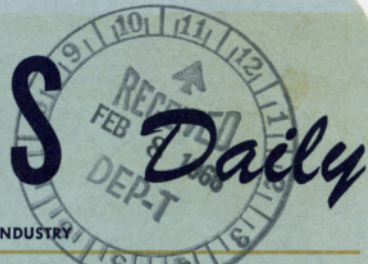


SPACE BUSINESS



FIRST DAILY MANAGEMENT NEWS SERVICE FOR THE MISSILE / SPACE INDUSTRY

SPACE PUBLICATIONS, INC.
ME. 8-0900 ME. 8-1577

WASHINGTON, D. C.
Cable: SPACE

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TWX: 202 — 965-0765 (SPACE - WASHINGTON)

Published five times a week by Space Publications, Inc., at 1341 G St., N.W., Washington, D. C. 20005
Subscription rates: \$175.00 for one year, \$110.00 for six months, \$20.00 for one month.
Permission for reproduction of this publication should be obtained from the editors.

Wednesday, February 2, 1966

Vol. 24, No. 22

39 ATTEND AA PREPROPOSAL CONFERENCE. Thirty-nine firms yesterday attended the preproposal conference at NASA-Marshall on the RFP for the integration of experiments and the modification of spacecraft for the **AA (APOLLO Applications)** program (SPACE Daily, Jan. 17 and 20). Although 23 firms were initially sent RFPs on the contract, only 19 of these firms attended the conference. Twenty additional firms asked to be included in the RFPs. The contract covers experiment integration in the **S-IVB** upper stage and the **LEM**; necessary modifications to the **LEM**; plus operation of a Payload Integration Facility.

The firms who were originally sent RFPs and attended yesterday's conference were: Aerojet-General, Bendix, Boeing, Chrysler, Douglas, General Dynamics, GE, Goodyear, Hughes, IBM, Ling-Temco-Vought, Lockheed, Martin, McDonnell, Honeywell, Northrop, RCA, Fairchild-Republic, and TRW Systems. In addition, the following firms also attended the conference: AC Spark Plug, Astro-Tec, Emerson Electronics, Garrett, Grumman, Hayes International, H.R.B. Singer, Industrial Nucleonics, Kollsman Instrument, North American, Philco, Planning Research Corp., Scientific Data System, Spacecraft Inc., Sylvania, Texas Instruments, United Aircraft, Westinghouse, Federal Electric, and Giannini Controls. Four firms were originally sent RFPs but did not attend the conference: Avco, Bell Aerospace, Raytheon, and Sperry Rand.

JOHNSON SUBMITS SPACE REPORT TO CONGRESS. President Johnson Monday transmitted his Report on Aeronautics and Space Activities to the Congress, calling 1965 "the most successful year in our history." The report cited U.S. accomplishments in the **GEMINI, RANGER, MARINER** and **EARLY BIRD** programs. "Research and development in our space program continued to speed progress in medicine, in weather predictions, in electronics--and, indeed, in virtually every aspect of American science and technology," the President said. "It continues to stimulate our education, improve our material well-being, and broaden the horizons of knowledge. It is also a powerful force for peace." The year 1965, the President told Congress, "is a brilliant preface to the coming years of **APOLLO**, stations in space, and voyages to the planets."

DOD TO ORBIT TACTICAL COMSAT LATE NEXT YEAR. The DOD will orbit a synchronous or near-synchronous communications satellite on a **TITAN III-C** late next year as the first step towards improving long-range Strategic Air Command communications. The Air Force, Army, and Navy will have mobile ground stations to support the satellite. Teletype transmissions will be used primarily.

The Leader in Missile/Space Reporting

LUNIK IX LAUNCHED TOWARD MOON. The ninth Soviet lunar probe and what is probably the sixth attempt to soft-land a spacecraft on the Moon was launched from the Soviet Union on Monday. The **LUNIK IX** probe was reported to be on "a trajectory close to the calculated one" and all equipment was reported to be functioning normally. As predicted, the sixth attempt to land a spacecraft on the Moon came quickly after the failure of **LUNIK VIII** (SPACE Daily, Dec. 7).

SENATE CONFIRMS SEAMANS' NOMINATION. The Senate has confirmed President Johnson's nomination of Robert C. Seamans Jr. to be Deputy Administrator of NASA, succeeding the late Dr. Hugh L. Dryden. The nomination, which was approved by a routine voice vote, was earlier approved unanimously by the Senate Space Committee (SPACE Daily, Jan. 31).

GEMINI VIII SPACECRAFT MATED. The spacecraft for the **GEMINI VIII** mission, presently scheduled for about March 15 (SPACE Daily, Jan. 24, p. 134), is currently being mated with its **TITAN III** booster at Cape Kennedy. The decision over whether to use the **AGENA** Target Vehicle or the substitute **ATDA** (Augmented Target Docking Adapter) passive docking target (SPACE Daily, Jan. 20) is apparently causing a slip in the proposed launch date. The **AGENA** Target Vehicle is currently undergoing high-altitude firing tests by the Air Force to validate the modifications made as a result of the failure of the **AGENA** during the abortive **GEMINI VI-AGENA** mission.

NERVA BREADBOARD TEST SET TOMORROW. The first test coupling a **NERVA** reactor and other engine components for power operation as a complete nuclear rocket propulsion system is scheduled tomorrow at the AEC/NASA site at Jackass Flats, Nev. The test had been set for December (SPACE Daily, Nov. 19). The objective of the test series, which is expected to continue for several weeks, is to determine the startup characteristics of a nuclear rocket engine, to determine component interactions, and to map stable operating range to full power conditions. Aerojet, **NERVA** prime, and its reactor subcontractor, Westinghouse Astronuclear Laboratory, will conduct the tests.

FIRST SATURN IB LAUNCH SET FOR 22ND. The first launch of the **SATURN IB** vehicle, **SA-201**, has been scheduled for February 22 (SPACE Daily, Dec. 17) in a suborbital, unmanned test of the heat shield for the **APOLLO** Command Module. The **SA-201** flight will be a simultaneous test of the **S-IB** first stage, the **S-IVB** second stage, the Service Module engines, and the Command Module heat shield (The **LEM** Adapter will contain only structural framework; there will be no test of the **LEM**). The **APOLLO-009** spacecraft to be used will have several significant deletions, principally in the crew systems (couches, waste management, scientific equipment, etc.) in the Command Module and the fuel cells, cryogenic storage system and DSIF antenna in the Service Module.

S-IB-I and **S-IVB-I** were mated at Cape Kennedy last October (SPACE Daily, Oct. 5) and the **APOLLO-009** spacecraft arrived in the latter part of the month (SPACE Daily, Oct. 28).

NAS RECOMMENDS SPACE-ASTRONOMY PROGRAM--I. An increased effort on such programs as the now cancelled **AOSO** program (SPACE Daily, Dec. 16), **ATOM** (SPACE Daily, Jan. 24), **LOT** and **MOT** has been recommended by the Space Science Board of the National Academy of Sciences in Part II of its report, Space Research: Directions for the Future. (See SPACE Daily, Jan. 17 & 19 for Part I of the report.)

The report was prepared by a working group of scientists, under the direction of George P. Woollard, University of Hawaii, which convened last summer at Woods Hole, Mass. The report was prepared at the request of NASA. Space Agency contributors to the report included Dr. Homer Newell, Associate Administrator for Space Science and Applications, and William B. Taylor, Director of the **APOLLO** Applications Office.

Optical Astronomy: The following recommendations were made regarding a "short range" program, covering the period 1965-1975.

- 1) The number of coarse-pointing sounding rockets available each year for optical space astronomy should be doubled from the present level. A fine-pointing system for **AEROBEE** rockets should be made generally available as soon as feasible.
- 2) Two or more telescopes having apertures of 40 inches or larger should be included in the **APOLLO** Applications (**AA**) program. The Orbiting Astronomical Observatory (**OAO**) program should be continued until **AA** launchings are definitely scheduled. Recommended experiments: High-resolution imaging; infrared photometry and spectrophotometry with cryogenics; planetary spectroscopy in the ultraviolet; polarization and photometry; x-rays.
- 3) Development of various detectors required in space telescopes should be supported by NASA. These include infrared devices, image-registering devices using solid-state detection, new photographic emulsions, cryogenic apparatus, and television techniques for astronomical use.
- 4) Development of improved gratings and echelles, especially for ultraviolet work.
- 5) Development of optical interferometers should be pressed, with probably initial operation on the ground.
- 6) R&D concerned with problems of space-telescope optics, especially with the primary mirror, should be supported by NASA.
- 7) Support of ground-based astronomy should be increased.
- 8) Studies toward development of a Large Orbiting Telescope (**LOT**), which would be used after 1975, should be undertaken. The space telescope would have a resolution corresponding to an aperture of at least 120 inches. Man may play an important role for **LOT**. **AA** could be an important forerunner of the manned high-resolution **LOT**.

Solar Astronomy: The working group considered the time period 1965-1980 and made recommendations for specific experiments that might be initiated in three periods 1965-1970, 1970-1975, and beyond 1975. (The group said its study was based on the NASA

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Office of Space Science and Applications' Prospectus 1965, listing program opportunities for 1966-1985--in a draft dated June 10, 1965. The Prospectus is based on two possible situations: a constant budget--called the Minimal Growth Program--and a 5 per cent year increase above this. Note: the **AOSO** was still in the NASA program at the time the working group made its recommendations.

1) The **AEROBEE** sounding rocket program should continue to receive full support, with highest priority given to the development of triaxially stabilized rocket attitude controls. (The working group pointed out that Britain has successfully flown three solar-pointed **SKYLARK** rockets, placing them ahead of the United States in one branch of solar research.) Other improvements, such as increased payloads, peak altitudes, increased reliability and more dependable recovery techniques, should be made in existing rocket systems. The number of rockets available per year for research in solar astronomy should be at least doubled (25 to 40 **AEROBEE-150** rockets will be needed each year from now until 1975). Funds for payload development should be increased to an adequate level.

2) The presently approved Orbiting Solar Observatory (**OSO**) program should be augmented by at least four additional launchings during the 1970-1972 period. No decision should be made to terminate **OSO** after 1972 without further review at an appropriate time. NASA should make every effort to improve **OSO**, i.e. increased power, offset pointing, localized raster scans, provision for slightly longer instruments, greater data capacity and more flexible format, and improved pointing accuracy. Consideration should be given to injection of one or more **OSO** craft into a polar retrograde orbit.

3) The Advanced Orbiting Solar Observatory (**AOSO**) is an indispensable next step in NASA's solar program and must be flown close to the coming solar maximum. The working group said **AOSO** cannot be replaced during the 1970-1975 period. (Since the report, the **AOSO** has been terminated by NASA -- See *SPACE Daily*, Dec. 16, Jan. 21 and Jan. 25.).

4) Manned missions in the 1968-1972 time period, such as the Astronomical Telescope Orientation Mount (**ATOM**) in **AA**, are desirable to supplement **AOSO**, but cannot replace it. (See *SPACE Daily*, Jan. 24, 25 & 26). Nonetheless, the **ATOM** concept merits vigorous support.

5) Solar space observations should be included in the manned space science program of the **AA** program.

6) Feasibility and design studies should begin immediately on solar telescopes to follow **AOSO**. These Manned Orbiting Telescopes (**MOT**) should have at least a one-meter aperture designed to obtain a resolution of 0.1 sec of arc at visible wavelengths and 0.5 sec of arc at far ultraviolet wavelengths. Erection, operation and maintenance of this telescope will require full utilization of astronaut-engineers and scientists.

7) Provisions should be made for a continuing, uninterrupted experimental program while the more advanced manned flights are in preparation, with many flights of various spacecraft, so that a scientist will have frequent opportunities for observation.

8) NASA should find means to continue a strong program with relatively inexpensive rockets and small unmanned satellites at the same time the large manned projects are under way.

9) When a single, large scientific instrument is carried on a manned space flight, scientific observations should be designated the primary mission for the flight.

10) NASA should bring more scientists into the spaceflight program as astronauts or observers.

11) NASA should move to provide additional support for ground-based solar studies. This would include a few major ground-based solar installations.

12) Increased support should be given to physical research in the laboratory as required to develop improved space instrumentation for solar physics research, to assist in data reduction, and to make possible a full interpretation of the results. Lyman Spitzer, Princeton University Observatory, was chairman of the Working Group on Optical Astronomy; and Leo Goldberg, Harvard University, headed the Working Group on Solar Astronomy. (This report to be continued tomorrow.)

NAA NAMES NEW S-II PROGRAM MANAGER

Maj. Gen. R. E. Greer (USAF-Ret.), who joined North American Aviation last summer, has been named a vice president of the company's Space and Information Systems Division and **SATURN S-II** program manager. W. F. Parker, the current program manager, will continue with the program as deputy program manager. Greer has been assigned to the **S-II** program since October as representative of division president Harrison A. Storms.

F-1 ENGINE PASSES 100,000-SECOND TEST MARK

Rocketdyne's **F-1** rocket engine had accumulated over 100,000 seconds of test firing time as of Monday when it was fired for 180 seconds. Approximately 1400 tests were conducted to reach the 100,000 mark. All the tests were made at NASA-Edwards' Mojave site. The 1000th **F-1** firing was run last June (SPACE Daily, June 23). The first was run on December 17, 1960 (SPACE Daily, Dec. 22, '60), exactly two years after NASA and Rocketdyne signed the development contract and almost exactly four years before the engine was formally accepted (SPACE Daily, Dec. 21, '64).

FOURTH CORALIE STATIC TEST SET FOR FEB. 3

CORALIE, the second stage of ELDO's **EUROPA 1** launch vehicle, will undergo its fourth static firing tomorrow at the LRBA plant in Vernon, France. The test was originally scheduled for late last month (SPACE Daily, Jan. 21). LRBA and Nord Aviation are the stage's prime contracting team.

Albert E. Forster will retire February 1 as chairman of the board of Hercules Powder. Forster, with Hercules for the past 36 years, was the third president and the fourth chairman of the board in the company's 53-year history.

UNIVAC CONTRACTED FOR NIKE X DATA PROCESSING SYSTEM

Sperry Rand-UNIVAC has received a multiple incentive contract from **NIKE X** design and development system subcontractor Bell Telephone Labs for continuation of design, development, and delivery of processors (computers) and high-speed thin-film memory modules for use in the **NIKE X** missile system. The first phase of the contract has been given a \$24 million price tag of which approximately 25 per cent will be subcontracted by UNIVAC.

RAYTHEON TO PRODUCE SATURN V CHECKOUT DISPLAY

Raytheon will develop and produce under a \$1.3 million subcontract, the five electronic display systems for the test and checkout systems for the **SATURN V** launch vehicle. The checkout system will check meters, valves, and other units for stress, strain, etc.

AAS MEETING TO CONSIDER SPACE APPLICATIONS

The national meeting of the American Astronautical Society, scheduled for February 21-23 at San Diego, will focus on "practical space applications." Dr. Harry Goett, a director at Philco's Western Development Labs, will give the keynote talk, and the luncheon speakers will be astronaut Scott Carpenter, L.A. Hyland of Hughes, and Dr. Leo Goldberg of Harvard. Some of the papers on tap are "Practical Use of Extraterrestrial Resources," "World Weather Watch," "Potential Uses of a Survey Satellite in Vegetation and Terrain Analysis," "Hospitals in Space," "Satellite Detection of Natural Resources," and "Space Communications beyond 1975."

AIAA ELECTRIC PROPULSION CONFERENCE: MARCH 7-9

The Fifth Electric Propulsion Conference of the American Institute of Aeronautics and Astronautics will be held in the El Cortez Hotel in San Diego on the 7th, 8th, and 9th of next month. The only events planned are nine technical sessions where over 60 papers will be given. The sessions are: (Monday) Plasma Propulsion I, Electrostatic Engine Research, and Missions and Systems; (Tuesday) Contact Ionization Research, Resistojets and General Technology, and Ion Engines; (Wednesday) Plasma Propulsion II, Bombardment Ion Engines and Components, and Colloids and Advanced Concepts.

AIAA/AAS MARS MEETING: MARCH 28-30

The American Institute of Aeronautics and Astronautics and the American Astronautical Society are sponsoring the Stepping Stones to Mars Meeting March 28-30 at the Lord Baltimore and Emerson Hotels in Baltimore. John Hall, director of Lowell Observatory, will be the keynoter, and among the luncheon speakers will be JPL director William Pickering. Fourteen technical sessions, plus tours of NASA-Goddard and Martin's **GEMINI** facilities, are planned.

Future Space Business**NIMBUS SUN SENSOR ARRAY ENGINEERING MODELS**

NASA-Goddard is requesting proposals for engineering models of a Sun sensor array, which are required for solar paddle orientation and yaw control on the **NIMBUS** spacecraft. The sensors must be insensitive to the Earth's albedo.

Contact: NASA, Goddard Space Flight Center, Greenbelt, Md.

DOD NEGOTIATIONS

Burroughs Corp. -- with Space Systems Division for additional engineering launch support at the Eastern Test Range and Western Test Range.

NASA NEGOTIATIONS

Space General Corp. -- with Goddard for the continuation of a contract to obtain engineering and analytical services for the **AEROBEE** family of vehicles.

American Science and Engineering, Inc. of Cambridge, Mass. -- with Washington for an analysis of celestial x-ray data.

Electronic Communications, Inc. -- with Marshall for the Phases III and IV to the work on existing contract NAS8-11917 for the finalized design and development of the microminiature **SATURN** control computer.

American Machine & Foundry Co. -- with Goddard to provide for an experimental investigation into more reliable materials for photocathodes, filters, and diffraction crystals for the **AEROBEE** rocket solar spectrometer.

RCA Laboratories -- with Lewis for the development and fabrication of thin film polycrystalline gallium arsenide solar energy converters.

Thiokol Chemical Corp. -- with Langley for igniters and squibs to be used in Thiokol manufactured rocket motors.

Bell Aerosystems, Division of Bell Aerospace Corp. -- with Edwards for design and drawings for the modification of a lunar landing research vehicle.

Mesa Scientific Corp. -- with Marshall for non-severable continuation of work under contract NAS811392 entitled "Program Analyzer and Tester (PAT) Study."

Geoscience Instrument Corp. -- with Lewis to conduct a developmental program to fabricate high-purity germanium crystal for use in gamma radiation detectors.

NASA CONTRACTS

Goddard

Hughes Aircraft -- \$495,300 for an engineering model of a high-gain multilobe electronically steerable antenna system.

ITT Industrial Labs -- \$267,663 for infrared radiometer.

Canadian Commercial Corp. -- \$48,650 for self-extendable boom.

Superior Engineering, Ann Arbor, Mich. -- \$322,030 for thirty nineteen grenade payloads and launch.

TRW Systems Group -- \$501,200 for orbital operational support for **OGO-A, -B,** and **-C.**

Rodana Research Corp., Bethesda, Md. -- \$70,000 for **APOLLO** emergency medical kits.

ITT Federal Laboratories -- \$360,670 for TDM communications applicable to medium altitude satellites design system fabrication and tests with relay satellites.

New Mexico State University -- \$64,356 for **NIMBUS "B"** antenna pattern measurements.

D. Brown Associates, Inc. -- \$235,503 for **GEOS** calibration.

Ball Brothers Research Corp. -- \$37,580 for prototype PCM junction box for **OSO-F.**

Houston

Philco Corp. -- \$22 million supplemental agreement to provide for the maintenance, operation, and engineering support at the mission control center.

Lewis

Electro-Optical Systems, Inc. -- \$31,583 for continuation of testing of an ion thruster system.

Aerojet-General Corp. -- \$53,808 for a study of thermal gas-cooled reactor technology.

General Dynamics -- \$438,400 for investigation of materials and components for use in a thermionic space power reactor.

Araco Co., Inc. -- \$429,000 for mechanical and electrical systems for combustor research in Impl. cell no. 1.

Field Emission Corp., McMinnville, Oregon -- \$97,140 for research on the behavior of various adsorbates on metal substrates.

TRW Systems -- \$524,000 for guidance equation support on NASA **ATLAS/AGENA** mission.