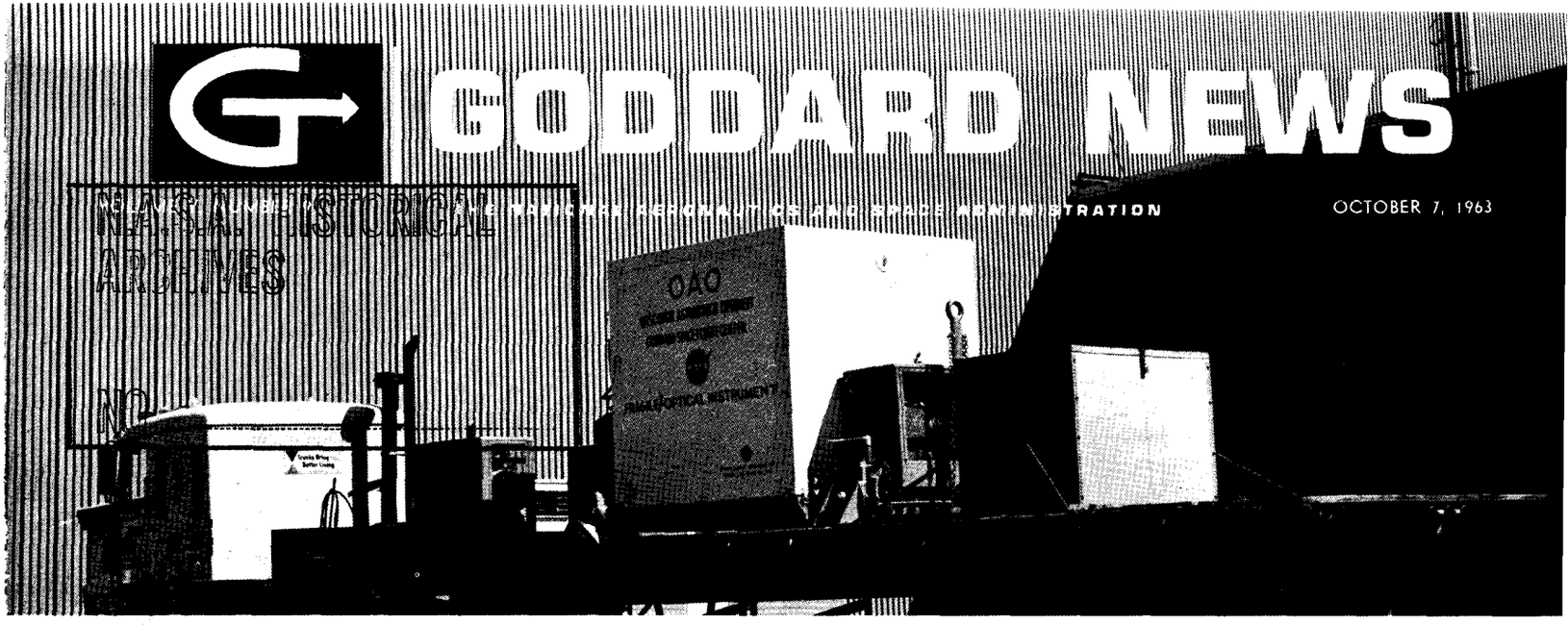
GODDARD NEWS

NEWS FOR THE PERSONNEL OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

OCTOBER 7, 1963

NASA HQ HISTORICAL ARCHIVES




*The University of Wisconsin's OAO experiment arrived at Goddard late last month in this form. The fragile optical instruments were heavily insulated, and heating and cooling systems were provided on the truck to keep the correct temperature.*

# Both Experiments for First OAO Are Being Tested Here

The University of Wisconsin experiment slated to be aboard the first Orbiting Astronomical Observatory (OAO) has arrived at Goddard for mating with an electronic spacecraft simulator to check electrical interfaces. The seven optical systems will also be calibrated on the vacuum optical bench here if time permits.

After tests, the Wisconsin experiment and the Smithsonian experiment (which also is in Building 10 now for testing) will be sent to the spacecraft contractor, Grumman Aircraft Engineering Corp., to be mated with the prototype spacecraft. The complete package will constitute one of the heaviest and most complex scientific satellites under development by NASA.

The OAO package will weigh in the neighborhood of 3600 pounds at launch. The Wisconsin experiment and the Smithsonian experiment will each weigh approximately 500 pounds. This can be compared (for perspective) with the model of Syncom in the lobby of building 8—Syncom weighs 86 pounds. OAO is scheduled for launch in 1965.

### The Wisconsin Experiment Team

Dr. Arthur D. Code, head of of the University of Wisconsin's astronomy department is in charge of the experiment. Fabrication and in-house testing is under contract to the Cook Technological Center near Chicago, Ill. Cook started work on the system in 1961. Dr. James E. Kupperian, Jr., head of Goddard astrophysics branch is OAO project scientist.

A series of OAO spacecraft will be launched, each with a different payload of astronomical experiments. The spacecraft will be nearly identical in each instance—containing all power and support electronics for the "passenger" experiments.

The University of Wisconsin package and its "sister" system from the Smithsonian will take the first ride into space, and their creators expect to measure the light energy of distant stars and nebulae.

According to Robert Stroup, OAO project coordinator and experiment systems manager, the Wisconsin experiment will carry four stellar photometer systems, one nebular system, and two scanning spectrometer systems. Each of the stellar photometer systems consists of an 8-inch off-axis telescope feeding a filter photometer (an instrument to measure the light energy). Different color filters are mounted on a rotating wheel in front of the measuring device.

A single-reflection on-axis telescope twice the diameter of the stellar systems' off-axis pieces is used to observe nebulae. As in the stellar optics, selectable filters are used to restrict the observations to

*(Cont'd. on p. 2)*

## King of Afghanistan's Group Visits Field Projects Branch

*After the briefing, John Neilon (left) and field projects branch chief Bob Gray (seated) explain satellite systems to the King.*

When King Mohammed Zaher and Queen Homaria of Afghanistan toured NASA facilities at Cape Canaveral early in September, one of the stops was at field projects hangar AE. Later, they were briefed by John Neilon, deputy chief of Goddard's field projects branch.

Neilon discussed Delta missions, upcoming Centaur missions, and the space administration's unmanned scientific space programs. The briefing was held at building AM.

### King Asks Questions

After the formal discussion, Neilon and Bob Gray, chief of Goddard's field projects branch, explained satellite systems to the king, and answered some of his questions.

## OAO Experiments

*(Cont'd. from p. 1)*

specific portions of the ultraviolet spectrum.

The scanning spectrometers consist of 8-inch telescopes and subsystems.

### Other Experiment Has Four 'Eyes'

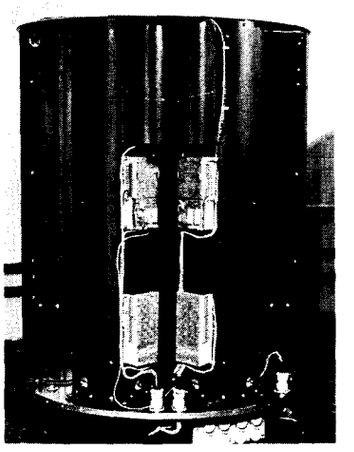
The Smithsonian experiment is composed of four telescopes of identical size. Mounted in the focal plane of each telescope is a special image detecting sensor called Uvicon, which determines the spectral response of the four instruments by the transmission characteristics of the photo cathode in the tube.

Both experiments will concentrate on an examination of the ultraviolet emissions of the stars and nebulae. Some 100,000 stars will be examined and their light energy recorded. The instruments will gather data from the entire celestial sphere rather than detailed observation of specific objects. This will come later when more sophisticated experiments are prepared and tested.

According to OAO project manager Robert Ziemer, "Ultraviolet spectral studies are of special interest to earth-bound astronomers — particularly the region between 4000 and 900 Angstroms, since the earth's atmosphere absorbs virtually all incoming radiation within these limits." (An Angstrom is a minute unit of length used in expressing the length of light rays.)

Other experiments for later OAO satellites will also be coming to and through Goddard, the project center.

*Beginning tests on the Wisconsin experiment are (from left): Dr. Theodore Houck and Dr. John McNall, U. of Wisc.; Goddard's Bob Stroup and Bob Ziemer; and Kurt Bendell and William Hines, Cook employees.*



*This photograph of the OAO Wisconsin experiment was taken by Cook Technological Center, experiment contractors.*

# U.S.—Japanese Experiments 'Check Up' On Each Other

Two similar experiments to compare measurements of electron density in the ionosphere rode the same Aerobee 150A sounding rocket out of Wallops Island on September 25. The two experiments were built in two nations—the United States and Japan.

The purpose of the experiment was to make simultaneous measurements in the ionosphere by different methods, with instruments supplied by Goddard, and the Radio Research Laboratory, Tokyo, Japan.

The Radio-Frequency Resonance Probe developed by Japanese scientists is designed to make it possible to measure electron density and temperature simultaneously with one instrument and to process the data faster. Data obtained by the Japanese and American instruments will be compared.

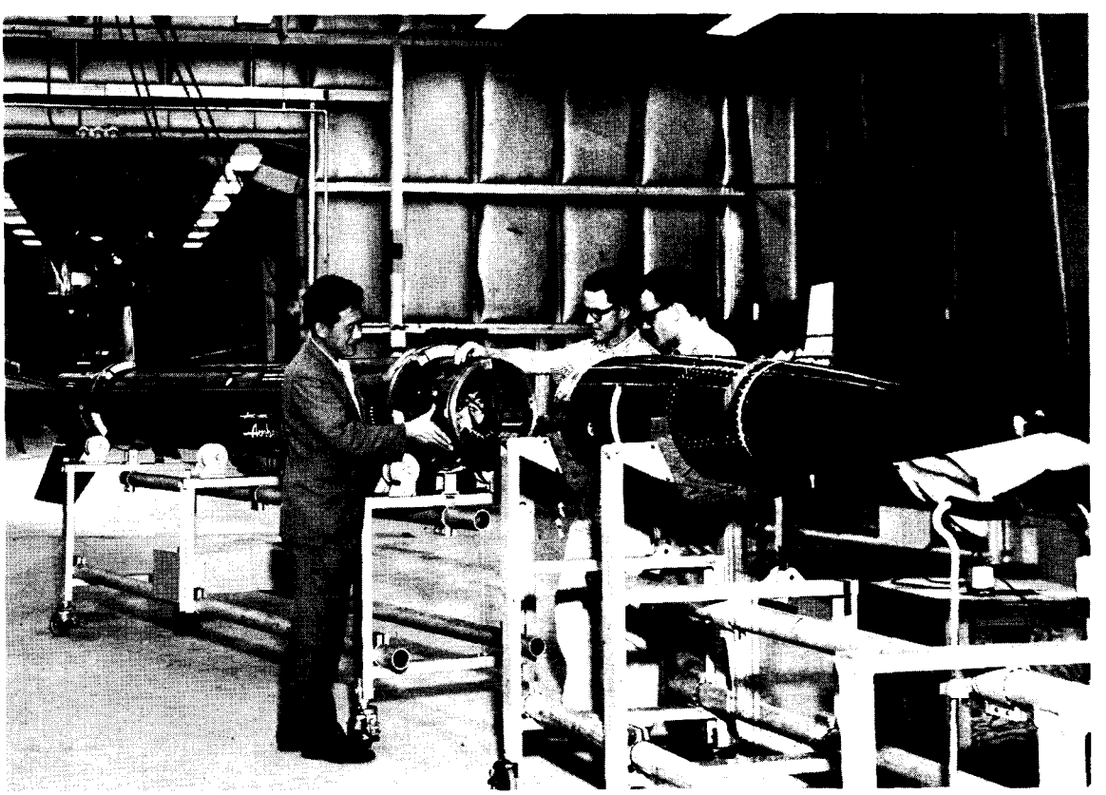
The Aerobee reached a peak altitude of 139 statute miles; impacted in the Atlantic 80 miles from launch site after 8 minutes of flight. A look at preliminary data indicated that the experiment functioned.

A second U.S.-Japanese experiment on September 28 was also a success on the evidence of preliminary data.

Also on board were two NASA-Goddard secondary experiments, one to study radio wave propagation at very low frequency, the other to measure the sodium gas content in the lower ionosphere.

Dr. Kunio Hirao, Chief Scientist, Radio Research Laboratory, Tokyo, is the Project Scientist for the U.S.-Japanese experiments. Gideon P. Serbu is Goddard's program manager.

Dr. Hirao and Mr. Toshio Muraoka, Scientist with the Yokohawa Electric Company, Tokyo, assisted with pre-launch operations and were present for the firing.



*Shown here during final assembly of Aerobee are (from left): Dr. Kunio Hirao, Chief Scientist, Radio Research Laboratory, Tokyo, who is Project Scientist for the U.S.-Japanese experiments; Mr. Doyle Craft and Mr. Donald Lynch of the Oklahoma State University Research Foundation. Mr. Craft is Payload Engineer and Mr. Lynch is Telemetry Engineer. The Research Foundation is under contract to Goddard.*

# News About Space & Aeronautics

● When the three-man Apollo team takes off for the moon the United States will have accumulated some 2000 hours of manned flight in earth orbit.

Addison M. Rothrock, Associate Director of Plans and Program Evaluation at NASA Headquarters, said that this experience will include rendezvous of spacecraft in orbit, transfer of men and materials from one spacecraft to another and space maneuvers. The 2000 hours will include about 1300 orbits of the earth by Americans in Gemini and Apollo spacecraft.

"We have learned the techniques required to achieve reliability while continually extending the operating range and operating flexibility of our craft—and this is particularly exemplied in projects Mercury, OSO, Mariner and Syncom," Rothrock noted.

• • •

● A third command and data acquisition (CDA) station, this one in Fairbanks, Alaska, became operational recently as part of the Tiros meteorological satellite CDA system.

The Fairbanks station will provide additional receiving and back-up capability so that all data from present and future Tiros satellites can be compiled and utilized.

The station will provide operational experience at this remote site which will be useful in later programs. For polar orbiting meteorological satellites the new station will be the primary CDA facility.

• • •

● ". . . The challenge of the exploration of space, of putting our fellow man safely into a desperately hostile environment, has provided a spur to great segments of our American business economy. And that spur will be keeping us on the jump until we get those men to the moon and back, and, then perchance, take off for Mars."—*James T. Dennison, Technology Utilization, NASA.*

• • •

● Voice and teletype were transmitted from Fort Dix, N. J. via Syncom II to the surface terminal ship Kingsport about 40 miles west of Lagos, Nigeria, recently—the first such experiment with a moving ship at sea.

Although the sea was rough, the 30 foot antenna aboard the vessel remained automatically locked on the spacecraft.

Officials at the Fort Dix ground station pointed out that reliable, continued conventional voice communication with a ship at sea is very difficult because of the general unreliability of the ionosphere.

The Kingsport will conduct a series of experiments to test shipboard equipment and reception in fringe areas.

• • •

● Relay and Syncom brought the opening of the United Nations General Assembly via television and radio to millions of persons in Europe and Africa.

Relay transmitted both video and voice coverage of the event to Europe. Syncom carried voice accounts of the General Assembly opening to Africa.

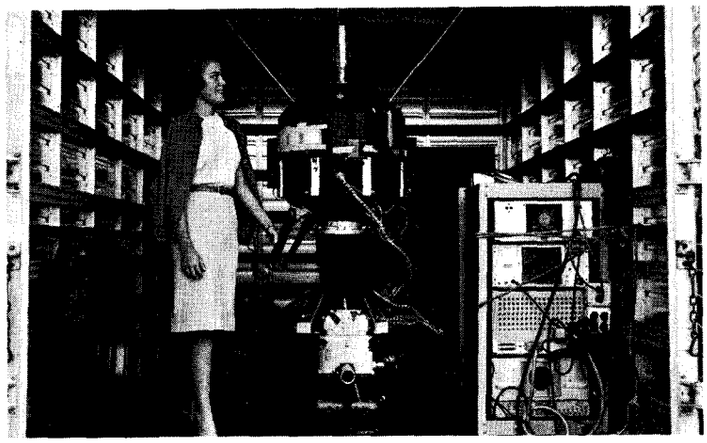
• • •

● "The President's statement has captured the imagination of the peoples of the world. In itself, cooperation in space activity between the great antagonists of the Cold War is a thrilling prospect. But the significance of this possibility is not limited to space; rather, it lies equally in the fact that cooperation in space is one more step toward cooperation on Earth, toward the banishment of the fear of the annihilation of life as we know it.

"The President's statement received weight and conviction from the fact that the United States now has a powerful space capability; and from the fact that this Nation is well on its way to achieving preeminence in this new environment. . . .

"Today the President of the United States has at his command a great new source of power with the potential for doing many things in space. We have never faltered in our belief that space should be used for peaceful purposes for all mankind, but we have developed the power to use it in any way required.

"Therefore, the President's decision to use this great national resource once again to explore the avenues of world unity and peace is greeted by all of us in the National Space Program with pride and pleasure."—*James E. Webb, NASA Administrator.*



***U.K.II, scheduled for launch from Wallops soon visited Goddard's College Park building recently (prototype) to test STARS (Satellite tracking and reduction system). Kohanna Morell, data processing branch gives U.K.II the once-over.***

# Impetus

**Editor's Note: This column of thoughts from various quotable sources will run whenever 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.**

"As I see it, an engineer's professional life can be represented by a triangle. The sides of that triangle are his school, his industry, and himself. His school's obligation is to equip him with the basic knowledge he needs. His company's responsibility is to provide challenge and to nurture individual dignity. The man's responsibility—and this is the most important side of the triangle—is to keep growing professionally—to become a man of substance. . . .

"For one thing, (engineers) can enhance their standing and that of the profession by taking an active part in community affairs and in their professional societies. For another, they can continue to learn.

"By reading no more than 30 minutes each evening before going to sleep, they can keep abreast of important literature, as well as current events.

"Willingness to work and sharpening of the intellectual curiosity are the indispensable factors in a person's growth.

"With the broad knowledge that an engineer can gain for himself by additional study, he will develop a better understanding of his own contributions. He can do a better job and improve his value to his company and to society while contributing to his own advancement. He will broaden his perspective, which reminds me of the two stone masons who were once asked what they were doing. One replied, as he continued to apply mortar, 'I'm laying bricks.' The other said, stepping back to get a better view of the rising edifice, 'I'm building a cathedral.'

"It's all a matter of outlook. Too often we may be surrounded by opportunities that we lack the vision to see."—*Dr. Charles Jones, president, Esso Research & Engineering Co.*

**GODDARD NEWS**

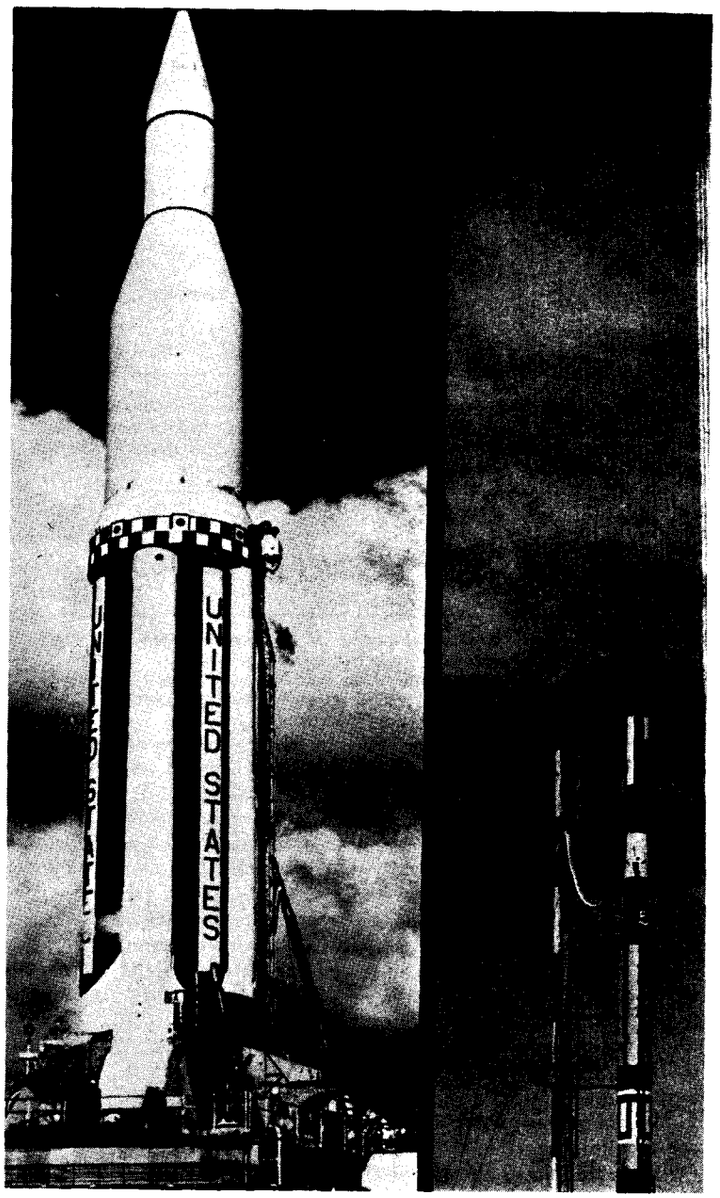
*"It is difficult to say what is impossible, for the dream of yesterday is the hope of today and the reality of tomorrow."*
—Dr. Robert H. Goddard

The Goddard News is a bi-weekly publication of the National Aeronautics and Space Administration's Goddard Space Flight Center, Greenbelt, Md., suburban Washington, D. C.

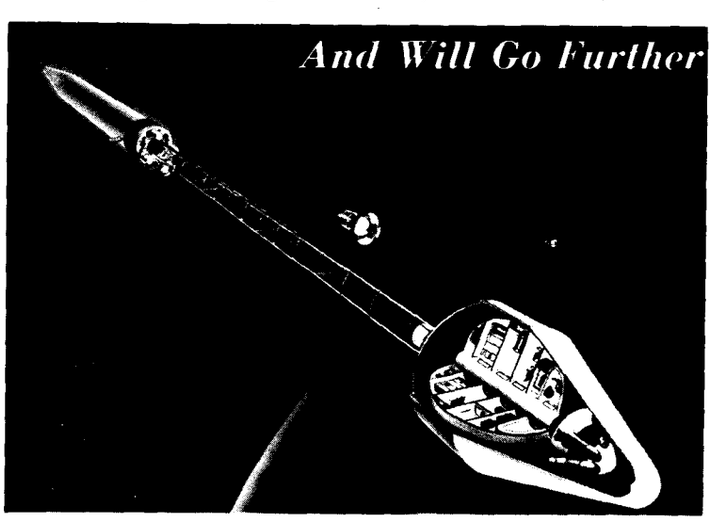
Phone—Ext. 4141 or 4142

Bruce Brough, *editor*—Shirley Deremer, *Inside Goddard*

# NASA Has Come Far . . .




*NASA's rapid growth and technological advancement over the past five years is illustrated by this juxtaposition of Saturn I and Vanguard. Vanguard is 72 feet tall—Saturn, 190.*




*This concept of a spacecraft for second-generation manned interplanetary trips comes from Lockheed Missiles & Space Co.*

# Anniversary Observances—

*Vice-president Lyndon Johnson addressing the group of NASA personnel who received achievement and patent awards Oct. 1.*

NASA marked its fifth anniversary October 1 with a salute to individuals whose personal efforts have contributed significantly to the nation's civilian space program. Two Goddard scientists were so honored.

### Vice-President Speaks

Vice President Lyndon B. Johnson, chairman of the President's National Aeronautics and Space Council, was keynote speaker at a special awards ceremony in Washington. Award presentations were made by NASA administrator James E. Webb, deputy administrator Dr. Hugh L. Dryden, and associate administrator Dr. Robert C. Seamans, Jr.

Eight cash awards totaling $12,200 were divided among 14 NASA employees for inventions and scientific and technical contributions.

The two Goddard employees, Jesse M. Madey and Xopher W. Moyer, shared $1,500 equally for the invention of a structural spacer.

The spacer, inserted in holes in lightweight panels, permits other structural pieces to be quickly attached to the panels although the spacer may not be in precise alignment. A floating element in the spacer allows a firm coupling in spite of these minor misalignments.

The device, which has resulted in saving thousands of dollars in its first year of use, is expected to have wide commercial application.

## Headquarters Display is Open to Public

NASA Headquarters is displaying models of manned and unmanned spacecraft in the lobby of its main building, 400 Maryland Avenue, S.W., from today through October 10. The display opened September 27 in observance of the agency's fifth anniversary.

The display includes a major portion of the NASA exhibit shown at the Paris Air Show last spring. Three areas of activity are represented: manned space flight, space sciences and applications.

In the manned space flight area is a full scale model of the Mercury capsule and its escape tower and one-quarter scale models of the Apollo, Lunar Excursion Module, and Gemini spacecraft. A space suit is also on display.

Space sciences is represented by a working prototype of the Mariner II which came within 24,000 miles of Venus; a working prototype of Explorer XI, gamma ray astronomy telescope; Explorer XII, Earth environment radiation experiment; and Pioneer V, which studied space between Earth and Venus and now is in orbit around the Sun. Explorer XI and XII are Goddard projects.

Applications satellites on display are full-scale models of the active repeater communications satellites Relay and Syncom and the meteorological satellites Tiros and Nimbus; all four of these are Goddard projects.

### Exhibit Open Daily

The anniversary exhibit is open to the general public daily between 7:30 a.m. and 6:00 p.m. except Saturday and Sunday when the building is closed.

INSIDE GODDARD

GODDARD SPACE FLIGHT CENTER / GREENBELT MARYLAND

October 7, 1963

**No Tickee' No Dancee'**

There are only 350 seats for OA's dinner-dance to be held Friday Oct. 18. Do you have your ticket? If not check with your division representative—first come first served.

# *Goddard's Library Has Expanded*

It was bound to happen. As Goddard has grown, so has the need for an outstanding technical library. From a small corner in the Colemont building in Silver Spring, Goddard's library moved in 1961 to the second floor of building 1.

The library occupied 2,370 square feet at that time—today it has been enlarged to 7,500 square feet—over 200 percent expansion. With this great expansion came many benefits for library users: more space to study and more space for browsing.

Past library-users found it inconvenient to search the shelves in the 29-inch aisles. Now crowded aisles no longer exist—they are 36 inches wide, and two persons can easily browse in the same aisle.

In addition to the "open" tables that were used by researchers, individual study carrels have been installed.

Goddard's library does a booming business on incoming mail, receiving 15 sacks of mail a week which is approximately one-half a ton of material.

*Wider aisles and individual study carrels make it easier to enjoy the new library facilities.*

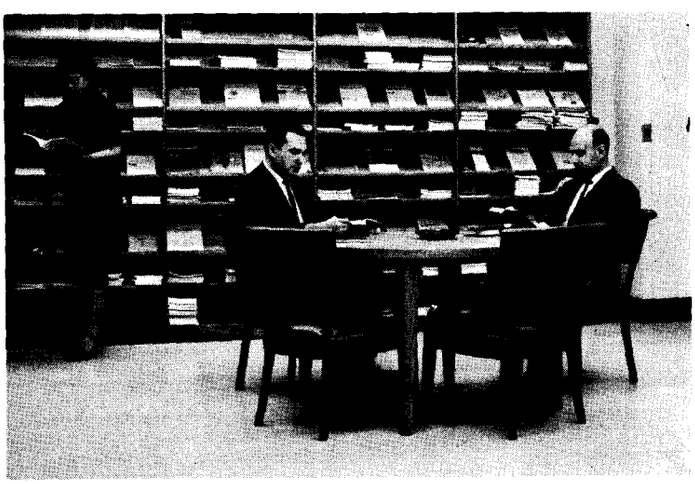
"In 1959 Goddard subscribed to 50 journals," said John Weaver, chief of the library branch. "Now we subscribe to 900 journals and our total subscriptions have reached 1,750."

WEAVER

The library expansion program has included a separate document section. Here every document that has been published by Goddard and other NASA Centers can be found.

Mr. Weaver and his staff invite those who have the need, to take advantage of Goddard's outstanding technical library.

*Mike Kubisiak (left), assistant librarian, Betty Gasch, secretary, and Hu Turner, reference librarian check reference material requested by employees.*



*One of five areas that can be used by researchers and persons who have the need for facilities conducive to study.*

## Goett Will Speak To Goddard Wives

The Goddard Wives Club's regular meeting will be a luncheon on October 9 at the Holiday Inn in College Park. The affair will begin with a social hour at 12 noon followed by lunch. The cost is $3 per person.

The program will feature an interesting speaker, the director of the Goddard Space Flight Center, Dr. Harry J. Goett.

Wives of both new and old employees are encouraged to attend.

A tourist in Athens noticed a bust of a man whose snub nose was not quite in the classic tradition. "Who was that?" he asked the guide.

"Socrates," the guide replied, "a warrior when necessary, but primarily a thinker and a very great teacher. He was forced to drink hemlock in 399 B.C."

"But if he was so great," the tourist asked, "why was he forced to kill himself?"

"He didn't publish," the guide replied . . . from *Chemistry and Engineering News*, 23 Sept. 1963.

## Goddard UGF Goal Is $48,500

The month of October marks the beginning of Goddard's United Givers Fund Campaign with a goal of $48,500 for this year.

"Employees can contribute through pledges spread over a year's time or by cash," said Hugh Easter, associate chief of the management services and supply division, and general campaign manager.

"Pledges are encouraged, as experience has shown that a planned contribution usually results in a fair share gift averaging 2½ times larger than donations made from available cash."

UGF supports 143 agencies in this area, which provide health, welfare and youth guidance services.

In this support, UGF helps one out of five persons locally. About 93 percent of all money collected goes for direct assistance to the needy; only seven percent is used in administration.

# T&E Terrors Win Championship

The Goddard slow-pitch championship playoff between the winner of the Western Division (T & E Terrors) and the Eastern Division champs (Boosters) was held at the recreation area on September 9, 11 and 18.

The first game was a thriller all the way with a 6 to 6 tie in the top of the 7th until George Smith led off with a single. V. Laakso followed with another single and Don Ochsner followed with a home run to win the first game for the T & E Terrors, final score, 9-6. Winning pitcher was George Biddison.

A victory in the second game was a must game for the Boosters. W. Flournoy hit a home run in the first inning with a man on base to get the Boosters rolling, but at the end of seven innings it was all tied up, 5-5. In the top of the eighth, W. Rick led off with a single, and J. Morton followed with a home run, to give the Boosters a 7-5 lead. They iced it with six more runs in that inning and won the game 13-5. Winning pitcher was Larry Muchinsky.

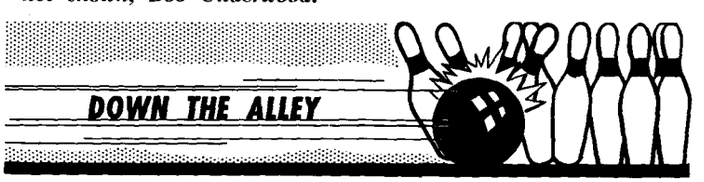
The tension was built up in the last game with one win for both teams. The T & E Terrors built up an 8-1 lead going into the last inning on the strength of a home run by Bill Hall with two on in the fifth inning.

The Boosters, with their backs to the wall, got a rally going and tied the game in the last of the seventh at 8-8 to send the game into extra innings.

In the top of the eighth Don Ochsner (Terrors) led off with a triple and Bill Hall followed with a towering home run, his second of the game, to right field to give his team a 10-8 lead. He also made two spectacular catches in the game to rob the Boosters of extra base hits.

The Boosters made a valiant try in the bottom of the eighth but just couldn't get the hit they needed as George Biddison retired the side and won the championship for the T & E Terrors. Thus ended an exciting season for Goddard's slow-pitch softball league.

***Champions of the T&E Terrors are, first row from left: Jeff Greenwell, George Smith (team captain), George Biddison, John Burcham, and Don Frerdicks. Second row from left: Jack Sipe, Don Ochsner, Bill Hall, Steve Yasolsky, Dick Dettmering, Neil Granick, Jerry Medlin, Veikko Laakso, and Fred Brown, not shown, Bob Underwood.***




## GODDARD MIXED DUCKPIN LEAGUE STANDINGS

**Tuesday (As of Sept. 18, 1963)**

| | W | L |
|---|---|---|
| Bob Cats | 6 | 0 |
| Ducklings | 5 | 1 |
| Coles Coolies | 5 | 1 |
| Alley Catz | 5 | 1 |
| Bluffers | 4 | 2 |
| Comets | 3 | 3 |
| Dukes & Duchesses | 3 | 3 |
| Stargazers | 2 | 4 |
| Toppers | 2 | 4 |
| Quicksilvers | 2 | 4 |
| Moonshiners | 2 | 4 |
| Alley Nauts | 1 | 5 |
| Vagabonds | 1 | 5 |
| Possibilities | 1 | 5 |

**Thursday (As of Sept. 26, 1963)**

| | W | L |
|---|---|---|
| Woodchoppers | 10 | 2 |
| Tick Tocks | 8 | 4 |
| Starlighters | 8 | 4 |
| Wombats | 8 | 4 |
| Syncoms | 8 | 4 |
| Astronauts | 7 | 5 |
| Thor Heads | 7 | 5 |
| Satellites | 7 | 5 |
| Safety Pins | 5 | 7 |
| Space Katz | 5 | 7 |
| Moon Pilots | 4 | 8 |
| Bobcats | 4 | 8 |
| Meteorites | 4 | 8 |
| Strikers | 2 | 10 |

## GODDARD MEN'S TENPIN LEAGUE STANDINGS

**Wednesday (As of Sept. 25, 1963)**

| | W | L |
|---|---|---|
| Fivers | 12 | 0 |
| Outcasts | 10 | 1 |
| Gosobs | 9 | 3 |
| Boxcars | 7 | 5 |
| Gubaths | 7 | 5 |
| The Junto | 5 | 6 |
| Snakeyes | 5 | 7 |
| Ones | 5 | 7 |
| Keglers | 4 | 8 |
| El Supremos | 4 | 8 |
| Rackets | 2 | 10 |
| Vibrators | 1 | 11 |

**Thursday (As of Sept. 27, 1963)**

| | W | L |
|---|---|---|
| Team No. 15 | 9 | 3 |
| Team No. 14 | 9 | 3 |
| Team No. 3 | 9 | 3 |
| Team No. 12 | 8 | 4 |
| Team No. 16 | 8 | 4 |
| Team No. 7 | 7 | 5 |
| Team No. 1 | 7 | 5 |
| Team No. 5 | 7 | 5 |
| Team No. 4 | 6 | 6 |
| Team No. 13 | 6 | 6 |
| Team No. 10 | 5 | 7 |
| Team No. 6 | 5 | 7 |
| Team No. 2 | 3½ | 8½ |
| Team No. 9 | 3½ | 8½ |
| Team No. 8 | 2 | 10 |
| Team No. 11 | 1 | 11 |

# *Goddard Welcomes*

**Bedard**

**Golodner**

**Gerardi**

**Grandinetti**

**Painter**

**May**

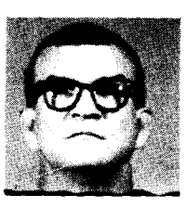
**Bauter**

**Burch**

**Chigas**

**Baker**

**Berzonsky**


**Davis**

*Carmela Bedard, Seymour Golodner,* Financial Management Div.; *Rosemary Gerardi, Anthony Grandinetti,* Manned Space Flight Support Office; *Earle Painter,* Network Engineering & Operation Div.; *Barbara May,* Office of Assistant Director Space Sciences & Satellite Applications; *Lawrence E. Bauter, Colin F. Burch, Wilma S. Chigas,* Organization & Personnel Div.; *Lauren H. Baker, M. J. Berzonsky,* Procurement Div.; *Winston Davis,* Management Services & Supply Div.

## *Basketball Season To Get Underway*

The basketball season will start soon, but the word has not reached all enthusiasts.

Last year Goddard's league had four teams—this year there is a drive for five additional teams.

Once the nine teams are organized they will play in competition—and winners during playoffs will be awarded trophies.

Anyone interested should form their team, select a captain, and then contact Bill Isley, ext. 4408.

## Oct. Film Schedule

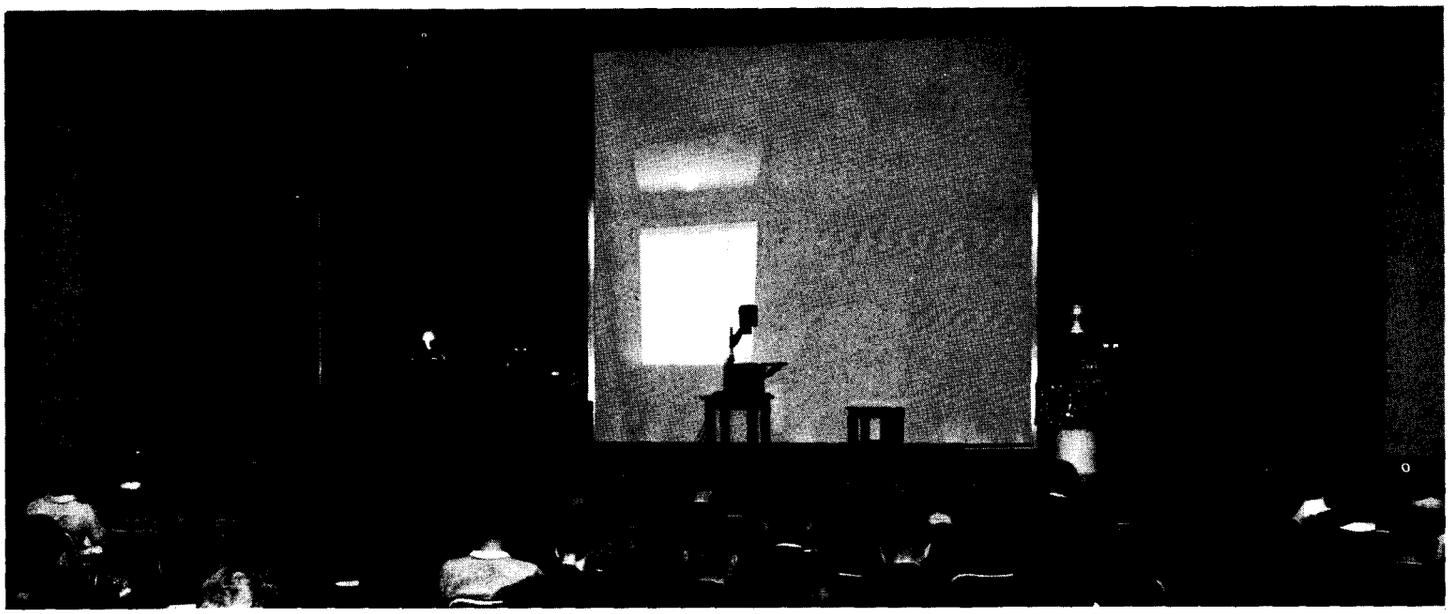
Scheduled for showing this month is an animated cartoon entitled, "A is for Atom." It explains the principles of atomic energy with emphasis on peacetime use in industry, medicine, agriculture and science.

A film extra entitled "Mouth to Mouth Rescue Breathing," which is self explanatory, will also be shown.

October Schedule

| Date | Time | Place |
|---|---|---|
| 7 | 12:00 p.m. | Bldg. 6, Rm. C-206A |
| 8 | 12:00 p.m. | Bldg. 7, Rm. 231 |
| 9 | 12:00 p.m. | Bldg. 3, Auditorium |
| 10 | 12:00 p.m. | Bldg. 5, Rm. 101 |
| 11 | 12:00 p.m. | Bldg. 2, Rm. 115 |

# Activities at Goddard and D.C. Mark the Occasion



*The first use of the new auditorium in building 8 was for the presentation of papers by the Youth Science Congress. Here one of the students presents his paper to a gathering of his peers.*

## Young Scientists Join Goddard For NASA Birthday

Goddard observed the fifth anniversary of NASA in a very logical fashion on October 1-3. A three-day program of presentations, tours and discussions stressed science education as the Youth Science Congress convened here under joint sponsorship of NASA and the National Science Teachers Association (NSTA).

Twenty-five high school science award winners from Maryland, the District of Columbia, Pennsylvania, New Jersey, West Virginia and Delaware presented papers during the period. The student audience for the presentation of research papers consisted of more than 200 area science students and teachers.

Dr. J. David Lockard of the University of Maryland represented NSTA, and acted as chairman of a panel of six Goddard scientists and engineers who judged the presentations. The three top papers were awarded a NASA-NSTA outstanding achievement certificate.

Winning students and their presentation subjects were: Henry Jaffin of Bethesda, Md., "A Study in Chemically induced Mutations in Sclerotinia; Boyer Westover, Johnstown, Pa., "Investigations of Some Pharmacological Actions in Scorpion Venoms; and Frederick Gittes, Wynnewood, Pa., "The Effect of Vitamin $K_1$ Analogue on the Coagulation Time of Cobalt-60 Irradiated Mice."

Goddard judges were: Charles H. Ehrmann, fields and particles instrumentation section; David W. Grimes, spacecraft systems branch; Theodore Noel, instrumentation branch; John F. Unger, space power technology branch; Patricia A. Egan, mathematics and computing branch; and Donald J. Ochsner, engineering design branch.

During the two days of presentation of papers, October 1 and 2, the student audience received an orientation of the center, with ⅓ of the total audience on tour at a time.

At the awards dinner Wednesday evening, October 2, at the Fort Meade Officers' Club, The Rev. Francis J. Heyden, S.J., director of Georgetown College Observatory, was guest speaker. Dr. Michael J. Vaccaro, assistant director for administration, was master of ceremonies. Associate director Eugene Wasielewski presented the awards.

On October 3, after being joined by a group of spacemobile lecturers from NASA headquarters and a welcome from Goddard's associate director, Eguene Wasielewski, the young scientists received a thorough briefing on the missions of the center presented by leading Goddard personnel.

Presentations for the Youth Science Congress included: "History of a Satellite" by Robert C. Baumann; "Test and Evaluation" by John New; "Delta" by T. B. Norris (NASA Hq.); "Satellite Tracking" by Harold L. Hoff; "Orbit Computation" by Dr. Joseph W. Siry; "Data Acquisition and Processing" by Edmund J. Habib; "Space Sciences" by Dr. Leslie H. Meredith; "Solar Physics, Orbiting Solar Observatory" by Dr. John C. Lindsay; "Orbiting Astronomical Observatory" by Carl Wenzinger; "Geophysical Observations" by Wilfred E. Scull; "Communications Satellites" by Albert L. Hedrich; "Meteorological Satellites" by Ernest F. Powers; "International Program" by Gilbert Ousley; and "Results of Space Research" by Dr. Wilmot N. Hess.

### Goddard Speech and Paper Presentations

**PAPERS**

**(Technical presentations approved as of September 30, for period of October 7 through October 20. Requests for copies of speeches and papers should be made directly to the author.)**

American Meteorological Society, Eppley Research Conference, Newport, R.I., October 10-11, 1963. ***"Radiative Problems in the Upper Atmosphere of Venus," by R. A. Hanel; "Radiation Measurements with Tiros Meteorological Satellites," by W. Nordberg.***

IEEE University of Florida, October 14, 1963, ***"Delta, NASA's Most Reliable Launch Vehicle," by F. J. Stevens.***

Washington History of Science Club, Washington, D.C., October 15, 1963, ***"Geodesy and the Sources of the General Theory of Relativity," by Dr. John O'Keefe.***

Student Chapter of IEEE, Duke University, Durham, N.C., October 15, 1963, ***"The Place for the Engineering Graduate in Space Research," by C. J. Creveling.***

American Vacuum Society, Boston, Mass, October 16-18, 1963, ***"Response of Bayard-Alpert and Modified Redhead Magnetron Type Vacuum Gauges Aboard Explorer XVII," by George P. Newton.***

Washington National Academy of Sciences, Washington, D.C., October 17, 1963, ***"The Nature of the Maria," by Dr. John O'Keefe.***

Washington Chapter of the Association for Computing Machinery, Washington, D.C., October 17, 1963, ***"Data Processing for the OGO Satellite," by E. J. Habib.***

Ninth Anglo-American Conference, Boston, Mass., and Montreal, Canada, ***"Scientific Results of OSO-1" by J. C. Lindsay.***

Society of Exploration Geophysicists, New Orleans, La., October 20-25, ***"Satellite Measurements of the Geomagnetic Field," by Norman F. Ness.***

# Saturn Boosters Are Produced at Michoud Operations, La.

## *Plywood Planes Were Once Built There*

The Marshall Space Flight Center's Michoud Operations, production site of Saturn boosters, is two years old and going strong as a bustling space-age complex.

NASA announced Sept. 7, 1961, selection of the sprawling Michoud Ordnance Plant to fabricate first-stage rockets that will be used in the Apollo manned lunar landing program.

Until then, the 20-year-old plant had seen little use. Designed as a shipyard, it was used briefly to make plywood cargo planes and, later, to produce tank engines. The facility was idle from July 1953, until its selection by NASA.

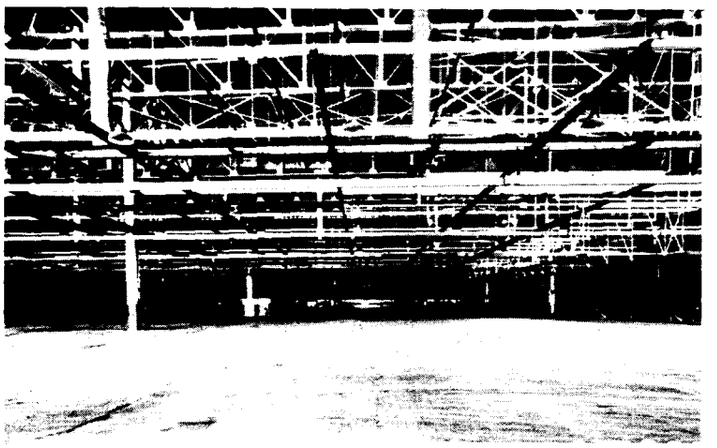
### 43 Acres Under One Roof

The 43 acres under one roof provide nearly two million square feet of floor space.

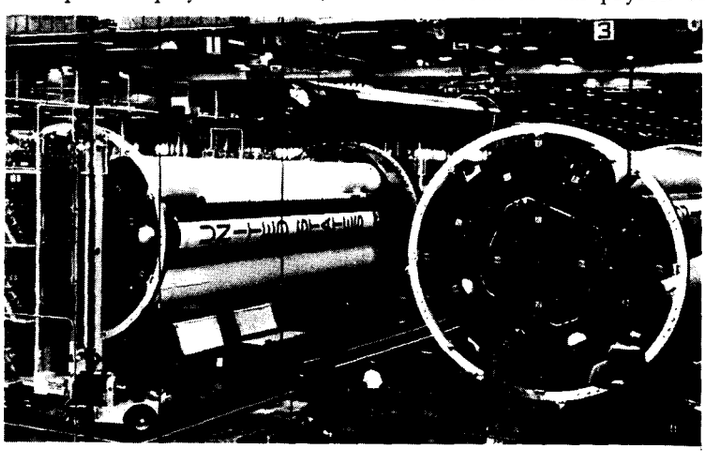
Today, Michoud has more than 7,800 persons employed at the main facility, 15 miles east of downtown New Orleans, and its Computer Operations Office, 22 miles northeast of Slidell, La.

### Major Employer

A peak employment of 10,000 with a total annual payroll of about $60 million is expected by mid-1964. Michoud will then be the largest single employer at one installation in Louisiana.



*This is what Michoud Operations, site of Saturn construction looked like less than two years ago when it was deserted.*



*Michoud Operations is now a beehive of activity. Here it is shown during assembly of two Saturn I first stages.*

A recent study by the New Orleans Chamber of Commerce indicated that Michoud's peak employment will—directly or indirectly—increase the area's personal income per year by $71,000,000, annual bank deposits by $22,900,000, number of retail establishments by 300, and annual retail sales by $33,100,000.

Managed by Dr. George N. Constan, Michoud is a division of the Marshall Space Flight Center, Huntsville, Ala. Marshall is directed by Dr. Wernher von Braun.

### Four Contractors

While Government owned and managed, Michoud is operated by four major contractors.

The Boeing Co., Saturn Booster Branch, will manufacture here 10 first stages for the 350-foot-tall Saturn V vehicle. Chrysler Corp., Space Division, is under contract to assemble 20 first stages for the smaller Saturn I and Saturn IB vehicles. Mason-Rust is support services contractor and Tele-computing Services, Inc., operates computers at the Slidell office.

*This is the eighth in a series of special articles on the activities and responsibilities of NASA's far-flung operations.*

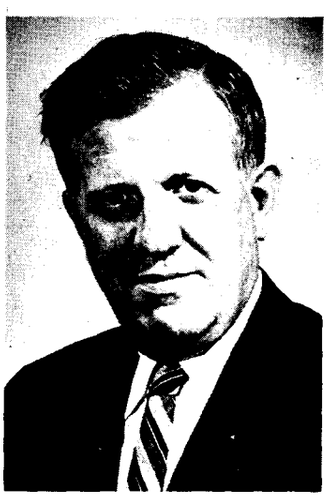
**ON ANNIVERSARY THEME:**

# *Wasielewski Praises NASA and Industry Engineers*

Eugene Wasielewski, Goddard's associate director, addressed the Scientific Research Society of America at Burroughs Research Center in Paoli, Pa., on September 25. He emphasized the accomplishments of NASA during its first five years with particular attention to Goddard's contributions.

After reviewing some specific Goddard projects and programs, the associate director summarized:

"While it is easy for me to say that NASA has, as an organization, launched over 50 satellites, of which 30 were put into orbit by Goddard . . . , I am sure that you must all realize the tremendous research and development effort that was required to put these spacecraft into orbit.



**Eugene Wasielewski**

### Delta Discussed

"Certainly Goddard . . . owes much to the successful development of the Delta launch vehicle which has given us 20 successes in 21 shots.

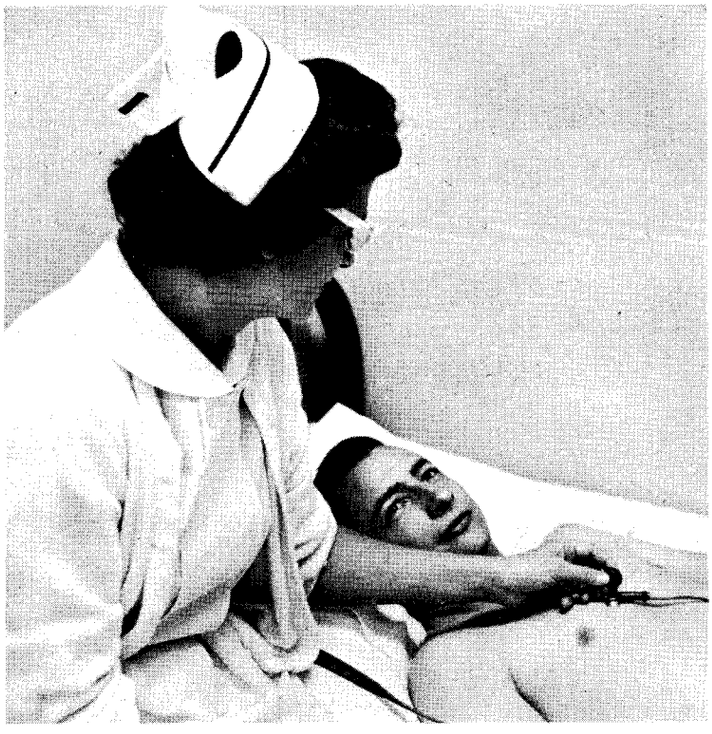
"As time goes on, NASA will make increased use of the Thor-Agena launch vehicles followed by the Centaur and Saturn class. And certainly the present developments in nuclear power sources and rockets will have extensive use in missions to the planets.

"The development of the satellite technology and the design and development of new instruments is a complete story in itself. Many new mechanical, electric, and electronic devices have been invented and developed in order to make these space flights possible.

### Closing With Thanks

"While I have spent much of the evening telling you of our scientific progress, I think that it is fitting that I close with an expression of our indebtedness to the great engineering and technological skills at NASA and in the industry which have made all of this possible."

# Health Unit Offers Many Services to Employees



*Nurse Francis Tyndall prepares Virgil McIe, Jr., photo section, for an electrocardiogram. The health unit has two R.N.s.*

*Mrs. Tyndall and Dr. Crago check the results of the cardiogram on equipment designed to give on-the-spot results.*

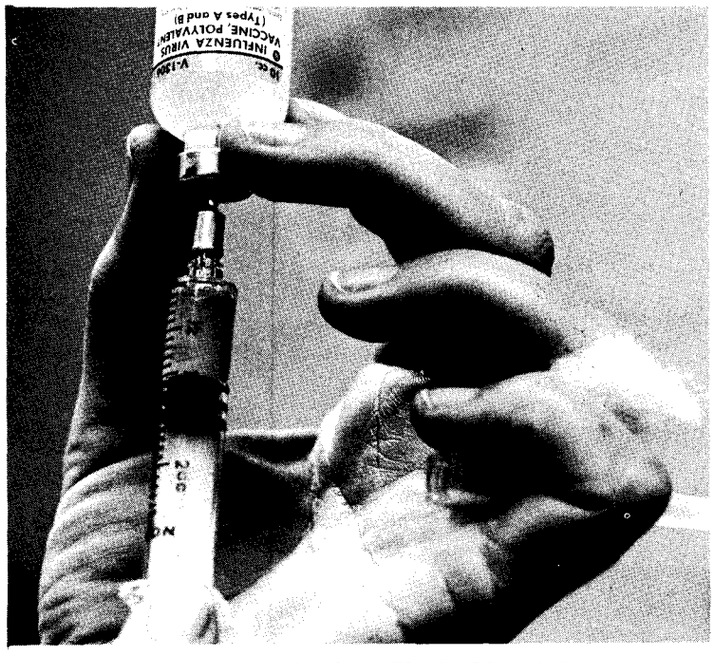
"Is there a doctor in the house?" At Goddard, the answer to this time-worn question is "yes!" The Center's health unit in the basement of building 1 has a doctor assisted by two registered nurses.

Thirty to forty employees per day make use of the facilities. Dr. Rex Crago, medical officer in charge, completed his training at the University of Illinois and interned at Illinois Central Hospital. He came to Goddard in July 1962.

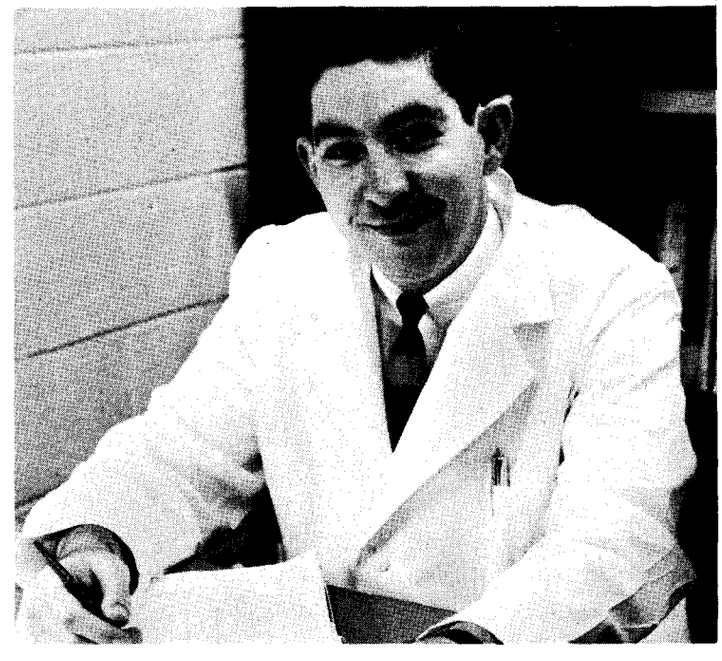
The health unit is not a part of Goddard per se. Organizationally, it falls under the Department of Health, Education and Welfare's Public Health Service. It is a part of that agency's Federal Employee Health Program.

The operation is not a dispensary. According to Dr. Crago, it is a provision to treat on-the-job illness and accidents, to provide immunization for overseas travel as well as tetanus, smallpox, flu and polio. Occupational Hazard Exams are also handled through the unit, as well as the voluntary Employee Health Maintenance Exams for employees over age 38.

Registered nurses Leola Kyle and Francis Tyndall and secretary Margaret Morin round out the staff.

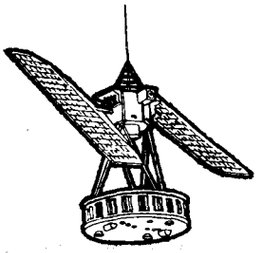


*And, don't forget your flu shot. The health unit has a complete immunization program for Goddard employees.*



*Dr. Rex Crago, officer in charge of Goddard's health unit is from central Illinois. He interned in an Illinois hospital.*

# Nimbus at Valley Forge—Passes Test



*This three-segment composite photo was "snapped" by Nimbus (NASA's second generation weather satellite) recently during major system tests at the General Electric Spacecraft Div. plant in Valley Forge, Pa. The test series, directed by Goddard, demonstrated the full spacecraft system in operation. A prototype Nimbus was mounted on a tower and commanded into operation via a radio frequency link. The pictures were stored briefly in a tape recorder in the spacecraft, then transmitted to the local ground station for processing and development. When placed into polar orbit, the three Nimbus cameras will "see" the entire sunlit portion of the earth once a day.*

# *Tiros VI Has Been Out of this World for a Year*

Goddard's Tiros VI weather satellite completed a full year of successful operation in September.

Original life expectancy of Tiros satellites was three to four months. All but Tiros I have exceeded this life span. Tiros I operated 2½ months, Tiros II 10 months, Tiros III, and IV, 4½ months and Tiros V, 10½ months.

*This artist's conception illustrates how three satellites like Goddard's Syncom II, which is now in near-synchronous orbit, can provide world-wide communications 24 hours a day. Television and telephone service could be included. Each satellite, at 22,230 miles altitude and with orbital speed synchronized so that it appears to hover over a predetermined point on earth, could receive and transmit signals to one-third of the globe.*

Tiros VII, launched June 19, 1963, also continues to provide cloud-cover photos in a different part of the world from VI.

The two tracking beacons on Tiros VI were shut off last month by an automatic beacon killer installed in the spacecraft prior to launch. This eliminates use of the tracking beacon but not the useful TV transmissions.

### Tiros VI's Record

Tiros VI has a long record of accomplishments. Along with Tiros V it supported the flights of Astronauts Walter Schirra and Gordon Cooper. It detected sand storms in Saudi Arabia; ice conditions in southern and northern hemispheres; 12 hurricanes, typhoons and tropical storms; and about 300 weather advisories to countries all over the world were issued based on some of the 63,000 cloud-cover pictures sent back to earth from the satellite.

Tiros project manager is Goddard's Bob Rados.

### Goddard Coming Events

**Goddard colloquium lecture:**

- **Oct. 8, 3 p.m., Auditorium, Bldg. 3—Dr. H. E. Hinteregger, Air Force Cambridge Research Center, "Solar EUV Radiation Effects on the Thermosphere."**