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Vanguard Celebrates 30th Anniversary

by David Thomas

In the beginning man thought Earth was flat. Twenty-five hundred years ago, Greek philosophers suggested Earth was round. Generally speaking, they were right—the Earth is pear shaped, not a perfect circle. Vanguard I surprised the world with this news after being launched March 17, 1958. And although Vanguard I stopped transmitting after seven years, it has been in space longer than any other man-made object and will continue to be for many centuries, perhaps a millenium.

This St. Patrick's Day marks the 30th anniversary of America's second successful satellite mission.

The Vanguard Project has its roots in 1954 when the International Geophysical Year (IGY) was proposed for 1957–58. Two international groups called for the launching of an artificial satellite during IGY, and the U.S. and the Soviet Union picked up the proposal. In July of 1955, the U.S. said it would launch a satellite. The Soviet Union made a similar statement the day after the U.S. announcement.

Within the U.S., the Army and the Navy jockeyed for position to be chosen to launch the first man-made satellite. The Navy won. But the Soviet's Sputnik I and II and the Army Explorer I spacecraft preceded the first successful Vanguard satellite launch.

Nevertheless, the Vanguard I met all of its objectives: to develop and procure a satellite-launching vehicle; to place at least one satellite in orbit during the IGY to accomplish one scientific experiment; and to track the satellite to demonstrate it had actually achieved orbit.

Goddard Established

By October 1958, President Eisenhower authorized the creation of NASA, and the construction of major new facilities for the American space program began. The Vanguard team, working at the Naval Research Laboratory (NRL) in Washington, DC, became the core of NASA's first major scientific laboratory for space exploration, the Goddard Space Flight Center, which was established on May 1, 1959.

One hundred fifty-seven NRL employees transferred to Goddard. Today, 17 troops from the original Vanguard party still "fall in" at the Center's "formation." Currently, at least two have children working here.

One is Kathy Williams, Code 224. She doesn't remember seeing the Vanguard I launch, but recalls, as a 12-year-old, accompanying her father, the late Leonard Williams, to the Cape to see a couple of unsuccessful Vanguard launches.

The other is Richard Schmadebeck, Code 682. When Richard was 16, he says he helped his father, the late Louis Schmadebeck, track Vanguard I as it passed within the line of sight of an antenna atop a building at the Naval Receiving Station in Washington.

Pear-Shaped Earth

John O'Keefe, Code 681, while not one of the original transferees, was one of the pioneering geophysicists at Goddard who studied the movements of the satellite, leading to the discovery that Earth is pear-shaped.

"I think the tracking data was the major success of Vanguard I," he said. "It told us the fundamental theory of geodesy was wrong."

The satellite contained a tiny minitrack transmitter, powered by the first solar cells in space, according to Bob Baumann, Code 300, from the original Vanguard crew.

Continued on page 3

***VANGUARD I*—Bob Baumann, now Goddard's Director of Flight Assurance, makes adjustments to the Vanguard satellite as it sits atop the third stage of the Vanguard launch vehicle in 1950. From left: George MacVeigh, now a Code 716 contractor from T.S. Infosystems, Roger Easton, Naval Research Laboratory (NRL), an unidentified NRL employee, Baumann and Joe Schwartz, NRL. Vanguard I marks its 30th anniversary March 17, 1988.**

INSIDE
ICE DRILLING REVEALS ANTARCTIC PAST
Page 6

Talk from the Top

John W. Townsend Jr.

Q: *What was your first job? How did you get it?*

A: My first real job was with the Naval Research Laboratory [NRL]. I got it accidently. In 1949, I drove a friend to the lab for an interview, even though there was a hiring freeze going on. A young woman from personnel offered to give me a tour. I met the lab chief of the rocketsonde branch, Homer Newell, who later became a NASA Associate Administrator. I had written a thesis on mass spectroscopy and they wanted to fly a mass spectrometer on a German V2 rocket. Dr. Newell asked if I'd be interested in a job. I said no because I already had a job lined up and didn't want to wait for the hiring freeze to end. When the woman from personnel escorted me back, she said that if I was a disabled veteran they could hire me. I told her that I had a 10-point disability but already had a job. NRL staged what seemed like a fraternity rush and I took the job. I stayed for ten years and ended as head of that branch.

Q: *You said (February 1988,* Goddard News*) that you would like to keep an Explorer kind of payload in-house at all times. What do you believe would be the ideal Explorer...for Goddard...? Do you have any candidates in mind now and how/when will you decide on a COBE [Cosmic Background Explorer] follow-on?*

A: I think the ideal Explorer would have a high level of technological involvement so we could solve problems and sharpen our own capabilities. I also would like one that isn't critical with respect to launch date—so, if necessary, we can park it off to the side, go solve a crisis, and then pick it back up. One of the problems we're having with COBE is that we're not able to do anything but keep right on it. I also think that COBE is too big a payload. The one mission that strikes me as a candidate is HRSO, the High Resolution Solar Observatory. HRSO is not a new start yet, and if it becomes one in the very near

Continued on page 8

Human Presence in Space Named as New U.S. Space Policy Goal

by Carolynne White

For the first time, the United States has a long-range goal of expanding human presence and activities beyond Earth orbit into the solar system.

President Reagan emphasized expansion of the human presence in space in a National Security Decision Directive (NSDD) he signed on January 5, outlining the new National Space Policy and a fifteen-point Commercial Space Initiative and asking for about $11.5 billion for the total FY 1989 NASA budget.

In addition to the primary goal of human presence and activity in the solar system, the new policy "clearly commits the United States to space leadership as a fundamental national objective," said NASA Administrator James C. Fletcher in a press conference on February 18. "It is now up to Congress to support this major step forward in restoring United States' leadership in space."

In support of the long-range goal of expanding human presence in space, the Space Policy budget includes $100 million to establish a major new technology development program, called Project Pathfinder. Intended to provide a knowledge base for wise decisions on long-term goals and missions, the project will focus on four critical areas of technology: exploration, operations, humans in space, and transfer vehicles technology. Within these categories, Project Pathfinder research will investigate such crucial problems as humans in the space environment; closed-loop life support; aero-braking; orbital transfer and maneuvering; cryogenic storage and handling; and large scale space operations.

Dr. Fletcher also affirmed NASA's support of the government's intent to expand the role of the private sector in space. "We will continue our programs to encourage and work cooperatively with private business concerns wishing to undertake enterprises in space," he said. In addition,

Robert Goddard Remembered

Robert H. Goddard, after whom our center is named, made many significant contributions to rocketry and space flight. March 16 marks the 52nd anniversary of his historic 2.5 second, liquid-fuel rocket flight. The lengthy list of Dr. Goddard's scientific "firsts" is an eloquent testimonial to his lifetime of work in establishing and demonstrating the fundamental principles of rocket propulsion.

- First explored mathematically the practicality of using rocket propulsion to reach high altitudes and to shoot to the moon (1912);
- First received U.S. patent on idea of multi-stage rockets (1914);
- First proved, by actual static test, that a rocket will work in a vacuum, that it needs no air to push against (1916);
- First developed and shot a liquid fuel rocket (1926);
- First developed pumps suitable for rocket fuels (1926);
- First shot a scientific payload (barometer and camera) in a rocket flight (1929);
- First used vanes in the rocket motor blast for guidance (1932);
- First developed gyro control apparatus for rocket flight (1932);
- First shot a liquid-fuel rocket faster than the speed of sound (1935);
- First launched successfully a rocket with a motor pivoted in gimbals under the influence of a gyro mechanism (1937).

"It is difficult to say what is impossible, for the dream of yesterday is the hope of today and the reality of tomorrow."

Dr. Robert H. Goddard

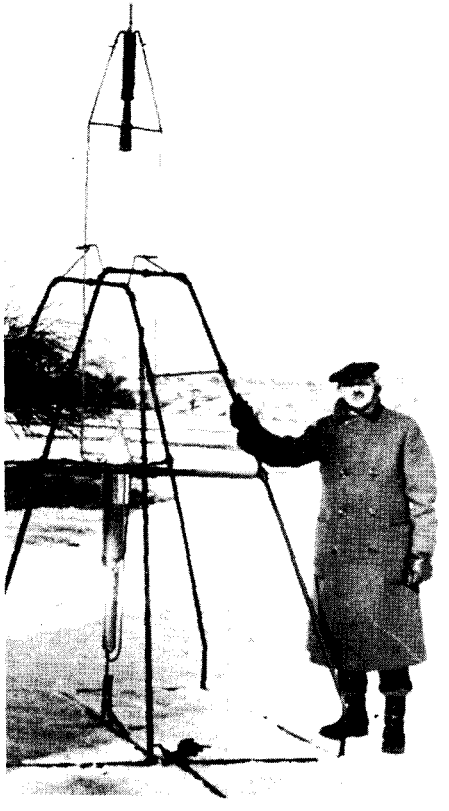
NASA will procure its needed Expendable Launch Vehicle (ELV) services commercially from the private sector.

These commercialization objectives are outlined in the President's fifteen point Commercial Space Initiative. The first of the fifteen points announces the Federal Government's intent to lease space as an "anchor tenant" from a commercially financed, constructed, and operated orbiting space facility for research and commercial manufacturing, primarily in microgravity research.

The Administration intends to award a contract during mid-summer of this year for this space facility and related services, to be available to the Government no later than the end of FY 1993.

The budget also includes about $967 million in support of NASA's Space Station, which will be moving into full-scale hardware development in Fiscal Year 1989 and is expected to be available in the mid-1990's.

This FY 1989 budget and the President's new National Space Policy, according to Dr. Fletcher, "give NASA what is needed to carry forward on-going programs in space and aeronautics and to take the essential next steps to assure future United States leadership in space."



NASA Pipeline

JET PROPULSION LABORATORY, Pasadena, CA — Researchers at NASA's JPL are completing the first field tests of a new, sophisticated spaceborne radar system. The system, a multi-frequency imaging radar polarimeter, was tested over the San Francisco Bay area in January and February aboard a DC-8 airplane. At aircraft altitudes, the system is able to detect objects as small as 39 feet across. The system's capabilities are useful in determining forest types, measuring ages of geologic features and analyzing crop types. The system will be used in some 25 flights supporting a variety of NASA-sponsored oceanographic and geological investigations.

HEADQUARTERS, Washington, DC — NASA has authorized studies to determine the feasibility of launching a new generation of unmanned scientific spacecraft to better understand black holes, distant quasars, nucleosynthesis solar particles and unexplored layers of the Earth's atmosphere. These studies were submitted to NASA under the Explorer Concept program, designed to develop intermediate size scientific experiments. Currently under development are several explorers to be launched in the early 1990's to study the cosmic microwave background, extreme ultraviolet from nearby stars and transient x-ray sources. One or more of the new studies could result in a mission to be launched in the mid-1990's by the Space Shuttle or by expendable rockets.

JOHNSON SPACE CENTER, Houston, TX — Space Shuttle crew pole escape system tests are underway at Edwards Air Force Base, CA. Objectives of the tests are to establish the feasibility of this concept for crew egress and to determine the margins on orbiter wing clearance. The telescoping pole is one of two methods currently being evaluated—the other is the tractor rocket extraction system. A decision on which of the two egress methods may be incorporated into Discovery will be made after test data are analyzed and recommendations are made to Shuttle program managers.

MARSHALL SPACE FLIGHT CENTER, Huntsville, AL — NASA and Morton Thiokol are examining 72 bolts in the interior of the Space Shuttle solid rocket motor. Replacement of these bolts, which attach the nozzle fixed housing to the nozzle's flex bearing assembly, is being considered. The bolts are threaded all the way to the bolt head instead of having a smooth bolt shank, which may be preferred to assure that special Stat-O-Seal washers located under the bolt heads seal properly.

HEADQUARTERS, Washington, DC — Former Director of Science and Engineering at Marshall Space Flight Center James B. Odom will assume the duties of Associate Administrator for Space Station, NASA Administrator James C. Fletcher announced this month. Dr. Fletcher also announced the appointment of Manuel "Manny" Peralta to the position of Associate Administrator for Management; Peralta has been serving in this position in an acting capacity since April, 1987.

Vanguard

Continued from page 1

"The solar cells . . . performed to perfection . . .," Baumann said, ". . . permitting accurate radio tracking and orbit determination for many years. . . ." Baumann worked on the Vanguard I design group and was instrumental in its development.

Vanguard I's 7 years of data were without parallel among the IGY spacecraft, providing scientific discoveries and firsts relating to upper atmosphere density, geodesy, geodynamics, solar terrestrial relationships, dynamical astronomy, and exospheric structure, according to Dr. Joseph Siry, Code 671, another of the Vanguard team vets who transferred from NRL.

"It is all the more remarkable to recall, in this era of multi-ton spacecraft, that such a rich scientific harvest came from a satellite weighing less than one and a half kilograms," Siry said.

Continued on page 8

International Cooperation: Key to Space Research

"I think exactly how we do cooperative programs in the future is a very key thing," said Dr. Frank McDonald, Center Associate Director, at the Lunch and Learn, co-sponsored by Goddard and the American Institute for Aeronautics and Astronautics (AIAA) last month.

Before a full house, Dr. McDonald discussed the future of space research, particularly in the differences among the U.S., Russian, Japanese, and European programs. In his talk, McDonald stressed international cooperation, and domestic competition, as keys to a successful space research program.

Following are some excerpts from Dr. McDonald's talk.

"If we had beat the Russians and launched the first satellite, I feel very strongly that there'd be a totally different space program in the U.S. today. If they had not got the jump on us and we had not felt so badly stung, and reacted in such a strong way, we would have been far more complacent in the nature of the space program that we had to put in place.... We reacted in a very positive way; we accepted the challenge.... We were clearly the leader and established total dominance in space for a period of more than twenty years.

"Now there is a perception that this is slowly changing.... This brings up an important point we need to consider: Why doesn't the U.S. pay any attention to what the Russians are doing?

"Their programs have received very little attention in the American press. They have built up an exceedingly large infrastructure for launch, capable of around 100 launches a year.... They have Mir, a multi-docking port...and they brought something far more important: they also reached out to Western Europe and said, 'Come fly on our missions!' They can't really support that [launch capability] with their current research structure, so they've reached out.

"This has a number of advantages: it spurs their research activity and...builds a friendship between countries....

"When we were there in celebration of the launch of Sputnik I, we saw...the confidence they have now, both in their manned and unmanned programs.... The U.S.S.R. is going to drive the U.S.; they're going to be the forcing function. I think the worst thing we can do is try to react to their programs.... We must... take a leadership role and establish our goals for the future...

"The U.S. program is unique in comparison. For example, there's nothing in the rest of the world that compares with our balloon and rocket programs. If you look at our deep space and tracking networks—[the Russians] have to come to us if they want thorough coverage.

"We also have extensive university support...[which is] really a big plus for the U.S. We have 15 or 16 operational satellites that are...legacies to the fact that we build things that last for a long time. For example, Nimbus-7 has given us data on the ozone hole, and when Supernova 1987A was detected last February, IUE [International Ultraviolet Explorer] caught the first sign.... All that is part of our infrastructure, too.

"We have the satellite servicing capability to repair large structures in space; we can put together things up there that you can't do on Earth. We offer the great promise of Space Station.

Key Areas: Goddard's Role

"I'm firmly convinced that...it is vital that the manned and unmanned program come together. I think the kind of things that Goddard is interested in doing are those like satellite servicing and repair.... That is a crucial item before you go out [to space].

"Another crucial item is cooperation, particularly with the Soviets. The National Space Policy provides for...cooperation with the U.S.S.R. I think that's a very positive sign. There are so many things to do in science and space, no one national program can do it all....

Launch Update: NOAA-H

A meteorological weather satellite, NOAA-H, managed by Goddard for the National Oceanic and Atmospheric Administration (NOAA), is scheduled for launch no earlier than May 18, 1988, according to Charles E. "Chuck" Thienel, Goddard's METSAT projects manager.

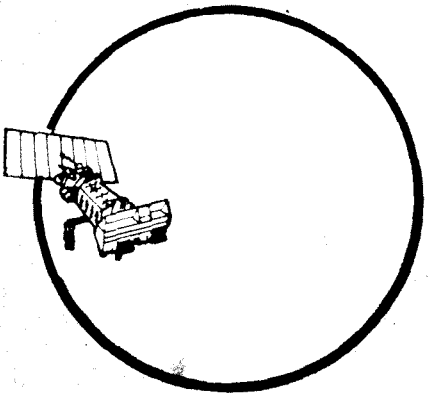
The satellite—to be designated NOAA-11 when on orbit—will be launched by a U.S. Air Force Atlas-E expendable launch vehicle from Vandenberg Air Force Base, CA.

NOAA-11 will join the now-orbiting NOAA-9 and NOAA—10 spacecraft in collecting meteorological data for transmission directly to users around the world to enhance local weather analysis and forecasting.

In addition to assisting in local weather forecasting, the satellite data are used for hurricane tracking and warning; and for agricultural, commercial fishing, forestry, maritime and other industrial uses.

NOAA-11, from its 470-nautical mile (870 km.) circular, near-polar orbit, will orbit the Earth approximately every 102 minutes and observe a different portion of the Earth's surface on each orbit.

Among the scientific instruments and equipment on board the spacecraft will be those of COSPAS/SARSAT—the acronym for a cooperative, satellite-aided search and rescue project of the



U.S., Canada, France and the Soviet Union.

The COSPAS/SARSAT equipment, already operational on NOAA-9 and 10, relays distress signals transmitted from downed aircraft or vessels at sea to ground-sea-air recovery forces. Since it began operations in September 1982, the system has helped save more than 1,000 lives.

Goddard provides NASA with the management of the U.S. research effort on COSPAS/SARSAT.

NOAA-11 is scheduled to replace NOAA-9 as the "afternoon" satellite; NOAA-10, launched in September 1986, is the "morning" spacecraft.

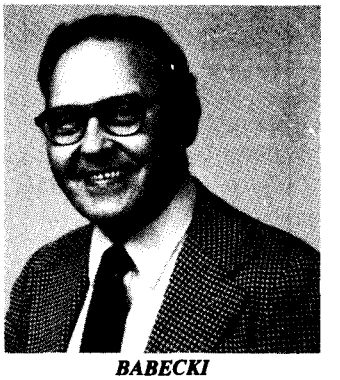
A third generation operational weather satellite, NOAA-11 has evolved from TIROS-N, a research and development prototype spacecraft launched in 1978.

Goddard Patent Holders to Receive Royalties

SCHUTT

YIN

HAEHNER



BABECKI

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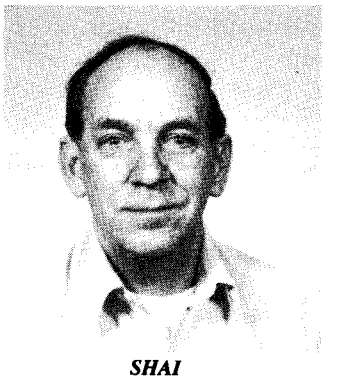


SHAI

Amendments to the Technology Innovation Act recently allowed seven Goddard patent holders to receive royalties for their inventions. Formerly, the Agency received money for patents developed by NASA personnel as a result of research conducted at NASA centers.

The royalties are generated when patents are licensed to private industry. These inventors are the first to receive royalty money under the new amendments; they will receive the royalties yearly throughout the 17-year life of the patent, after which it must be renewed.

Among the inventors was Dr. John B. Schutt, Code 623, holder of a patent for his innovative improvement on a traditional zinc compound to produce a corrosion-inhibiting coating which provides long-term protection with a single coating. The coating, originally developed for gantries and other structures at the Kennedy Space Center, FL, was used in the renovation of the Statue of Liberty. Shutt's royalty award was the highest in the agency.

Dr. Lo I. Yin, Code 682, who developed the Lixiscope (Low Intensity X-ray Imaging Scope) also will receive royalties for his invention. The Lixiscope is a self-contained, battery-powered flouroscope for multi-purpose use. Because of its portability it can be used in emergency field situations in such procedures as scanning for possible bone injuries to accident victims or athletes. The small size and low radiation dosage also make it attractive for hospital emergency room use. Additionally, the Lixiscope is receiving widespread industrial use for such techniques as instant detection of product flaws and security examination of parcels in mail rooms and building entrances.

Carl Haehner, Code 313, in collaboration with Al Babecki, now retired, has developed a process by which thin coatings of various metals can be plated onto other surfaces. A variation on the technique called "peening," the process uses compressed air to apply concurrent streams of small glass beads and powdered plating material to the surface. This process has applications in decorative finishing of various surfaces, in addition to its primary application of applying protective coatings to the large metal panels on the outside of spacecraft.

Dr. Charlie Chu, Code 313, has patented a variation on this method, which uses rapidly solidifying metal powders to coat spacecraft. Dr. Chu's tests have shown that peen plating with this rapidly solidifying metal powder can improve the fatigue-resistant properties obtained by coating with the peening process.

Donald Lokerson, Code 724.3, patented a set of computer algorithms which make computer speech recognition speaker-independent. Because sounds generated by a person speaking can vary with accent, inflection, tone, and an infinite variety of other factors, most computer speech recognition programs can interpret voice signals only from a single speaker, who generally has to be trained to speak clearly and slowly so that the computer can "understand." Lokerson's invention allows a computer to recognize untrained, even accented speech.

Michael Shai, Code 754.2, has patented a type of conductive paint which dissipates electrical charge buildup on the outside of spacecraft. Without this conductive coating, the International Sun Earth Explorer (ISEE)-3 spacecraft (renamed the International Cometary Explorer (ICE), it made history by intercepting Comet Giacobini-Zinner in 1985) would probably have burned up within about two years after launch, according to Shai. Shai's paint also coats the outside of the San Marco D/L spacecraft, scheduled for launch this month.

Ice Drilling Reveals Antarctic Past

by Randee Exler

"You never think you miss color until you reach Christchurch [New Zealand]. The green grass blows me away, every time," said Goddard glaciologist Dr. Bob Bindschadler about a joint NASA/National Science Foundation (NSF) project which has taken him out of the Washington winter and into the Antarctic summer for the last four years.

The Antarctic summer is bright, white and cold. The sun never sets, there's no vegetation; and where the NASA/NSF science team camps out, the temperature ranges between −18° and 23° Farenheit (F) (−28° and −5° Celsius (C)). If the isolation doesn't get to you, the wind chill probably will.

"The concept of wind chill was developed here," said Bindschadler. "During the summer it can be −112°F [−80°C]."

Why would someone return to this harsh environment year after year? "The science," Bindschadler answered without hesitation, "and also the chance to be with people that are just as crazy as you are!"

"We're trying to understand the evolution of the region. This year our goal was to determine the age of the Crary Ice Rise," the Goddard scientist explained.

The ice rise, named after U.S. Antarctic scientist Bert Crary, is located on the floating Ross Ice Shelf in West Antarctica where it is grounded on a submarine mountain peak 860 feet (260 meters) below sea level. By calculating the ice temperature at different levels, the scientists can determine when the ice rise was formed.

Crary Ice Rise

The four-man, one-woman team was outfitted in Christchurch, New Zealand last November before flying via military aircraft to McMurdo Station, the largest base in Antarctica. A Navy aircraft, equipped with skis for landing on the ice, transported the team and equipment to the Crary Ice Rise, approximately 450 southeastern miles away.

"It's always a shock when the plane leaves," Bindschadler recalled. "The pile of equipment looks so small. We have a radio but there's little chance of getting anything you may have forgotten."

The team used hot water drills to bore through the ice to the bedrock below. "The first hole, which was 1,220 feet [370 meters] deep, took about 16 hours to drill so we worked nonstop until we hit the bedrock," Bindschadler explained.

WHITE AND BRIGHT—**What looks like a lunar colony is really the snow camp where a NASA/National Science Foundation team studied the Crary Ice Rise in West Antarctica last winter.**

"We were about 130 feet [40 meters] deep before the ice was dense enough to hold, rather than absorb, the hot water," he added.

Once the hole was drilled, a thermister cable was lowered to the bottom. Thermisters vary their electric resistence with temperature which allows the scientists to calculate the temperature profile of the ice rise once the hot-water filled hole freezes.

The average surface temperature of the ice rise is 17°F (−27°C). The team's first measurements indicated that the temperature on the bottom is approximately 28°F (−2°C), which is close to the freezing point of sea water. The warm temperature at the bottom suggested that the Crary Ice Rise is a recent phenomenon probably formed during the last several hundred years, according to Bindschadler. "The temperature at the bottom would have been colder if the feature was older," the scientist explained.

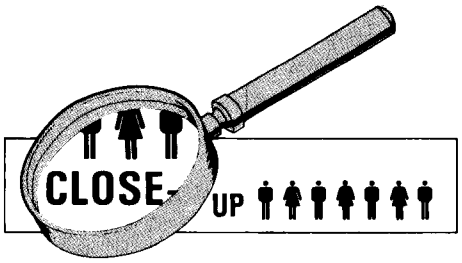
Second Hole

The team bored a second hole 1,580 feet (480 meters) deep and then experienced difficulty removing the drill from the hole. "The drill sat on the bottom for at least an hour," Bindschadler said. When the drill was finally removed, it was covered with gray mud.

Sediment analysis at the Byrd Polar Research Center, Ohio State University revealed fossilized organisms, called diotomes, that date back to the Upper Miocene epoch, five to six million years ago.

Next year, Bindschadler will return to Crary Ice Rise for final measurements.

ANTARCTIC COUCH POTATO—**Pictured is Bob Bindschadler, Code 671, relaxing by a snow mobile. What is he reading? A book on glaciers, of course!**



BOGGESS

DR. NANCY BOGGESS, Code 680, will present "The Infrared Sky" as part of the Exploring Space Lecture Series at the National Air and Space Museum on Wednesday, April 10, 7:30 p.m. Boggess will discuss how infrared radiation is used to detect relatively cool materials in the cosmos, such as dust, rocks and molecules. Boggess is the deputy project scientist for Goddard's Cosmic Background Explorer (COBE), a satellite which will use infrared instruments to study the origins of the Universe.

Congratulations to **STEPHEN W. WHARTON,** Code 623, whose paper, "A Methodology for Evaluation of an Interactive Multi-Spectral Image Processing System,"—written in conjunction with William M. Kovalick and Jeffrey A. Newcomer, contractors from Science Applications Research (SAR)—won the 1987 President's Award for Practical Papers: Third Prize. The paper was the result of the authors' evaluation of the Land Analysis System (LAS), a system developed to satisfy the image processing needs of scientists conducting research in forestry, agriculture, geology, and hydrology in the Laboratory for Terrestrial Physics, Code 620.

BURR

Congratulations to **PETE BURR,** who was recently appointed Deputy Director for Flight Projects. Burr joined Goddard in 1960 and has held the positions of spacecraft manager for the Synchronous Meteorological Satellite (1970-1975), project manager for the Solar Maximum Mission (1975-1980) and project manager for the Upper Atmosphere Research Satellite (1980-1988).

Lau Named Most Outstanding Young Scientist

DR. WILLIAM K. M. LAU, Code 613, has been awarded the 1988 Clarence Leroy Meisinger Award of the American Meteorological Society, which is given to the nation's most outstanding young scientist.

Lau has been recognized for his outstanding contributions to the basic understanding of the global climate system, in particular his use of satellite observations to study the phenomenon known as the El Nino/Southern Oscillation which impacts long range weather forecasting.

Lau joined Goddard's Laboratory of Atmospheres in 1981. He currently serves as head of the Experimental Climate Forecast Center and is visiting lecturer at the University of Maryland.

In 1987, Lau received the John C. Lindsay Memorial Award, Goddard's highest honor for scientific achievement. He was honored recently as one of the Top Ten Science Talents in the Washington area for his research contributions in climate dynamics by *Washington Technology.*

LAU

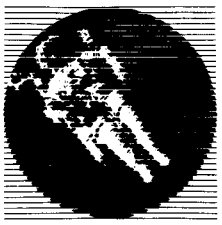
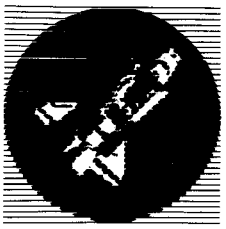
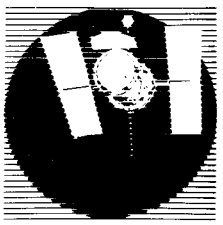
See your name in print!

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

Retirees

Best wishes to the following Goddard employees who retired recently!

	CODE	YEAR
Boswell, Floy	231	20
Chandler, John B.	724	31
Hogan, George D.	410	31
Mears, Joseph E.	273.2	28
Quann, John J.	100	29
Reid, Dorothy	120	16
Roberts, Conway H.	831.2	32
Stoehy, Richard S.	542.2	29

Visitor Center—April Calendar

April 3—
Model Rocket Launch—1:00 p.m.

April 9—
Star Watch—7:00 p.m. to 9:00 p.m.

April 9 & 10—
NASA Film Series—1:00 p.m.
"Apollo 13: 'Houston. . .We've Got A Problem' "
"Apollo 16: Nothing So Hidden"

April 17—
Model Rocket Launch—1:00 p.m.
Special Guest Appearance—
12:00 p.m. to 2:00 p.m.
ITV "Give Science A Hand" Stars David Zahren and Watson

April 24—
Public Program—1:00 p.m.
"Robotics: Our Space Age Helpers"

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

The Visitor Center is open Wednesday through Sunday, from 10:00 a.m. to 4:00 p.m.

Goddard Hosts Eos Symposium

Goddard has overall responsibility for a space platform that will be part of the Earth Observing System (Eos), a NASA mission that will extend into the 21st century.

The Goddard platform will be one of the topics discussed during a March 22 agency-wide preproposal briefing—originating at Goddard and to be telecast via NASA Select TV—on the Announcement of Opportunity (AO) for Eos. The event will serve primarily to answer preliminary questions from prospective investigators in the Eos program.

Three types of proposals are being requested in this AO: instrument investigations for polar platforms and/or for Space Station attached payloads; research facility instrument team members and team leader investigations for six NASA research facility instruments; and interdisciplinary investigations for data analysis and modeling, preparing for and using Eos-derived data.

The panelists will be Alex Tuyahov, NASA Headquarters (HQ) Eos program manager; Dr. Dixon Butler, HQ Eos program scientist; Charles MacKenzie, GSFC Eos project manager; and Dr. Gerald Soffen, GSFC Eos project scientist. In addition to NASA, the National Oceanic and Atmospheric Administration, Canada, the European Space Agency and Japan are expected to be major participants in the Eos Program.

The overall goal of Eos is to advance the understanding of the entire Earth system on the global scale through developing a deeper understanding of the components of that system, the interactions among them, and how the Earth system is changing. Eos will create an integrated scientific observing system which will enable multidisciplinary study of the Earth, including the atmosphere, the oceans, the land surface and the solid Earth.

The Eos mission is intended to continue for approximately 15 years after the launch of the first of four polar-orbiting platforms. The first platform is now scheduled for launch no earlier than October, 1995. Goddard has overall responsibility for the space platform, which may carry up to 20 instruments. The three remaining platforms will be the responsibility of the European Space Agency (ESA), NASA and Japan.

Instruments to serve as Space Station-attached payloads are slated for launch between 1995 and 1997. The platforms from ESA, NASA and Japan are scheduled for launch no earlier than March, 1997, April, 1997 and a date to be determined in 1988, respectively. The NASA platforms are to be launched by an expendable Titan IV launch vehicle, with an upgraded Space Shuttle as backup; ESA will use the Ariane rocket and Japan the H-2 launch vehicle. The NASA platforms will carry an instrument payload between 6,000 and 8,000 pounds.

Vanguard

Continued from page 3

As a youth, near the beginning of the 20th century, Robert Goddard, the Center's namesake, began to dream of spatial voyages. He successfully launched the first liquid-fueled rocket on March 16, 1926, thereafter becoming one of the great pioneers of astronautics.

The Vanguard project, according to the book on its history, *Vanguard — A History,* was a major step in transforming his dreams to reality. It may be said to have been rooted in Goddard's New Mexico rocket launchings, and to have stretched far upward toward a manned landing on the Moon, and beyond.

But perhaps the most significant achievement of Project Vanguard, according to another history book, "was to bring together a group of dedicated and talented scientists and engineers who came to understand the complexities and challenges of the space sciences program."

Talk From the Top

Continued from page 2

future, it's not the kind of project that we could take on in-house because of our manpower constraints. However, if HRSO is delayed several years, it might be a good choice.

Q: *Would you like to see Goddard take on a broader role in the space technology arena...or do you believe our current level of involvement is appropriate for a flight center?*

A: I would like to see that effort increased. The level I would like to try to get to is something like 10%, probably in manpower, not in money. Industry uses 10% for investing in advanced programs for the future and in the area of engineering space technology, I would take a similar approach.

Center Director Dr. John W. Townsend, Jr. wants to hear from you! Send your questions to: TALK FROM THE TOP, Code 130.

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