



# GODDARD NEWS

GODDARD SPACE FLIGHT CENTER / GREENBELT, MARYLAND

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THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

JUNE 17, 1963

## Launch Phase Simulator Model Studied at U. of Maryland

In a small room on the University of Maryland campus, a 1/20 scale model of the circular installation which appears behind buildings 7 and 10 on current Goddard location plan maps has been assembled.

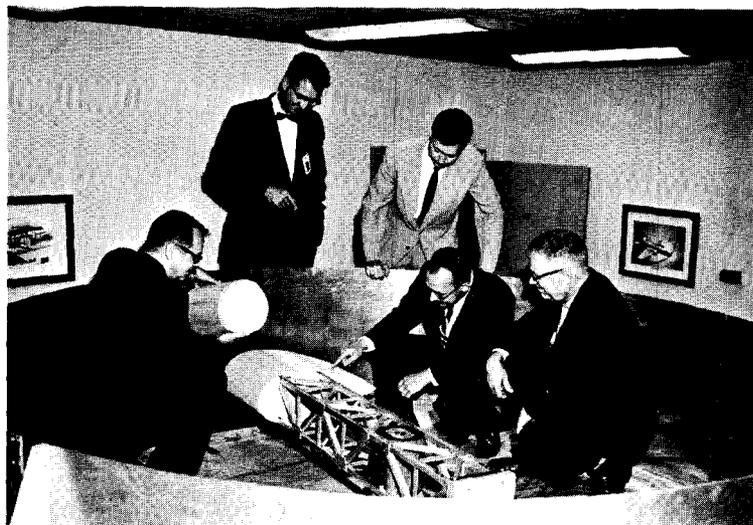
This item on location plans is the proposed launch phase simulator (LPS), a test and evaluation division facility which will have the capability of testing a spacecraft in the environments of acceleration, vibration, vacuum and acoustics.

The LPS is basically a centrifuge with a test chamber mounted on the outboard end. The arm and chamber which are enclosed in a circular pit can be rotated at speeds up to 200 miles per hour. A spacecraft approximately the size of Orbiting Astronomical Observatory (OAO) can be accommodated in the chamber; the interior of which will be 10 feet

in diameter and approximately 15 feet long.

The scale model has been constructed for an aerodynamic study for the purpose of determining the drag power (or torque) required to drive the full-size simulator at the required speeds and rates of acceleration. The project is being handled under Goddard technical direction by Charles J. Arcilesi, structural dynamics branch, with responsibility for design, fabrication and testing of all scale models of the LPS in the hands of the wind tunnel department of the University of Maryland. Richard Windsor of that department is the university's project engineer.

"The information resulting from these studies will contribute to the state of the art of centrifuge design," Arcilesi said, "since no previous data



Examining the 1/20 scale model LPS at the University of Maryland are (inside the pit): Edward J. Kirchman (left), structural Dynamics branch head, holding balsa model of the unfaired chamber; Charles J. Arcilesi, structural dynamics branch; and Dan Cope (right), engineering design branch. Standing are: John C. New (left) test and evaluation division chief, and Richard Windsor, University of Maryland project engineer.

has been published in this technical area."

Edward J. Kirchman, structural dynamics branch head and technical director for the design of the new simulator, feels that the first few tests conducted with the scale model incorporating a cylindrical test chamber have more than justified its expense.

"For example," he said, "one of the earliest tests indicated that a roof over the pit reduced horsepower requirements by approximately two-thirds. This reduction in motor drive power alone could more than justify the possible expense of a completely enclosed pit."

In addition to these early results, the studies will provide data on (1) the effect of variation of end clearance between arm and edge of centrifuge pit and (2) variation of vertical clearances, such as height of the rotating arm above pit floor and the distance that the pit roof is above the centrifuge arm.

Also under study is the configuration of the chamber itself, which is mounted on the extremity of the centrifuge arm. Both faired and unfaired shapes of the chamber and arm are being tested in order to arrive at an optimum aerodynamic

configuration. Dan Cope, LPS project manager of the engineering design branch, is pleased with the results of the chamber shapes.

"In a test using the faired chamber with the pit roof in place and with the same pit clearances used in the initial tests on the unfaired (cylindrical) chamber, we noted an additional reduction in drive power."

Utilizing the optimum aerodynamic configuration both static and dynamic pressures will be measured on the walls and roof of the pit. These figures will be important to the facilities engineering division, which has the responsibility of designing and constructing the pit at Goddard.

"This aerodynamic model study will be followed up by a dynamic model study of the present design of the LPS," said Arcilesi. "The data resulting from both the aerodynamic and the dynamic model tests should be very valuable in the overall design of this facility not only from a cost standpoint but also from a structural integrity point of view."

See page three for picture and diagram of the LPS model—Ed.

## O'Keefe Comments on Moon Wall

The Straight Wall, pictured here, is one of the few vertical surface features of the moon. Commenting on this geographic factor, Dr. John A. O'Keefe, assistant chief of Goddard's theoretical division, said, "The Straight Wall is the largest and best known of the faults on the moon's surface.

"Its height is approximately 800 feet and its length about 60 miles. In spite of the fact



Shown above is the Straight Wall, one of the few vertical features on the face of the moon. Dr. John A. O'Keefe says that the wall is approximately 800 feet high.

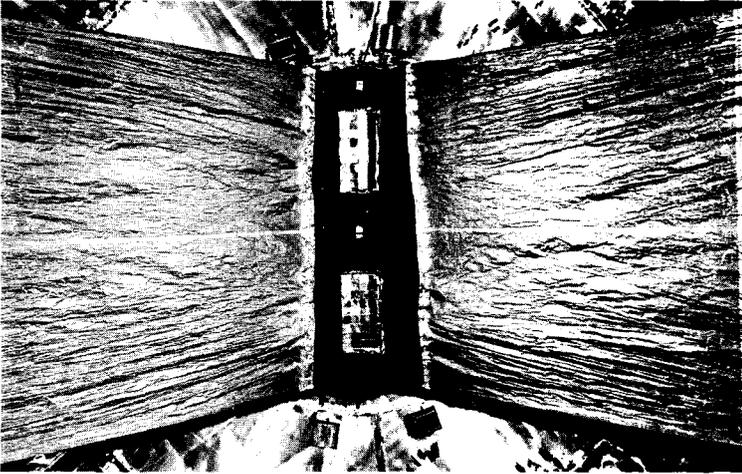
that the wall appears to be vertical it has been verified by studies of shadows that the slope is in fact not over 40°. The reduction in the slope is no doubt due to the formation of a rubble slope on the downthrow side.

A fault, in geological terms, is a linear fracture in the surface of the earth (or moon). Sometimes, as in the case of the Straight Wall, the bedrock on one side of the fault will rise with respect to the other side, producing a cliff or "wall."

"Here and there along the Straight Wall modern observers have noticed evidence of landslides," O'Keefe said.

"We notice that the Straight Wall is almost completely a vertical feature. There is no evidence of sidewise movement along this fault such as often exists along terrestrial faults. Many observers consider that the ring of mountains which appears in the lower portion of this picture curving upward is the remnant of a crater which has been largely buried in Mare Nubium."

# Goddard Successfully Develops New Echo Inflation System Before . . .



A "worm's eye view" of inflation bags attached to Echo balloon material in the dynamic test chamber.

A new method for installing the inflation system in the Echo A-12 passive communications satellite has been successfully tested in Goddard's test and evaluation division facilities.

The new method is being designed and perfected by Goddard's Echo staff to correct a serious problem — lack of proper sphericity and surface smoothness in the 135-foot sphere. The proper initial skin stress is essential to meeting the requirements of a passive communications satellite of this type.

John M. Thole, Echo's assistant project manager said that the results of this test will be combined with other tests to be conducted in the program to demonstrate the adequacy of the new inflation configuration.

"The new inflation system will produce sufficiently high pressure in the balloon to yield and set the material in the required geometric configuration," Mr. Thole predicted.

## Systems Differences

Basic differences exist between the new controlled inflation system and the systems which it supersedes. With the controlled inflation system, the subliming agent—the material which sublimates to the gaseous state for inflating the balloon—is in the form of slabs and is confined in bags attached to the inside surface of the balloon; the gas flow is appropriately retarded during the inflating of the balloon.

With preceding systems the subliming agent was in the form of powder, dusted (unconfined) within the balloon

about 37°C (98.6°F) the wax adhesive sealing the bags melts, the bags open and the subliming agent produces the gas to inflate the balloon.

The purpose of these drop tests was to insure that the balloon material would hold up during initial deployment. In the tests, the loaded bags were attached to the top side of long strips of balloon material secured at the top of the chamber. The bags were raised, then suddenly dropped 24 feet. This procedure was then repeated with the bags attached to the under side of the material.

Jim Talentino of the Echo staff said that test results demonstrated that the attachments can be made with no detri-

mental effects to the balloon, and that two methods of attachment proved superior to several others.

## Future Tests

Future tests will include the flight-acceptance and environmental tests, which qualify the spacecraft for orbital flight. The folded, complete satellite in its canister will undergo acceleration, and vibration tests. A canister drop test also will be conducted in the vacuum chamber. The canister containing the folded satellite will be explosively opened while in free fall to simulate the initial deployment of the balloon in orbit.

The Echo A-12 satellite is a 135-foot-diameter, rigidized, spherical balloon constructed of a laminated material. The material consists of 0.00035-inch thick Mylar (a Dupont product) bonded on either side to 0.00018-inch aluminum foil. The satellite is scheduled to be injected into orbit from the Pacific missile range at about 700 nautical miles altitude late in 1963.

←

Lester Millman, test and evaluation division coordinator, gives an approving smile after a successful test. The bags were dropped an estimated 24 feet. This simulated an inflation velocity of 40 feet per second, in excess of five times the anticipated inflation velocity.

# And After . . .



and there was no retarding feature. The lack of control with this inflation system resulted in improper time of occurrence of sublimation and severely reduced available pressures.

With the controlled inflation system, the bags confining the sublimation material are tightly sealed with a low-melt-point adhesive wax to prevent sublimation while the balloon is folded in its space vehicle or canister on its way to orbital deployment. The wax adhesive was developed for this application by the Diamond Ordnance Fuze Laboratory.

## Temperature Rises

Upon deployment in outer space the heat transferred from the balloon-skin exterior to the interior causes the mean radiation temperature of the balloon to rise from an initial 20°C (68°F) to a value between 50 and 60°C (122-140°F). At



Goddard's Echo project staff poses behind the Echo canister at the G. T. Schjeldahl company, Northfield, Minn., after the first successful installation of the satellite in the present configuration. The satellite was folded, packed and ready for environmental qualification testing. From left, they are Frank Boyne, Herb Eaker, George Adams, Ken Parks, Wilbur Nyberg, John Thole, Al Schaefer and Jim Talentino. Mr. Schaefer is a representative of Grumman Aircraft Engineering corporation.

# News About Space & Aeronautics

● The National Rocket Club has announced the opening of the Robert H. Goddard Historical Essay Award competition for 1963. This annual nation-wide competition with a \$200 prize is open to any U. S. Citizen.

The contest is named in honor of the world rocket pioneer, Dr. Robert H. Goddard, whose scientific and technological contributions—although belatedly recognized in the United States—opened the door to space. This center is named for him.

Essays may treat any significant aspects of the historical development of rocketry and astronautics, and will be judged on their originality and scholarship. Entries should be submitted by Nov. 1, 1963, to the Goddard Historical Essay Contest, % National Rocket Club, 1745 K Street N.W., Washington 6, D. C. The winner will receive the Goddard Historical Essay Trophy and a \$200 prize.

● NASA has launched an inflatable paraglider instrumented to gather information on the meteoroid hazard in space. The paraglider, built by B. F. Goodrich Co. under contract to Space-General Corp., remained in space five minutes before gliding back to its launch area at White Sands Missile Range.

The micrometeoroid paraglider concept was developed by NASA's Langley Center as a technique for obtaining direct information on all particles of matter which exist in space. The paraglider, successfully recovered two hours later, was the first atmosphere re-entry by a flexible wing paraglider vehicle. It is made of glass fiber coated with a silicon rosin to withstand re-entry heating.

● New Zealand's first sounding rocket in a cooperative program with NASA was successfully launched late in May from Birdling's Flat on the Canterbury Plains, New Zealand.

Its purpose was to measure the electrical characteristics of the lower ionosphere. While only electrical measurements were made in this flight, later sounding rockets are expected to include additional equipment to make simultaneous meteorological measurements.

● Goddard scientists have brushed some 50 years of theory aside with the report that scientific instruments have actually observed how part of the earth's ionosphere is continuously created. This blanket of electrified particles makes radio communications on earth possible.

The discovery is regarded as a major scientific contribution to understanding the effects of the sun's radiations on the earth's atmosphere. It is a fledgling step but one which holds promise for development of a system in which man would know the precise physical condition of the ionosphere at any time. This, in itself, would have profound effects on world communications.

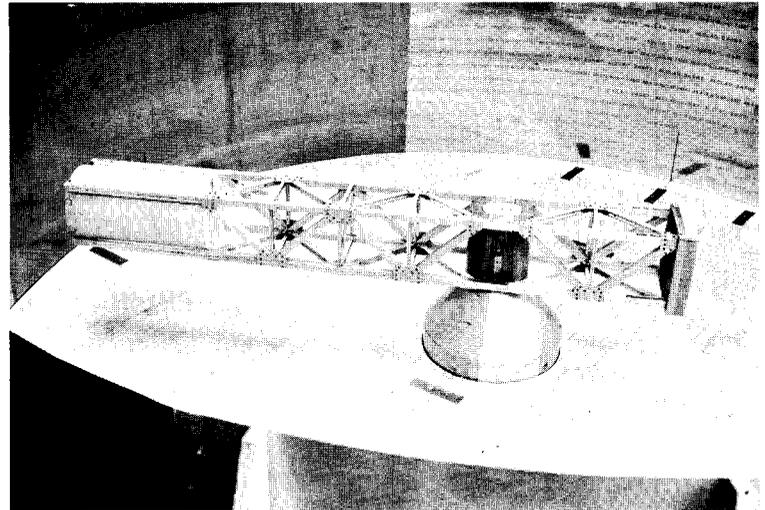
While many theories have been advanced concerning the creation of the ionosphere, there had been no simultaneous measurement of the responsible radiations and the resulting ionization.

Direct evidence was provided for the first time on March 8 (with the flight of a low-cost Nike-Apache sounding rocket launched from Wallops Island) by a simultaneous measurement of a specific solar radiation line and the ionization it is thought to create. Instrumentation looked at a hydrogen element line—called Lyman-Alpha which is emitted in ultra-violet light by the sun.

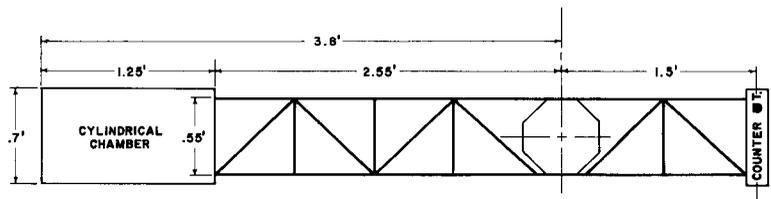
The Lyman-Alpha radiation was observed being absorbed mainly between 44 and 55 miles in the D-region. At 44 miles, other instrumentation recorded an increase in the number of electrons, proving that an ionization process had indeed occurred, and most probably resulted from Lyman-Alpha, although it conceivably could be accounted for by another portion of the solar spectrum being absorbed in a similar manner. The rocket's instruments also measured for the first time an ionospheric layer below 44 miles, which had been theorized to have been created by cosmic rays.

Arthur C. Aikin, Jr., of Goddard was one of the experimenters along with Elden C. Whipple, Jr., Joseph A. Kane of Goddard's planetary ionospheres branch, and Jan Troim, a visiting Norwegian scientist.

LPS Model Study (Cont'd from p. 1)



In this photograph, the cylindrical or unfaired chamber is in place at the end of the centrifuge arm. The shape of the chamber as well as other factors are being explored in the current aerodynamic tests.



The above artist's illustration of the launch phase simulator, a top view, shows the proportionate size of the various components. These are the dimensions of the 1/20 scale model which has been constructed at the University of Maryland. In actual practice, this arm, chamber and counterweight are enclosed in a pit (see photo above).



D. C. and Prince Georges County Science Fair winners and their sponsors quiz Goddard scientists at the close of their tour of the Center held May 29. From left, front row: Mrs. Melba Robinson, biology teacher, McKinley High School; Shelia Minor, McKinley High School; Joe Maskasky, DuVal High School, son of John A. Maskasky of Goddard's A&M division; Mary Catherine Garner, Regina High School; Joseph Garner, Mary's brother and Georgetown University engineering major; rear row: Terry Dawson, Suitland High School; Mrs. Dawson, his mother; and Raymond Roche, Goddard science fair coordinator.

# Goddard Seeks Industrial Appl

The 1958 Space Act gave the administrator of NASA the responsibility to "provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."

Goddard's Sam Keller, industrial applications officer, is here to see that private industry receives full benefit of the innovations, inventions, and new applications of old ideas that result from this center's research and development activities.

"We are not necessarily after only the astounding, sophisticated discovery," according to Keller. "The major concern in the industrial applications program is not whether an item or a process is absolutely new, but whether it is of real value to a large segment of industry."

### Unbalanced Research Noted

National leaders have become concerned in recent years because approximately 77 per cent of research and development work is being sponsored by the federal government, with private industry funding the remaining 23 per cent.

A second concern leading to the initiation of a vigorous program of dissemination of information to private industry is the fact that all research and development, if not classified, really belongs to the American people as a whole if it results from government spending of tax funds. This applies to work done by private firms under government contract as well as to NASA research.

Here at Goddard, Keller has found that "almost every division in the center has come up with something." His job is to locate innovations applicable to industry in the work done here and by Goddard contractors, to put the information in proper form, and send it to the office of new technology utilization at NASA headquarters, directed by Louis B. C. Fong. The central group handles incoming information from all centers, and disseminates the information to industry by:

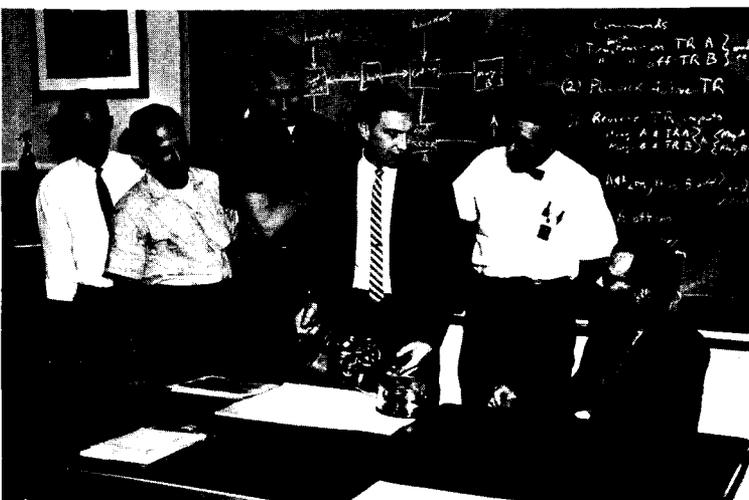
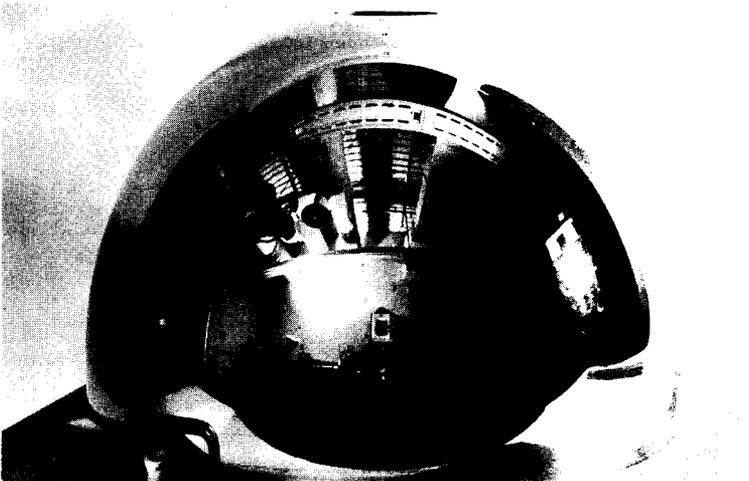
- *Applications Notes*, a publication which presents applicable ideas by type and source.
- Articles and ideas in trade journals and other publications.
- Research organizations which work in close contact with manufacturers in their local areas to assist in the adaptation of innovations to commercial production.
- A handbook series made available to interested parties.

*Applications Notes*, for example, takes one subject (such as welding techniques) and presents selected innovations and improvements in one publication. A complete series is planned.

An article in a recent issue of *Science*, quoting Jerome B. Weis-



Charles L. Graefe, Jr., is shown above operating a floating head optical polishing device developed by Goddard's fabrication division for polishing an elliptical electroform master (below). This new process, which maintains critical tolerances, should have wide application in the manufacture of highly polished non-spherical elements.



Jack Peake, chief of flight RF systems branch, is applications representative for the spacecraft technology division. Here (from left), Wm. Tallant, Raymond Di Silvestre, Lib C. Rogers, Paul Uber, and Clint Carle—recording techniques section, discuss with Peake (right) new modularized tape recorder techniques.



Dwight C. Kennard, Jr., technical assistant for advanced research and industrial applications in his division with Sam Keller on the balcony representative for the industrial applications program for test

# Applications of Space Research

ner, the president's science advisor, had this to say concerning industrial applications: ". . . In the decade after World War II, military expenditures produced developments that had direct civilian application, but . . . (Weisner said) 'this is happening less frequently as military requirements and civilian needs diverge. There is not nearly as direct an application of the Atlas booster to the civil economy as there was of the B-52 to the 707 (airliner) . . .'"

Obvious innovations which Keller has had reported to him here at Goddard point up this divergence. For example, one Goddard discovery involved a technique for dehydrating the special oil used in vacuum chamber diffusion pumps. The technique resulted in a manifold increase in the usable life of the extremely expensive oil. This discovery is of major benefit—but to few people. It is a part of Keller's job to find these people and "marry" them to the improvement. In some instances, his matchmaking may be a bit easier.

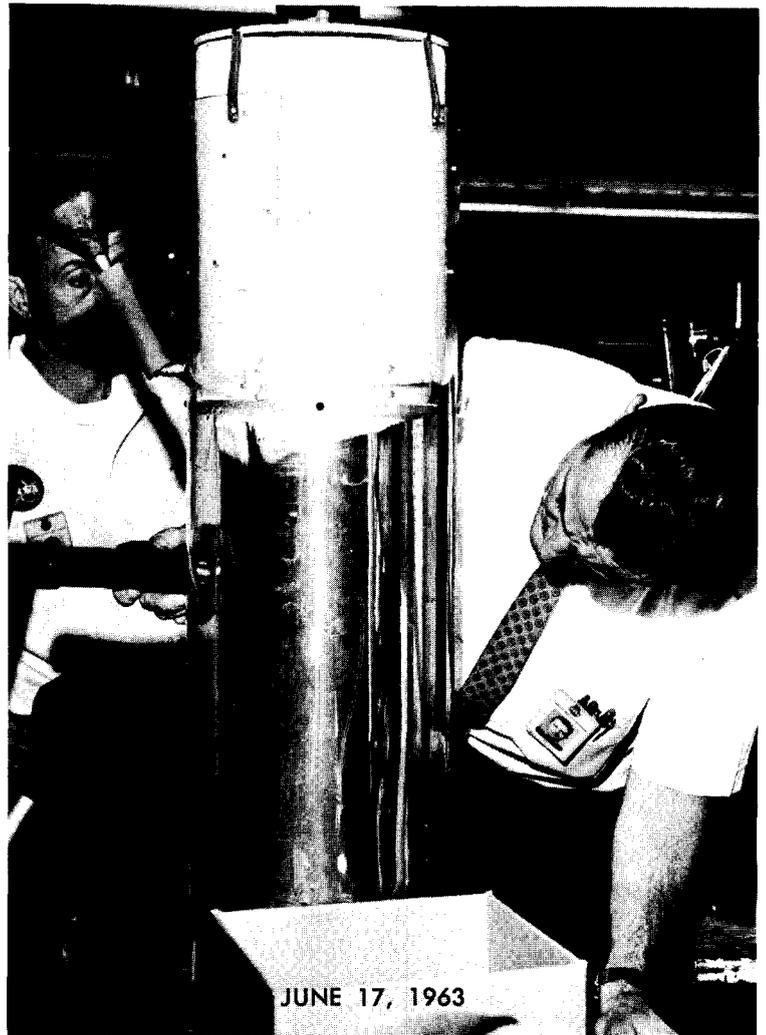
Another Goddard discovery, with application to a far wider range of industries, was a floating honeycomb fastener. This item, though simple, is widely usable where a small fastener is needed in "tight spots." It was also discovered here that a beryllium collar around certain transistors would drastically cut their operating temperature.

## From Nimbus to Steel Mill

One Goddard contractor, Barnes Engineering Co., has come up with an invaluable contribution to the steel industry as a result of research on the Nimbus project. An especially-developed infra-red horizon sensor which Nimbus required was applied by the contractor for plate and rod thickness control in steel rolling mills. The infra-red sensor measures the thickness to .002 of an inch as the material moves past at 70 miles per hour.

The previous method was time consuming and less accurate; the rod or sheet had to be stopped, cooled, and hand measured with a micrometer. Due to the expense and inefficiency of the old method, measurements had been taken every 3000 feet. Using the space-developed sensor, measurements on the hot moving steel are made every eight inches.

The NASA industrial applications program, in its present form, is only about a year old. Keller believes it offers some real answers to current needs. He feels that if this NASA program is a success, as it gives every indication of being, other government organizations will tend to take an active role to insure that the results of their research efforts are transferred to the greatest number of potential users.



Charlie Madison (left) and Bill Kitts, both of thermo-dynamics branch, check lighting during the filming of the operation of a liquid level measuring device for liquid nitrogen. The device is expected to find use in the applications program.



The administrator has appointed an industrial applications advisory committee to advise him on the technological needs of industry and possible applications of NASA research. A few of the committee members are shown here on a recent tour of Goddard facilities (left to right): Louis B. C. Fong, director, office of technology utilization, NASA Headquarters; John C. New, chief of Goddard's test & evaluation division; Dr. Howard S. Turner, vice president of J & L Steel Co.; Jerome Rosenberg, office of technology utilization, NASA Headquarters; Dr. Fred Neimann of NASA's Northeastern office; Malcolm M. Hubbard, former vice president of ITEK Corp.; Walter L. Lingle, NASA's deputy associate administrator for industrial affairs; and Edmund F. Bryan, consultant to the administrator.



Technology, discussing possible applications of building 7. Kennard is director of evaluation.



Louis B. C. Fong, of NASA headquarters, directs the office of new technology utilization. The industrial applications officers from Goddard and the other centers channel their findings through the headquarters office, which takes care of the dissemination of information to interested private industries.

# Impetus

**Editor's Note:** This column of thoughts from various quotable sources will run whenever qualitative and stimulating ideas are available which fit this definition—"comments which give impetus to the creative mind; which stretch and exercise the intellect." Publication does not necessarily imply endorsement.

"If a liberally educated person is one who can make critical judgments of his society and his time, who today is liberally educated if he knows nothing about science? It would be foolhardy and undesirable to try to make every bright student a scientist. It would be impossible to stock a general student's head with scientific facts sufficient for him to be knowledgeable, even for a brief time after graduation, about the broad expanse of science.

"Yet it is most unfortunate to send him into a world evolving swiftly under the impact of scientific knowledge without a grasp of scientific method, an elementary understanding of the larger principles of science, an appreciation of the influence of science in philosophy, economics and history, and a knowledge of the power and dynamics of science in creative evolution.

"Wherever your future graduates go—into business, politics, industry, government, teaching, or whatever field—they will find their effectiveness and their rewards greatly increased by a knowledge of science. In the healthy working of the democratic process, a wider understanding of the dynamics of science is imperative.

"I believe that one of the critical decisions the participants in this conference could make would be to work for a return of science to a significant place in general education."—*Dr. Glenn T. Seaborg, Chairman, Atomic Energy Commission, in remarks before the 18th National Conference on Higher Education.*

## John New Receives I.E.S. Fellowship



**John C. New**, chief, has been elected to an I.E.S. Fellowship.

New joins a select group of 24 fellows and 2 honorary

fellows within the 1500-member Institute. He is the only fellow at Goddard, excepting Dr. Elias Klein, who is an honorary fellow.

Mr. New has long been active in I.E.S., as well as in Research Society of America, Society for Experimental Stress Analysis, and American Society of Civil Engineers. He is listed in *American Men of Science*, has authored numerous papers, and holds several patents.

### Goddard Speech and Paper Presentations

(Technical presentations approved as of June 5 for period of June 9 through June 23)

#### SPEECHES

**W. N. Hess and N. F. Ness**, Symposium on Plasma Space Science, June 11-14, Catholic University, Wash., D.C., "*Trapped Electrons from High Altitude Explosions*," "*Observations of the Magnetosphere Boundary*."

**C. J. Wenzinger, Leonard Rabb**, American Institute of Aeronautics and Astronautics, June 17, Los Angeles, "*The Solar Power Supply System for the Orbiting Astronomical Observatories*," "*Dynamic Testing of the Orbiting Astronomical Observatory*."

**Arthur L. Levine**, University of Oklahoma, June 18-20, Norman, "*Intra-Governmental and Governmental University Cooperative Programs in Space Science*."

#### PAPERS

**M. E. Lipschutz**, American Society for Testing Materials, June 23-28, Atlantic City, N. J., "*Cosmic Ray Induced Stable and Radioactive Nuclides in Iron Meteorites*."

## Summer Workshop Lists 1963 Topics

Goddard's NASA summer workshop program titled "Measurement and Simulation of the Space Environments" will open with a convocation at 9 a.m. June 18 in the auditorium of building 3. Project topics for the three-month series will be: solar radiation and simulation, heat transfer and cryogenic pumping in vacuum technology, magnetic environment simulation, and causes and effects of radiation damage.

This second summer workshop program will involve four teams, each made up of faculty members and graduate students from a number of universities and Goddard permanent staff members. Each team will investigate in-house one of the four project topics, with the end result a comprehensive project report.

The resulting interchange of ideas between employees and the academic scientists should help Goddard in applying new concepts and newly acquired basic knowledge to current problems. Another important function of the workshop is to indoctrinate the faculty representatives with the manpower needs and an understanding of the other problems ahead for space exploration.

The ad hoc steering committee for the program is: Dr. Elias Klein, summer workshop chairman; James C. Reese, employee development officer; and Dr. William W. Wolman, systems review group.

### Recent Technical Publications

#### Authored by Goddard Staff

**S. Biswas, C. E. Fichtel, and D. E. Guss**, "A Study of the Hydrogen, Helium, and Heavy Nuclei in the November 12, 1960, Solar Cosmic Ray Event," NASA Technical Note D-1764, May 1963

**H. A. Whale**, "Ion Sheath Effects Near Antennas Radiating Within the Ionosphere," D-1746, May 1963

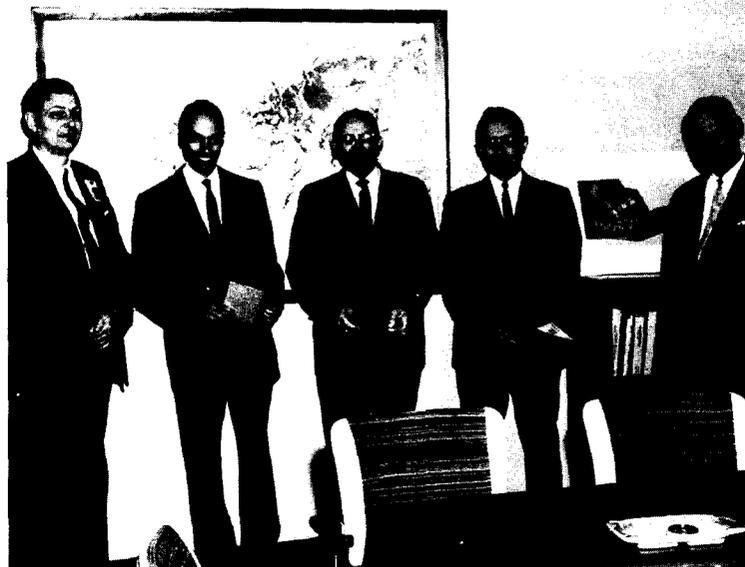
**W. S. Cameron, J. H. Glenn, M. S. Carpenter, and J. A. O'Keefe**, "The Effect of Refraction on the Setting Sun as Seen from Space in Theory and Observation," D-1721, May 1963

**L. Dunkelmann, W. B. Fowler, and J. P. Hennes**, "Spectrally Selective Photodetectors for the Middle and Vacuum Ultraviolet," D-1759, May 1963

**W. M. Kaula**, "A Review of Geodetic Parameters," D-1847, May 1963

**A. Temkin**, "Electron-Hydrogen Phase Shifts Just Below the Inelastic Threshold," D-1720, May 1963

**U. D. Desai, R. L. Van Allen, and G. Porreca**, "Explorer XII Satellite Instrumentation for the Study of the Energy Spectrum of Cosmic Rays," D-1698, May 1963



Three Goddard engineers in the spacecraft technology division have received patent awards recently totalling \$900. Justin C. Schaffert and John Libby, both of flight RF systems branch, shared a \$500 award for inventing an ultra-long monostable multivibrator. David H. Schaefer, flight data systems branch, received \$400 for a logarithmic converter. Pictured above, from left, are: Herman E. LaGow, chief, systems review group, who presented the awards; Schaefer; Schaffert; Libby; and Whitney Matthews, chief, spacecraft technology division.

## Big Windup For Duckpin Leagues

"What a terrific windup for the season" was the opinion of those attending the duckpin banquet held on June 1. The gala festivity, including an orchestra, took place at Rinaldi's Starlight room in Queenstown.

Dr. Michael J. Vaccaro, assistant director for administration, presented the trophies to the championship teams. Winning 67 games, the Hi Vacs came out on top in the Tuesday night league. The victory team for the Thursday night league was the Tick Tocks, winning 58 games.

President of the welfare association, Allen L. Franta did the honors for individual trophies and cash awards.

Mr. Franta also awarded "official patches" to the most improved bowlers for the season. Virginia Tackett and Ernie Sorgnit were the winners for Tuesday nights. Ironically, Virginia and Ernie were members of the last place team. Recipients for Thursday night were Judy Lockerson and Jerry Hodge.

### Miss Goddard's First

Among the guests was our own "Miss Goddard," Merhlyn Pickett. Performing her first official function after election, Merhlyn drew the winners for the ten door prizes.

The new officers for the coming year 1963-64 are: Tuesday night league: president, S. Di Benedetto, accounting branch; vice president, Robert Keefe, procurement branch; and secretary-scorekeeper, Jessica Dunne, procurement branch. Thursday night league: president, Joseph Greco, plant engineering branch; vice president, Charles A. Jones, employee development branch; and secretary-scorekeeper, Jean Campbell, editorial branch.

Secretary-scorekeeper for last year, Peggy Becker, visual arts branch, said, "The interest in the Duckpin League this season doubled in comparison to last year. Looking ahead, I feel sure we'll have three leagues next season."

It is suggested that those interested in bowling duckpins should put their bids in early next fall. Peg's statement certainly speaks for a well-organized league.



PRESENTING the two top winning teams their trophies is (left) Dr. Michael J. Vaccaro. Tuesday night winners, the Hi Vacs, from left, Betty Parker, Jack Sipe, Norris Paxson (captain) and Owen Wood, not present, Coneta Whitten. The Tick Tocks, Thursday night winners, from left, Nancy Kemper, Marie Humble, Al Dunn (captain), Oliver Humble and Neil Zylch.

## INSIDE GODDARD

June 17, 1963



Presenting the awards, (left) Allen L. Franta. Thursday night league winners are Judy Lockerson and Jerry Hodge.



Award winners for the Tuesday night league are Virginia Tackett and Ernie Sorgnit.

### MOST IMPROVED BOWLERS

### GODDARD MIXED DUCKPIN LEAGUES — TOP WINNERS

Individual Standings (Tuesday)		Individual Standings (Thursday)	
Women	Men	Women	Men
High Average: Beverly Dinn ..109	High Average: Owen Wood ...122	High Average: Marion Wells ...96	High Average: Adol'h Krasnick..106
High Spares: Beverly Dinn ..203	High Spares: Owen Wood ...322	High Spares: Marion Wells ..134	High Spares: Adol'h Krasnick..187
High Strikes: June Wilkinson .....70	High Strikes: Lee Murphy ...83	High Strikes: Kay Church ....47	High Strikes: Charles Jones ..59
High Set: Peggy Becker .396	High Set: Lee Murphy ...432	High Set: Kay Gordon ....353	High Set: Charles Jones .395
High Game: Peggy Becker .151	High Game: Lee Murphy ...178	High Game: Doris O'Neill ..137	High Game: Jerry Hodge ...154
High Flat: J. Christie .....94	High Flat: Charles Ingegneri .....96	High Flat: Sue Vermillion .....95	High Flat: C. Jones, J. Greco, N. Roberts .....94
M. Gallagher ...94			
Team Standings		Team Standings	
High Set: Hi Vacs .....1770	High Game: Hi Vacs .....627	High Set: Wood Choppers .....1586	High Game: Tick Tocks ...568 Starlighters ...568

### BILL LONG ENTERS PBA TOURNAMENT

"Experience is worth more than the dollar," said near-winner Bill Long, construction management branch and ex-president of the Goddard Men's Tenpin League. On June 5, Bill entered the Professional Bowlers Association (PBA) tournament at the Colt Lanes in Towson, Md.

The PBA tournament is a "professional plus amateur" individual competition.

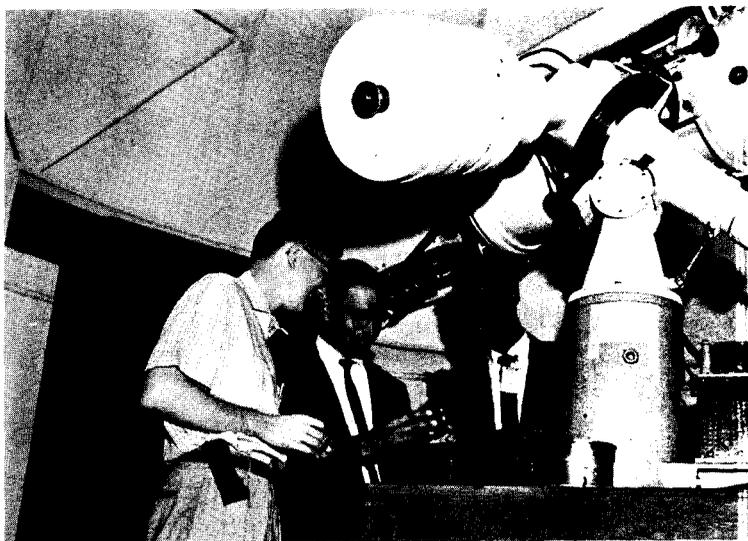
Bill's pro-partner was Tom Fowler from Westville Grove, N. J. Their final score was 1227 (with handicap). Out of 172 amateurs, only the top 20 were given cash awards. The scores for the top winning teams started with 1370 and ended with 1276. Bill and his pro-partner Tom were close to the top with their score of 1227.

Bill said, "After the tournament Tom Fowler gave me some good pointers on how to improve my bowling. His advice was worth just as much as money."

The Men's Tenpin League better keep an eye on Bill next year—that advice may prove "a bird in the hand is worth two in the bush."



Bill Long



**CHECKING** eyepieces that will be used with the 12½ inch reflecting telescope are, from left, Dr. Dave Harris, Frank Bartko and Dick Wiack. The telescope has been made available to all club members through the optical tracking branch.

## NASA—Goddard Gun Club 1 Year Old

When referring to "shots" it would be a good idea to check what type "shots." Now one year old, the NASA-Goddard Gun Club has been promised that consideration would be given to the possibility of having their own pistol range. It would be located on Goddard grounds. Meanwhile, temporary arrangements have been made for the members to have access to the facilities of other clubs in the area.

Recently it was established that meetings would be held the second Wednesday of every month at 4:30 p.m. Members will be informed where they will be held.

### Gals are Welcomed

When firm arrangements for matches with other gun clubs have been made, "Inside Goddard" will tell the story. President John Zegalia, operations branch, said, "We wouldn't mind having a cheering section. In fact, for those who have never seen a match it would be something different than the usual softball, bowling, etc." John also told us, "that the club is not strictly 'males only.' We welcome the gals too. Also you don't have to be a pro, if you've never handled a rifle or pistol we have qualified National Rifle Association instructors who can train anyone in the proper handling of fire arms and give instructions on range procedures."

The club has been very suc-

cessful since it got underway a year ago when Goddard employees, who were members of the NRA met to organize a NASA-Goddard Gun Club. The club is NRA affiliated and members now number 77 in comparison to their original charter of 31.

Officers for the 1963-64 year are: president, John Zegalia, operations branch; vice president, Edwin Reid, time measurement branch; executive officers, Joe Parisi, aeronomy and meteorology division and Larry Brown, operations support division; chief instructor, Jack Watterson, mechanical systems branch.

New members are welcomed. Those interested should contact John Zegalia, ext. 4946 or Roy Kruger, ext. 4160.

## Astronomy Club Obtains Telescope

The Goddard Astronomy club consists of Goddard personnel interested in the field of astronomy. The primary function of the group is to promote an interest in astronomy through various meetings, lectures, observations and telescope making projects. The immediate goal of the club is the acquisition of its own telescope.

### Use of Optical Facilities

All optical components are presently available and plans for housing the telescope and mounting have been completed. Permission for use of an available land site has been obtained. (Optical tracking branch has the use of an observatory on the Beltsville agricultural farm and necessary space has been allotted to the Astronomy club). Until the club telescope is in operation, arrangements have been made with the optical tracking branch to use their facilities whenever convenient.

### Interesting Speakers

The club usually meets on the first Wednesday of each month.

Various guests have presented talks of general astronomical interest. Past speakers include Dr. John O'Keefe, theoretical division, Dr. Plotkin, optical systems branch, D. Harris, physics branch, of Goddard, Dr. Nancy Roman, headquarters, office of applications and Dr. A. Mikesell of the Naval Observatory.

### What Members Receive

At present there are 18 mem-

bers. Annual dues are \$5 and include a yearly subscription to "Sky and Telescope." A monthly newsletter is sent to members summarizing club activities of the preceding month.

Club officers are: president, Dick Wiack, time measurement branch; vice president, Frank Bartko, physics branch; and secretary-treasurer, Dr. David L. Harris, physics branch.

All interested people are invited to join. Contact Mr. Wiack on ext. 4677.

## Civil Defense Films Of Interest To All

A series of motion pictures have been scheduled as part of the Civil Defense information and training program now being offered to all Goddard employees and their dependents.

These films will be presented at six locations throughout Goddard every four weeks. Detailed scheduling will depend upon the availability of areas in which to show these films, so check the bulletin board in your building for time and place of showings, they will be posted on preceding Fridays.

### A Short Preview

Scheduled for showing next month is the film entitled "Radiological Defense".

It explains in full detail the entire radiological defense program. Also if you've wondered how fallout is produced this film will answer any questions you have had in the past.

In addition, the film describes the effects fallout has on humans, livestock and crops.

The films are being obtained from the Maryland State Civil Defense Headquarters and the Walter Reed Medical Center.



**DON'T** let this happen to you—traffic regulations are being enforced. Here Pvt. Ed Simms tickets a vehicle in a "No Parking" zone. Be sure you are familiar with Policies and Procedures Manual 23-1-4, Vehicle Regulations.

### CHUCKLES . . .

Out of this World—

Not to be outdone by Astronaut Gordon Cooper's in-flight menu, Cape cafeteria number two posted this fare Tuesday:

Roast Beef Au Atlas Jus, Chicken Astro Ala Cooper, Spaghetti With Faith 7 Meat Sauce, Fried Filet of Around the World Fish with 22 Blended Sauce and Beef Orbital Soup.

. . . from Spaceport News

# A Goddard Professional Goes to School...

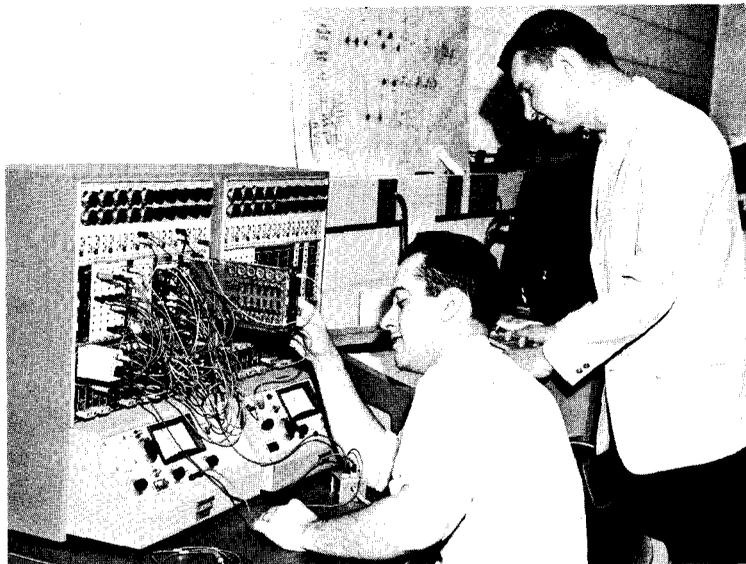
Goddard and The Catholic University of America have cooperatively developed a new program of graduate study in aerospace engineering, mechanical engineering and physics called the three-quarter credit graduate study program. It is the result of mutual concern regarding the academic development of engineers and physicists. The program serves as a compromise between full-time graduate study (which Goddard also offers to qualified personnel) and part-time study involving three to six credit hours per semester.

This innovation represents the results of considerable discussions between leaders at The Catholic University school of engineering and architecture, the physics department, and James Reese, head of Goddard's employee development branch. This new program allows the student to work three full days, Monday, Wednesday and Friday, at Goddard and to spend all day Tuesday, Thursday and a half day Saturday on campus.

The student in the program carries an academic load of ap-

proximately ten credit hours (which is approximately three-quarters of a full graduate study load). The University schedules its graduate courses in light of the program and provides each student with a desk for his campus study. In contrast to the piecemeal opportunities provided for in part-time study, students in this program are brought into closer contact with their professors and are provided with the opportunity to do a greater amount of concentrated course research work. This program, which shows great potential for application at other universities, is providing for a great educational need.

The three-quarter program was organized and instituted with Goddard advice and support for curriculum research associated with its development. It is open to other research and development organizations and several are following Goddard into this unusual graduate education adventure. Through this program Catholic University is now able to provide greater individual help and counsel for students. The program leads to the degrees of



*Tom Flatley utilizes instruction gained in the three-quarter credit program in solving a space dynamics problem involving the San Marco satellite. Observing results from the analog computer is Dr. Joseph Fedor, standing, research associate in Goddard's mechanical systems branch.*

Master of Aero-space Engineering, Master of Science, Doctor of Engineering and Doctor of Philosophy. Five Goddard employees are participating in the program. These are: Albert J. Fleig, spacecraft systems and projects division, Thomas W. Flatley, spacecraft technology division, Donald A. Kniffen and John D. Stolarik, space sciences division, and Kenneth L. Rosette, test and evaluation division. Current plans call for Goddard to expand its participation in this program by as many as ten additional employees beginning with the 1963 fall semester. Applications for employee participation are now being solicited from divisions and are due in the employee development branch by July 12.

In addition to The Catholic

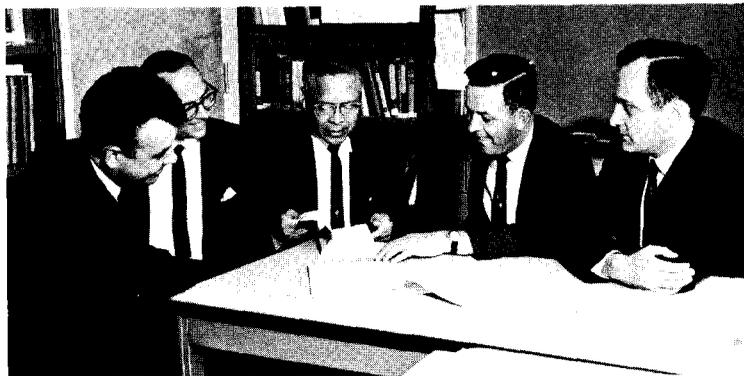
University three-quarter credit program, Goddard is sponsoring two employees through its research and study fellowship program in full-time study at the doctoral level. Thomas J. Lynch, space data acquisition division, is pursuing a program in electrical engineering at the University of Maryland and Dennis F. Hasson, spacecraft systems and projects division, is engaged in a full-time program in aerospace engineering at Catholic University.

These study programs point up the center's general policy of sponsoring programs of advanced education in all fields of aerospace technology and actively supporting the efforts of local universities to innovate. The programs represent Goddard management's desire to

*(Cont'd on page 8, col 1)*



*Dr. James Brennan, head of The Catholic University physics department, discusses with Don Kniffen, Goddard three-quarter credit student, the operation of a piece of laboratory electronics equipment.*



*The future of The Catholic University three-quarter credit program and Goddard's participation in it is the subject of discussion by, from right, Dr. Gabriel Boehler, aerospace engineering coordinator; Prof. John Baltrukonis, head of the mechanical engineering department; Dr. C. C. Chang, head of the proposed space science and applied physics division; James Reese, chief of Goddard's employee development branch; and Dr. James Brennan, head of the physics department.*

# Goddard and Nearby Colleges Spur Advanced Study



*Goddard's Don Kniffen uses a desk and other study facilities specifically set aside for participants in the three-quarter credit program at The Catholic University.*

*(Cont'd from page 7)*

assist employees striving for greater competence in their assigned or related jobs which lie in the area of Goddard's mission.

Benefits of the three-quarter plan are evident in many areas. It helps provide for upgrading the technical competence of Goddard employees; it allows employees to work at the center three full days each week during the academic year while carrying three-quarters of a full graduate study program; it allows employees and Goddard

to benefit from intensive study in a reasonably short period of time.

The Catholic University, as the result of intensive curriculum research, is adding courses in the areas of space science and applied physics. The curriculum research is being aided by a NASA grant.

Dr. C. C. Chang, a well known scientist, author, inventor and educator will speak on the new courses in the space science program at Goddard at 9:30 a.m. July 12 in the auditorium of Bldg. 3.



*Dr. Henry Reed, professor of electrical engineering and graduate student adviser at the University of Maryland, discusses a research problem in the doctoral dissertation of Goddard's Tom Lynch. Lynch has a full-time research and study fellowship at the school.*



*At his Goddard desk, three-quarter credit student John Stolarik performs reduction and analysis of data from a Goddard satellite to be used in a terminal report.*



*Dr. C. C. Chang describes to Don Kniffen the new space science program at the Catholic University.*