

International satellite helps save crew of capsized catamaran

The International Satellite Search and Rescue demonstration project (COSPAS/SARSAT) has assisted in rescuing the three man crew of a capsized catamaran 300 miles off the coast of New England. The incident was the first application of the satellite program in a sea rescue, according to officials at Goddard, which manages American participation in the international program.

The offshore drama involved commercial aircraft, the Coast Guard, the Russian satellite COSMOS-1383, and two merchant vessels. The catamaran's radio distress signal was heard for the first time the evening of October 10. By the afternoon of the following day all the boat's crew were aboard the Coast Guard cutter "Vigorous." Coast Guard officials credited the speedy save in a major part to satellite data. According to Michael Foster, assistant controller of the New York Coast Guard Rescue Center, the satellite helped to pinpoint the cata-

maran's location within a few miles.

The rescue story began at 9:23 pm October 10 when the Federal Aviation Administration's New York Ocean Center received a report of a distress call from an Emergency Locator Transmitter (ELT) at 42 09 N by 63 25 W. The report came from TWA Flight 90, flying at 33,000 feet. Minutes later, another commercial airplane flying at 29,000 feet reported the same distress signal at 40 N, 64 W. The FAA immediately notified the Coast Guard Rescue Center in New York, which has responsibility for Atlantic operations. The Coast Guard, in turn, called the Air Force Rescue Coordination Center at Scott Air Force Base, Illinois, and requested information from the satellite search and rescue program regarding the distress signal's location. Scott AFB reported that the COSMOS-1382 satellite had already relayed the distress signal to Scott AFB on a pass over the

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Grimes takes post with private firm



David W. Grimes

David W. Grimes, Manager of the Delta Project at Goddard since 1977 has resigned to join Trans-space Carrier, Inc., a private corporation.

The Delta launch vehicle, manufactured by the McDonnell-Douglas Corporation, has been the free world's busiest and most successful launch vehicle. In 164 launches since 1960, Delta has been successful in 153 cases.

Grimes came to Goddard in 1963 and has been involved in a series of increasingly responsible project management activities.

He first served as Project Engineer for System and Ground Support for the Orbiting Geophysical Observatories (OGO). He engineered the launch operations of OGO-A in September 1964 and OGO-C in October 1965. He then served as System Manager for the Atmosphere Explorer-B project, managing the integration, test and launch phases of Explorer 32, successfully launched in May 1966.

Grimes then managed the development of the Planetary Quadropole Mass Spectrometer for use on the Planetary Atmosphere Experiment Test (PAET) successfully flown in 1970. He was the Study Manager for the Atmosphere Explorers (AE) C, D & E through 1970 and Project Manager through 1975,

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Blood donor reaches 100th pint



Center Director Noel W. Hinners (second from left) congratulates John Adolphsen (code 311) for contributing his 100th pint of blood when the Red Cross Bloodmobile visited Goddard recently. Far left: John McCart, chairman, Volunteer Committee for the Prince Georges County Chapter of the American Red Cross. Far right: Pamela Brown (225), Center Coordinator for the Red Cross Blood Mobile.



Left: Bill Cahill (l), original manager of the Science and Applications Computation Center and Jim Fleming, principal executive responsible for the procurement action that brought System 360 to Goddard, jointly push the deactivation button terminating its Goddard service. Right: Present to pay last respects to the venerable System 360 were, from left, front row, Hans O. Bremer, Sr. Staff Assistant; Ches Looney, former System 360 Project Manager; James J. Fleming, former Assistant Director for Center Automatic Data Processing; Darrin H. Gridley, former Special Assistant to Jim Fleming; Cahill; back row, Joe Bredekamp, Manager, Science & Applications Computing Center (601), and Dr. George Pieper, Sciences Director (600).

The soul of an old machine

by Fred B. Shaffer, Jr.

The Science and Applications Computing Center retired its IBM 360/91 computing system on September 10th, 1982. This system was the first of its kind to be shipped by IBM. It replaced an interim 360/65 and 360/50 ASP configuration which was installed in August of 1966 and was removed in October of 1967, to allow for installation of the necessary power and chilled water systems for the 360/91. This was the first IBM computing system to require chilled water.

The procurement which resulted in the acquisition of a massive amount of IBM 360 equipment, including the 360/91, was a center-wide replacement of the second generation IBM 7094 systems. Mr. Chesley Looney was the Project Manager for this major effort. The technical team included Mr. James

Fleming, Mr. William Cahill, and Mr. Darrin Gridley. Dr. Michael Vaccaro and Mr. William Doles were responsible for all business aspects. Mr. Eugene Wasielewski, the Associate Center Director, had overall responsibility and was a major participant in the very involved negotiations with IBM. The acquisition process was completed in less than one year. This is especially interesting when compared to current lead times for ADP procurement.

When the first IBM 360/91 was delivered to the Science and Applications Computing Center in December of 1967 it was capable of producing 1 percent of the total floating point machine calculations in the United States. It had the equivalent computational power of companies the size of General Electric and countries the size of Great Britain.

It could perform a double precision sine or cosine computation in the same time its predecessor machine, the IBM 7094 MOD II could load a register.

A series of three papers presented by G. Amdahl, T. Chen, and C. Conti of IBM at the 1964 Fall Joint Computer Conference projected a requirement for 60 printers to support the 90 series systems with ancillary warehouses to store the paper. A new approach involving interactive online optical display of data stored on a mass storage device was proposed and eventually implemented at Goddard as RITS (The Remote Input Terminal System), a forerunner to TSO, IBM's Time Sharing Option.

This machine served the Goddard Science community well for almost 15 years. No general purpose computer will ever again be delivered with such a great increase in raw computing power.

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Cooperative Office Experience Program

Goddard recruits clerical staff from local high schools

Cooperative Office Experience (COE) is a course of study offered by local high schools which combines academic instruction and on-the-job training in any occupational field. In 1975 Goddard established the COE program as a clerical "feeder" program with emphasis on affirmative action. The program has increased from a student participation of 15 in 1975 to as many as 35 in recent years. Goddard currently recruits for this program from nine Prince George's County schools and four Anne Arundel County schools:

Prince George's Anne Arundel

Fairmont Heights	Meade
Eleanor Roosevelt	Severna Park
Frederick Douglass	Old Mill
Duval	Arundel
Largo	
Bowie	
Parkdale	
Bladensburg	

COE students work 20 hours per week and are classified as GS-1 Clerk-Typist (Trainee) or Clerk-Stenographer (Trainee). The students are assigned to the program for the length of the academic year. Major duties are typing, filing, telephone answering, and copying. Students are eligible for conversion to full-time permanent clerical positions contingent on graduation, successful completion of the program, passing the Civil Service test, and availability of a position at Goddard.

A recent analysis of the program indicated that 169 students have been placed in permanent, full-time positions and nearly 57 percent are still employed here. In order to evaluate the success of graduates, Program Coordinator Bonnie Kaiser recently interviewed a number of students from the program and the following profiles are presented.

CLASS OF 1976

Wilma Warren

School: Fairmont Heights
COE assignment: Code 212, Accounting Branch



Students from COE front row from left: Paula Staats, Teri Warnick, Claudette Moore, Tina Faunteroy, Eileen Adams. Back row from left: Sheri Elben, Robin Mohr, Donna Bailey, Monique Benns Williams, Lavern Harris, and Traci Warnick. Not pictured is Wilma Warren.

Current assignment: Accounting Technician in Code 151.2, Accounting Branch
Awards: Special Achievement Award – 1977; Group Achievement Award – 1977

Remarks: Wilma plans to pursue her Bachelor's Degree in Accounting. She feels COE helped her in getting her current job. She would advise other students to apply for COE.

CLASS OF 1977

Donna Bailey

School: Fairmont Heights
COE assignment: Code 270, Facilities Engineering Division

Current assignment: Code 717, Physical Science Technician

Remarks: As a Physical Science Technician, Donna works in the Optics Shop making lenses and mirrors. She feels she "was in the right place at the right time, as a woman." In the future, Donna hopes to go into advanced optics work.

Lavern Harris

School: Northwestern
COE assignment: Code 900, Applications Directorate

Current assignment: Voucher Examiner in the Accounting Branch, Code 151.2

Remarks: Lavern highly recommends the upward mobility programs to other clericals. She likes being a Voucher Examiner very much. She plans to

apply for the STEP program sometime in the future.

CLASS OF 1978

Teri Warnick

School: Duval

COE assignment: Code 408, TIROS, Project

Current assignment: Code 800, Secretary to Steve Fogleman, Assistant Director for Program Planning & Implementation

Awards: Outstanding Secretary – 1980 and 1982

Remarks: Teri feels the COE program is good for seeing the real work world. She feels fortunate that she has always had good supervisors who have acknowledged her work and she finds her work interesting.

Tina Wilcox Faunteroy

School: Fairmont Heights

COE assignment: Code 815, Systems Integration Branch

Current assignment: Code 500, Secretary to Dr. Peter Kurzhals, Assistant Director for Research & Technology and Dr. Paul Schneck, Assistant Director for Computer & Information Science

Awards: Outstanding Secretary – 1982

Remarks: Tina feels that COE has been

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COE

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beneficial in attaining her current position and also her branch level experience was helpful.

CLASS OF 1979

Eileen Adams

School: Bowie

COE assignment: Code 310, Product Assurance Division

Conversion assignment: Code 311, Parts Branch

Remarks: Eileen feels COE was definitely helpful in getting her "foot in the door."

Monique Benns Williams

School: Fairmont Heights

COE assignment: Code 280, Program Procurement Division and Code 202, Office of Public Affairs

Current assignment: Code 250.2, Administrative Communications Office

Awards: Peer Award – 1980; Special Achievement Award – 1981

Remarks: Monique served on a Clerical Multi-Management Board within Code 250 which made recommendations to management regarding clerical issues.

Robin Mohr

School: Bowie

COE assignment: Code 251, Administrative Support Branch and Code 140, Executive Development Office

Current assignment: Code 923, Secretary to Dr. Robert Murphy, Acting Head Earth Resources Branch

Awards: Outstanding Performance Award – 1981

Remarks: Robin aspires to become a Financial Analyst at Goddard. She definitely recommends the COE Program for other students.

CLASS OF 1980

Traci Warnick

School: Duval

COE assignment: Code 200, Administrative Correspondence Center working primarily for the Public Affairs Office

Current assignment: Code 202, Public Affairs Office

Awards: Special Achievement – 1981

Claudette Moore

School: Fairmont Heights

COE assignment: Code 731, Mechanical Engineering Branch

Current assignment: Secretary to Elmer Travis, Head of the Mechanical Engineering Branch

Remarks: Claudette feels the COE program is valuable in finding permanent employment. She highly recommends it to other high school students.

CLASS OF 1981

Sheri Elben

School: Largo

COE assignment: Code 221, Personnel Management Branch

Current assignment: Code 221, Personnel Clerk working for Susan Johnson, Head of the Personnel Management Branch

Awards: Special Achievement Award – 1981 and Outstanding Clerical Award – 1982

Remarks: Sheri feels COE was definitely advantageous in obtaining her Personnel Clerk position. She likes her work very much.

Paula Staats

School: Bowie

COE assignment: Code 480, TIROS Project

Current assignment: Project Secretary to George Hogan, SOT Project, Code 425

Remarks: Paula feels she has a lot of responsibility in her current position because she is the only secretary in an office that usually has 2 or 3 clericals, but she likes her job very much. She feels that her first COE assignment was very valuable in acquiring skills she now uses.



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New observations build case for Antimatter Galaxies

Are there galaxies, even other planets similar to our own but constructed of antimatter?

Once the thought was irresistible. At the movie matinee, Earth and anti-Earth moved toward each other like magnets, just barely avoiding mutual annihilation.

The thrill has dimmed at the movies, but the scientific questions which sparked the fiction remain as active as ever. If antimatter can be created in the laboratory—albeit in minute particles—could it not conceivably be present elsewhere in the universe? And, if it is present, why have astronomers been unable to detect it?

"The answer may be that we have not known how to look," says Dr. Floyd Stecker, a Goddard scientist who addressed the question at the 104th International Astronomical Symposium on Cosmology in Crete last month. A specialist in Cosmology, the study of the origin of the universe, Stecker believes that new observational evidence may be hinting at huge galaxy clusters of antimatter in the universe. Indeed, the galaxy clusters of antimatter could be as abundant as those of matter and separated from them by the vast distances of space.

In part, Stecker sees preliminary evidence for the existence of antimatter in recent successes at Goddard in measuring radiation from the far reaches of the cosmos. Some of these measurements, made by Goddard's Drs. Carl Fichtel and Jacob Trombka using the SAS-2 satellite and the Apollo 15 spacecraft respectively, have revealed gamma-rays occurring in just the spectral distribution that would be expected from matter-antimatter annihilation. Specifically, says Stecker, the measurements suggest annihilation occurring at the boundaries of immense, opposing clusters of matter and antimatter galaxies.

Additional evidence of widespread antimatter in the universe, Stecker reports, may have been found by astronomers measuring cosmic rays, the highest energy radiation known. Recently, observers

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PEOPLE



Dr. Juan Bonnett, Jr. (second from right), Director for the Center for Energy and Environment Research (CEER), San Juan, Puerto Rico, was a guest speaker at Goddard during National Hispanic Heritage Week. During his visit, he met with Center Director Noel W. Hinners (c), and Deputy Director John J. Quann (background) and toured the Center.

Far left: Orlando Figueroa, code 713.1; second from right: Dr. Manuel Garcia M. Morin, consultant for CEER; far right: Goddard Hispanic Employment Program Manager Madeline J. Butler.

*Quann
welcomes
guest*



Center Deputy Director John J. Quann is shown here with Mr. Dail Jones, a member of the New Zealand Parliament. Quann welcomed Jones last month when Jones visited Goddard for a tour and briefing.



Bendix Field Engineering Corporation (BFEC), Columbia, Md., has contributed \$1700 on behalf of its employees to the United Way of the National Capital Area at Goddard. Barbara A. Coughlin and Robert H. Oertly (right), cochairpersons for BFEC's 1982 United Way Campaign, present the check to Stephan W. Fogleman, Goddard's assistant director for program planning and implementation, Networks Directorate, and Sandra L. Morey, network chairperson for the Combined Federal Campaign, who accept the check on Goddard's behalf. Joining in the presentation is Donald E. Smith, BFEC vice president and director, Spaceflight Tracking and Data Network.



Management Operations Director Benita A. Sidwell presents Captain Manuel Garcia-Carmona, a student of the Inter-American Defense College, a book entitled "Mission To Earth: Landsat Views The World." Garcia-Cormona had earlier presented Sidwell a plaque of appreciation on behalf of members of the college who recently visited Goddard. Background: Marita Llaverias of the Personnel Division, who translated for Garcia-Carmona.

Antimatter

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have reported detecting signals of anti-protons among cosmic-rays which may come from antimatter galaxies.

While Stecker cautions against drawing too many conclusions from the recent measurements, he noted that for the first time they are beginning to build a case of observational evidence for the existence of antimatter galaxies.

Traditionally, the inability of astronomers to find observational evidence of antimatter has led most cosmologists to argue that antimatter may have been abundant at the creation of the universe but is absent today. The antimatter present at the time of the primal explosion which began the current expansion of the universe, they believe, was destroyed during the early part of the "big bang".

In light of the new observational evidence, Stecker believes that the traditional model of the universe may require re-examination. In its place, he suggests a theoretical model of the big bang process which, instead of leading to a total disappearance of antimatter, leads to a "honeycomb" universe of both matter and antimatter. In some areas there would be large concentrations of matter, in others, antimatter, and in still others, nothing but empty space.

Many cosmologists base their models of the universe on recent advances by particle physicists in proposing Grand Unified Theories (GUTs) of natural laws. These theories, by attempting to integrate what is known of the diverse physical forces into a comprehensive understanding of matter and energy, have spawned a re-thinking of the nature of subatomic particles—the building blocks of cosmology.

According to the proponents of an all-matter universe, the "GUT" insights allow for the evolution of the universe toward a one-sided asymmetric state, where there is matter but no antimatter. Stecker, together with physicists Robert Brown of Case Western Reserve University in Ohio, and Goran Senjanovic of Brookhaven National Laboratory in New York, offer an alternative theoretical model, also based on GUTs, which results in the symmetric "honeycomb" universe

containing both matter and antimatter.

The theoretical debate over antimatter's presence in space may continue well into the future, but Stecker is hopeful that new observational evidence will increasingly clarify the picture. Of particular interest will be future satellite observations.

One opportunity for a satellite to address the question will come in 1988, when NASA launches the Gamma Ray Observatory. The most advanced satellite to date for observing high energy gamma radiation from space, the Gamma Ray Observatory will be able to return data regarding the location of gamma-ray sources. If there is indeed gamma radiation associated with matter-antimatter boundaries in space, the Observatory's instruments may be able to distinguish it from radiation originating in more conventional astronomical sources.

Another opportunity to search for antimatter has been proposed for Spacelab. Borne aboard the Space Shuttle, Spacelab could look for atomic nuclei of antimatter in cosmic rays. The discovery of a single anti-nucleus would indicate that element building has taken place in antimatter stars located in antimatter galaxies.

While the Gamma Ray Observatory and the Space Shuttle search space from orbit, other scientists may be seeking answers deep under the ocean. The University of Hawaii is currently building an underwater cosmic ray neutrino detector which can detect the anti-neutrinos expected to be created in space if there is abundant antimatter. These antineutrinos would result from the decay of subatomic particles called pions which would be produced when cosmic ray antiprotons collide with photons of the background radiation left over from the big-bang.

Think about it . . .

The contemplation of celestial things will make a man both speak and think more sublimely and magnificently when he comes down to human affairs.—*Cicero.*

Wallops experiment

Yo-yo device attached to balloon helps scientists study earth's atmosphere

What may be the world's biggest yo-yo will help scientists study the earth's atmosphere. The project is part of the NASA Balloon Program managed by the Goddard's Wallops Facility, Wallops Island, Va.

An instrumented device is borne to high altitudes by balloon, lowered into the atmosphere to make readings and then hoisted up again using energy generated and stored during descent as a yo-yo does.

The reel-down system instrument package can be lowered 16 kilometers (10 miles) below the balloon and hoisted up again. A recent NASA test of the device at the National Balloon Facility in Palestine, Texas, was highly successful.

A 26 million cubic foot balloon with the instrument package rose to 40,538 meters (133,000 feet). The package was reeled down to 12,192 m (40,000 ft.) below the balloon in about 27 minutes and then reeled back up in about 36 minutes. The required energy for the reel-back came from 54 kilograms (120 pounds) of storage batteries. The instrument package was released from the balloon on a parachute near Tyler, Texas, where the payload was recovered.

Scientists hope to use this system on long duration balloon flights on which the package will be lowered and hoisted 10 to 12 times, sampling the chemistry of the stratosphere at different altitudes, times of day and locations.

The primary purpose is to make extensive measurements to help resolve whether the stratospheric ozone layer is seriously threatened by synthetic chemicals, such as the fluorocarbons used as refrigerants and, to a diminishing extent, as spray can propellants.

Project scientist Dr. James G. Anderson, professor of atmospheric chemistry at Harvard University, hopes that flights of two or three months can eventually be accomplished. The reel-down system was

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