

# SPACE BUSINESS *Daily*

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**SURVEYOR REORIENTED/OPERATIONAL MODEL CANCELLED.** NASA's decision to renegotiate the **SURVEYOR** contract between JPL and Hughes (SPACE Daily, Dec. 16) is the tocsin that the program's race with time is running out. With the introduction of the negotiations **SURVEYOR** will become a rare program that calls for the development only of "engineering test models," with plans for more advanced operational models pushed still farther into the future, a future that is expected to be out of the reach of acceptability.

The current contract between Hughes and JPL calling for the delivery of seven spacecraft (four engineering test models and three "operational" scientific models) will be renegotiated to provide for seven engineering test models (SPACE Daily, Dec. 16). The **SURVEYOR** program specifies 10 spacecraft, with three operational models not under contract but available if the program is granted that much time and effort.

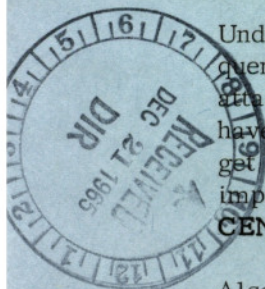
It is not the rush of the Soviet **LUNIK** soft-landing efforts that is placing the program in jeopardy. While the odds are very high that the Soviet Union would be capable of informing us of the texture and bearing of the lurain in advance of the first **SURVEYOR** attempt now scheduled for May or June, it is the closing of the design point of no-return for the **LEM** that dictates the reorientation. While the **LEM** landing gear design is already frozen it is hoped that **SURVEYOR** can provide the very vital confirmation that that design is valid before the **LEM** is forced to lower itself to the lurain with only the insurance of a **STOMPER**-type of soil scout (SPACE Daily, Dec. 16). In addition, **SURVEYOR** is also moving into an overlap with the flight schedule of the **LUNAR ORBITER** which was supposed to have followed the **SURVEYOR**.

Under the new plan seven of the simplest vehicles would be available for rapid sequence launching in order to improve the chances of reliability for the successful attainment of useful data. The five failures of the Soviet Union already seems to have convinced our planners that we should at least expect similar difficulties. To get seven of these spacecraft off in less than two years will demand not only a much-improved **SURVEYOR** availability but a very healthy delivery schedule for the **ATLAS-CENTAUR**.

Also a part of the reorientation plan is a scheme where the erosion of the lurain, and hence a better gauge of its texture, would be obtained by igniting the descent engine of the **SURVEYOR** after it has landed and taken preliminary measurements and photographs with its single TV camera. Another plan, which anticipates early failures, would be the installation of a crash recorder which would survive a crash landing and record basic but vital information. The early **RANGERS** were designed with this basic principle in mind where a data capsule would survive a semi-soft landing.

*The Leader in Missile/Space Reporting*

MORE



It was our attempts with this type of **RANGER** which is believed responsible for the Soviets' first attempt to make a "soft" landing on the Moon (SPACE Daily, April 3 & 9, '63).

The simpler engineering models will weigh only 2100 pounds as compared with 2400 pounds for the advanced version. The heavier, more advanced **SURVEYORs** would have carried stereo TV cameras with color filters, an integrated touch-down dynamics experiment, a soil mechanics sampler, an alpha-back-scattering experiment to provide a rough chemical analysis of the lunar soil, a micrometeoroid detector, and a lunar seismometer.

With all the other difficulties, there is also the problem that this is a tight money year for NASA, the second in a row, and worse than the last when NASA was pulled back to a Johnson guideline of \$5.25 billion, which has been modified to meet the growing war and welfare demands (SPACE Daily, Sept. 24, 27 & Dec. 13). While **SURVEYOR** has a better chance than many unmanned space science programs in the new budget, its stretchout and race with time, which will add still more costs, have brought it in line for monetary scrutiny.

**AOSO CANCELLATION IMPERILS OGO/OAO.** The cancellation of the Fairchild-Republic Advanced Orbiting Solar Observatory (**AOSO**) by NASA (SPACE Daily, June 21 & Dec. 16) because of "budgetary considerations" may expose the whole family of NASA's satellite observatories to a budget assault by Congress. Leading space legislators, educated by NASA that the **AOSO** was a priority program, now reason that the **AOSO** cancellation may throw doubts on the "reasonability of these other (observatory) programs."

NASA officials, in appearances before the Congress these past few years, have argued that larger, more sophisticated satellites were needed to supplement and enlarge on the earlier solar, physics and astronomy observers to return greater amounts of more precise data in these areas. Accepting the NASA argument, Congress has supported the **AOSO**, **OGO** (Orbiting Geophysical Observatory) and **OAO** (Orbiting Astronomical Observatory) programs. Legislators now voice the opinion that the budget requests for the **OGO** and **OAO** may come under severe scrutiny in the forthcoming hearings.

NASA program officials admit that the only reason for cancellation of the **AOSO** was the fact that requests had to be cut somewhere and since **AOSO** was just getting started in the hardware development, it would involve the least waste of funds. The decision apparently involved no determination of which scientific programs were of the least priority, but merely which would be the most economical to cancel.

The National Academy of Sciences' Woods Hole Summer Conference this summer underlined the importance of solar physical observation and indications are that a number of members of the scientific community will be ready to voice their "distress" if the opportunity is given during budget hearings next year. There was apparently no question of the technical feasibility or scientific desirability of the program. **AOSO** would have been a 1250-pound satellite, with complete attitude stabilization which would involve a very precise pointing capability to allow a study of individual regions of the Sun.

**HOUSTON/MARSHALL SHARE AA RESPONSIBILITIES.** NASA-Washington has confirmed that Houston and Marshall will share major development and operational responsibilities for the AA (APOLLO Applications) program (SPACE Daily, Oct. 25 & Nov. 22). Houston has been assigned responsibility for development and procurement of all standard and modified spacecraft and integration of experiments in the Command and Service Modules. Houston will also manage astronaut activities and flight operations.

NASA-Marshall will be responsible for development and procurement of launch vehicles and integration of experiments into the LEM and SATURN instrument units (IU) and S-IVB stages. NASA-Kennedy has been assigned the management of assembly, checkout and launch of AA vehicles and associated payloads.

**NASA CONFIRMS NEW SCOUT EXPERIMENTS PROJECT.** NASA, in an official confirmation of the Langley plans to procure three spacecraft for a new flight test of turbulent convective heating (SPACE Daily, Dec. 15), identifies the program as the sixth re-entry experiment in the SCOUT Re-entry Heating Project which has completed four tests and plans for another early next year. Langley is issuing RFPs for the design of the spacecraft (one flight, one prototype, and one back-up) with a January 25 due date. The test, to represent the sixth of the program and scheduled for 1967, will require the launching of a 13-foot cone from Wallops Island to the vicinity of Bermuda employing a modified SCOUT.

**P&W TO DEMONSTRATE METHANE FLOX CENTAUR ENGINE.** Negotiations will be conducted with Pratt & Whitney by the NASA-Lewis for a design development program leading to the feasibility demonstration of an RL-10A-1 engine using the methane-flox propellant combination. The RL-10A-1 is the basic engine which, with a liquid hydrogen/oxygen combination, is the powerplant for CENTAUR and SATURN S-IV upper stage vehicles. The program will include the design analysis and testing.

**BOEING TO STUDY SATURN V'S VOYAGER CAPABILITY.** Boeing's Aero-Space division has been issued a request for a proposal to investigate the engineering and development requirements necessary to convert the SATURN V into a VOYAGER unmanned Mars exploration vehicle. The request was issued by NASA-Marshall. The SATURN V was introduced into the VOYAGER program, replacing the SATURN IB-CENTAUR as the launch vehicle, when the MARINER IV data dictated a major revision of the VOYAGER program concept (SPACE Daily, Aug. 3 & Oct. 4). Plans tentatively call for the launch of two larger VOYAGERS by the SATURN V in 1971.

Boeing has also been awarded a \$370,500 contract by Marshall for the program to study the designs of Improved SATURN V vehicles and the Intermediate Payload SATURN vehicles. In conjunction, Chrysler has been awarded a \$450,000 contract for improvement studies of the SATURN IB, the vehicle now being readied for its first flight test.

**FCC ABC SATELLITE DECISION NOW DUE EARLY NEXT YEAR.** In lieu of the formal deferment expected (SPACE Daily, Nov. 24 & Dec. 2), an unannounced interim has been substituted to allow the FCC to devote the time and attention appropriate to a question of the significance of that posed by ABC's application for the right to own and operate a domestic TV-radio satellite (SPACE Daily, Sept. 22 & Oct. 21). The Commission acknowledges that it would have been "physically possible" to render a final decision this year as it had intended to do (SPACE Daily, Oct. 29), but it avers a need for more opportunity to consider the question because its answer may well establish a major precedent and will at least settle a major issue.

The decision will now come in "late January or early February," and the interim may involve the request for additional information from ABC that would have been made as part of the formal deferment (SPACE Daily, Nov. 24). As indicated when the deferment was first anticipated, if it had been enacted it would have pushed the decision date into next year anyway, so the net effect of the interim is the same.

The feeling has been expressed both in Washington and New York that the Commission was not immediately convinced of ABC's seriousness in making the application and that even now the additional support the Commission may solicit could touch on how determined ABC is to move into the satellite communications arena. ABC assured SPACE Daily last Friday that its intentions are most serious, especially since the proposed merger of ABC with ITT (SPACE Daily, Dec. 3 & 9) would make the new organization well suited to own and operate a communications payload. Not only could ITT contribute to the development and production of the satellite, it could also provide ground stations and related equipment and could give technical counsel to the satellite's managers.

The basic problem engendered by the ABC application is that of how to interpret the Communications Satellite Act of 1962. According to the Act, "it is the policy of the United States to establish, in conjunction and in cooperation with other countries, . . . a commercial communications satellite system as part of an improved global communications network. . ." Further, "to facilitate this development and to provide for the widest possible participation by private enterprise, United States participation in the global system shall be in the form of a private corporation. . ."

ABC contends that its satellite system is unrelated to the global system embraced by the Act; that a domestic satellite for special communications is not the kind of payload Congress meant to be covered by the Act. The company notes one of the Act's opening paragraphs: "It is not the intent of Congress by this Act to preclude the use of the communications satellite system for domestic communications services. . . nor to preclude the creation of additional communications satellite systems. . ." The first part of that paragraph would seem to refer to a secondary use of the global system while the second part leaves the door open for independent systems of unspecified uses.

ComSat, the corporation begot by the Act, avows that itself alone is the rightful agent to own and operate communications satellites, regardless of use or the geographical distribution of the satellites' services. ComSat reacted quickly (SPACE Daily, May 27) to ABC's announcement of its intention to seek satellite ownership and provide a channel free for educational television (SPACE Daily, May 18). On the heels of that reaction came a ComSat proposal to put up its own "national satellite" to serve both TV networks and airlines (SPACE Daily, June 1).

**COSMOS 100 IN CIRCULAR ORBIT.** The Soviet Union launched their first circular orbit satellite from Baykonur-Karsakpay Friday morning. The 400-mile-out vehicle, identified as **COSMOS 100**, was launched into the 65 degrees used by manned spacecraft, **PROTON** space station test vehicles, and **MOLYNIA** communications satellites. NORAD tracked the spacecraft at an orbit of 393.5/-413.3 miles several hours after the launch. However, the Soviets in the original announcement said the "sputnik was placed in a circular orbit near the calculated one of 650 kilometers (403 miles)."

Although the Soviets made no efforts to circularize the two **PROTON**'s orbits and while indicating that they are not seeking a circular orbit for the **MOLYNIA**s, circularizing a target vehicle's orbit (such as was done with **GEMINI VII** before the **GEMINI VI** rendezvous) before sending up an intercept vehicle is presently the most ideal and cooperative means of attaining a rendezvous. A space station at 400 miles would have an extremely long-duration lifetime affording a long-time target for manned or unmanned rendezvous attempts.

**AVCO/GE AWARDED NEW ABRES TEST CONTRACTS.** Avco/RAD will be asked by the Ballistic Systems Division to negotiate for the Phase IA of the **ABRES** (Advanced Ballistic Re-Entry Systems) integrated flight test program. Avco will be required to supply full-scale and large sub-scale re-entry vehicle planning, analytical studies, ground tests, design, development, fabrication, delivery, flight testing and flight testing analysis for this new phase of the Air Force re-entry/penetration-aids development program.

In concert with the Avco contract, General Electric's Re-Entry Systems Division is expected to be asked to negotiate with BSD for Phase IB for the **ABRES** integrated flight test program which involves design, fabrication and flight testing of medium sub-scale re-entry vehicles. The **ABRES** test vehicles are launched from Vandenberg to the vicinity of Kwajalein by **ATLAS** Ds. Other contractors involved in the **ABRES** program include TRW Systems, American Bosch Arma, General Dynamics/Convair and NAA.

**AIA'S HARR ADDRESSES SPACE MEETING.** President Karl Harr Jr. of the Aerospace Industries Association has a year-end progress and outlook report for the Aviation/Space Writers Association meeting tomorrow in Washington.

**BENDIX'S LUNAR NAVIGATION PROGRAM TO BE EXTENDED.** NASA-Marshall plans to initiate negotiations with Bendix-Ann Arbor for an extension of their original "non-severable" development of lunar surface navigation techniques. Control Data, in a separate program, is under contract with NASA-Langley for the design of a minimum requirements component computer for lunar navigation systems (SPACE Daily, Feb. 10).

**THE LOG OF GEMINI VII.** December 17, 1965--5:40 AM EST: Ground control gives go-ahead to **GEMINI VII** astronauts for full 14-day, 206-orbit mission, despite fuel cell power troubles. Splashdown is set for 9:05 AM December 18. 3:15 PM EST: Entered the 196th orbit with only 10 to go.

### RADIATION RECEIVES IDCSP TERMINAL ADD-ON

The Army's Satellite Communications Agency (SATCOM) has awarded Radiation Inc. a follow-up contract of just under \$2 million for four more transportable Mark V ground stations for use with the **IDCSP** (Initial Defense Communications Satellite Project). The first contract, worth just over \$7 million, calls for nine of the stations, which are officially designated AN/TSC-54s (SPACE Daily, Oct. 7). The terminals are designed to be dropped from aircraft into remote areas where they can be deployed quickly for telephone and teletype communications between themselves or with various other stations in America and abroad.

The **IDCSP** will be implemented early next year when the fourth **TITAN III-C** is launched with eight of the satellites aboard for orbiting at a near-synchronous altitude (SPACE Daily, Oct. 7 and Dec. 13). Radiation's Mark V work will run two years, with the first station to be delivered possibly next summer and no later than the fall. The complete **IDCSP** network will have 24 satellites.

### BOEING DELIVERS FINAL LUNAR ORBITER SHROUD

The last of ten **LUNAR ORBITER** shrouds, designed to protect the spacecraft during the early stages of its flight to the Moon, has been delivered to NASA by Boeing, prime contractor for the lunar craft.

The **ORBITER**, with its antennas and solar panels folded back, fits inside the shroud which will be positioned atop an **ATLAS-AGENA** launch vehicle. In space the shroud will separate, freeing the spacecraft to continue to the Moon. The cover weighs 300 pounds and is 13.5 feet long and 5.5 feet in diameter at its widest point. Five of the shrouds will be used for testing, while five will be flight models.

Five **LUNAR ORBITER** flights are scheduled, beginning in mid-1966, designed to obtain detailed photos of possible lunar landing spots for **APOLLO** astronauts. Boeing is now testing the first nonflight **ORBITER** (SPACE Daily, Nov. 29).

### FIRST NASA/BRAZIL TEST COMPLETED

The first **NIKE-APACHE** sounding rocket in the joint U.S./Brazilian ionospheric sounding rocket program was successfully launched Wednesday from Brazil's Natal Range. The rocket took measurements of the lower region of the ionosphere between 50 and 200 kilometers with emphasis on the effect of cosmic rays. Instrumentation for the rocket payload and the telemetry ground support equipment was built by Brazilian technicians at NASA-Goddard. The Brazilian Space Activities Commission (CNAE) directed the test.

A Memorandum of Understanding signed by the U.S. and Brazil last spring calls for a comparison of sounding rocket measurements taken from Wallops Island and Natal. (CNAE was to conduct the final launch in the program from Natal Saturday.) The Memorandum provides for no exchange of funds on the project.

**Murray A. Schwartz** has been appointed assistant director of IIT Research Institute's Ceramics Division. Schwartz was formerly with UAC's United Technology Center where he directed research in ceramic, metallic, and polymeric composite materials for rocket motor applications.

### FCC WILL NOT RECONSIDER COMSAT TV ORDER

The FCC has denied a CBS petition for reconsideration of the Commission's July 15 order on procedures for providing TV service via ComSat's **EARLY BIRD** satellite (SPACE Daily, July 19). Under the order AT&T, RCA, ITT, and Western Union are to offer such service as common carriers until the Commission settles the "authorized user" question (SPACE Daily, June 21 and Nov. 24). This question concerns the definition of what entities can rent the satellite channels to provide communications to the public for profit.

### THE HUGHES FAMILY OF SATELLITES

Hughes has designed and developed nine basic satellite configurations. Two have become operational payloads, two are being fabricated, two were dropped for want of customers, two are being considered, and one was a study model that led the way to one of the two now being built. The in-house designations of the satellites are the HS-300 series (Hughes Satellite).

HS-301 is the **SYNCOM** (SYNchronous COMmunications) satellite, three of which were built and orbited for NASA. **SYNCOM I** achieved orbit February 14, 1963, but never worked. **II** and **III**--launched July 26, 1963, and August 19, 1964, respectively--assumed good orbits and are now being used by the Defense Communications Agency.

HS-302 was a study configuration called Advanced **SYNCOM**. Components and a mockup were built, but development was not pursued. It was, however, the forerunner for HS-306.

HS-303 is **EARLY BIRD**, ComSat's synchronous communications satellite now on station over the Atlantic. It was launched last April 6.

HS-304 is the Advanced **EARLY BIRD** Hughes proposed to ComSat for a global commercial network. ComSat decided to seek a different configuration.

HS-303A is based on 303 but rooted in the work on 304. It is the **BLUE BIRD** satellite being built for ComSat to help provide communications support for the **APOLLO** flights and for later DOD flights. Four 303As are in the making.

HS-305 is the proposed payload for the DOD's **ADCSP** (Advanced Defense Communications Satellite Project). ComSat has also put in a proposal, as has Philco, contractor for the **IDCSP** (Initial Defense Communications Satellite Project).

HS-306 is the **ATS** (Applications Technology Satellite), the NASA payload for scientific experiments. Five **ATS**s in three configurations (two satellites of one configuration, two of another, and one of the third) are being built.

HS-307 is the satellite ABC will orbit if the FCC so rules and the one CBS is considering. It would relay TV signals from New York or Los Angeles to local stations in the 50 states.

HS-30X will not receive a full number because it will not be developed. It is a version of **BLUE BIRD** that was proposed to ComSat in lieu of 304. ComSat turned it down for TRW's proposal.

### APOLLO ABORT-6 PUSHED INTO JANUARY

The sixth **APOLLO** escape system test (SPACE Daily, Dec. 3, 7 & 17) has been postponed until next month due to technical problems and weather conditions.

**Future Space Business****MICROWAVE ANGLE MEASURING SYSTEM**

The Army Engineer Research and Development Laboratories is requesting proposals on the design, development, fabrication, test and delivery of one feasibility model microwave angle measuring system.

Contact: Research and Development Procurement Office, U.S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va. 22060, Attn: A. W. Crickenberger, 66-G-26-B. Reference: RFQ AMC(T)-44-009-66-G026-B. Due date: Jan. 7.

**PRECISION GYRO BALANCING LASER SYSTEM**

NASA-Marshall is preparing to issue a contract for the design, development, detailed specifications, fabrication and delivery of one breadboard-type prototype laser system for precision gyro balancing.

Contact: Purchasing Office, Marshall Space Flight Center, Huntsville, Ala. 35812. Reference: RFQ 1-6-40-68199. Due date: Jan. 10.

**RADIO NEUTRALIZATION SYSTEM**

Aberdeen Proving Ground has a requirement for the design, development, fabrication and testing of a radio neutralization system.

Contact: Procurement Division, Bldg. 4603, Aberdeen Proving Ground, Md. Reference: RFQ-RD-APG-77-66. Due date: Jan. 13.

**NASA SPACE SCIENCE DATA CENTER CONSTRUCTION**

NASA-Goddard has issued IFBs for the construction of a NASA Space Science Data Center.

Contact: NASA, Goddard Space Flight Center, Glendale Rd., Greenbelt, Md. 20771, Attn: D. J. Menard, Code 249.3. Reference: IFB S-56138/630. Due date: Jan. 18.

**ORBITING VEHICLES LIFETIME PREDICTIONS**

NASA-Marshall is funding a study on lifetime predictions for orbiting vehicles.

Contact: Purchasing Office, Marshall Space Flight Center, NASA, Huntsville, Ala. 35812. Reference: RFQ DCN 1-6-7500056. Due date: Jan. 12.

**MAGNETOMETER FLIPPER MOTOR STUDY**

NASA-Ames is issuing RFPs for a study of magnetometer flipper motors.

Contact: NASA, Ames Research Center, Moffett Field, Calif., Attn: A. S. Hertzog, Procurement Officer. Reference: RFP A-11081 (AC-43). Due date: Feb. 7.



**DOD NEGOTIATIONS**

Hughes Aircraft Co.--with Air Force Systems Engineering Group for research on laser array techniques.

Systems Research Laboratories, Inc., Dayton, Ohio--with Air Force Systems Engineering Group for the final fabrication and evaluation of dopler satellite simulator and support of laser/multimeter interface.

**NASA NEGOTIATIONS**

Beckman Instruments Inc., Fullerton, Calif.--with Ames for research on detection of extraterrestrial microorganisms by microcalorimetry.

**DOD CONTRACTS****Army**

General Electric Co., Missile and Space Division--\$445,700 for performance of test operations, data reduction and analysis for Project **GLOW**.

Douglas Aircraft Co.--\$2,450,000 for EDTR research effort on classified project for ARPA.

University of Texas--\$74,985 for study of hybrid resonance energy transfer.

Batesville Manufacturing Co., Batesville, Ark.--\$100,328 for APE study of E27 warhead casing (**LANCE**).

General Electric Co., TEMPO--\$65,741 for additional research and development study on strategic implications of hardsite defense.

**Navy**

Sylvania Electric Products, Inc., Sylvania Electronic Systems--\$49,876 for investigation of antennas in plasma media.

The Pacific Manufacturing Co., St. Arcadia, Calif.--\$154,500 for rocket motor parts.

Raytheon Co., Missile Systems Div.--\$337,486 for phased array antenna system.

Pacific Data System Electronics Associates, Inc., Santa Ana, Calif.--\$25,700 for inertial guidance system platform evaluator.

**Air Force**

Northeastern University--\$250,000 for research directed toward studies on airglow and aurora phenomena.

**MORE**

## DOD CONTRACTS - Contd.

## Air Force

University of Denver, Colorado Seminary--\$159,920 for investigation of radiative fluxes in the atmosphere.

Dian Controls, Inc., Boston, Mass.--\$37,925 for repair of memory codes applicable to AN/ARC-106 digital communications system.

United Aircraft Corp., Research Laboratories--\$147,673 for theoretical calculations on advanced oxidizers.

FMC Corp., Chemical Research and Development Center, Princeton, N.J.--\$97,440 for catalyst investigation of 98% hydrogen peroxide.

Socony Mobil Oil Co., Inc. Research Division, Central Research Division Laboratory, Princeton, N.J.--\$73,000 for research on plasma probing with high energy beams.

Thiokol Chemical Corp., Reaction Motors Division--\$80,000 for replacement parts for YLR-DD liquid rocket engines.

Thiokol Chemical Corp., Reaction Motors Division--\$35,000 for spare parts for YLR liquid rocket engine.

## NASA CONTRACTS

## Goddard

Aracon Geophysics, Concord, Mass.--\$400,000 for operation of **NIMBUS** Data Utilization Center.

American Standard, Mountain View, Calif.--\$631,563 for long life Earth sensors for **ATS**.

Sperry Rand Corp., Vickers, Inc.--\$43,978 for spare parts for steerable antenna hydraulic drive system.

Honeywell Inc.--\$215,000 for design, development and fabrication of a nonredundant breadboard spacecraft digitized controller.

## Lewis

Aerojet-General Corp.--\$1 million for incremental funding and modification of reporting requirements.

General Dynamics Corp.--\$4 million to increase funds and extend estimated period of performance.