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HST Reveals New Scientific Findings

After only preliminary analyses of three new photos taken by the Hubble Space Telescope (HST) in the last two months, astronomers now have data unlike anything seen before. The photos each show a different aspect of the universe. The first is a four-part photo of 30 Doradus within the Large Magellanic Cloud. The second photo, page 2, is of the galaxy NGC 7457. The third photo, page 2, is a new look at Supernova 1987A.

In the first photograph, shown at right, the HST has provided the first detailed views of how massive stars are formed in galaxies unlike our own. Early observations of 30 Doradus, the most prolific stellar nursery within the Large Magellanic Cloud, revealed new information about our neighboring galaxy.

These pictures are even more exciting because they were taken in support of an engineering test for the Goddard High Resolution Spectrograph (GHRS).

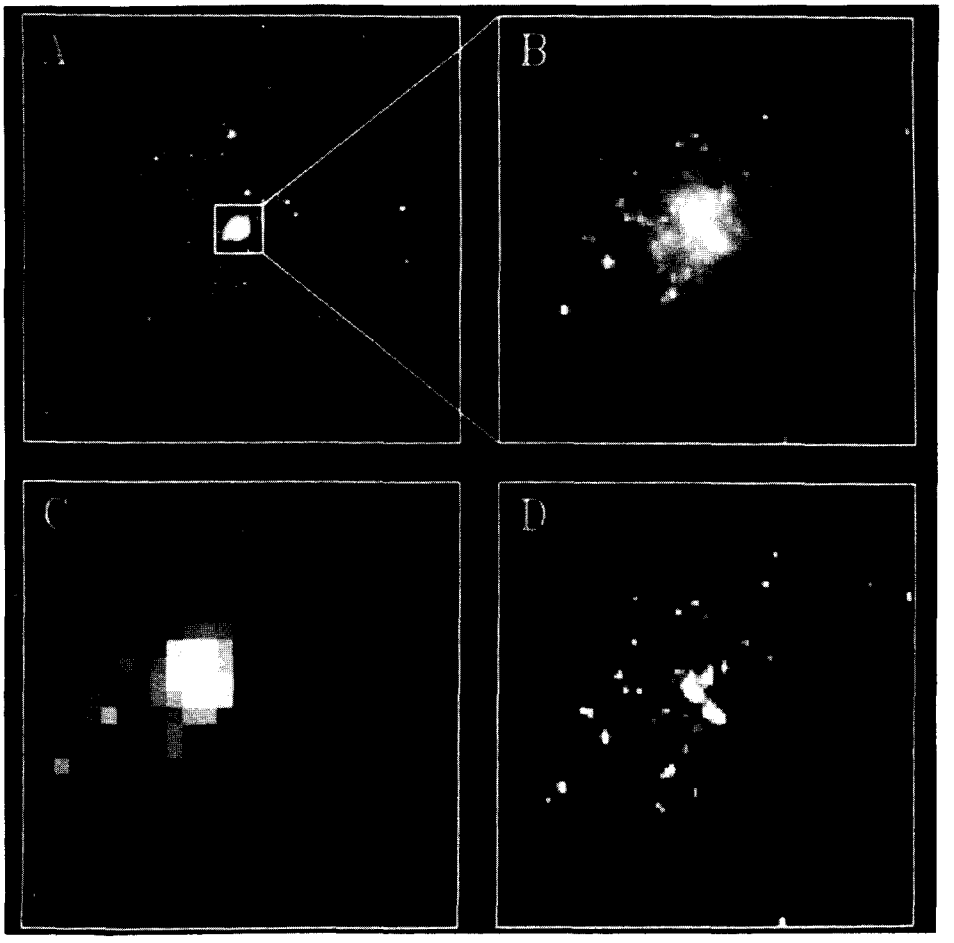
"To have important science unexpectedly arise from engineering test data came as a pleasant surprise to the HST science team," said Dr. Edward Weiler, HST program scientist.

Hundreds of stars are believed to exist in this region, which is smaller than the distance from here to the nearest star, about four light years away. One can easily count 60 stars just with the naked eye. Early computer analyses of this same image suggest that HST may be able to pick out many more stars. This region was thought to consist of a single star as recently as just 10 years ago.

NASA now has a unique and detailed view of massive stars in the neighborhoods of their birth. "We knew we were sitting on a pot of gold," said Dr. Sally Heap, co-principal investigator of the GHRS. "We now have the finest family portrait of stars outside our galaxy."

The HST photograph of 30 Doradus was made on August 3, 1990, with the Wide Field/Planetary Camera (WF/PC) for use as a finding chart in the checkout of the GHRS. This image quality is sustained over the full field of view, which is 2.7 arcminutes square.

Every HST picture of star clusters should achieve the resolution demonstrated in the photograph of 30 Doradus. Such photographs, when obtained through the different colored filters on the WF/PC and the Faint Object Camera (FOC), are expected to provide detailed information on the masses of stars in the clusters.



***160,000 LIGHT YEARS, DOESN'T SEEM THAT FAR AWAY*—All of the above images are of the same region of space. Panel A, of 30 Doradus, was taken with the Hubble Space Telescope's (HST) Wide Field and Planetary Camera (WF/PC). Panel B is an enlargement of the central portion of Panel A. It shows the compact star cluster R136. Panel C is the same region as in Panel B, taken with the Max Planck Telescope in Chile. Panel D shows how computer processing of the HST image in Panel B has sharpened its appearance.**

NGC 7457

Not long after scientists began celebrating this excellent photography, they had more reasons to celebrate. On August 17, another image taken by the WF/PC provided a remarkably detailed view of the core of a galaxy which lies 40 million light years away. The two views, page 2, top right, are of galaxy NGC 7457. The picture on the left with high contrast shows the central portion of the galaxy. The picture on the right is of the same galaxy, but the contrast has been adjusted to reveal a surprisingly high concentration of stars pinpointed exactly at the galaxy's core. Stars are crammed together at least 30,000 times more densely than they are in our

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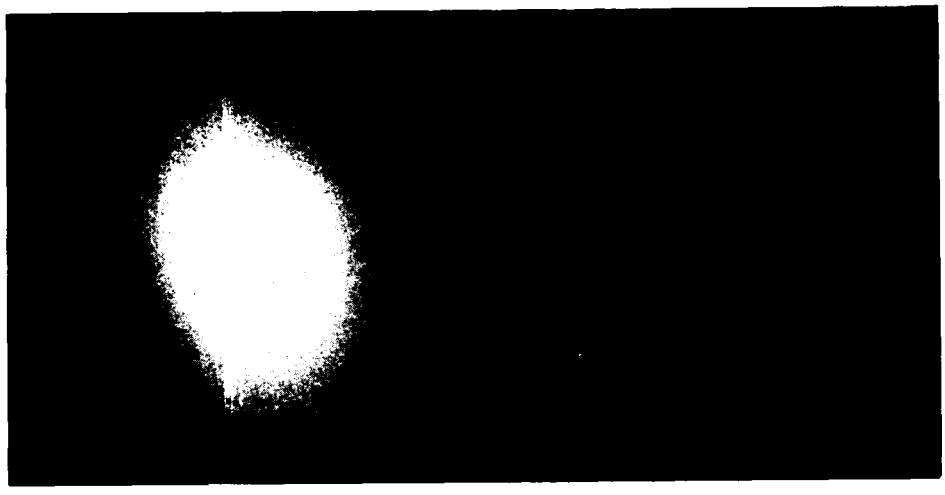
own stellar neighborhood. Scientists do not yet know how this tight core is gravitationally held together. Because this galaxy is assumed to be a "typical" galaxy, these preliminary findings suggest that the nuclei of normal galaxies may be more densely packed with stars then previously thought.

It is far from clear whether a massive black hole is at the center of NGC 7457, because the images alone do not provide the answer. But these new data suggest that NGC 7457 is an excellent place to use the HST's spectrographs to measure how much mass is concentrated at the center of the galaxy.



IT'S A LITTLE CROWDED IN THERE—**This HST picture of galaxy NGC 7457 was also taken with the WF/PC. The picture on the left with high contrast shows the central portion of the galaxy. The picture on the right is the same galaxy, but with the contrast adjusted to reveal a surprisingly high concentration of stars. Stars are crammed together at least 30,000 times more densely than they are in our own stellar neighborhood.**

Supernova 1987A

The other picture, lower right, is a dramatic new look at the remnants of one of the most spectacular and unexpected astronomical events of this century, the great supernova of 1987 and its surrounding shell of stellar material.

The image, taken in visible light, reveals the details of the circumstellar shell, whose characteristics had been previously suggested by ground based observations and data from the International Ultraviolet Explorer satellite.

The new image will provide important insights into the evolution of massive stars and their catastrophic deaths as supernova explosions.

This raw image clearly shows an ellip-

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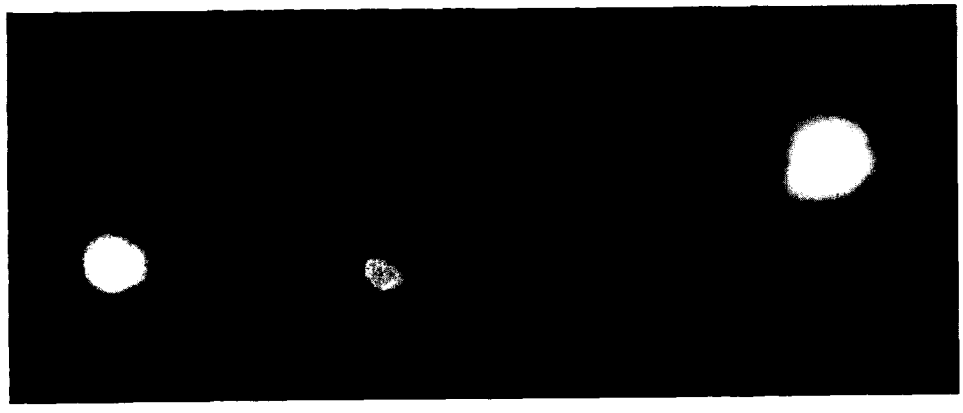


RING AROUND THE STARS—**Taken with the HST's European Space Agency's Faint Object Camera, this is a raw image of the remnant of Supernova 1987A and its mysterious elliptical ring of material. The ring is believed to have existed around the star before the supernova.**

It's A Bird, It's A Plane, It's Silver Snoopy

"In Appreciation for professionalism, dedication, and outstanding support that greatly enhanced flight safety and mission success..." So begins the certificate that accompanies the Silver Snoopy Award given by astronauts to recognize individuals, throughout NASA, other government agencies and industry who have made an exceptional contribution to the success of manned space flight missions.

Astronaut Ken Reightler, Jr., presented Silver Snoopy Awards to the following GSFC individuals August 16 and 17: Warren F. Adams, Code 535; Emma J. Burley, Bendix Field Engineering Corporation (BFEC), Code 530.3; Charles R. Chidekel, Code 733; David C. Clark, Code 752; David L. Davies, BFEC, Code 533; Mike Del Giudice, AT&T, Code 542; John T. Donohue, Code 532; Joel Edelman, Engineering and Economics Research, Inc. (EER), Code 720; Stephen G. Edwards, BFEC, Code 534; Carol Elfant, Computer Sciences Corporation (CSC), Code 515; Arthur C. Emrick, Jr., BFEC, Code 530.3; Andre S. Fortin, Code 532; James A. Glasson, Jr., Lockheed Missiles and Space Company (LMSC), Code 440; Marilyn S. Goodall, Code 535; Sandra M. Harris, BFEC, Code 534; David C. Hartman, Code 532; Dr. Cheng-Shong Hsieh, LMSC, Code 440; Reginald K. Hunt, BFEC, Code 534; Homer E. Johnson, BFEC, Code 534; Semion Kizhner, Code 733; Dr. Paul D. Lowman, Jr., Code 922; Dr. James B. Mason, Code 720; Michael E. McGrath, Code 285; Robert D. Medlock, BFEC, Code 531; Naomi M. Nichols, Code 534; Llewellyn W. Nicholson, Code 410; Joan E. Rattigan, CSC, Code 553; Julian S. Scarborough, BFEC, Code 530.3; Richard M. Schonbachler, Code 534; Joseph E. Snyder, BFEC, Code 530.3; Robert A. Sperling, Jr., CSC, Code 553; A. James Warren, BFEC, Code 530; Albert G. Wilhite, Jr., Code 535; Louis C. Yakstis, CSC, Code 553; Edward M. Young, BFEC, Code 534.

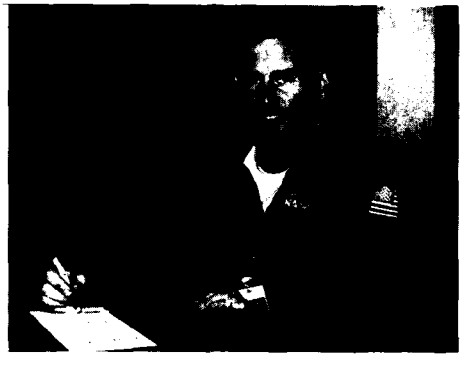
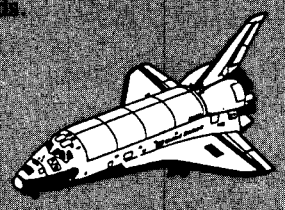


PHOTO: J. WALTERS

GOOD GRIEF, CHARLIE BROWN!—**Astronaut Ken Reightler, Jr. signs a certificate that accompanies a Silver Snoopy Award. Thirty-five Goddard civil service and contract employees were presented this award for exceptional contributions to manned space flight missions.**

Launch Update: SSBUV Locked In

The Shuttle Solar Backscatter Ultraviolet (SSBUV) payload was successfully integrated into the Orbiter Discovery recently and will be launched with the spacecraft Ulysses, currently scheduled for launch on October 5, 1990. Once Ulysses is deployed into orbit, the SSBUV which remains in the shuttle, will compare the observations of several ozone measuring instruments aboard the National Oceanic and Atmospheric Administration (NOAA)-9 and -11 and the Nimbus-7, in order to calibrate the instruments to insure the most accurate measurements possible. Accurate satellite ozone measurements are crucial for detecting global ozone trends.



The SSBUV helps scientists solve the problem of data reliability caused by calibration drift of solar backscatter ultraviolet instruments on orbiting satellites. The SSBUV uses the space shuttle's orbital flight path to assess instrument performance by directly comparing data from identical instruments aboard the NOAA spacecraft, and the Nimbus-7, as the shuttle and the satellite pass over the same Earth location within a one-hour window. These orbital coincidences occur 17 times a day.

With the October 5 launch date, SSBUV is preparing for its second mission in less than one year. SSBUV flew a successful mission on STS-34, last October.

Space Travel Trivia

Many NASA astronauts have journeyed into space. Some more than once on a variety of missions. One former NASA astronaut leads the pack, however.

1. Name the astronaut who accomplished the most missions.

2. Name the missions.

Trivia Answers
1. John W. Young
2. Gemini III, Gemini IX, Apollo 10, Apollo 16, STS-1, STS-9.

NASA Pipeline

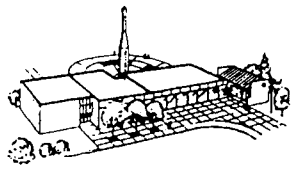
HEADQUARTERS, Washington, DC—NASA Administrator Richard H. Truly has named Margaret G. Finarelli as acting associate administrator for external relations. Finarelli has served as deputy associate administrator for external relations since December 1988. Kenneth S. Pedersen, associate administrator for external relations since November 1988, will be on a one-year teaching assignment as a visiting professor at Georgetown University, Washington, DC, effective August 6.

LYNDON B. JOHNSON SPACE CENTER, Houston, TX—Plans are underway to build a new underwater facility for astronauts to practice building Space Station Freedom. The pool will be 135 feet (41.1 meters) × 235 feet (71.3 meters) × 60 feet (18.3 meters) deep. Construction of the Neutral Buoyancy Laboratory, which will be nine stories high to accommodate a 10-ton crane, is scheduled to begin this December.

HEADQUARTERS, Washington, DC—NASA has announced the selection of four candidates for two payload specialist positions for space shuttle mission STS-53 scheduled to carry the U.S. Microgravity Laboratory (USML)-1 in March 1992. Selected for mission training were Lawrence J. DeLucas, O.D., Ph.D.; Joseph Prahl, Ph.D.; Albert Sacco Jr., Ph.D. and Eugene H. Trinh, Ph.D. Two of the candidates will be selected for flight in March 1991, and the others will serve as alternates.

MARSHALL SPACE FLIGHT CENTER, Huntsville, AL—A government-industry board has completed a key milestone with its decision defining the type of rocket engine which will be designed and built to power the NASA/U.S. Air Force Advanced Launch System (ALS). The two candidates were the gas generator power cycle, similar to the J-2 engine employed on the second and third stages of the Saturn moon rockets, and the closed expander power cycle, similar to the RL-10 engine used in the Saturn I and the Centaur upper stage. The decision went to the gas generator cycle.

Greenbelt Visitor Center Events for October



With Labor Day behind us, the Goddard Visitor Center goes back to regular hours of operation. From now until next summer the Visitor Center will be open from 10:00 a.m. to 4:00 p.m. Wednesday through Sunday. All events are free. For more information call 286-8981.

Launch Site Goddard — Sunday, October 7, and 21, 1:00 p.m. More than 1,000 model rockets are launched yearly from the grounds of Goddard's Visitor Center. Even if you've never launched a rocket before, or have never seen one launched, here is your chance to join the fun.

Saturday Video — Saturday, October 13, 1:00 p.m. Come watch "The Extreme Ultraviolet Explorer (EUVE)," the story of a satellite, scheduled for launch next summer, that will map the entire sky to determine the existence, direction, brightness and temperature of thousands of sources of extreme ultraviolet radiation, which borders x-ray radiation. EUVE will be pointed into deep space to study hot white dwarfs which are 300 light years or more from Earth.

Know and Tell — Sunday, October 28, 1:00 p.m. "A New Era of Explorers" — Jim Barrowman, featured on page 6, project manager of the Explorer and Attached Payloads Project (EAP) will discuss the Explorer Platform, and the EUVE. EUVE will be a vital element in astronomers' efforts to understand the universe by discovering what objects are present, and how they form, change and die.

Star Watch — Saturday, October 13, from 7:00 p.m. to 9:00 p.m. Gaze into the heavens with a Goddard telescope, or bring one of your own (and a sweater). Goddard staff will be on hand to answer questions and provide help.

Balloon Payload to Yield Big Results with Small Budget

by John J. Loughlin II

They have been observed blasting hot plasma loops up to 700,000 kilometers (434,960 miles) into the icy void of space. These fiery spirals of raw energy are more than 70,000 kilometers (43,960 miles) around and pack an explosive punch that would make the combined energy of all the nuclear weapons ever produced seem like a child's firecracker on the Fourth of July. They're called solar flares and these high energy outbursts are more common than you might imagine, disrupting the Earth's magnetic field and wreaking havoc upon advanced communications equipment.

A Goddard-managed project to study solar x-ray and gamma ray activity from a balloon-borne gondola, slated for two launches during the current solar maximum, has the potential to bring to light significant knowledge about the dynamics of the flare activity taking place on our closest star, the Sun.

Sophisticated Telescope

The payload, called the High Energy Imaging Device (HEIDI), includes a sophisticated telescope employing a system of fine and course grids to pinpoint the sites of solar hard x-ray and gamma ray emissions to within two-arc seconds.

"The telescope uses brute force to make the images," says Principal Investigator Dr. Carol Jo Crannell, Code 682. "There are no mirrors or lenses in the device; it works like the old pinhole cameras," she added.

To date, scientific knowledge about the hard x-ray band, the band most similar to the type of x-rays used for medical purposes, was obtained from orbiting spacecraft costing hundreds of millions of dollars. HEIDI, according to Dr. Crannell, will cost less than two million dollars and will yield a whole new scientific dimension. "HEIDI offers us modest spectral resolution, but excellent temporal resolution and excellent spacial resolution," she said.

Spectral resolution tells solar scientists what type of energy is emitted, while temporal resolution measures energy output related to time, and spacial resolution tells observers where the emission is coming from.

The balloon program is managed by Goddard's Wallops Flight Facility, Wallops Island, VA. The actual balloon to be used for the HEIDI Project is a helium filled lifting body capable of achieving altitudes of up to 130,000 feet (47,400 meters). The payload, which is recoverable for future use, has a 17 foot (5.2 meter) telescope, made with commercially available materials and a gondola more than 22 feet (6.7 meters) high. "It has been a real challenge trying to keep the weight down to less than a ton and still provide the stability needed for precision pointing of the telescope," Dr. Crannell said. "So far, we've been able to do just that, thanks to the efforts of some very talented people," she added.

Small Price Tag

Despite its small price tag, HEIDI is an ambitious project involving a host of scientists, engineers and technicians from a wide variety of respected institutions such as the Naval Research Laboratory, Washington, DC; Auburn University, Auburn, AL; The Catholic University of America, Washington, DC; California Institute of Technology, Pasadena, CA, and Delft Technical University, Delft, The Netherlands, as well as important industrial contractors. Goddard personnel helping to make HEIDI a reality include the following co-investigators: Project Manager Dr. Larry E. Orwig, Code 682, Instrument Manager Dr. Richard Starr of Catholic University, Washington, DC; Software Manager Dr. Brian R. Dennis, Code 682, and Dr. Jay P. Norris, Code 668.

The study of the Sun's hard x-rays and gamma rays is important because these studies will help scientists to understand the fundamental particle acceleration processes that take place within solar flares.

PHOTO: J. WALTERS

NO, IT'S NOT VENICE—**The mock-up gondola that Dr. Carol Jo Crannell is holding is not for use in the water, but in the air, attached to a balloon. Dr. Crannell is the principal investigator for HEIDI, which will fly on this gondola.**

Astrophysicist's Achievement Award

Dr. Carol Jo Crannell, Code 682, an astrophysicist in Goddard's Solar Physics Branch (see above article), has been honored by Women in Aerospace (WIA) with the Outstanding Achievement Award for 1990. WIA, incorporated in 1985, is a non-profit, professional society organized to provide a formal network for women working in the aerospace field. Along with her work at Goddard, Dr. Crannell is an Adjunct Associate Professor of Physics at The Catholic University of America. She was recognized by WIA for her dedication to expanding women's opportunities for career advancement and for increasing their visibility through her activities as an aerospace professional.

Dr. Crannell is the Principal Investigator for the Laboratory for Astronomy and Solar Physics' balloon program and leader of a team developing x-ray and gamma ray imagers and spectrometers for the study of solar flares. She has been a role model for young women through her involvement with the Girl Scouts since 1975. She has just returned to Goddard after spending six months teaching and doing solar radio research at Caltech under the auspices of the National Science Foundation's Visiting Professorships for Women Program.

Dr. Crannell received her award at the Fifth Annual Women in Aerospace Awards Reception at the U.S. Botanical Garden on September 12.

Astronauts On Center For GRO-ing Experience

by Susie Marucci

A countdown, a blastoff and the shuttle rides again. To many of the public, that is the end of the story, until the shuttle touches Earth days later. For the Flight Operations Team (FOT) on any mission, the launch marks the beginning of the job. In August, four of the astronauts who will be aboard the Space Shuttle Atlantis when it lifts off for STS-37 visited Goddard. They met the Gamma Ray Observatory (GRO) Flight Operations Team (FOT).

It was a chance for the FOT and the astronauts to get to know one another. Assistant FOT Manager, Joe Dalrymple, TRW, Code 403, said the purpose of the meeting was to "exchange information about what we're doing on the GRO mission."

There were questions on both sides about the jobs that would be done once the Shuttle Atlantis, carrying GRO, is launched. "We understand a lot more of what the astronauts do," said Mike Swanhart, Operations Manager, TRW, Code 403. He felt the experience was a very successful one. "It really helps to meet the guys you are going to be working with on a launch."

The visit was a very informal one, giving the FOT and the astronauts a chance to meet, talk, and have some lunch. While they were here, Commander Steve Nagel, Pilot Ken Cameron, Mission Specialist Jay Apt and Mission Specialist Linda Godwin saw the GRO Mission Operations Room in building 14, and spent most of their time talking to the FOT, learning about the FOT's side of the mission. Commander Nagel, who has flown on two previous shuttle flights, shared his experiences with the FOT.

PHOTO: P. BALTZELL

RIGHT ON THAT SCREEN, THERE—**Joe Dalrymple, TRW, Code 403, far left, explains part of what the Gamma Ray Observatory's (GRO) Flight Operations Team's job will be during the GRO mission. From left: Dalrymple, Mission Specialist Linda Godwin, Pilot Ken Cameron, Mission Specialist Jay Apt, Commander Steve Nagel, seated: Eric Barksdale, TRW, Code 403 and Ann Cooter, TRW, Code 403.**

While the FOT and the astronauts will not be in direct contact during the launch and subsequent deployment of GRO, Dalrymple and Swanhart felt it was important for them to meet each other now. "It gave everyone a chance to meet one on one, to see what they have to do on the mission," said Swanhart. "It was a real experience for our Flight Ops Team."

When GRO is launched in Spring 1991, it will be carrying four instruments that have a greater ability to study gamma rays than any previous experiments or missions. One of the instruments, the Energetic Gamma Ray Experiment Telescope (EGRET), is a GSFC project.

Gamma rays are believed to be a reliable record of cosmic evolution and change. Yet compared to other bands in the electromagnetic spectrum, little is known about gamma rays. GRO is planning to change all that. GRO will be able to unlock some of the mysteries of quasars, pulsars, even black holes.

Base One Goddard: You Can't Make An Omelet . . .

by Dolores Beasley

Seventeen young faces peered down at the styrofoam container in anxious anticipation.

"Did it?" asked one. "Yeah, it did," another confirmed.

And so it went, as each student, ranging in age from 11 to 13, checked to see if his or her "payload" egg broke after it was dropped about 20 feet from the roof of the Visitor Center.

The students were participating in one of the many activities of Base One Goddard: Aerospace for Kids (ASK). The three-day program is designed to provide students with a first-hand look at NASA projects and aerodynamic principles through a multi-faceted approach including lectures, tours, and hands-on activities. This was the second year for the program, which was sponsored by the Goddard Visitor Center. The program was broken into two sessions. The first session, held August 15-17, had 18 students. Seventeen students participated in the second session, August 22-24.

The egg experiment gave students an opportunity to prepare and evaluate their own shuttle payloads. Using cotton, rubberbands, paper towels, and other packing material, they attempted to find the best way to place an egg in a fastfood carton so that it would not break upon impact.

"You want to have a little space inside or it's not going to make it," Lindy J. Perkes, manager of the Visitor Center cautioned them.

Perkes inspected each payload for bulges and sealed them shut with tape. "There's no turning back now, the payload is closed," she said.

David Fair, assistant manager of the Visitor Center, helped by standing on the roof and dropping each payload. With some payloads, it was apparent as soon as the carton hit the ground that the mission failed, the telltale evidence of yolk oozing out of the carton being a dead giveaway. With others, the suspense mounted as each student carefully unwrapped the payload before discovering breakage and dropping it with the others into the waiting trash can.

Only one egg payload survived the fall, one packed by 13-year-old Tony Garufi. This experiment is harder than it sounds, but it's also a lot of fun, so watch out for missing eggs in your refrigerator, and look up when you walk outside!

INSIDE

Jim Barrowman's future was decided in a phone booth.

In 1961, a teenaged Barrowman stood in a phone booth in Toledo, OH, waiting for a call from his co-op supervisor telling him whether he would be sent to Wright-Patterson Air Force Base in Dayton, OH, or be one of the first co-op students at Goddard Space Flight Center. Finally, the call came.

"I found out I had passed muster for Goddard, so a buddy and I hopped in the car and drove to Maryland," he said. Twenty-eight years later, Barrowman, project manager for the Explorer and Attached Payloads Project, Code 410, is still here.

Of course, in 1961 things looked a bit different. Directions were required. "We weren't sure where the heck Goddard was," Barrowman recalled with a grin. It turned out that the facility, with less than three completed buildings to its name, was on a single-lane strip of road called Greenbelt.

Those Early Days

His first co-op job was at the Anacostia Naval Receiving Station where a number of Goddard projects were conducted in those early days. After getting his B.A. in aerospace engineering from the University of Cincinnati in 1965, Barrowman worked for the sounding rocket branch, where he specialized in aerodynamics, trajectory simulation and analysis and rocket dynamics. The work must have agreed with him, because that's where he "pretty well stayed for the next 20 years."

"It was a good group to work with," Barrowman said. "I got to work analysis, but also got to go out into the field." The branch became very involved in shuttle payload activities and planning, he said. It was during this period that he got more involved with management.

"I found I enjoyed management," he said. "I like working with people and I like the challenge of organizing things so that they move smoothly; the planning and thinking through how things ought to be done."

The Best Times

Not long after the sounding rocket division became the special payloads division,

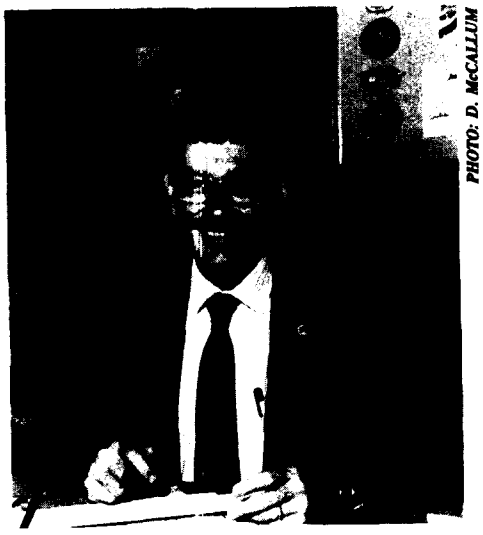


PHOTO: D. McCALLUM

HE'S ALL SMILES—**Jim Barrowman never regretted that as a teenager he hopped into his car and headed to Goddard as one of GSFC's first co-op students. That was almost 30 years ago.**

Barrowman saw an article in NASA Activities regarding small self-contained payloads, which later evolved into the Get Away Special (GAS) program. He helped formulate the GAS program and was GAS project manager at Goddard until September 1985.

Barrowman described his years with the GAS program, which gives individuals and organizations a chance to fly experiments aboard a space shuttle inexpensively, as "probably one of the best times I've ever had at Goddard."

"Those seven years really stand out in my mind," he said. "There were so many who contributed to that project. It was a tremendous educational tool to motivate youngsters. It was a good project all the way around. It still is."

In 1984, Barrowman was awarded the NASA Exceptional Service Medal for his management of the GAS project.

Barrowman said he honed his management skills during his time with the GAS program. In 1981, he received his M.S. degree in Engineering Administration from George Washington University. "It gave me the formal education that went along with the practical experience I was gaining," he said.

From the GAS program, Barrowman moved to the special payloads project. While there he worked on the Solar Optical Telescope (SOT), which was designed as a device to be carried on Spacelab. SOT was reformulated into the smaller, less-costly, High Resolution Solar Observatory (HRSO). In 1986, Barrowman received the GSFC Exceptional Achievement Award for his management of the redefinition of the SOT into HRSO.

Since 1988, Barrowman has been project manager of the Explorers and Attached Payloads project where he is in charge of the planning, definition and development of medium sized Explorer missions, medium to large attached space shuttle payloads, and attached space station payloads.

Barrowman describes his management style as a combination of delegation and support. "I depend on the people working with me," he said. "My philosophy is to delegate out responsibility for various missions, let them run their show and give them the best help I can."

His office in building six is full of mementos of his 28 years with Goddard. A wooden paddle with the words "Configuration Control Board" written across it in large, black letters sits against the drawing board. A balloon given to him by a secretary is mixed in with a pipe collection. Various model rockets are interspersed with family photos, and a tall baseball trophy stands next to a model of the space shuttle.

Barrowman, a youthful 48, and a resident of Arnold, MD, has been married for 25 years. He has two daughters and one granddaughter.

Model Rocket Enthusiast

When he became a full-time employee at GSFC in 1965, he became involved in model rocketry. He described Goddard at that time as "a hotbed of model rocketry." He is a member of the National Association of Rocketry, and in 1969 became president, a position he kept for three years. Some of the youths he helped with model rockets are now scientists and engineers, he said. "It is a delight to see those guys advance."

And to think it all started in a phone booth. "I often look back at that time and thank my lucky stars," he said smiling. "I don't think anyone could ask for a better place to work. There's variety, and there's a tremendous group of people at all levels. This sounds kind of hokey, but it's real. It's been a real exciting place to work."

CLOSE-UP

Congratulations to the following employees on their recent appointments:

PHOTO: M. SMALL
WOYWOD

MICHAEL WOYWOD, Chief of the Information Management Division, Code 250 . . . **THOMAS C. UNDERWOOD, JR.,** Second Tracking and Data Relay Satellite System Ground Terminal Project Manager, Code 530.4 . . . **JAMES WILK,** Head of the Employee Development Section, Code 114.1 . . . **JOHN H. SCHMIDT,** Head of the High Data Rate Handling Section, Code 564.4 . . . **HOWARD D. BRANCH,** Head of the Fluid Systems and Hazardous Test Section, Code 713.3 . . . **THOMAS A. CYGNAROWICZ,** Head of the Cryogenic Systems Development Section, Code 713.4 . . . **DR. EDWIN ENGMAN,** Head of the Hydrological Sciences Branch, Code 974 . . . **DR. DOROTHY J. ZUKOR,** formerly Assistant Executive Officer to the NASA Administrator, now the Associate Director for Projects Engineering in the Earth Sciences Directorate, Code 900 . . . **EARL BEARD,** Head of the Mission Support System Branch, Code 563 . . . **PETER W. MAYMON,** Head of the Optical Design Section, Code 717.4 . . . **MICHAEL A. KRAINAK,** Head of the Optical Communications and Data System Section, Code 726.2 . . . and **DAVID A. GLENAR,** Head of the Laser Remote Sensing Section, Code 726.3.

PHOTO: M. SMALL
ENGMAN

In Memoriam: Laura Steefel 1963-1990

LAURA STEEFEL, Code 663.2, an electronics design engineer in the Analog Systems Section of the Laboratory for High Energy Astrophysics (LHEA), died of cancer August 15.

Steefel first came to Goddard as a student intern during the summer of 1984. After graduating from Johns Hopkins University in 1985, she began her full-time career with Goddard. During her five years in the Analog Systems Section, she was the local computer network supervisor and worked on the Advanced X-Ray Astrophysics Facility (AXAF) and her most recent project, the Monitoring X-Ray Experiment (MOXE). Steefel was the lead design engineer for the analog electronics subsystem on MOXE.

In May, 1989, she received a peer award given every year to three outstanding members of the LHEA. Bob Joyce, Head of the Electronics Systems, Code 663, and Steefel's supervisor said, "She was not only a good engineer technically, but she was the life of the branch. She helped anyone who needed help. We miss her terribly."

STEEFEL

GIVE

On August 1, the Bloodmobile was held in the Building 8 auditorium and 191 prospective donors volunteered to donate blood. The following is a list of Goddard employees who were cited by the American Red Cross with gallon pins at the Bloodmobile.

# Gallons	Name	Code	# Gallons	Name	Code
4	Walter Allison	735	5	John McWilliams	750
3	Robert Candey	696	4	Arnold Rausch	530
3	Shirley Cocke		1	Michael Schein	713
3	Carolyn Dent	514	1	William Smith	751
1	Anne Douglass	616	2	John Spohr	519
1	Warren Focke	666	5	Andrew Szymkowiak	666
5	Maeda Kaichi		1	Donna Wiltsey	116
3	Louis Kouvaris	613			

The next Bloodmobile is scheduled for October 2 in the Building 8 Auditorium. Watch Dateline Goddard for more details.

Irven Errera Honored for 50 Years of Government Service

Most people look forward to retiring with 20 years of government service, while some attain the lofty goal of 30 years. Only a few, however, can say they spent 50 years in service to their government, their nation. **IRVEN ERRERA**, Code 752.4, is one of these few people. He was honored in August for 50 years of government service—twenty-one of those years at Goddard.

Center Director Dr. John M. Klineberg presented a 50-year Length of Service Certificate and pin to Errera at the August 20 Management Council Meeting. NASA Administrator Admiral Richard H. Truly sent a letter of recognition stating, "Your dedication, accomplishments, and technical expertise in the mechanical integration area have contributed significantly to the success of many space missions."

Truly also praised his work in the area of mechanical integration and launch support on such missions as the Javelin and Tomahawk sounding rockets, the Solar Maximum Mission, the Energetic Gamma Ray Experiment Telescope and the Cosmic Background Explorer.

PHOTO: J. WALTERS

50 YEARS OF SERVICE! **!—Irven Errera receives his 50-year Length of Service Certificate and pin from Center Director Dr. John M. Klineberg.**

PHOTO: D. McCALLUM

VOL• UN•TEERS (VOL'-AN-TĒRZ), N. 1. PEOPLE WHO ENTER INTO OR OFFER THEMSELVES FOR A SERVICE OF THEIR OWN FREE WILL—**The Goddard Space Flight Center is fortunate to have nine volunteers who conduct tours, with an additional 33 new volunteers who have just completed training for a variety of jobs. According to Darlene Ahalt, Office of Public Affairs' Volunteer Coordinator, "More than 900 hours of volunteer service have been devoted within the last year, conducting tours at the Visitor Center."**

Ahalt added, "Recent recruiting efforts have been extremely successful in attracting volunteers with varied backgrounds, and few have NASA experience. The volunteer experience provides an opportunity to learn more about Goddard's resources."

For more information about the volunteer program contact Darlene Ahalt at x6-8101. Pictured are some of Goddard's newest volunteers. From left to right: (front row) Dorothy Velasco, Nancy Saxon, Teresa Alcaraz, (back row) Luis Leon, Abdallah Daoud, Robert Gontrum, Berthold Zarwyn, James Scullen, Jr., Sherry Stafiej, Edwin Wenig, Daniel DeMarall, Rosemarie Strand, Gino Battistone, Andrew Baines, Lee Horning, Richard Gallen, Jeanette Kremann, Suzanne Kerry, Mary Pagliaro.

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HST

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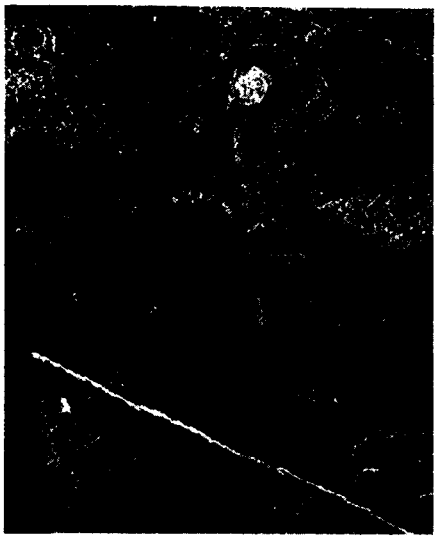
tical, luminescent ring of gas about 1.3 light-years across surrounding the still glowing center of the 1987 explosion. The ring is not a by-product of the supernova, but a relic of the hydrogen-rich stellar envelope that was ejected by the red supergiant star that existed an estimated 10,000 years before the explosion took place.

This diffuse gas was subsequently swept and compressed into a narrow, high-density shell by a high-speed stellar wind ejected from the star when it evolved back to a blue supergiant stage.

In the first few hours following the supernova blast, the ring was fully ionized and heated by a flood of ultraviolet radiation. Three and a half years later, the ring still glows at a temperature of more than 20,000 degrees Kelvin.

Magellan's New Image: Does This Look Like Hawaii?



After traveling more than 1.5 billion kilometers (948 million miles), the Magellan spacecraft was inserted into orbit around Venus on August 10, 1990. This mosaic consists of adjacent pieces of two Magellan image strips obtained on August 16 in the first radar test. Each image strip is 20 km (12 miles) wide and 16,000 km (10,000 miles) long. This mosaic is a small portion southeast of a volcanic highland region called Beta Regio. The resolution of the image is about 120 meters (400 feet), 10 times better than previous images of the same area of Venus, revealing many new geologic features. The bright line trending northwest-southeast across the center of the image is a fracture or fault zone cutting the volcanic plains. This area is similar geologically to volcanic deposits seen on Earth in Hawaii and the Snake River Plains in Idaho.