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SYLVANIA WINS COMSAT ANTENNA AWARD. As reported in yesterday's SPACE Daily, ComSat has selected the contractor for the two 85-foot antennae to be installed at the two new ComSat ground stations (one at each site). Sylvania was chosen over RCA, Philco, and Hughes. The contract, a copy of which has been filed with the FCC, is for $4,650,000 and calls for delivery of both units by December 1, 1966.

The pedestal for each antenna will be 55-feet high and 22-feet wide at the base. The dish will be formed of 252 aluminum panels and will have a 37,000-pound counterweight. The overall antenna will weigh about 387,000 pounds. One of the ground stations is near Brewster, Wash., and the other near Paumalu, Hawaii. Each site will also have a 42-foot horn antenna from Page Communications (SPACE Daily, Oct. 18 & 26 and yesterday).

ABC/ITT DISCUSS MERGER. The International Telephone and Telegraph Corporation and the American Broadcasting Company Inc. are currently engaged in discussions concerning a possible merger. No agreement has been reached in these tentative discussions which climax other similar meetings during the past several months.

AUSTRALIA OFFERED MARTEL FOR F-111A. **MARTEL** ("Hammer"), the new Franco-British **ARM** (Anti-Radiation Missile) (SPACE Daily, Oct. 26), has been proposed to Australia for use on the two dozen F-111A aircraft the United States will sell Australia in 1967. The French version of the missile, built by Matra, is designated AS-37 and is guided by a radar homing device from Electronique Marcel Dassault, while the English version, built by Hawker Siddeley, is called AJ-168 and is TV guided by a Marconi device. General Dynamics builds the F-111A (old TFX, Air Force model).

NORTHROP/EDWARDS SPACE SHUTTLE CONTRACT TO BE EXTENDED. NASA-Edwards plans to open negotiations with Northrop-Norair for an extension of the contract for research and development support to the Ames M-2 and Langley HL-10 lifting body space shuttle flight test programs at the center. The new contract will increase the R&D effort and extend the services through Sept. 30, 1967. Northrop won the Edwards contract to design and fabricate two lifting body vehicles (M-2 and HL-10) in a competition with four other companies early last year (SPACE Daily, Feb. 3 & April 22, '64). In addition to this program Northrop was selected with

McDonnell this year (SPACE Daily. Jan. 4 & May 3) to conduct preliminary design feasibility studies as the first phase of a possible unmanned single orbit and return flight test of space shuttle design for NASA-Edwards.

LARSEN NAMED DDR&E ASSISTANT SECRETARY. President Johnson has named Dr. Finn J. Larsen, Honeywell vice president, as Assistant Secretary of Defense (Research and Engineering). Larsen, a former Assistant Secretary of the Army, succeeds Dr. Eugene G. Fubini in the post, which has been officially redesignated Principal Deputy Director of Defense Research and Engineering. Fubini, who had been in charge of R&E since 1963, resigned last summer (SPACE Daily, June 30) and is now a corporate vice president of IBM. The White House said that Larsen's appointment is in line with the President's efforts "to strengthen research and development programs throughout the government."

PROPOSED ELDO-AS VEHICLE WOULD HAVE SOLID TRANSTAGE. If ELDO (European Launcher Development Organization) chooses the first **(ELDO-AS)** of the three proposed improved versions of its current launch vehicle, **EUROPA-1 (ELDO-A)** (SPACE Daily, Dec. 1), that version will use a solid-fueled fourth stage for a transtage to put the payload into a circular orbit. **ELDO-AS** (essentially the **ELDO-A**: the three-stage **ELDO-A** plus the transtage) would be launched into a 155-mile circular orbit where its third stage would refire to change the apogee to 8700 miles. At that apogee, the transtage with its payload would separate and fire to circularize the payload's path at that altitude.

The motor for such a transtage has been studied by SNECMA, an engine producer owned largely (90 per cent) by the French government and partially (10 per cent) by Pratt & Whitney, under contract to **ELDO.** It would weigh 205 pounds, deliver 3700 pounds of thrust for 12 seconds, and be able to increase the payload's speed by 4265 feet per second.

The other two proposed **ELDO** versions--**ELDO-B** and **-C**--would use hydrogen/-oxygen-fueled upper (third) stages. Pratt & Whitney is prime contractor to NASA for the RL-10 hydrogen/oxygen engine that is being used on the **CENTAUR** upper stage and that was used on the **S-IV** upper stage (**SATURN I**'s second stage).

M-1 GETS $2 MILLION. The Bureau of the Budget has apportioned $2 million for FY1966 for the M-1 large liquid hydrogen engine project. The M-1, along with the Large Solid Propellant Program and the **SNAP-8**, had been cancelled by BOB and NASA in the FY 1966 budget request but the Congress authorized $7.5 million for the M-1.

GT-7 COUNTDOWN PROCEEDING WELL. Latest indications from Cape Kennedy are that the countdown of **GEMINI VII** will proceed normally to the scheduled liftoff tomorrow at 2:30 PM EST. Medical checks of the astronauts were favorable, and the weather is expected to be good. A major status review will be made today.

DODGE VIES WITH ATS

DOD and NASA are preparing to begin almost simultaneous competitive launchings of satellites to test out gravity gradient stabilization systems for communications applications at synchronous altitudes. NASA's program, the **ATS** (Applications Technology Satellite) series, will include three gravity gradient stabilized satellites to test out communications technology, one at medium altitudes, and two at synchronous altitudes (SPACE Daily, Nov. 18). These Hughes-developed satellites will utilize a three-axis stabilization system produced by GE. The first is scheduled for launch in the first half of 1967.

The DOD entry into the field would include an exploratory **GGTS** (Gravity Gradient Test Satellite) to be launched by a **TITAN III-C** in the first quarter of 1966. It will be designed to test a two-axis stabilization system in near-synchronous altitudes. Following the **GGTS** will be the **DODGE** (DOD Gravity Experiment) satellite (yesterday's SPACE Daily). It will have, like the NASA **ATS**, a three-axis stabilization system produced by APL and General Dynamics to test out communications techniques at synchronous altitudes when launched in January of 1967 by another **TITAN III-C.**

It appears that the **ATS** program was originally scheduled for flight about mid-1966 and then slipped about 8 or 9 months to its present launch date of first half-1967. DOD, perhaps with an eye to its **ADCSP** (Advanced Defense Communications Satellite Project)(SPACE Daily, Nov. 22), decided to begin its own program. The **DODGE** satellite project is now scheduled for launch only a few months ahead of NASA's first gravity gradient **ATS.**

DODGE/ATS In Controversy

Proponents of the **DODGE** system claim that it will be primarily a gravity gradient test satellite, that it will use many more extendable rods (around 18), that it will be able to test and retest and even attempt to reorient the satellite, and that its system is more sophisticated than the **ATS** system.

On the other hand, NASA observers point out that it is smaller (300 pounds vs. 1500 pounds or more) than the **ATS**, that the **ATS** is more heavily instrumented, and that many experts consider the **DODGE** to be an "overly ambitious" project. The controversy between **ATS** and **DODGE** has resulted in extensive internal "discussions" between NASA and DOD but at present both satellites are firmly scheduled with the DOD satellite planned to go up first.

GENERAL DYNAMICS/CONVAIR REALIGNS MANAGEMENT

Elmer R. Peterson, vice president-research and engineering at General Dynamics/Pomona, has been appointed vice president-research and engineering at the Convair Division. Peterson replaces R. C. "Sparky" Sebold who is retiring after more than 35 years service with General Dynamics.

Others who have been handed new assignments include: Grant L. Hansen, vice president and program director for the **CENTAUR** high-energy upper stage program, appointed vice president-launch vehicle programs, and Charles S. Ames, previously vice president and program director-space launch vehicles, to become vice president-military space programs.

AEROJET NAMES KIMBALL TO HEAD EXECUTIVE COMMITTEE

Aerojet-General's board of directors has appointed Dan A. Kimball, chairman of the board, as chairman of the company's executive committee. M. G. O'Neil, president of Aerojet's parent company, General Tire & Rubber, succeeds Kimball as board chairman.

In commenting on Kimball's appointment, O'Neil said, "As chairman of the executive committee, Dan Kimball is in an excellent position to counsel, advise and approve important business undertakings in Aerojet-General...This industry has an expanding future, and this move will help us to improve our position as a leader."

MARQUARDT STOCK SALES BOOSTED BY INVESTMENT PLAN

Marquardt's officers, directors and principal stockholders sold a total of 29,778 shares during the third quarter of 1965. This amount excludes gifts and a total of 700 shares which were purchased by President J. B. Montgomery. Montgomery, in answer to an erroneous report about the transactions, said that of the 30,478 shares sold, 28,108 were accounted for in transactions made by Chairman of the Board Roy E. Marquardt. Marquardt's largest transaction was the exchange of 25,008 shares for stock of General Exchange Fund Inc. This exchange is part of an investment diversification plan initiated by Marquardt.

HUGHES TO STUDY PLANET RECOGNITION SYSTEM

NASA-Goddard has awarded the Hughes Research Labs at Malibu, Calif., a $44,700, one-year contract to study and design a satellite system that would observe the surface of a planet and classify it according to programmed categories. The system would use Hughes's Multivac Mark II device that identifies patterns electronically from video inputs. A major phase of the study will focus on adaptive and nonadaptive filters to aid the system's scanning and data-processing modes. Slides of representative planet surfaces will be supplied by NASA.

34TH POLARIS SUB PASSES FIRST SEA TRIAL

The USS George Bancroft, the 56th nuclear-powered Navy submarine and the 34th to carry **POLARIS** missiles, performed satisfactorily last Monday during its initial sea trial. Commanded by Captain Joseph Williams, she left her assembly berth Sunday night at the General Dynamics-Electric Boat yard at Quincy, Mass., and steamed under full power through surface and subsurface tests. Among the officials aboard was Vice Admiral H. G. Rickover for the Navy and the AEC.

New appointments at the Management Information Systems Development group of RCA's Defense Electronic Products include: **G. E. Lloyd**, manager, systems engineering; **G. Kellner**, manager, advanced system development; and **L. H. Souder**, manager, systems implementation.

DOUGLAS PROPOSES NEW SATURN MISSIONS

A new series of possible space missions utilizing **SATURN** boosters was proposed in Washington yesterday by Donald Douglas Jr., president of Douglas Aircraft.

Douglas noted that NASA has outlined a "tantalizing list of desireable experiments" in its **APOLLO** Applications (**AA**) program to be carried out by the space industry in the future. Filling in on that outline, Douglas proposed to the AIAA the following space ventures with **SATURN** boosters:

1) Orbiting of a lifting body craft into Earth orbit with a command and service module--the lifting body exposed at separation of the modules. Astronauts would then remotely control separation, ignition and descent of the lifting body into the atmosphere. Later, astronauts would test re-entry themselves by entering the lifting body and piloting it to Earth.

2) Using the **SATURN** upper stage(Douglas' **S-IVB**) as a technology vehicle ("a giant **X-15**") to test effects of new materials, astrionic systems and structural concepts.

3) Providing simultaneous line-of-sight communications between the **APOLLO** Lunar Excursion Module and Earth by adding velocity to **S-IVB** after separation from the payload. **S-IVB**, orbiting above the Moon, would serve as a communications repeater.

Other missions suggested by Douglas included the recovery of space booster stages from orbit; establishment of platforms for in-orbit experimentation; and performing high velocity re-entry tests.

MAXSON TAKES POSSESSION OF NAVAL ORDNANCE PLANT

Maxson Electronics has taken possession of the Naval Ordnance Plant at Macon, Ga., which it purchased last month for $6,760,000 (SPACE Daily, Oct. 14). Included with the purchase was a production contract for approximately $16 million of fuzes, primers, and other ordnance devices.

ROHR FILES STOCK PLAN

Rohr Corp. has filed a statement with the Securities and Exchange Commission seeking registration of 100,000 shares of common stock, to be offered in carrying out its Qualified Stock Option Plan.

AF HELIUM TEST GETS SCHEDULE CHANGE

Now in its 50th day, the latest Air Force test of a helium-oxygen environment for astronauts (SPACE Daily, Oct. 5) will end on December 13 as planned, but the last four days will use a regular ground-level atmosphere rather than the helium experimental atmosphere that has been used from October 13 to the present and that was originally intended to remain until the test ended. The change has been decided upon to allow extra time to evaluate the subjects under test conditions without the helium air. The test is being run at the AF School of Aerospace Medicine.

AIR FORCE SLED TO TEST ANTI-MISSILE EFFECTS

Goodyear Aerospace has completed fabrication of a supersonic rocket-driven sled which will be used later this month by the Air Force to measure the effects a missile might encounter when hit by a nuclear-armed anti-missile missile.

The sled, built for the AF Missile Development Center at Holloman AFB, N.M., will carry a missile nose cone through a simulated high-impact nuclear explosion at speeds of about 2300 mph. The 4500-pound sled will be subjected to the high energy blast when it is some 13,000 feet down the 35,000 foot-long rail course. Initial test firing is expected within two weeks.

The 22-foot long vehicle is made from a new alloy steel (HP 9-4-25) developed by Republic Steel's Special Metals Division, and will be powered by in-line, three-stage solid fuel boosters. The first and second stage boosters are comprised of four **TERRIER** rockets each, while four **RECRUIT** rockets make up the third stage booster. A Goodyear **BALLUTE** will decelerate the sled after it passes through the blast area.

NASA TO BRIEF PETROLEUM INDUSTRY

NASA-Lewis will host a Conference on Selected Technology for the Petroleum Industry in Cleveland December 8 and 9. The session is being held under the agency's Technology Utilization Program whose objective is to make available to industries the results of knowledge gathered from space research and development.

The two-day conference will feature presentations by NASA Administrator James E. Webb and Frank N. Ikard, president of the American Petroleum Institute. Sessions are planned in the following areas: combustion; heat transfer; storage and handling of cryogenic fluids; magnetics and superconductivity; physics and chemistry of solid surfaces; hydrodynamics of liquid surfaces; pump technology; and bearings, seals and lubricants.

DRI TO STUDY VIBRATION DESIGN SOLUTIONS

Highly accurate design solutions to problems of vibration in aerospace structures will be investigated for the Air Force by the University of Denver's Research Institute under a $110,000 contract. Heading the study for the Institute is Dr. Rudolph Szilard, senior research engineer and professor of civil engineering, who has developed a computer solution for dynamic stress distributions in flight structures of various shapes. The contract calls for refining and extending that solution, which "uses an improved discreet element approach formulated as a stiffness matrix deflection problem...well suited for computer analysis." Dr. Szilard recently presented a paper on the solution to the International Symposium on Shell Structures at Budapest and is set to present a similar paper next year in Leningrad.

Stanley Hancock Hillyer has been appointed Raytheon's senior corporate representative in the Far East. Hillyer, formerly director of international planning, will make his headquarters in Tokyo.

TRW DEVELOPS MICROMETEOROID SIMULATOR

TRW Systems has developed a particle accelerator, adapted from a Van de Graff Accelerator, which can be used to accelerate small electrically charged iron dust particles, measuring about 39 millionths of an inch in diameter, to speeds of 6100 to 74,000 mph. Fired at rates of up to 600 particles a second, the charged particles can be used to simulate the mass and speed of micrometeoroid dust in space and their effects on various materials.

APOLLO ABORT-6 SCHEDULED FOR DECEMBER 8

The sixth and last **APOLLO** Abort test launch has been scheduled for December 8 at White Sands. Launched aboard a **LITTLE JOE II** solid rocket, the test will demonstrate the ability of the launch escape system to separate from the **APOLLO** Command Module while tumbling and prove the structural integrity of the first production spacecraft.

The **APOLLO** Abort series is designed to test the effectiveness of the **APOLLO** launch escape system in case of an abort on the launch pad or in early stages of the **APOLLO/SATURN V** launch. The **LITTLE JOE II** rocket is a General Dynamics-fabricated launch vehicle which uses two **ALGOL** and five **RECRUIT** solid rockets to simulate the early stages of the **SATURN V** launch.

In the **APOLLO** Abort-6 flight, **LITTLE JOE II** will boost the Command Module launch escape system to 58,000 feet where an abort signal will trigger the launch escape system which will separate the Command Module from the booster and carry it up to 70,000 feet. Immediately after the launch escape system engine cut-off, during the coast phase up to 70,000 feet and during the descent phase, the Command Module launch escape system will be preset to tumble. Canards on the launch escape system will deploy during descent to stablize the spacecraft with its aft heat shield forward. At 21,000 feet the launch escape system will be jettisoned and two seconds later the forward heat shield will be jettisoned. The drogue parachutes and the three main parachutes will then be deployed at about 86,000 feet to bring the Command Module back to the surface. The **APOLLO** spacecraft will be the first production model Command Module **(002)** to be launched.

Previous **APOLLO** Abort tests were: Nov. 7, 1963, pad abort test using only the launch escape system; May 13, 1964, high altitude dynamic pressure test; Dec. 8, 1964, maximum dynamic pressure test at 31,000 feet; May 19, 1965, intended as a high altitude abort test, the **LITTLE JOE II** rocket disintegrated during the early stages of powered flight but the launch escape system successfully separated the Command Module during the unscheduled abort; June 29, 1965, a pad abort test.

Douglas Aircraft has appointed **Schuyler Kleinhans,** previously corporate director of research and engineering, vice president-engineering, and **Dr. Lewis Larmore,** director of the Advanced Research Laboratories, as vice president of the Labs, which will be moved to a new facility in Huntington Beach early next year.

Robert L. Tibbs has been appointed marketing director of Avco's Huntsville Operation. Tibbs was previously marketing manager for space electronics at the firm's Electronics Division.

DOD NEGOTIATIONS

Lockheed Propulsion Co.--with Bureau of Naval Weapons to conduct a research program to investigate the influence of thermal ionization and after burning and the effects of ionization reduction by use of impurity-free propellant components in rocket motors.

Avco Corp., Research and Advanced Development Division--with Air Force Ballistic Systems Division for re-entry environment and systems technology program.

General Electric Co. (TEMPO)--with Army Missile Command for nine months penetration aids study.

Physics International Co., San Leandro, Calif.--with Air Force Flight Test Center to conduct a vernier impulse thrustors feasibility demonstration.

Hughes Aircraft Co.--with Army Electronics Command to continue research work in the field of satellite communications.

Radiation Inc., Melbourne, Fla.--with Army Electronics Command to continue research work in the field of satellite communications.

Lockheed-California Co.--with Air Force Systems Engineering Group to integrate existing technology into preliminary designs of two high polymetric efficient flight test vehicles.

NASA NEGOTIATIONS

Physics Technology Laboratories, La Mesa, Calif.--with Goddard for development and fabrication of an RF ion mass spectrometer calibration ion source system.

Hayes International Corp., Huntsville, Ala.--with Marshall for research and development on experimental hypervelocity impact.

The Bendix Corp., System Division--with Washington for research relative to small interplanetary probe experiments spacecraft study.

Hughes Aircraft Co., Aerospace Group of the Space Systems Division--with Washington for research relative to a study of recovered satellite analysis (**SYNCOM**).

DOD CONTRACTS

Air Force

Avco Corp.--$1.6 million increment to a previously awarded contract for design, development, fabrication, test and evaluation of the **MINUTEMAN** Mark IIA re-entry vehicles.

U.S. Department of Commerce, National Bureau of Standards, Central Radio Propagation Laboratory--$250,000 for investigation of the effects of atmospheric turbulence on propagation.