

Modular Data Handling and Linking System Tested with TDRSS

by David Thomas

NASA engineers have successfully tested a modular, fit-all-spacecraft data handling and linking system capable of operating with the agency's Tracking and Data Relay Satellite System (TDRSS) network.

Using flight proven concepts and hardware and incorporating state-of-the-art technology, the module could satisfy the increased data handling requirements for satellites for the next two decades, according to Richard P. Hockensmith, who leads a team of GSFC engineers. He said that it will be on-orbit serviceable, recoverable, reusable and adaptable to most program requirements.

Called the NASA data link module (NDLM), the system will reduce data handling system costs because of its modular features, permitting the system to be adapted to any spacecraft without expensive and extensive engineering modifications.

Many data handling systems, subsystems and components developed by NASA and private industry have evolved over the years. The NDLM uses these, in effect, in an effort to integrate all the previous work into one aggregate part which conveniently can be "plugged into" any spacecraft.

In the tests conducted from a TDRSS observatory in Phoenix, AZ in mid-May, data successfully were sent back and forth between Phoenix and the TDRSS ground terminal in White Sands, NM, via the TDRS satellite, 22,300 miles above Earth.

The NDLM standard concept is similar to the multimission modular spacecraft (MMS) bus used on several existing missions and slated for future missions, according to Center engineers.

"The MMS has flight proven the feasibility of packaging all spacecraft support subsystem components into modules," Hockensmith said. Depending on mission requirements, the NDLM could be as small as a breadbox or as large as a refrigerator. The full complement would be as large as a single MMS module, (4×4×½ feet) with three antennas attached nearby or onto the box. Hockensmith said a prospective

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"Here's A Good One!" An Inside Look At Public Mail

by Randee Exler

"I'm just the guy who answers the mail," says Dean Dyer as he fumbles through his desk drawer and pulls out another letter.

This one's from Kori Seabury of Brookfield, CT. She writes:

"... I was wondering if you could give me information on Sally Ride or an extra jumpsuit that the astronauts wear?"

Dyer, the Visitor Center's Schedule Coordinator, single-handedly answers almost 200 letters a week from students, teachers and the general public. More than half of Goddard's public mail comes from students of all ages.

The letters come in from around the globe. Correspondence from Poland and "tons of letters" from Mexico arrive weekly, according to Dyer.

His personal favorite came from the Soviet Union. A ninth-grade student requesting information about the shuttle enclosed detailed drawings of Soviet spacecraft. In his letter, the student wrote:

"... I wish the clear sky and peace space in future."

Occasionally, Dyer receives what he calls a "warm up, butter up and punch" letter. One flattering writer said that NASA "... is a marvel only to be rivaled by the unique individuals who make its everyday performance possible..." The author then asked for "... every piece of literature available."

There are restrictions on what can be sent to the public free of charge. Although NASA has some publications of a general nature available at no cost, more detailed information and older publications which are out of stock must be purchased from the Government Printing Office, Washington, DC.

Because of the large volume of mail that Goddard receives, most letters are answered with a form letter. All correspondence is answered within a week.

Dyer, an Omniplan employee under contract to the Visitor Center, may not be an official NASA spokesperson, but to almost 200 writers a week, he's a link to the country's space program.



"I'M JUST THE GUY WHO ANSWERS THE MAIL!"—Dean Dyer single-handedly answers almost 200 letters a week from students, teachers and the general public.

Dear NASA, I'm Mr. Jones, and I am trying to get posters for my classroom before we get into the space program and please send them frequently. Please send them to me.

Thank You
Mr. Bill Jones

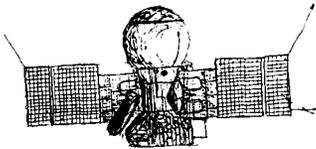
December 5, 1986

Dear People,

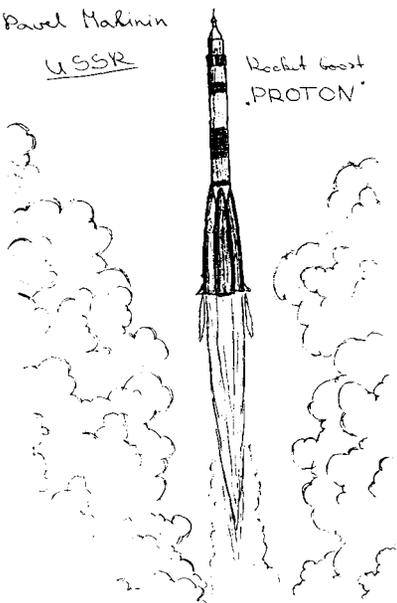
I in January my class will be studying about space. Please send me some information about space. I like to learn about space. The moon is big and stars twinkle.

Sincerely,
Tamara Fritz

Spacecraft automated "VEGA-1"



Sincerely yours,
Pavel Malinin
USSR



Dear Reader,

Space Food!

Hi my name is Jenni. I like to eat earth food. I like to eat a turkey, I would like to eat some of that food. I think it would be good. I get a letter from my friend, she is my best friend. She is an enemy, like truth is a super cat. But my way she is a space. I gotta go Bye!

10
11:50

Your fan,
Jenni

System Tested

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user would take only what was needed for the particular mission.

The NDLM has three primary subsystems: data management with limited storage, a radio frequency (RF) and antenna control.

The data management subsystem handles data in three partitions—300 megabits per second (mbps) to 20 mbps, 20 mbps to 3 mbps and 3 mbps to 125 bps—for payload data and telemetry acquisition; ground command and telepresence processing and execution; data storage facilities to 20 mbps; and on-board data processing.

The RF subsystem will receive and transmit signals through space to and from NASA network terminals.

The antenna control subsystem attaches the antennas to the structure of the spacecraft, moves the antenna beams as commanded by a distributed processor system and deploys and retracts the antennas, as required.

Hockensmith said the NDLM concept was developed from research conducted at GSFC over the past 5 years and is unique because of its adaptability and simplicity.

Spelman Scholarship Winners Visit Goddard

Under a grant from NASA, the Spelman College, Atlanta, GA is sponsoring a Women's Science and Engineering Scholars Program. This program provides scientifically-talented minority women with the opportunity to pursue undergraduate studies in science and engineering. Two young women from the Baltimore/Wash-

ington area have been selected to participate in the program. They are Martilla Rene Jones, Ft. Washington, MD and Monica Lynn Briggs, Baltimore, MD. Martilla and Monica will enroll at Spelman College as freshmen in August 1987 and will participate in a ten-week research experience next summer at Goddard.



SCHOLARS—Pictured: (left to right) On a recent visit to GSFC, Dr. Lewin Warren, Deputy Assistant Administrator for Equal Opportunity Programs, and Dillard Menchen, Chief, Equal Opportunity Program Office introduced scholarship winners Martilla Rene Jones and Monica Lynn Briggs to Center Director Dr. Noel W. Hinners.

Goddard Hosts Small Minority Business Conference

There was something for everyone at the Fourteenth Annual Small and Small Disadvantaged Business Conference held in the Building 8 Auditorium on Wednesday, May 20.

The conference brought together small and disadvantaged companies with representatives from Goddard's scientific, technical and administrative areas to discuss the Center's needs and how they may be filled by the companies.

The conference was a place where small business representatives could ask questions about how to do business with Goddard and talk directly to the people who might profit from their services.

More than 400 companies were represented, according to Franz Hoffman, Head of the Procurement Analysis Branch.

The Small Business Administration and local government agencies provided counselors for the conference and several of Goddard's prime contractors provided information on their company's subcontracting opportunities.

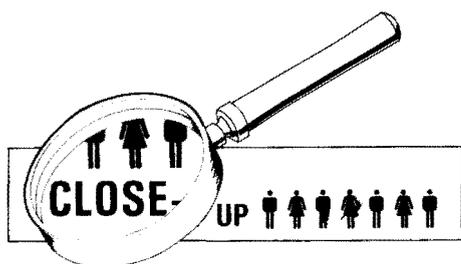
NASA Establishes Office of Exploration

Dr. James C. Fletcher, administrator of NASA, announced the creation of an Office of Exploration to coordinate agency activities that would "expand the human presence beyond Earth," particularly to the Moon and Mars.

"There are considerable—even urgent—demands for a major initiative that would re-energize America's space program and stimulate development of new technology to help the nation remain pre-eminent both in space and in the world's high-tech market place," Dr. Fletcher said.

"This office is a step in responding to that demand," Dr. Fletcher said. "It will analyze and define missions proposed to achieve the goal of human expansion off the planet. It will provide central coordination of technical planning studies that will involve the entire agency. In particular, it will focus on studies of potential lunar and Mars initiatives."

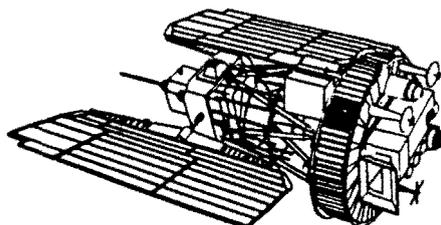
Mail your story to the Goddard News (Code 130), or call the Editor at 286-7277.



Congratulations to **JOHN ADOLPHSEN**, Code 311, who has completed his 40th year of service with the Federal Government. At GSFC, he has served as an engineer on projects such as Orbiting Solar Observatory, Aeros, Radio Astronomy Explorer, and the Earth Resources Technology Satellite. Adolphsen has made valuable contributions in the electronic parts area in the use of scanning electron microscopes for microcircuit evaluation, the application of particle impact noise detection tests, and the understanding of single event upsets in semiconductors.



Here's one to GRO on . . . A model of the Gamma Ray Observatory (GRO) was presented to Command Management System Manager **ALLEN JOHNS** (left) by Director of Flight Projects William Keathley (right) for Johns' outstanding contribution to the GRO project. Dennis Ellsworth of the Marshall Space Flight Center and John Macri of the University of New Hampshire also received models for their contributions to the project.



Nominations are being accepted for the **WILLIAM T. PECORA AWARD** for outstanding contributions toward the understanding of the Earth by means of remote sensing. The award is sponsored jointly by NASA and the Department of the Interior. Know of an individual or group that might qualify? Contact NASA's Incentive Awards Board at 453-2593 for more information.

"Flight Path to the Future" is the theme of NASA's exclusively audio-visual exhibit at the 37th Paris Air Show, Le Bourget, France. The show opened on June 11 and will run through June 21. Located in the United States Pavilion, the exhibit will focus on the advances in aerospace research, challenges of the future in space and the people of NASA.

Blood Donors

Following is a list of Goddard Donors who were cited by the American Red Cross with gallon pins at the Bloodmobile of June 3, 1987:

Name	No. of Gallons
Tad Blanchard	1
Gilberto Colon	2
Arnold Eudell	2
John Howie	1
Joseph Iffrig, Jr.	1
Pat Kilroy	2
Landis Markley	7
Paul Newman	1
Carl Palladino	1
Robert Price	4
John Robinson	2
Andrew Szymkowiak	3
Paul Trahan	2
Barbara Vargo	2
Mary Walsh	1
Kristin Wunderlich	1

THANK YOU, Goddard, for supporting the urgent need for blood in our community! All special orders for blood for patients in hospitals were met!!!

The next bloodmobile visit will be on August 5, 1987 from 8:30 a.m. to 1:30 p.m. in Bldg. 8 auditorium.



DR. JAYLEE MEAD, Assistant Chief of the Laboratory for Astronomy and Solar Physics, Code 680, has been selected Associate Chief of the Space Data and

Computing Division, Code 630. In the new position, she will be the NASA coordinator for the recently-established Center of Excellence for Space Data and Information Sciences (CESDIS) (see story page 3). Mead also will serve as the principal liaison to the Goddard, national and international communities in the area of astronomical data. She will continue her own research on computerized astronomical data bases and data retrieval as well as her chairmanship of the Goddard Scientific Colloquium Committee.

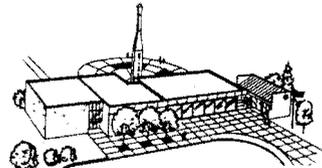
Retirees

Farewell and best of luck to the following retirees who left Goddard in May!

	Code	Years
Cheek, Frank	480	23
Federline, Marion F.	731	30
Gasch, Elizabeth M.	231	30
McKiernan, John W.	551	35
Putney, William D.	631	30
Ratliff, Thomas H.	735.1	32
Travis, Elmer W.	731	32

Visitor Center—July Calendar

- July 5 — Model Rocket Demonstration Launch — 1 p.m.
- July 11 & 12 — Commemorative Films — 1 p.m.
"The Mission of Appollo/Soyuz"
"Eagle Has Landed: The Flight of Apollo II"
- July 19 — Model Rocket Contest — 1 p.m.
(Rain Date — July 26)
- July 26 — Special Tour: Bldg. 3/4—on the hour
Space Telescope Operations Control Center,
NASA Communications, and Flight Dynamics Facility.



The Visitor Center is open to the public five days a week, Wednesday through Sunday, from 10 a.m. to 4 p.m. There is no admission charge. For more information, call the Visitor Center at 286-8981.

Portable Ground Stations Test Satellites

by David Thomas



TEST VAN—NASA/Bendix engineers perform operations in the compatibility test van during testing in Phoenix, AZ for a modular data handling and linking system adaptable to any satellite. Pictured: (Front to back) Dave Bennett, Jack Long, Joe Baros.

When the patient can't go to the hospital the doctor has to make a house call. So, when it's unfeasible for satellites to be brought to Goddard to undergo compatibility tests with NASA's communications networks, a Center-managed government/contractor team assembles its operating tools and makes "house calls" to various spacecraft manufacturing sites throughout the U.S., using one of three Compatibility Test Vans (CTV).

These vans are, in effect, portable ground stations that test the telecommunications systems aboard communications satellites prior to launch to verify the

spacecraft's compatibility with NASA tracking systems. The vans can "look like" NASA's ground and space communications networks, simulating either at various spacecraft manufacturer's sites.

Satellites must communicate with Earth using receive and transmit signals, which are used to track the satellite, monitor its health and pass on scientific data. To communicate successfully, the satellite's transmitting and receiving equipment must be working on the same frequency as equipment on the ground and in other satellites.

This is where the 24-member government/contractor team enters. They travel

to wherever the satellite is being built and test it. You might call them doctors making housecalls across the country. And just as a doctor's housecall is nothing new, the CTVs have been around for a while.

"The van testing started 20 years ago," said Tony Comberiate, head, Goddard Compatibility Test Section. "They were first used in 1967 to conduct tests at the spacecraft contractor's plant."

But NASA's compatibility testing started in 1962 at Blossom Point, MD. When that facility was closed in 1965, all compatibility test functions were moved to the Network Test and Training Facility (NTTF) (Building 25) at Goddard, where virtually all network-supported scientific satellites were tested.

The mid-1960s saw the advent of larger and more complicated satellites, requiring more extensive satellite tests before the spacecraft's construction was completed. Also, transporting some of the larger satellites to the NTTF was not feasible. The compatibility test vans solved these problems.

"The vans alleviated tight time schedules and resulted in overall cost savings for the spacecraft projects," Comberiate said.

Each van is 45 feet long and weighs 57,000 pounds. A 400-horsepower Cummins diesel engine powers the tractor that pulls the 40 tons of equipment around the country. Thirty racks of electronic test equipment complement the 9,000 feet of cable running through the vehicle.

Sidestepping through the van during peak operations, a spectator might feel "sandwiched in" between the columns of electronic equipment. "It slewed off a negative five degrees in azimuth," is some of the jargon you might hear during a test were you inside the van. This reference was to the position of one of the antennas used in the tests.

For the most part, however, the van engineers can express their work in basic terms: "We just make sure the satellite can communicate with NASA's ground and space communications networks prior to its launch."

NASA
National Aeronautics and
Space Administration
Goddard Space Flight Center

Goddard News

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Executive Editor . . . James C. Elliott
Managing Editor . . . Rande Exler
Senior Editors Michael Braukus,
Carter Dove and
Joyce Milliner
(Wallops).

Space Data Consortium

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researchers can work on NASA problems at their home institutions and share their experiences via communications network meetings."

In explaining the need for the research facility, Halem cited rapidly-evolving technology in the computing arena as outstripping our ability to keep abreast of state-of-the-art advances in space science.

"Thank You for Five Wonderful Years!" Dr. Hinners Leaves Goddard

by Randee Exler



CHANGING HANDS—Former Center Director Dr. Noel W. Hinners (right) presents new Center Director Dr. John W. Townsend, Jr. with a model of the Tracking and Data Relay Satellite.

Dr. Noel W. Hinners announced in a special address to Center employees that he had accepted a post at NASA Headquarters as Associate Deputy Administrator (Institution), effective June 22. Dr. Hinners had been the Director of Goddard since June 1982.

New Position

In his new role, Dr. Hinners will assist and, when appropriate, act for the Administrator and Deputy Administrator in the management of institutional matters at NASA.

As part of the NASA recovery from the Challenger accident, NASA Administrator Dr. James C. Fletcher created the position of Associate Deputy Administrator (Institution) to provide a focus on institutional management matters, including determination of requirements and distribution of resources for manpower, facilities and institutional funding at NASA's nine field centers.

"It's Good to be Back!"

Dr. Townsend Named New Director

by Randee Exler

Goddard's new Center Director, Dr. John W. "Jack" Townsend, Jr., is no stranger to the Center. He was Goddard's Assistant Director, Space Science and Satellite Applications beginning in 1959 and was appointed Deputy Director in 1965.

"It's good to be back," Dr. Townsend said in a recent interview.

"My priorities are good science, good engineering and integrity," he said. "You can't have the first two without the third."

The Last 19 Years

What's he been up to for the last 19 years?

Dr. Townsend left Goddard in 1968 when President Johnson appointed him Deputy Administrator of the Environmental Science Services Administration. Under a reorganization plan in 1970, this Agency became part of the National Oceanic and Atmospheric Administration (NOAA) and Dr. Townsend was appointed Associate Administrator by President Nixon.

Dr. Townsend completed 31 years of federal service in January 1977. Since that time he had been employed by Fairchild Industries, Inc. Before his return to Goddard, Dr. Townsend was Executive Vice

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"Why Me?"

When Dr. Fletcher asked Dr. Hinners to fill this position, Dr. Hinners said that his first response was, "Why me?"

In a letter to all Goddard employees, Dr. Hinners wrote that Dr. Fletcher "... wanted to fill the position with someone who has had major Center experience."

"I have the right background," Dr. Hinners said.

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**VALERIE
THOMAS—**

**The Challenge
of Computer
Technology**

INSIDE

Page 3

Hinners

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"When Dr. Fletcher asks you to do a job, it's hard to say no," he added.

"This decision didn't come easy," Dr. Hinners explained to a packed auditorium in building 8. "Goddard is the best of the NASA Centers, and this is the best job in NASA."

"You've been good to me and for me," he said. "I've gained confidence in your capabilities. I hope I've been a good leader."

Major Accomplishments

Dr. Hinners will be remembered for many Goddard successes. The following is by no means a complete list, but a few accomplishments worth noting: the first Tracking and Data Relay Satellite launch

Townsend

Continued from page 1

President for Corporate Development. He has held also the following positions at Fairchild: President, Fairchild Space Company, 1977-1985; Corporate Vice President, 1979-1985; Director, Spacecom, Inc. 1984-1985; Chairman of the Board, American Satellite Company, 1985; Senior Vice President and Group Executive of Aerospace, 1986.

In addition, he has been busy with many hobbies. He is an avid amateur radio operator whose call letters are W3PRB. He also sails the Bay on a 37-foot Tartan named the "Space Cadet" and builds working steam engines.



"I've gained confidence in your capabilities. I hope I've been a good leader."

Dr. Noel W. Hinners

and recovery, the Solar Maximum Mission (SMM) spacecraft repair mission and subsequent Presidential visit; the Space Telescope Operations Control Center inauguration; the opening of the Visitor Center's Hall of Satellites; Goddard's 25th anniversary activities and the International Cometary Explorer encounter with Comet Giacobini-Zinner.

Dr. Hinners will be remembered also for initiating several projects that will be completed after his tenure. They are, to name a few: the completion and launch of the

Cosmic Background Explorer, the launch and operation of the Hubble Space Telescope, and the completion of the Spacecraft Systems Development and Integration Facility.

Strategic planning, an ongoing process implemented by Dr. Hinners, will continue to shape where we want to be as a Center in the future.

The streets on Center were named at Dr. Hinners' request. One of the last requests to Center employees is a simple one: "Please do not un-name the streets."

Dr. Townsend attended Williams College where he received a Bachelor of Arts in 1947, a Master of Arts in 1949, and an Honorary Doctor of Science in Physics in 1961. During World War II he served as an officer in the Army Air Forces for over three years.

He received the Navy's Meritorious Civilian Service Award in 1957, NASA's Medal for Outstanding Leadership in 1957, NASA's Medal for Outstanding Leadership in 1962, the Arthur S. Flemming Award in 1963, and the NASA Distinguished Service Medal in 1971.

Dr. Townsend is a member of the Na-

ISEE-1 and ISEE-2: Two NASA Scientific Spacecraft To Reenter Over South America

by Jim Elliott

Two NASA scientific satellites are expected to create two "fireballs" when they reenter the atmosphere only two minutes apart over South America on September 26, officials at Goddard Space Flight Center reported recently.

The satellites—ISEE-1 and ISEE-2—will come down over Brazil, starting to glow at an altitude of about 40 miles and continuing to burn for approximately 10 minutes, according to Osvaldo Cuevas, of Goddard's Flight Dynamics Facility. Impacts are expected, if they occur, at 2:37 and 2:39 A.M. EDT, respectively. ISEE is the acronym for the International Sun-Earth Explorer.

NASA flight dynamics specialists believe the two spacecraft will burn up in their descent. If fragments do reach Earth, however, ISEE-1 is expected to come down at 7.73 South Latitude and 39.05 West Longitude, an area just north of Triunfo, Brazil and about 210 miles west of Recife, Brazil. ISEE-2's fragments would be expected to land at 8.03 South Latitude and 39.05 West Longitude, just east of

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"My priorities are good science, good engineering and integrity. You can't have the first two without the third."

Dr. John W. Townsend

Federal Career

Dr. Townsend began his federal career at the Naval Research Laboratory in 1949 as a research physicist instrumenting V-2, Viking and Aerobee sounding rockets for upper air research. When NASA was created in 1958, he transferred with his Branch and the Vanguard Project into the new agency, becoming Chief of its Space Sciences Division before coming to Goddard in 1959.

tional Academy of Engineering (and a member of its Finance Committee), and a trustee of the International Academy of Astronautics. He is a fellow of three professional societies, a member of three others, and has published a number of papers and articles. He is currently the chairman of the Space Applications Board, and a member of the Committee on NASA Program Reviews, both of the National Research Council.

Valerie Thomas: The Challenge of Computer Technology

by Rosina Lida Rubin

Editor's Note: The Organization for Equal Education of the Sexes, Inc., Brooklyn, NY included Valerie Thomas, Code 633, in its "Women in Math and Science" educational resource promotion series. The following is Thomas' excerpted biography which was written to accompany a classroom poster:

When Valerie Thomas entered college in the early sixties, she chose to major in physics, then an atypical choice for young women. She selected the field not because of the career opportunities that might follow but because, as she says, "I've always been curious about what makes things tick."

... Thomas remembers no more than one other female physics major in her class at Morgan State University in her hometown of Baltimore, MD. That didn't bother her...

During her senior year... she was offered a position as a mathematician/data analyst at Goddard... She accepted the job.

Writing computer programs was part of her work, and Thomas had never seen a computer... She still considers this experience—entering the new world of high technology—one of the biggest challenges of her career. Gradually, she learned how to write computer programs and, what is more important, she learned how to make them work...

"I love the challenge of having to figure out how to do things," she says. "Some people might easily say, 'It can't be done,' but not at NASA. Here we say, 'What will it take to do it?'... It's a can-do mentality."

... Thomas credits the thrill of solving difficult problems with keeping her at Goddard for over twenty years. Another source of satisfaction is her very high regard for her colleagues. "All of the people are very, very bright," she notes...

One of her favorite assignments was managing the development of image-processing software systems for Landsat... She wrote a document that answered the most frequently asked questions. "It went like hotcakes," she says. Eventually it was distributed all over the world, earning Thomas significant recognition in her field...



DATA ANALYST—Valerie Thomas, Code 633, was recently featured in an educational resource promotion series called "Women in Math and Science."

Seeking a look at "the bigger picture," Thomas moved to NASA Headquarters... in 1975. After a year... she returned to Goddard...

Thomas... moved on to become Deputy Project Manager for the Pilot Land Climate Data System... Instead of developing the system first and then teaching scientists how to use it, the development team relied on scientists' input as they went along.

"Often scientists are not computer experts," Thomas explains. "... Computer people may not know much about scientific needs... Getting people together at the beginning to hash out ideas means less frustration..."

Thomas currently serves NASA in two capacities: Computer Facility Manager for the National Space Science Data Center and Project Manager for the Space Physics Analysis Network (SPAN)...

Throughout her years at NASA, Thomas has continued her education... When she decided to pursue an advanced degree, she chose the Master of Engineering Administration Program at George Washington

University, from which she graduated in 1985... She completed the coursework part-time, while continuing to work and rear her two children.

Despite her hectic schedule, Thomas has found time for other important pursuits... For many years, she has been a member of the National Technical Association (NTA)... The NTA—most of whose members are black—encourages young people to become interested in technical careers. It is a mission central to Valerie Thomas's life...

"If there's one thing I want to do," Thomas says, "It's to help students focus on the things they need to think about and do before college... to help them make choices that will pay off in the long run."

... Thomas remembers back to a time in her childhood when, influenced by science fiction movies, she played space-oriented games, pretending to be "the person in the white coat who stood in front of the space center controls. I didn't know exactly when they did," she says, "but it looked interesting."

Love of the unknown is still holding Valerie Thomas's attention.

Ham Radio Contest at Goddard Visitor Center

by Fandee Exler

The radio waves were "jamming" at the Visitor Center from 2:00 p.m. Saturday, June 25 until 2:00 p.m. Sunday, June 26 when Goddard's Amateur Radio Club (GARC) competed in the 51st Annual American Radio Relay League Field Day Emergency Preparedness Test.

For this particular activity, GARC did not depend on commercially supplied electricity to operate. The club members depended on energy sources such as gasoline

powered generators and solar arrays from spacecraft spare parts.

In times of crisis, when normal lines of communications are down, ham operators provide an invaluable public service by reporting conditions and relaying calls for help.

The goal of the competition, which involved ham radio stations in the U.S. and Canada, is to drill amateur operators for such a crisis. During the competition, the

amateur radio operators had 24 hours to contact as many stations as possible.

Hundreds of North American groups tried to "reach out and touch someone." The Goddard club contacted more than 550 different clubs.

Highlights of this year's field day operations included two-way radio communications via amateur radio satellites, and a solar powered radio station.



photos by L. Kilroy

EMERGENCY PREPAREDNESS TEST—Dung Phan (right), KA3RTA, Code 542.2, fine tunes a gasoline generator which was the main source of electricity for Field Day operations at the Visitor Center. Don Bennett (left), WA3MLK, Goddard Retiree, along with the other members of Goddard's Amateur Radio Club contacted more than 550 similar groups across North America from the Hall of Satellites.

NASA Announces Sounding Rocket Campaign in Norway

by Michael Braukus

Goddard officials announced plans to launch four sounding rockets from Andenes, Norway, as part of the Middle Atmosphere Cooperation International Science Program.

The NASA launches are scheduled during the Summer In Northern Europe (SINE) campaign. Their launch window, at the time of this printing, extends from July 6-19, 1987.

"The SINE campaign will study the general middle atmosphere circulation and temperature structure, as well as waves, turbulence and winds in high latitudes during summer solstice conditions," said Jay F. Brown, project manager at Wallops.

"The U.S. experiments are part of a series of 64 meteorological rocket firings and ground-based observations by scientists from 12 countries, including Austria, Canada, Czechoslovakia, Denmark, Finland, France, Norway, Russia, Sweden, United Kingdom, West Germany and the United States," Brown explained.

The four U.S. rockets will carry electron density probe experiments from Utah State University. The principal investigator is Dr. James C. Ulwick.

NASA will use single-stage Super Arcas rockets to carry the probes to an altitude of at least 59 miles (95 kilometers).

"These are high resolution probes that

have the capability of looking at very small scale irregularities of electron density in the polar mesosphere," Ulwick said.

The study of electron density is important because of the problems it causes in communications.

These scientific experiments are part of the overall NASA Sounding Rocket Program which is managed by the Wallops Flight Facility. The program consists of approximately 40-45 sounding rocket launches a year from worldwide locations.

Manufactured by the Atlantic Research Corporation, the solid-propellant Super Arcas with their payloads are 4.5 inches in diameter and 105.5 inches in length.

Summer Aide Employment Program Focuses on Disabled Students

by Michael Braukus

When asked for her opinion about being hired as a summer employee at Goddard, Gina Sciannella's response was spontaneous.

"It's great," she exclaimed.

For Sciannella, who is partially blind, this is the first time she has had a paying job. She is one of eight disabled college students working at Goddard through the Summer Aide Program.

The Summer Aide Program in the past has provided employment assistance to economically disadvantaged women or minorities, but this year the program has focused on the disabled.

"This is the first time that we have run anything for disabled students," said Chris Rodriguez, a Goddard employment opportunity specialist. "This program is a result of our concern about the representation of the Center's affirmative action efforts for the handicapped."

The eight students that are working at Goddard were recruited by Rodriguez, who made visits to colleges and universities in the metropolitan area. "When I interviewed the students at their colleges, I tried to match the students with their career

interests. I also tried to identify mentors here at Goddard," he explained.

Rodriguez believes that the best way to enhance the Center's disabled employment program is to identify potential talent graduating from area schools, give them an opportunity to perform in summer jobs or co-op positions and then try to bring them on board in career appointments.

The program, which lasts 10 weeks, has been running very smoothly. Rodriguez compliments the program's mentors for the program's success. "I have really been impressed by how receptive most of the supervisors were and how they are trying to work with the students," he said.

Rodriguez does not doubt that the program will contribute towards improving the Center's disabled employment statistics. "The whole emphasis of this program is to raise the supervisors' awareness that a person's disability should not get in the way of hiring the best person for the job," he explained.

Sciannella, a junior majoring in industrial psychology at the University of Maryland, Baltimore County Campus, is

Continued on page 6



SUMMER AIDES—Eight disabled college students were selected to participate in the Goddard Summer Aide Program. Pictured: (Front row) Peter Ling; Lois McIntyre, Summer Program Coordinator; Loretta Hamell; Gina Sciannella; Won Yoon; (Back row) John Quann, Center Deputy Director; Chris Nicholas; James Johnson; Jon Lee; David Weeks; Chris Rodriguez, Equal Opportunity Specialist; and Dillard Menchan, Equal Employment Opportunity Programs Manager.

Mentors: (not pictured) Jim Elliott, Code 130; Ron Keysey, Code 205.2; Damian Romano, Code 254; Pat Lightfoot, Code 514; Tom Stengle and Vilas Johnston, Code 554.1; Stanley Way, Code 615; Fred Shaffer, Code 631; Joe Nuth, Code 691 and Gary Burgess, Code 694.

STDN TRACKING ANTENNA



Construction workers erect a protective fiberglass radome top, enclosing the recently refurbished S-band tracking antenna at NASA's Ponce DeLeon Inlet Station, FL, a part of Goddard's Space Flight Tracking and Data Network (STDN). This is the primary source of air-to-ground voice and data communications during the second minute of a Space Shuttle launch.

ISEE-1 and ISEE-2

Continued from page 2

Afogados da Ingazeira, Brazil which is about 150 miles west of Recife.

Goddard officials believe the two spacecraft will first become visible just west of Floriano.

ISEE-1 and ISEE-2 were launched simultaneously on a single McDonnell Douglas Delta rocket from the Cape Canaveral Air Force Station, FL on October 22, 1977. Purpose of the mission was to have the spacecraft, each with identical instruments, but separated by a variable distance, study fluctuations in plasma waves, the magnetic field, proton and electron density, cosmic rays, gamma ray bursts and the solar wind in the near-Earth environment.

ISEE-1 was a NASA Goddard Space Flight Center-designed spacecraft, built, fabricated and tested at Goddard with all of its components made either at Goddard or supplied by industries or universities.

A consortium of 10 European countries supervised the construction of ISEE-2 under contract to the European Space Agency (ESA). The 10 countries were Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, Sweden, Switzerland and the United Kingdom. Dornier Systems in Germany led the contractor team.

At reentry, the two spacecraft will have been in orbit almost 10 years, greatly surpassing their designed lifetime of three years. They will make their reentries on their 1,518th orbit, according to Robert O. Wales, ISEE mission manager at Goddard.

1987 SHARP Program Begins

In the fall of 1979, the Director of the Office of Science and Technology Policy in the Executive Office of the President requested Federal Agencies to stimulate an interest in science and engineering among high school students.

NASA responded with the Summer High School Apprenticeship Research Program (SHARP), an eight-week internship program specifically designed to attract and serve under-represented minorities. A key feature is a direct mentor-student relationship through a research apprenticeship.

One hundred twenty-eight students—111 at Greenbelt and 17 at Wallops—have participated in SHARP at Goddard since 1980. All of these students have gone on to college and have graduated from Universities such as Cornell, Brown, Purdue, Princeton, Harvard, Vassar, Boston, George Washington, Yale and the United States Air Force Academy and Naval Academy.

Students selected for SHARP generally have just completed their sophomore or junior year of high school, have done well in their science and math courses, are high achievers, are active in school and in the community, and have been recommended by their teachers as able to benefit from, and contribute to, the SHARP experience.

Student follow-up data completed in

1985 revealed that 82% of SHARP participants have continued with the math and science related fields such as engineering, physics, computer sciences, biology, medicine, and mathematics.

Of the 30 participants this summer—25 at Greenbelt and 5 at Wallops—18 are new to SHARP and 12 are returnees.

The SHARP program at Goddard is managed by the Educational Programs Unit of the Office of Public Affairs.

The 1987 SHARP participants are pictured below. Their mentors are: George Rumney, Jeff Barnes, Code 636; Luis Ramos-Izquier, Code 674; Stanley Way, Code 615; Dr. Peter Wasilewski, Code 691; Richard Hoekensmith, Code 727.1; Gregory Frazier, Code 731.2; Phillip B. Pease, Code 636; Dr. Joseph King, Robert Tice, Steve Peregoy, Code 633; Emmett Chappelle, Code 623; Ashok Jha, Code 630.4; Douglas Ross, Code 728.4; Patrick Hennessy, Code 532.2; Nathan James, Code 633; David Provost, Code 735.2; Lee Foster, Code 633; James C. Smith, Code 674; James Patrick Gary, Code 630.4; Dr. Tom Wilheit, Code 675; Dr. Milton Halem, Code 630; Lee Nearhoof, Code 743.3; George Gerondakis, Code 740.1; Dr. James Strong, Code 636; Robert Patschke, Code 727.2; Dr. Mario Acuna, Code 695.

Employment Program

Continued from page 5

a firm believer in the Summer Aide Program. "It is a terrific way to get disabled people work experience," she said.

Assigned to the Health and Safety Office, Sciannella reports that she was well received by her co-workers and that she is getting along very well. Currently, she is working on the employee census program and doing some research on the work force. Other program participants are working in areas such as astrochemistry, computer services and flight dynamics.

Before interviewing for the summer aide job, Sciannella never thought about working for the government. But now she has a different reaction. "I would like to get my masters degree and come back here to work," she said. "Goddard is a good place. I really like it."

MAD at Wallops: A GSFC First

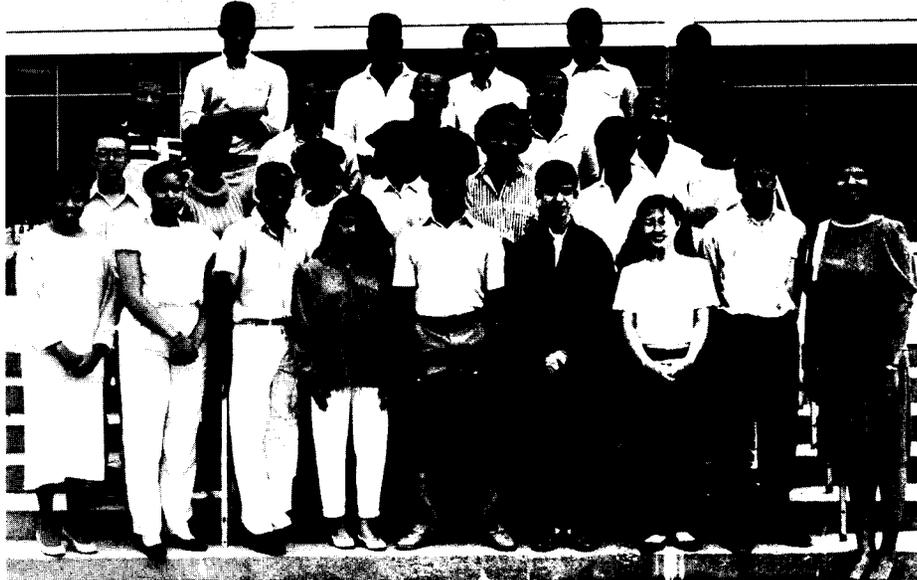
by Marty Davis

"A MAD SAMPLER" was performed at the Wallops Flight Facility on Saturday, June 27 in the Rocket Club to a packed house of more than 100 people. The MAD (Music and Drama Club) company of 50 presented a two-hour show consisting of song, dance, drama, slides, and band, drawn from the 1987 Spring Shows performed at Greenbelt, as well as from previous MAD productions.

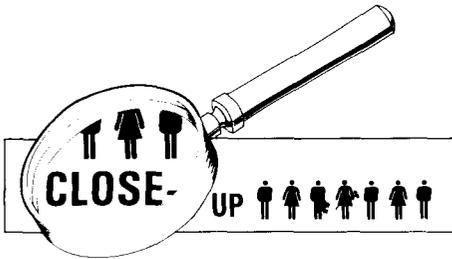
The MAD troupe was made up of civil service and retired civil service employees, on-site contractors, off-site contractors, and guest participants. MAD President Marty Davis, Code 403, produced the show; Gayle Negri (wife of Andy Negri, Code 612) was artistic director; and John Lindsay, Code 401.6, was technical director. Jim Hardin, Code 822.4, was Wallops liaison for the show arrangements.

The show was undertaken with the support of GEWA and WEMA to assist Goddard management in its goal to bring the Greenbelt and Wallops folks closer together.

In addition to the performers, MAD transported all its light and sound equipment, musical instruments, props, set pieces, video, and other accessories to Wallops.



1987 SHARP PARTICIPANTS—Row 1: Mar-jeau Barrett, Kellie Campbell, Todd Baker, Kimberly Williams, Oscar Randy Grant, Gonzalo Granpera, Jennifer Park, George Cordero, Cyn Hadnott-Goster. Row 2: Edwin Dair, Paula Southerland, Deirdre Watkins, Kendra Freeman, Kristin Cordin, Paul Johnson, Michele Gray. Row 3: Malachi Jones, Anthony Hill, Nathaniel Dozier, William Brown, Sean Turner. Row 4: Troy White, Ryan Lloyd, Carl Garrett, Michael Navy, Terrence Taylor. Not Pictured: Lucy Bonerek, Melissa Sheow.



BAKER

Welcome aboard **DR. DANIEL N. BAKER**, the new Chief, Laboratory for Extraterrestrial Physics. Baker served as the Leader of the Space Plasma Physics Group within the Earth and Space Sciences Division of the Los Alamos National Laboratory, NM before joining Goddard on June 18. Baker has a worldwide reputation in magnetospheric physics which is evidenced by his extensive record of publications and invitations to lecture.

* * *

DR. LARRY D. TRAVIS of the Goddard Institute for Space Studies (GISS), has been appointed Associate Chief of the Institute.

* * *



GROUND BREAKING—Former Center Director Dr. Noel W. Hinners (right) presents Goddard's Director of Engineering John W. Boeckel with a small ceremonial shovel at the Spacecraft Systems Development and Integration Facility (SSDIF) ground breaking ceremony on June 10. The SSDIF will contain the world's largest clean room of its type and will be complete in 1989.



MEREDITH

Late Breaking News—Goddard's Associate Director **DR. LESLIE H. MEREDITH** has accepted the position of Director of Research Programs with the American Geophysical Union and will leave Goddard July 31. Meredith was on the original team that came over from the Naval Research Laboratory when Goddard was established in 1958. His tenure was interrupted in 1975 when he served in the London Office of the Office of Naval Research. At Goddard, Meredith has served as Chief of the Laboratory for Space Sciences, Deputy Director of the Space and Earth Sciences Directorate, Director of the Applications Directorate, and Assistant Director of Goddard.



ABSHIRE

DR. JAMES ABSHIRE, formerly of the Advanced Electro-Optical Instrument Section has been appointed Head, Electro-Optical Sensor Systems Section, Instrument Electro-Optics Branch. Dr. Abshire replaces **JACK BUFTON** who was reassigned as Head, Experimental Instrumentation Branch.

* * *

Jim Robinson is back! After a stint at NASA Headquarters, Office of Space Station, **JAMES H. ROBINSON, JR.** returned to Goddard, July 5, as the Assistant Director for Operations, Engineering Directorate. Robinson was Goddard's Associate Director for Institutional Management before joining Headquarters.

Retirees

Farewell and best of luck to the following retirees who left Goddard recently.

	Code	Years
McKay, Ruth P.	233	24
Studer, Philip A.	716.2	30
Winters, Marjorie	625	35

DIAL 286-NEWS

Feeling out of touch? Out of the news mainstream? Dial 286-NEWS. This is the new number for the Office of Public Affairs code-a-phone. Dial in for up-to-the-minute information on Goddard and related events.



DRIVER BEWARE—Let this be a stark reminder to those of you who continue to park illegally around the center. You may get more than a ticket.

Goddard Speakers Bureau Awarded



"It's hard to keep this group quiet," former Center Director Dr. Noel W. Hinners said at a special awards ceremony for the members of the Goddard Speakers Bureau. The speakers were recognized for their professionalism, dedication and outstanding support of the Bureau. These volunteers deliver approximately 100 talks a year on a variety of subjects in 11 states and the District of Columbia. Most talks are given on their own time. Dr. Hinners called this group "the real ambassadors of the space agency." **FRONT ROW:** George F. Griffin, Code 754.1; Jeffrey N. Elliott, Bendix Field Engineering Corporation (BFEC); Fred S. Flatow, Code 480; Dr. Malcolm Niedner, Code 684.1; Karen L. Moe, Code 522.2; Joseph H. Rothenberg, Code 510; Dr. William J. Webster, Jr., Code 622; Dr. Jacob I. Trombka, Code 682. **BACK ROW:** U. Joseph

Walters, Code 253.1; Charles P. Boyle, Code 200; Thomas D. Russell, BFEC; Dr. James B. Garvin, Code 622; David E. Manion, BFEC; Robert L. Ball, Jr., Code 503; Dr. Noel W. Hinners, former Center Director; Dr. Michael Mumma, Code 693; Vincent Gigliotti, Code 411. **NOT PICTURED:** Frank J. Cepollina, Code 408; Donald S. Friedman, Code 702; Dr. Stephen P. Marant, Code 680; Dr. John C. Mather, Code 685.2; David R. Skillman, Code 400.2; Dr. Gerald A. Soffen, Code 600; William N. Stewart, Code 408; Valerie L. Thomas, Code 633; Dr. David J. Thompson, Code 622. The Goddard Speakers Bureau is managed by the Office of Public Affairs. For more information, or if you are interested in participating in the Speaker's Bureau, call Darlene Ahalt at X68101.

Goddard Sponsors Two Students for Space Camp

Goddard sent two area students to camp—not for campfires nor ballads, but countdowns and simulations.

The students, Hanna Yu, Greenbelt Middle School, Greenbelt, MD and Kanti Ford, Dunbar High School, Washington, DC, competed in art and mathematics contests for an all-expense paid week at the United States Space Camp, Huntsville, AL.

Goddard's sponsorship was designed to stimulate young people to think about their role in the future of the Nation's space program, according to Dillard Menchan, Goddard's Equal Employment Opportunity Programs Manager.

"We think events of this type promote the human side of high technology and underscore the important role that people, particularly young people, play in the development and progress of high technology in the fast-moving world we live in today," Menchan explained.

"We think our sponsorship helped to create a warmer relationship with young people who are interested in the space program and helped to cultivate that interest into something that will benefit both the individuals and the Nation."

The students' expenses were paid for with money that Goddard received for winning NASA's Equal Opportunity Award for 1986.

NASA
National Aeronautics and
Space Administration
Goddard Space Flight Center

Goddard News

SECOND WHITE SANDS GROUND STATION



This is an artist's concept of the second Tracking and Relay Satellite System (TDRSS) ground station planned for White Sands, NM. Construction on the facility, expected to cost \$18.5 million, will start sometime this summer with completion expected in July 1989, according to project officials. The other ground station at White Sands has conducted operations since the launch of the first Tracking and Data Relay Satellite in 1983. Station Manager is Virgil True.

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Deadline for submitted material is the first of each month. For additional information, contact Randee Exler, 286-7277. The GODDARD NEWS staff is:

Executive Editor... James C. Elliott
Managing Editor... Randee Exler
Senior Editors... Michael Braukus,
Carter Dove and
Joyce Milliner
(Wallops).

GSFC Participates in Airborne Antarctic Ozone Experiment

by Randee Exler

Goddard is supporting a cooperative investigation which will help scientists better understand the nature of a puzzling phenomenon—the formation of record low total ozone amounts over the Antarctic in a region known as the ozone hole.

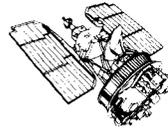
In particular, there are indications that the amount of ozone over the Antarctic, in early springtime, has been decreasing over the last eight years. Ozone is the chemical that shields Earth life from harmful ultraviolet radiation from the Sun. Atmospheric chemists have proposed that the growing number of fluorocarbons in the atmosphere have destroyed the ozone, while physicists—using ozone maps from Goddard's Total Ozone Mapping Spectrometer (TOMS) aboard the Nimbus-7 spacecraft—propose that circulation changes are responsible for the hole. In October 1985, the ozone in the hole was 22% lower than the lowest ever observed before 1980, according to Dr. Arlin Krueger, GSFC principal investigator.

Ozone Experiment

NASA is conducting a major airborne experiment to resolve this question. The mission depends on the production of real-time TOMS data from Goddard for its successful deployment.

The Airborne Antarctic Ozone Experiment will fly NASA ER-2 and DC-8 aircraft specially fitted with remote sounding instruments to measure ozone, aerosol profiles and other chemical constituents of the Antarctic atmosphere. The flights into the Antarctic ozone hole are scheduled for August 17 through September 29.

Near real-time ozone maps from TOMS will be used for operational planning and to direct the aircraft to the ozone hole, according to Krueger. TOMS is the only source of high resolution global information about the total ozone content of the atmosphere.



Aircraft Missions

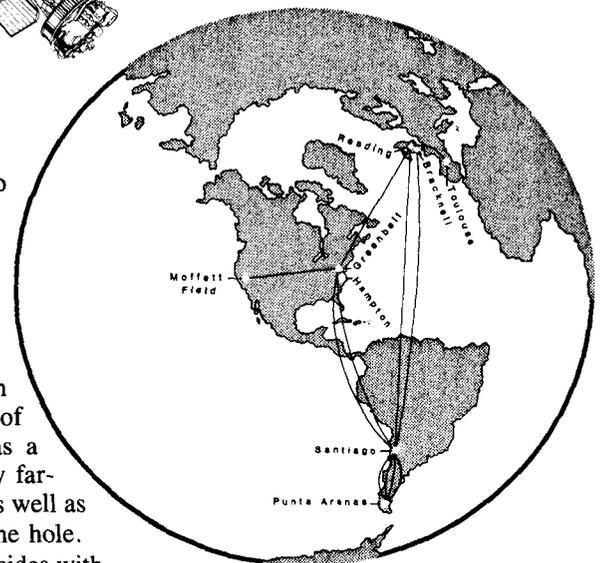
The ER-2 is scheduled to fly up to 10 separate missions from Punta Arenas, Chile on the extreme southern tip of South America at the Straits of Magellan, over the Antarctic to about 72 degrees south latitude and then return. This flight plan allows substantial penetration of the ozone hole. The DC-8 has a vastly longer range and will fly farther south into the ozone hole as well as investigate the region around the hole.

The timing of the flights coincides with the onset of the hole—which begins at the end of winter in the southern hemisphere and lasts through spring—and with sunlight conditions required for the aircraft flights.

Under Krueger's direction, Goddard will produce the TOMS data and transmit it to Punta Arenas, in near real-time, for the duration of the flights. Data from the Nimbus-7 Solar Backscatter Ultraviolet (SBUV) instrument and NOAA-9 SBUV/2 also will be produced in near real-time as a backup for the TOMS, which now has operated continuously for 8½ years. Mark Schoeberl, Code 616, is traveling to Punta Arenas to assist in flight planning strategy and scientific analysis.

A group led by Drs. Joel Susskind and Wayman Baker, Code 611, also is sending same day total ozone analysis to Punta Arenas, derived from the High Resolution Infrared Sounder-2/Microwave Sounding Unit (HIRS-2/MSU) instruments onboard the NOAA-10 spacecraft.

"HIRS-2/MSU will serve as an additional backup to TOMS," said Susskind.



COMMUNICATIONS NETWORK—Goddard's Total Ozone Mapping Spectrometer (TOMS) aboard the Nimbus-7 spacecraft (pictured) is supporting NASA's Airborne Antarctic Ozone Experiment. Goddard, through a contract with Research and Data Systems, Inc., set up a mission communications network for the experiment. Six leased lines connect the GSFC TOMS Operations Center with the Mission Operations Center, Punta Arenas, Chile; the United Kingdom Meteorological Office, Bracknell, England; and the European Center for Medium-range Weather Forecasting (ECMWF), Reading, England. Existing lines between the following locations also are being used: GSFC to Ames Research Center, Moffett Field, CA; GSFC to Langley Research Center, Hampton, VA; and the ECMWF to Centre National de Recherche Meteorologique, Toulouse, France. All communication lines in Chile must pass through Santiago.

**HOFFMANN
RECEIVES
MINORITY
BUSINESS AWARD**

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Ozone Experiment

Continued from page 1

“HIRS-2/MSU data agree reasonably well with those obtained using TOMS but are of lower spatial resolution and somewhat poorer quality,” he added.

Code 611 personnel also will forward to Punta Arenas other quantities derived from HIRS-2/MSU data such as cloud height and amount and atmospheric temperature, as well as stratospheric analyses of wind, temperature, and potential vorticity obtained with an atmospheric general circulation model running in an assimilation mode. This information may be useful in interpreting the ozone data.

Communications Network

Sol Broder and Jerome Bennett, Code 630.4, assisted by Bob Hudson, Code 616, will oversee the mission communications network, which connects the GSFC TOMS Operations Center; the Langley Research Center, Hampton, VA; the Ames Research Center, Moffett Field, CA; the Mission

Operations Center, Punta Arenas, Chile; the United Kingdom Meteorological Office (UKMO), Bracknell, England; the European Center for Medium-range Weather Forecasting (ECMWF), Reading, England; and the Centre National de Recherche Meteorologique (CNRM), Toulouse, France.

The Code 616 TOMS Operations Center, Building 21 and the Rolm Switching Center, Building 1, are key nodes in the project. In addition to transmitting the real-time TOMS data to Punta Arenas, the Building 21 Center is relaying near real-time NOAA-10 HIRS data to the ECMWF for total ozone analysis by the CNRM.

The TOMS Operations Center is serving as an alternate to the Mission Operations Center, Punta Arenas, in case of a communications network failure. The Mission Operations Center is staffed with atmospheric physicists and meteorologists who will analyze the weather conditions over the Antarctic and conduct research on

the mechanisms for formation of the ozone hole.

Balloonborne Measurements

A team from Wallops is flying balloonborne meteorological and ozone radiosondes — measuring instruments — daily through October from Palmer Station on the Antarctic Peninsula. The data will be used to make launch decisions for the ER-2 and DC-8 aircraft and are expected to provide information on the vertical structure and horizontal extent of the ozone hole.

The mission is organized and managed by NASA with substantial contributions from the National Oceanic and Atmospheric Administration and with the cooperation and involvement of the National Science Foundation (National Center for Atmospheric Research and Polar Programs Division), the Chemical Manufacturers Association, various U.S. universities and selected European meteorological organizations.

Goddard Team Develops Supernova Instrument

by Carter Dove



SERLEMITSOS

A team of scientists and engineers from Goddard is developing a special instrument they believe will give scientists the most direct proof possible of where and how heavy elements such as oxygen, calcium and iron—the ones necessary for life and for the formation of planets—were first formed.

Dr. Peter Serlemitos, Code 666, said that the instrument under development, the Supernova X-ray Spectrometer (SXS), is scheduled for launch aboard a sounding rocket from Woomera, Australia in the late Fall to observe the recently-discovered exploding star, Supernova (SN) 1987a. The instrument will be recovered and used for later flights, also.

SN1987a was the result of the February 23 explosion of the star Sanduleak 69-202 located in the Large Magellanic Cloud, a neighboring galaxy of our own Milky Way.

Because the emissions from the star now are obscured by expanding debris, the late

Fall launch of the SXS is contingent on the star's being visible in the x-ray band, Serlemitos explained.

He said the supernova is being monitored for x-ray emissions by the Japanese satellite, Ginga. When it detects x-ray emissions, the Goddard scientists hope to launch the SXS to collect data during the early period of escape when optimum data will be available.

With assistance from engineers of the Optics Branch, the SXS is being developed almost exclusively within Goddard's Laboratory for High Energy Astrophysics.

Serlemitos, a member of the laboratory staff, is the principal investigator for the SXS.

Goddard's role in the SXS development program stems from a response to a NASA Headquarters call for proposals for rocket and balloon instrumentation to view SN1987a.

The SXS design is primarily patterned on that of the Goddard-managed Broad Band X-ray Telescope (BBXRT), using the same type of x-ray mirror and detector as the BBXRT but modified to meet sounding rocket constraints.

Launch of the spectrometer from Woomera will be from a Terrier-Black Brant sounding rocket managed by Wallops.

Considered by most scientists to be the most significant astronomical event of the century, SN1987a is the first supernova seen since 1604 and the first bright supernova since the invention of the telescope in 1609.



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

Hoffmann Receives Small Business Award

by Randee Exler



FEDERAL EMPLOYEE OF THE YEAR—Goddard's Small Minority Business Specialist Franz "Frank" Hoffmann, Code 263, (right) and Procurement Officer Charles "Chuck" Dunfee, Code 200, hold the trophy that Hoffmann was awarded by the U.S. Small Business Administration for his "...exemplary procurement support to the minority business community."

You might know Franz "Frank" Hoffmann, Code 263, as the man behind Goddard's annual Small and Small Minority Business Conference. Recently Frank, Goddard's Small and Minority Business Specialist, was selected by the U.S. Small Business Administration (SBA) Region VI as the Federal employee of the year award winner of the Hilary J. Sandoval Jr. Award.

"This award is presented to an individual who has demonstrated exemplary support to the minority business community," wrote Joseph Pena, SBA, Regional Administrator, in a congratulatory mailgram to Goddard Director John Townsend, Jr.

Hoffmann, Head of the Procurement Analysis Branch, Code 263, was nominated because of Goddard's outstanding support of minority businesses, according to Eugene D. Rosen, Director, Office of Small and Disadvantaged Business Utilization, NASA Headquarters. In 1986, Goddard awarded \$83 million to minority businesses and during the first six months of fiscal year 1987, Goddard awarded \$34.8 million to small minority businesses. This was over twice as much as any other

NASA center and accounted for 34.2% of all NASA awards to minority businesses.

The Hilary J. Sandoval Award is named after the first Hispanic Administrator of the SBA. Sandoval's contributions to minority small business have been called both far-reaching and long-lasting by SBA officials.

Hoffmann received this special award in El Paso, Texas last month. Upon his acceptance, he said: "We at NASA are very excited about receiving this award. I personally am very proud to represent our NASA Goddard Space Flight Center team that understands and implements the 8(a) program on a day-to-day basis. Our engineers, scientists and administrative people believe in the 8(a) Program and what it has done and will do to strengthen this Nation's society... It has been proven by Congressional studies that small businesses are the leaders in innovation, and innovation is this country's competitive edge in the world market. Therefore, we all must thank our small businesses for what has been and will be done to improve this Nation's standard of living..."

NASA Chief Scientist and GSFC Associate Director Appointed



HINNERS

McDONALD

Former center director Dr. Noel Hinners will serve as the NASA Chief Scientist in addition to his responsibilities as Associate Deputy Administrator (Institution), effective August 24. Dr. Frank McDonald, who has been Chief Scientist since September 1982, will return to Goddard as Associate Director/Chief Scientist.

As the NASA Chief Scientist, Dr. Hinners will be the principal advisor to the Administrator and to senior management on agency-wide aspects of NASA's scientific activities. Dr. Hinners was Goddard's center director from June 1982 to June 1987.

Dr. McDonald began his NASA career in 1959 as head of Goddard's Energetic Particles Branch in the Space Science Division. In 1970, he became chief of the Laboratory for High Energy Astrophysics at Goddard. He was detailed to the White House Office of Science and Technology Policy as a senior policy analyst in 1982.

HEAO-1 Anniversary

August 12, 1987 marked the tenth anniversary of the launch of the first High-Energy Astronomy Observatory (HEAO-1), the heaviest unmanned scientific satellite (three tons) up to the year 1977.

Alanna Connors, a University of Maryland graduate student, is completing her Ph.D. dissertation based on Goddard's HEAO-1 cosmic X-ray experiment. As part of the anniversary activities, Connors announced, in a seminar on August 12, significant new results concerning the first evolution of the spectrum of X-radiation from a gamma-ray burst. This is the first time that the evolution of a complete burst has been observed and the best spectroscopy to date, according to Connors.

“Teachernaut” Returns to Classroom After Two Years With NASA

by David Thomas



TEACHER AND STUDENTS—Teacher-In-Space Finalist Kathleen Beres shared her enthusiasm for the Nation's space program recently with guests at the Visitor Center. Beres, a Baltimore science teacher, has been on sabbatical in the Office of Public Affairs.

As the excited group of employees gathered in the lobby for a gander at who was being honored with limousine service, the honoree wondered if she could have spared them the commotion by being picked up at a more remote site.

Ah, but pomp and circumstance have been the norm for this lady since being selected two years ago as one of ten finalists in NASA's Teacher-In-Space Program. This event would be just another fast descent on the roller coaster ride she's been

on since being launched into an orbit of speaking engagements, impromptu appearances, media interviews and work with NASA.

On this day, Kathleen Beres—a science teacher from Kenwood High School in Baltimore, MD, on sabbatical in Goddard's Office of Public Affairs—would be sharing the stage with Vice President George Bush and Dr. Robert Jarvik, famous for the Jarvik-7 artificial heart. Beres, the “Space Ambassador,” would

stand in for Mrs. Bush, who had to cancel her appearance. The three celebrities would present awards to nine student finalists in Invent America, a national contest sponsored by MasterCard International which judges inventions by students in kindergarten through eighth grade.

Beres will return to the school system this fall after two years of teaching and learning in the NASA classroom. She will be a consultant to science teachers, sharing with them her NASA experiences.

She worked at Marshall Space Flight Center, Huntsville, AL the first and second year at Goddard, which she said she liked because of the research atmosphere, and because “it was like being on a college campus, again.” Beres majored in pre-medical sciences at the College of Notre Dame of Maryland and received a master's degree from Johns Hopkins.

The only science teacher among the finalists, Beres said she actually reached more students after becoming a Space Ambassador. “In the usual classroom setting, I'd teach about 150 students daily,” she said. “The NASA outlet has enabled me to reach more than 150,000 students in a relatively short time.”

Moreover, observing day-to-day field center operations impressed Beres. “Virtually all the employees were proud to be working for the space program,” she said. “Everyone was excited and enthusiastic,

Continued on page 6



THEY HAVE ESP — Benita Cooper, Director of the Management Operations Directorate, recently held a special awards presentation for Code 200 employees who contributed to the Employee Suggestion Program (ESP). **BACK ROW** (left to right): Richard Fedorchak, Code 290; Terry Velasco, Code 290; Benita Cooper; John Baniszewski, Code 285; Helen Zug, Code 250; Greg White, Code 290. **FRONT ROW**: Veronica Stubbs, Code 260; Cindy Cherrix, Code 280; Sharon Bland, Code 280; Ellen Ollendorf, Code 280; Janet Jew, Code 260; Jan Tetrick, Employee Suggestion Program Coordinator, Code 224.

ESP on the Move

by Jan Tetrick

The Center Employee Suggestion Program (ESP) has undergone some new changes. A Center-wide Employee Suggestion Committee, consisting of representatives from each directorate has been organized. Recently, the committee reviewed ideas submitted for the Equal Opportunity Award.

Another addition are new ESP boards in every building. These boards contain the ESP forms and envelopes and flyers on ESP.

More people are submitting ideas and more ideas are being adopted. In FY85, two suggesters shared a ESP cash award of \$5,000. IN FY86, 33 cash awards, ranging from \$50 to \$500, were received. So far, in FY87, 21 employees have

Continued on page 6

*From Student To Teacher:***Former SHARP Student Reverses Role**

by David Thomas

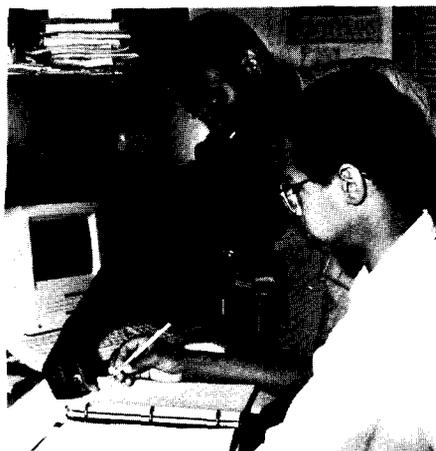
When Cyn Hadnott solicited mentors for this year's Summer High School Research Apprenticeship Program (SHARP), she was unaware that among the acceptees was a newly-hired employee who participated in the program at its inception here in 1980.

"When I called him," explained Hadnott, SHARP coordinator for the last four years, "he didn't tell me he had been in the program. I didn't find out until I read the project summary he submitted a few days later." He is the first SHARP student to graduate from college and work at Goddard.

"He" is 24-year-old Nathan "Nate" James, a systems programmer in the Central Data Services Facility. This story is about him, how he's returning to the SHARP Program what he received from it: direction, career counseling and work experience pertinent to his future endeavors.

James' role reversal epitomizes the benefits of a program like SHARP—student becomes teacher and enlightens others as he once was. But not only is James a mentor in the SHARP Program, which encourages talented and gifted students to pursue technical careers, he is a mentor in life as well.

Involved in many church activities since he was a tot, James is now a senior member of the Young Adult Ministry, in which he teaches other youth the virtues of leadership; he also writes music for the church's 30-piece orchestra and aspires to be its music director, something that's "in his blood" because his mother is director of the church's Music Ministry. Because he likes music, gospel and jazz especially, he also works with the Audio Ministry



SHARP SUCCESS—Former SHARP intern "Nate" James, Code 633, (back) was hired by Goddard as a Systems Programmer in the Central Data Services Facility and now serves the program as a mentor to future oceanographer Anthony Hill.

Department, mixes gospel music and deejays gospel at a local roller skating rink.

Asked if he's considered becoming a minister, he puts a finger to his temple and peers into space as he ponders with a smile. "Well, not necessarily from the pulpit," he answers. "You see, I consider the marketplace my ministry."

Indeed, in the year that he's been a full-time professional at Goddard with his computer science degree from the University of Maryland, he has established a bible study class. The class evolved from lunchtime discussions among a small group of friends, he said. "Now we've got a room in Building 18 where I teach the class weekly."

In the family setting, James' role-modeling responsibilities are two-fold: be-

cause he has two younger brothers, he knows it's imperative to set a good example; as a family-man in his own right—he's been married three years and he and his wife are expecting their first child—he wants his own family to look to him for leadership.

"I think everyone should have someone to emulate," he said.

Will James' student, 16-year-old Anthony Hill, emulate his mentor?

"Of course," Hill said. "When 'Nate' was in SHARP, one of his tasks was to write a useable Fortran program for his project. He's teaching me how to write Fortran now... I'm confident my project will be just as good or better."

James said Hill is catching on fast and expects him to complete successfully his project during the eight-week program. Hill, now attending the Baltimore Polytechnic Institute, plans to attend the U.S. Naval Academy and eventually wants to become an oceanographer.

Fortunately, things might work out so that James will be a mentor for SHARP students for years to come. Regarding career plans, James said he's not one who has to change jobs every three years.

"Once I've settled on something, I usually stick with it," he said. "I'm sure I'll be with Goddard for a while because it's proved to be fertile ground."

The cycle appears to be productive. You know, those sayings that go: "You reap what you sow... You only get out of something what you put into it." James benefitted from SHARP by gaining insight about the workplace and direction for career growth. At the very least, he is providing the same things to Hill, the future oceanographer.

"A Celebration of Citizenship"

**September 16, 1987
1:00 p.m.**

Participate in a once-in-a-century event! The event, called "A Celebration of Citizenship," commemorates the 200th anniversary of the Constitution of the United States.

President Reagan will lead the Nation in the Pledge of Allegiance and Chief Justice Warren E. Burger will lead a recitation of the Preamble to the Constitution on September 16 at 1:00 p.m. The ceremonies will take place on the west steps of the Capitol, and everyone is invited to attend.

Can't make it downtown for the event?

National radio and TV will cover the Mall ceremonies. Why not bring in a transistor radio and tune into the broadcast from your office? How about wearing red, white and blue?

This is your chance to participate in a historic occasion which rededicates the document which gives us the blessings of liberty. For more information, phone the Commission on the Bicentennial of the United States Constitution, Federal Programs Division, at (202) 653-2486.

Employees Enjoy a "Silent Lunch"

"It's hard not to talk with your hands full!" said Jackie Cooper, Code 224, organizer of the "silent lunch," a weekly session for employees who want to practice their sign language skills.

Cooper, along with other recent graduates of a Goddard-sponsored sign language training course, get together on Tuesdays at 11:30 a.m. in the Building 21 cafeteria to practice their newly-acquired skills over lunch.

"You have to keep it up or you'll forget what you've learned," she explained.

Sign language training is one of many courses offered at Goddard. The sign language instructors are from Gallaudet College, a higher-education institution for the hearing-impaired, located in Washington, D.C.

"I feel pretty good about what I learned," said Cooper. "I really got a lot out of the course," she added. "There might be an advanced course offered here next year which I would be interested in taking."

Margie Small, Code 253.1, was asked to photograph a recent "silent lunch." Small, who is hearing-impaired, couldn't help but join in the session.

"I'm glad I got to help them practice their sign language," she explained. "People don't realize that deaf people can slow down and use basic signs that beginners can understand. We don't bite! People shouldn't be afraid to practice with me or any of the other deaf employees on Center."



DO YOU KNOW WHAT THEY'RE SAYING?— Left to right: Jackie Cooper, Code 224.2, Pat Greco, Code 224.2 and Gloria Blanchard, Code 286 don't want to forget what they learned in class so they practice their sign language skills over lunch.

Visitor Center Tour Guide Training Begins



Training began for the Visitor Center's volunteer tour guides on July 9 and will continue through August. The volunteers will be receiving first-hand information from Goddard's network of scientists, engineers and researchers so they can help explain Goddard's mission and exhibits primarily to school groups. "On behalf of the Visitor Center and the Office of Public Affairs, I'd like to thank this group for donating its time to Goddard," said Darlene Ahalt, Volunteer Coordinator. "The group is really enthusiastic about the

space program and looking forward to working with students." Pictured: BACK ROW: (left to right) William O'Leary, Visitor Center Staff; George Dow; Mark Zetterstrom; Robert Wilson; Roland Van Allen; Dr. Robert Goddard (photo cutout); Darlene Ahalt, Volunteer Coordinator; Richard Lowman; Kenneth Horner; Robert Sclater, Visitor Center Manager. FRONT ROW: Janet Butler, Marie Jensen, Elisabeth Redsecker, Harriet Mensky, Jacques Aimi, John Casey, Gerald Gaffney.

"Teachernaut"

Continued from page 4

whether a co-op student or employee about to retire."

A Baltimore County newspaper quotes her as saying "... There's no university, no graduate program in the world that could have afforded me the experience that I've gotten in these last two years."

Beres is setting a good example for youngsters to emulate: "not following where the path may lead, but, instead, going where there is no path and leaving a trail." A small indication of her success in this respect is the influence the Teacher-In-Space Program has had on young students.

Our interview for this story followed a conversation she had with a starry-eyed 11-year-old girl, clad in shuttle-astronaut garb, who had just returned from Space Camp. The youngster quizzed Beres for nearly two hours on how to become an astronaut.

In keeping with her lifestyle, becoming an astronaut is merely an extension of her many adventures: she has climbed Mount Kenya, traversed glaciers in Greenland, kayaked in Alaska and crossed the ocean in a 31-foot sailboat. Most recently, she conducted research on penguins in southern Argentina.

But NASA was her most exciting adventure of all.

ESP

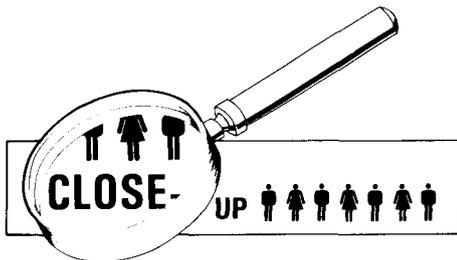
Continued from page 4

received cash awards ranging from \$50 to \$750. Code 200 recently held a special ESP Awards presentation which recognized 19 employees for their contributions to the Center ESP.

What is a suggestion? A suggestion is an idea which, when implemented, will result in more efficient or more economical operations, or any other improvement in Government operations. It may propose: a way of reducing operating costs; improvement of procedures, products, services, safety, employee relations, or public relations; new uses for present equipment or facilities; or a practical solution to a problem it identifies.

An employee's suggestion, if implemented, makes him or her eligible for the "Suggester of the Year" award. This award is presented to the individual or group whose suggestion has had the most beneficial impact on the Center. This award is presented by the Center director at the annual joint NASA/Goddard awards ceremony.

Has anyone ever said, "Someone should really do something about that" or "Why don't *THEY* do something about that?" Well, here is your chance — write those ideas down and submit them to the Center Employee Suggestion Program. For additional information, contact Jan Tetrick, ESP Coordinator, Code 224, x63094.



Paddack Partakes in U.S. Space Observance



NANCE

Farewell to **BOB NANCE**, Code 220, who transferred to NASA Headquarters this month as Chief, Staffing Policy of the Personnel Programs Division. For the past six years, Bob has been responsible for most of the performance management and merit pay-related functions on Center.



TREINISH

LLOYD A. TREINISH of Goddard's National Space Science Data Center (NSSDC), Code 634, and **MICHAEL L. GOUGH**, a Satellite Applications Research employee at the NSSDC, wrote the lead story for the American Geophysical Union's weekly newspaper, *EOS*, recently. The story, entitled "A Software Package for the Data-Independent Management of Multidimensional Data," described a newly-developed software package which supports a data structure called the Common Data Format.



GOUGH



Dr. Stephen Paddack, Chief, Advanced Missions Analysis Office, was a principal speaker at the opening ceremonies for U.S. Space Observance '87 in Salt Lake, City, UT recently. Paddack also presented an American Institute of Aeronautics and Astronautics (AIAA) Student Science Achievement Award to Theran Davis of

Brighton High School (BHS) in Salt Lake City. Davis (right) received the award for his outstanding contributions to Brighton's award-winning student shuttle simulator, called 'Starlab,' and for work on a BHS Getaway Special experiment waiting for a shuttle flight.

The Space Agency Branch of the Citizens Bank of Maryland closed its doors this month after 23 years of service to the GSFC community. An open house was held on August 7 to honor past and present bank employees.

Blood Donors

Following is a list of Goddard donors who were cited by the American Red Cross with gallon pins at the bloodmobile of August 5, 1987:

NAME	No. of Gallons
Sandra Biggs	1
Mort Friedman	15
Tom Gostomski	2
David Haykin	6
Linda Kasprzak	1
James McLean	4
Walt Paroby	1
Henry Price	9
Dale Shultz	2
Dick Stonesifer	3
John Tominovich	11
Wariwat Wachrathit	1

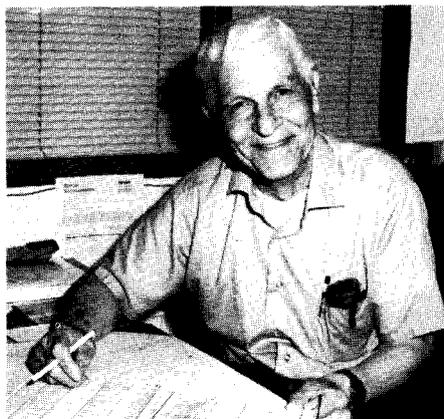
All special orders for blood were met! **THANK YOU**, Goddard, for supporting the urgent need for blood in our community!

The next bloodmobile visit will be on October 7, 1987 from 8:30 a.m. to 1:30 p.m. in Building 8 auditorium.

Retirees

Farewell and best of luck to the following retirees who left Goddard recently!

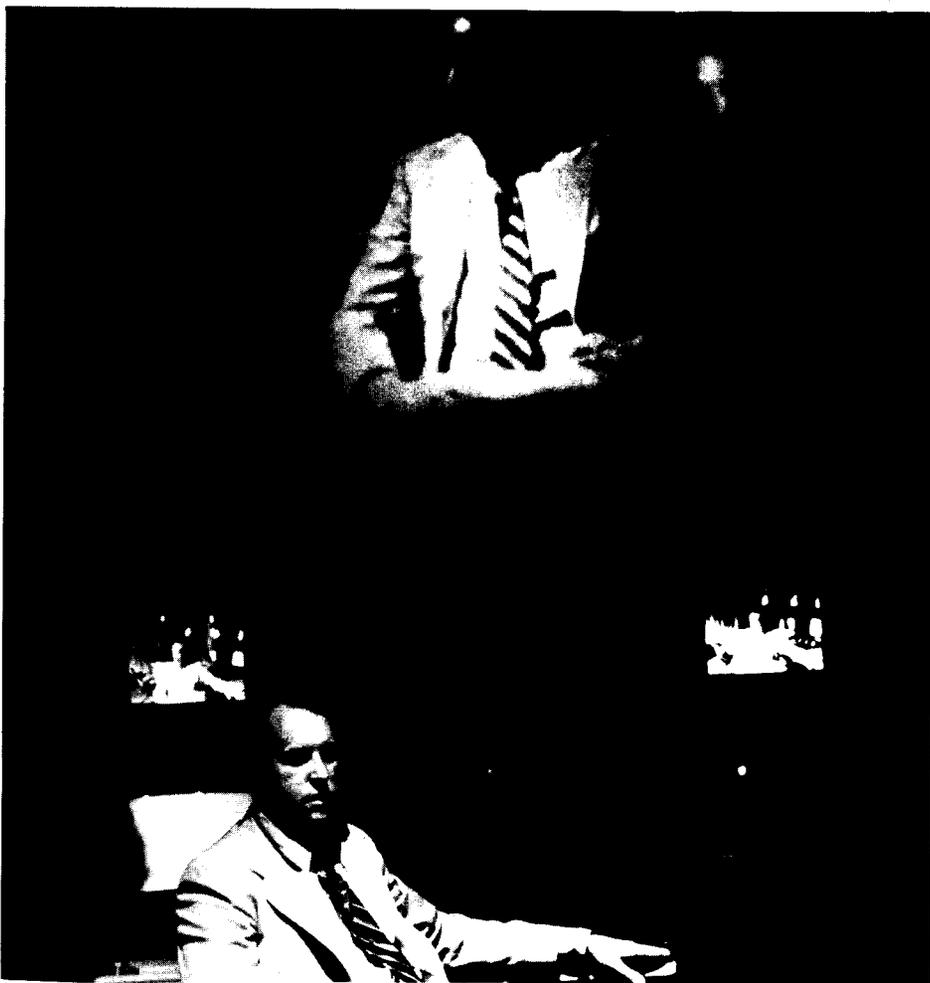
	Code	Years
Albin, Frank I.	515.2	22
Coffman, John W.	531.1	31
DiBartolo, Anthony	291	35
Glunt, George E.	752.1	36
Marechek, George M. Jr.	553.1	31
Pierro, Anthony J. Sr.	754.3	34
Stivaletti, Joseph F.	716.1	33
White, George	540	34



MORE THAN HALF-A-CENTURY OF SERVICE—Congratulations to John T. Dukes, Code 293, who retires from Wallops this month with 55 years of government service.

Goddard Holds Space Telescope Planning Session

by Michael Braukus



VIDEO PROCESSING CONSOLE — Sitting in front of the video processing console in the Goddard Visitor Center's auditorium, Jeffrey Elliott, Goddard Television, explains the NASA Select TV satellite link-up used to telecast his image on the large screen behind him to public affairs representatives attending a conference on the Hubble Space Telescope.

NASA
National Aeronautics and
Space Administration
Goddard Space Flight Center

Goddard News

The GODDARD NEWS is published monthly by the Office of Public Affairs, Goddard Space Flight Center, Greenbelt, MD 20771 for people like:

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Executive Editor... James C. Elliott
Managing Editor... Rande Exler
Senior Editors... Michael Braukus,
Carter Dove and
Joyce Milliner
(Wallops).

Goddard's Office of Public Affairs and the Space Telescope Science Institute co-hosted a two-day conference recently to discuss plans for disseminating news about the Hubble Space Telescope (HST) to the public.

Attending the meeting were public affairs officers from the HST's principal investigators' home organizations which included the California Institute of Technology, University of Colorado, University of Texas and the University of Wisconsin.

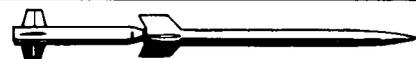
Also attending were the telescope's principal investigators and public affairs officials from Ball Aerospace; Lockheed Missiles and Space Company, Inc.; Martin Marietta; Perkin-Elmer Corp.; European Space Agency; Jet Propulsion Laboratory; Marshall Space Flight Center; and NASA Headquarters.

The first day of the conference was spent at Goddard's Visitor Center where the participants reviewed NASA's HST public affairs plan and its various elements, including press release procedures and press room operations.

During the morning session, the group saw a demonstration on the capabilities of the video processing console located in the Visitor Center's auditorium. Throughout the telescope's orbital and scientific verification periods, the Visitor Center will serve as the HST news center.

Resembling a television control room, the console operation will allow media representatives to retrieve images of news conferences and transmit video materials on HST activities. The group also was given a demonstration of the satellite broadcast capabilities of NASA Select television.

The second day of the conference was held at the Space Telescope Science Institute in Baltimore, where the group was briefed on the Institute's role during the telescope's operational period. A tour of the Institute included the photo laboratory and the guide star selection system vault, as well as a demonstration of the Institute's image processing workstation.



Model rocket demonstrations blast off from the Visitor Center (VC) on Sunday, September 5 and 19 at 1 p.m. For more information about upcoming VC events call x68981.

Groundbreaking at New White Sands Facility



SECOND GROUND STATION—This is an artist's concept of the second Tracking and Data Relay Satellite System (TDRSS) ground station being built at White Sands, NM. This station will serve as a backup to the existing ground station and will support the increased mission requirements in the Nation's space program in the mid-1990s. To be located just a short distance from the existing facility, the new \$18.5 million ground station, with a main building of 80,000 square feet, will feature the latest state-of-the-art equipment. Ground breaking for the facility took place on September 9. It is expected to be completed in July 1989.

Dignitaries Participate in Event

by Jim Elliott

Leading NASA, New Mexico and Las Cruces dignitaries participated in ground-breaking ceremonies for NASA's \$18.5 million ground terminal at White Sands, NM on September 9.

Speakers at the 10 a.m. ceremony included Robert O. Aller, Associate Administrator for Operations, NASA Headquarters; Secretary Thomas Thornhill, New Mexico Department of General Services; David Steinborn, Mayor of Las Cruces; and John Quann, Goddard Deputy Director.



HAUCK

scheduled for June 1988.

The facility being built is the second ground station for NASA's Tracking and Data Relay Satellite System (TDRSS), a system of in-orbit satellites used for com-

munications with other orbiting satellites, including the Space Shuttle. The new facility is located three miles north of the existing TDRSS ground terminal. Construction is expected to be completed by mid-1989, according to Donald P. Eckel, Goddard's project manager.

The new ground terminal is necessary, Eckel said, to serve as a backup to the existing station and to meet the increased mission requirements in the Nation's space program in the 1990s.

When in operation, the facility is expected to hire approximately 150 persons, Eckel said. Following the ground-breaking ceremony, the guests attended a reception and toured the existing ground terminal.

Other attending dignitaries included State Senator Harold Foreman; State Representative Leonard Sheffield and Mrs. Sheffield; Henry G. Steele, representing State Senator Ellen Steele; Dr. John Stapp and Gregory Kennedy, International Space Hall of Fame (Alamogordo); Major General Joe Owens, Commander, White Sands Missile Range; and representatives

from the offices of U.S. Senator Pete Domenici and U.S. Congressman Joseph Skeen, both from New Mexico.

Others included H. James Fox, Bureau of Land Management; Lt. Col. Harry Betlay, U.S. Air Force Communications Support Facility; George Myerson, Computer Sciences Corporation (Beltsville, MD); Robert Campbell and Chris Willadsen, Stevens, Mallory, Pearl and Campbell, Architects, Albuquerque; and David Batcho, Batcho & Kauffmann Associates, Archaeologists, Las Cruces.

The construction contractor is The Argee Corporation, Denver, Colorado.

**SPACE
STATION
LOGOS
SELECTED**
INSIDE
Page 3

New NASA Ground Station Keeps Pace With Spacecraft Technology

by Michael Braukus

Advances in NASA spacecraft technology have led to the development of sophisticated instruments that generate large amounts of data. Spacelab, the Hubble Space Telescope and the Cosmic Background Explorer are just a few of the upcoming NASA space missions that will generate huge amounts of scientific information.

Good communications between Earth and orbiting spacecraft are essential to a successful mission. For this reason, NASA developed the "Space Network" (SN), a communications system that will increase information exchanges between low-orbiting spacecraft and the ground.

The SN consists of orbiting Tracking and Data Relay Satellites plus the White Sands, NM ground station and the Network Control Center at Goddard. The Tracking and Data Relay Satellite Sys-

tem (TDRSS) is the main element of Goddard's SN.

At present, the TDRSS has only one satellite in operation. Eventually, three satellites will comprise the operational system—with each satellite in geosynchronous orbit 22,300 statute miles from Earth, each able to relay signals from the ground to orbiting satellites and, conversely, scientific and other data from an orbiting satellite to a station on the ground. A fourth satellite will be placed in orbit as a spare.

When operational, TDRSS will permit communications with and tracking of orbiting satellites for 85 percent of an orbit or better, as opposed to 20 percent with ground stations alone.

Additional ground support will be provided when a new second ground ter-

terminal, now under construction, is completed. Located three miles north of the existing TDRSS Ground Terminal, which has been in operation since 1983, the new facility will act as a backup and respond to the increased communications demands of the Nation's space program, according to Donald P. Eckel, Goddard's project manager for the new facility.

The \$13.1 million construction contract for the new ground terminal was awarded to Argee Corporation of Denver, CO. The facility is expected to be completed by late 1989 and in full operation by early 1993.

When completed, the new ground terminal will include an 80,000-square-foot main terminal, a 25,000-square-foot technical support building and a 9,000-square-foot power plant. It will house electronics worth more than \$300 million and employ approximately 150 people.

Excavation for Second Ground Terminal Opens Window Into Past

by David Batcho

Editor's Note: In keeping with NASA's Federal responsibilities with regard to the protection of our Nation's cultural resources, test excavations were conducted near the site of the Second Tracking and Data Relay Satellite System (TDRSS) Ground Terminal (STGT), in White Sands, NM, to determine if the construction of the STGT would adversely impact any significant archaeological or historical sites. Following are excerpts from a report prepared by David Batcho, Batcho and Kauffman Associates of Las Cruces, NM, NASA's archaeological consultants for the project, who uncovered American Indian artifacts near the site of the STGT:

"...it soon became apparent that one of the sites contained the undisturbed remains of a pithouse settlement, while the other—located a few miles farther south—contained the remains of a temporary camp, probably once used to gather and process wild foods.

"Pithouses were a common type of dwelling used by prehistoric Indians in the Southwest. They are called pithouses because they are constructed by first digging or scooping out a large hole or depression in the ground..."

"The superstructures excavated... were



PREHISTORIC ARTIFACTS—Virgil True, Station Director, White Sands Ground Terminal (right) shows Howard Ottenstein, Office of Public Affairs, Code 130, Indian artifacts near the site of the second Tracking and Data Relay Satellite System Ground Terminal.

...perhaps six or seven feet in diameter, and dug into the ground about a foot deep. This suggested that they probably were used for only a very short period, maybe a month or so, while the Indian group was camped in the area.

"One of the excavated structures had burned (after its abandonment) and fortunately for the archaeologists, appears to

have been fairly quickly covered by blowing sand. As a result, some of the charred roofing material was found still lying on the floor in nearly the exact same position as when it fell... The preliminary radiocarbon analysis indicates that this little structure was built more than 1,200 years

Continued on page 4

The Votes Are In: GSFC Space Station Logos Selected

When the Office of Space Station, NASA Headquarters solicited ideas from around the Agency for a new logo for the Space Station, 12 Goddard employees and their associates put pens to paper and created 22 original designs.

"The Space Station Project and the Office of Public Affairs would like to thank everyone who submitted designs," said Ron Browning, Space Station Manager. "The turnout was greater than we expected," he explained. "Choosing the winners was very difficult."

Browning, along with Randee Exler, Office of Public Affairs, and Carol Kulwich, Presentations Department, narrowed down the entries to three final logo

designs. They based their joint decision on the following logo criteria developed by the Office of Space Station, NASA Headquarters:

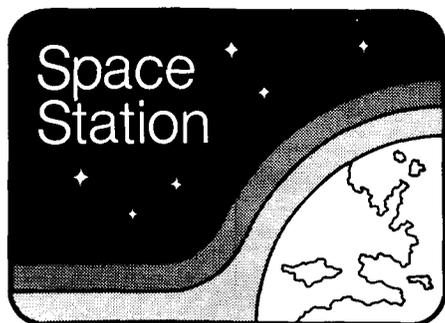
"It should be bold, new and lend itself to a variety of imaginative uses . . . it should be simple enough to be used on a variety of printed materials, such as publications and vugraphs, as well as for applications such as lapel pins, decals and cloth patches . . . the logo will represent a project that will evolve and grow over time . . . Faddish designs, or those that are configuration-specific could be out of date quickly."

The selected logos were submitted by Bob Watson, Code 515.1; Dominic Man-

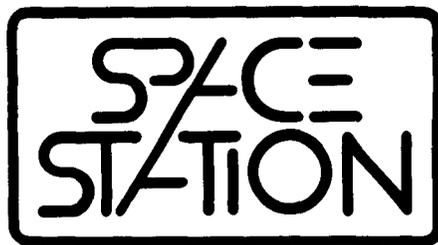
zer, Code 711.2 with Elsie Grant, TS Infosystems (TSI), Code 616; and Kent McCollough, TSI, Code 616 with Elsie Grant.

Additional entries were submitted by Sheila A. Alpers, Unisys, Code 500; Troy Ames, Code 522.1; Ben Chao, Code 621; Rick P. Collins, Bendix, Code 534; Deborah Foch, Computer Sciences Corporation, Code 550; Gloria Goodman, Code 420; John M. Lindsay, Code 401.6 and Rachel E. Tocylowski.

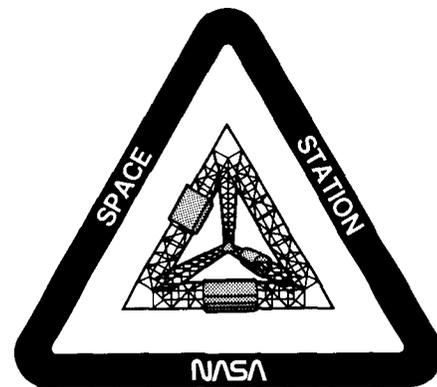
The three selected logos were submitted to the Office of Space Station. The logo designs from all of the Centers will be presented to the Space Station Management Council this month.



Dominic Manzer, Code 711.2/Elsie Grant, TS Infosystems (TSI)



Kent McCollough, TSI/Elsie Grant, TSI



Bob Watson, Code 515.1

"Need Travel Assistance? Ask Mr. Foster!"

There have been some major changes in Goddard's travel office. The most obvious one is a change in personnel.

The Scheduled Airline Traffic Office (SATO), which had been at Goddard since 1979, did not have their agency-wide contract renewed by NASA. "This is in no way reflective of the performance of the SATO staff at Goddard," explained Bob Herrick, Traffic Management Specialist. "Our SATO personnel took extra steps in their job. They cared about the people they served."

Ask Mr. Foster Travel Service replaced SATO. This company has been in the travel business since 1888, according to Lauren Naiman, Site Manager and "there really was a Mr. Foster."

As the story goes, Ward G. Foster, a travel buff, owned a gift shop across from a popular hotel in Florida. When guests had travel related questions, the hotel staff

would direct them to the gift shop to "ask Mr. Foster."

Ask Mr. Foster Travel Service is the largest independently owned travel agency in the country with 460 offices nationwide.

according to Naiman. In addition to government travel assistance, the Ask Mr. Foster staff can help you plan your next vacation. This company offers special discounts for selected tours and cruises.



NEW TRAVEL OFFICE PERSONNEL—Pictured are the team of Ask Mr. Foster Travel Service personnel at Goddard. FRONT ROW (left to right): Lauren Naiman, Linda Raduazo, Gigi Bellucci. BACK ROW (left to right): Jim Luker, Siobhan Adams.

First Satellite-Aided Save Remembered

COSPAS/SARSAT, the satellite-aided international search and rescue program, celebrated the fifth anniversary of its first save this month.

This historic save was made in the midst of 50-foot trees and 7,000-foot mountains in British Columbia, Canada, on September 10, 1982. Three persons, searching for another downed aircraft, crashed in the mountains and activated their Emergency Locator Transmitter (ELT). The distress signal was picked up by the Soviet satellite Cospas I, which relayed the signal to Canadian authorities, who alerted rescue forces.

That save marked the first time in history that a satellite had assisted directly in the rescue of people in distress.

Since then, at least 916 lives have been saved through the assistance of satellites—500 air, 378 marine and 38 pedestrian.

The system now has five satellites in operation, three Soviet and two American.

Sponsored by Canada, France, the Soviet Union and the United States, COSPAS/SARSAT is designed to reduce the time required to rescue air and maritime distress victims and to find victims who otherwise probably would not be found.

SARSAT (Search and Rescue Satellite-Aided Tracking) equipment is carried on National Oceanic and Atmospheric Administration (NOAA) satellites. Canada provides transponders; France provides

onboard receiver/processors, and the United States provides the spacecraft.

The U.S. effort is supported by NASA, the National Oceanic and Atmospheric Administration, the Air Force and Civil Air Patrol and the Coast Guard and its auxiliary.

COSPAS (Russian acronym for Space System for Search of Vessels in Distress) equipment is carried on Soviet Cosmos satellites. The Soviet Union provides its own equipped spacecraft and launch.

All four countries, as well as Norway and the United Kingdom—provide ground stations. Other participating nations are Bulgaria, Finland, India and Denmark. Brazil is expected to join in the near future.

Goddard is responsible for the research effort behind the program. The SARSAT System Evaluation and Development Laboratory (SEDL), located in Building 22, is where software routines are developed and tested to process emergency beacon signal data and make it more useful. Doug Kahle is the SEDL and Local User Terminal Manager. Fred Flatow, Code 480, is the SARSAT Mission Manager.

An understanding was signed with the International Maritime Satellite Organization (INMARSAT), London, England, in February 1987 to provide administrative secretariat services for the program. When the COSPAS/SARSAT Steering Committee meets in London this November, the international delegates will toast the fifth anniversary of this humanitarian project.

Excavation

Continued from page 2

ago, probably some time between 650 and 750 A.D.

"In addition to the structures themselves, a broad area around and between the pithouses was also excavated. These are what archaeologists call activity areas. These activity areas contained the remains of outdoor camp and cooking fires, as well as large quantities of the everyday debris of living—the trash. This trash consisted of pieces of broken pottery, several arrowheads, and discarded or broken stone tools and the chips of stone left over from making them. Also, a large amount of burnt and unburnt animal bone was found—the last remains of many meals... Analysis has shown that most of these bones are from jackrabbits..."

The second site which was excavated was small and did not contain any structures. The main feature of this site was an excellently preserved roasting pit. Early settlers in the area have described how roasting pits were used by the nearby Mescalero Apaches when the white man first arrived...

"The roasting pit site... is probably about 1,000 years old..."

"While construction is about to begin on this new, high technology facility—to give us another window into space—archaeologists have, likewise, been able to open a small, yet intimate, window into the dim past."

The Baltimore Sun recently carried this Letter to the Editor, written by Howard Ottenstein, Code 130, The Goddard News staff thought that it was worth sharing with our readers:

Geese at Goddard

Editor: If Aberdeen has its eagles, Goddard Space Flight Center is proud of its geese. Indeed, so popular has Goddard become as a nesting preserve for Canada geese that almost once every two years, whole families must be gathered up and shipped to "Goddard East," better known as the Wallops Flight Facility, a division of Goddard, located on Virginia's Eastern Shore about one hour south of Ocean City.

There, they never again need to fear crossing Goddard's main road at Greenbelt, Md., and dodging the cars of some 7,000 employees. Whole families of deer also roam Goddard's rolling green acres, but their grace and beauty are admired from afar. Goddard, Greenbelt — a lovely place to work.

Howard K. Ottenstein.



RESEARCH EFFORT—Doug Kahle, Code 480, and Hugo Hodge, Westinghouse, in the SARSAT System Evaluation and Development Laboratory (SEDL). Goddard is responsible for the research effort behind COSPAS/SARSAT, the satellite-aided search and rescue program.

Nimbus-7 Gears Up for the 1990's

The Nimbus-7 Operations Control Center, Building 3, is shrinking. More than 2,000 square feet of vintage 1960 computer hardware is being replaced by a desk top computer, monitor and printer.

"The Expert Nimbus Operations System (ENOS) can do everything that the old system can do and more. It's a more cost effective operation," explained Mike Forman, Nimbus-7 Operations Manager.

"I estimate that the ENOS will save between \$40,000 and \$60,000 a month in power requirements, maintenance and operating costs," he said. "One of the benefits of this system is that it frees up valuable space for other operations."

The ENOS is a data base driven software/hardware system which evaluates Nimbus-7 telemetry in real time for purposes of health, safety and condition of the spacecraft, according to Richard "Dick" Stephenson, General Electric/RCA

Government Services. Personnel in the Nimbus-7 Operations Control Center have been using the system since June.

"The ENOS is truly transportable," Stephenson said. "It can provide on pass visibility to Nimbus-7 anywhere that a NASCOM (NASA Communications Network) line is transferring Nimbus-7 data."

The Operations Control Center has been manned 24 hours a day since Nimbus-7 was launched in 1978. Operators send and verify commands to the spacecraft through the NASCOM at Goddard.

"It's a lot easier and faster now that everything is in one room," according to Forman.

Nimbus-7 is the last in a series of Nimbus spacecraft designed to survey the atmosphere of the Earth, map land and water characteristics, and observe weather and climate patterns. Five experiments aboard Nimbus-7 are still in operation.

Space Engineering Centers Announced

by Randee Exler

More than 300 Universities throughout the country were invited to participate in a pre-proposal video conference about a new NASA program which is being designed to expand the Nation's engineering talent base for research and development.

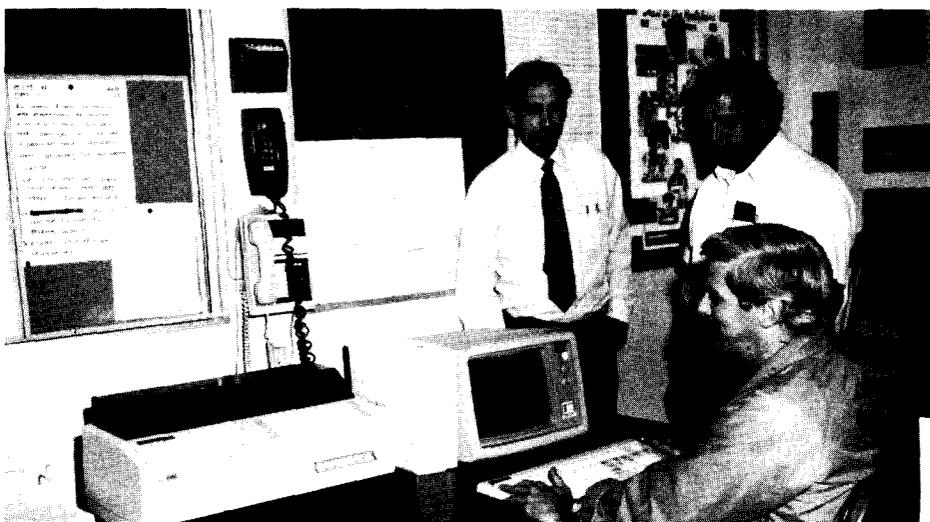
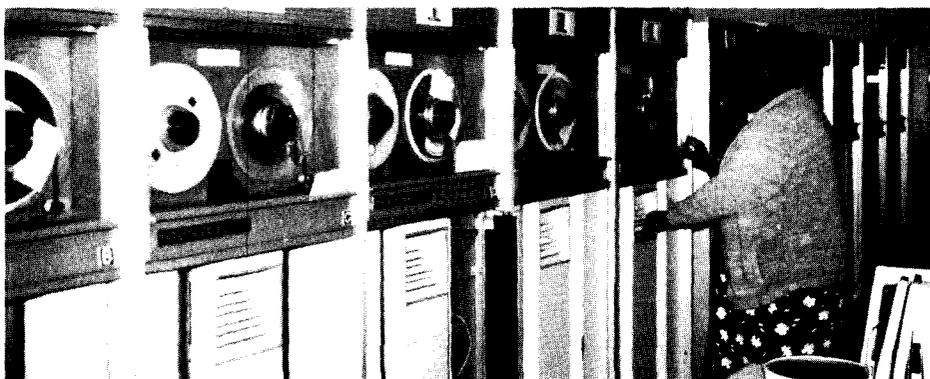
NASA's Office of Aeronautics and Space Technology (OAST) announced plans recently to establish a number of university-based Space Engineering Research Centers. The goal of these Centers is to enhance and broaden the capabilities of the Nation's engineering community to meet the needs of an expanding space program.

Each Center will be established under a NASA grant. The Centers are expected to focus on one or more of the research and technology areas that will enhance operational bases on the Moon, manned and unmanned missions to Mars, missions to other parts of the solar system and Earth observations.

The university Centers' programs may involve collaborative activities with other universities, industrial and other organizations as well as one or more NASA Centers, according to the program notice. Up to eight Centers may be established in the first year of the program, based upon the proposals submitted.

The preproposal video conference which originated from Goddard's Visitor Center on September 2, was introduced by Center Director Dr. John W. Townsend, Jr. and led by Raymond Colladay, Associate Administrator for Aeronautics and Space Technology, NASA Headquarters. It included an overview of the program as well as a question and answer session.

University contacts at Goddard for this program are Dr. Henry Plotkin, Code 700 and Dr. Gerald Soffen, Code 600.



BEFORE AND AFTER—TOP: Jeannette Brooks, Bendix, switches a tape on the old Nimbus telemetry housekeeping/processing system. This bank of computers represents about one-half of the equipment being replaced in the Nimbus-7 Operations Control Center. BOTTOM: Two rooms of computer hardware are being replaced by a desktop computer, monitor and printer. Pictured: Bernie Gonciarz, General Electric/RCA Government Services (seated); Dick Stephenson, General Electric/RCA Government Services (left); Mike Forman, Nimbus-7 Operations Manager (right).



Equal Opportunity Prize Winners Announced

by Randee Exler

"Cash awards... will be granted to individuals who submit the best technical proposals and provide solutions to everyday problems facing handicapped employees in the workplace."

The challenge was made. The challenge was met.

When Goddard became the 1986 recipient of NASA's Equal Opportunity (EO) award, the Center received prize money in addition to a trophy. The Office of EO decided to sponsor a Center-wide competition with cash awards, which would enable Civil Service employees to make positive contributions toward the elimination of barriers which impact disabled individuals. The deadline for technical proposals was May 22, 1987.

The Employee Suggestion Committee, consisting of representatives from each directorate, reviewed the proposals and based its selections on the following criteria: originality, technical merit, scope of impact, ease of production, commercial potential and verbal presentation.

First Prize

First prize (\$2,000 each) went to three Code 713 engineers: Scott Glubke, Glenn Lightsey and David Lindauer.

Their joint proposal would enable visually impaired people to know their exact location on Center and regain their bearings, if lost. The general navigation system they propose, uses a coordinate grid to determine exact locations on Center.

The General Positioning System (GEPS), consists of 2 radio emitter stations and an inexpensive hand-held receiver. The suggested technology is based on an existing airplane navigation system.

"At the press of a button, the hand-held receiver measures the angles of the strongest reception of signal from each emitter with the use of an electronic compass," according to the GEPS proposal.

"A simple algorithm on the micro-processor determines the position of the pedestrian in coordinates, which is then announced to the visually impaired user by the software speech synthesizer."

A system such as this would allow visually impaired people greater freedom to walk around the Center on their own, without special assistance. If a person becomes disoriented or lost, he need only press a button to determine his location.



AWARD WINNERS--Pictured behind NASA's Equal Opportunity (EO) Award, awarded to Goddard for 1986, are the winners of a competition to help eliminate barriers which impact disabled individuals on Center. Left to right: Deputy Director John Quann, John P. Krehbiel (third-prize winner), David Lindauer (first-prize winner), Bruce Milam (second-prize winner), and Equal Opportunity Specialist Chris Rodriguez. NOT PICTURED: First-prize winners Scott Glubke and Glenn Lightsey.

"A minor modification to the portable receiver could provide an option to relay the position coordinates to Security if the individual needs help or assistance," according to the proposal.

Second Prize

The second prize (\$1,500) went to M. Bruce Milam, Code 716, for his Optical Filters for the Color Blind suggestion. "Some people who are color blind can not see electronic displays," according to Milam. "These electronic displays are used at Goddard on the ROLM phones," he added. "The worker cannot determine which mode the ROLM phone is in."

Milam's solution to the problem is a simple one. He suggests taking a transparent strip with a colored tint and taping it over the electronic display indicators on the ROLM phone. "You have to experiment with the colors to find the right combination to make the electronic display visible to the individual," he explained.

"According to statistics, approximately seven percent of all males are color blind," Milam added. "That means there may be more than 300 Goddard employees affected by this problem."

Third Prize

Third prize (\$1,000) went to John P. Krehbiel, Code 732.2, for his suggestion that would enable verbally disabled per-

sons to leave voice messages on the GSFC telephone network.

"Since the ROLM phone system already has the ability to generate computer voice messages, it would be a simple matter to arrange for the computer to generate a particular series of message groups which would be combined into a single voice message," Krehbiel explained.

The system would use a dictionary of phrases identified by numbers. The user would string phrases together by entering a series of numbers into the ROLM system. The messages could be delivered via the existing phone mail segment of the ROLM system.

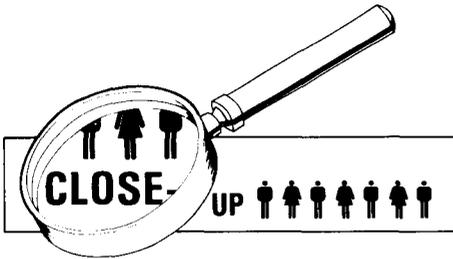
"One of the benefits of this system is that it can be used from any pushbutton telephone," Krehbiel explained.

The Equal Opportunity Prize winners will be recognized during a special ceremony on October 8 to kick-off "Hire the Handicapped Week."



DIAL 286-NEWS

Feeling out of touch? Out of the news mainstream? Dial 286-NEWS. This is the new number for the Office of Public Affairs code-a-phone. Dial in for up-to-the-minute information on Goddard and related events.



STROUD

BILL STROUD is back. Following a six-year tour of duty with the Scientific Affairs Division of the North Atlantic Treaty Organization (NATO) Headquar-

ters, Brussels, Belgium, Stroud returned to Goddard recently as Special Assistant, Flight Projects Directorate.

As Programs Director of NATO's Science for Stability Program, which was initiated in 1981, Stroud organized and directed a special civil program with Greece, Portugal and Turkey. The purpose of the program is to give scientists and engineers in these three countries experience in the management of applied research and development projects that require collaboration between government, university and industry laboratories.

Oops . . .

Our apologies to John T. Dukes, Code 293, Wallops. The last issue of the Goddard News incorrectly featured Dukes in the retiree box. Dukes completed 55 years of federal service on August 23, but he has no plans to retire now . . . or in the near future.

Retirees

Best wishes to the following Goddard employees who retired recently!

	CODE	YEARS
Bolster, William	470	32
Bradley, Walter D.	705	32
Harbach, Thomas R.	754.3	37
Holland, Alfred C.	672	22
Keipert, Frank A.	500	31
Leatherwood, Maceo	253.3	34
Mead, Gilbert D.	601	25
Meredith, Leslie H.	100	34
Norton, Doris M.	400.6	33
Skolka, Edwin J.	713.2	25

Dr. James H. Trainor Named Director of Space and Earth Sciences



Dr. James H. Trainor has been named Director of Space and Earth Sciences, Code 600, Goddard officials announced recently.

Dr. Trainor, the former Deputy Director of Space and Earth Sciences succeeds Dr. Franklin D. Martin, who was appointed Deputy Associate Administrator

* * *

ROBERT D. "DENNIS" MARCHANT, who joined Code 204 in June as Deputy Patent Counsel, has been named Chief of Patent Counsel. He succeeds John Tresansky who retired recently. Before joining Goddard, Marchant was Director of Patent Licensing under the Associate General Counsel for Intellectual Property at NASA Headquarters.

* * *



PICNIC AREAS—The outside eating areas are for everyone's enjoyment. Please be sure to deposit all trash in the receptacles that are provided. Don't let your trash spoil someone else's lunch. Remember, a little litter hurts a lot!

for Space Station, NASA Headquarters in September 1986. Dr. Trainor has served as Acting Director since that time.

Since joining NASA in 1964 as a research physicist, Dr. Trainor has made significant contributions to the success of Goddard and NASA in a number of positions of increasing responsibility. He served as a Section Head, Branch Head, and Associate Chief of the Laboratory for High Energy Astrophysics, until becoming Deputy Director of the Sciences Directorate in 1982. In 1984, he became Deputy Director of the Space and Earth Sciences Directorate.

Dr. Trainor has been a NASA project scientist for the Orbiting Geophysical Observatory, Small Scientific Satellite, Interplanetary Monitoring Platform and Helios programs. He is currently the NASA project scientist for balloon and sounding rocket payloads, which are managed at the Wallops Flight Facility.

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

Former Center Director Dr. Noel W. Hinners 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,

My deepest appreciation and thanks go to the people of Goddard for the warm (sometimes hot!) send-off party. The Sony discman helps immeasurably in getting me in the mood to face each new Hq. day. And it is always sobering and instructive to see and hear what really impresses the troops over time (reserved parking, etc.). The evening at the Rec Center was a tough one emotionally — to see so many good people who are talented and dedicated the way Goddard folks are and to know one is breaking the tie creates a sense of ir retrievable loss.

My best wishes go to all.

Sincerely,

Noel

Goddard's STOCC Conducts Joint Orbital Verification Test

by Michael Braukus



ORBITAL VERIFICATION TEST—Arnold I. Boone, working under the Lockheed missions operations contract for the Hubble Space Telescope, operates the Data Management System/Instrumentation and Communication console in the Space Telescope Operations Control Center, Building 3, during the joint orbital verification test. During the five-day test, Goddard's Space Telescope ground system was manned around-the-clock.

Goddard's Space Telescope Operations Control Center (STOCC) conducted a joint orbital verification test in preparation for the launch of the Hubble Space Telescope (HST) recently.

The test, which employed a computerized spacecraft simulator, began — Monday, August 31 and ended — September 4. During the five-day test, Goddard's Space Telescope ground system was manned around-the-clock.

The test marked the first time that all the HST's ground operational elements, which include Goddard, the Marshall Space Flight Center and the Space Telescope Science Institute, have participated together in such an exercise, according to Ron Felice, Goddard's HST operation manager. It also was the first time a special computer program which simulates the operation of HST had been used at Goddard, he said.

"The simulation provided us with a close replica of both the spacecraft and its environment so that the ground systems personnel could be exercised realistically," Felice explained.

Felice said that the simulator was an operational tool to train console operators and engineers. "When you have a spacecraft as complex and sophisticated as HST, it is essential to have something on the ground that allows the operators to practice," he said. "The simulator also permits us to evaluate not only the operators but the control center systems."

As part of the test, a bogus problem was included. "We put this into the system to force us to replan and examine how the system, as well as the personnel, respond to a change in our plans, and do it concurrently to ongoing operations," Felice said.

Developed by Marshall, the simulator allowed the operators to experience the presence of the spacecraft. Felice said, "The telemetry data the simulator transmitted gave the test some realism, but it was the simulator's reaction to commands from the STOCC that gave the console operators the sensation that they really were commanding the HST."

Felice stated that before the HST is launched by the shuttle Discovery in June, 1989, the HST ground system and its personnel will be exercised in other significant tests, some involving the actual spacecraft itself.

The telescope's operations are managed by Goddard. The Center also manages the Space Telescope Science Institute in Baltimore, the science facility from which the scientific observing program is conducted.

NASA
National Aeronautics and
Space Administration
Goddard Space Flight Center

Goddard News

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Executive Editor . . . James C. Elliott
Managing Editor . . . Randee Exler
Senior Editors . . . Michael Braukus,
Carter Dove and
Joyce Milliner
(Wallops).



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*Remember,
Someone out there needs
someone like you.*

NASA's Fall Supernova Campaign May Yield First Gamma Ray Detection

by Jim Elliott

NASA will conduct a coordinated series of sounding rocket, scientific balloon and research aircraft observations of Supernova 1987a from Australia and New Zealand beginning in October, according to officials at Goddard's Wallops Flight Facility.

Personnel from Wallops will play a major role in two sounding rocket launches and four balloon launches planned for the campaign, they said. The research aircraft, the Kuiper Airborne Observatory, is from the Ames Research Center, Moffett Field, CA.

Launch Window

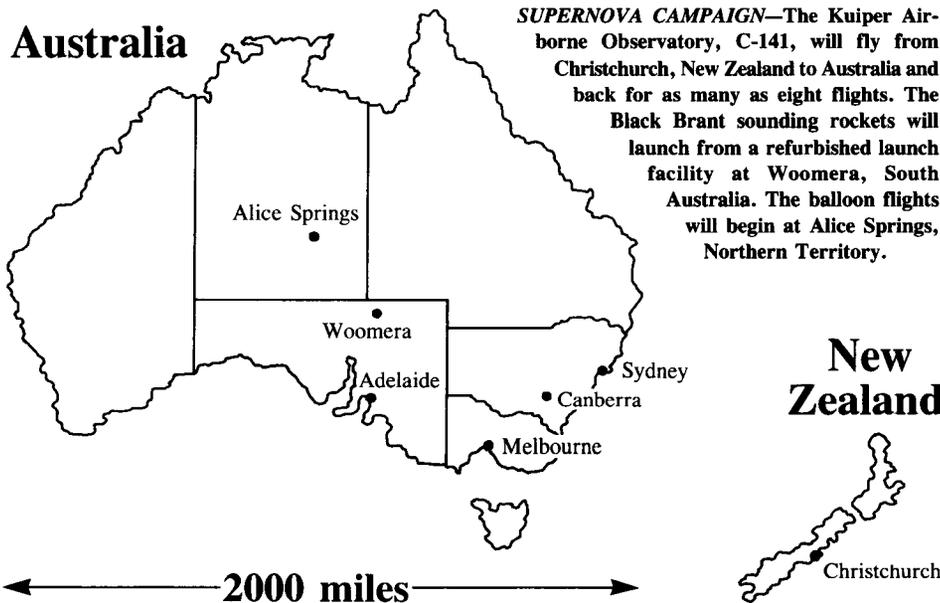
The window for the balloon launches, which will be conducted at Alice Springs, opens October 26 and closes December 14, according to Richard H. "Dick" Bradford, Balloon Campaign Manager at Wallops.

The two sounding rocket launches, from the Woomera Range, are scheduled for November 12 and 18, according to W.A. "Bill" Brence, the Wallops Sounding Rocket Campaign Manager. The November 12 flight will study x-ray emissions and the November 18 mission will investigate for gamma rays, Brence said.

The Kuiper Airborne Observatory will operate from Christchurch, New Zealand, performing eight flights between November 2 and 28, according to Guenter Riegler, Supernova Program Manager at NASA Headquarters.

Continuing Investigation

The fall campaign in Australia is a follow-on to a spring campaign in which three successful supernova balloon flights were made from Alice Springs. It also is a prelude to a continuing series of investigations of the supernova by these three means of study over the next two years, Riegler said.



SUPERNOVA CAMPAIGN—The Kuiper Airborne Observatory, C-141, will fly from Christchurch, New Zealand to Australia and back for as many as eight flights. The Black Brant sounding rockets will launch from a refurbished launch facility at Woomera, South Australia. The balloon flights will begin at Alice Springs, Northern Territory.

The supernova, 170,000 light years from Earth, was first detected last February 23 in the Large Magellanic Cloud by Ian Shelton of the University of Toronto, Canada and Oscar Duhalde of the Las Campanas Observatory, Chile. Within a few hours of the discovery, Goddard's International Ultraviolet Explorer (IUE), a cooperative project with the European Space Agency and Great Britain's Science and Engineering Research Council, began a program of observations of ultraviolet and visual wavelengths. Within the first week of the discovery, radio measurements from the Deep Space Network, far ultraviolet observations from the Voyager spacecraft and gamma ray observations from Goddard's Solar Maximum Mission satellite also were begun.

X-ray Emissions

Recently, first sightings of x-ray emissions have been reported by Japanese and Soviet scientists. The Japanese observations were from the Ginga satellite, and the

Soviet observations from the astrophysics module Kvant, which is docked to the space station Mir.

U.S. scientists with payloads for this Australian campaign plan to detect x-rays that will help solve some of the mysteries of the supernova and hope to be the first to detect gamma rays.

Bobby Flowers, Jon Van Overeem, Paul Buchanan, Anel Flores and Frank Lau from the Sounding Rocket and Balloon Projects Office at Wallops are the payload managers for this series of supernova flights.

INSIDE

LASER
ENGINEER WINS
MOE I. SCHNEEBAUM
AWARD

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Lab Chief Uses Remote Sensing To Study Mercury

by Carter Dove

We know it as the solar system's innermost planet: too close to the Sun to see, too hot by day and cold by night to touch, with an atmosphere too alien to breathe.

Not a good place for a family vacation. The "place" is Mercury.

Mercury is the least-studied of the terrestrial planets. As a result, scientists know little about its interior and subsurface properties. And until very recently, most of what we learned about the planet came from the data transmitted back to Earth by the Mariner 10 spacecraft 13 years ago.

Even today, only 40 percent of its surface has been photographed; the rest is largely unmapped.

But now, aided by advances in remote sensing technology, scientists such as Goddard's Dr. Dan Baker are approaching Mercury with renewed interest.

One of the "tools" being used by Baker and his colleagues to increase their knowledge of Mercury are the Very Large Array (VLA) ground-based radio antennas at Socorro, NM.

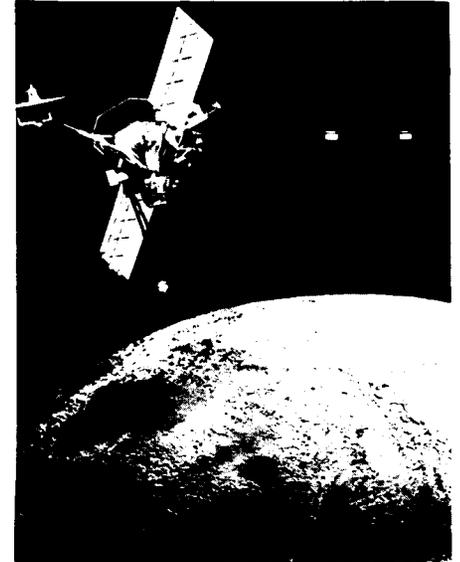
Baker—formerly with the Los Alamos National Laboratory, NM, and now Chief, Laboratory for Extraterrestrial Physics—along with Dr. Jack Burns and colleagues at the University of New Mexico, has reported on radio imaging observations which represent new information about the planet.

Augmenting the photographs taken by Mariner 10, the Baker team obtained the first-ever radio wavelength "pictures" of Mercury on July 6, 1986. The images:

- Probed a level approximately three feet (1 meter) beneath the Hermean (for Hermes, Greek-god counterpart of Mer-

Continued on page 6

Simulated Encounter



Mercury, smallest of the nine planets in the solar system, is named after the Roman mythological god of commerce, travel and thievery.

The solar system's innermost planet, Mercury is so close to the Sun that usually it is not visible from Earth. When it is — just after sunset or just before dawn — it is obscured by the haze and dust in our atmosphere.

Until recently, most of what we knew about Mercury was derived from the photographs which the Mariner 10 spacecraft radioed back to Earth during three flybys from September 1974 to March 1975.

Mariner 10, passing within 500 miles (805 km) of the planet, showed us an ancient, heavily-cratered surface much like our own Moon — crisscrossed by cliffs as high as 1.2 miles (2 km) and as long as 932 miles (1,500 km). Apparently, these cliffs were created when Mercury's interior cooled and shrank, compressing its crust.

Further, the Mariner 10 instruments revealed a planet with a weak magnetic field and only a trace of atmosphere — one with just a trillionth of the density of the Earth's and mostly made up of the gases argon, neon and helium.

Accentuating Mercury's inhospitability to humans, the days and nights are each 59 Earth days long, with temperatures in the extreme: 950° Fahrenheit (510° Celsius) on the sunlit side to -346° Fahrenheit (-210° Celsius) on the night side.

FIRAS: An Infrared Eye of the COBE

by Carter Dove

Construction is complete now on one of the infrared "eyes"—the Far Infrared Absolute Spectrophotometer (FIRAS)—which will fly on the Goddard-managed Cosmic Background Explorer (COBE) spacecraft, according to Roger Mattson, the spacecraft project manager.

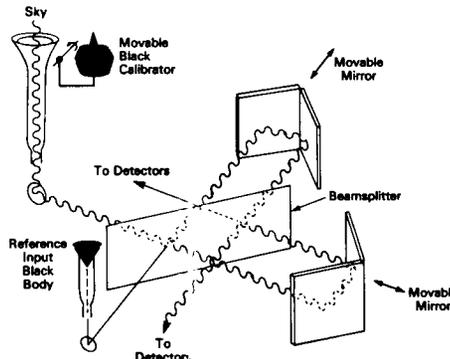
The FIRAS is one of three instruments designed to fly aboard the COBE.

The COBE, originally built as a Space Shuttle payload, now is being modified extensively for a 1989 launch aboard a Delta expendable launch vehicle—a move dictated by the Space Shuttle Challenger accident in January 1986.

The COBE spacecraft's mission is to answer questions about the Big Bang, the cataclysmic explosion which created the universe about 15 billion years ago.

The FIRAS, using a trumpet-shaped cone to collect light, will produce scientific information from each of 1,000 different parts of the sky. The data will be analyzed to determine how much of the light originates from the Big Bang.

The other instruments designed to fly on the COBE are the Differential Microwave Radiometer (DMR), to determine if the residual radiation from the Big Bang was equally bright in all directions; and the Diffuse Infrared Background Experiment (DIRBE), to search for the light of primordial galaxies and other celestial objects which formed after the Big Bang.



FIRAS CONCEPT—The FIRAS measures the wavelength of incoming radiation. Light from the sky is funneled through a trumpet-shaped cone and sent to an interferometer which breaks the wave into two equal parts, delays one part, and then recombines the wave. The wavelength can be measured by varying the delay and studying how the wavelength recombines. Four detectors are used to sense the radiation.

The Delta launch, set tentatively for early 1989 from Vandenberg Air Force Base, CA, will place the spacecraft into a circular orbit 559 miles (900 km) above the Earth.

The Delta expendable launch vehicle program is managed by Goddard.

The COBE has been designed and is being integrated and tested by Goddard engineers and scientists, who also designed its instruments. Dr. John Mather is COBE project scientist.

NASA Pipeline

AMES RESEARCH CENTER, Moffett Field, CA — Ames had lead responsibility for implementing U.S. participation in Cosmos 1987, a Soviet biosatellite mission launched recently. More than 50 NASA-sponsored scientists from Ames and universities throughout the Nation were involved directly in 27 major joint experiments. The U.S. has participated in five previous Cosmos missions. The last mission was in 1985 and involved a single American experiment.

HEADQUARTERS, Washington, DC — NASA announced five crew members for STS-27, a Department of Defense Space Shuttle mission targeted for early fall, 1988, aboard the orbiter Atlantis. Crew members are Robert L. Gibson (Cdr., USN), commander; Guy S. Gardner (Lt. Col., USAF), pilot; and mission specialists Richard M. Mullane (Col., USAF), Jerry L. Ross (Lt. Col., USAF) and William M. Shepherd (Cdr., USN).

LEWIS RESEARCH CENTER, Cleveland, OH — Lewis Director Dr. John M. Klineberg announced recently the appointment of Lawrence J. Ross as Lewis Deputy Director, effective immediately. Ross has served as Director of Space Flight Systems at Lewis since 1980. Recently, Ross directed the investigation into the May 1986 failure of a Delta launch vehicle.

NATIONAL SPACE TECHNOLOGY LABORATORIES, Bay St. Louis, MS — NASA assisted fire fighters in northern California by providing remotely sensed data, taken from a specially equipped jet aircraft, which shows where fires and other "hot spots" are located in large areas of burning forests. NSTL's Learjet acquired images covering more than 10,000 square miles over the fire areas.

JET PROPULSION LABORATORY, Pasadena, CA — The Magellan spacecraft, scheduled for launch from the Space Shuttle in April 1989, has completed a critical test of the interface between the spacecraft and the radar that will map the surface of Venus. John Gerpheide, Magellan project manager at JPL, said, "As a result of the successful test, Magellan's prospects for meeting the scheduled launch aboard Atlantis is excellent."

MARSHALL SPACE FLIGHT CENTER, Huntsville, AL — Marshall has completed construction of its Transient Pressure Test Facility which will be used for a series of Space Shuttle solid rocket motor tests scheduled to start in early November. The tests will verify the ignition pressure dynamics of the motor. These tests, in conjunction with Joint Environment Simulator tests and full-scale motor firings being conducted at Morton Thiokol's Wasatch Facility in Utah, are expected to lead to qualification of the redesigned motor.

Former Associate Director Honored

Former Associate Director Dr. Leslie H. Meredith was told that the scientific colloquium on September 18 would be dedicated to him in recognition and appreciation of his many years of outstanding scientific leadership at Goddard.

What he wasn't told was that Former Center Director Dr. Noel W. Hinners and Center Director Dr. John W. Townsend, Jr. would present him with one of NASA's highest honors, the Distinguished Service Award.

Before Dr. Meredith left Goddard July 31 to become Director of Research Programs with the American Geophysical Union, he played a leading role in estab-

lishing Goddard's space science programs and in fostering the Nation's space research effort.

Dr. Meredith was a Goddard pioneer. He was on the original team from the Naval Research Laboratory when Goddard was established in 1958. His tenure was interrupted in 1975 when he served in the London Office of the Office of Naval Research.

At Goddard, Dr. Meredith served as Chief of the Laboratory for Space Sciences, Deputy Director of the Space and Earth Sciences Directorate, Director of the Applications Directorate, and Assistant Director of Goddard.

Space Station Council Selects GSFC Logo



PHOTO: PETE BALTZELL

Congratulations to Dominic Manzer, Code 711.2 (left) and Elsie Grant, TS Infosystems (right) whose Space Station logo design was selected by the Space Station Management Council to represent the program!

The Office of Space Station, NASA Headquarters, received 34 logos from the NASA Centers. Seven designs, including two from Goddard, were chosen to present to the Space Station Management Council. The Goddard logos were submitted by Dominic Manzer/Elsie Grant and Kent McCollough/Elsie Grant.

The Space Station Management Council narrowed the seven entries down to three, and once again, both Goddard entries were selected.

Finally, the Dominic Manzer/Elsie Grant logo won.

"The design for this logo comes from the double 'S' in Space Station, stretched to form the atmosphere around the Earth," Manzer explained about his winning entry.

"I think it's how the Earth will look from the Space Station," Grant said.

The logo will be used for a variety of printed materials, such as publications and vugraphs, as well as for applications such as lapel pins, decals and cloth patches.



Lunch & Learn With Dr. Townsend

by Randee Exler



PHOTO: DEBORA McCALLUM

"I have been in both government and industry... and I must say that in many ways government is much harder...."

Center Director Dr. John W. Townsend, Jr. was the Lunch and Learn keynote speaker on September 8 at the Goddard Recreation Center.

Lunch and Learn, a quarterly luncheon/speaker series, is co-sponsored by Goddard and the American Institute of Aeronautics and Astronautics and features prominent speakers from NASA and the aerospace community.

Following lunch and an introduction by Leonard Arnowitz, Chief, Special Payloads Division, Dr. Townsend addressed 175 employees.

Dr. Townsend's talk included topics such as good rules for sound management and reserved parking at Goddard. He answered the questions that he's most frequently asked as well as queries from the audience. Following are some excerpts:

Government vs. Industry

"I have been in both the government and industry... and I must say that in many ways government is much harder... for a very simple reason. There is no objective measurement of your performance.

"In industry... you can pretty much be given a plan and it's yours to make or break and at the end of the year you're judged on that plan. If you make your plan, they'll usually keep you. If you exceed it, you'll get a bonus. Those plans are substantive. They're objective. They're easily measured.

"In government, we have three or four bosses. In the first place, we have an executive and, in NASA, it's more often than not OMB. We have at least six committees up on the hill... We've got a constituency out there in the aerospace industry that, at times, shows a lot of ownership of NASA and the management of the operation has to stand in the middle of that kind of triangle and somehow or other make a

living. It's very difficult. So anybody who tells you that government is easy... don't pay them any attention!"

Good Management

"In all management endeavors... common sense is probably the most important thing. You'd be surprised how many people do not exercise common sense... If you have to have one trait as a manager... I would want that trait to be common sense.

"The second thing... is integrity... You've seen a lot of examples recently in the aerospace industry that are real horror stories of people losing all sense of balance and doing things that... are illegal, illegitimate and very definitely not moral....

"Sometimes you have to tell the boss, 'Hey, I screwed up!' Believe me, it's better telling the boss.... Every now and then bosses can help.

"The third thing... is to have some heart. Superior managers generally like people. They can be tough but they like people, are comfortable with them, are sympathetic and do what they can.

"The last thing is attention to the customer. That may be a little surprising to you because in industry it's suppose to be the rule. But it's a rule in government, too!

"We have customers. We build satellites. We buy satellites. We cause them to be launched, and we do it for a reason... space science, space applications; etc.

"One thing NASA has trouble in is dealing with customers. It tends to be a little arrogant and tell other agencies and other individuals that... 'NASA knows more than you do about this so you can relax and we'll take care of all of that for you!'

"... In some ways, Headquarters is a customer... They expect you to do something and you should treat them like a customer....

"Those are my principle principles...."

Goddard Changes

"How does it feel to be back?

"Absolutely great... It doesn't feel any different. The culture has not changed at Goddard. I don't think it will ever change...."

"What has changed?"

"... on the positive side, the Centers

have become much more powerful.... I think that there's some little redress needed there....

"On the negative side, I find that Goddard has gotten quite bureaucratic....

"In the old days, we used to pride ourselves on getting out onto thin ice and skating around on it. Every now and then we fell in, but so what....

"I think all of NASA has become too risk intolerant since the Challenger tragedy. You run around and have a sounding rocket bust and it's like a federal offense of some sort. Sounding rockets should never be treated the same way as a manned spacecraft is....

"I think there's a little less willingness to take risk here than when I left. That's something that we're going to have to pay close attention to....



PHOTO: DEBORA McCALLUM

"In the old days, we use to pride ourselves on getting out onto thin ice and skating around on it. Every now and then we fell in, but so what...."

"There's a balance between let's get it done and let's get it done right. And there's some cases where getting it done quickly is important even if you take a little more risk than you should....

"The next question people always ask me is how long am I going to stay?... I'll stay as long as I enjoy getting up in the morning and coming to work... as long as this job's fun and I think I can do some good, I intend to stay....

Reserved Parking

"The other question is reserved parking... I heard more about this downtown than any issue at Goddard... everybody says do something! Noel made me promise not to do anything for six months. Theresa tells me to count off six months from June 22... we'll see...."

Luncheon Highlights Hispanic Heritage Week

by Carolynne White

Strains of "La Bamba" and other Latin American songs filled the air at the Hispanic Heritage Luncheon, held at the GEWA Recreation Center on September 15.

The luncheon highlighted Goddard's participation in National Hispanic Heritage Week, created to promote awareness of Hispanic American contributions to American history.

The featured speaker was Dr. Carmelo E. "Tom" Velez, a former Goddard employee, now Chief Operating Officer, Computer Technology Associates Inc., Denver.

Velez's original interest was music; he began his career at the Manhattan School of Music in classical violin and jazz guitar, before coming to Goddard in 1964 as an entry level mathematician. At Goddard, he continued his education and received a master's degree in mathematics and computer science, then a Ph.D. in applied math from Georgetown, and a law degree from the University of Baltimore, meanwhile becoming a branch chief.

In 1979, Velez and a partner launched Computer Technology Associates. One of the fastest growing, privately-held firms in

the country, this computer design and systems engineering firm was ranked eighty-sixth in last year's *Hispanic Business 500*.

Dr. Velez talked about the bridges minorities must cross in adapting to a new cultural environment, citing his own experiences when moving to the United States from Ecuador.

Chris Rodriguez, Goddard's Hispanic Program Manager, said that new Hispanic employees often experience a culture shock when coming to Goddard. Goddard's Hispanic Employment Program recruits talented Hispanics from such diverse areas as Puerto Rico, the New York metropolitan area, and the Southwest.

"We try to reach out to these new employees and make sure that they feel welcome," Rodriguez said. "In many instances this is their first time away from home."

Goddard currently employs approximately 80 Hispanics in a variety of occupational areas. Rodriguez provides orientation, counseling, and referral services to help these and other ethnic minority employees make the transition to a new environment.

Health Plan Premium Increase Announced

The Office of Personnel Management (OPM) has announced that there will be a Federal Employees Health Benefits Open Season from November 9 through December 11, 1987.

This should be a busy Open Season because OPM has announced sharp increases in health plan premiums for next year. The average premium for non-postal federal employees will rise by 31 percent.

Employees will receive a copy of a new 1988 plan brochure directly from their current plan. Open Season instructions will be distributed to all employees prior to November 9.

Choosing a health plan for Greenbelt employees can be confusing because there are so many plans and Health Maintenance Organizations (HMOs) in the Baltimore/Washington area to choose from. Plan on attending the Center's fourth annual Health Benefits Fair on Wednesday, November 18, 1987, in the Building 8 Auditorium from 11:00 a.m. to 2:00 p.m.

Blood Donors

Following is a list of Goddard donors who were cited by the American Red Cross with gallon pins at the bloodmobile of October 7, 1987:

NAME	Gallons
Darlene Ahalt	3
Virg Cleveland	17
Dennis Giblin	1
Scott Glubke	1
Ted Mecum	1
Richard Mills	2
Paul Schneck	4
Merrick Shawe	5
Oren Sheinman	1
Robert Stepp	1
Richard Tagler	3
Claudia Tom	2
Barbara Vargo	2
Charles Woodyard	6

The next bloodmobile visit will be on December 2, 1987 from 8:30 a.m. to 1:30 p.m. in Room 205 of Building 26.



GROUND BREAKERS — NASA, New Mexico and Las Cruces Officials participated in ground-breaking ceremonies for NASA's Second Tracking and Data Relay Satellite System (TDRSS) Ground Terminal (STGT) being built at White Sands, NM. Pictured (left to right): John Quann, GSFC Deputy Director; Bob Spearing, Director, Mission Operations and Data Systems Directorate; Donald P. Eckel, STGT Project Manager; Secretary Thomas Thornhill, Governor's Office, New Mexico Department of General Services; Robert O. Aller, Associate Administrator, Office of Space Operations, NASA Headquarters; Benita Cooper, Director Management Operations Directorate; David Steinborn, Mayor, Las Cruces. Special thanks is given to Code 270 which is responsible for the design and construction of the facility.

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

Goddard Laser Engineer Wins Moe I. Schneebaum Memorial Award

by Carolynne White

When John Degnan began his physics career as a co-operative education student attending Drexel University in Philadelphia, he had two interests: light and space. He landed an ideal first co-op assignment—designing lasers for NASA!

Now head of the Advanced Electro-Optical Instrument Section of the Instrument Electro-Optics Branch, Degnan recently won the Moe I. Schneebaum Memorial Award for Engineering for his original contributions to the advancement of laser technologies for remote sensing, ranging, and communications. The award was presented in conjunction with the Memorial Lecture, given by Walter S. Sullivan, Jr., Science Editor for the New York Times, in the Building 3 Auditorium, on Monday, September 21.

Sullivan's talk included a discussion of the development of laser technology. The word, laser, is actually an acronym for light amplification by stimulated emission of radiation. Lasers use the stimulation of high-energy atoms by light to amplify a beam of light.

For more than 20 years, Degnan's work at Goddard has run the gamut of laser applications and design technology. As a co-op from 1964 to 1968, Degnan investigated liquid-chelate lasers, forerunners of modern dye lasers. After graduating in 1968, Degnan joined Goddard full-time, and developed theories for two components of heterodyne spectroscopy: the waveguide carbon dioxide (CO₂) laser and optical antennas. Heterodyne spectroscopy is a means of spectral analysis which mixes the light of a laser with an extraterrestrial source to generate different frequencies in the radio or microwave region of the spectrum, providing a very high spectral resolution.

Degnan's more recent projects include the successful upgrade of the Mobile Laser Ranging (MOBLAS) and Transportable Laser Ranging System (TLRS-2) satellite laser tracking stations to centimeter-level accuracies. He currently is developing alexandrite laser transmitters for the joint Langley/Goddard Lidar Atmospheric Sensing Experiment (LASE), which will measure water vapor profiles from the NASA Earth Resources (ER-2) high altitude research aircraft. Degnan also is leading an effort for extending these sources into other spectral regions through



LASER ENGINEER—Center Director Dr. John T. Townsend, Jr. (left) presents John Degnan with the 1987 Moe I. Schneebaum Memorial Award for Engineering. Degnan has worked with lasers at Goddard for more than 20 years.

improved optic techniques. In addition, Degnan heads an effort to develop compact automated waveguide CO₂ laser oscillators for future spaceborne missions.

When he's not revolutionizing laser technology, Degnan's interests include community theatre and guitar (you may remember his guitar solo in the recent MAD Christmas Show). Degnan lives in Annapolis with his wife, Adele, and two children, Adam 17, and Andrew, 14.

Mercury

Continued from page 2

cury) surface. These observations allowed the Baker team to examine the long-term heating effects on Mercury by the Sun.

- Confirmed the theory that Mercury possesses a "hot pole" which arises from the unique spin-orbit coupling of the planet with the Sun.

- Allowed scientists to predict the electrical properties of the Hermean surface.

"Lying fallow for so long," explained Baker, "Mercury has emerged as an intriguing and exciting object for study. Despite being so close to Earth, it is still among the least understood of the planets."

The Mercury observations were conducted at the National Radio Astronomy Observatory, operated by Associated Universities, Inc., under contract with the National Science Foundation.

Agency-Wide System Links NASA Libraries

by Randee Exler

Patrons of Goddard's Homer E. Newell Memorial Library soon will be using personal computers to look up books, documents and periodicals.

The Aerospace Research Information Network (ARIN) will be operational by the end of the year, according to Joe Langdon, Technical Information Specialist, Code 252. This NASA-wide system will integrate the Centers' library holdings and keep users up-to-date with library materials at all of the NASA libraries.

"When the library first opened, we used a card catalogue to index materials. We eventually switched to book catalogues and then to the current microfiche system," explained Langdon. "ARIN is the next step," he said.

"The biggest advantage that the ARIN system has over microfiche is that it can be updated immediately," Langdon explained. The library's microfiche system is updated monthly.

"When ARIN is fully operational, patrons will know what is on the shelves and what is circulating," Langdon explained.

"Each entry also will indicate where materials can be located," he commented. "For example, if another NASA library has a book that you need, we can get it for you through the interlibrary loan program."

Six Work Stations

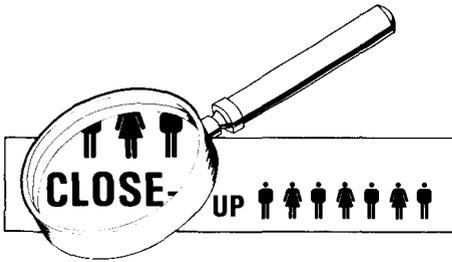
Six work stations will be set up in the library for ARIN users. Each station will have a desktop terminal, printer and disc drive.

"The ARIN system also is compatible with the IBM personal computers on Center," Langdon noted. "Users will be able to copy information found in ARIN onto floppy discs for customized bibliographies," he said. Users must bring their own discs for this service.

The main computer for the ARIN system is located at the Scientific and Technical Information Facility located near the Baltimore Washington International Airport and is operated by RMS Associates. This is where all of NASA's official records are stored.

The software for the ARIN system was originally developed by Northwestern University. The Goddard network is being developed by Win Laboratories Ltd.

PHOTO: DEBORA MCCALLUM



Carr Accepts Headquarters Position: Moore Named HST Project Manager



DAVIS

"I have a real soft spot for Goddard's Tennis Club," said **ROBERT E. "BOB" DAVIS**, Code 408. Davis helped form the club and build the courts. Recently, he

was one of nine members of the United States Professional Tennis Association, Inc. (USPTA) awarded the rating of USPTA Master Tennis Professional for this year. Davis received the award at the Saddlebrook Golf and Tennis Resort in Tampa, FL on September 26.

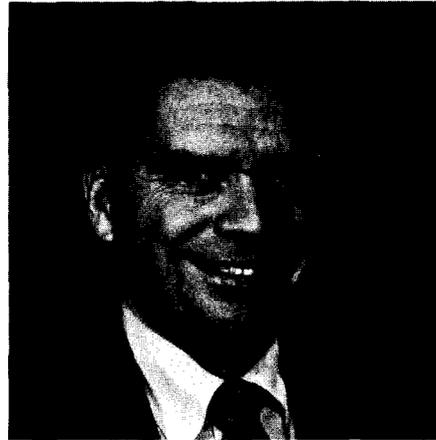
A major three-year effort in Goddard's Oceans and Ice Branch has been completed with the recent publication of an Arctic sea ice atlas based on the data of the Electrically Scanning Microwave Radiometer on the Nimbus-5 satellite. Entitled *Arctic Sea Ice, 1973-1986: Satellite Passive-Microwave Observations*, the book was written by **DRS. CLAIRE L. PARKINSON, JOSEFINO C. COMISO, M. JAY ZWALLY, DONALD J. CAVALIERI AND PER GLOERSON OF CODE 671.**

Once again, the members of the **CODE 200 SECRETARIAL NET** are helping Center employees learn more about Goddard's mission and activities. Their latest endeavor is an employee-tour series of different GSFC facilities. A tour of the Wallops Flight Facility is scheduled for November 19. Sign-up information for the bus from Greenbelt will be announced in *Dateline Goddard*.

Retirees

Best Wishes to the following Goddard employees who retired recently!

	CODE	YEAR
Barritt, Paul F.	540	27
Cottrell, Julian	727.2	37
Grant, Daniel J.	725	42
Murray, Charles W. Jr.	636	25
Righter, Donald L.	661	36
Rossey, Calvin E.	723.3	20
Sundermann, James A.	303	32
Tresansky, John O.	204	38



CARR

Frank A. Carr has accepted the position of Deputy Director of Solar System Exploration Division, NASA Headquarters. Carr formerly was Deputy Director of Flight Projects for Space Telescope at Goddard, a position he had held since December 1982.

In his new role, Carr will assist in planning and conducting NASA's exploration of the planets and small bodies of the solar system.



MOORE

Carr fills a previously vacant post. He has been succeeded at Goddard by James V. Moore, who has assumed the title of Project Manager, Hubble Space Telescope. Moore was the previous Experiment Systems Office and Systems Engineering Office Manager for the project.

The Hubble Space Telescope is scheduled to be launched from the Shuttle Discovery in 1989.

GSFC Scientists Join Topex/Poseidon Team

Drs. James Marsh, Braulio Sanchez, and Antonio J. Busalacchi are among the scientists participating in the joint U.S. and French Topex/Poseidon oceanographic satellite mission.

Dr. Marsh's investigation is entitled "Ocean Topography Mapping, Improvement of the Marine Geoid, and Global Permanent Ocean Circulation Studies from Topex Altimeter Data." "Global Ocean Tide Mapping Using Topex" is Dr. Sanchez's investigation. Both Drs. Marsh and Sanchez work in Code 621. In addition, Dr. Antonio J. "Tony" Busalacchi,

Code 671, is a collaborator on one and a co-investigator on two of the Topex/Poseidon studies.

Scheduled for launch on the European Ariane rocket in December 1991, Topex/Poseidon will carry instruments in a 63 degree inclination orbit to measure the Earth's ocean circulations and its variation in detail. This data and data from other international experiments planned at the same time will produce the most extensive studies of the world's oceans ever undertaken, officials believe.

Visitor Center—November Calendar

November 1—

Model Rocket Launch—1:00 p.m.

November 15—

Model Rocket Launch—1:00 p.m.

November 7 & 8—

Commemorative Films—1:00 p.m.

"The Four Days of Gemini 4"

"Within This Decade: America in Space"

November 22—

Lecture on NASA's Hubble Space Telescope and tour of the Space Telescope Operations Control Center (STOCC)

For more information, call the Visitor Center at 286-8981.

GSFC Sets Goal for 1988 Combined Federal Campaign

by Carolynne White

"Remember, someone out there *needs* someone like you."

The 1988 Combined Federal Campaign (CFC) is here, and Goddard is prepared to raise more money than ever for the worthy organizations supported by the CFC. Last year, the Center exceeded its goal of \$235,000, raising a total of \$289,776, which represented 123% of the 1987 goal.

The overall goal set by CFC Headquarters is \$23 million; Goddard's goal for 1988 has been set at \$245,000 an increase of 4% over last year's goal.

Your contribution may be donated to any health and welfare charity. The money raised by the Combined Federal Campaign is distributed to more than 2,000 voluntary agencies dedicated to serving poor, hungry and sick people here and overseas. CFC also helps fund critical health research and education.

Payroll Deduction

A special emphasis is placed on giving through payroll deduction, which makes it easy to make a substantial gift because of the convenience of spreading a contribution over the entire year. A \$4.00 bi-weekly payroll deduction can provide glaucoma screening for 14 people; \$9.00 deducted bi-weekly can provide four days of comprehensive residential care for an abused infant or child; \$19.00 bi-weekly will purchase a wheelchair; and a \$30.00 bi-weekly deduction can feed 50 children



1988 COMBINED FEDERAL CAMPAIGN COORDINATORS — Standing (left to right): Tom Hamilton, Code 600; GSFC Comptroller Duke Stanford, Chairman; Marietta Sturgell, Code 300; Cindy Thornberry, Alternate Coordinator, Code 700 (not pictured Clay McGee, Coordinator, Code 700); Kathy Mikkelsen, Code 400; Alan Drew, Code 200. Seated (left to right): Sharon Arneson, Code 500; Theresa Wirth, Code 100; Sylvia Parker, Committee Advisor, Code 231; MaryAnne Hartman, Code 150.

overseas a daily nutritious lunch for one month.

Employees who designate payroll deduction between October 19 and November 13, automatically will be entered in a drawing for a VIP tour of the Air and Space Museum, followed by an IMAX theatre showing of "Living Planet." The drawing, to be held November 17, will

select 28 people to go on the trip, scheduled for Friday afternoon, November 20. Also, 28 additional names will be drawn to attend a VIP tour of Goddard, on November 24.

The Combined Federal Campaign is especially proud of its remarkably low administrative costs. Only about 4% of the money raised by CFC is spent on the costs incurred in printing materials, training volunteers, auditing contributions, and other management functions, so that nearly all of the money collected can be spent on helping people. This also helps the charities served by CFC minimize their fundraising costs.

NASA
National Aeronautics and
Space Administration
Goddard Space Flight Center

Goddard News

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Executive Editor . . . James C. Elliott
Managing Editor . . . Randee Exler
Senior Editors . . . Michael Braukus,
Carter Dove,
Joyce Milliner and
Carolynne White



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Goddard Scientists Calculate Specific Mass of "Mystery Particle"

by Rande Exler



CHIU

Goddard scientists have developed a method to calculate the mass of one of the least understood elementary particles in the universe—the electron neutrino.

Ramifications of this study may help explain "missing" mass in the Universe that scientists have not been able to account for using existing observational data.



KONDO

So little is known about neutrinos that theorists have dubbed them "mystery particles." What is known is that neutrinos are stable particles with no electric charge that are created in the course of nuclear reactions. These particles are so small that they are referred to in terms of mass rather than size. Neutrinos have so little mass—which usually is measured in terms of weight—that they are measured in terms of electron volts instead of grams.



CHAN

Drs. Hong-Yee Chiu, Code 610.1, and Yoji Kondo, Code 684, of Goddard and Dr. Kwing L. Chan, an Applied Research Corporation scientist working

at Goddard, Code 610.2, say that the rest (not moving) mass energy of a neutrino is approximately 3 eV (electron volts). The rest mass serves as a reference point because, like all matter that is constantly moving, the neutrino mass increases with speed, especially when travelling near the speed of light.

Supernova 1987a

"The detection of a neutrino burst from Supernova 1987a, which is the first clear

detection of neutrinos from outside the solar system, provided valuable information on the rest mass of the electron neutrino," explained Chiu.

"Our calculations show that the probability that 3 eV is the correct mass of the electron neutrino is 97 percent," he said. "If the 3 eV value is confirmed by future experiments, the neutrino is the least massive object known."

"It would take the combined mass of 150,000 neutrinos to equal that of one electron," he added. Electrons are energy-charged particles that form part of all atoms.

When the core of a star collapsed—followed by a subsequent explosion which created Supernova 1987a in a neighboring galaxy, the Large Magellanic Cloud—a countless number of neutrinos were created and hurled to Earth at almost the speed of light. Although billions of neutrinos harmlessly passed through the planet, according to Kondo, these elementary particles are so elusive and interact so rarely with other matter that only twelve were revealed by the giant detectors at the Kamiokande II proton decay experiment in Kamioka, Japan and eight by the Irvine-Michigan-Brookhaven (IMB) experiment near Cleveland, OH. One reason neutrinos were able to pass through the planet is because their interaction with other particles is so weak.

Energy Levels Vary

The detected neutrinos carrying different amounts of energy reached Earth at slightly different times—during a 6 second period at IMB and a 13 second period at Kamiokande II. Most of the science community reasoned that if neutrinos have mass, the most energetic particles should arrive first and those that follow should have decreasing amounts of energy.

The Goddard team concluded from available data that the neutrinos did not reach Earth in order of sequential descend-

ing amounts of energy. This may mean that the neutrinos were not all created at the same time, according to Chiu. In other words, some of the neutrinos may have been created and emitted during the initial collapse of the star, and some of the neutrinos may have been created and emitted during the subsequent cooling processes.

To determine the rest mass, Chiu, Kondo and Chan coupled the neutrino data for all possible pairs and performed an energy vs. time-of-arrival correlation analysis on the data sets. Their analysis is based on the dispersion of the arrival time of the neutrinos and the energy levels measured.

Continued on page 2

INSIDE

ENGINEER OFFERS FRESH APPROACH TO CREATIVE THINKING

PAGE 6



HAPPY THANKSGIVING

Goddard Marks 10th Anniversary of GAS Program with Fourth Annual Symposium and Hardware Exposition

by David Thomas

Goddard marked the 10th anniversary of NASA's Get Away Special (GAS) Program with the fourth annual GAS Symposium and a hardware exposition last month. Approximately 30 hardware displays and 25 papers were presented from experimenters who have flown or who are slated to fly GAS payloads aboard the Space Shuttle.

The symposium provided a forum for exchanging information within the GAS community on experimental results and plans, as well as on engineering and safety lessons learned during the early years of payload operations and flight.

The hardware exposition allowed past and present experimenters to display their hardware as well as to view the present GAS hardware. Graphic displays of hardware also were available.

More than 300 people attended the symposium and exposition, which was open to all users, domestic and foreign. The meet-

ing included a day and a half of presentations, culminating in a panel discussion with technical and administrative personnel from the GAS program. Craig Covault, Senior Space Technology Editor, *Aviation Week and Space Technology*, was the keynote speaker for the event.

NASA's GAS program affords individuals, groups and organizations an opportunity to buy space on a Shuttle to conduct scientific experiments. Experiments are housed in small, self-contained canisters and placed in the orbiter's cargo bay. The canisters, available in two-and-a-half and five-cubic-foot sizes, hold 60, 100 and 200-pound payloads, and cost \$3,000, \$5,000 and \$10,000, respectively.

Fifty-three GAS canisters have flown to date. Goddard manages the program for NASA. Larry Thomas is the technical liaison officer for the GAS program at Goddard; George Gerondakis is Goddard's GAS mission manager.

PHOTO: RANDY FRISCH



HARDWARE EXPOSITION—Ken Meese, Code 683.1 (left) and Jim Houston, Code 683.2 (right) were among the Goddard participants at the fourth annual Get Away Special (GAS) Symposium last month in the Building 8 Auditorium. Pictured is the Orbiter Stability Experiment (OSE), a GAS experiment slated to fly on a shuttle at a later date. The OSE was built at GSFC by Code 680 and will attempt to measure the high-frequency variation of the shuttle's orientation due to vibration that may be present in the orbiter's structure during routine in-flight operations.

"Mystery Particle"

Continued from page 1

"Missing" Mass

The Goddard study may someday help explain "missing" mass in the Universe, according to Kondo. The behavioral properties of the galaxies require a certain amount of mass which scientists have not been able to detect.

Even though the mass of a neutrino is so small, these particles may account for this undetected mass because their number is so great. Using the value of 3 eV for the neutrino mass energy, Chiu and Kondo estimate that the Universe may have at least 20-times greater mass in neutrinos than in matter.

The Chiu, Kondo, Chan study will be published in the May 1, 1988, *Astrophysical Journal*.

Neutrino Facts

- The star which collapsed and created Supernova 1987a emitted 10^{58} neutrinos within a few seconds. This is about ten times the number of protons, neutrons and electrons in the Sun.
- The interaction of neutrinos with other matter is so weak that even though approximately three thousand trillion neutrinos passed through the 7,000-cubic-meter Irvine-Michigan-Brookhaven experiment, only eight were detected.
- Billions of neutrinos passed through the Earth and possibly had a harmless interaction with every person on the planet.



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NASA Pipeline

JOHNSON SPACE CENTER, Houston, TX — The Manned Flight Education Foundation, Inc. announced recently that it will create a world center at Johnson to chronicle the continuing story of manned space flight. Walt Disney Imagineering will design the new center, which is scheduled to open in early 1991.

AMES RESEARCH CENTER, Moffett Field, CA — Ames has entered negotiations to award a \$16,184,800 fixed-price contract to Continental Construction Corp., Las Vegas, NV, for construction of an Integrated Test Facility (ITF) to support testing of advanced aircraft and their complex, interdependent systems. The new facility will allow NASA to significantly reduce aircraft systems checkout time and costs, since researchers will be able to integrate all systems in a controlled manner while they are being tested rather than being limited to separate systems checkouts. When completed, the ITF will be the only site in the free world that offers complete systems checkout and testing capability in one fully equipped facility. The ITF can accommodate up to six different aircraft at once.

MARSHALL SPACE FLIGHT CENTER, Huntsville, AL — Representatives of space agencies in Europe and Japan, NASA officials, U.S. astronauts, designers and potential users of the permanently manned Space Station met at Marshall recently to participate in a Space Station laboratory workshop.

Workshop attendees toured full-scale engineering mock-ups of the U.S. laboratory module and habitation module to see firsthand what living and working in the Space Station will be like.

JET PROPULSION LABORATORY, Pasadena, CA — An antenna design expected to play a key role in NASA's mobile satellite experiment (MSAT-X) program has been successfully tested by JPL engineers. Mounted on the roof of an automobile, the antenna, during an extensive test, locked onto the INMARSAT satellite in geosynchronous orbit over the western Pacific Ocean. It's believed to be the first time a steerable antenna mounted on a passenger vehicle has tracked an in-orbit satellite. A mobile satellite communications system would extend mobile telephone service to a whole new community of users, including forestry personnel, ships at sea, planes in flight and other wide-ranging land transportation systems.

NATIONAL SPACE TECHNOLOGY LABORATORIES, Bay St. Louis, MS — The third acceptance-test firing of Space Shuttle main engine number 2027 was conducted recently at NSTL. While initial data following the 520-second test indicated that the engine performed normally, there were indications of a potential leak in the oxidizer heat exchanger. The potential heat exchanger leak is being analyzed by NASA and its prime contractor for the main engines, the Rocketdyne Division of Rockwell International. Unless it turns out to be a generic condition affecting other engines, this problem is not expected to affect the STS-26 scheduled launch.

HEADQUARTERS, Washington, DC — NASA has announced recently the selection of three firms for negotiations leading to parallel contract awards to perform the first of a two-phase systems definition study for a proposed unmanned, cargo-carrying launch vehicle. The first study phase, valued at approximately \$1.5 million for each of the firms, is expected to require four months to complete. The new vehicle, named the Shuttle-C (for cargo), would have a lift capability of 100,000 to 150,000 pounds to low-Earth orbit, giving the U.S. space program a launch vehicle with two to three times the payload capability of the present Space Shuttle. The firms selected by NASA are: Martin Marietta Manned Space Systems, New Orleans, LA; Rockwell International, Space Transportation Systems Division, Downey, CA; and United Technologies Corp., USBI Booster Production Company, Inc., Huntsville, AL.

FIFE Project Concludes First Year Measurements

by Carter Dove

A team of approximately 100 scientists—including a group from Goddard—recently concluded its first year of field measurements over the Konza prairie area near Manhattan, KS, in a major NASA-managed effort to understand how the Earth's vegetation influences climate and weather.

Known as FIFE—First Field Experiment of the International Satellite Land Surface Climatology Project—the results of its measurements “should lead to significantly improved weather forecasts and better predictions of long-term climate trends,” according to Dr. Forrest Hall, Code 623.

Hall, along with Dr. Piers Sellers of the University of Maryland and Dr. Ghassem Asrar of Kansas State University, was the coordinator of the project.

Their team spent 60 days throughout the spring, summer and fall of this year in a 86-sq.-mi. (225-sq.-km.) natural prairie tract—last of the great tall grass areas—near Manhattan in central Kansas.

During four intensive field campaigns, the FIFE science teams came to the prairie to measure daytime patterns of visible, infrared and microwave radiation; moisture and heat flux; and carbon dioxide and other gas fluxes—using hand-held, truck and aircraft-mounted instruments.

The FIFE data set, consisting of about 1,000 computer tapes, has been assembled at Goddard on the Laboratory for Terrestrial Physics data system, for access by the FIFE science community.

Hall said that FIFE scientists will be analyzing this data over the next two years, participating in workshops and reporting results at various symposia, as papers become available.

FIFE is scheduled to continue through 1989.

**See your name
in print!**

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

Mixed Fleet MANIFEST Through 1990

Space Shuttle					
Flight	Date/ Orbiter	Primary Payload	Flight	Date/ Orbiter	Primary Payload
26	6/2/88 <i>Discovery</i>	TDRS-C	36	12/7/89 <i>Atlantis</i>	DOD
27	9/8/88 <i>Atlantis</i>	DOD	37	3/9/90 <i>Columbia</i>	GPS-2 SYNCOM IV-5
28	12/1/88 <i>Columbia</i>	DOD	38	3/29/90 <i>Discovery</i>	STARLAB
29	2/2/89 <i>Discovery</i>	TDRS-D	39	4/26/90 <i>Atlantis</i>	DOD
30	4/27/89 <i>Atlantis</i>	Magellan	40	6/4/90 <i>Columbia</i>	GRO
31	6/1/89 <i>Discovery</i>	HST	41	7/2/90 <i>Discovery</i>	DOD
32	6/29/89 <i>Columbia</i>	ASTRO-1	42	8/2/90 <i>Atlantis</i>	TDRS-E
33	8/24/89 <i>Atlantis</i>	DOD	43	8/31/90 <i>Columbia</i>	SKYNET-4A EURECA-1L
34	10/9/89 <i>Discovery</i>	Galileo	44	10/5/90 <i>Discovery</i>	Ulysses
35	11/9/89 <i>Columbia</i>	GPS-1 IBSS			

Expendables

Date	Launch Vehicle	Payload
1/88	Delta 181	DOD-2
3/88	Scout S-206C	San Marco-D1
5/88	Scout S-212C	ITV-2
5/88	Atlas 63E	NOAA-H
8/88	Delta 183	DOD-3
8/88	Scout S-213C	SOOS-3
10/88	Atlas Centaur 68	FLTSATCOM-F 8
2/89	Delta 184	COBE
2/89	Scout S-214C	SOOS-4
3/89	Atlas 50E	NOAA-D
5/89	Scout S-215C	ITV-3
8/89	Scout S-210C	NOVA-II
2/90	Delta	ROSAT
2/90	Scout S-218C	TRANSIT-27
3/90	Atlas Centaur	GOES-I
5/90	Scout S-216C	ITV-4
6/90	Atlas Centaur	CRRES
6/90	Atlas 34E	NOAA-I
8/90	Scout S-211C	TRANSIT-28
12/90	Atlas Centaur	GOES-J

Glossary

ASTRO	Ultraviolet Astronomy Telescope	ITV	Instrumented Test Vehicle
COBE	Cosmic Background Explorer	MAGELLAN	Venus radar mapping satellite
CRRES	Combined Radiation Release Experimental Satellite	NOAA	National Oceanic and Atmospheric Administration
DOD	Department of Defense	NOVA	Advanced Navy Navigation Satellite
EURECA	European Retrievable Carrier	ROSAT	Roentgen Satellite
FLTSATCOM	Fleet Satellite Communications	SAN MARCO	NASA/Italian Earth physics satellite
GALILEO	Jupiter probe	SOOS	Stacked U.S. Navy Navigation Satellites
GOES	Geostationary Operational Environmental Satellite	STARLAB	DOD Spacelab
GPS	Global Positioning System	SYNCOM	Hughes Geosynchronous Communication Satellite
GRO	Gamma Ray Observatory	TDRS	Tracking and Data Relay Satellite
HST	Hubble Space Telescope	TRANSIT	Navy Navigation Satellite
IBSS	Infrared Background Signature Survey	ULYSSES	Formerly International Solar Polar Mission

Goddard Payload Is First To Fly in '88

NASA recently issued a new, mixed fleet manifest reflecting primary payloads for Space Shuttle missions through 1990 and expendable launch vehicles (ELVs) through 1995. A Goddard-managed Tracking and Data Relay Satellite (TDRS-C) will be the sole payload on Flight 26, the first post-Challenger flight.

In addition, Goddard has primary payloads—or plays a major role in primary payloads—on ten of the nineteen shuttle missions and eight of the ELV missions scheduled through 1990. For this time period, two Goddard-managed Delta rockets will serve as launch vehicles.

Goddard's payload involvement is in addition to its regular Shuttle duties of managing the world-wide tracking network and serving as the hub of the Agency's communication's operations.

Among the secondary shuttle payloads to fly will be Goddard's Shuttle Solar Backscatter Experiment (SSBUV). The SSBUV will fly on Flight 29 with TDRS-D in February 1989, according to the Project Manager Ernie Hilsenrath. Secondary payloads are formally scheduled 12 months in advance.

The manifest reflects the high priority assigned to major science payloads. In 1989, five NASA science missions, some with international cooperation, will be launched. Four will fly on the Shuttle.

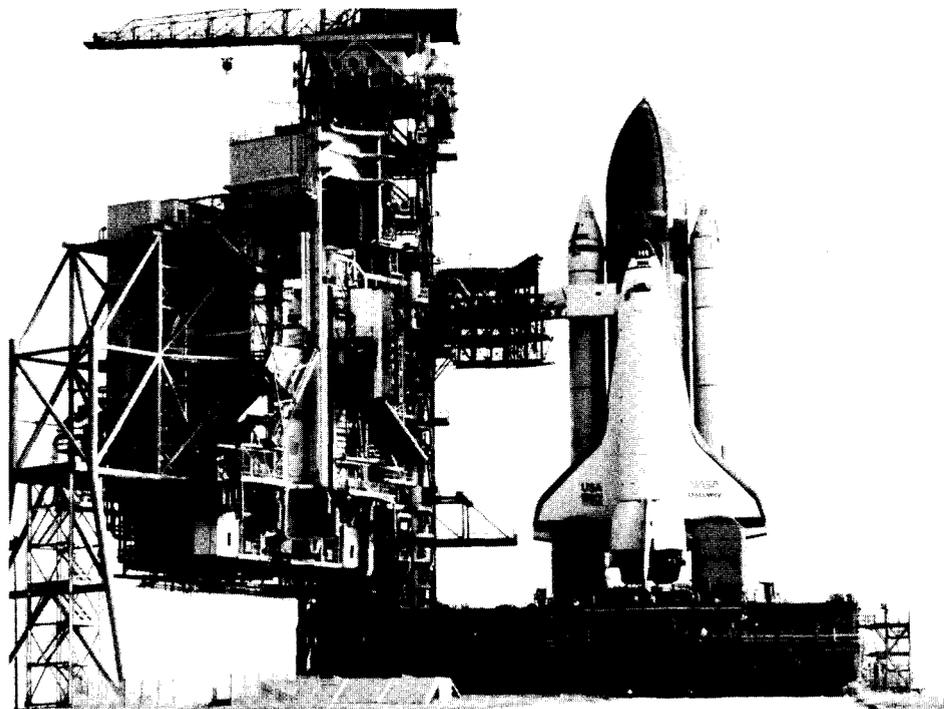
The four Shuttle missions include—Magellan, which will map Venus with high-resolution radar, in April; Hubble Space Telescope (HST), one of NASA's highest priorities and a cooperative project with the European Space Agency (ESA), in June; ASTRO-1, a Shuttle-born ultraviolet observatory, also in June; and Galileo, a cooperative project with Germany to make the first comprehensive survey of Jupiter and its moons, in October.

In addition, the Cosmic Background Explorer (COBE), a Goddard-managed mission to investigate the Big Bang theory of the origin of the universe, is planned for launch on a Delta in February 1989. NASA also will accelerate deployment of other space science missions by fully utilizing ELV's.

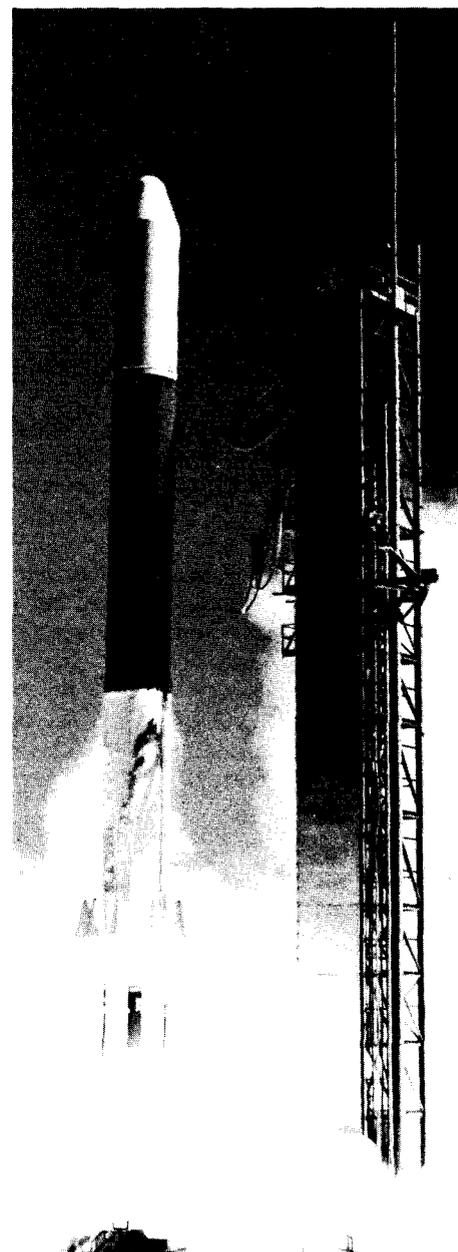
Following are shuttle missions in which Goddard will be involved with payloads; included is the flight number, date and payload, respectively:

Flight 26, June 2, 1988, TDRS-C; Flight 29, February 2, 1990, TDRS-D; Flight 30, April 27, 1989, Magellan; Flight 31, June 1, 1989, Hubble Space Telescope; Flight 32, June 29, 1989, ASTRO-1; Flight 34, October 9, 1989, Galileo; Flight 38, March 29, 1990, STARLAB; Flight 40, June 4, 1990, Gamma Ray Observatory; Flight 42, August 2, 1990, TDRS-E; Flight 44, October 5, 1980, Ulysses.

Following are ELV emissions through 1990 in which Goddard will be involved with payloads; included is the date and payload, respectively: March 1988, San Marco-D1; May 1988, National Oceanic and Atmospheric Administration (NOAA)-H; February 1989, COBE; March 1989, NOAA-D; February 1990, Roentgen Satellite; March 1990, Geostationary Operational Environmental Satellite (GOES)-I; June 1990, NOAA-I; December 1990, GOES-J.



SHUTTLE LAUNCHES—Beginning with Flight 26 on June 2, 1988, the Space Shuttle Discovery is scheduled to fly seven missions through October 1990. Nineteen shuttle missions are scheduled in the new manifest.



DELTA LAUNCHES—Goddard will manage two of the five Delta launches scheduled on the Expendable Launch Vehicle manifest issued by NASA Headquarters recently.

Engineer Offers Fresh Approach to Creative Thinking

by David Thomas

Nearly 30 years ago, Jim Kerley decided "enough was not enough" and started teaching his kids a newer math than the "new math" being taught in the schools. Actually, what he began teaching was not new math but rather a "fresh approach" to the thinking process.

Seven years ago, he brought the fresh approach to Goddard and began teaching a class to engineers titled "Creative Design, Invention and Research." Recently, he lectured on his new method to an advisory group to Dr. William Bennett, Secretary of Education.

The fresh approach is based on the natural processes of thinking, namely, induction and deduction. His approach is unique, however, not because it presents problems to be solved by deductive or inductive logic, but because it combines the two.

Testimonies from all beneficiaries have been laudatory.

"The greatest benefit I got," said one of the engineers here who took his class, "is how to approach any problem and get a solution that fits the circumstances of the problem."

Kerley, 66, has been an engineer at Goddard for the past 15 years, but has invented for industry and government. He said he holds about 24 patents. He has a civil engineering degree from Dartmouth, and has worked for Vitro, Litton, Westinghouse and Lockheed; he also has owned his own engineering company but gave it up after four years.

"You can't run a business right and do a lot of inventing at the same time," he said.

Methods Adopted

Between the time he started tutoring his kids and teaching engineers here, Kerley's new way of thinking and problem solving has been adopted effectively by local teachers in "home schools" and accepted by engineering organizations at home and abroad who've heard him lecture on the subject.

A tutor who currently uses his method recalled her success in helping two students who once struggled pitifully with math in grade school, but who now make the highest grades in a private high school.

PHOTO: RANDY FRISCH



FRESH APPROACH—Jim Kerley has been teaching Goddard engineers "Creative Design, Invention and Research" for seven years. Eleven engineers recently participated in this training. Pictured are Jim Kerley (standing) and Joe Generie. Kerley's approach combines deductive and inductive logic.

In addition, Kerley has hundreds of letters, from local, national, and international groups, attesting to the effectiveness of his fresh approach to creative thinking.

But even before he began tutoring his kids, Kerley was developing college students' creative talents as professor of civil engineering at George Washington University.

"I've been studying the philosophy of science all my life," Kerley said. "My approach to inventing is psychological, as well as philosophical, and this is very evident in my classes."

Kerley said that it is important to teach more about the thinking process because it forces people to use their brain more. "People are so used to having their problems solved for them," he said.

But the many seeds he's planted over the years are starting to sprout now, in that most of his five children are teaching, to some degree, he said. One is an engineer. And, he said, last year one of his daughters was "one of the three leading teachers in the state of Maryland."

Castor-IVA Rocket Failure Cause Found

by Carter Dove

Goddard officials announced late last month that scale model tests conducted by Morton Thiokol at their Huntsville, AL, plant, successfully duplicated a Castor-IVA solid rocket motor failure experienced in August 25. The Castor-IVA motor, under development by Morton Thiokol, will be used to increase the lift capacity of the Delta expendable launch vehicle.

The failure occurred in the motor because of staple holes left in a thin membrane of insulation known as a "stress relief flap" located between the main propellant and the front end of the motor. At motor ignition, propellant—which filled the holes during the manufacturing process—burned through the flap into the main propellant and ignited localized areas which then burned back through the flap holes in an intense jet of flame, causing burn-through of the front end of the motor.

Scale model tests have demonstrated this process, including ignition of the fuse, creation of the flame jet and case burn-through.

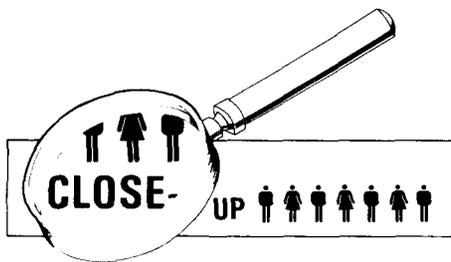
Program engineers subsequently have developed new procedures which preclude the use of staples for stabilizing the stress relief flap during the application of insulation to the motor casing. The new procedure uses the natural tackiness of insulation in its pre-vulcanized state. The use of the staples at any time during the manufacturing process has been eliminated.

William A. Russell, Jr., Delta Project Manager at Goddard, said, "The tests confirm our hypothesis and establish the failure cause beyond any doubt." Russell also said that the rocket motor test failure is not expected to have an adverse impact on the Delta launch schedule, because near-term Delta missions use the current Castor-IV motors.

Retirees

Best wishes to the following Goddard employees who retired recently!

	CODE	YEARS
Dinn, Beverly	151.1	36
Dubach, Leland L.	612	21
Leyh, Frederick	730	32
Smor, Paul	501	36
Tebay, Jack C.	683.2	18
Tochunko, Hubert F.	717.4	30



QUANN

The American Astronautical Society (AAS) recently elected Deputy Director **JOHN J. QUANN** as a Fellow of the Society. This highest-ranking level of membership was awarded in recognition of Quann's significant contributions to astronautics. The awards ceremony was held in conjunction with the 34th Annual AAS Symposium in Houston, TX. Deputy Director for space station



BROWNING

RONALD K. "RON" BROWNING also participated in the symposium. Browning served on the Automation and Robotics for the Space Station Panel. His topic was: "Flight Telerobotic Servicer and Platforms View."

Goddard's Fitness Lab held its Annual Fall Picnic recently to celebrate the running of the 24th Intercenter Run. During the awards ceremony, the following individuals and teams received trophies for the two-mile event: **MARK BAUGH**, First Male Finisher; **AMY KEKEISEN**, First Female Finisher; Code 511's **SPEED AND SNOOZE**, First Team; and **CAC FLEET OF FEET**, Team With Most Finishers.

DAVE HARRIS has accepted the position of manager, Space Network Operations, NASA Headquarters, effective October 25. Harris joined Goddard in 1959 and formerly was chief, Flight Mission Support Office. In his new position, he manages the operations of the TDRSS Program, which includes space operations, the White Sands, NM ground terminal elements and Goddard's Network Control Center. Also, he is the primary user interface at the program level.

Don't Miss Your Chance To Transfer — FERS Open Season Ends December 31

It's time to make up your mind about retirement systems. The Federal Employees Retirement System (FERS) transfer open season ends on December 31, 1987.

The FERS and Civil Service Retirement System (CSRS) plans are quite different. FERS is more like a private sector plan because benefits come from a modified Civil Service pension, Social Security, and a tax-deferred savings plan. The CSRS is a less complicated plan—benefits are derived from a Civil Service pension and an option to participate in a tax-deferred savings plan.

The CSRS plan is not portable and generally suits those who intend to work a full career with the Federal government and retire at age 55 with 30 years of service, or age 60 with 20 years of service. The FERS plan may be more attractive for those who plan to leave the Federal government before they are eligible to retire or otherwise wish to keep their options open.

The decision to remain in the CSRS or transfer to the FERS is one that shouldn't be taken lightly since it will impact your future financial security. To arrive at the decision you will need to assess both your and your spouse's career plans, goals, social security status and current financial position. Along with these assessments, consider the following factors:

- Do you intend to stay with the Federal government until retirement? If so, at what age do you think you would retire?
- Whether or not you stay with the Federal government, how long do you intend to work?
- Have you earned any Social Security quarters of coverage? If so, how many?
- Will your spouse be eligible for Social Security benefits based on his or her work history?
- Do you intend to work after retirement?
- Will you contribute to the Thrift Savings Plan? If so, how much?
- Will you be able to achieve tax savings by contributing to the Thrift Savings Plan?
- Will the differences in disability and survivors benefits between CSRS and FERS have an impact on your benefits?

The FERS Transfer Handbook distributed to employees last summer addresses these and other factors to consider if you are thinking about transferring to the FERS. Remember, that once you transfer officially to the FERS, the decision *cannot* be changed. If you have any questions about transferring to the FERS, call the FERS HOTLINE at x62779.

COPE Provides a Sympathetic Ear for Troubled Goddard Employees

Everyone has problems. Family conflicts, drug or alcohol abuse, or emotional difficulties are often easier to handle when there is someone to talk to, especially if that someone is a trained psychologist. Tom Strange, representative of the COPE program at Goddard, encourages troubled civil servants to call him for an appointment to talk things through.

The Center for Occupational Programs for Employees, or COPE, is a function of Goddard's Employee Assistance Program (EAP). Employees can be referred to the program by their supervisors, or make an appointment on their own. About 20% of the participants are referred by their supervisors, while the other 80% are self-referred, according to Strange.

COPE is a confidential program. For employees who contact COPE themselves,

no information is provided to their workplace. When an employee comes to the COPE program through a supervisory-mandated referral, general information regarding the employee's participation is provided to the supervisor only after the employee signs a release of information form.

One of the main objectives of the program is to identify and provide short-term counseling and resolution assistance; longer-term problems are referred to resources in the employee's community based on the nature of the problem.

For employees who need counseling before or after working hours, COPE also maintains an office in the Greenway shopping center. For more information about COPE, call Tom Strange at the Health Unit, x6666.

Second Phase of Visitor Center Renovation Begins

by Randee Exler

The Visitor Center's (VC) Hall of Satellites closed for renovations last month and is expected to reopen its doors in March. This latest VC renovation is the second and final phase of a total facelift for the facility.

When the ribbons were cut for the VC's Hall of Space Exploration a year ago October, employees, families and friends got to take a look at exhibits on current and

future projects of the Nation's space program. This latest section to be renovated will have a more historical perspective.

"We want our Visitor Center to be a place where people come to learn about NASA and Goddard programs," said Public Affairs Specialist Sheila Stanford who is overseeing the VC renovation.

"Renovating the VC is not just an attempt to update the exhibits, but will make

it more enjoyable and educational through the use of interactive displays," she explained.

Exhibit areas will be framed by space station-like structures. One exhibit will feature Dr. Robert Goddard, the rocket pioneer for whom our Center is named. Another display is about the people at Goddard and the kinds of work we do. An area called "How Do We Study Space Science?" will explain how we get data from space.

The Gemini 12 capsule and a full-scale mockup which visitors can sit in are featured in an area called "How Do We Use Spacecraft?"

A special section explains the role of other NASA centers, and how we work together as a team.

Other interactive displays include a computer game on building your own spacecraft and an ATS-3 satellite transmitter/receiver site where visitors, during certain hours, can hear their voices relayed via satellite.

Repeat visitors will recognize some of the old displays, such as the International Ultraviolet Explorer (IUE) prototype and data feed from the satellite. The Vanguard and Delta models are among the old models worked into new exhibits.

A current events corner will highlight Goddard research. The theme will be Supernova 1987a when the Visitor Center reopens.

During the renovation, the Hall of Space Exploration and the auditorium will remain open. The VC will continue to feature model rocket launches on the first and third Sunday of each month at 1:00 p.m. and will host other public programs.

When the renovation is complete, visitors should leave the VC with a better understanding of the importance of the national space program and of the major role played by the people of the Goddard Space Flight Center.



PHOTO: MARGIE SMALL

GEMINI 12—Former Astronaut James A. Lovell, Jr. visited Goddard recently and stopped by the Visitor Center to see the Gemini XII spacecraft which carried him and Edwin E. "Buzz" Aldrin in near-Earth orbit from November 11-15, 1966. This final Gemini mission made 59 revolutions around the Earth, lasted 94 hours and 34 minutes, and carried 14 scientific experiments. Lovell, currently Group Vice President of the Centel Corporation, Chicago, also flew on Gemini 7 and Apollo 8 and 13. The Gemini 12 capsule will be displayed alongside a full-scale mockup in which visitors can sit and "fly" when the Visitor Center renovation is complete this spring.

NASA
National Aeronautics and
Space Administration
Goddard Space Flight Center

Goddard News

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Executive Editor... James C. Elliott
Managing Editor... Randee Exler
Senior Editors... Michael Braukus,
Carter Dove,
Joyce Milliner and
Carolynne White

