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NORMAN E. BAKER, Publisher & Editor

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WEST GERMANY REPLIES TO JOINT JUPITER PROPOSAL. A West German aerospace team has completed a design study of a Jupiter probe and is prepared to join President Johnson's proposed European-American interplanetary program (SPACE Daily, Dec. 22). The probe studied would weigh 1300 pounds, take two and a half years to reach Jupiter, and investigate the planet's "red spot". The team made the study for the West German Research Ministry. Johnson made the proposal to West German Chancellor Ludwig Erhard during the Chancellor's recent U. S. visit.

13 BID ON SPACEBORNE MULTIPROCESSING STUDY. Thirteen companies have submitted proposals on a NASA-Cambridge contract to develop new concepts of multiprocessing oriented to the requirements of future long-range manned space missions. Fourteen invitations were released (SPACE Daily, November 22). Those responding with regard to ERC/R&D 66-92, Spaceborne Multiprocessing Study: Autonetics; Burroughs; GE; Goodyear; Honeywell; Hughes; RCA; Raytheon; Stanford Research Institute; Sylvania; Teledyne; Univac; and Westinghouse.

COMSAT ISSUES RFP FOR NATIONAL SATELLITE. Declining to speculate on ABC's chance at securing FCC authority to own and operate a communications satellite (SPACE Daily, Sept. 22, Oct. 21, and Dec. 20) but reaffirming its "hope" that such authority is denied (SPACE Daily, May 27), ComSat has revived its plan to orbit a similar satellite for use by companies like ABC (SPACE Daily, June 1) by issuing an RFP for that satellite to 22 American and dozens of foreign firms.

With the FCC decision expected late this month or early next (SPACE Daily, Dec. 20), the appearance of the RFP implies ComSat anticipates a pro-ComSat ruling. The Corporation introduced its national satellite in the wake of ABC's announcement of its intention to seek satellite authority. As described then and now, the proposed ComSat payload would serve the aircraft and maritime industries as well as the television networks. The RFP refers to it as "multi-purpose".

The request is for design study concepts of a satellite whose "communications capacity" is "at least 20 times (that) of **EARLY BIRD**," ComSat's present communications satellite, which has 240 two-way voice channels or one two-way TV channel. The craft would be put into a synchronous orbit, would operate for at least five years, would weigh about 2300 pounds, and would be primarily powered by solar cells (although nuclear power is to be considered).

MORE

The Leader in Missile/Space Reporting

COMSAT ISSUES RFP FOR NATIONAL SATELLITE (Contd). The RFPs, due the second weekend of February, went to AT&T, Ball Brothers Research, Bendix, Boeing, Collins Radio, Douglas, General Dynamics, General Electric, Grumman, Hughes, IIT, Ling-Temco-Vought, Lockheed, Martin, McDonnell, North American, Philco, RCA, Republic, TRW Systems, United, and Westinghouse.

Like the ABC satellite, the national satellite would receive-TV transmissions from key ground stations--probably near New York and Los Angeles--and relay them to local TV stations. Such a system would replace, largely at least, the present wire/microwave network used to distribute commercial television programs. CBS has shown interest in a TV satellite (SPACE Daily, Nov. 1) but has not followed ABC's lead in applying to the FCC for procurement permission. The ABC craft would also process radio signals, but the RFP does not indicate the national satellite would do likewise, although presumably it could be designed to.

The national satellite would also relay communications between planes, ships, and ground stations. The aircraft industry has voiced its desire for access to communications satellites--ComSat's in particular (SPACE Daily, Oct. 25).

SAUDI ARABIA DECIDES ON HAWK. Saudi Arabia has decided to order the Raytheon **HAWK** surface-to-air missile for its air-defense system instead of the British Aircraft Corp's **THUNDERBIRD**. (See SPACE Daily, November 18.) Raytheon has received a letter of intent from the Saudi Arabian government for the purchase of \$100 million worth of **HAWK** missiles, associated ground equipment and related services. In addition to **HAWK**, the Saudi Arabian air-defense system will include British supersonic Lightning interceptor jet fighters and an advanced ground environment defense system.

TEAGUE SAYS BUDGET WILL BE "ENOUGH". Congressman Olin D. Teague (D-Tex.), chairman of the House Subcommittee on Manned Space Flight, has expressed his opinion that the President's budget for FY 1967 will provide "enough money to run the space program". Teague indicated that the manned space flight effort (**GEMINI** and **APOLLO** programs) particularly would not receive any major cuts. NASA has already cancelled the **AOSO** (Advanced Orbiting Solar Observatory) program (SPACE Daily, June 21, Dec. 16 and 20), stretched out the **VOYAGER** program (SPACE Daily, Dec. 23) and reoriented the **SURVEYOR** program (SPACE Daily, Dec. 20) even before the FY '67 budget is announced. Additional cuts have been made in the **APOLLO** Applications request and several other programs (SPACE Daily, Dec. 13) as the budget nears its final form under the increasing pressure of the Viet Nam war. The stretch-out of the **VOYAGER** program will not entirely remove the pressure from this corner, however, since the new program, calling for modification of the **MARINER** '64 backup spacecraft for a Venus fly-by in FY '67 and development and construction of two advanced **MARINERS** for a Mars '69 fly-by mission, will require immediate funding in FY '67.

ESRO INITIATES THIRD SATELLITE SERIES: TD

The European Space Research Organization (ESRO) has approved and is proceeding to develop the third member of its stable of satellite families. This member has been tentatively tagged **TD** because it will use **THOR DELTA** launch vehicles. **TD I** was originally planned for a 1969 liftoff, but additional studies have now been deemed necessary, so no launch date has been scheduled. **TD II** is being aimed at a first-half-'69 liftoff into a 217/627-mile, near-polar path to investigate solar phenomena. The RFP for **TD II** to European firms was expected to be issued last August but is now to come out "early this year." Nine experiments have been approved for **II**. ESRO's first satellite series is **ESRO** (SPACE Daily, June.18) and its second is **HEOS** (SPACE Daily Dec. 9). **TD** launches will be from the U.S.

VENEZUELA JOINS/SIX OTHERS MAY JOIN COMSAT

Venezuela has become the 48th member of the international consortium ComSat represents; Thailand, Malaysia, and the Philippines are seriously considering joining; and Kenya, Uganda and Tanzania have expressed interest in joining. Venezuelan Ambassador Dr. Enrique Tejera-Paris signed the agreement last Thursday. Nigeria became the 47th consortium member last month (SPACE Daily, December 13).

Mexico Is Still Prospective Member

Mexico, firmly ready to join the consortium last summer (SPACE Daily, July 8), has wavered since then on the grounds that other matters hold "economic priority," but her chances of ultimately coming in remain good because she is known to be concerned with transPacific communications, and the 1968 Olympics in Mexico City may be an additional spur.

COSMOS 102 & 103 ORBITED

The Soviet Union has launched two more satellites in its **COSMOS** series. **COSMOS 102**, launched December 27, has an inclination of 64.95 degrees, a period of 89.13 minutes, and an apogee of 279.6 kilometers and a perigee of 214.5 kilometers; **COSMOS 103**, launched December 28, has an inclination of 56.05 degrees, a period of 96.96 minutes, and an apogee of 659.7 kilometers and a perigee of 596.7 kilometers.

AA METEOROLOGICAL STUDY CONSULTANTS NAMED

GCA Corp. has acquired the consulting services of three university scientists to assist in a company effort under NASA contract to propose significant and feasible meteorological experiments to be performed by **APOLLO Applications (AA)** program spacecraft and follow-on **ORL** (Orbiting Research Laboratories) spacecraft. Named as consultants on the six-month study, which originated in September under an \$80,000 NASA contract, are Dr. Carl Sagan of Harvard, Dr. Alan Barrett of MIT and Dr. Zdenek Sekera of the University of California. The company intends to propose a number of remote-sensing experiments to probe the atmosphere by remote microwave, ultraviolet, laser, infrared and radio/radar techniques.

NASA ORDERS STANDARD SATURN MICROCIRCUITS

A one-year \$240,000 contract to develop microcircuits for **SATURN** and other advanced space systems has been awarded to North American-Autonetics by NASA's Applied Research Branch, Huntsville.

Under contract terms, Autonetics will develop eleven standard microcircuits and recommend basic design techniques for additional custom circuits. Prototype quantities of AC and DC amplifiers, precision choppers, multiplexers, modulators and demodulators, and circuits for a multi-channel analog-to-digital or digital-to-analog converter will be designed and delivered in prototype quantities.

NORTHROP AWARDED MINUTEMAN II GYROSCOPE FOLLOW-ON

North American-Autonetics has awarded a \$2.4 million follow-on contract to Northrop-Nortronics for production of auxiliary gyroscopes for the **MINUTEMAN II** inertial guidance system.

RCA SEES SALES OF \$2 BILLION FOR 1965

RCA will report sales exceeding \$2 billion for the first time in its history for 1965, with profits, after taxes, of \$100 million. Subject to final audit, sales for 1965 will be more than 11 per cent greater than 1964, and profits will be more than 21 per cent higher. Earnings per common share will be approximately \$1.70, as compared with \$1.37 in 1964. As for its space/defense business, RCA says a three-year decline in dollar volume "appears to have been reversed in the latter part of 1965."

HARDY NAMED NRC PRESIDENT

Allan F. Hardy, Jr., executive vice president of National Research Corp., has been elected president of the company. He succeeds Hugh S. Ferguson, who retired December 31. Hardy is a director of both NRC and its parent organization, Norton Company. He is also a vice president of Norton.

PIONEER RETURNS FIRST DATA

Preliminary data received from **PIONEER VI** on its curving path in around the Sun, indicate that the solar wind is presently blowing at a relatively slow speed--about 670,000 mph compared to up to two million mph during periods of high solar activity--magnetic fields are fairly unfluctuating, and that comparatively few charged particles are being encountered. **PIONEER VI**, launched December 16 (SPACE Daily, Dec. 13, 16 and 17), has achieved final Earth-Sun orientation, all six scientific experiments have been turned on and are functioning normally, all three booms have been deployed, the normal spin rate of 59 revolutions per minute has been achieved, the solar cell units are supplying the full 60 watts of power required and temperature levels appear to be normal. The TRW Systems spacecraft, with a six month lifetime, will go into a heliocentric orbit with a perhelion of 75.6 million miles and an aphelion of 90 million miles.

NASA INDUSTRY AFFAIRS APPOINTMENT

NASA has named Bernard Moritz, assistant general counsel for procurement, as assistant deputy associate administrator for industry affairs. He will be second in command to William Rieke in NASA's Office of Industry Affairs. The office handles NASA activities in procurement matters, reliability and quality assurance, facilities management, labor relations and the Western Operations Office. S. Neil Hosenball, chief counsel at NASA-Lewis, will succeed Mortiz in the headquarters legal post.

SPACE GENERAL SOCIO-ECONOMIC CONTRACT

A second contract which will apply space systems engineering techniques to socio-economic problems has been awarded to Space General. The \$50,000 contract from the Defense Department calls for a study of hospital facilities. The initial contract was a study for the State of California to determine better methods for the control and prevention of crime and delinquency. The socio-economic area has been labeled by the Aerospace Industries Association as one area where the space industry can successfully expand its capabilities (SPACE Daily, December 22).

LIFE SCIENCES BUILDING DEDICATED AT AMES

NASA-Ames has opened a new Life Sciences building with a dedication ceremony addressed by Mac C. Adams, NASA's new associate administrator for Advanced Research and Technology. The new building will house some 250 scientists and staff working on interdisciplinary approaches to the life sciences.

ESRO'S ESTEC TO GET FIVE VACUUM CHAMBERS

ESTEC, the ESRO (European Space Research Organization) SpaceTEchnology Center, has one vacuum chamber in service, is set to receive three more this year, and is about to name the contractor for a fifth that will enter service late this year or early next. Additional chambers are envisioned, but procurement has not been initiated.

The first chamber, American built, was delivered to ESTEC's Noordwijk, Netherlands, site in August and put into operation in October. It can handle test objects up to 6.5 feet in diameter and is currently being used to thermal test a nonflight model of the **ESRO II** satellite (SPACE Daily, Dec. 17).

The second chamber is similar to the first but was built by a European team headed by Sogev, a French company, and Heraeus, a German. The stainless steel shell was supplied under subcontract by Compagniedes Ateliers et Forges de la Loire of Saint Etienne (France). The chamber has just arrived at ESTEC and will enter service in July.

The English company Cryosystem is constructing the third and fourth chambers, which are four feet in diameter and 6.5 feet long. It will allow thermal testing at temperatures from 100 to 400 degrees K. Both are expected to begin operation next December.

The contractor for the fifth chamber is due to be named as soon as negotiations are over. This chamber will be simpler than the others and will not be used for heat tests. It, however, will be the same size as the third and fourth and will see service at about the same time or somewhat later.

BENSON AWARDED APOLLO BACKPACK CONTRACT

Benson Manufacturing Division will produce canister and reservoir assemblies for **APOLLO** backpack life support systems under a \$275,000 contract from Hamilton Standard Division, prime contractor to NASA for the **APOLLO** life support system. The contract calls for 21 assemblies and assorted hardware to support all components carried on the astronaut's back during extra-vehicular activity. Under an earlier contract from Hamilton Standard, Benson produced prototype assemblies for the backpack and prototype reservoirs and canisters for the unit.

AMU CHECKED OUT

The Air Force and LTV Aerospace, prime contractors for the unit, have completed check out procedures and commenced final tests of the AF Astronaut Maneuvering Unit (**AMU**) to be tested on the **GEMINI IX** mission in the second quarter of 1966. The **AMU**, which will be stowed in the rear of the **GEMINI** adapter section and must be reached by extra-vehicular activity (*SPACE Daily*, Nov. 23), has been qualified by LTV but the new check out procedures are designed to investigate the astronaut's ability to climb over the **GEMINI** capsule with the NASA **MMU** (Modular Maneuvering Unit) chest pack and umbilical, attach himself to the **AMU**, and perform the unit checkout. The NASA back-pack (**BGMU**) (*SPACE Daily*, Nov. 29) which will be tested on **GEMINI VIII** is under final test by NASA-Houston, its developers.

ITT PREPARES EXTRA-VEHICULAR RADIOS FOR GEMINI

Six sets of two-way radios which will be used by an astronaut adrift in space to talk with his orbiting spacecraft have been delivered by ITT Federal Laboratories to LTV Aerospace. The AM radio voice communications sets are expected to be used operationally for the first time on the **GEMINI IX** mission. The radio will be contained in the **GEMINI** astronaut's back-mounted **MMU**.

PROCUREMENT STANDARDS FOR THE APOLLO PROGRAM

NASA's Office of Manned Space Flight has released a report, **APOLLO** Program Mass Properties Standard, designed for the procurement of systematized, verifiable and controllable mass properties of vehicle arrays. Procuring activities will, when necessary, require the meeting of these standards in contracts for portions of launch vehicles or spacecraft such as engines and instrumentation. Order Stock No. N-65-24019 from Clearinghouse, U.S. Department of Commerce, Springfield, Va. 22151. \$3.

NUCLEAR FIREBALL STUDY

Air Force Weapons Laboratory has contracted with Avco-Everett Research Laboratory for a study of the radiative properties of heated air in the 1800 to 36,000 degrees F range. The studies are expected to provide information applicable to the nuclear fireball phenomena.

DOD NEGOTIATIONS

Army

Falcon Research & Development Co.--with Aberdeen Proving Ground to provide drawings and target description data for a foreign armored vehicle and missile carrier.

Physics International Co., Berkeley, Calif.--with Aberdeen Proving Ground for a modification to contract Da-04-200-AMC 796(X) of additional research on a high explosive gun for reentry simulation.

Air Logistics Corp., Pasadena, Calif.--with Redstone Arsenal for the manufacture and delivery of eight each 3000 transportation trailers and five each model 4500 universal rollover adapters for the **SPARTA** program.

Air Force

Thiokol Chemical Corp.--with Air Force Flight Test Center to procure prepackaged liquid propellant propulsion system technology.

NASA NEGOTIATIONS

Westinghouse Electric Co., Aerospace Electrical Div.--with Lewis for evaluating design changes to be incorporated into ion engine power conditioners.

Gerber Scientific Instrument Co.--with Houston for modification of existing Gerber X-Y Plotter Jif to be used for **APOLLO** Landing Site Election.

Space Defense Corp.--with Headquarters for amendment to conduct additional research on the development of a multi-cell vegetable respirometer for space research.

Spacelabs, Inc., Van Nuys, Calif.--with Houston for bioinstrumentation equipment for the **APOLLO** spacecraft.

Douglas Aircraft Co., Missile & Space Div.--with Headquarters to establish criteria for spacecraft atmosphere selection.

Dynatech Corp., Cambridge, Mass.--with Headquarters for a study of the feasibility of an electrohydrodynamic vapor absorption refrigerator for weightless environments.

Hayes International Corp.--with Kennedy for additional effort for the engineering, design, redesign, development of technical criteria, testing fabrication and documentation of launch support equipment for **SATURN V** programs.

Emerson Electric Co.--with Langley for a thermal performance test program to demonstrate the feasibility of a thermal-structural heat shield concept.

General Electric Co.--with Houston for a study of optimum soft-landing trajectories.

DOD CONTRACTS**Navy**

Booz-Allen Applied Research Inc.--\$73,253 for an ocean surveillance mathematical simulation study.

Dayton T. Brown, Inc.--\$26,464 for an evaluation and test of prototype models of a prototype remote arming/safing system for air launcher weapons.

Air Force

Space and Tactical Corp.--\$93,251 for designing electronic circuitry for solar wind.

Emerson Electric Co., Electronics and Space Div.--\$98,800 to study and design an integrated radome, antenna and RF circuitry.

Martin-Marietta Corp.--\$25,000 for study of **MOL** to Earth satellite millimeter wave link feasibility tests.

NASA CONTRACTS**Ames**

Graduate Research Center of the Southwest--\$700,000 for cosmic ray experiment for Project **PIONEER**.

ITT Research Institute--\$27,982 for a study of celestial inertial navigation.

Marshall

Astrosystems International--\$26,837 for electro-magnetic exhaust velocity measuring system.

Houston

Motorola, Inc.--\$72,000 for application of integrated circuits to nondigital portions of the **APOLLO** up-data link system.

Kennedy

TRW Inc.--\$86,000 for a study concerning evaluation of safety hazards in connection with launch and space vehicle assembly.

Marshall

Aero Spacelines, Inc.--\$1.6 million for transporting large rocket cargoes in its "Super Guppy" aircraft; will run through November 30, 1966.