Deacidification Facility to Start Tests

In a unique library science-supporting role, Goddard started in mid-November the first book deacidification run at its newly-opened developmental test facility, using a process patented by the Library of Congress (LOC) 15 years ago.

The project, situated at Goddard's Magnetic Test Facility on Goodluck Road, is directed by Alda Simpson, head of Goddard's Simulation Test Section, and Anand J. Apte, Senior Engineer for Northrop Services, Inc., the contractor.

"Ironically", notes Simpson, "the al

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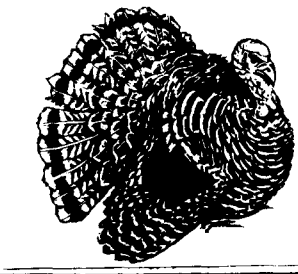
HAPPY THANKSGIVING



NASA
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Dewar for COBE Arrives at Center

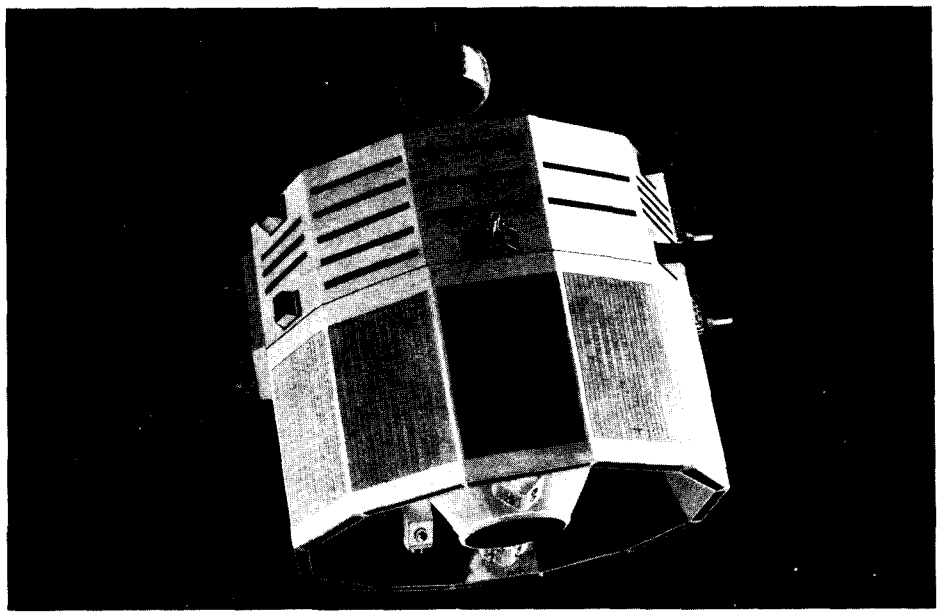
By Carter Dove

The COBE, the Cosmic Background Explorer satellite, now being built at Goddard will be taking its own "thermos bottle" into space when it is launched from the Space Shuttle in late 1987 or 1988 to study the origin and dynamics of the universe.

The "thermos", known as a dewar (after Scotsman James Dewar, the inventor of the insulated vacuum container), is an insulated liquid helium vessel designed to keep two of the COBE's three instruments cooled to almost absolute zero for more than a year.

The dewar was built by Ball Aerospace Systems Division, Boulder, CO and delivered to Goddard on November 12.

The COBE, designed, integrated and tested by engineers and scientists at Goddard, has the mission of challenging or confirming the theory that the universe began about 15 billion years ago with a Big Bang—a cataclysmic explosion—and then expanded.



COBE IN ORBIT— **An artist's conception shows how the COBE satellite will appear in orbit after launch in late 1987 or 1988 from the Space Shuttle.**

Maps of the Sky

This spacecraft will produce maps of the sky in 100 microwave and infrared wavelengths with unprecedented accuracy and sensitivity. Its reach will extend throughout the infared background radiation which could have come from the first stars and galaxies.

The COBE dewar, only the second of its type to be part of a satellite, will be the largest liquid helium dewar ever put into space.

Helium—with the lowest boiling point of any element and the only substance which will not freeze—is a crucial feature of the dewar in providing temperatures of approximately minus 271.6 degrees Centigrade. This is important because the satellite's infrared instruments measure radiation which is only a few degrees above absolute zero (273°C).

A thermos bottle as effective as the dewar would keep coffee warm for 30 years. The vacuum system is so leak-tight that no more than a lungful of helium could escape over a period of 10,000 years.

The COBE is scheduled for launch from the Western Space and Missile Center, Vandenberg AFB, CA by the Space Shuttle and ultimately will reach an operational sun-synchronous orbit of 560 statute miles.

Deacidification

Continued from page 1

kaline paper used for printing 100 years ago has left those books in better shape than modern-day books printed in a process which creates sulfurous acid in the paper."

Although the LOC developed the acid-removal process, it was successful in demonstrating a technique for the removal of acid from only small quantities of books. The LOC turned to Goddard to come up with a technique for the removal of the acid in large-quantity runs (5,000 books or more) because of its test simulation facilities and expertise.

Four Year Development

For almost the past four years at Goddard, Northrop Services has been refining a technique for taking the acid from books. "The acid", according to Apte, "is self-destructive—so that after 20 or 25 years the paper yellows and gets brittle."

"...gas is forced into a vacuum chamber loaded with approximately 300 books..."

In the technique developed by Northrop, diethyl zinc (DEZ) gas is forced into a vacuum chamber loaded with approximately 300 books. The books, positioned one-half inch apart in wire-mesh racks, remain closed. The DEZ, nonetheless, permeates the paper, reacts with the acid and water in the pages and leaves a protective coating of zinc oxide (an ingredient of baby talcum).

The second by-product, ethane gas, then is pumped from the chamber.

Eventually, the Library of Congress plans to process batches of 7,500 books in 5-day cycles at its Fort Detrick, Md site due for operation in December 1987.

With LOC holdings now totaling 40 million books, and new acquisitions flowing in at the rate of 300,000 a year, the efficient and large-scale removal of sulfurous acid contained in all modern-day paper has become crucial.

Search for Ocean Rain Ground Truth Leads to Strange Sites: Oil Rigs

By Charles Recknagel

What do looking for rain and looking for oil have in common?

Oil rigs!

That might puzzle you until you meet Gene Gilbert, a technician in Goddard's Laboratory for Oceans. He is looking at oil rigs to solve a problem that has plagued meteorologists for years: how do you accurately measure rain in situ as it falls over the ocean?

Over the years, meteorologists have developed a good picture of the weather over land masses. But to complete their models, they still need to know what happens over the remaining two-thirds of our planet that is covered by water.

Goddard scientists are studying the development of a new space-based system that could survey ocean weather elements and provide information that would fill the gaps in our understanding of rainfall. If approved, the system—known as the Tropical Rainfall Measuring Mission (TRMM)—could take the form of a satellite or Space Station attachment operational in the mid-1990s. The system would improve upon rainfall sensors that have flown aboard Nimbus satellites.

But developing better sensing capabilities first requires accurate "ground truth" measurements to test the accuracy of remote observations.

Question Resurfaces

So, the question resurfaces: how do you measure rainfall at sea?

In the past, ocean ground truth has come from rain gages aboard boats and buoys. But both present problems.

If you put a collection bucket on a ship, Gilbert explains, different locations on deck can give you different results, depending on whether or not you're sheltered from the wind. And the movement of the ship gives you an angular measurement of the rain, not a true vertical one.

A buoy can be just as bad. "It may look stationary," he says, "but it really is not." Even the largest ones, which are 50 feet across, toss in a storm, splashing and spraying and washing out results.

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DURING A CEREMONY AT WALLOPS on Wednesday, October 30, 1985, Dr. Noel Hinners, Center Director, presented to the Wallops staff a Special Commendation for work performed during Hurricane Gloria. Frank Moore, MOD Associate Director, showed some pictures of the storm damage and the evacuees who were housed at Wallops during the hurricane and gave a chronology of the preparations and subsequent clean-up. Dr. Hinners stressed the team effort of everyone, civil service and contractor employees and the extraordinary effort required to accommodate the people from low-lying areas on the Eastern Shore and to save valuable equipment. (Left to right:) Dr. Hinners; Warren Keller, SPOD Director; Frank Moore; and Ms. Benita Cooper, MOD Director.

CAFETERIA FACELIFT– An artist's view shows the new decor which Goddard's cafeterias will adopt after January.

Goddard Cafeterias to Get New Look and Fare Starting in January

The Goddard Employees' Welfare Association expects to award a new foodservice contract December 1 to Canteen Corporation, located in Landover.

Canteen will be responsible for operating two manual foodservice facilities—a full-service cafeteria in Building 21 and a food court in Building 1; the mobile snackbar; and the vending operation located in all buildings at Goddard.

There will be many menu changes and new ideas being served up in the next few months, including a "By-the-Ounce" program, particularly in the Building 1 Food Court.

The following Canteen Menu Highlights will be incorporated either into the Building 21 full-service or Building 1 food court:

Early Bird (Building 21 Only)

° A balanced and nutritional breakfast program with regular breakfast menu, two daily alternatives; 3 specials for the hearty appetite or a light breakfast menu.

Main Event (Lunch-Building 21 Only)

° Main course meals with at least two hot entrees daily.

Farmer's Market

° A complete range of sizes and types of salads including large chef's salad, julienne salad bowls, cold luncheon meats, fruit plates and "Build your own salad".

New York Deli-Hot Gulliver's

° Carved hot delicatessen sandwiches such as roast beef, kosher pastrami, corned beef served on a choice of breads.

By the Ounce-Gulliver's

° Cold luncheon meat sandwiches, and a large selection of breads and rolls will be available.

Stop and Go

° Fast food items (example, burgers, shrimp in a basket) and a "Fixins Bar".

The Final Touch

° Cakes and pies plus premium desserts. In Building 1, a complete line of fresh bakery products will be purchased by the dozen for home consumption (open until 4:00p.m.)

The Oasis

° Beverage island including soft-drinks, milkshakes, juices and iced tea.

In addition, Building 1 will offer a pizza and gyro station.

The Building 1 foodservice facility will be closed for approximately 4 weeks for redesign after the contract is awarded. In mid-January, there will be a "grand opening ribbon cutting" of the new Building 1 facility, which will include the GEWA Exchange Store as well as the "food court".

Melwood Co-Ops Join Workforce

By Randee Exler

Most co-op students at Goddard work indoors. This fall, a special group of co-ops are working outdoors as landscapers. These students are from the Melwood Horticultural Training Center, Inc., a private non-profit organization which develops job responsibility, marketable vocational training, and social skills in mentally handicapped adults.

"From what I've heard," explains Richard Stewart, Code 290.1, Environmental Service Specialist, "Melwood provides very good workers. Choosing Melwood is also of benefit to the community. This program puts tax dollars to good use by employing people who might otherwise be supported by social services."

According to Melwood spokesperson Debby Coughlin, Melwood is recognized throughout the world as a leader in the field of rehabilitation of the handicapped through horticulture.

Melwood trainees work at other government installations such as the National Zoo, the Smithsonian Garber Facility, Martin Luther King, Jr. Library, the Naval Research Lab and the Naval Ordnance Station.

After the fall planting is through, Stewart hopes to have the Melwood team return in the spring under a one-year ground maintenance contract.

Meet Maureen Locke: Astronomer, Skier, Diver, etc.

By Carter Dove

"X-ray Astronomers Do It With High Frequency".

That's the motto on Maureen Locke's office door. It could have read just as easily: "Caution. Maureen Locke inside. Highly-charged Atmosphere".

This two-time, non-knitting type of grandmother "blew away" all of the conventional notions about grandmothering by recently recalling some of her feats of physical and professional daring over the years.

In "real life" she's Maureen Locke, a Science Observation Systems Manager for the Hubble Space Telescope (HST) operations at Goddard. Otherwise, she's Maureen Locke, Adventure-woman.

The adventure began early. "I've been totally curious and on the 'go' since the day I was born", the Pittsburgh, PA native recalled. "I must have been born running". She forgot to add flying, scuba diving, sailing, rock climbing, snow skiing, and sky diving.

> *"I've been totally curious and on the go since the day I was born..."*

One of the early influences in shaping her adventurous spirit came in Pittsburgh with the Civil Air Patrol, the search and rescue auxiliary of the U.S. Air Force. As a 15 year old, she flew numerous missions as a CAP observer.

One of two children and married at seventeen, Locke "grounded" herself to take care of domestic and, later, motherly matters.

To Feed or to Fly

The single and multi-engine-qualified Locke adds woefully, "I got bogged down in raising three kids—it was feed or fly, and I had to do my motherly duties first".

She did. Her "kids" can testify to that. One is a career Navy man stationed in Hawaii along with his wife and three and one-half-year-old daughter; another son, a Prince Georges County fireman, is married with a three-year-old son; and her daughter and husband reside in Chesapeake, Md.

By the 1970s, however, she could see "daylight" and found time to participate in such events as the Angel Derby, one of two major air races held by the all-women "99s" organization. On one occasion, Locke flew from Toronto, Canada, across the U.S. and to the Bahamas in a single engine Piper Cherokee.

Along with the flying, Maureen's adventure "menu" at the time also included skydiving.

A WOMAN FOR ALL SEASONS– **The Space Telescope is just one of Maureen Locke's many interests.**

The jumping "urge" hit in 1963. In 1964, she joined up for a short stint with the Barnstorming Barnhills, two brothers who conducted an aerial circus on their own on weekends in Ohio. In her matter-of-fact manner, she said, "After we got airborne, I'd do a brief wing walk and then take a dive".

She entered her first national skydiving competition in 1964, also.

Hooked on Skydiving

She stayed "hooked" on skydiving into the 1970s. One of the highlights for her in that period was the Transpo 72 air show at Dulles International Airport. If you were there, you may have seen her as she plummeted from an Air Force C-130 transport in a mass drop. Locke was one of 3 or 4 women in the 64-person drop.

She had her mind on diving, ironically, all the way to the ground—scuba diving.

But then, it's not surprising that a former nuclear submarine physics analyst (she was a staffer at the Bettis Atomic Power Laboratory for Westinghouse at Pittsburgh, PA from 1960-65) might turn sooner or later to scuba diving.

In fact, she turns that way even now as she joins with other divers who search for wrecked ships off the Atlantic—often 30 miles or more off shore—from New Jersey to Florida. The happy-go-lucky adventurer quickly adds, "It's just for sport. However, we do find old china and brass. And lobsters."

In recent times, the effervescent brunette reportedly has bubbled to the surface for long periods. For example, in July of this year she joined up with 19 others in climbing the Inland Ice Pack in Greenland. Seven of the 19 made it all the way into the ice pack and back to the starting point. Locke was one.

Singles on Sailboats

Before we could find out the background on her skiing and white water rafting, the subject changed to sailing with Singles on Sailboats, a Washington, D.C. week-end cruising club. She

Continued on page 5

Death of a Deer
-Editorial-

At 7 a.m. on October 7—at just about sunrise—Mia Wachsmuth saw a beautiful sight. Coming to work, she passed the Goddard pond and saw half a dozen deer by the water. There were yearlings, does, and young males with their antlers just beginning to fill out. She stopped her car and watched them in the morning light.

At 5 p.m. that same day, and at about the same place, Mia Wachsmuth saw an ugly sight. Somebody leaving work in a hurry had run into one of those same deer, and now it was dying in the middle of the road.

The deer, a yearling, was dying with a crushed shoulder and a fractured hind leg.

An animal can take a long time to die—longer than most people would care to witness. But Mia got to see the whole thing. That was because, by coincidence, she was volunteering her time after work that evening at the Chesapeake Wildlife Sanctuary near Bowie. And it was the Sanctuary that Goddard Security called to come and try to save the deer.

The deer finally died at 9 p.m. at the Sanctuary, when a veterinarian ended its agony.

Those who watched the deer die are not likely to forget the sight. And though they are glad no one else had to see it, they would like everyone to at least try to imagine it and to take every precaution when leaving the Center in the evening to not put another deer—or any of your fellow employees—through such an experience again.

Locke

Continued from page 4

quickly noted, "All my navigation and flying sure come in handy with sailing."

Oh, yes, she cannot resist comets either. She has just put together for the Goddard Employees Welfare Association (GEWA) an 11-day tour from Washington, D.C. to Antofagasta, Chile April 2-12, 1986 to watch Comet Halley.

It figures. Locke admits that all her life she has "wanted to do everything, know everything—and I'm still trying".

She just might make it.

Around the Center

ON HALLOWEEN DR. HINNERS (above) invited some guests to lunch. What was on the menu? Spookghetti, of course.

DR. VITTORIO CANUTO, a Goddard Institute for Space Studies [GISS] astrophysicist since 1968, has received the Vatican's highest award for non-heads of state.

In the name of His Holiness Pope John Paul II, Cardinal Agostino Casaroli, Secretary of State for the Holy See, confered upon Dr. Vittorio Canuto the Knighthood of the Order of Saint Gregory the Great for his service to the Holy See, in a brief ceremony at the Holy See Mission to the United Nations, New York, on October 17.

Canuto has made outstanding contributions to the Pontifical Academy of Sciences by organizing and directing the Study Weeks of the Academy on "The Impact of Space Exploration on Mankind", on "The Weaponization of Outer Space", and on "Remote Sensing for Developing Countries". Dr. Canuto is a member of the Holy See delegation to the United Nations General Assembly and serves as an expert in astrophysics.

AL SEIVOLD, DR. DAVID BERTSCH, AND STRATON LAOIS, all of the Gamma Ray Observatory team, received awards October 23 from the GRO Project for outstanding contributions during this quarter to the GRO mission. The awards, scale models of the GRO observatory, were presented by Director of Flight Projects William Keathley for their contributions respectively in thermal engineering, software management, and data systems. The observatory is scheduled for launch in May 1988.

Bloodmobile

Next Bloodmobile visit is scheduled for December 4, 1985, Wednesday, from 8:30 a.m. to 2:30 p.m. in Bldg. 26 auditorium, Room 205. Note change of bldg. from bldg. 8 to bldg. 26.

GODDARD'S JOHN SCHUTT, Code 623, was cited in the December issue of "Science Digest" for one of the year's "Top 100 innovations." Schutt developed the inorganic zinc coating that was used this past year to paint the Statue of Liberty. The coating, which lasts 50 years, is easy to apply, competitively priced and a major breakthrough in rust protection, according to the magazine. More than 1,200 corporations, universities, colleges, scientific and engineering associations, nonprofit institutions and government departments and agencies were surveyed. Five hundred nominations were made, and the 100 were chosen by a panel of the magazine's editors.

CROSSING THE FINISH LINE (below), Barbie Beckford, No. 162, of CSC (743), left, wins the women's division of the two mile Inter-Center Fun Run at Goddard October 9 with a time of 12 minutes 52 seconds. At right is Darrell Smith, No. 318, (415.3). The men's division was won by Bill Conroy of G.E. (743) with a time of 10 minutes 27 seconds. Placing second and third in the women's division were Arlene Bigel (733) and Claire Parkinson (671). Second and third in the men's division were Mark Baugh (543) and Tom Nolan (664).

Ocean Rain

Continued from page 2

"What is needed," says Gilbert, "is a surface that is stationary, vibration free and splash-proof. I think oil platforms could satisfy all those conditions." He notes that the deck of an oil producing rig which is no longer drilling stands about 25 meters (80 ft) above the waves.

In July, Goddard's Microwave Sensors and Data Acquisition Systems Branch placed the first rain gage on an oil producing platform in the Gulf of Mexico off Lafayette, LA.

Hurricane Hits Rig

"The very next month a hurricane knocked out our data transmission antenna," he remembers. "But we repaired the damage easily, and we have been getting good data since then."

The rain gage is a teeter-totter with a shot-glass sized cup at each end. The cups fill successively with 1/100th of an inch of rain and drop the measure back into the ocean. Each count is transmitted to NOAA's Geostationary Operational Environmental Satellite (GOES) and then back to Goddard via NOAA's data processing facility in Suitland, MD.

"The goal is to demonstrate that using a gage on an oil rig gives us our most accurate ocean rainfall data to date," Gilbert says. "If it does, we may expand to include other oil rigs. Then we will finally have good ground truth data for measuring rainfall over the ocean by satellite, at least for those oceans which include oil rigs."

TEACHER RESOURCE LABORATORY (Left to right) Elva Bailey, Goddard Educational Programs Officer shows the new facility to Charles Collins, Principal of Foulois Middle School, Alice Morgan-Brown, Supervisor of Mathematics for Baltimore City Public Schools, and Judy Barock, Science Department Head of Hyattsville Middle School.

Goddard Opens Teacher Resource Laboratory Inside Visitor's Center

By Randee Exler

A new Teacher Resource Laboratory (TRL), designed to provide teachers in the Metropolitan D.C. area and 11 northeastern States with materials to assist them in developing aerospace education programs, opened at the Goddard Visitor's Center November 13.

The facility is available to educators by appointment, Wednesday through Saturday, from 10:00 a.m. to 4:00 p.m.

The TRL has reference materials, NASA publications, wall charts, pamphlets, lithographs and photos, slides, books, videotapes and lesson plans, as well as equipment for reviewing slides and videotapes and machines for duplicating print and other material.

Slides, Audio and Video

Slides, audiotapes and videotapes can be previewed and duplicated at the Laboratory. The TRL also has a copy stand for educators who want to create slides from pictures found in publications. Educators must provide their own tapes and film.

The available materials reflect NASA's research and technology development and relate to curriculum areas such as astronomy, Earth science, aeronautics, mathematics, physical science, and life science.

More than 1,000 slides and 100 videotapes are on file for viewing and duplicating. Topics include aeronautics, careers, Earth resources, energy, lunar exploration, manned spaceflight, weightlessness, the space shuttle, space station, technology utilization, weather and others. Audiocassettes and filmstrips are also available.

A collection of lesson plans and class activities have been collected from aerospace educators for the TRL. Educators may photocopy curricula during their visit.

Materials from other government agencies, aerospace industries and some general aerospace reference books are also on hand.

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