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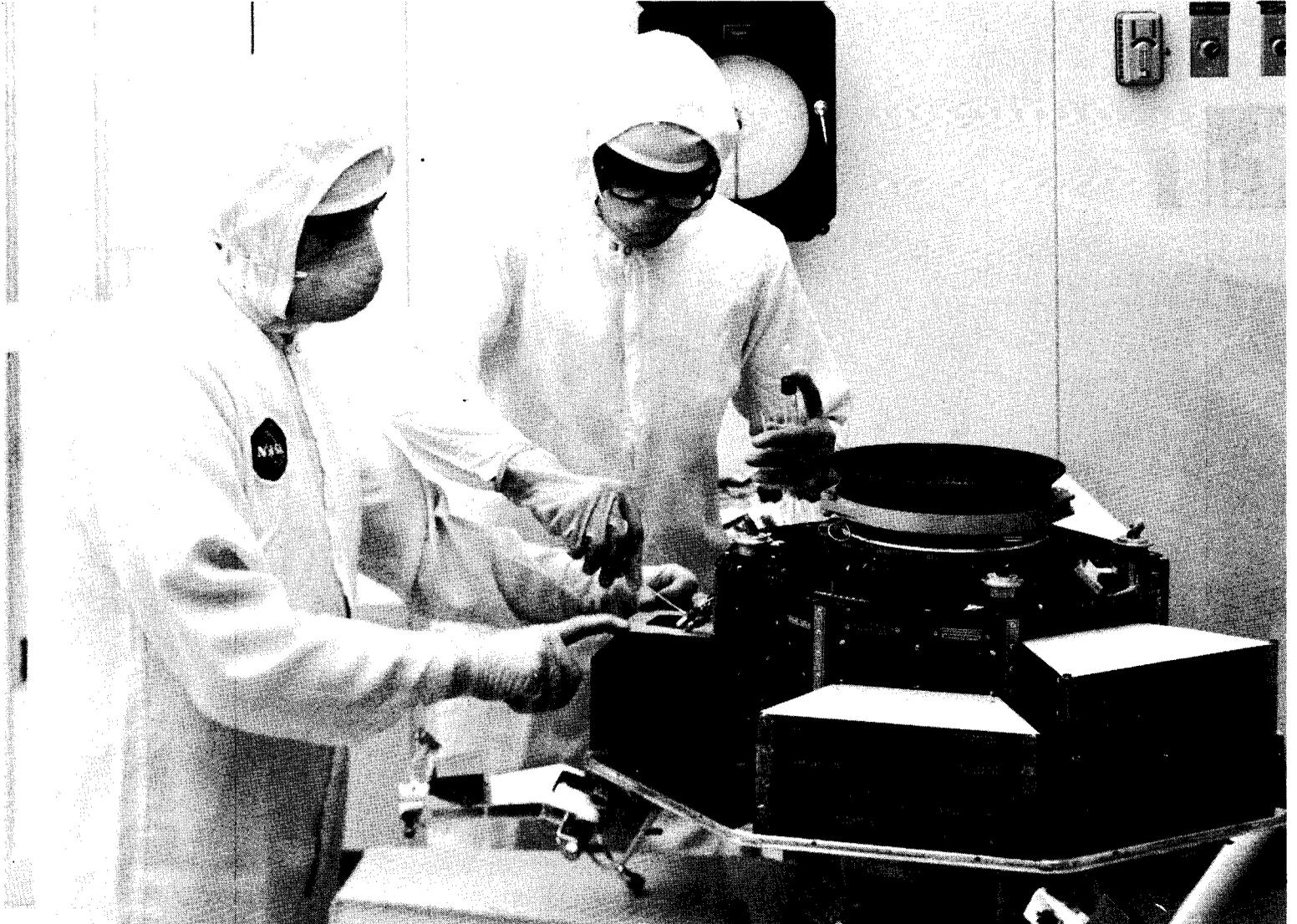
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GODDARD NEWS

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ASSAY SAMPLES are being taken by Anthony Pierro (left), Lead Decontamination Technician, and Edward Artest in the Clean Room.

Goddard's Clean Room 'Tops in Its Field'

The Anchored Interplanetary Monitoring Platform (AIMP-E), scheduled for launch July 19, 1967, will be the cleanest spacecraft launched to date, according to a study conducted by NASA's Office of Planetary Quarantine. The study compared AIMP-E, recently decontaminated by the clean room staff of Goddard's Mechanical Systems Branch (SI&SR), to spacecraft built previously by Goddard, other NASA centers and industry and found it to contain the lowest number of viable microorganisms that could contaminate the moon's surface.

The methods of decontamination control developed at Goddard will have considerable impact on future NASA programs requiring low levels of contamination prior to terminal sterilization of spacecraft for planetary missions, reports Francis N. LeDoux, Head of the Structural and Mechanical Applications Section and designer of Goddard's clean room facilities in Building 11.

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Science Teachers Participate in Goddard Research Projects

By Jim Kukowski

"I am convinced that we would find better science teaching if we could have more teachers engaged in some type of scientific research."

The statement made this spring by James W. Latham, Jr., Maryland State Science Supervisor, sparked an imaginative program at Goddard this summer. Five Maryland high school science teachers are now engaged in research projects here under the Secondary Teachers Research Assistant Program (STRAP) jointly sponsored by GFSC and the Maryland State Department of Education.

Each teacher has been assigned to a laboratory where Goddard scientists are involved in work closely related to the teacher's educational responsibility. Mr. Latham has indicated that the

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SCIENCE TEACHERS . . . from Page 1

six-week pilot program could lead to similar projects in the future at other federal agencies and private industries throughout Maryland.

The teachers and Goddard personnel cooperating in STRAP are: Goswin Boner, Woodlawn Senior High, Baltimore with Dr. Philip Cressy and Charles Midkiff, Theoretical Studies Branch; George Beckert, Eastern Junior High, Silver Spring with William Cahill, Theoretical Studies Branch; James Larson, Wheaton Senior High, Wheaton, with Drs. Grace Lee Picciolo and Norman MacLeod, Space Biology Branch; John Heck, Golden Ring Junior High, Baltimore with Dr. Paul Lowman, Theoretical Studies Branch; and Raymond Carriere, Springbrook Senior High, Silver Spring with Drs. Isidore Adler and Jacob Trombka, Theoretical Studies Branch.

Elva Bailey, Goddard's Educational Programs Officer, says, "The enthusiastic support of the Goddard personnel in this program is indicative of the intense dedication they have, not only in furthering scientific knowledge, but of desiring to pass it along to our young people. This program will enrich the teacher's background with an experience that can be passed on to hundreds of students during ensuing years." He adds, "It will result in a significant contribution by Goddard to this nation's future potential supply of technical manpower."



RICHARD J. WIACK (left), Astronomy Club Vice President; and **Dr. Michael J. Vaccaro**, Assistant Director for Administration and Management; cut the ribbon to dedicate the Astronomy Club's new telescope site.

Goddard's Astronomy Club Holds Open House June 27

More than 52 persons were on hand when Goddard's Astronomy Club dedicated its new telescope site during an open house June 27, at the Optical Research Facility on Fairland Road. Star attractions of the evening were the club's two telescopes, one a 12-inch Newtonian system built by club members, and the other a 12-inch Nishimura with a four-inch refractor finder and a low power finder.

After a short welcoming speech by Richard J. Wiack, Club Vice President, Dr. Michael J. Vaccaro, Assistant Director for Administration and Management, formally dedicated the site and cut the ribbon.

During the ceremony, Dr. Vaccaro said, "This site is important to all of us. By cooperating with the Goddard Astronomy Club, we are able to popularize an important aspect of the Goddard scientific mission, offering a facility for astronomy studies to the Center staff and to the community in general."

Dr. Vaccaro expressed the hope that the telescope site might be used to teach a general course in basic astronomy to Goddard employees. Hopefully adding that the club and the center might under a cooperative effort expand this program into a planetarium.

"The exploration of space is the center's business and all of us who support our scientific missions should at least have a general knowledge of our solar system and the universe beyond."

Membership in the Astronomy Club is open to all personnel on the Center. Club officers are Robert S. Watson, President; Richard F. Wiack, Vice President; Patricia A. Comella, Secretary; George H. Wyatt, Chairman of the Committee on Facilities; and John A. Brown, Chairman of the Committee on Special Projects.



FIVE MARYLAND high school science teachers discuss their research projects under the Secondary Teachers Research Assistance Program (STRAP). Left to right are; **George Beckert**, **James Larson**, **Goswin Boner**, **Raymond Carriere** and **John Heck** (back to camera). The six week pilot program is sponsored jointly by GSFC and the Maryland State Department of Education.



STRAP participants discuss their research programs with Goddard personnel. Clockwise, from upper left are, **John Heck**, **James Latham**, Supervisor of Science for the Maryland State Department of Education, **Dr. Jacob Trombka**, **William Cahill**, **Dr. Paul Lowman**, **Charles Midkiff**, **Alfred Rosenthal**, **Dr. Isidore Adler**, **Dr. Grace Lee Picciolo**, **Burgess Hildreth**, **Elva Bailey**, **George Beckert** and **James Larson**.

King of Thailand Visits Goddard



DR. JOHN W. TOWNSEND, JR., (left center), Goddard Deputy Director, talks with His Majesty King Bhumibol Adulyadej of Thailand shortly after the latter's arrival here by helicopter, June 28, 1967. His Majesty spent two hours here, visiting the Satellite Exhibition Room in Building 1, the High Bay clean room of Building 11, Test and Evaluation facilities in Buildings 10 and 15, and Tracking and Data Acquisition Facilities including OPSCOM, NASCOM and an ATS demonstration in Building 14.

Meet Our People



Charles R. Hamilton

Charles R. Hamilton, Goddard's Radiological Safety Officer and Chairman of the Radiological and Isotope Committee, is responsible for all radioactive material and sources of ionizing radiation used for Goddard projects.

Under his direction, the Radiological Safety Office (RSO) formulates policies, procedures and legal safe guards for the center to insure compliance with the regulations and licensing requirements of the Atomic Energy Commission. The office also prepares documentation and submits range approval for the use of nuclear material associated with Goddard programs at launch sites in the U.S. and overseas. This includes an average of seven spacecraft and 50 sounding rocket and balloon payload launches each year.

An old hand at Goddard, he came here in December, 1958. Mr. Hamilton was Project Engineer and Coordinator for the first two Goddard Aerobee sounding rockets launched from Ft. Churchill, Canada, in September 1959, and Project Manager for two other Aerobees launched from the same range in November 1960. He was Project Coordinator for Explorer VIII and Project Manager for the Extremely Low Frequency (ELF) monitor station that was designed and built during 1961. In December, 1962, he prepared the Goddard Radiological Safety Handbook which established the policy and procedures on the use of radioactive material at the center and field installations.

Born in Grafton, West Virginia, Mr. Hamilton began his Civil Service career at the Naval Research Laboratory where he worked from 1942 to 1958. During the spring of 1946, he was assigned at White Sands, New Mexico for the launching of nine NRL V-2 rocket payloads. This was during the time that Dr. Wernher von Braun and his staff were temporarily located at White Sands for launching of V-2, rockets.

After returning from White Sands, Mr. Hamilton became the Atmospheric Electricity Branch Engineer responsible for the design and installation of scientific equipment for use in aircraft, ships, balloons and rockets.

Mr. Hamilton has been a member of the American Legion for 15 years and held office as a Judge Advocate for five years.

With seven children of his own, Mr. Hamilton enjoys working with young people and is active in the Boys Club and youth groups near his home. His hobbies are sports and working on cars.

Mr. Hamilton and his wife Elizabeth live at 19 Kentucky Avenue, Parkland Maryland, with their six daughters—Debbie Ann, 18; Pamela Louise, 10; Cheryl Ann, 7; Cathy Lyn, 8; Lisa LaJean, 3; and Karen Rene, three months. A son Ricky, 22, is with the Army at Fort Hood, Texas.

—DATA TOPICS—

PAUL J. PASHBY is the Head of the Network Computer Section of the Data Operations Branch. Mr. Pashby received his BS in Mathematics at Boston College in 1955 and joined NASA in 1960. He was responsible for the implementation of the Coordinate Conversion Computer System at Goddard, used for Gemini mission simulation. Mr. Pashby was employed at the Naval Ordnance Laboratory as a Programmer for five years prior to his joining NASA.



Apollo Remote Site Computer Programming

By Paul J. Pashby

The first generation of Apollo mission support programs for the Manned Space Flight Network (MSFN) are being checked out. This article is a follow-up on a Data Topics written by Mr. Pashby for the April 4, 1966 issue of the Goddard News that concerned itself with the software requirements of Apollo mission control.

The "Data Topics" written one year ago on remote site programming was written in the future tense; now the first generation of mission support programs for Apollo has been written and checked out. This column constitutes, in essence, a status report on these programs and a look again at the future.

The current set of programs will support Apollo missions 501, 502, and 204 LM-1. Although no mission has actually flown with these programs, many simulations sessions indicate that the chosen concepts are sound. With the fundamental concepts now implemented and proved, our attention can be directed toward the extension of those concepts and the development of more sophisticated techniques. We have learned, for example, that ground control requirements undergo considerably more modification than originally anticipated. This is due in part to changes to spacecraft computer software.

In addition, much more flexibility in the definition of high speed telemetry is required. To satisfy the two conditions mentioned above and to provide for the implementation of some of those requirements which were not accomplished in the first generation programs; a second level of mission support programs is now being designed.

The new telemetry programs will be able to operate with multiple high speed data lines. Smaller blocks of data will be defined, and it is hoped that a scheme to dynamically group these smaller blocks into specific formats can be developed. Thus, for example, flight control personnel could call for all data from on-board computers to be transmitted at one time, or smaller segments of the same set of data.

A more generic approach to the procedures used to load spacecraft computers from the ground will be incorporated into future command programs. If the development is successful, the net effect will be to insulate the "command program" from perturbations due to on-board computer software changes.

In addition to improvements to operational programs, automatic checkout techniques are now being developed. These techniques will make it possible to reduce the time needed for validation of the command program by a factor of ten.

We have been able to develop programs to transmit program modifications by high speed data lines to the remote sites. This concept may be extended to include the transmission of entire computer programs to the remote sites. By way of illustration: if the

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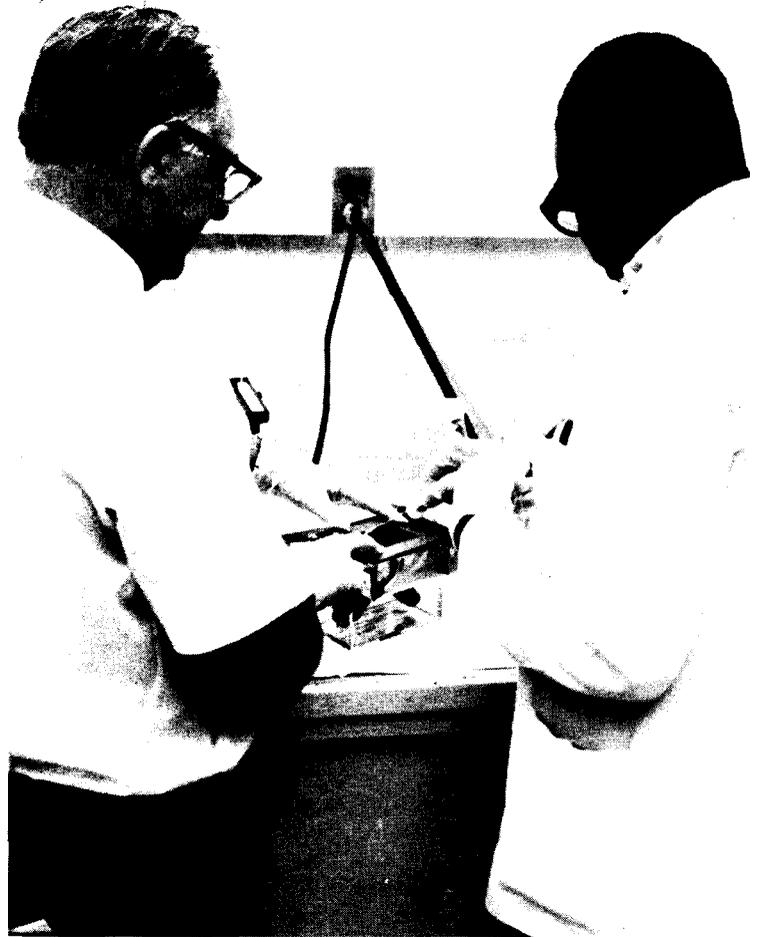
CLEAN ROOM . . . from Page 1

Mr. LeDoux says, "Clean room operations conducted last month on AIMP-E reduced the number of microorganisms aboard the spacecraft from about 7×10^5 to 2.2×10^3 . This is a new record for such operations.

"Since a prime objective of present bioscience programs is the detection and analysis of extraterrestrial life, our decontamination of spacecraft such as the AIMP's which orbit or land on the moon is important to help insure that any life found there will be of purely lunar origin."



ANTHONY PIERRO in the Bioclean room cleans one of the facets prior to integration of the electronic modules.



FRANCIS N. LeDOUX (left), Head of the Structural and Mechanical Applications Section, and Charles Paige take an assay sample from the Contamination Monitoring Experiment.



LEWIS E. PAUL works in the Encapsulation area of the clean room complex to decontaminate an electronic circuit before it is conformal coated.

ASEE/NASA Summer Faculty Fellowship Now in Full Swing

The first month of the ASEE/NASA Summer Faculty Fellowship has been highly successful, reports Dr. James C. Morakis, Program Director for Goddard. The ten-week program began June 12 and is being sponsored by NASA and the American Society for Engineering Education (ASEE). Co-directors with Dr. Morakis for 1967 are Dr. Alan B. Marcovitz, of the University of Maryland; and Dr. Cheih C. Chang and Dr. Bertrand Fang, of the Catholic University of America.

Dr. Morakis says, "This year 24 faculty members from colleges and universities across the country are here to take advantage of the research opportunities offered by the program. We have added two more research areas to the six covered last year, and two short courses for the participants."

The Fellowship Program benefits both Goddard and the universities through an exchange of scientific ideas. Its two-year cycle allows participants time to finish research begun the year before

and to help solve research problems that are important to the center.

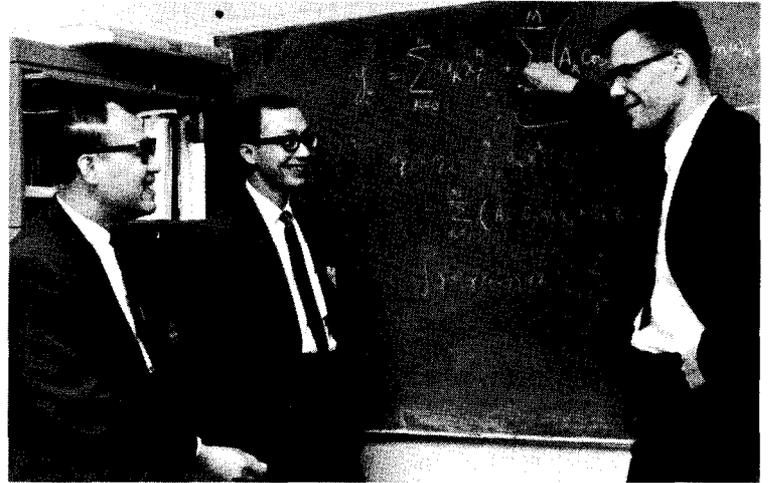
Short courses are also offered the participants on subjects about which they have a special interest. The short courses offered this year are an "Introduction to Information Theory" taught by Dr. Marcovitz, and an "Introduction to Quantum Mechanics" taught by Dr. Thomas J. Eisler, Associate Professor of Space Sciences and Applied Physics at Catholic University.

Each of the faculty participants is conducting research in one of the areas of Communication and Telemetry, Computers, Quantum Electronics, Antennas, Structures, Automatic Control, or Space Science.

Rounding out the program is a series of 13 lectures, seminars and workshops on topics related to the space program. The next two lectures will be "Medical Engineering" on July 21, and the "Sociological Consequences of Space Exploration" on July 25.



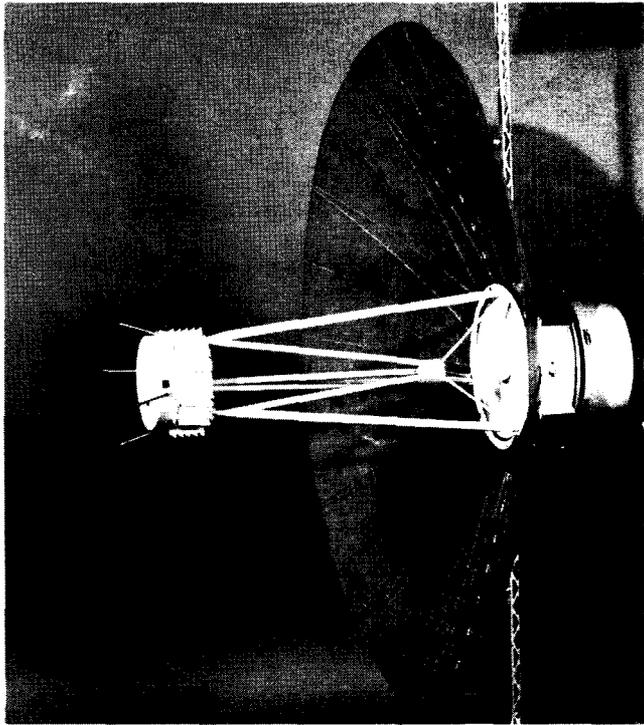
DR. ALAN B. MARCOVITZ, co-director, discusses Information Theory during one of the short courses offered as part of the Summer Faculty Fellowship in Building 26. To the right of Dr. Marcovitz is Dr. Bertrand Fang, one of the four co-directors.



SUMMER FACULTY ADVISOR Andrew R. Chi (from left), Head of the Timing Systems Section (ADD); discusses a research problem with Dr. David H. S. Cheng, of the University of Missouri; and David Koenig, of the Catholic University of America. Mr. Chi is one of 16 Goddard employees acting as research advisors for the program.



PARTICIPANTS in the 1967 Summer Faculty Fellowship program listen to Dr. Marcovitz.



MODEL of new deployable space antenna.

NASA to Build 30-Foot Model of Space Antenna

NASA will build and test on the ground in a vacuum chamber a full-scale test model of a 30-foot diameter parabolic antenna, designed for deployment on a spacecraft for advanced communications research.

Such a deployable antenna would be part of the experimental package of the Applications Technology Satellites F and G under consideration as possible second-generation spacecraft in the ATS program.

Managed by Goddard, the program has the general objectives of developing and flight testing promising technology that is a common requirement of a number of satellite applications.

Harry L. Gerwin, ATS F & G Project Manager, says, "I am very pleased that the program is underway. This is the beginning of a significant space antenna program. The antenna technology developed in this program will be an important keystone in future programs such as meteorology, navigation, communications and the galactic probe."

The antenna model will be designed, fabricated and tested by Goodyear Aerospace Corp., Akron, Ohio.

Construction of the model antenna is an option provided under terms of the NASA contract with Goodyear, covering Phases I and II of the large antenna development. This action does not imply approval of construction of the ATS F and G vehicles. Final action on ATS F and G awaits congressional approval of the request for this program in the FY 1968 budget.

The objectives of the proposed ATS F and G developmental effort are to further the technology necessary for a number of different space applications. The resulting technology could be useful for such applications as orbiting data relay satellites, deep space tracking, navigation satellites, data collection, and galactic probes. This includes communications with aircraft, other satellites, ships and ground vehicles.

The ATS F and G spacecraft would be placed in a synchronous equatorial orbit, 22,300 miles above the equator. Launch vehicles under consideration for these missions are the Atlas/Agna, Atlas/Centaur and the Tital 3C.

Five spacecraft in the first generation ATS series have been approved for flight. Of these, two (ATS I and II) have been launched. The remaining three will be launched over the next two years.

TECHNOLOGY UTILIZATION



DR. JOHN W. TOWNSEND, Deputy Director (left) and Dr. John B. Schutt, Technology Directorate (center), discuss the manufacture of the new "Satellite" paint with Jules Knapp, President of United Coatings Inc. Mr. Knapp demonstrates the abrasion resistance of the silicate paint which is an adaptation of the basic coating invented by Dr. Schutt.

Chicago Firm Markets Goddard Invention

By Kenneth F. Jacobs

Dr. John B. Schutt, of the Thermophysics Branch, Spacecraft Technology Division, has invented a variety of inorganic silicate paints which are extremely stable to the heat and ultra-violet radiation experienced by space vehicles. These coatings are far superior to other inorganic paints developed for space use since they are easily formulated, adhere without the necessity of costly surface preparation, and possess a relatively long shelf life.

Goddard's Dr. Schutt developed the heat-resistant, silicate paint while searching for an improved coating to withstand the extreme temperature, and radiation environment experienced by satellites in space.

Silicate paints are not new. However, they have never been manufactured due to the extreme difficulty of formulation. Dr. Schutt's development represents a major breakthrough in this field.

The paint was made available to the industrial community through the Technology Utilization Program. Of the 1,072 companies requesting detailed information, 22 have received a NASA license to manufacture the paint. The interested companies represent a wide range of utilizations indicating the versatility of the coating. One company, United Coatings, Inc., of Chicago, with the assistance of Dr. Schutt, has adapted a formulation specifically for use as an interior house paint.

Jules Knapp, President of United Coatings, Inc., is presently in the Washington area to promote the sale of his product by local retailers. He has announced the Hecht Company of Baltimore will place his product on sale in September. Under the trade name of "Satellite," the paint is now being sold in the northern United States. Mr. Knapp boasts his product possesses features homeowners have long been seeking in an interior, flat wall paint. It is easily applied, non-toxic, easily cleaned with water and has a scrubbing resistance many times that of conventional paints. Due to its excellent scrubability, "Satellite" may be used on woodwork or heavy wear surfaces instead of a semi-gloss paint.

The "Satellite" silicate latex paint is the first spin-off derived from Goddard's technology which has been marketed for the general public.

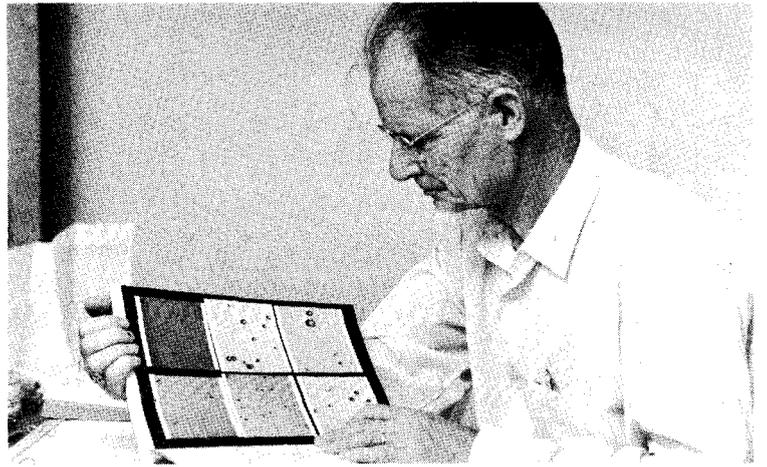
DATA TOPICS . . . from Page 3

same data encoding methods used for command data are applied to computer program transmission, it would require approximately two million bits of transmitted information to assemble a 32,000 word program on-site. At a 2400 bits per second transmission rate, it would require approximately 15 minutes of transmission time for the entire process for one site. The feasibility of loading all sites in parallel will be investigated as well.

In summary, the programs described in the first data topics column have been written; they are being modified now to provide greater flexibility in future applications, and steps are being taken to improve the areas surrounding mission support program production.

Goddard's Co-op Work-Study Program, in progress since 1961, provides students with the opportunity to gain valuable work experience in the aerospace field.

— PERSONALITY PROFILES —



Luc Secretan: Prizes Family Tradition and Art

Luc Secretan, of the Astrophysics Branch (LSS), comes from one of the oldest families in Switzerland and is noted throughout the center as an artist whose specialty is landscapes done in pastels, watercolors or oils. At work he is an Aerospace Technologist specializing in micro-meteoroid studies.

Since coming to Goddard on December 28, 1958, Mr. Secretan has worked as a co-experimenter on more than six satellite projects including the Vanguards, three Explorers, Mariner IV, and Pioneer. He has worked with Aerobee Sounding Rockets, and on the Mercury and Gemini-Agena Projects. At the present time, he is working on micro-optical analysis of micrometeorite collection specimens and the design of micrometeorite detection and collection apparatus. In 1966, he received a \$400 award for a semi-automatic bead dropper used to calibrate the sensitivity of micrometeorite detectors and has a patent pending on the device.

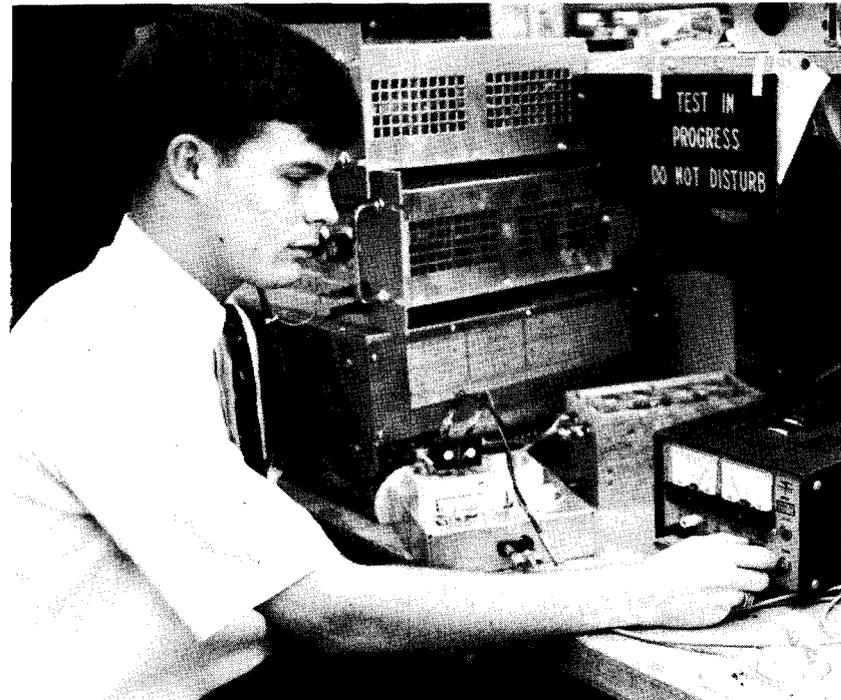
Prior to joining Goddard, Mr. Secretan worked as a quality control engineer with the Cleveland Graphite Bronze Co. in Ohio. From 1948 to 1958 he was a metallurgist at the Naval Research Laboratory in Washington, D.C. While at NRL he taught classes in German, a language he learned along with French and Latin during his early childhood in Zurich, Switzerland.

Born in Lausanne, Switzerland, Mr. Secretan came to the United States in 1928 and received his citizenship in 1937. He is a graduate of Calvin College in Geneva, Switzerland, and received his BS degree from the Polytechnical Institute in Zurich in 1928. His graduate studies include work at the University of Brussels, Belgium and at John Hopkins University, Cleveland, Ohio. He is a member of the "Swiss born Scientists and Engineers," and the "Swiss Benevolent Association," both affiliated with the Swiss Embassy in Washington.

The family name of Secretan dates back to the mid 16th Century when it was first registered in Lausanne, and the original coat of arms is still in use among the Secretan families. "The family contains many lawyers and ministers," says Mr. Secretan. "My father, Etienne Secretan, was founder of the first French Speaking Protestant Church in Zurich, and an uncle, Edward Secretan, was director of the newspaper *Gazette de Lausanne* which helped maintain unity between the French and German parts of the country during the First World War."

Mr. Secretan shares his love of art with his wife Hermine. While he paints, she practices ceramics and weaving or teaches languages at home. He has had a number of exhibits of his work, such as a recent one at the Prince Georges Public Library last February, and some of his paintings of monuments in Washington have been used on Christmas cards for congressmen. His other hobbies are astronomy and restoring and repairing clocks.

The Secretans have three children, Ingrid, Frank and Stanley, and seven grandchildren. He and his wife live at 5906 Mustang Drive, Riverdale, Maryland.



Tom Chamblin: Co-op Student

Tom Chamblin, a sophomore electrical engineering major at Virginia Polytechnic Institute, is one of 72 students taking advantage of Goddard's cooperative education program. Tom came to Goddard in June 1966 and has been working in the Power Conversion and Control Section of the Spacepower Technology Branch.

At Goddard, Tom is working with experimental low input voltage converters. His main assignment is in the development, construction, testing, and evaluation of low voltage converters. When asked to comment on his work, he said, "I am glad to have the opportunity to work in and learn about this area of space technology. I feel that I have gained much valuable experience that will help me in school as well as in life."

At Virginia Tech, he is active in numerous activities and is a member of the Tau Delta fraternity. In high school he was a member of the National Honor Society, president of his junior class, and co-captain of the varsity football team.

His other interests include playing the guitar, sports, tape recording and music.

His Goddard supervisor, Edward R. Pasciutti, says, "Tom's enthusiasm, independence, learning capability, as well as productivity, are necessary assets in advancing the work in the difficult and challenging research and development area of conversion and regulation of unconventional power sources."

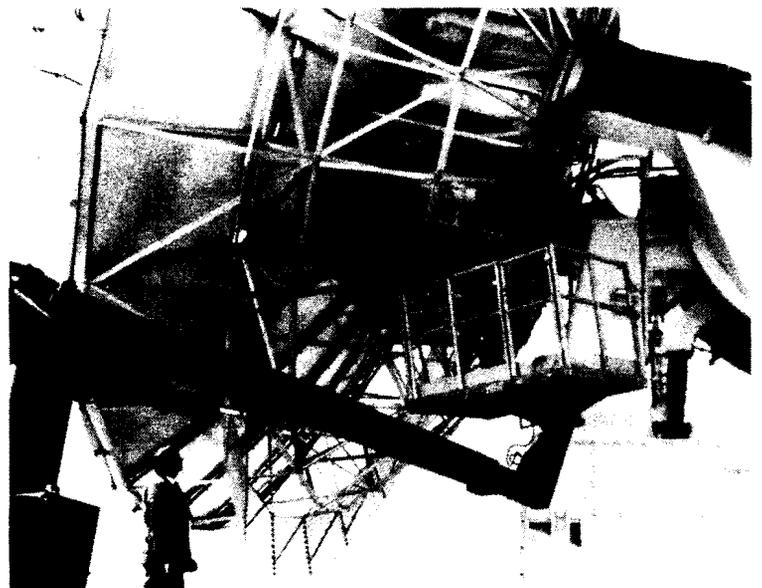
His home is in Purcellville, Va.



GODDARD AROUND THE WORLD
 —News of NASA's Worldwide Tracking Stations—



QUITO, ECUADOR (STADAN). Eugene Young, (left) Station Director, presents the Bendix Performance Plaque to Howard Morland. The station won the award for its work during the months of January, February and March, 1967.



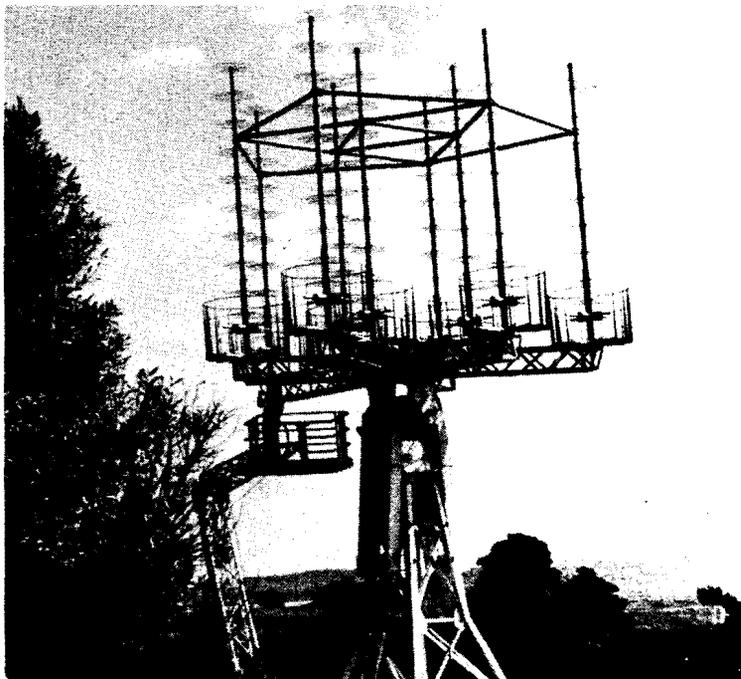
MOJAVE, BARSTOW, CALIFORNIA (STADAN). Charles V. Lundstedt, Station Director; watches from the ground while Charles Defir, Test Controller; checks the coolant lines on the 40-foot dish antenna.



GRAND CANARY ISLAND (MSFN). Albert B. Washburn (from left), Assistant Station Director; Charles A. Rouiller, Jr., Station Director; John L. Kennedy, Chief Test Conductor; David E. B. Wilkins, M&O Supervisor; Francis I. Glynn, a Test Conductor for the Instrumented Aircraft Section (MFOD); James A. Livesay, Implementation Engineer; and Tommy M. White, Assistant M&O Supervisor; discuss acceptance tests for the new 30-foot USB antenna.



MADRID, SPAIN (MSFN). Victor Figueroa (standing), NASCOM Director at the Madrid Switching Center, discusses plans with Spanish Air Force helicopter pilots. The helicopter was used to install a passive microwave reflector on a mountain top to link the Apollo station with its wing facility at the nearby JPL site. Daniel S. Hunter is Station Director.



JOHANNESBURG, SOUTH AFRICA (STADAN). A technician checks out the coaxial connections to the elements of a SATAN antenna.



ASCENSION ISLAND (MSFN). Al Beigert, Facilities Supervisor, helps with the Site Beautification Plan at the Devil's Ashpit station. Station Director is Henry Stintz.