

Last IMP in Orbit

The tenth and last of Goddard's Interplanetary Monitoring Platforms (IMP-J) was launched aboard a Delta rocket on October 25 from the Kennedy Space Center. The spacecraft, named Explorer 50 once in orbit, is part of a series designed to investigate the Earth's radiation environment over an entire solar cycle.

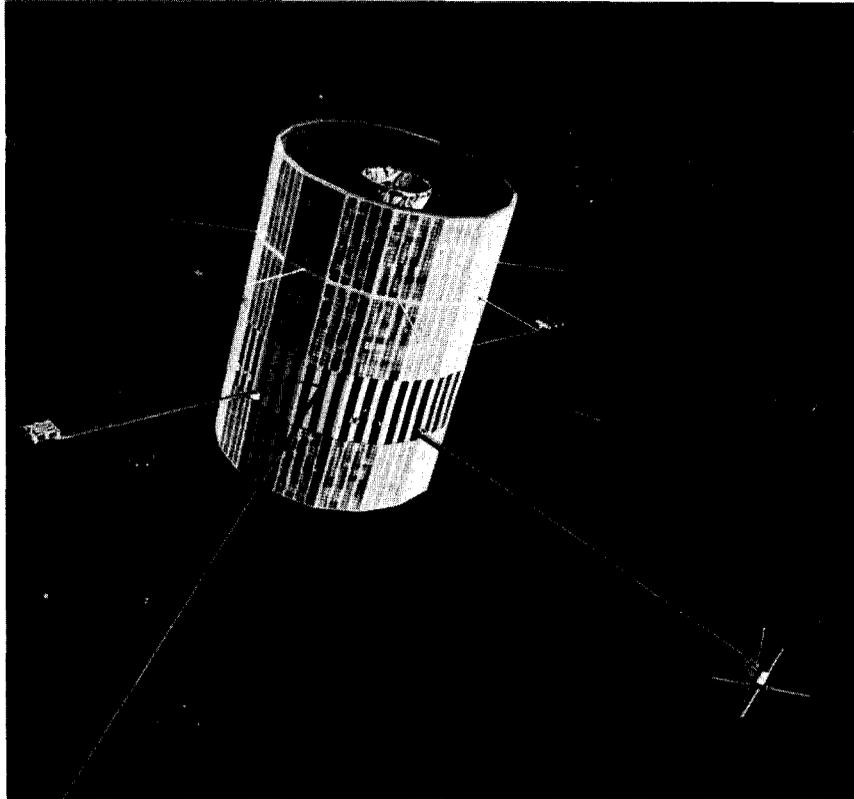
IMP-J Experiment Manager Martin Davis reports that, although the orbit is a bit lower than planned, everything looks good for a successful mission. All but one of the 12 experiments onboard were turned on during the week of October 29. The final experiment, the low energy particles experiment, will be turned on about the middle of this month.

The flight of IMP-J marks the end of the study of the 11-year cycle of solar activity and a return to the Quiet Sun period with which NASA began its IMP exploration in 1963. Completion of the IMP series will provide science with the most continuous record ever obtained of the characteristics of the interplanetary medium.

Explorer 50 carries 12 scientific experiments to obtain measurements of energetic particles, plasmas, and magnetic and electrical fields. The 398-kg. satellite joins its sister spacecraft, Explorer 47 (IMP-H), in a near-circular orbit about halfway to the Moon. The two spacecraft will frequently be 180 degrees apart, providing investigators with a means of correlating data on various phenomena and disturbances.

For example, it would often happen that the pair would view the impact of a solar flare with one spacecraft on the day side of the

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GOODARD'S LAST Interplanetary Monitoring Platform is now Explorer 50 in orbit.

goddard news

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NASA's 15th Annual Awards Ceremony

NASA held its 15th annual awards ceremony on October 25, and three Goddard employees received the NASA Exceptional Service Medal. Four other employees received the NASA Exceptional Scientific Achievement Medal.

Exceptional Service Medals went to Joseph Arlauskas of the Earth Observations Systems and Systems Engineering Division, Thomas E. Huber of the Stabilization and Control Branch, and Oscar Weinstein of the Earth Sensors Branch.

Joseph Arlauskas received his award for "contributions in the successful development and flight of the Multi-Spectral Scanner on the first Earth Resources Technology Satellite."

Thomas Huber was honored for "contributions in the successful development and flight of the Orbiting Astronomical Observatory."

Oscar Weinstein was cited for "contributions to the development of television imaging systems which have successfully flown on meteorological and earth resources survey spacecraft."

Exceptional Scientific Achievement Awards went to Robert A. Hoffman of the Particle Physics Branch, Warren A. Hovis, Jr., of the Earth Observations Branch, Irving M. Salzberg of the Operational Orbit Support Branch, and Floyd W. Stecker of the Theoretical Studies Branch.

Robert Hoffman was cited for "accomplishments in dealing with critical problems in the Small Scientific Satellite program with the result that the satellite has produced excellent data on magnetospheric fields and particles far beyond its expected lifetime."

Warren Hovis received his award for "developing spectroradiometric techniques which make possible the surveying of marine

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Two Successful Years for S³

Goddard's Small Scientific Satellite (Explorer 45) dubbed S³-A, completes on November 15 two years of investigating the causes of worldwide magnetic disturbances associated with large solar flares. Launched in 1971 by a Scout rocket from the Italian-operated San Marco Equatorial Range in the Indian Ocean off the coast of Kenya, its scientific instrumentation has gathered the first substantial data capable of testing modern theories of magnetic storms.

Dr. Robert A. Hoffman, S³-A Project Scientist, said other major accomplishments have been:

- The first measurement by satellite of man-made stimulated electromagnetic emissions in the magnetosphere.
- The first measurements of alpha particles in the equatorial region of the magnetosphere where they were 100 times more numerous than expected.
- The first detailed analysis of the interaction of electromagnetic waves with charged particles.
- Identification of several new electromagnetic waves in the magnetosphere.
- Measurement of the closest approach to Earth of the boundary of the magnetosphere at about 25,000 kilometers (16,000 miles).

Serious study of the Earth's magnetic field has been going on for over 400 years. In 1722 a London compass maker, George Graham, found that there were variations in this field. Many well known scientists, such as Gauss, Celsius, Birkeland, and Störmer, continued to study the magnetic field, magnetic storms, and their relation to auroras. Modern advances in the science began in 1930 with the

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Mrs. Goddard at GSFC

by Dr. David P. Stern

Mrs. Esther C. Goddard visited this NASA center on Friday, October 5, 1973 to present an Engineering Colloquium lecture on the life of her husband.

Mrs. Goddard has been here only twice before. The first time was on March 16, 1961—a cold wintry day, the 35th anniversary of Dr. Goddard's first launch of a liquid-fueled rocket—when she attended the Center's dedication. Her second visit took place a few years afterwards when she attended the dedication of the nearby Robert H. Goddard Junior High School.

Now, almost 10 years later, she had her first glimpse of a greatly expanded Goddard Space Flight Center. In the morning she was given an extended tour of the center, with accent on the new ERTS picture retrieval and distribution facility. Mrs. Goddard moved around with agility and responded with enthusiasm.

She was shown an enlarged ERTS picture of her home area around Worcester, Massachusetts (later a large copy of this picture was presented to her) and was fascinated by special TV equipment which superimposed ERTS images in various wavebands in colors which could be varied by the twisting of a few controls. Yet, what perhaps impressed her most at the ERTS center was the number of women engaged in scientific work. She contrasted this to her own role in Dr. Goddard's work which mainly consisted of filming the launches.

"I would take a chair and a book and go back about a thousand feet from the launch while Bob got the rocket ready" she said, adding that she refrained from staying around the launch area since "I was afraid I might spill something."

She later described life in the desert around Roswell, New Mexico, where "Bob" built and launched his rockets (although, she said, she quickly learned that the proper local word was "prairie", not "desert") and about the pictures Dr. Goddard painted of the surrounding scenery—including one which, it later turned out, was made close to the site on which the first nuclear explosion took place in 1945.

Mrs. Goddard could not help contrasting the sophisticated equipment built and used here with her husband's simple tools. The scientific activity at GSFC also contrasts with the quiet New England countryside where she now lives in a 150 year old house helping take care of the Goddard Library and the Goddard exhibit at Clark University in Worcester. She still guides visitors who arrive from all over the world, and often gives them her autograph as a souvenir, signing either her own name or, if requested, "Mrs. Robert H. Goddard."



ESTHER C. GODDARD signs autographs for students at the Dr. Robert H. Goddard Junior High School.



MRS. GODDARD receives a "space related" stamped envelope collection from Dr. John F. Clark, Goddard Director, in behalf of the Goddard Stamp Club. At the time of her lecture, she also received a desk model of her husband's famous rocket.

A special lunch to honor Mrs. Goddard was held at the recreation center. Those attending included John Clark, Don Hearsh, George Pieper and several others of the center's top people, as well as Robert Gilruth, NASA Director of Key Personnel Development at JSFC in Houston, and representatives of the Goddard's Engineering and Scientific Colloquium committees. At the lunch table Mrs. Goddard led a lively conversation about her husband's work and about NASA's current continuation of it.

On the way back to the main part of GSFC she stopped at the Robert H. Goddard Junior High School, where she was presented with a spray of roses and—after the intermission bell rang—was besieged by autograph hunters. As the children milled around her, one girl was overheard asking another: "Is that the wife of the man in the picture (displayed on the wall)? But he's so old and she is so young!"

The Engineering Colloquium on "The Life and Achievements of Dr. Robert H. Goddard" began at 2:30 p.m. with an introduction by Dr. Clark, who presented Mrs. Goddard with a table-top replica of her husband's first liquid-fuel rocket. He also gave her a collection of "space related" stamped envelopes, presented by the Goddard Stamp Club (which also awarded her an honorary membership).

The lecture itself lasted about half an hour (questions apart) and dwelt mainly on the personality of Robert H. Goddard from his childhood, in which many interests and talents manifested themselves in him, through the years of early rocket experimentation, culminating in his work in the New Mexico desert. Perhaps the most touching part of her story concerned Dr. Goddard's first view of one of the captured German V-2 rockets, several months before his death. As he and one of his mechanics examined the machinery, the mechanic suddenly exclaimed: "But this is your rocket!"

"Yes, it seems so," answered Dr. Goddard, very quietly.

How does a person like Mrs. Goddard feel in a huge center where her husband's name is repeated from hundreds of signs and is used casually and constantly in conversation, often by people with little awareness of Robert Goddard the person? Mrs. Goddard perhaps expressed it all when she visited the control center in building 14. Sitting in the darkened audience section, she looked up at the wall-size world map displaying the location of the tracking stations and suddenly noticed the caption "Goddard Network" surmounting it in large red letters.

"Wouldn't he be pleased" she commented, to no one in particular, "that you have done so many things with rockets."

NASA AWARDS. . . From Page 1

resources, detection and identification of water pollution, and mapping of the earth's mineral composition by remote sensing from space."

Irving Salzberg was honored for "contributions to the Apollo program in the development and utilization of Very Long Baseline Interferometry to track the Apollo 17 astronauts in the Lunar Rover Vehicle on the surface of the moon."

Floyd W. Stecker was cited for "contributions to cosmology leading to new insights into the structure of the universe, and in particular, for deducing that the observed cosmic gamma ray spectrum is a unique indicator of large amounts of antimatter in the universe."

Most award citations are quoted only in part.

Planned Goddard Launches

As the *Goddard News* goes to press, the following spacecraft launches have taken place or are planned for launch:

ITOS-F was successfully launched by a Delta Rocket from the Western Test Range (WTR) on November 6. This Improved TIROS Operational Satellite is the 27th meteorological satellite to be orbited by NASA. Funded by the National Oceanic and Atmospheric Administration, ITOS-F will be turned over to NOAA about two weeks after launch. Goddard Project Manager is Jack Sargent.

AE-C by Delta from WTR on December 6. This Atmospheric Explorer will explore an area from 120 to 300 kilometers altitude on a global basis where important energy transfer, atomic and molecular processes and chemical reactions are critical to the heat balance of our atmosphere. The spacecraft will be capable of changing orbit using an onboard propulsion system. Goddard Project Manager is David Grimes.



GETTING READY FOR KOHOOTEK. About 40 members of national and local news media were at Goddard on October 18 for a briefing on the rapidly approaching comet Kohoutek. The briefing included a slide and panel discussion plus a question and answer session by key members of NASA's Operation Kohoutek team. Later interested media members viewed simulation of the comet's passage in the Planetarium. NASA will conduct extensive studies of the comet using Skylab, Copernicus, the Orbiting Solar Observatory, the Mariner Venus-Mercury probe, aircraft, balloons, sounding rockets and ground observations. Speakers during the discussion in the Building 3 Auditorium included (from left) Dr. John F. Clark, Goddard Director; Dr. Stephen Maran, of Goddard, head of NASA's Operation Kohoutek; Astronaut Karl Henize of the Johnson Space Center who is responsible for the Skylab studies; Dr. George Caruthers of the Naval Research Laboratory; Robert Cameron, Ames Research Center aircraft experiments; Dr. James Dunne, Jet Propulsion Laboratory Mariner Venus-Mercury probe; Dr. John Brandt, Goddard solar wind experiments; and Dr. William Fastie, Johns Hopkins Applied Physics Laboratory sounding rocket experiments. Comet Kohoutek will be brightest for the December holidays and in early January. It will first become visible later this month.

INTERESTING PEOPLE



Kathi Williams: Goddard Contact for Retirement Benefits

A warm voice on the phone and a bright smile in person are the trade-marks of Kathi Williams. An Employee Relations Specialist in the Personnel Services Branch, Kathi has provided program planning and counseling for the nearly 150 employees who have retired from Goddard in the past year.

She also handles the mounds of paper work involved with each retirement as well as being the woman in charge of disability benefits, work injuries, debt complaints, and death claims. She acts as a prime contact for the hiring of the handicapped.

Her work load is no problem, in spite of the fact that she is legally blind.

Kathleen G. Williams first came to Goddard in February of 1969 as a contract negotiator in the Procurement Division. She held this post until September 1971 when she found she was going blind.

The problem became progressively worse, and she took a nine-months leave of absence. With the help of Goddard and the Maryland Vocational Rehabilitation Center, she attended the Greater Pittsburg Guild for the Blind to learn the many possible ways of coping with her handicap. Her progress at the Guild was so good that she later received an award as one of the Guild's outstanding students.

Back at Goddard, Kathi was assigned to her present post. Her high school sister helped as a reader during her first hectic summer on the new job.

Now her "Men Friday" are her secretary "Charlie" Weaver and Tony Madison, a college student who works as her part-time reader and assistant. Kathi has used Braille and a tape recorder for her work, but has regained enough of her sight to write notes with a dark felt pen.

A native of Maryland, Kathi holds a degree in journalism and business administration from the University of Maryland. She worked as a writer at the Navy Department before coming to Goddard.

Goddard Mourns. . .

Moe I. Schneebaum, Chief of the Earth Observations Systems and Systems Engineering Division, died on Sunday, November 4. He was a true Goddard pioneer. Among his many scientific and technological achievements, Mr. Schneebaum was responsible for the successful development and flight of the Multi-Spectral Scanner and Vidicon sensors on the Earth Resources Technology Satellite and for other and future applications satellites.



EXPLORER 50. . .From Page 1



KEY MEMBERS of Goddard's IMP team were at the Cape in preparation for the launch of Explorer 50. From left are William Fletcher, Coordinator of Delta Spacecraft Operations at the Kennedy Space Center; Dr. Stephen J. Paddock, Goddard Project Operations Director and Spacecraft Manager; William R. Limberis, IMP-J Project Manager; Dr. Norman F. Ness, IMP Project Scientist; Martin A. Davis, Experiment Manager; and Franz W. Hoffman, IMP Project Coordinator.

Earth and the other on the night side. This will allow scientists to make highly accurate measurements of the effects on opposite sides of the Earth at the same time.

The two spacecraft will also form reference points for other spacecraft taking measurements in deep space, such as the Jupiter-bound Pioneer craft and the recently launched Mariner-Venus-Mercury. Comparison of their measurements with IMP data will enable the investigators to separate effects of the Sun from those of the galaxy.

The drum-shaped IMP-J will measure changes in Earth's magnetic tail as the changing solar-wind "weather" disturbs the Earth's environment. In addition, this newest satellite will continue to provide warning of possible solar flare radiation for manned space flight missions as its predecessors have done over the years.

The importance of the magnetosphere and its influence on the Earth's environment has been described by a National Research Council panel on Solar-Terrestrial Research as follows:

"The magnetosphere exerts a subtle but significant influence in several domains that directly affect man and his interaction with his environment. The magnetosphere determines how a portion of the vast energies of the Sun's magnetic field and charged-particle populations are transmitted to the Earth's upper atmosphere. Some of this energy ultimately reaches the Earth's surface. This energy may be sufficient to perturb the delicate dynamic balance of the atmosphere in general and thus contribute to the release of large amounts of energy accumulated in the lower atmosphere. Any increase in our understanding of the associated processes can be beneficial to the understanding of our immediate environment and allow us to better evaluate the relative importance of the factors that control this environment."

Commenting on the IMP series accomplishments, Goddard's Dr. Norman F. Ness, IMP-J Project Scientist, said:

"We have explored and defined the average characteristics and behavior of the Earth's magnetosphere and how the Sun affects it. As a result, we have a much better understanding of the relationship of such events as solar flares to global magnetic storms which cause terrestrial effects: aurorae and communications blackouts of world radio and undersea cable networks."

A measure of the progress made in the IMP spacecraft during the past ten years can be seen in a comparison of satellite and experiment weights and power supplies. The first IMP weighed 62 kilograms (138 pounds) including an experiment complement of 19 kilograms (43 pounds), and had a power supply of 35 watts for the total spacecraft, with 10 watts for the experiments. This compares

with IMP-J's 395 kilograms (877 pounds), 81 kilograms (181 pounds) for experiments and power supply of 120 and 42 watts for total spacecraft and experiments respectively.

A follow-on cooperative mission, called the International Magnetosphere Explorer (IME) Project, is planned with the European Space Research Organization (ESRO). This will involve the launch of two Earth-orbiting spacecraft and a heliocentric (solar orbit) spacecraft in the later 1970s. The Earth-orbiting spacecraft will make repeated passes through the boundaries of Earth's magnetic field to measure fine-scale and time variations, while the interplanetary heliocentric spacecraft records simultaneous variations of the incoming solar wind.

IMP-J experiments are provided by universities throughout the nation, the National Oceanic and Atmospheric Administration (NOAA), the Atomic Energy Commission (AEC), and GSFC. Two engineering tests also will be conducted.

The series of IMP spacecraft is part of the space exploration program directed by NASA's Office of Space Science. GSFC, where the IMP spacecraft are constructed, is responsible for spacecraft and launch vehicle project management. EMR-Aerospace Sciences, College Park, Md., built the spacecraft and electrical harness, integrated spacecraft subsystems and assisted in environmental testing and launch support. McDonnell Douglas Astronautics Company, Huntington Beach, California, is prime contractor for the Delta launch vehicle.

TWO SUCCESSFUL YEARS. . .From Page 1

publication of the Chapman and Ferraro theory of magnetic storms. This was followed in 1961 by the classical work of Axford and Hines on the theory of convection of charged particles in the magnetosphere. They postulated that charged atomic particles moved in the Earth's magnetic field, which was deformed by the interaction with the solar wind, and an electric field also originating from this interaction. At the time of a magnetic storm these interactions are modified to convect protons and electrons from the tail of the magnetosphere deep into the magnetosphere into the region of the S^3 orbit to establish a toroidal ring current around the Earth. The magnetic field from this electric current produces the magnetic variations at the surface of the earth which have puzzled man for several hundred years. Among other effects, these magnetic storms disrupt communications and produce harmful transients on long-distance power lines. S^3 -A was especially instrumented to measure the particles comprising the ring current system, the resulting magnetic field variations along the orbit of the satellite, and other plasma physics phenomena associated with storms.

In addition to its scientific accomplishments, S^3 -A is also known as the most innovative and compact satellite launched in the Explorer series. As pointed out by Jerry Longanecker, Project Manager, several new spacecraft systems were developed by Goddard engineers, some of which have become standard for Goddard programs. For the first time on a satellite an in-line data handling system gave complete in-flight control of the data acquisition through the use of computer-type stored programs which could be reprogrammed from the ground. So successful has been this system that by November 1 of this year it had been reprogrammed 541 times. The computer software schemes devised to identify and extract data from the telemetry stream required such new and unique procedures that a patent application has been made. The power system has become a standard for Goddard spacecraft, having been used on recent IMP's and is planned for the SATS, IUE and IME programs. Spin rate and attitude control are obtained with the first light weight, low power automated air-coil system ever flown. An especially light-weight structure was designed using a pop-rivet sheet metal construction technique, which again has been adopted by other programs. This mission was also the first use of a Scout rocket to place a satellite into a highly elliptical orbit. In spite of all these new complex systems, which are nonredundant, the satellite continues to transmit high quality data after two years in orbit.

BLOODMOBILE NEWS

Goddard Honored By Red Cross

Goddard topped its quota in the Bloodmobile program last year and became one of over 60 organizations to be honored at the 25th annual awards dinner of the Prince George's County Chapter of the American Red Cross on September 13.

Mrs. Gertrude Law, Goddard's Bloodmobile Coordinator, received an award in behalf of all Goddard donors who gave enough blood in Fiscal Year 1973 to help Goddard top its quota by a whopping 107%. Honors also went to Clarence House, Goddard's top blood donor, who has given 13 pints over the past 32 years.

By meeting its quota, Goddard has insured free blood transfusions for all Center employees, both Civil Service and contract, and their immediate families.

Goddard's contributions also help meet the growing blood needs of Prince George's County. When the P.G. program began in 1948, 971 units of blood were donated in the county. This past year volunteers contributed 14,265 units of blood.

Also, studies have shown that people who receive Red Cross blood transfusions run a far lower risk of contracting viral hepatitis than people who receive commercially bought blood.

In the past five years, the program has increased production by 10%. If safe blood is to be provided for all patients, production will have to be increased by 20%.

This goal would be reached in one year if only one out of every four of last year's donors would bring in a new donor this year. Think of the additional lives that could be saved.



GERTRUDE LAW receives a certificate of appreciation in behalf of all Goddard blood donors from Norman Coe, Administrative Director of the Washington Regional Blood Center, during the annual awards dinner of the Prince George's County Chapter of the American National Red Cross.

Ten Gallon Donor

Fred L. King

Twelve Gallon Donor

Robert M. Porter

Thirteen Gallon Donor

Clarence B. House

One Gallon Donors

- Amelia G. Allen
- Dennis I. Asato
- Jeanette Marie Baylor
- John A. Behuncik
- Allen K. Berndt
- Dennis M. Berned
- Ronald G. Blunck
- Wilbur S. Brandenburg
- Michael A. Calabrese
- Floyd H. Clark
- E. Kent Cockerhan
- Dennis F. English
- William H. Eyster
- Andrew A. Franco
- Clyde H. Freeman
- Bevan M. French
- Allen J. Frenzel
- Edward R. Gardner
- Robert L. Grigsby
- David J. Haykin, Jr.
- Donald J. Hei, Jr.
- Melvyn Herman
- Clarence W. Hoyt
- Harold B. Johnson, Jr.
- Martin J. Keller
- Francis L. Keith
- Clara H. Klemcke
- William J. Lagos
- Straton C. Laios

- John B. Lallande, Jr.
- William F. Mack
- Patrick McClain
- James T. McLean
- Martin D. Menton, Jr.
- Virgil M. Morgan
- David D. Neill
- Richard S. Norton
- Lorrel E. Popp
- Peter A. Rickard
- Teresa B. Ricketts
- Mary J. Riley
- Eleanor H. Ritchie
- Paul Rudnick
- Stephen M. Schoenwetter
- John E. Sissala
- David E. Smith
- Donald John Steinmeyer
- William A. Struthers
- William J. Tierney, Jr.
- Allen G. Tucker
- Albert B. Washburn
- Martin G. White
- Ralph Baker Wight
- Thomas T. Wilheit
- James H. Williamson
- Lawrence D. Wing
- James E. Zerega

Three Gallon Donors

- Vincent L. Arillo
- Harlan F. Beheydt
- Everett Besse
- William C. Bryant, Jr.
- Herbert E. Foster
- Earl C. Gernert, Jr.
- Jacques D. Knox
- Ronald B. Miller

- Herbert Mitnick
- Ronald M. Muller
- James S. O'Brien
- Joseph P. Pacheco
- Clarence R. Pase
- Fred W. Paul
- Carter L. Silcox
- Thomas A. Ziegler

Four Gallon Donors

- Willie A. Bullock
- Earl D. Ellis
- Morris L. Ferguson
- Lee J. Horning

- Anthony J. Mileo
- William F. Mitchell
- John J. Tominovich

Five Gallon Donors

- Virgil L. Cleveland
- Ralph Cosme
- Irven Errera
- Walter J. Gates
- Dale L. Lund

- Andrew J. Mazurick
- Albert J. Newman
- Eugene R. Stroup
- John F. Unger

Six Gallon Donors

- Ray W. Baldrige
- Murry B. Barnett
- Martin A. Davis

- Norman J. Haiflich
- Robert L. Krenning
- Frank J. Trama

Two Gallon Donors

- Curtiss C. Barrett
- Robert L. Brown
- Stanley Corwin
- Michael L. Forman
- William E. Fizell, III
- John E. Gilkey
- James R. Higgins
- John F. Laudadio
- Robert D. Mattingly
- Richard S. Marriott

- Gary F. Meyers
- Michael J. Prokopchak
- James W. Ryan
- Clell S. Seacree
- Manfred P. Siebert
- Donald T. Stillwell
- Joan M. Stockwell
- James W. Thompson
- Carl J. Tonty

Seven Gallon Donor

Robert D. Phillips

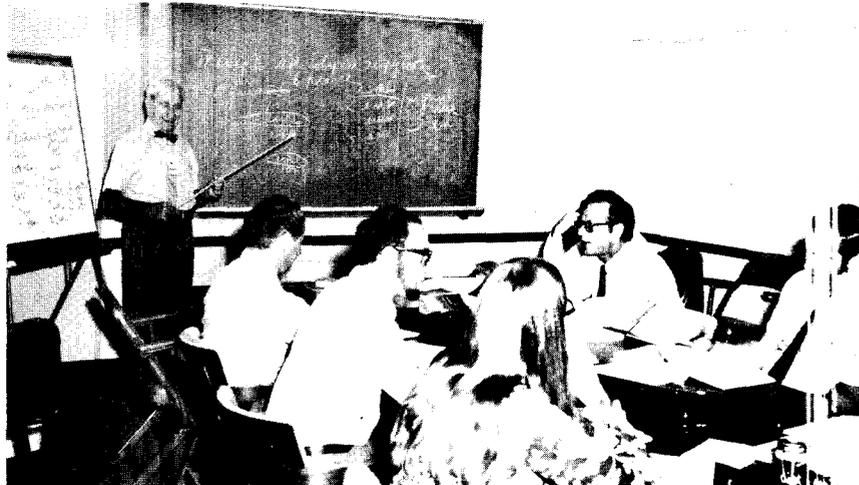
Eight Gallon Donors

John W. Adolphsen
George B. Hatton



CLARENCE B. HOUSE receives an award from Mrs. Robert Beaver, Chairman of the Prince George's Blood Program, for donating 13 gallons of blood to the Red Cross program. His white hat is an award he received several years ago for donating ten gallons.

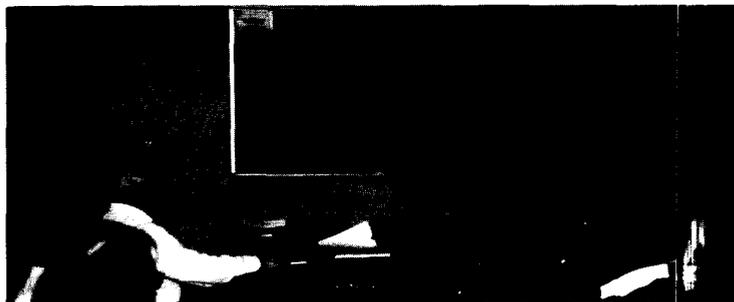
Goddard Courses H



INSTRUCTOR ALLAN ZAMANSKY teaches Russian to members of Goddard who will be involved in the upcoming joint US/USSR space venture.



"TO TEACH" is the sign being demonstrated by Gallaudet College instructor Tim Medina during a session of the Manual Communications Course. The sign language classes, offered at both the beginner and intermediate levels, have been credited with improving Center morale by giving hearing employees a better means of communicating with their deaf co-workers. The television monitor in the background is used to allow students to see themselves sign.



EDWARD PUCCINELLI of the Test and Evaluation Division conducts a course which provides an introduction to the principles of theory and solution of matrix eigenvalues.

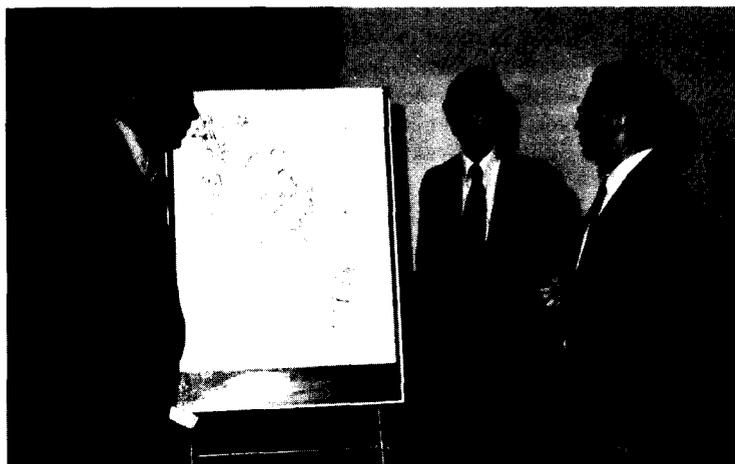


IN GODDARD'S LEARNING LAB, secretaries work on speed building shorthand tapes. The Shorthand Refresher course is programmed instruction that allows a trainee to progress at her own pace.

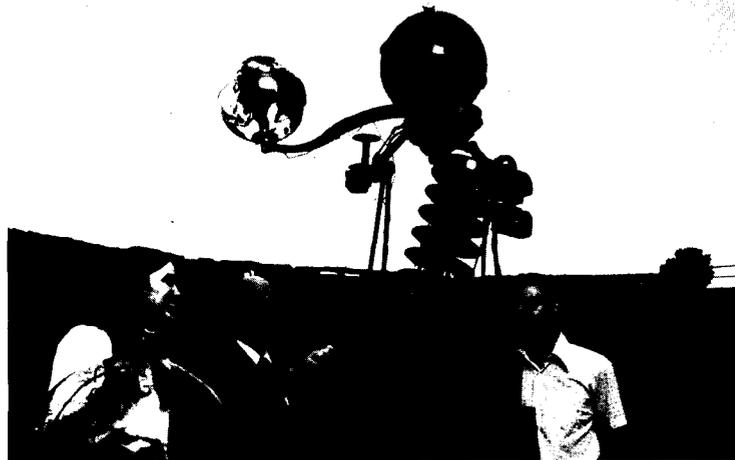
About 600 Goddard employees are presently taking part in a wide range of on-site courses that are administered by the Organization and Employee Development Branch. These courses serve the dual purposes of helping Goddard accomplish its missions and enabling employees to upgrade their job skills.

Many on-site courses are offered regularly each year. Students are nominated by their supervisors for courses announced in the annual GSFC Training Survey. This year's instruction covers several topics in administration; a basic astronomy course for non-technical personnel; 20 courses in computer languages and concepts; five courses dealing with management; 11 procurement courses; four safety courses; and nine courses on scientific and engineering topics.

Additional instruction is developed to fill specific needs of Goddard organizations throughout the year. Examples of such special classes are the recent typing course for men of the Experimental Machining Branch who needed to operate a computer termi-



GODDARD PROFESSIONAL COURSE instructors Wendel Wright and Joe Piehuta, of Leadership Resources Incorporated (LRI), discuss an organization structure with Marty Stein of the Organization and Employee Development Branch. The Goddard Professional course is designed to develop an individual's understanding of his position in the organization and help him grow within his environment and achieve his goals.



COORDINATOR SHEILA DUCK of the Organization and Employee Development Branch watches David Friedman and Charles Peruso as they set up the projector in the Goddard Planetarium for a simulated view of the night sky as part of the Basic Astronomy Course. The course helps non-technical employees gain a greater understanding and interest in a subject which is closely related to the activities of the Goddard Center.

p Upgrade Job Skills

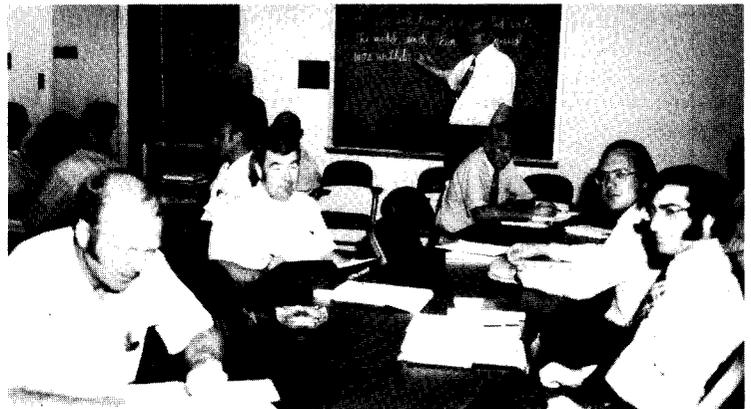
nal (*Goddard News*, August 1973) and a manual communications course to help members of the Space and Earth Sciences Computing Center and other Goddard employees communicate with their deaf co-workers (*Goddard News*, April 1973). Another specially designed program is the Russian language course for those working with Russian scientists and technicians on the Apollo-Soyuz Test Project.

"Goddard's on-site courses," says Stan Morse, Head of the Organization and Employee Branch, "are primarily to satisfy training needs of a continuing nature. The value of such courses is dependent upon the degree to which supervisors and employees jointly develop each employee's individual training needs. We can better do our job if supervisor-employee interaction takes place in determining the areas where training is required."

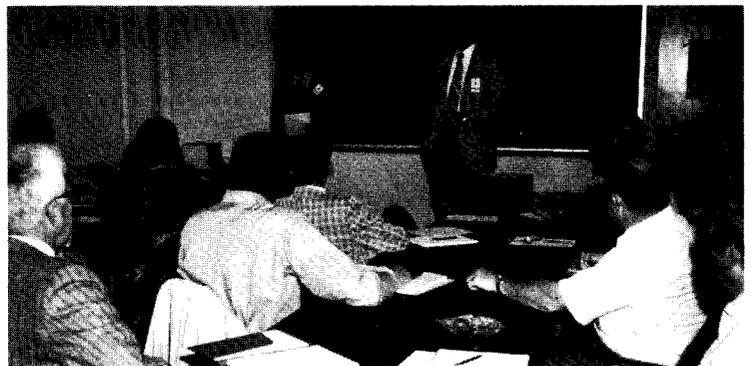
Employees who are interested in on-site training possibilities should contact their supervisors. (See Page 8)



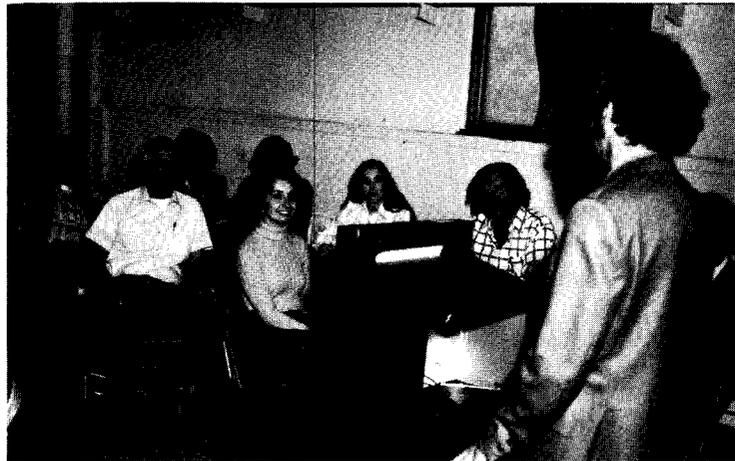
TINKER TOYS are a tool for illustrating organization structures for students in the Goddard Professional Course.



ROBERT DONAHUE of Training Associates Conducts a class in Technical Report Writing for Professionals and Technicians. This course stresses writing techniques for planning and organizing a report or article.



METRICATION is taught by instructors Dr. George Kalish and Frank Spanbauer of the University of Maryland. With conversion to the metric system around the corner, this course covers metric conversion and the thought processes underlying metrication.



RAY BALDRIDGE delivers his first stand-up impromptu presentation during the Effective Communications Course. The course, taught by psychologist Dr. Stanley Berlinsky, stresses the application of psychological principles to the practical problems of face-to-face communication in both one-to-one situations and small and large groups.

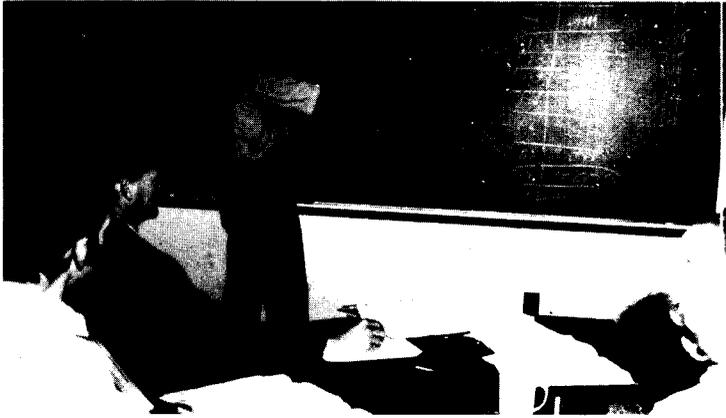


SUPERVISORS JOIN THEIR SECRETARIES to examine ways of working together more effectively during a workshop session of the Advanced Secretarial Techniques course. The course, conducted by David Booker of Booker Associates, is designed to help the secretary examine the problems faced in an office, gain an expanded view of herself and her performance, and give her a good understanding of the basic tenets of human relations so she may better handle office problems and exert a positive influence on co-workers. A Basic Secretarial Techniques Course is also offered to help improve the efficiency of less experienced secretaries.



JACK BOOKOUT, a Prince George's County teacher, conducts a class in Gregg Shorthand I. An individualized Basic Stenography course is also offered in Goddard's Learning Lab. Both courses offer the opportunity to learn or up-grade a skill which enables the secretary and/or typist to improve her performance and enhance her qualifications. Coordinator Gladys Chasnoff observes.

COURSES. . .From Page 7



A CALCULUS REFRESHER COURSE taught by Charles Katz of the Earth Observations and Systems Engineering Division is intended to up-date and review the student's grasp of integral calculus and analytic geometry.



A PROGRAMMING LANGUAGE (APL) is taught by Dr. Charles Wende and coordinated by May Adams. The programmed instruction course for APL is designed to give prospective APL users sufficient information about the language and the APL system to make possible self-paced learning of the language. Jim Curtis of the Organization and Employee Development Branch is coordinator for Goddard's computer instruction.



INSTRUCTOR WILLIAM COOPER discusses field positions during the Introduction to Inquiry and Reporting Systems course. The course was organized to provide a fast, efficient and easy-to-use method of extracting information from computer files by programmers and non-programmers alike. It is being presented for the first time.



A SESSION in social studies and history is conducted by Jean Pitt of the University of Maryland to trainees in the College Level Examination Program (CLEP). CLEP is designed to assist interested employees in accelerating their undergraduate academic progress. A participant may earn up to 24 semester hours of credit by achieving a passing score on various standardized tests. The five areas of study are: six hours of English composition, six hours of social science and history, six hours of humanities, three hours of science, and three hours of mathematics. Goal of the course is to stimulate employee self-development leading to undergraduate degrees.



GODDARD EMPLOYEES study Remote Sensing Technology and Application via a video tape developed by Purdue University. This course, first run last year, is designed to provide a working knowledge of the theoretical basis and practical techniques of remote sensing. "The application is useful to those working on the data from the Earth Resources Technology Satellite and the Skylab/Earth Resources Experiment Package," says Alfred Shehab, coordinator from the Organization and Employee Development Branch.



THE SOUND-PROOF LANGUAGE BOOTH in the Learning Lab is demonstrated by Sheila Duck. The booth is used primarily for self-instructed German and Spanish classes via cassette tapes. It makes language study possible for Goddard employees who need it for their work, but who cannot find time to meet in regularly scheduled classes.

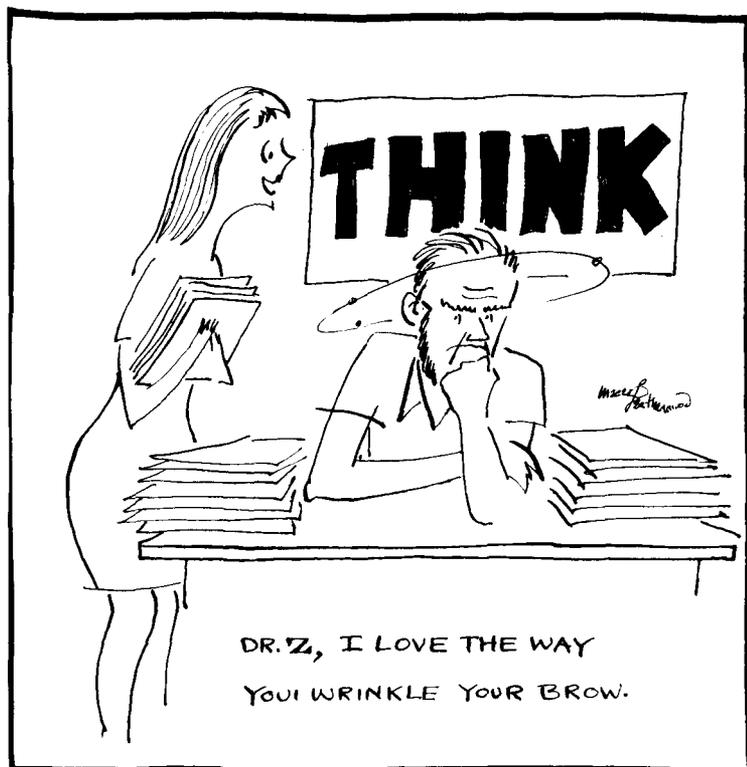


TENNIS CHAMPS. The winners of Goddard Tennis Club tournaments played in September on the club's courts near the Recreation Center are (from left, seated) Mary Obler, winner of the women's singles championship; and Randy Harbaugh, winner of the men's singles competition. Standing are Robert Davis, double championship runner-up; Nelson Potter, who shared the doubles championship with Randy Harbaugh; Fred Sontag, runner-up in the men's singles and the doubles championships; Cheryl Harbaugh, winner, with her husband Randy, of the mixed doubles championship; and Rilla Potter, women's singles runner-up.



PROCUREMENT GOLF CHAMPS. The Procurement Division held its fourth annual golf tournament on October 27 at the Northwest Park Golf Course. Winners, with Division Chief Bill Mathis (left) who presented the awards, are (from left) Dick Backe, "winner" of the tail-ender trophy; Bill Grimes, low gross; Phil Waller, third flight low net; Dave Taylor, Division low gross; John Lovelace, first flight low net. Larry Doss, second flight low net, is not shown.

Outputts *by* Maceo Leatherwood



Recent Retirements

Best wishes go to the 15 Goddard employees who retired from Government service in July, August September and October. Listed by directorate, they are:

Administration and Management Directorate

Elden Appel	Paul R. Dolvin
Victor Beck	Alma Kunz
William Blair	Eugene Novak
Dorothy Dick	E. Pen Stephens

Mission and Data Operations Directorate

Robert C. Danek
Eula Paseur

Space and Earth Sciences Directorate

Ernestine Haszard

Space Applications and Technology Directorate

Grahm Moore
Myrtle Quarles

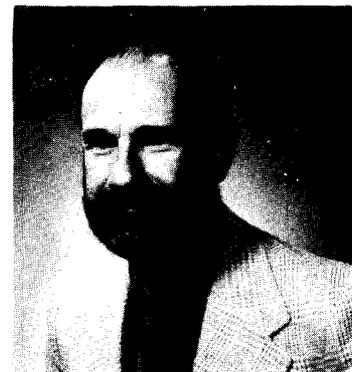
Networks Directorate

Donald Dunsmore
Gladys Reep

Wardrip Elected TCG

Vice Chairman

At the October meeting of the IRIG Tele-Communications Group (TCG), Range Commanders Council (RCC), Clark Wardrip of Goddard was elected Vice Chairman of the TCG for a one year term. This is the first time that an associate member of the TCG has been elected to hold office. Mr. Wardrip has been active in the group as chairman of the Ad Hoc Timing Subcommittee.



S. Clark Wardrip

The Range Commanders Council was established in August of 1951 as the primary means of exchanging technical and operational information, and to coordinate and standardize systems, techniques, methods and procedures within the member ranges and facilities.

There are eleven standing groups within the RCC. Each group has a chairman and vice chairman. Members are elected from the various Department of Defense Ranges, and associate members from civilian and military government agencies. The TCG is one of the eleven groups making up the RCC. The TCG deals with range timing and synchronization systems, data transmission systems, radio command control systems including those pertaining to flight termination, and the development of standards for these systems.

S. Clark Wardrip is head of the Timing Systems Section of Goddard's Data Handling and Display Branch.



USNS VANGUARD. The sign read "Welcome aboard Gloria and Karen, one small climb for a woman, one giant leap for Women's Lib." The occasion was the first day on board for the ships first women crew members. Both employees of the Bendix Field Engineering Corporation, Gloria L. Tucker (left) is a teletype operator and Karen S. Wright is a telemetry technician. They reported on board off Mar del Plata, Argentina by tugboat on September 22. Station Director Otto Thiele reports that the general consensus on ship is that their arrival is a "great thing."



CLIP AND SAVE

GEWA Club Listing

CLUB	PRESIDENT	EXT.
Archery	Wilson Bedwell	2345
Art	Roger Ratliff	6611
Astronomy	Leslie Salter	2527
Automobile	Jim Shaughnessy	6372
Basketball	Eric Victor	4286
Bowling:		
Tues. Mixed TP	Art Anderson	5400
Thurs. Mixed TP	George Springham	5628
Wed. Men's TP	Steve Evan	4705
Thurs. Men's TP	Walter Flourmoy	2884
Tues. Mixed DP	Roland Leland	4697
Youth DP	Beverly Dinn	4074
Bridge	Daniel McHugh	4327
Day Care	Ann Merwarth	5933
Chess	Daniel Dembrow	5710
Fishing	David Nava	5433
Flying	Jim Metzger	2374
Football	Cyrill Bock	5147
Golf	Robert Powless	4415
Gun	Larry Pratt	4414
Ice Skating	Shu Shumann	4978
Judo	Earl Gernert	4734
Karate	Bernard Dixon, Jr.	5667
MAD	Gil Mead	4470
Men's Chorus	Tom Cherrix	6079
Movie	Robert Miller	4681
Photo	Richard Buehler	2486
Radio	Hugh Turnbull	4557
Sailing Assn.	Gene Willingham	5346
Scuba	Ron Miller	4713
Ski	Clint Carle	5464
Soccer	Ed Pucinelli	5081
Softball, Men's	Jack Thomson	6182
Women's	Pamela Bolling	4728
Square Dance	Everett Besse	2661
Stamp	Pedro Sarmiento	5827
Tennis	Tom Kelsall	2354
Toastmaster	Carroll Horn	4786
Trap & Skeet	Walter Carrion	4942
Women's Club	Linda Dickinson	577-1378

CLIP AND SAVE

This is the sixth of a series of articles by Earl D. Ellis on plating, protective coatings and electrochemical processes available from Goddard's Experimental Engineering and Fabrication Division. For further information, Mr. Ellis can be reached on extension 4870.

Metallic Depositions and Surface Treatments of Aluminum

Satisfactory electroplating on aluminum and its alloys depends upon the preparation of the surface prior to the electro-deposition. After applying standard cleaning procedures most of the practical techniques require a deposition of a zinc immersion coating. This is immediately followed by an electro-deposition of copper to prevent deterioration of the zinc coating.

After the zinc and copper depositions have been obtained, almost any surface coating such as gold, silver, nickel, black nickel, tin, black chrome, etc., may be applied.

Electroplated tin imparts good solderability, black nickel and black chrome are used for thermal and emissivity control, gold and silver for low resistance contacts and chrome to provide a hard wear resistant surface. The final finish may be specular or dull depending upon buffing and polishing prior to and after plating.

Anodic films are generally required for corrosion resistance, abrasion resistance and for their dielectric properties on aluminum and its alloys.

Three basic types of anodizing are in use at GSFC. They are classified in Specification Mil-A-8625C.

Type I, Chromic acid anodize on aluminum and its alloys is preferred if the article to be anodized has laps, joints, seams, recesses or weldments where solution entrapment is a possibility, because the chromic acid process leaves no corrosive residue.

Type II, Sulphuric acid anodize is the most common method used for producing colored surfaces on aluminum and its alloys. Anodized articles dyed a specific color are often used in preference to paint, however normal type II coatings do not withstand space environment particularly well because of outgassing and the tendency of the dyes to fade.

Type III, hard anodize is used where a very hard, wear resistant finish is required, or as an insulating coating on aluminum and most of its alloys. Normal thickness of the coating varies from .0005 inch to .004 inch depending upon the requirements. The coating penetrates the base metal as much as it builds up, and coatings over .002 inch tend to break down on sharp edges and corners.

Chromate conversion coatings on aluminum and its alloys are covered by specification Mil-C-5541. This finish is used mainly as a base for paint and where corrosion resistance and good electrical conductivity is required. This coating can also be applied for touch-up where rework has removed anodized coatings.

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GODDARD

lic Affairs at the Goddard Space Flight Center, Mail Code 202, National Aeronautics and Space Administration, Greenbelt, Maryland 20771. Deadline for contributions is the last Thursday in the month for publication the following month.

Nancy Menge, Editor
 Patricia Ratkewicz, Secretary, Phone Extension 4141