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AF MANNED SPACE SHUTTLE PROGRAM INITIATED. Expected since late September (SPACE Daily, Sept. 20), **PILOT**, Phase III of the Air Force's **START** (Spacecraft Technology and Advanced Re-entry Tests) program--the phase that involves the manned configuration of the **SV-5** space shuttle--has begun. The AFSC Aeronautical Systems Division is about to negotiate with Martin and Northrop for the **PILOT** work. The manned model is designated **SV-5P** (Pilot).

Phase II, **PRIME**, is being conducted by Martin (SPACE Daily, July 23, 1964), which named its subcontractors last fall (SPACE Daily, Oct. 28 and Nov. 1). The **PRIME** model is **SV-5D** (Developmental). Northrop is prime contractor to NASA for the **M2** and **HL-10** space shuttles. **M2** was rolled out last summer (SPACE Daily, June 16) and **HL-10** last month (SPACE Daily, Jan. 18). **SV-5P** will be similar to but larger than **SV-5D** but will not be flight tested like its predecessor--i.e. it will be dropped from a B-52 rather than arced down the test range (SPACE Daily, Nov. 1).

ATOM READY TO MOVE INTO PHASE IB. The NASA has requested about $500,000 in the FY 1967 budget to fund the development of Ball Brothers' **ATOM** (**APOLLO** Telescope Orientation Mount) for the **AA** (**APOLLO** Applications) program. One of the "few" long lead time items for the **AA** follow-on program which is being pushed into development this year, **ATOM** (SPACE Daily, Jan. 24) is being backed not only for its own potential, but as a partial replacement for the cancelled **AOSO** (Advanced Orbiting Solar Observatory) program, even though the Space Science Board of the National Academy of Sciences has stated flatly that "**ATOM** (is) desirable to supplement **AOSO**, but cannot replace it" (SPACE Daily, Feb. 2).

The **ATOM** system, a precise pointing boom to carry experiments which can be extended from one sector of the **APOLLO** Service Module and controlled by the astronauts (SPACE Daily, Sept. 23 & 27), is presently the subject of a preliminary feasibility study, initiated last spring, by Ball Brothers, Inc. of Boulder, Colorado. The study is scheduled to be finished in March. Negotiations on the Phase IB experiments definition contract will be initiated shortly, if they are not already in progress.

The **ATOM** is intended for use on one of the later **AA** Alternate Missions or one of the earlier **AA** Follow-on Missions. However, some observers close to the program feel that the technical problems involved in development of the experiment system are greater than presently foreseen. Disturbances caused by equipment and astronaut activity could pose serious problems for a system trying to maintain a high degree of pointing accuracy.

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SOVIETS PROPOSE COOPERATIVE SPACE PROJECT. Soviet scientists have sent proposals to the Secretary General of the International Astronautical Union calling for an international research program designed to "contact extra-terrestrial civilizations, if they exist." The move was disclosed by the Soviet news agency Tass in a Russian language dispatch. "Soviet astronomers think that to start with the search should concentrate on radiation from stars within a radius of 1000 light years and from the three nearest galaxies," Tass said.

NEW TERMINAL GUIDANCE FOR HOUND DOG. The Defense Department is asking money in fiscal 1967 "to undertake engineering development of a new terminal guidance system for **HOUND DOG** which gives promise of achieving a better overall system reliability." Total development cost is estimated at $20.5 million. New obligational authority for FY '67 is budgeted at $8.1 million with $6.6 million additional from reprogramming available funds. North American's Space & Information Systems Division is prime contractor for the new program with Ling-Temco-Vought performing the guidance work. Breakdown of funds has not been determined as yet. The NAA **HOUND DOG** is scheduled to be maintained in the operational inventory through fiscal 1970, with a phase down in 1971 in accordance with the completion of the B-52C-Fs.

RCA AWARDED MINUTEMAN TAPS CONTRACT. Research and design studies on a Trajectory Accuracy Prediction System (TAPS) for possible application on the **MINUTEMAN** program will be carried out by RCA's Defense Electronic Products Division, Camden, N. J., under a $1.4 million contract from Boeing, **MINUTEMAN** systems integrator. Boeing is studying TAPS as a part of studies aimed at increasing **MINUTEMAN**'s capability.

BRITAIN TO SUPPORT IDCSP WITH TERMINALS. Defense Secretary McNamara and British Defense Minister Denis Healey have signed a "Memorandum of Understanding" whereby the United Kingdom will furnish and operate ground stations for support of the DOD's Initial Defense Communications Satellite Project (**IDCSP**). The **IDCSP** satellite system will have 22 communications payloads in near-synchronous orbits to test the comsat concept for military messages. The Memorandum provides for mutual use of the test data. The first group of **IDCSP** satellites will ride the fourth **TITAN III-C**, which is set for launch in late April or early May (SPACE Daily, Jan. 19) with seven **IDCSP** packages and one **GGTS** (Gravity Gradient Test Satellite) aboard (SPACE Daily, Jan. 14). Radiation Inc. and Hughes are supplying **IDCSP** ground stations to the Army (SPACE Daily, Oct. 7 & Dec. 20).

OAO/NIMBUS/BIOS LAUNCHES SET. The first Orbiting Astronomical Observatory (**OAO**), the 4000-pound satellite carrying eight various types of telescopes, has been scheduled for launch on March 10. **NIMBUS C**, the second developmental meteorological satellite, is scheduled for launch on April 22. The first **NIMBUS** was placed in orbit August 28, 1964. The tentative launch date for **BIOS**, the first Biosatellite, has been set for sometime in September.

NAS RECOMMENDS SPACE-ASTRONOMY PROGRAM--II. In addition to examination of the areas of Optical Astronomy and Solar Astronomy (SPACE Daily, Feb. 2), working groups of the Space Science Board's Woods Hole, Mass., study considered these other programs in the general classification of astronomy.

Radio and Radar Astronomy: The following recommendations cover major instrumental and observational advances which should take place over the next 15 years.

1) The Radio Astronomy **EXPLORER (RAE)** satellite series should be continued and expanded. At peak rate, launches of at least one a year will be needed. Lead times for approval of programs for **RAE** must be reduced. Two **RAE** satellites should be flown near sunspot maximum.

2) The National Academy of Sciences should appoint a panel to study possible conceptions of a space radio telescope with an aperture of 20 km, and to initiate studies of the scientific and engineering problems connected with its construction.

3) Work should start now on a high-resolution broad-band antenna system for radio-astronomical observations (in connection with #2). The antenna could be a possible payload for **AA** (**APOLLO** Applications).

4) The exploitation of millimeter-wave and far infrared observing capabilities from ground-based, aircraft-borne, and balloon-borne facilities should be encouraged and supported by NASA.

5) NASA should make studies of the technology, feasibility and cost of building space telescopes with apertures of 100 feet. Launching and maintenance of such a telescope could possibly be a part of **AA**.

6) NASA should vigorously support ground-based radar astronomy studies.

7) NASA should include in the **VOYAGER** series planetary orbiters containing a swept or multifrequency radar system to detect and measure any planetary ionosphere. The first **VOYAGER** to approach Jupiter should carry instruments designed to study the planets magnetosphere, ionosphere and atmosphere.

8) NASA should include in the **VOYAGER** series investigations by means of bistatic radar systems with one element of the radar on Earth and the other on the probe. A similar experiment where the probe is occulted by the planet is recommended for study of planetary atmospheres and ionospheres.

9) Lunar orbiter missions should be used by NASA to test instruments suggested for #7 & 8, as well as for gathering data on the Moon. These missions would again be possible payloads for **AA**.

10) A substantial extension of existing radio and radar observations of the solar corona and interplanetary medium is recommended. Suitable interplanetary probes **(RAE)** would be launched in conjunction with ground stations. The ground-based equipment should be regarded as a national facility and its construction given high priority.

11) NASA should devote a much larger fraction of its resources to the construction of ground-based deep-space telecommunications terminals, with the objective

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of increasing the amount of information that will be returned from solar and planetary spacecraft now proposed.

As for the question of the use of the lurain for radio and radar astronomy, the working group stated: "From a strictly scientific point of view, despite the possible attraction of the back of the Moon as an interference-free site, all the future plans that the group considered appeared to be more easily and better done in orbit than on the Moon."

Solar Radio and Radar Astronomy:

1) A substantial extension in existing radio and radar observations of the Sun should be made. Large, new, versatile instruments, to be regarded as a national facility, should be constructed. The national facility should be given highest priority so that observation may be started during the coming sunspot maximum.

2) A series of Solar **RAE** satellites should be flown during the sunspot maximum, to provide data on low-frequency characteristics of solar radio bursts.

(This report to be continued tomorrow.)

SECRET NAVY SATELLITE MISTAKENLY NAMED

"GREB," a misnomer that was dropped from the Naval Research Lab's **SOLRAD** satellite series (SPACE Daily, Dec. 16), turned up inexplicably last April as the official name for a classified NRL payload in what may well have been the first instance of a U.S. secret satellite receiving a government-promulgated label. Now, however, the name has been acknowledged as a mistake that resulted, partly at least, from the presence of a **SOLRAD** on the same launch with the secret package. The launch occurred last March 9 when a **THOR-AGENA** lifted eight satellites off a Vandenberg pad. The "GREB" was the only secret one of the eight.

In actuality, of course, the satellite was never intended to be named, and the mistake will be corrected in some records, although NORAD, the source for NASA-Goddard's "Satellite Situation Report," is not expected to do so in keeping with its general policy.

Because of GREB, a typographical misreading of GRAB (Galactic Radiation and Background), the **SOLRAD** series has been bothered with a confusion of names throughout its career. Actually, there have been ten **SOLRAD**s to date, one of which was never completed and four of which were numbered abnormally--the upshot being that the last **SOLRAD** to be launched was called **VIII** even though it was the ninth to try for orbit and the tenth to exist. The next **SOLRAD**s will follow **VIII**'s lead by taking the designations **IX** and **X**. **SOLRAD**s carry experiments that measure solar radiation from low orbits.

SECOND SURVEYOR LANDING TEST SUCCESSFUL

Hughes has successfully conducted the second **SURVEYOR** drop test of the vernier engines and the Radar Altimeter and Doppler Velocity Sensor (RADVS) system at Hollomon AFB, New Mexico. The test was a duplicate of the first test (SPACE Daily, Nov. 29) in which the **SURVEYOR** model was suspended from a tethered balloon at 1400 feet, the engines were started, and the model released. It descended on its engines to 500 feet where the vernier engines were shut down and the model descended by parachute. The test was a good sign for the troubled lunar soft landing program (SPACE Daily, Dec. 1).

GOP CHARGES UNFAVORABLE DOD CLIMATE FOR SMALL BUSINESS

Rep. Arch A. Moore Jr. (R-W. Va.), a member of the House Select Committee on Small Business, wants the Small Business Administration representatives reinstated in their positions at DOD procurement centers throughout the country. Some 30 SBA representatives were withdrawn from the centers after the Defense Department, the Bureau of the Budget, and the SBA agreed that the job of representing the small businessman could be done by the DOD small business officials stationed at the various centers.

However, Moore charges that of necessity the orientations of the SBA personnel and the DOD small business officials are different: the primary concern of the SBA is the small business firm, while the DOD is primarily interested in the completion of defense contracts. Moore and his GOP colleagues on the committee contend that for the sake of small business procurement, which increased to a total of $5.305 billion in DOD prime contracts during FY '65 (SPACE Daily, Jan. 27), officials are needed who have a "total sensitiveness to small businessmen."

TRW BEGINS COLLECTING PIONEER BONUS

TRW Systems is now receiving a $2000-a-day bonus for the successful performance of the **PIONEER VI**, which entered its 45th day in orbit last week. The $2000 bonus will remain in effect for each successful day up to the 70th when a $1000-a-day bonus is scheduled to start. The company could conceivably earn an extra $1000 each day for the next 90 days for a maximum payment of $180,000 (SPACE Daily, Dec. 14). The company has already earned a $30,000 bonus for successful orientation of the spacecraft.

45.2% OF DOUGLAS CONTRACTING DOLLARS TO SMALL BUSINESS

Douglas paid a record 45.2 per cent, or $153,667,000 of its total FY '65 $339,898,-000 procurement budget, to small business suppliers during the year. The firm's small business procurement increased by $40,412,000, or 35.7 per cent, over the $113,255,000 paid to small business in 1964.

ESSA-I SLIPS ONE DAY

ESSA I (Environmental Survey Satellite), originally scheduled for February 2 (SPACE Daily, Jan. 31), has been postponed until 2 PM EST February 3 due to bad weather. High speed winds in the jet stream over Cape Kennedy caused the postponement of the Weather Bureau's second operational **TOSS** (**TIROS** Operational Satellite), now called **ESSA I**.

ONE-MILLIONTH OF A POUND ROCKET IN DEVELOPMENT

The Navy has awarded a $49,577 contract to Rocket Research to design and develop a valveless subliming solid control rocket for positioning and orbital adjustment of a three-axis gravity-gradient-stabilized satellite. The rocket will produce approximately one-millionth of a pound of thrust.

BIDS IN FOR NASA-CAMBRIDGE PROCUREMENT REQUESTS

Proposals have been submitted for the following NASA-Cambridge research and development programs:

Electromagnetic interference study (ERC/AO 66-216) (SPACE Daily, Jan. 7)--Barkley & Dexter Laboratories, Bendix Field Engineering, Geinstron Inc., Jansky & Bailey Division of Atlantic Research, Raytheon, Sanders Associates, and Instrument Associates.

A study of cold substrate deposition of thin-film passive elements (ERC/-R&D 66-158)--General Precision Librascope. Six companies were on the Center's original invitation list (SPACE Daily, Jan. 13).

INTERSTATE TO SUPPLY POLARIS TEST UNITS

The Bureau of Naval Weapons has awarded Interstate Electronics a $1,033,000 contract for radio frequency test instruments for the **POLARIS** missile program. Interstate has been the prime contractor for such instrumentation since 1956 when the program began. The company is located in Anaheim, Calif.

NORTHROP CONSIDERING ACQUISITION OF HALLICRAFTERS

Northrop and The Hallicrafters Co. (Chicago) have begun discussions on the possibility of Northrop's purchasing all of Hallicrafters' assets and assuming liabilities with payment to be made in cash or Northrop convertible debentures. The total price probably would be around $20 million with Hallicrafters' stockholders receiving approximately $8.00 a share in cash or in Northrop convertible debentures at par.

If Northrop acquires Hallicrafters, the manufacturer of communications systems would be operated with its present management as a wholly-owned Northrop subsidiary.

DOUGLAS EARNS THOR BONUS

Douglas Missile & Space Systems Division has earned a $500,000 bonus on the perfect launch performance of its **THOR** booster at the Western Test Range last year. It was the second year in a row Douglas was awarded the AF bonus for **THOR**. Total 1965 contract was for $17.15 million. **THOR** scored 21 successful launches last year, bringing its total to 51 successes in a row from the WTR.

PHILCO DEVELOPS ANALOG VOCODERS

Philco has been awarded a $100,000 contract to design, develop and fabricate two Analog Vocoders for future manned space flight communications. The Vocoders are speech compression devices which compress the human voice into a spectrum narrower than the standard three kc. Using the Vocoders plus multiplexing devices a number of simultaneous voice transmissions can be made over the same conventional three kc link.

Future Space Business

LOCKALLOY SPACECRAFT APPLICATIONS STUDY

The Air Force Systems Engineering Group is preparing to fund a program to develop a manufacturing process for the extruding of structural sections of Lockalloy (38 per cent aluminum and 62 per cent beryllium) with improved properties for space vehicle applications.

Contact: Directorate of R&D Procurement, Systems Engineering Group, RTD, Wright-Patterson Air Force Base, Ohio 45433, Attn: SEKA-1. Reference: KRB 66-52A. Due date: Feb. 19.

SOLAR PROBE FLUID CONTROL SYSTEM REQUIREMENTS

NASA-Cambridge is initiating a research program to investigate requirements for a fluid control system for a solar probe.

Contact: NASA, Electronics Research Center, 575 Technology Square, Cambridge, Mass. 02139, Attn: Procurement Office. Reference: ERC/R&D 66-264. Due date: Feb. 10.

S-BAND TELEMETRY CHECKOUT RECEIVING SYSTEMS

NASA-Kennedy is funding the design, fabrication, and delivery of three unified S-band telemetry checkout receiving systems.

Contact: John F. Kennedy Space Center, NASA Kennedy Space Center, Florida 32899. Reference: RFTP CC-458-6. Due date: Feb. 28.

NASA-LEWIS INSTRUMENTATION INTERCONNECT SYSTEM

NASA-Lewis is requesting bids for the installation and connection of the instrumentation interconnect system in cell CW-18 of the Center's Engine Research Building. The work includes the furnishing and installing of a cable through system connectors and data and control cable and terminating, tagging and coiling.

Contact: Lewis Research Center, 21000 Brookpark Rd., Cleveland, Ohio 44135. Reference: IFB C-310411. Due date: Feb. 18.

APOLLO C/S MODULE ELECTRICAL CHARGE CALCULATIONS

NASA-Houston is preparing to fund a program to devise calculational techniques and to perform calculations to estimate the net electrical charge on the **APOLLO** Command and Service Module in the vicinity of the Moon.

Contact: NASA, Manned Space Flight Center, Houston, Tex., Attn: H. T. Christman, Code BG2, TWX No. 713-448-0454, Telephone (713) HU 3-4511. Reference: RFP BG721-28-6-344P. Due date: Mar. 1.

Future Space Business

COMPUTATION LABORATORY TECHNICAL SUPPORT SERVICES

NASA-Marshall is requesting bids for technical support services in support of the Computation Laboratory. Types of services include computer utilization, space or facilities utilization, management engineering, design and documentation of data systems, data systems engineering, data systems and computer equipment maintenance, fabrication and rework of data systems hardware preparation of technical reports, computer operations, computer programming, computer techniques, mathematical analysis, and systems analysis design and documentation research and development.

Contact: Purchasing Office, Marshall Space Flight Center, Huntsville, Ala. 35812, Attn: PR-EE, J. R. Neutez, Telephone 842-2123. Reference: RFP 3-6-70-00103. Due date: May 14.

VISUAL TARGET ACQUISITION TRAINER

The Naval Training Device Center is preparing to fund the design, development and fabrication of a prototype and one additional unit aircraft weapons delivery trainer. Device 3H16, which will be a simulated visual target acquisition trainer for conventional weapons delivery as well as the **BULLPUP** and **WALLEYE** weapons for fighter and attack-type aircraft (A4E).

The required device will provide means to permit a trainee to gain skills in acquiring strategic ground targets by flying a simulated aircraft to a position which will enable him to begin a "run-in" and effect simulated weapons delivery followed by a "pull-up." All maneuvers will use a simulated visual terrain presentation as reference for control of the aircraft flight path.

Contact: U.S. Naval Training Device Center, Port Washington, N. Y. 11050, Attn: Code 110. Reference: Synopsis No. 66-9. Due date: Feb. 8.

ZERO GRAVITY PARABOLAS CONTROL/DISPLAY INSTRUMENTATION

The Air Force Systems Engineering Group is funding the design and development of reduced gravity and supergravity control and display instrumentation to minimize pilot (human) error in flying zero gravity parabolas.

Contact: Directorate of R&D Procurement, Systems Engineering Group (RTD), Wright-Patterson Air Force Base, Ohio, Attn: SEKMB. Reference: RFP 63158-MB. Due date: Feb. 6.

DOD NEGOTIATIONS

Research Institute for Advanced Studies (RIAS), Div. of Martin-Marietta Corp. -- with Army Missile Command for additional research studies directed toward development of a stabilizer oxidizer for use in rocket propellants.

Value Engineering Co., Alex., Va. -- with the Bureau of Naval Weapons to provide for the review, revision, and product conversion of drawings for **TERRIER/TARTAR** installation kits.