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GODDARD NEWS

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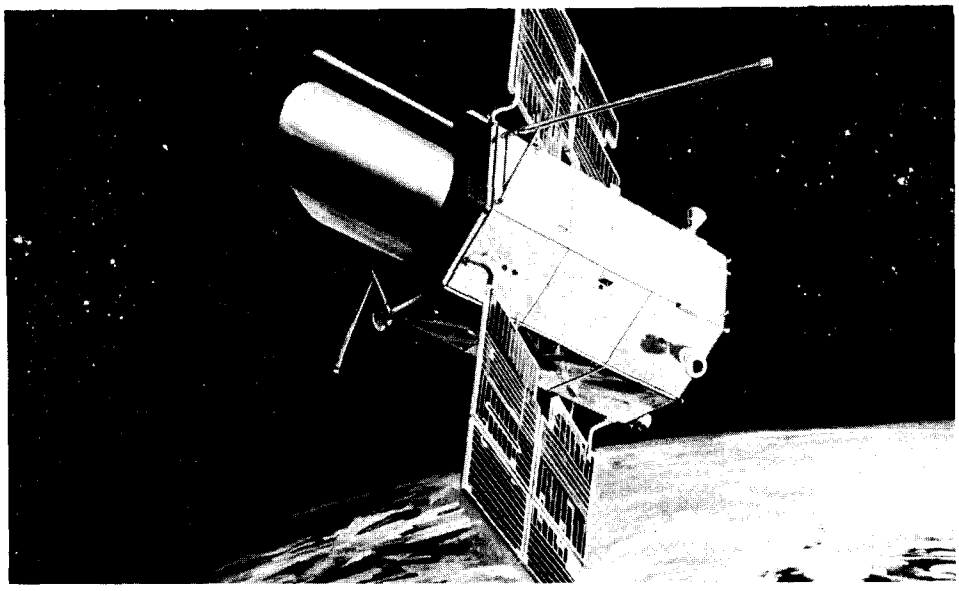
Orbiting Astronomical Observatory-C to be terminated



The 8½ year old Orbiting Astronomical Observatory-C, the heaviest and most complex U.S. unmanned space observatory ever launched by NASA, will be terminated in a two-phase, ground-controlled procedure recently implemented by spacecraft engineers at Goddard.

Designed to seek answers to some of the fundamental questions concerning stars and interstellar matter, OAO-C was launched aboard an Atlas-Centaur rocket at 6:28 a.m. EDT August 21, 1972, from the Kennedy Space Center, Fla. Upon achieving orbit, OAO-C was named "Copernicus" in honor of the famed Polish astronomer Nicolaus Copernicus who lived from 1473 to 1543.

The conduct of formal scientific investigations through Copernicus will end on December 31, after which a series of engineering tests will be conducted for another 6 weeks. On February 15, 1981, all contact with the spacecraft will be terminated.

Project engineers are uncertain whether Copernicus will permanently orient itself toward the Sun, begin a permanent orbital tumbling action, or a variation of both modes. What is certain is that OAO-3 will thereafter be irrecoverable; no chance of revival will exist, nor will opportunities for revival be attempted.

Engineering data acquired through the terminal 6 weeks tests have value beyond casual housekeeping information. Copernicus' performance profile has been nothing short of astonishing to project engineers and scientists. Since Copernicus performed consistently beyond design specifications, and 7½ years beyond project requirements, spacecraft engineers are eager to compile modeling data for possible use in the design of future spacecraft.

From its 460-mile high orbit above the Earth, the 4900-pound automated space-

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Four key personnel changes announced by Center Director

Center Director A. Thomas Young announced that as of December 14, there will be four key personnel changes within Goddard.

James J. Fleming, formerly Assistant Director for Center Automatic Data Processing, Mission and Data Operations Directorate, is assigned as Assistant Director for Center Automatic Processing in the Program and Institutional Planning Office (Code 110), Office of the Director. Fleming's responsibilities remain unchanged as well as his location.

Former Applications Directorate Resources Manager James E. Zerega is assigned to the new position of Assistant Director for Institutional Planning in the Program and Institutional Planning Office (Code 110), Office of the Director, where he will be responsible for directing the Center's annual manpower planning, analyzing the Center skill-mix balance, and recommending long-range redirections in the Center manpower and facilities resources. He will be located in Building 8.

Waddell Longus, former Chief of Personnel Division in the Management Operations Directorate, is assigned to the new position of Assistant Director for Personnel Planning in the Program and Institutional Planning Office (Code 110), Office of the Director. He will be responsible for the long-range planning of methods to correct skill-mix imbalances, including recommending new training programs, hiring policies, and other personnel related matters. Longus will be located in Building 8.

Kenneth Jacobs has been appointed Chief, Technical Information and Administrative Support Division (Code 250), Management Operations Directorate, replacing Don C. Hutchison, recently appointed Energy Resources Officer within the Management Operations Directorate. In addition to his permanently assigned duties, Jacobs will also lead the Personnel Division in an acting capacity depending selection of the permanent division chief.

Goddard engineers suggest ways to control electrostatic build-up

by John McKiernan, code 814

In the late 16th century, William Gilbert, an English scientist discovered that rubbing different kinds of material together caused them to attract light-weight objects. He called this phenomenon electricity. Today it is known as static electricity and is caused by the transfer of electrons from one surface to another.

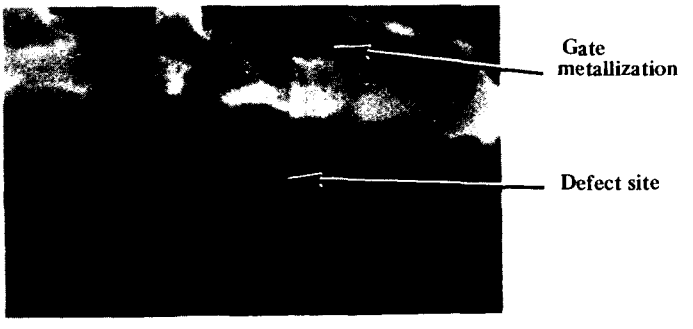
Plastic, paper, textiles and other materials are normally electrically balanced. The positive charge in the nucleus of each atom is exactly balanced by the negative charge in the electron cloud around the atom. When two pieces of material come in contact under pressure and friction, and are then separated, electrons are torn from the surfaces. One piece is deficient in electrons and has a positive charge, the other, having an excess of electrons assumes a negative charge. These charges, depending upon such factors as humidity, type of material, etc., can be as high as 35,000 volts. A person, for example, walking across a vinyl covered floor can generate up to 20,000 volts.

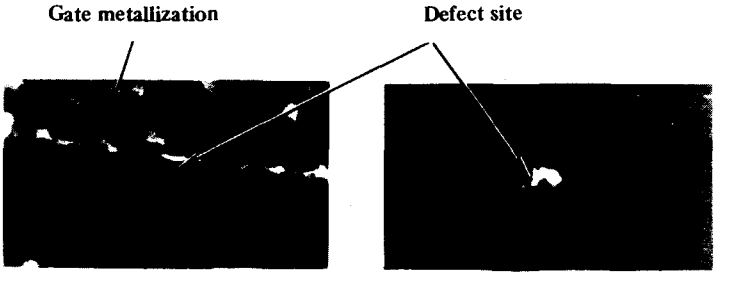
Modern electronic equipment uses many small junction semiconductor devices which are manufactured using membrane thin insulating and active layers. These include Bi-Polar Transistors, CMOS, MOSFETS, and thin film resistors which are used extensively in NASA equipment. These "thin-skinned" units can be destroyed by static voltages discharging through them. Devices manufactured by the CMOS technology can be destroyed by static voltages as low as 250 volts. It can be easily seen that a person touching a CMOS device after walking across the floor carries a voltage 100 times greater than CMOS can tolerate.

Static electricity cannot be eliminated but it can be controlled. To prevent its build-up the following controls have been suggested for implementation by the Network Engineering Division (NED):

1. All discrete devices in single units or mounted on printed circuit boards received from manufacturers or vendors should be shipped in static protective bags or carbon loaded plastic containers.
2. Shipping and receiving departments should not remove these units from their protection for any reason. Any acceptance tests required or quantity verification should be done at static free work areas.
3. All maintenance, trouble shooting and/or testing procedures performed in NED labs or at STDN Stations should be done at static free work stations.
4. Grounded floor mats should be used in operation areas to ground personnel operating static sensitive equipment.
5. Personnel performing maintenance testing or operation duties should wear anti-static lab coats.
6. Testing and/or repair tools should be of a static free design or they should be used in a manner to reduce their potential to inflict damage.

Using these controls should considerably reduce electrostatic damage. The most important consideration is to make all personnel aware that static electricity is always with us and can do considerable damage.





Photomicrographs of the gate electrical overstress sites in two Micro Power Systems microcircuits. Top: SNI, 800 X; bottom: views of the gate overstress before and after removal of the gate metallization in SN3, 500 X.

KeyAppointments

Effective immediately, Mr. Levin B. Gray, Chief, Health & Safety Engineering Office, is designated Acting Head, Security Office, pending selection of a replacement for Mr. Christopher O. Bryan, who recently resigned. These duties are in addition to those of his permanently assigned position.

Goddard hosts Time, Frequency Conference

The Twelfth Precise Time and Time Interval (PTTI) Applications and Planning Meeting, which is sponsored by NASA and the Department of Defense, was hosted by Goddard on December 2-4. Among this years 220 attendees were representatives from Argentina, Austria, Canada, Peoples of Republic of China, Finland, France, Federal Republic of Germany, India, Italy, Japan, Switzerland, and Yugoslavia. Of the 47 papers presented, ten were by foreign authors.

Papers authored by Goddard people were: NASA PTTI Programs: Present and Future, C. Wardrip; Recent Progress in NASA-Goddard Atomic Hydrogen Standards Program, Dr. V. Reinhardt; Time and Frequency Stability for the Crustal Dynamics Project, Dr. R. Coates and J. Ryan, and Geodynamics Frequency and Phase, Dr. F. Vonbun and Dr. V. Reinhardt.

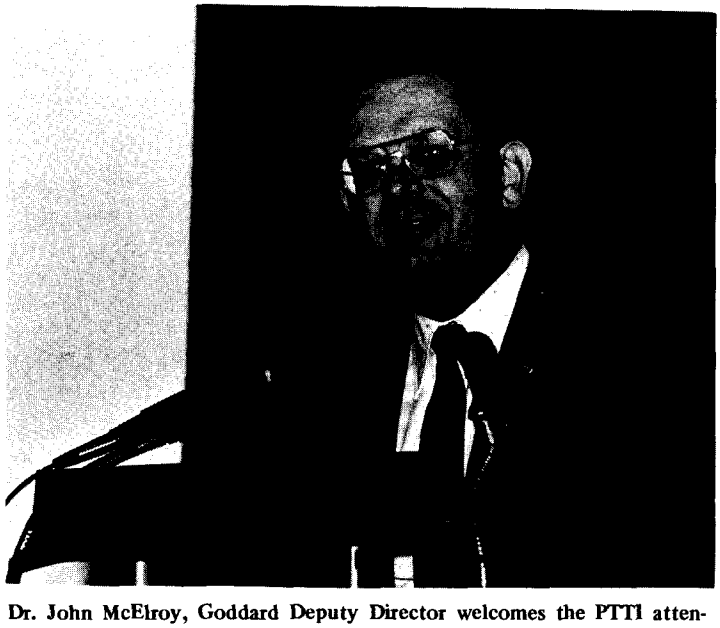
Those who welcomed the attendees on behalf of the sponsoring agencies were Dr. John H. McElroy, Deputy Director, Goddard; Rear Adm. Ross N. Williams, Director, Naval Oceanography Division, Office of the Chief of Naval Operations; Rear Adm. R. J. Eustace, Vice Commander, Naval Electronic Systems Command; Capt. Raymond A. Vohden, Superintendent, Naval Observatory; and Capt. E. E. Henifin, Command Officer, Naval Research Laboratory.

People

The four recipients of Group Achievement Awards pictured above with Bettie L. White, Federal Women's program Manager (center), are members of the Federal Women's Program Mobility Subcommittee: (From left to right) Wilma Odenthal, code 280.4; Dr. Regina Cody, code 691; Bettie L. White, code 120; Madeline Justiniano, code 816.3; and, Helen Rothman, code 260. These employees devoted their personal time to the design, development, implementation and evaluation of a 36-hour workshop entitled "Practical Skills for Transition into Management." This workshop was the result of a five month study conducted by the Mobility Subcommittee regarding the mobility and management development programs and their impact on women at Goddard.

The purposes of the PTTI Meetings are to exchange practical information at the user level; to review present and future precise time and frequency needs; to acquaint system engineers, technical managers, and program administrators with PTTI technology and its problems.

Papers are solicited and invited each year covering PTTI needs related to navigation, communications, geodesy and geophysics, interferometry, missile and spacecraft tracking systems, meteorology, frequency and time generation, and synchronization and laser applications.



Dr. John McElroy, Goddard Deputy Director welcomes the PTTI attendees on behalf of Goddard.

Goddard groups, employees receive NASA awards

Sixteen Goddard employees and four groups have been selected to receive 1980 NASA/Goddard Honor Awards ceremony at 2 P.M. on Thursday, December 18 at Goddard in the Building 8 auditorium.

Two employees received the distinguished Outstanding Service Medal. They are as follows:

- Frank B. McDonald, "in recognition of outstanding leadership over the past 11 years as Chief of the Laboratory for High Energy Astrophysics of the Sciences Directorate, in developing internationally recognized research groups in gamma ray astronomy, X-ray astronomy, and cosmic ray physics."
- Helen M. Neumann, "in recognition of outstanding leadership in support of Goddard's flight projects by responding to and directing the solution of spacecraft technical problems during design, integration, test, launch, and operation. Her dedication, competence, initiative, and resourcefulness have contributed significantly to the success of many of NASA missions."

The Exceptional Scientific Achievement medal was awarded to Larry H. Brace, for his "unique scientific contributions to knowledge of the electron density, temperature, and related properties of the ionospheres of the Earth and Venus, resulting from Pioneering Langmuir Probe measurements from a variety of spacecraft, including Television and Infrared Observation Satellite (TIROS), early Explorers, Alouette, International Satellite for Ionospheric Study (ISIS), Atmosphere Explorers and Pioneer Venus."

The Exceptional Service Meals were received by the following: Henry B. Benton, Electronics Technician; Peter A. Bracken, formerly Associate Chief, Information Extraction Division; James S. Evans, Deputy Procurement Manager for Delta Project West; Elsie N. Ford, Administrative Officer, Engineering Directorate; Charles F. Fuechsel, Assistant Deputy Project Manager for Ground Segment (NOSS); James R. Greaves, Global Atmospheric Research Program (GARP) Project Manager; Raymond G. Hartenstein, Systems Engineer; James G. Marsh, Geophysicist; Gilbert W. Ousley, Sr., MAGSAT/AMPTE Project Manager; Henry W. Price, Division Chief, Instrument Division; James M. Williamson, Project Operations Director.

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NASA awards

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The NASA Exceptional Service Medal is granted for significant achievement or service characterized by unusual initiative or creative ability that clearly demonstrates substantial improvement in engineering, administrative, spaceflight or space-related endeavors which contributed to the programs of NASA.

The Equal Employment Opportunity Medal was received by the following:

- Kathleen R. Hipkins, "in recognition of outstanding efforts to further equal opportunity as Goddard's Cooperative Education Program coordinator. She displayed remarkable dedication, vitality, creativity, and the spirit in making Goddard's coop program one of the most successful, well-functioning feeder programs of any of NASA's installations."
- Anthony Walch, Jr., "in recognition of exceptional performance and personal dedication in developing young minorities in skilled trades that are critical to improving the nation's productivity."

The Group Achievement Award is given to a group or team of individuals who through technical and managerial competence, have made an outstanding contribution to the Space program. The following groups received this award:

- Applications Explorer Missions Heat Capacity Mapping Mission/Stratospheric Aerosol and Gas Experiment (AEM HCMM/SAGE) Operations Team for "devising and carrying out the in-orbit operational procedures which have saved both the HCMM and SAGE spacecraft from potentially devastating malfunctions and have maintained valuable scientific data acquisition operations beyond the design lifetime for both spacecraft."
- Sea Satellite (SEASAT) Altimeter and Orbit Team, "in recognition of the exceptional contributions provided to the SEASAT Project in the areas of precision orbit computation, altimeter calibration, sea surface topography, station coordinates, and gravity field modeling."

The Public Service Group Achievement Awards were given to the following:

- Physical Science Laboratory – New Mexico State University, Las Cruces, New Mexico, "for its technical contributions to the NASA Sounding Rocket Program for more than 20 years and the support of more than 1500 launch operations."
- RCA Astro-Electronics, Princeton, New Jersey, "in recognition of the technical excellence and management expertise that have led to the successful operation of Television and Infrared Observation Satellite Meteorological satellites since April 1, 1960."

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OAO-C

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craft has viewed the heavens with a precision and clarity never before possible. Its supersensitive ultraviolet telescope, largest ever orbited, is capable of pointing accuracies equivalent to seeing a volleyball from a distance of 400 statute miles. The 32-inch-diameter reflecting device is housed in the central tube of the 10-foot-long cylinder-shaped spacecraft and provides data in the form of ultraviolet spectral readings otherwise invisible to ground-based observatories because of the obscuring effect of Earth's atmosphere. The instrument was provided by Princeton University. Professor Lyman Spitzer, Jr., is the Principal Investigator.

England's University College, London, under the sponsorship of the United Kingdom Science Research Council, provided the second instrument. It consists of three small telescopes and an associated counting device designed to study X-ray sources in space at various wavelengths. The University College experiment has helped open the door to a better understanding of new celestial X-ray phenomena.

For example, the experiment yielded important information on X-ray sources such as black holes and neutron stars and was instrumental in the discovery of the first black hole (CYG X-1). In combination with the UV experiment, it discovered the newest black hole candidate (OAO 1653-40). Copernicus also produced information on star temperatures, gravities, and chemical composition. Additionally, it studied the atmosphere of Earth, Mars, Jupiter, and Saturn.

During its 8½ years of operation, Copernicus has been used by more than 160 investigators from the United States and 13 foreign countries to observe over 450 unique objects.

The greater stability of the satellite, the high resolution and wide observing range of the primary experiment (Princeton Experiment Package-PEP), have enabled numerous significant astronomical observations to be made. In many cases, the observations made could not have been accomplished by any other astronomical satellite operating or in the planning stage.