GODDARD NEWS

GODDARD SPACE FLIGHT CENTER / GREENBELT, MARYLAND

VOLUME VII, NUMBER 12 | THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION | NOVEMBER 2, 1964

Astrobee Launched—Most Powerful SR Yet!

NASA To Select Scientist-Astronauts For Future Missions

Recruiting of ten to twenty scientist-astronauts will begin at once for the nation's future manned space flight missions, the National Aeronautics and Space Administration announced recently.

Selection of this first group of scientist-astronauts is to be completed by next spring.

A vast scientific frontier is being opened to direct scientific exploration by man. Observations made by scientist-astronauts will provide new information on the solar system and on man's ability to perform effectively in prolonged space flight, it was announced.

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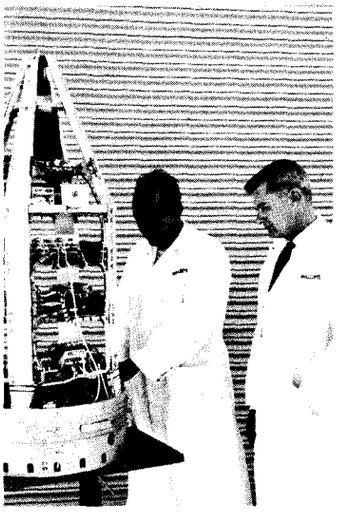
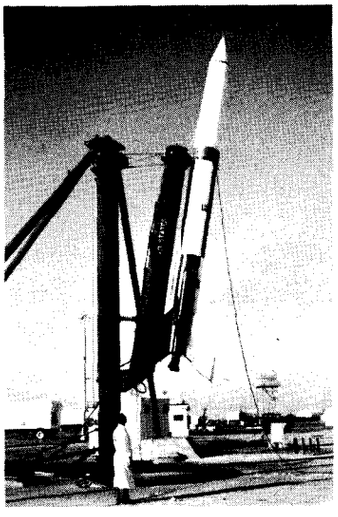


Herbert Honecker (left), project engineer, and Ernest Sorgnit, project scientist, inspect the payload of Astrobee 1500.



Astrobee 1500 ready for launch.

The most powerful rocket in the National Sounding Rocket Program, the Astrobee 1500, was flight-tested October 22 from NASA's Wallops Island Station, Virginia.

The solid-propellant rocket, weighing over 5½ tons, carried 156 pounds of instruments and equipment to measure acceleration, vibration, temperatures and pressures. The second stage reached a peak altitude of 1212 statute miles and impacted in the Atlantic Ocean 1326 miles from the launch site.

Goddard Managed

Goddard project scientist, Ernest F. Sorgnit, and Project Engineer Herbert Honecker reported that 27 minutes of telemetered data was received from the flight, and from a preliminary examination, the test appeared successful. The data will be reduced and analyzed at Goddard which manages the NASA Sounding Rocket Program.

Instrumentation was designed by Donald Tackett, and built and checked by Bill McAlister.

Adequate performance data was not achieved in the first NASA flight test conducted in April 1963. A nose fairing failure ended the flight 16 seconds after launch.

The Astrobee 1500 is being developed to carry heavy scientific payloads to high altitudes. It is designed to boost a 250-pound payload, for example, to 750 statute miles, or a 60-pound payload to over 1600 miles, with a normal launch elevation of 80 degrees.

Top Thrust

The rocket is 32 feet long and weighs 11,714 pounds, less payload. The first stage has a 31-inch diameter and the second stage, 21 inches. The first stage is an Aerojet Junior solid-propellant rocket motor augmented by two Thiokol Recruit rockets. The Aerojet motor has a burning time of slightly over 40 seconds, developing an average thrust of about 51,870 pounds. The Recruits burn for 2.4 sec-

(Cont'd on Page 3)

NEW ULTRAVIOLET SPECTROGRAPH DEVELOPED BY GODDARD

Alfred K. Stober examines a vital part of the new spectrograph: the light collimator, made from a quarter-section of a single cylindrical parabolic mirror which is thought to be the largest of its type ever ground.

Man may soon get his first look at the middle ultraviolet region of "airglow," the night-sky phenomenon that has puzzled scientists since first observed over a hundred years ago.

Goddard scientists have developed a new ultraviolet spectrograph which will be rocketed above the earth's atmosphere to collect data that is unattainable from the ground.

The spectrograph is compact enough for two of the instruments to be installed in the nose cone of a single Aerobee rocket. It is sensitive enough to record the required data during the four minute useful recording time in flight.

Extending from an altitude of about 65 miles down to 50 miles, airglow is a thin layer on the outer edge of the earth's atmosphere which emits energy ranging from infrared through the visible and all the way down to the far ultraviolet end of the energy spectrum. Its origin is associated with photochemical reactions of gases caused by radiation from the sun.

(Cont'd on Page 3)

James Greenacre, of ACIC at Lowell Observatory, peers into the "Moon Blink" demonstrator as S. H. Vogt of Headquarters and J. J. Gilheany of Trident look on.

Operation "Moon Blink"

John J. Gilheany, assistant science professor at the U. S. Naval Academy, will talk on the "Moon Blink" project at the Goddard Astronomy Club meeting November 4, 12:45 p.m. in Room 168. Bldg 8. Background and operational techniques of the new project are of top interest in the astronomical world.

One of the most significant lunar observations ever made, rivaling the Ranger VII photographs and the Russian pictures of the back of the moon, was the spectrogram of the crater Alphonsus made by N. A. Kozyrev of the Crimean Astrophysical Observatory on 3 November, 1958. The emission spectrum he obtained showed a fluorescence of gases issuing from the central peak of the crater. Some controvery exists concerning Kozyrev's interpretation of the spectrogram, but the presence of an emission spectrum can not be questioned.

On October 29 and November 27 of last year, Greenacre and Barr of the USAF Aeronautical Chart and Information Center at Lowell Observatory made a visual observation of red spots in the region of the crater Aristarchus. Since that time a number of observations of red spots or a pink haze on or above the lunar surface have been reported by amateur and professional astronomers. The most recent observation was made in the Aristarchus region by Sol H. Genatt and Ed Reid of Goddard on August 25th of this year.

The Office of Advanced Research and Technology, NASA Headquarters, became extremely interested in this phenomenon. Dr. James B. Edson technical assistant to the head of that office, considers them of significance, both from the standpoint of possible extraterrestrial resources and as possible health hazards to lunar astronauts. Trident Engineering Associates, Inc., of Annapolis, Maryland, was awarded a Goddard contract by the Theoretical Division and OART to design equipment and develop its implementation for the detection of this color phenomenon and to establish a lunar surveillance network of professional and amateur astronomers to maintain a nationwide lunar watch. The detection equipment and the program itself have earned the nickname "Moon Blink."

The "Moon Blink" technique consists of intercepting the telescopic image with alternative red and blue filters. The image is then viewed on an image tube (amateur version) or on a television screen (professional version). By alternating the filters, any portion of the lunar surface which is covered by a red-orange colored haze will blink in and out of the picture, thus being readily detectable.

One such station, the Johnson Observatory at Port Tobacco, Maryland, has been operational for the last three months. It is equipped with a 16-inch reflecting telescope and the amateur version of the "Moon Blink" equipment. This station, staffed by Trident, is the first of its type in existence.

Present planning is for a nationwide "Moon Blink" network consisting of twenty stations to be manned by amateur astronomers and six to be manned by professional astronomers. All of these stations will be connected by a "hot-line" telephone network, presently being established by Mrs. W. Cameron, Code 641. Upon detection of occurrence of lunar outgassing, attempts will be made to determine spectroscopically the exact nature of the gases.

Primary emphasis has been placed on establishing the amateur portion of the network first. The "Moon Blink" equipment will be distributed to the amateur astronomers on a loan basis, and participation in the program is voluntary. It is planned that the first five models will be distributed and operational prior to the lunar eclipse of 19 December.

Javelin Probes Explorer XX Region

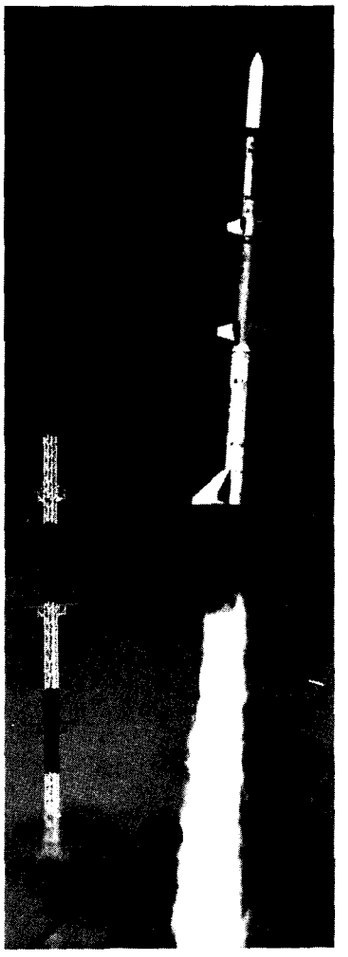
The flight of a sounding rocket was timed October 23 to coincide with the passage of the Explorer XX, the Fixed-Frequency Topside Sounder satellite which was launched last August for ionospheric studies.

The four-stage solid-propellant Javelin (Argo D-4) was launched from Wallops Island, Virginia, with a 95-pound payload containing delicate instruments particularly designed to measure low-level cosmic radio noise which penetrates and is absorbed in the ionosphere.

Receivers on Explorer XX, in the intervals when not receiving signals "bounced" from the ionosphere by the satellite, are being used as an experiment in radio astronomy, specifically to investigate cosmic noise source at wavelengths which do not penetrate to the earth because of the shielding effect of the ionosphere.

The launch of the Javelin was programmed to send the rocket payload up through the region of the satellite about 15 minutes after Explorer XX passed through the area at about 650 statute miles altitude. Allowance had to be made for adequate distance between rocket and satellite so that satellite's sounding transmissions would not interfere with the rocket experiments. Today's experiment will provide scientists with data for comparing measurements made by the satellite's instruments with those made by the rocket payload.

The Project Scientist, Goddard's Dr. Robert G. Stone, reported that 18 minutes of scientific data were telemetered from the rocket payload, which reached an altitude of 660 statute miles and impacted in the ocean 650 miles from Wallops Island, and that from a preliminary examination, "the results of the flight looked good." The data gathered from the rocket and satellite will be processed at Goddard.



Liftoff of the four-stage solid-propellant Javelin (Argo D-4) with a 90-pound payload on October 23 from Wallops Island, Va. The firing was timed to coincide with the passage of the Explorer XX, the Fixed-Frequency Topside Sounder Satellite, launched last August for ionospheric studies.

Astrobee

(from Page 1)

onds, each developing about 36,000 pounds thrust.

The second stage is an Aerojet Alcor solid motor, having a 30-second burning time and developing about 8460 pounds thrust.

The Astrobee 1500 is built by the Space General Corporation under contract to Goddard. Space General is a subsidiary of Aerojet General Corporation.

Spectrograph

(from Page 1)

Data collected with the spectrograph will extend man's knowledge of the phenomenon by helping with the identification of the constituents and mechanisms producing the airglow. It is this type of data which permits man to better understand the effects of solar radiation on the earth's atmosphere. This, in turn, will enhance his understanding of the atmosphere of other planets such as Venus and Mars.

Airglow energy from anywhere within a 30 degree angle is admitted through one end of the spectrograph by a narrow, knife-edge slit about four inches long. The energy then falls on a collimator made from the quarter-section of a cylindrical parabolic mirror. Since this mirror focuses only in one dimension, it collimates the energy into a one-dimensional strip, the rays of which are parallel to within less than 1/8th of a degree.

A four-inch wide plane grating picks up the light relayed from the collimator and breaks it down into a spectrum which is recorded with an F.07 camera system. A timed shutter on the camera initiates and terminates exposure of the camera's film to the airglow energy at the appropriate time during flight.

When developed, the single film frame in the spectrograph camera will show the energy spectrum of the airglow phenomenon. By detecting the energy peaks on the recorded spectrum, the constituents emitting light in the middle ultraviolet region of the airglow's energy spectrum can be identified.

Two spectrographs will be installed as redundant and complementary systems in the nose cones of each of two Aerobee sounding rockets preparatory for flight.

Hatches on the sides of these nose cones are designed to be ejected in flight to allow the spectrograph to view the airglow during flight.

Attitude control systems on the rockets will point the vehicle so that the spectrographs will view the horizon where the airglow is brightest. When the rockets re-enter the atmosphere, the nose cones are separated and parachuted to earth for recovery.

Goddard plans to fly the four spectrographs during late November and early December of this year. They will be launched at night from the White Sands Missile Range in New Mexico.

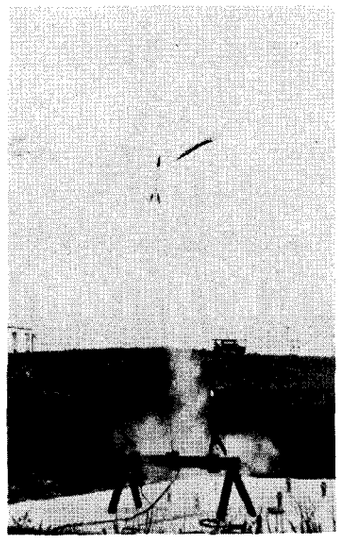
The unique spectrographs were designed and built at Goddard. The light collimator in each unit was made from a quarter-section of a single F0.9 cylindrical parabolic mirror measuring 9.5 inches wide by 12 inches long. This mirror is thought to be the largest of its type ever ground.

Project manager for the spectrograph rocket payload is John Hennes of the Astrophysics Branch in Goddard's Space Sciences Division. The special mirrow was provided by the Optics, Plastics and Plating Branch in Goddard's Fabrication Division. This Branch is headed by John W. Larmer.

ROCKET TEAMS PUT ON SHOWS

PREP-LAUNCH—James Kukowski, Executive Secretary, NAR, prepares a model rocket for launching.

COUNTDOWN—Johnny Nowakowski shouts he's ready, completes his count, and pushes the launch button. Left to right are Jim Barrowman, Margaret Nowakowski, Kathy Maxen, Sunpaper photographer (sitting), Robert C. Baumann, Chief, Spacecraft Integration and Sounding Rocket Division at Goddard, and his children.



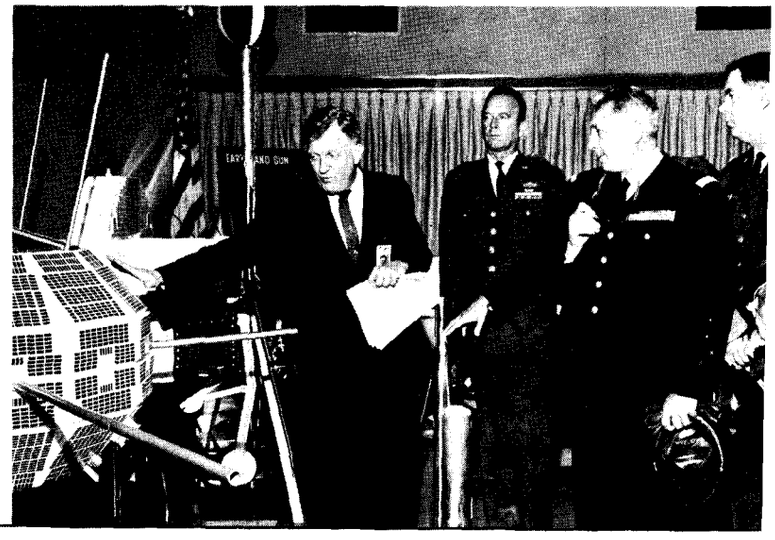
LIFTOFF!—Rocket after rocket shot skyward, under NAR supervision, at the SI&SR Division picnic.

More than a hundred model rockets of various shapes and sizes whooshed off the launching pad at the Goddard Recreation Area during the annual picnic of the Spacecraft Integration and Sounding Rocket Division.

The launching was done under the sharp eye of James Kukowski, Executive Secretary of the National Association of Rocketry (NAR), who supervised the NAR demonstration team doing the firing.

Another rocket squad, called "The Star-Spangled Banner Section" of the NAR comprising youths of the Baltimore area, also launched a number of regulation-sized rockets, under the supervision of Howard L. Galloway, Goddard Physicist, of the Flight Performance Section.

Eugene W. Wasielewski (below left), Goddard's Associate Director, answers the questions of General André Martin (holding glasses), Chief of Staff, French Air Force, at the Building 1 Satellite Exhibit during the latter's Goddard visit October 15.

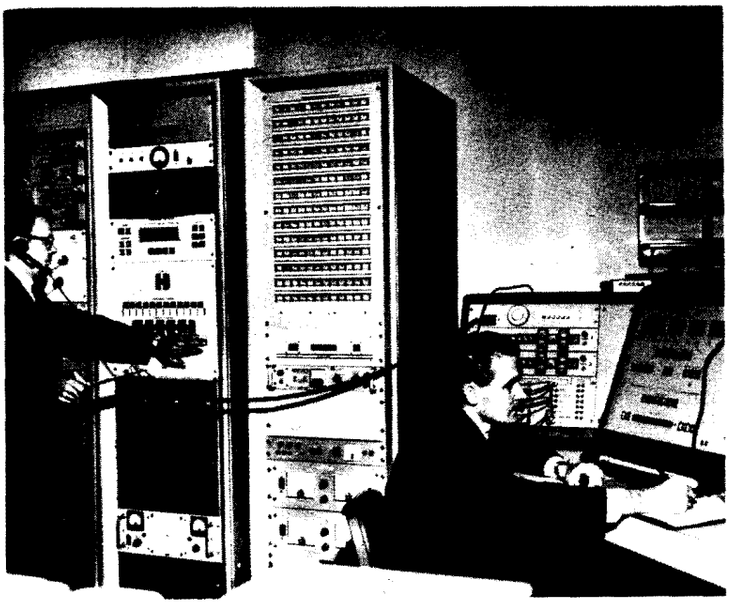


SPACECRAFT CONTROL

COMSOC
Communications Spacecraft Operations Center

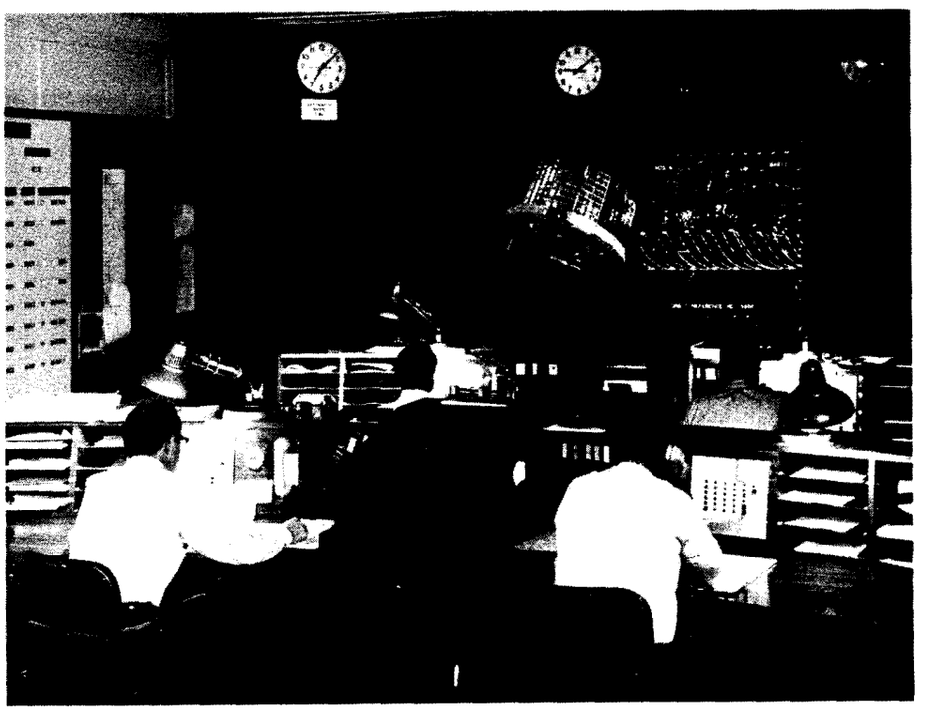
John B. Zegalia, COMSOC Ground Operations Manager, checks the status of communications satellites: RELAY I and II, ECHO II, TELSTAR II, SYNCOM II and III.

OGO
Orbiting Geophysical Observatory



James Ippoliti, (left), commands OGO-I via Rosman, N.C., STADAN (Space Tracking and Data Acquisition Network) while James Leitzel controls Real-Time operations. Ronald O. Britner is the OGO Ground Operations Manager.

TIROS
Meteorological Satellites



Controllers keep tabs on TIROS VII and TIROS VIII, monitoring their precise positions, locations in space, and the status of the ground stations.

SO
Space Operation

Both worldwide tracking systems: S Flight Tracking Network can be cont here, launch operations are monitor Cape Kennedy or the Western Test

CENTERS AT GODDARD

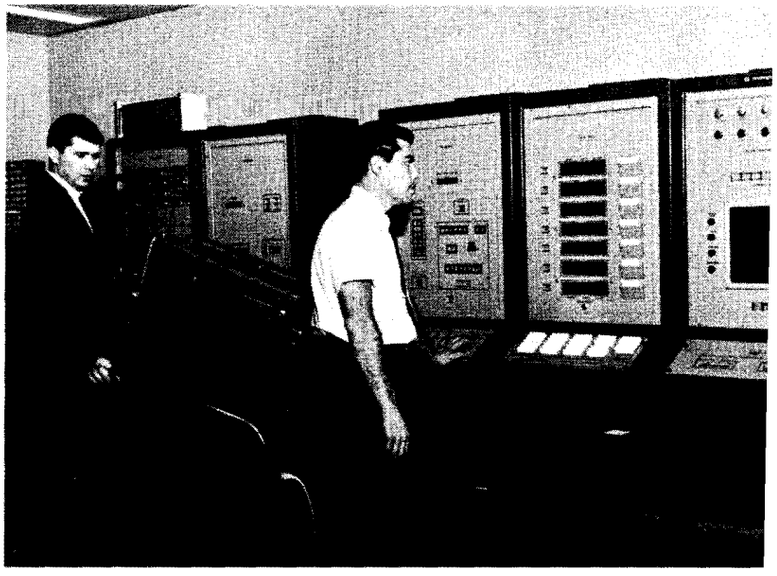
OSO
Orbiting Solar Observatory

(OSO–B is scheduled for launch in fourth quarter of 1964.)

Discussing the set-up of the new OSO Control Center are (left to right) John F. South, Head, Spaceflight Branch, William F. Mack and Neil C. Carrigan.

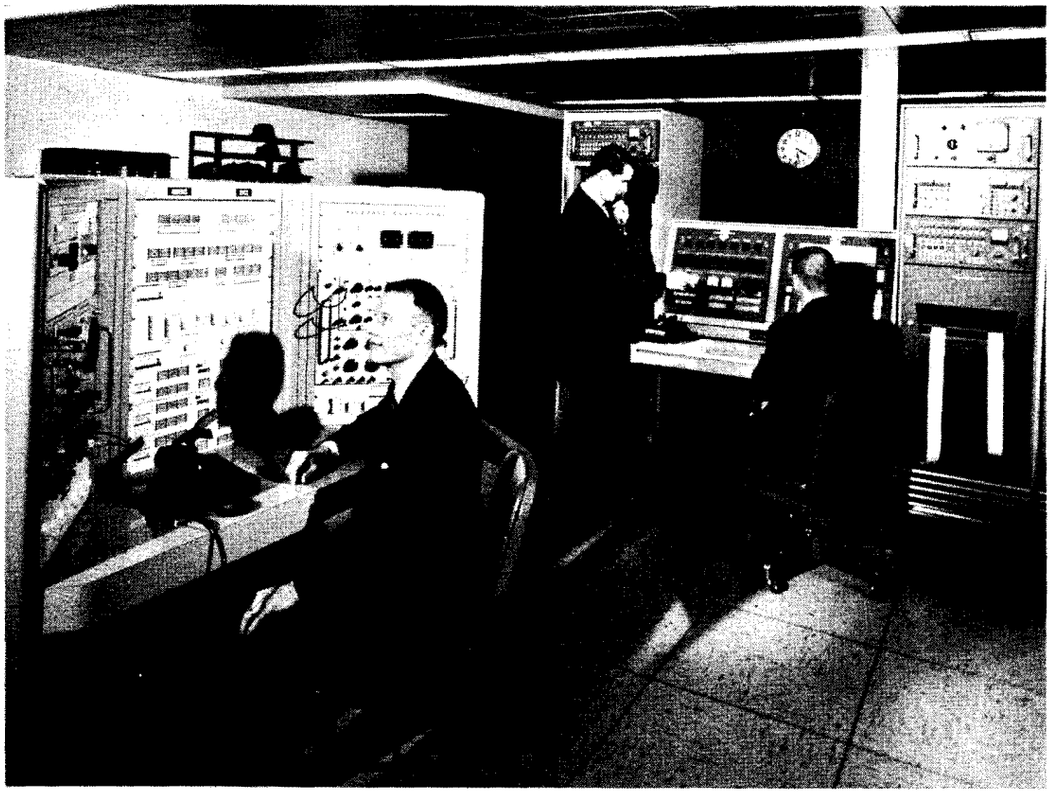
John South waits for OSO in the control center's new home in Building 14, which will soon be like a beehive of activity as OSO-B's launch nears.

OAO
Orbiting Astronomical Observatory



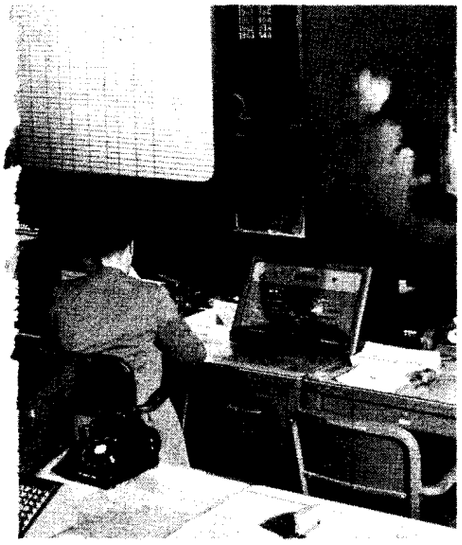
Thomas Underwood, (left) checks the OAO ground operations equipment while Jerome Taube commands the AD/ECS (Adaptable Digital Electronic Computer System) via the control console.

NIMBUS
Meteorological Satellite



Bill Ormsby (foreground), is at the console of AVCS (Advanced Vidicon Camera System Control). The Nimbus spacecraft control console is in the background.

;CC
ıs Control Center



'ADAN and Goddard's Manned Space olled from this SOCC complex. From d through data acquired from either Range facilities.

Scientist-Astronauts

(from Page 1)

The Office of Space Science and Applications, NASA Hqs., and the National Academy of Sciences have cooperated in developing the scientific criteria for the selection process and the Academy will conduct the screening for scientific qualification of the applicants. The Office of Manned Space Flight and the Manned Spacecraft Center, Houston, Texas, will be responsible for all other aspects of selection criteria and screening.

On April 16, the National Academy of Sciences was requested to participate in establishing scientific criteria for scientist-astronauts by Dr. Homer E. Newell, Associate Administrator for Space Science and Applications, in a letter to Dr. Harry H. Hess, Chairman of the Academy Research Council Space Science Board.

Scientific criteria were developed by the Space Science Board ad hoc Committee on Scientific Qualifications of Scientist-Astronauts which began a series of meetings in May.

The scientist-astronaut program is open to scientists in scientific, medical or engineering specialties or in any combination of those specialties. To be eligible for the scientist-astronaut program, an applicant must:

1. Have been born on or after August 1, 1930; be a citizen of the United States; and be no taller than six feet.

2. Have (a) a Bachelors degree and (b) a Doctorate in the natural sciences, medicine or engineering, or the equivalent in experience.

3. Have transcripts of academic records sent directly to Scientist-Astronaut, Post Office Box 2201, Houston, Texas, 77058, from all institutions of higher education which he has attended.

4. Have scores in the graduate record examinations sent by Educational Testing Service, Princeton, N. J., directly to Scientist-Astronaut at the Houston address above. (NOTE: Examinations will be given Jan. 16, 1965. Completed application and examination fee must reach Educational Testing Service by Dec. 31, 1964.

In the event that an applicant has not taken graduate record examinations and plans to take the Jan. 16 examination, he should note on his application that scores from that examination will be forwarded directly to Scientist-Astronaut, Houston. by the Educational Testing Service.)

5. Submit a Standard Form 57, Federal Employment Application Form, available at any U. S. Post Office.

6. Submit a Standard Form 89, Report of Medical History, obtainable at any U. S. Post Office. This form should be signed by both the applicant and his physician.

7. Submit Standard Form 78, Certificate of Medical Examination, Part A to be completed by applicant and Part B, Questions 1 through 21, to be completed by his physician. This form also is available at local post offices or offices of the Civil Service Commission.

All applicants should address their applications, postmarked no later than midnight, Dec. 31, 1964, to Scientist-Astronaut, Post Office Box 2201, Houston, Texas, 77058.

Application forms are now available at the Goddard Personnel Office.

JOHN C. NEW, Chief, Test and Evaluation Division, has been named president of the Society of Experimental Stress Analysis (SESA).

"Just Routine" in The Comsat Department

The Goddard News reporter went to Building 6 to see if he could find a communications satellite story. The place was buzzing like a beehive, people rushing from huddled conference to huddled conference. Finally a hardworking COMSAT type found time for a word.

"Everything here is just routine. Nothing much cooking."

"What are all the conferences about?"

"Most of those guys are working on ATS."

"What's ATS?"

"Applications Technology Satellite. We used to call it the Advanced Technology Satellite, but what was current and experimental yesterday is old hat and operational today, and what was advanced yesterday is current now. ATS is the world beyond Syncom and Relay anl Telstar and Echo. It will have about everything. Communications experiments. Meteorological and scientific ones. New wrinkles in stabilization and control. New antenna designs. You name it. It will probably fly on ATS."

"There must be a good story there."

"Relax. It doesn't fly until 1966. Let the dust settle. We had room for a few extra experiments to go aboard ATS, so we asked for proposals, thinking we'd get a couple or three. We got more than 200, and it will take a while just to sort them out, let alone make choices."

"How about the Syncoms and Relays and Echos? Are they doing anything spectacular nowadays?"

"No, just routine stuff."

"Such as?"

"Well, Syncom III is bringing in the Olympics everyday, of course. With the help of the Japanese, Comsat Corp., U. S. Navy, NASA, NBC, the Canadians and the Europeans, it's being sent from Japan to Syncom to Point Mugu, Cal., to Montreal live, then the tape goes to Hamburg by plane so Europe sees the Olympics every day in prime time. The American nets use some of it, too."

"I hear the TV transmission quality of Syncom III is great, better than predicted."

"Well, you have to be a perfectionist in this kind of work. Syncom II is doing great, too, by the way."

"I'm new here at Goddard. I don't understand this. Here I see people working like crazy. All over the world at ground stations people are working, making this communications satellite thing a huge success. Yet you say it is just routine."

"That's right. Transatlantic planes also are landing at Paris every hour, and not a one of them gets the play Lindbergh did. They are doing a great job, but it is routine."

"How about the Relays? Routine also."

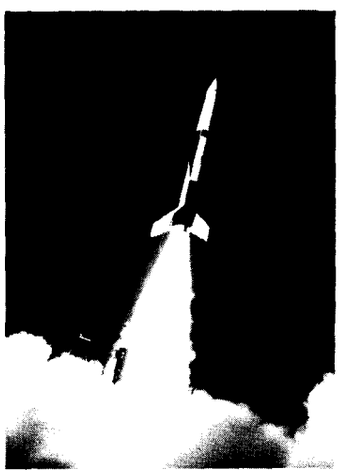
"Yes. Both are working great. They used them the past few days to send a teletype message from the president of Brazil to the people of France, to bring us the British elections, and to send Olympic stuff to France."

"And the Echos?"

"They are relaying voice messages and music from Dallas to Stump Neck, along with photofacsimile pictures. Some are real good, even those sent by Echo I."

"All this sounds like a big success story to me. If all this is so routine, how come everybody is working like crazy?"

"They've been working like that the past four years. And from the way ATS is shaping up, and the Early Bird shots, and new inflatable structure studies, it looks like this routine is going to continue the same way for the next four."



Astrobee 1500 Launch.

Sounding Rockets To Be Launched From Shipboard

A mobile sea-going platform will be the base from which forty or more scientific experiments will be launched next year as part of the sounding rocket program being conducted during International Quiet Sun Year (IQSY) 1964-65.

NASA plans a three-month expedition, using a converted aircraft transport, to launch sounding rockets through areas of the upper atmosphere and ionosphere that cannot be reached by land-based rockets.

The project is under the overall direction of NASA's Office of Space Science and Applications with the Goddard Space Flight Center responsible for coordinating most of the scientific experiments. The NASA Langley Research Center, Hampton, Va., will also participate.

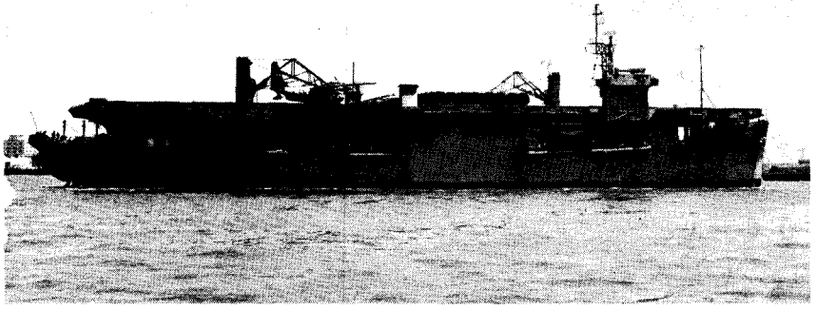
Goddard's part in the project will be handled by Karl R. Medrow's Sounding Rocket Branch.

Two Goddard engineers will be aboard ship from Ed Bissell's Sounding Rocket Instrumentation Section. The engineers are John I. Hudgins and James R. Lease. They will be responsible for certification of payload, readiness for flight, and liaison between the experimenter and the Wallops Mobile Range.

Many Goddard people figured predominently in setting up the experiments, including Carl Seddon, Robert Bourdeau, Dr. Neil Davis, Dr. Arthur Aikin, Dr. James Heppner, Wendell Smith, Giles Spaid, and John Stolarik.

John I. Hudgins, Manager, Attitude and Position Determination.

James R. Lease, Instrumentation Engineer for shipboard project.



USNS Croatan, launch platform for the Nike-Apache and Nike-Cajun sounding rockets, has been converted to an aircraft ferry from use as an escort aircraft carrier. It will be furnished and staffed with civil service personnel by the U. S. Navy's Military Sea Transportation Service under contract with NASA.

Edward E. Bissell, Jr., Head, Sounding Rocket Instrumentation Section.

Water-Saving Studied

The Facilities Engineering Division of OTS formed a committee last February to ensure prudent use and conservation of city water and to monitor and review the centers' water consumption on a regular recurring basis.

In forming this committee, Mr. N. Philip Miller, Chief, Facilities Engineering Division, pointed out how significant savings in water consumption could be made possible by modifying existing systems and by careful planning for the installation of new equipment.

All Goddard personnel are encouraged to participate in this program. Any suggestions or questions pertaining to this may be directed to Mr. L. R. Shipp, who is chairman.

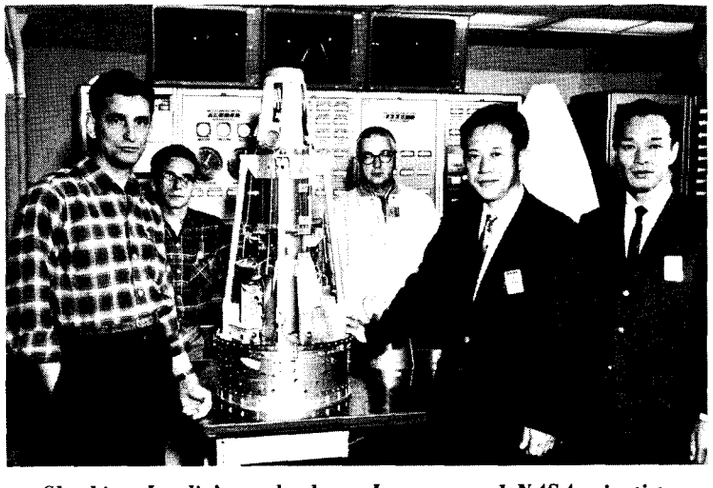
SIXTH JAPAN-U.S. IONOSPHERE EXPERIMENT LAUNCHED

On October 19, NASA launched the sixth payload of Japan-U.S. experiments in a cooperative program to investigate properties and characteristics of the ionosphere.

The experiments were sent aloft from the NASA's Wallops Island, Virginia, by a four-stage solid propellant Javelin (Argo D-4) sounding rocket. The 125-pound payload reached a peak altitude of about 521 statute miles and impacted in the Atlantic Ocean 840 miles from the launch site.

Telemetry during the flight was intermittent, and full results of the experiments are still inconclusive. The data are being reviewed and analyzed. Recovery of the payload was not necessary.

The project scientist for the U. S. -Japanese experiments is Dr. Kunio Hirao, Chief Scientists, Radio Research Laboratory, Tokyo. Giddeon P. Serbu is the NASA Goddard Program Manager. Ralph D. Welsh is the Wallops Project Engineer.



Checking Javelin's payload are Japanese and NASA scientists (left to right): Gideon P. Serbu, Goddard Program Manager; Robert B. Pincus, Payload Engineer; John G. Guidotti, Vehicle Manager; Dr. Kunio Hirao, Chief Scientist, Radio Research Laboratory, Tokyo, who is Project Scientist for the U. S.-Japanese experiment; and Toshio Muraoka, Scientist with the Yokohawa Electric Co., Tokyo.

Dr. Priester Wins Post In West Germany

Dr. Wolfgang Priester, who has concluded a year's work as a senior research scientist at the Goddard Institute for Space Studies, has returned to Bonn University in West Germany to become Director of the Institute of Astrophysics and Space Research. He has also been appoined as co-director of the university's Astronomical Institute.

During his stay at the Goddard Institute, Dr. Priester continued his research on the effect of solar activity on the heating of the upper atmosphere. In a paper to be published November 1 in the Journal of Geophysical Research, Priester and co-authors Richard Horowitz of NASA Headquarters and George P. Newton of the Goddard Center, show that the heating of the upper atmosphere during quiet geomagnetic conditions due to an energy source which derives its energy from the solar corpuscular radiation is much stronger than was realized before.

During geomagnetic storm conditions, it is known that there is additional heating of the upper atmosphere. This was determined in 1959 by Dr. Luigi Jacchia of Cambridge, Massachusetts from an analysis of satellite drag data. From his conclusions, it was expected that during quiet conditions with no geomagnetic storms but only mild variations of the index of the geomagnetic field, the heating of the upper atmosphere would vary up to 20°K. Now it has been found from analysis of the Explorer 17 satellite data that the variation of the exospheric temperature during quiet conditions actually goes up to 200°K. This is ten times greater a variation than had been previously expected.

The data for this discovery were obtained by density guage measurements on board the Explorer 17 satellite at an altitude of 250 to 600 km. Richard Horowitz of NASA Headquarters and George P. Newton of the Goddard Center worked together in obtaining the data.

The findings of Horowitz, Newton and Priester were independently confirmed at the same time by Jacchia at Cambridge.

Dr. Wolfgang Priester

During his year at the Institute, Dr. Priester also extended his research on "the second heat source" of the upper atmosphere. In July, 1962, Dr. Priester in collaboration with Dr. Isadore Harris of the Goddard Center, suggested the theoretical necessity of an additional heat source outside the absorption of the solar ultraviolet radiation.

There were sound theoretical reasons to expect a correlation between the extreme ultraviolet flux and the solar radio radiation. This correlation has since been confirmed by measurements on board the OSO satellite. Thus, it seemed that the extreme ultraviolet and x-ray radiation which is generated in those active regions of the solar corona would be sufficient for the heating of the upper atmosphere. But with an extreme ultraviolet heat source alone, it was not possible to reproduce theoretically the observed day to night variations in the density and temperature above 200 km.

In August, 1964, Dr. Priester and Dr. Harris published their findings after further investigation of this problem with particular emphasis on the several possibilities which could be thought to eliminate the requirement for "the second heat source."

Dr. Priester joined the Institute staff in 1961 as a senior research scientist for one year under a National Academy of Science-National Research Council grant. He returned in 1963 for one year under a similar grant. During both visits Dr. Priester lived close to the Institute on Riverside Drive with his wife, Gisela, and his five year old son, Ashim.

GODDARD NEWS

NOVEMBER 2, 1964

"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

Photography by Goddard's photo branch

Jerry Stark, *Editor* Shirley Deremer, *Inside Goddard*

**Press date precedes publication date by approximately seven days.*

Recent Technical Publications Authored by Goddard Staff

J. J. Freeman, "Real-Time Compensation for Tropospheric Radio Refractive Effects on Range Measurements," NASA Contractor Report CR-109, October, 1964.

W. Smith, L. Katchen, P. Sacher, P. Swartz, and J. Theon, "Temperature, Pressure, Density, and Wind Measurements with the Rocket Grenade Experiment," NASA Technical Report TR R-211, October, 1964.

Goddard Speech and Paper Presentations

(Technical presentations approved as of November 2, 1964, for period through November 19. Requests for copies of speeches and papers should be made directly to the author.)

Patrick Thaddeus, Stevens Institute of Technology, October 28, 1964, Hoboken, New Jersey, ***"Radio & Radar Astronomy of Planets."***

Robert Jastrow, New York Medical College, November 6, 1964, New York City, New York, ***"Man and His Future Environment."***

A. G. W. Cameron, New York Naval Applied Science Laboratory, September 25, 1964, Brooklyn, New York, ***"Communicating with Intelligent Life on Other Worlds."***

Tatsuzo Obayashi, The City College of New York, Physics Department, October 1, 1964, New York, New York, ***"Recent Studies on Magnetosphere."***

Robert Jastrow, American Association for the Advancement of Science, October 1-3, 1964, Washington, D.C. (No title of speech at present time.)

Henry Maurer, Jr. BIS and SEE Symposium on Space Environment Simulators, November, 1964, London, England, ***"Space Environment Simulators for Spacecraft Testing at GSFC."***

J. C. New, Institute of Environment Sciences, Eastern Regional Symposium, November 5-6, 1964, Baltimore, Maryland, ***"The Technical Project Engineer, His Functions, Education & Training."***

John A. O'Keefe, Colloquium on Fluid and Plasma Dynamics, Case Instit. Tech., November 6, 1964, Cleveland, Ohio, ***"Fluidization and the Origin of the Lunar Maria."***

Robert E. Bourdeau, University of Pittsburgh, November 12, 1964, Pittsburgh, Pennsylvania, ***"Research Within the Ionosphere."***

D. C. Kennard, Space Simulation Testing Conference, American Institute of Aeronautics & Astronautics, November 16-18, 1964, Pasadena, California, ***"Where Do We Go From Here?"***

K. R. Mercy, Space Simulation Testing Conference, American Institute of Aeronautics & Astronautics, November 16-18, 1964, Pasadena, California, ***"Performance Reliability Improvement of GSFC Spacecraft by Environmental Testing."***

E. J. Kirchman, Space Simulation Testing Conference, American Institute of Aeronautics and Astronautics, November 16-18, 1964, Pasadena, California, ***"Launch Phase Simulator."***

J. E. A. John and William F. Hardgrove, Space Simulation Testing Conference, American Institute of Aeronautics and Astronautics, November 16-18, 1964, Pasadena, California, ***"Simulating the Space Vacuum Environment."***

Robert Jastrow, New York Medical College, November 6, 1964, New York City, New York, ***"Man and His Future Environment."***

Ishtiaq Rasool, State University College, November 9, 1964, Oswego, New York, ***"Atmospheres of Mars and Venus."***

H. Fortak, New York University, November 10, 1964, New York City, New York, ***"Certain Aspects of Lagrangian Hydrodynamics."***

Patrick Thaddeus, IBM Research Center, November 12, 1964, Yorktown, New York, ***"Radio and Radar Astronomy of the Solar System."***