SPACE BUSINESS Daily

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THE PRESIDENT/THE GREAT SOCIETY/WAR & SPACE (A Brief Analysis). For the first time since the National Space Program was conceived under President Eisenhower, our struggles for leadership in space are not important enough to be mentioned by the Chief Executive as a topic deserving of attention in a report to the Congress and the American people. Only one or two conclusions can be drawn. Either the President now considers the battle won or the fruits of our space labors are of a minority priority for competition with the domestic and international welfare and war endeavors of our nation. Some say he will speak of space later. However, we feel that our space efforts are not a diversion or a luxury that we can accept or reject or postpone after all the "serious" matters are out of the way. With the first "space recession" budget ready to go before Congress (SPACE Daily, Sept. 24 & Jan. 7) we can expect that Congress when acting on this budget will follow the leader.

SPACE-AGRICULTURE FOR AA BEGINS TO EVOLVE. An entire new outline for the United States space program is beginning to evolve from the NASA's envisioned **AA** (**APOLLO** Applications) remote sensor program. With the enthusiasm for the nation's space program appearing to lessen as we reach toward our **APOLLO** goal (SPACE Daily, Dec. 13), the NASA has in the last year taken the first positive actions necessary for absolutely direct application of space achievements and space technology to needs on Earth.

The program as evolved sets up five major areas of work, based on the use of remote sensor instruments from space to be included in the **AA** program. (See SPACE Daily, Jan. 7.) The programs, which are being funded in most part by NASA and directed by other government agencies, are at this stage to determine "ground truth data" i.e., to verify that determination of Earth problems and studies can be aided or solved by remote sensing from space.

Three of the study areas are being or will be directed by the Department of the Interior's Geological Survey. They are: 1) Geology/Planetology; 2) Hydrology; 3) Geography/Cartography (SPACE Daily, Jan. 11 & 12). Another area, Oceanography, is being conducted by the Naval Oceanographic Office, with a transfer of $900,000 in funds from NASA (SPACE Daily, Jan. 4, 7 & 10). And the fifth portion of the program, Agriculture/Forestry, is being directed by the Department of Agriculture.

The cooperative task agreement between NASA and the Agriculture Department (USDA) has been signed with little fanfare.

MORE

The agreement calls for the agencies to conduct joint research and development activities to define manned Earth orbit experiment programs for agriculture and forestry. NASA agreed to provide funding totaling $847,000 for the program.

The USDA set up a Research Management Team, consisting of intra-agency and university members, to conduct its program. The Team's job has been to: determine policy, select projects, pick sponsoring agencies, disperse funds, select consultants and administer technical direction to the program. The Team is headed by Dr. H. A. Rodenhiser, Deputy Administrator of the Agricultural Research Service. Ranking member of the team representing forestry is Dr. Keith Arnold, Director of Forest Protection Research Division. Dr. A. B. Parks, Assistant to the Administrator of the Agricultural Research Service, is liaison officer between USDA and NASA.

The Team, though not on a regular schedule, has been meeting on call throughout the year and has announced a twelve project program for the space agreement. All work will be carried out by USDA agencies or by three universities--Purdue, Michigan and California. All agencies have been selected for the twelve projects, with formal announcement expected within "a few weeks." Typical experiments include investigation of multi-spectral studies of crop and soil species, maturity, salinity, disease, moisture; timber types; wild land resources; plant reflectivity. The program is being conducted over three areas: Berkeley, Calif., Ann Arbor, Mich., and Weslaco, Tex. Another study in the twelve project program involves the investigation of the potential economic benefits of surveying by remote sensors from space.

Dr. Parks told SPACE Daily that the USDA "is confident" that the studies will prove the case for the Space-Agriculture/Forestry program. He indicated the program will lay the groundwork for future participation by industry for hardware efforts on the project, which he said has unlimited potential. Just one example is soil reclamation. Dr. Parks said that one area where USDA does anticipate some technical difficulty is in the area of data handling. He said, however, that the development by the University of Illinois of the ILLIAC III computer (SPACE Daily, Jan 12) may go a long way toward solving the problem.

The five-pronged NASA/government agency remote sensing program will in 1966 begin to yield first concrete proof of benefits to be reaped on Earth from space-based operations. The program could be the keystone to the first major return for the improvement of man's lot from the space program. The unlimited implications of this new program for the nation are readily apparent.

SPACE MEDICINE SEEKS SPACE LAW. The Aerospace Medical Division is planning the preparation of a guide to space law to be used as a basic reference material for all agencies engaged in space activities. According to the Air Force medical unit the compilation of a space law reference work was chosen because of the "interface with medical problems" and because the entire subject of space law is to be found at the present time in "a relatively few documents" (400 items known). The research effort will establish a method for searching, selecting, abstracting and indexing on a continual basis in order that all future significant contributions in the field of space law will be made available. An RFP has not been issued but is contemplated.

GGTS TO RIDE NEXT TWO TITAN III-CS. The two General Electric Gravity Gradient Test Satellites (SPACE Daily, June 21) are now scheduled to accompany seven (perhaps less for the first shot) Philco **IDCSP** payloads (Initial Defense Communications Satellite Project) on the fourth and fifth **TITAN III-C** vehicles. Earlier indications were that the sixth **III-C** launch would also involve a **GGTS** (SPACE Daily, Dec. 13), but present plans are for that shot to carry eight **IDCSP** packages. **III-C-4** is officially set for mid March (SPACE Daily, Jan. 5), but the shot may not come off until April due to the extreme care being taken to prepare the vehicle so as to preclude the sort of mishap that ruined the last two **III-C** missions.

GGTS is being orbited to evaluate the gravity gradient stabilization concept for use on communications satellites like the **IDCSP** satellites. If the concept proves itself applicable for that purpose, it may be adopted for the **ADCSP** (Advanced Defense Communications Satellite Project) payloads, which are now under design proposal evaluation (SPACE Daily, Nov. 22). Each **IDCSP** satellite weighs 200 pounds and will be put in a near-synchronous orbit. The total payload weight for **III-C-4** is 3500 pounds. GE built two flight and two nonflight models of the **GGTS** for the Air Force. If each of the next two shots includes seven **IDCSP**s and one **GGTS** and the following shot includes eight **IDCSP**s, there will be 22 **IDCSP**s in orbit to comprise the initial **IDCSP** network.

ROHR TO BUILD TWO COMSAT ANTENNAE. Rohr Corporation has been named by Sylvania Electronics Systems to build the high gain antennae to be used at the ComSat ground stations being established at Brewster Flat, Wash., and near Paumalu, Hawaii, and by Page Communications to build the Casshorn antennae for three transportable ground stations to support ComSat's **APOLLO** satellite system.

Rohr, which was on the Sylvania bid team which won the ComSat award last month to provide the 85-foot antenna systems for the ground stations (SPACE Daily, Dec. 3), will build and install the antenna structures, including servos, under a forthcoming $1.6 million pact from Sylvania. ComSat's contract with Sylvania is for $4.65 million, and calls for delivery of both units by Dec. 1, 1966.

Page was selected last year by ComSat for the three 42-foot horn antennae (SPACE Daily, Oct. 18 & 26), and is to deliver two systems by June and the third a month later. The transportable stations will be deployed at ComSat's three permanent ground stations, Brewster, Paumalu, and Andover, Me.

TRW TO BE AWARDED NEW SPARTA CONTRACT. Negotiations are underway between TRW Systems and the Army Missile Command for an additional work contract on the **SPARTA** detection and tracking program for the Advanced Research Project Agency's Project **DEFENDER** ballistic missile defense study and development program. TRW recently signed a $6.5 million contract with AMC for a 20-month test program for a demonstration of the feasibility of the **SPARTA** anti-**ICBM** discrimination program (SPACE Daily, Dec. 7 & Oct. 6). In addition, AMC is presently negotiating with RCA for the program to plan the test phase and experiments for the **SPARTA** test program (SPACE Daily, Dec. 17).

NAM PRESIDENT ATTACKS PRESIDENT'S LABOR POLICIES

W. P. Gullander, president of the National Association of Manufacturers, charges that President Johnson, in his State of the Union message, used an "inconsistent paradox" in references to strikes and organized labor. Gullander "wholeheartedly agrees" with the President's proposal that Congress act against "strikes that threaten irreparable damage to the national interest." However, the head of the NAM said that the President was guilty of the paradox later in the same speech when he again urged Congress to repeal Section 14B of the Taft-Hartley Act, which would make right-to-work laws illegal.

By repealing 14B, Gullander said that "Congress would...drive many unwilling industrial workers into the union organizations and add to the power of union bosses like Mike Quill...We hope it may be possible to have both 'guns and butter' without inflation--but irresponsible, economically crippling strikes will make both more difficult to obtain," Gullander said.

OPERATIONAL SURVEYOR RETRO AWARD

Hughes Aircraft, prime contractor for **SURVEYOR**, has awarded a $2 million contract to Thiokol to develop the larger thrust retro-rocket engine which will be necessary to brake the approach of **SURVEYORs VIII**, **IV** and **X** as they near the Moon.

Thiokol, which recently delivered the first 9000-pound thrust retro-rocket for the first seven **SURVEYOR** "engineering-test" model spacecraft (SPACE Daily, Jan. 10), was selected to design and produce the retro-rocket for the heavier (2500 pound) "operational" models.

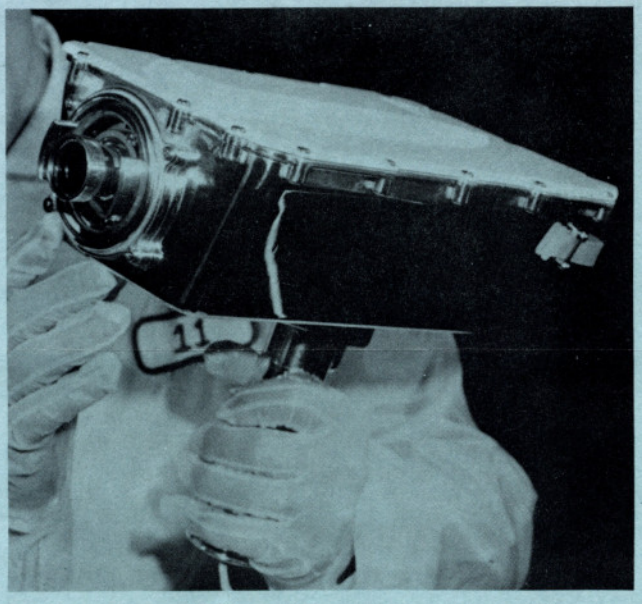
NASA recently reoriented the **SURVEYOR** program to eliminate the operational models from the Hughes contract (SPACE Daily, Dec. 16 & 20). The presently approved **SURVEYOR** program calls for 10 spacecraft--seven engineering test models and three operational models. However, only the first seven spacecraft are presently under contract. They are scheduled for flight starting May or June of 1966.

MARTIN TO SUPPLY X-15 HEAT SHIELDING

NASA-Edwards has awarded Martin-Baltimore a $200,000 contract to design, fabricate, and test a thermal protection system for the modified X-15 experimental aircraft (No. 2) that will fly at speeds above 5000 mph. The 300-pound system will be based on Martin's MA-25S silicon ablator and will maintain air-friction heating at well below the 1200-degree-F safety limit. The six-month contract also calls for establishment of refurbishment procedures.

Martin was the winner (SPACE Daily, Aug. 5) of the NASA-Langley contract for R&D work on refurbishable heat shielding for space shuttles (SPACE Daily, Mar. 23 and Apr. 21). Under the contract, the company has been investigating various ablator materials that can be fixed to a reuseable substructure (SPACE Daily, Oct. 4). Among the materials studied are Martin's own elastomeric silicone and Langley's purple silicone.

FIRST APOLLO TV CAMERA DELIVERED



This is an engineering model of the television camera that will allow the American public to witness as it happens the Moon mission of the **APOLLO** astronauts. Camera-developer Westinghouse Aerospace recently delivered a similar model to NASA-Houston and will begin delivering operational models in June. Two such models will be delivered in June, July, and August, and one in September. The first flight camera will be used on the initial lunar journey.

The camera was developed under a $5 million Houston contract. It is able to endure a temperature flux of 750 degrees F--i.e. from -300 to 450. It has about 250 electronic parts. Without its lenses, it weighs seven pounds; with its accessories, it weighs about twice that. It needs six watts (24 volts) to function. Its configuration is designed to minimize heat absorption. It scans at 10 or .625 frames per second with 320 scan lines per frame. It can be operated from a fixed or portable position. Four lenses will be used: a wide-angle for interior shots, a telephoto for shooting from the spacecraft, a narrow-aperature for shooting on the lurain in daylight, and a wide-aperature for shooting in darkness.

During injection into Earth orbit, the camera will be mounted within the **APOLLO** Command Module to observe the astronauts. In that orbit, it will be relocated to view both instruments and astronauts. On the translunar trip, it will be hand-held and aimed out the module's ports. When the two astronauts transfer to the **LEM**, they will take the camera with them and store it for the descent. On the lurain, the command astronaut, the first to leave the **LEM**, will be viewed by the camera from within the **LEM**. Later the camera will go outside on an 80-foot umbilical to photograph the **LEM**, the other astronaut, and the Moon. There, it will also make low-scan scientific pictures.

MCCONNELL WARNS OF MISSILE DEFENSE BREAKTHROUGH

Air Force Chief of Staff Gen. John P. McConnell said the United States must continue its program of space and missile R&D but added that we must maintain a missile/-bomber mix in case the Soviet Union scores a "technological breakthrough" which would "lead to a revolutionary principle of missile defense which would be virtually impenetrable to even the most advanced missiles." Our deterrent, in such a case, "would be seriously impaired," McConnell said.

Kenneth H. Jacobs, previously director of program management, has been appointed to the post of vice president and general manager for Lockheed Propulsion's large solid motor programs.

RAYTHEON ESTABLISHES PARIS OFFICE

Raytheon Europe International has established a Paris office to be headed by Harold M. Landau, formerly director of marketing for Raytheon Europe. The new office will represent four Raytheon divisions: Missile Systems, Space and Information Systems, Equipment, and Submarine Signal. The office will work with government agencies and systems manufacturers in Europe, Africa and the Middle East.

NINE INVITED ON M-2/HL-10 MOBILE GROUND UNIT

NASA-Edwards has invited nine firms to bid on the design and fabrication of a mobile ground support unit to checkout Stability Augmentation Systems (SAS) on **M-2/HL-10** lifting body research vehicles.

The units will consist of an assembly of electronic test equipment arranged in modular form, rack mounted, easily removed and housed in a four-wheeled mobile unit, steerable and equipped with brakes. The SAS senses and dampens short-period oscillations in the pitch, roll and yaw axes. The mobile ground support unit will be used for field-level maintenance and inspection of the lifting body vehicles by semiexperienced personnel, and have research tool capabilities when used by experienced engineering personnel.

The following firms were invited to bid: Northrop-Norair, Hughes-Electronics, American Bosch Arma, Garrett, Trio Tech-Offner, Beckman Instruments, Westinghouse, GE and Cubic Corp. Interested firms have until February 21 to bid on RFP PR 6-306.

GIFTS TO GODDARD LIBRARY EXCEED $1.5 MILLION

J. Leland Atwood, president of North American Aviation and general chairman of the Robert Hutchings Goddard Library Program at Clark University, reports that advance gifts totaling $1,546,000 have been pledged to the program. Aerospace corporations have committed $700,000 of the total with $846,000 coming from University trustees and friends and foundations.

Major gifts from aerospace corporations have included $100,000 each from Boeing, General Dynamics, Grumman, Lockheed, and North American. In addition, GE has pledged $75,000 and $50,000 has been received from Avco and IBM and $25,000 from Westinghouse.

Atwood says that the gifts which have already been pledged represent nearly 30 per cent of the $5.4 million needed to build and endow the Library.

BALL BROTHERS TO FURNISH ADDITIONAL OSO HARDWARE

NASA-Goddard is negotiating with Ball Brothers Research Corp. of Boulder, Colo., prime contractor for the Orbiting Solar Observatory (**OSO**), for the following items for the spacecraft: telemetry suitcase test set for simulating the spacecraft's electrical output; flex-print study program to determine the feasibility of accommodating additional circuits in the spacecraft; and fabrication of miscellaneous base plates to accommodate two **OSO** experiments.

HOUSTON TESTS AIRBORNE APOLLO HOMING SYSTEM

NASA-Houston's Landing and Recovery Division conducted a series of tests last week to check out direction finding equipment for homing on **APOLLO** spacecraft for post-landing recovery.

The homing equipment, built by Cook Electric under a $6.2 million contract, consists of an AN/ARD 17 VHF/S-Band direction finding receiver which is installed on Air Force HC-130H Air Rescue Aircraft. The device, which is being installed on all HC-130H rescue aircraft, will have the capability of tracking the spacecraft in Earth orbit (on early **APOLLO** flights) as well as during re-entry. Several of the air rescue aircraft will be used to cover the landing of the **APOLLO** on its return from the Moon. Installation of the receiver on all aircraft is expected to be completed by early 1967.

Tests last week were performed off Galveston Island in the Gulf of Mexico using an **APOLLO** boilerplate spacecraft with the **APOLLO** Recovery Beacon and **APOLLO** Survival Radio transmitting signals. Homing runs were made from varying altitudes of 28,000 to 500 feet. The equipment performed "exactly as expected," NASA said, with line-of-sight acquisition of the **APOLLO** boilerplate spacecraft, in the Gulf, on all homing runs of the aircraft. Acquisition was made on line-of-sight from 21 nautical miles out when the aircraft was at 28,000 feet.

SATURN IB FOR SPACE STATIONS IN 10 YEARS

Chrysler, prime contractor for the **SATURN IB** first stage, has completed studies (SPACE Daily, Jan. 10) which indicate that the two stage launch vehicle could be used for building orbital space stations, re-supplying such stations, and assembly of orbital launch vehicles.

The Chrysler studies show that a space station for six to twelve persons and equipment for missions of one to five years duration would be possible within ten years. Space stations, according to the study, would prove valuable in four principal areas: the investigation of man's ability to exist for extended periods in space; the development of technology for complex space operations such as orbital launching of manned and unmanned space probes to other planets; an investigation of all aspects of the near-Earth environment and Earth-oriented applications such as meteorology, geography, geology, navigation, and communications (see story this issue); the acquisition of scientific information in the fields of astronomy, planetology, and space environment.

Many other post-**APOLLO** missions would also be possible with an uprated **SATURN IB**, which could have twice the payload of the present launch vehicle, including near-Earth orbit, synchronous, polar, lunar, planetary, solar, deep space, and unmanned Mars landing missions.

NAVY NAMES MANPOWER ASSISTANT

Richard A. Beaumont, president of Industrial Relations Counselors, Inc., New York City, has been named to the new position of Deputy Under Secretary of the Navy (Manpower). The position was established to provide an assistant for all manpower matters for which the Under Secretary of the Navy is responsible.

Future Space Business

VERSATILE STERESCOPE RFP

NASA-Houston is inviting companies to submit proposals for a versatile sterescope with a scanning stand, zoom power pod, ten-power eye pieces, and relay lens system. Contact: NASA, Manned Spacecraft Center, Industry Assistance Office, Houston, Tex. Reference: RFP BG731-30-6-342P. Due date: Jan. 25.

DOD NEGOTIATIONS

Westinghouse Research Laboratory--with Air Force Special Weapons Center for fallout prediction study.

Acoustica Associates, Los Angeles, Calif.--with Air Force Flight Test Center for the development of a propellant gauging device designed to be capable of measuring propellant quantity under long term zero gravity conditions.

Rohm and Haas Co., Redstone Research Div.--with Army Missile Command for studies, investigations and support of **NIKE-X** propulsion system.

Hughes Aircraft Co., Culver City, Calif.--with Army Missile Command to amend the FY '66 **TOW** R&D contract to provide for development of vehicle adapter kits.

G. T. Schjedahl Co., Northfield, Minn.--with Air Force R&D Contracts Div., L. G. Hanscom Field for the development of balloon system designs.

NASA NEGOTIATIONS

Electro-Optical Systems, Inc.--with Lewis for design analytical study and testing to determine the feasibility and performance effect of operating the discharge in an electron-bombardment cesium ion thrustor directly from the transformer output of a D.C. to A.C. inverter power supply.

NASA CONTRACTS

Ames

Philco Corp., Western Development Laboratories--$30,000 for a study proving a system analysis of the proposed Ames lunar magnetometer experiment (Phase II).

Marshall Laboratories--$840,000 for a plasma probe experiment for **PIONEER C** & **D** spacecraft.

Goddard

Vitro Labs.--$273,114 to provide technical service for **APOLLO** range ships program evaluation of test data.