



SPACE PIONEER AND TOP EARTH SCIENTIST, DR. WILLIAM NORDBERG DIES

Dr. William Nordberg, 46, internationally known space scientist and Director of Applications at NASA's Goddard Space Flight Center, Greenbelt, Md., died Sunday, October 3, of cancer after a two year illness.

Dr. Nordberg was born in Fehring, Austria and received his higher education, Bachelor and Doctorate degrees in physics, at the University of Graz, Austria. He came to the U.S. in 1953. He worked for the U.S. Army Signal Corps as an atmospheric physicist and later as project scientist on the International Geophysical Year Rocket Program and the Vanguard II Meteorological Satellite during the 1950's at Fort Monmouth, N.J.

In 1959 he came to Goddard Space Flight Center as part of a group of scientists that were being transferred from the Army to the newly-formed NASA. His first job was Head, Physical Measurement Section, Meteorology Branch in the Satellite Applications Systems Division.

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NASA LAUNCHES THIRD MARISAT FOR COMSAT GENERAL CORP.

The third maritime satellite (Marisat) was launched by NASA for COMSAT General Corp. from Cape Canaveral, Fla., October 14th on board a Delta rocket, at 6:44 p.m. EDT.

The spacecraft is the third in the new Marisat system. Marisat satellites now stationed over the Atlantic and Pacific Oceans are providing communications to the U.S. Navy, as well as the commercial shipping and offshore industries.

The Navy will increase its use of Marisat by leasing UHF capacity in the third Marisat, which is to be positioned over the Indian Ocean. Marisat-C will be placed into synchronous orbit over the equator at 73 degrees E. longitude.

The first spacecraft, Marisat-1, was launched successfully Feb. 19 and is in orbit over the Atlantic at 15 degrees W. longitude. The second, Marisat-2, was launched June 9 and is in orbit over the mid-Pacific at 176.5 degrees E. longitude. The spacecraft were placed in orbit by Delta launch vehicles from Cape Canaveral, Fla.

Both in-orbit spacecraft provide communications service to the Navy as well as full-time commercial voice and data communications to the maritime industry. Initially, Marisat-C will be used only by the Navy.

NASA TO MONITOR EXPECTED CLOUD FROM VOLCANO

If and when the long-smoldering LaSoufriere volcano on the Caribbean island of Guadeloupe evolves into a major eruption, its resulting cloud is scheduled to be monitored by satellites, balloons and possibly sounding rockets and NASA's high-flying U-2 aircraft.

An informal group of scientists are working together to extract as much information as possible from the expected eruption to see, for example, what effect the mushrooming cloud will have on the ozone layer in the area as well as the type and number of gases and particulates it will carry.

The particulates and chemical content of major volcanic eruptions can affect the radiation balance of the atmosphere as well as the ozone layer. Hydrochloric acid released by the volcano contains chlorides as do fluoro-carbons, which produce chlorine and chlorine oxide above 25 km (13 miles) altitude destroying ozone.

At Goddard Space Flight Center, Greenbelt, Md. the project scientist for NASA's Applications Sounding Rocket Program, Ernest Hilsenrath, says he has made arrangements to have scientific data returned from a number of satellites, radiosonde balloons and possibly sounding rockets, all of which carry ozone detectors should the eruption be a major one as expected.

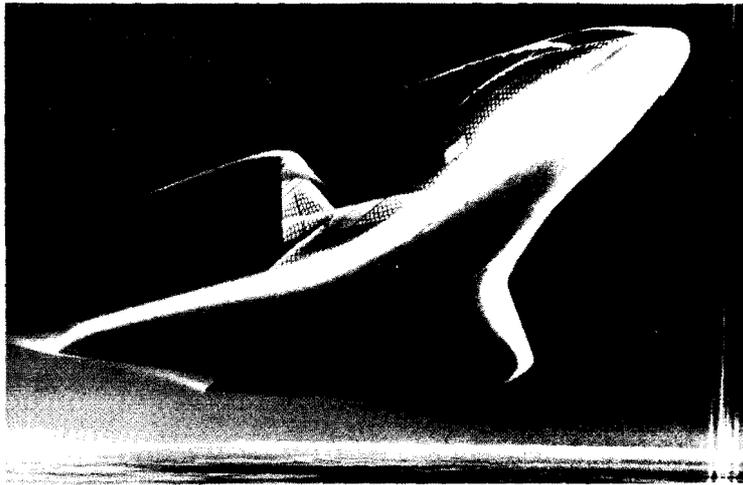
Hilsenrath says he has made arrangements to get information from NASA/Goddard's upper atmosphere explorer, Explorer 55, which measures ozone with high resolution from an orbit 250 kilometers (155 miles) above the Earth in the Guadeloupe area. He also expects to get similar information on a larger scale from the polar-orbiting Nimbus-4 weather satellite which carries similar ozone-sampling instrumentation as Explorer 55.

In addition, he is working with National Oceanic and Atmospheric Administration personnel to get quick one kilometer (about 1/2 mile) resolution pictures from a NOAA synchronous orbit satellite. It is expected to be able to track the cloud, taking pictures from directly overhead every 20 minutes, so that decisions can be made on whether or not to fire sounding rockets and when to fly radiosonde balloons for ozone measurement.

NASA personnel from Wallops Flight Center, Va. recently arrived on the Island of Antigua, about 96 kilometers (60 miles) north of Guadeloupe, to perform balloon ozone measurements prior to the eruption and will continue these flights if the volcano spews a huge cloud into the upper atmosphere. Balloon flights are also being conducted from San Juan, Puerto Rico which is about 400 km (250 miles) to the west, since the cloud will pass over that island if the prevailing winds persist.

DR. VACCARO APPOINTED DIRECTOR OF EXECUTIVE DEVELOPMENT

Dr. Michael J. Vaccaro has been appointed to the position of NASA Director of Executive Development, effective September 26, 1976. In this position he is responsible for the operation and management of the Agency's executive resources system, the coordination of development plans for key personnel, and the development of innovative methods for implementing these programs.



Bricks of pure silica are seen in this artist's concept protecting NASA's Space Shuttle from intense heat that turns much of the underbelly white-hot during reentry into the Earth's atmosphere.

PRODUCTION BEGINS ON SPACE SHUTTLE'S HEAT SHIELD

A space-age insulation, which sheds heat so efficiently it can be held with bare hands while still red hot, is now being manufactured in great quantities at a new Lockheed facility.

Refined from common sand, the unique all-silica material will be used as a heat shield to protect space travelers of the 1980's aboard NASA's Space Shuttle.

Nearly 34,000 "tiles" of the insulation will be used to cover about 70 percent of each spacecraft's surface.

The tiles are expected to survive temperatures up to 2300° F for 100 flights with only minor maintenance. It is this feature that makes the Shuttle a truly reusable—and economical—space transportation system. Previously, all manned spacecraft used a heat shield that was destroyed during each fiery reentry into the Earth's atmosphere.

Each tile on the spacecraft will be precisely milled to match the curvature of the Shuttle's surface at the exact point it is to be attached. This means no two of the 34,000 tiles in a shipment are exactly alike.

Further complicating assembly, tiny gaps must be left between tiles to allow air inside to escape on orbit, and those gaps must be uniform to within 20 one thousandths of an inch—a very small margin for error. All this makes the task of fitting tiles together on the spacecraft's skin somewhat like assembling the world's largest three-dimensional jigsaw puzzle on a surface twice the size of a basketball court.

LUT ARRIVES

From 1:30 to 3:00 p.m. October 20th, Goddard will demonstrate a new type of high resolution ground station for the reception of weather pictures direct from orbiting satellites. The demonstration will take place at the Center.

Called a Local User Terminal (LUT), it was designed specifically to aid meteorologists, especially in underdeveloped countries which must depend in whole or in part on such systems for weather forecasting information.

This new, user oriented Earth station costs considerably more than the old Automatic Picture Transmission (APT) system developed in the 1960's, but meteorologists consider the LUT far superior to the old APT polaroid picture receivers.



White hot, and fresh from a 2300° F oven, the glowing cube provides the only illumination in these photographs as a technician from Lockheed Missiles & Space Co. holds it in his bare hand without injury. The demonstration illustrates the remarkable speed with which heat is cast off by a unique silica insulation that Lockheed is manufacturing for NASA's Space Shuttle. The company will make nearly 34,000 "tiles" of the material for each spaceship, enough to cover all the underside and portions of the upper wings, fuselage and tail. Expected to survive at least 100 flights with minimum maintenance, the insulation will protect the Shuttle from fiery 2300° F reentry temperatures when it returns from space to the Earth's atmosphere. The photo at left was taken less than 10 seconds after the cube's removal from the oven. A few seconds later (center photo), the glow begins to fade. At right, still less than 30 seconds from the oven, the cube's edges reach room temperature and turn gray while its interior remains red hot.

SIGNALS FROM BEYOND

What may be the last major radio source in the solar system identifiable from Earth has apparently been observed by Goddard's own Larry Brown.

The source? Uranus, a gaseous, extremely cold planet some two billion miles from the Earth and Sun. To Uranus, the Sun is merely a far away speck of light, like a distant star to Earth. Yet the planet seems to emit a radio signal that comes either from a molten core that generates a magnetic field around Uranus, or by the rotation of the planet as it revolves on its axis.

Just two years ago, Brown discovered that Saturn emitted radio signals, the first such discovery since radio astronomers heard radio noises from Jupiter in the early 1950's.

The signals from both Saturn and Uranus are so weak they can only be heard via NASA satellites designed to pick up infinitesimal signals from outer space relay then via digital data to Earth. In both cases the satellite used was IMP-6, a radio astronomy satellite and the sixth of the Interplanetary Monitoring Platforms launched and managed by Goddard.

By deleting the data from such sources as the Sun and Earth, and chopping off all galactic background signals when the satellite was looking toward the planet, Mr. Brown accumulated enough data to strongly indicate that Uranus itself is giving off radio signals.

DID YOU KNOW?

The first of the two Space Shuttle training aircraft has been delivered for use by NASA's Johnson Space Center, Houston, Tex. The aircraft will be used in crew training to simulate the flight characteristics of the Space Shuttle Orbiter. Space Shuttle is a space transportation system designed to perform Earth orbital missions.

GODDARD DIRECTOR AND TRACKING NETWORK DIRECTOR NAMED AAS FELLOW

Dr. Robert S. Cooper, Director of NASA's Goddard Space Flight Center, Greenbelt, Md., and Tecwyn "Tec" Roberts have been elected Fellows of the American Astronautical Society and presented to the membership at a Mayflower Hotel banquet in Washington, D.C. October 7th.

As two of 12 persons elected as AAS Fellows this year, they join a select group which the AAS says, "comprises the highest ranking members of the Society. This level of membership is conferred in recognition of the recipient's significant contributions to astronautics."

Dr. Cooper was appointed Goddard Director July 1, 1976 and served as Deputy Director from the previous July. He came to GSFC from the Department of Defense where since August 1972, he was Assistant Director of Defense Research and Engineering (Space and Advanced Systems).

Prior to that he spent six years as a manager and researcher at the Massachusetts Institute of Technology's Lincoln Laboratory, Lexington, Mass. and was an Assistant Professor at MIT, Cambridge, Mass. from 1963 to 1966.

He received his electrical engineering degree from the University of Iowa in 1954 and masters degree (M.S.E.E.) in 1958 from Ohio State University, meanwhile serving two years as an Air Force officer.

As GSFC Director, Dr. Cooper is directly responsible for overall management of about 3600 persons engaged in space research programs involving fundamental scientific knowledge as well as useful applications of space technology.

As Director of Networks since 1972, Mr. Roberts is responsible for the operation of the tracking and communications networks used in support for both manned and unmanned spacecraft projects.

He joined the Goddard staff in July of 1964 and was for 7 years Chief of Goddard's Manned Flight Engineering Division before taking his present job. His experience in manned flight dates back to 1959 when he joined NASA to work on the Mercury Program at the Langley Research Center and then the Gemini and Apollo programs, starting in 1962, at the Houston Manned Spacecraft Center.

Prior to joining NASA, Mr. Roberts was employed by Saunders Roe Ltd. of England and Avro Aircraft of Canada.

He was born in Liverpool, England and educated at the Beaumaris Grammar School, Southampton University and the Isle of Wight Technical College. While at the latter college, he received in 1948 a Higher National Certificate in Aeronautical Engineering.

ASSISTANT DIRECTOR MEREDITH PRESENTS AWARD TO STEPHEN V. VERSACE OF MVA

In a ceremony attended by Administrator Ejner J. Johnson and Deputy Administrator William T. S. Bricker of the Maryland Motor Vehicle Administration (MVA) on September 17, Goddard's Assistant Director, Dr. Leslie H. Meredith, presented a Certificate of Appreciation to Mr. Stephen V. Versace of the MVA for his outstanding contribution to the Center's overall Safety Program.

The award was presented to Mr. Versace in recognition of his development for and presentation to more than 700 Goddard employees over the past 2 years a special 6-hour program of instruction on safe driving. The course incorporates the latest methods and techniques designed to increase the chances of the automobile driver's survival in today's traffic-congested environment; hence its title: Driver Survival Training. The course has been widely acclaimed by those who have taken it and continues to enjoy a high degree of popularity. This is evidenced by the large number of employees currently enrolled and the number still waiting to be assigned to a class.

Also witnessing the presentation ceremony held in the Office of the Director were: Mrs. H. Curtis Versace, wife of Mr. Versace; Mr. Stephen Horowitz, MVA Public Information Officer; Mr. John Bertak, Editor of the MVA Employee Newsletter; Mr. Leven B. Gray, Chief of Goddard's Health and Safety Engineering Office; and, Ben B. Pagac, Goddard's Health and Safety Training Coordinator.

GOODBYE UNIVERSE

More and more evidence is accumulating, according to the latest findings of two Princeton University scientists using NASA's Copernicus (Orbiting Astronomical Observatory) satellite, that the universe is literally flying apart—never to return.

In scientific circles this has been a subject of intense controversy for many years, at least back to the '30s when the oscillating universe concept first attracted scientific attention. This concept assumes the universe was just one bit atom or ball of dense energy that exploded about 12 billion years ago. Then, after slowing down, gravitational attraction will pull the whole thing back together 100 billion years from now, when it will again explode with a tremendous bang just like the first time. This provides an endless birth and rebirth of the universe.

The Copernicus spacecraft is managed by Goddard, and the ultraviolet experiment is conducted by Princeton. It was launched from Cape Canaveral Florida in 1972.

GODDARD MOURNS. . .

William G. Grenier — Code 313.1
51 years old, died Monday September 13th

J. Edgar Lichtenstein — Code 253.2
59 years old, died September 15th

John G. Kibsey, Jr. — Code 246
59 years old, died September 30th

Dr. William Nordberg — Code 900
46 years old, died October 3rd



Jean Arena, a Contracting Officer, in Building 12, recently won an award for her display of a Macramé Owl. Jean has made many macramé projects for her friends at Goddard and is willing to share her expertise with anyone who would like to learn.

Nordberg

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He was placed in progressively more responsible management positions while continuing his scientific research in Earth resources and meteorology culminating with being appointed to his final job in January 1974.

From the beginning he played an important role in rocket and satellite experiments dealing with meteorology and the structure of the atmosphere.

As a pioneer in the investigation of the Earth and its environment, using remote sensing from satellites, he was a member of the TIROS Weather Satellite team that proved differences in surface features could be observed from satellites. This not only led to the development of instruments with higher accuracies on later spacecraft, but to Dr. Nordberg's leadership of a team which developed instrumentation to map ocean rainfall and sea ice on a global basis.

He successfully coordinated the design and use of several highly complex remote sensors that were flown on the world's first satellite to be developed specifically to compile information on the Earth's limited resources. In addition, his overall leadership on that project, Landsat, was largely responsible for assuring its success.

During the first year of Landsat operation, Dr. Nordberg coordinated the activities of 300 select scientists from 38 different countries, including the United States, in a program to develop highly sophisticated techniques and demonstrate how a spacecraft can watch changes on Earth for the betterment of mankind. The data were applied to such diverse scientific discipline areas as: agriculture, forestry, land use classification, marine resources and oceanography, mineral and oil exploration, geology, water resources and environmental impact problems.

His list of scientific publications are numerous and deal primarily with exploration of the upper atmosphere and the practical applications of Earth observations from space.

In 1975, he received the William T. Pecora Award and NASA's highest award, the Distinguished Service Medal, both for his outstanding contributions to the applications of remote sensing of Earth from spacecraft.

Earlier, he received NASA's Exceptional Scientific Achievement award in 1965 and Goddard Space Flight Center Special Act Awards in 1964 and 1966. The National Oceanic and Atmospheric Administration of the Commerce Department gave him a Commendation in 1969 for planning the Barbados Oceanographic and Meteorological Experiment which was a part of a global, long range, international weather project.

He lived in Greenbelt and leaves his wife the former Beatrice Junek, of Fehring, his parents, Hans and Sophie Nordberg, of Feldbach, Austria and a brother, Dr. Kurt Nordberg, of Graz.

GODDARD NEWS is published monthly by the Office of Public Affairs at the Goddard Space Flight Center, Mail Code 202, National Aeronautics and Space Administration, Greenbelt, Maryland 20771.

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The MAD Story

By Sandy Walter

It's that time of year again, when tickets for MAD's musical production are on sale at the GEWA store, and posters appear around Goddard's buildings. Once again, MAD is headed for a successful season.

To do something well requires hard work—and MAD's fall production requires a lot of time by many persons of varied talents. Opening night for "How to Succeed in Business Without Really Trying" is Friday, October 29 and all members of this year's production are gearing up for a polished performance right from the starting bell.

The process started back in March when the MAD Board of Directors began interviewing those interested in directing the fall show. Five people threw their hats into the ring. After a painstaking deliberation by the Board, Devonna Oliver was selected as the Director for the second year in a row. The next step was to assemble a production team and to obtain a musical director. The Producer has the job of making sure all the logistics are met. He is responsible for the total financial budget for the production. For obvious reasons, this position does not draw the competition that the Director's position does; consequently a volunteer/draftee is usually sought. Jim Vette volunteered this year after being drafted the previous year. Randy Barth was eager and accepted the part of Musical Director giving Gil Mead, a nearly perennial Music Director of MAD's fall show, a well deserved rest. Gil, never one to be complete idle, is assisting Randy and is handling the men's chorus.

Another key member of the production team is the Technical Director, who is responsible for set construction, lights, sound, and costumes. Woody Woodyear was drafted. The Show Selection Committee studied a number of possible plays from the standpoint of casting, music and technical support, audience appeal, and the interest of the Director. The committee consisted of Chairman, Susan Martin (Mad's President), the Director, Producer, Music Director, Technical Director, two MAD Board Members, Carolee Wende (Drama Coordinator), Priscilla Struthers (Music Coordinator) and two MAD members-at-large chosen by draw—Jeanne Kahn and Fred Fanning. After five weeks of deliberations over more than 30 candidate plays which involved reading scripts, studying musical scores, looking at set designs, etc., the 1976 selection was made and announced to the MAD membership.



The MAD players are shown rehearsing "The Brotherhood of Man", one of the rousing production numbers in their fall show, "How To Succeed In Business Without Really Trying."