

SPACE BUSINESS



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HUGH LATIMER DRYDEN PASSES FROM THE SCENE. The dean of American space scientists, Dr. Hugh Latimer Dryden, died of cancer last Thursday night after a prolonged illness. Dryden, the first deputy administrator of NASA, remained at his post almost until the end, providing the technical leadership for the national space program. Born July 2, 1898, Dryden was a government aviation/space executive for more than two decades. He was the director of the National Advisory Committee for Aeronautics (NACA) from 1947 until the formation of NASA in 1958 when he was appointed second in command under Dr. T. Keith Glennan. His honors include the Daniel Guggenheim Medal (1950), Wright Brothers Memorial Trophy (1955), Robert H. Goddard Memorial Trophy (1964), and the President's Award for Distinguished Federal Civilian Service (1960).

LUNIK VIII MAKES SOFT-LANDING BID. Without hedging this time, the Soviet Union says **LUNIK VIII** is on its way to the Moon on a mission seeking "further refinement of the elements of a soft lunar landing and scientific studies." This latest soft-landing probe, the fourth in seven months, represents an outstanding technology back-up capability. Apparently, **LUNIK VIII** is the back-up vehicle for the ill-fated October 4 launch and failure of **LUNIK VII**, confirming that it had to give up the launch pad at Tyuratam in November for the **VENUS II** and **VENUS III** probes (SPACE Daily, Nov. 17). The launch of the Venus probes indicated that the Soviet Union has a dual-launch capability for unmanned missions as well as for its manned missions (SPACE Daily, Aug. 14, '62), a United States deficiency which the **GEMINI VII/VI** mission will attempt to temporarily overcome. **LUNIK VIII**'s weight of about 3300 pounds is approximately the same as the previous five attempts (going back to **LUNIK IV**) in 1963 (SPACE Daily, April 3 & 9, '63).

SEDOV CONFIRMS DUAL VENUS MISSIONS. Academician Leonid Sedov has confirmed that **VENUS II** and **III** are separate experiments differing in "some constructive features" in order to perform complementary missions as they arc past Venus (SPACE Daily, Nov. 17). The flights of **VENUS II** on Nov. 12 and **VENUS III** on Nov. 16 were planned "so that in case of a safe conclusion of the flight(s), both stations explore the physical conditions of Venus, applying different methods and supplementing each other." Sedov said last week that the two probes have traveled about 4 million miles on their less than four-month journey.

NASA-EDWARDS SPACE SHUTTLE DECISION PENDING. The two, six-month design feasibility studies of a manned space shuttle concept possibility for NASA -

The Leader in Missile/Space Reporting

MORE

Edwards (SPACE Daily, Jan. 4 & May 3) were completed last week by McDonnell and Northrop Norair and are currently under evaluation. A decision for continuation of the program is expected to be made about the middle of next month. McDonnell and Northrop's studies represented the first phase and were concerned with the development of conceptual designs of a research prototype for assessment of operational problem areas and their influence on the final design. Phase II would include the orbital flight test of an unmanned lifting body space shuttle configuration to be determined by Phase I. While McDonnell has gained experience in this area of space shuttles with the Air Force **ASSET**, Northrop is also engaged in the development of NASA's **M-2** and **HL-10** vehicles (Friday's SPACE Daily).

LANGLEY TO STUDY SPACE SHUTTLE LIMITATIONS.

NASA-Langley is issuing requests for proposals (L-6411) for a program to determine the relationship of size and cost to the eventual development of lifting body space shuttle systems. The RFP, which is due January 17, seeks to determine the influence the size of a manned space shuttle will have on the research potential and the cost of the project. Requests for the RFP will be honored until next Monday, December 13.

FCC ENDORSES LIVE TV OF GT-6/-7 RECOVERIES.

ITT, builder and owner of the mobile ground station now aboard the USS Wasp in the Atlantic awaiting the splashdown of the **GEMINI** astronauts, has received the permission it sought (SPACE Daily, Nov. 29) to use the station to transmit TV signals from the aircraft carrier to ComSat's **EARLY BIRD** to the permanent station at Andover, Me., to help provide live coverage of the **GT-6** and **-7** recovery operations as it had hoped to do for **GT-5** (SPACE Daily, July 20) and **GT-6** (SPACE Daily, Sept. 21), and as it again negotiated to do for the present two missions (SPACE Daily, Nov. 16).

The FCC authorization gives ITT "direction and control" of the station but requires the company to coordinate its work with ComSat "so that all technical requirements for access to and use of the **EARLY BIRD** system are satisfied." CBS, the down-range pool agency for the TV networks, began planning the recovery coverage earlier in the fall (SPACE Daily, Nov. 1 & 12) and finally firmed its arrangements in the latter half of last month (SPACE Daily, Nov. 17 & 24). The CBS cameras will feed the ITT terminal, and Andover will send the signals to New York City via cable for distribution to the three networks.

MARSHALL SEEKS TO DEFINE EXTRAVEHICULAR MODE.

NASA-Marshall is issuing requests for quotations (1-5-21-00033) for a program to define an experiment program for the space operations techniques and subsystems necessary for extravehicular missions during the **AA (APOLLO Applications)** program. Due date for the RFQ is Jan. 3.

MOL SERVICE TOWER UNDER CONSTRUCTION.

The mobile environmental shelter service tower which will be used for the launch of the Manned Orbiting Laboratory (**MOL**) at Cape Kennedy has been contracted for construction by Akwa Downey Construction Company.

COMSAT ELECTRONICS CONTRACTOR TO BE PICKED THIS WEEK. Either RCA or ITT will get the ComSat nod this week to supply the electronics package for each of the two new ComSat ground stations (SPACE Daily, Aug. 20, p. 246). The RFP was issued to 29 companies (SPACE Daily, Sept. 2), but only RCA and ITT responded. An industrial poll favors RCA to win the contract.

COMSAT MULTIPLEX RFP MAY COME THIS MONTH. Now that the construction contractors (SPACE Daily, Nov. 29 and Dec. 2) and the antenna contractors (SPACE Daily, Oct. 26 and Dec. 3) have been selected and the electronics contractor is about to be selected (above story), the one major procurement remaining for ComSat's two incipient ground stations (Brewster, Wash., and Paumalu, Hawaii) is the multiplex equipment for installation at each station (SPACE Daily, Aug. 20, p. 246: there described as "interface equipment"). The RFP for that hardware is being prepared now and will be issued this month or early next.

COMSAT PURCHASE OF ANDOVER EXPECTED EARLY '66. Negotiations are continuing between ComSat and AT&T over the proposed purchase by the Corporation of AT&T's ground station at Andover, Maine (SPACE Daily, July 14), and indications are that an agreement will be reached early next year. ComSat presently rents the station from AT&T for support of **EARLY BIRD**, the Corporation's operational communications satellite.

NASA/THIOKOL SIGN C-1 CONTRACT. NASA-Marshall and Thiokol-Reaction Motors have signed a \$16,146,000 contract for the Phase II development of the 100-pound thrust **C-1** liquid propellant upper stage engine. Thiokol was selected for the contract two months ago (SPACE Daily, Oct. 15). Thiokol won the competition with TRW Systems for a two-year design, fabrication, flight rating and qualification of the engine. The program was initiated more than a year ago (SPACE Daily, Oct. 23, '64).

FRANCE PREPARES FOR ANTARCTICA LAUNCHINGS.

Preparations for launching **DRAGON** sounding rockets from the South Pole have been initiated by France. A French scientific team, which recently left Paris, is expected to reach the Dumont d'Urville Base, Petrels Island, Terre Adelie, Antarctica, by the middle of this month. Among other work, they will set up ground installations needed for the launch of the Sud Aviation-built sounding rockets, three of which are scheduled to be launched from Dumont d'Urville in 1967. Launches will be conducted by CNES (French space agency) and GRI (Group of Ionospheric Research).

AEROSPACE PR DIRECTOR FORMS FIRM

Eugene Phillips, until November 12 director of Aerospace Corporation's Washington, D.C., office, and Kenneth Youel have formed a management consultant firm--Youel, Phillips & Associates. The firm offers counseling in public relations, public affairs, and communications with government.

HUGHES TO BUY BLUE BIRD SOLAR CELLS FROM TEXTRON

Hughes has notified the FCC of its intention to subcontract with the Heliotek Division of Textron Electronics for the solar cells for the four **BLUE BIRD** communications satellites it is building for ComSat (SPACE Daily, Aug. 16 and Nov. 29). The **BLUE BIRD** system will support the **APOLLO** flights.

BAIRD TO BECOME NAVY ASSISTANT FOR FINANCE

President Johnson has named Charles F. Baird, currently an assistant treasurer of Standard Oil of New Jersey, to become Assistant Secretary of the Navy (Financial Management), replacing Victor M. Longstreet, who is resigning effective December 30.

NASA ORDERS APOLLO AIR ANALYZER

NASA-Cambridge has contracted with Block Engineering, Cambridge, Mass., to develop an aerosol particle analyzer which will be used to study the air content inside an **APOLLO** spacecraft. The device will determine the concentration of aerosol particles (matter whose diameter is measured in microns) within the spacecraft and ascertain whether they have any effect on the well-being of the astronaut or the reliability of the electronic equipment. The instrument will fit into a drawer in the spacecraft cabin and will be removed periodically by the astronauts for measurements. The device is scheduled for use on one of the manned **APOLLO** Earth orbital flights scheduled for 1967. Block's contract is for \$160,000.

MARSHALL PLANS RADIATION TEST FACILITY

Plans for laboratory testing of the effects of space radiation on rocket materials have been prepared by NASA-Marshall. The Space Flight Center has awarded a \$358,808 contract to Bryson Construction Company to build a new non-destructive test facility. Operated by the Propulsion and Vehicle Engineering Laboratory's Materials Division, the facility will have four shielded radiographic laboratories. Rocket materials will be exposed to radiation in these areas. Construction work is scheduled to be completed by next fall.

LINK FOUNDATION SEMINAR MEETING TODAY

The Link Foundation, General Precision's Link Group, and the University of Nebraska Aerospace Education Division are conducting a seminar in Binghamton, N.Y., today on the exchange of information and ideas relating to space and oceanology research and development.

Principal speakers at the one-day meeting are Edwin A. Link, founder of the Link Foundation, who will talk on "Man-in-Sea" programs, and Dr. Joseph F. Shea, manager of the **APOLLO** Spacecraft Program Office at NASA-Houston, who will speak on "Man-in-Space."

ECI TO ACQUIRE SCOTT ELECTRONICS VOTING STOCK

Electronic Communications Inc. (ECI) of St. Petersburg, Fla., and Scott Electronics Corp. of Orlando have reached an agreement whereby ECI will acquire all of Scott's voting stock.

Scott Electronics, which will be operated as an ECI subsidiary, has an annual sales volume of approximately \$1 million. The manufacturer of magnetic components for space and defense electronic equipment will continue to be headed by its president, Peter L. Scott.

ECI president S. W. Bishop said that the acquisition is in line with ECI's policy of broadening and diversifying its product lines, both through acquisition and internal expansion. The company recently merged with Benson Manufacturing, a Kansas City, Mo., subsidiary (SPACE Daily, Oct. 28 & Nov. 30) and acquired the business of Standard Precision, a wholly-owned subsidiary located in Wichita, Kans.

ECI SALES DOWN/EARNINGS UP FIVE PER CENT

Electronic Communications (ECI) of St. Petersburg, Fla., had sales of \$22,261,716 for the fiscal year just ended, down from last year's \$26,818,136. Earnings rose, however, from \$537,389 to \$566,009--a gain of five per cent. The firm's year-end backlog reached a record high of \$42,300,000, nearly double the year-ago figure of \$21,800,000.

President S. W. Bishop described the year as a "bench mark year in the company's growth pattern" and forecast record levels for both sales and earnings in FY '66. Bishop commented that "Despite the year-to-year cycles which characterize defense and space work, that portion of our business is in a strong expansion phase dominated by new products in programs of longer than normal duration. . . Our company now has product lines offering a greater diversification, flexibility and market depth than ever before."

ROHR FIRST QUARTER EARNINGS UP 49 PER CENT

Rohr's sales for the first quarter of the current fiscal year were \$44,843,129, up from the \$37,250,865 recorded for the same period a year ago. Earnings rose 49 per cent from \$869,592 to \$1,296,239. Backlog rose from \$218,693,000 to \$227,700,000.

AEROJET DECLARES CASH DIVIDENDS

The board of directors of Aerojet-General has declared a quarterly cash dividend of 12.5 cents per share on its issued and outstanding \$1 par value common and also declared an extra cash dividend of 50 cents. Both dividends are payable December 31 to shareholders of record on December 15.

MARQUARDT DIRECTORS DECLARE DIVIDEND

The board of directors of Marquardt has declared a dividend of 25 cents a share, payable January 14, 1966, to stockholders of record on December 17.

HAWKER SIDDELEY RECEIVES IKARA CONTRACT

Britain's Hawker Siddeley Dynamics has been selected by the British Ministry of Aviation to provide supporting services on the Australian-built **IKARA** anti-submarine missile, which the Royal Navy has purchased.

Under terms of a May British/Australian agreement, part of the required modifications on the missile system would be done in the United Kingdom, but further development on the missile to adapt it to Royal Navy requirements would be carried out in Australia by the original design team. Under the agreement reached this month, Hawker Siddeley will provide supporting services for the **IKARA**, once the weapons systems enter service. Prime contractor for the ASW weapon is Weapons Research Establishment.

APOLLO SHIP DAMAGE REPORT DUE

With much of the repair work completed on the two **APOLLO** tracking ships which were damaged during Hurricane Betsy last September, a cost/scheduling report is expected by the Navy from prime contractor Ling-Temco-Vought this month. Additional funds will undoubtedly be requested to meet original scheduling.

The ships, the USNS Huntsville and USNS Watertown, will be used for the re-entry phase of the **APOLLO** mission. They were originally expected to be delivered for final testing on July 15, 1966, and Sept. 16, 1966 (SPACE Daily, March 16). The hurricane washed the ships aground over five miles from where they were moored. Repair efforts began September 18 when tugs brought the ships to the wharves at Avondale Shipyards, New Orleans.

The Navy says much of the repair work has been accomplished on above-the-water damage, where the brunt of the hurricane's force struck. The two ships were in dock last month for start of below-the-water repair.

GENERATOR DEVELOPED FOR MOBILE MISSILE LAUNCHERS

A new lightweight electric generator, designed to supply power to mobile missile launchers and other forward combat area systems, has been developed by Westinghouse Aerospace Electrical Division. The 1100-pound generator set is powered by a Curtiss-Wright RC (rotating combustion) engine, which will provide 185 horsepower at 5000 rpm, with fuel consumption at about 9.5 gallons per hour.

GEMINI MAY STAY UP 15 DAYS

NASA **GEMINI** program officials are providing a "cushion" in case **GEMINI VI** is not able to get off the ground on the 13th by planning to be able to keep **GEMINI VII** in orbit for an extra day. The 14- or 15-day mission was scheduled for launch at 2:30 PM EST Saturday but was threatened by fast moving rain storms moving into the area.

A. F. Bond has been promoted to director of Brown Engineering's Planning and Programs Office and R. G. Pierce has been named manager of the division's newly-formed Contract Administration Office.

PIONEER SERIES TO RESUME

Sometime within the next few weeks, NASA will attempt to launch **PIONEER A** (which if successful will become **PIONEER VI**) in order to resume the **PIONEER** series of interplanetary spacecraft which was begun in 1958 and concluded in 1960.

The purpose of the new series is to return measurements of the interplanetary environment including magnetic fields, the solar wind, cosmic rays, and micrometeoroids from two areas: the area in toward the Sun between the orbits of Earth and Venus; and the area out from the Sun between the orbits of Earth and Mars.

PIONEER I failed due to an upper stage malfunction and **PIONEERS I** and **III** were unsuccessful lunar probes which nevertheless returned valuable data on the space environment before decaying. Both **PIONEERS IV** and **V** went into solar orbit, returning important data for several months. In 1960 the series was cancelled because the importance of knowledge of interplanetary weather was "not fully appreciated" and because it was thought that the **MARINER** series would provide sufficient data. The new series will include four launches between now and 1967 with each spacecraft having a design lifetime of six months.

PIONEER A will be launched aboard a Thrust Augmented **THOR DELTA** and is planned to go into a heliocentric orbit between Earth and Venus. It will carry a magnetometer, two plasma probes, a cosmic ray telescope, a detector to measure the anisotropy or variation in directivity of cosmic rays, and a radio propagation experiment. The launch was originally scheduled for September but since one **DELTA** launch pad is undergoing modifications, the scheduling for the remaining pad forced the delay.

SYLVANIA WINS COMSAT ANTENNA -- II

The ComSat-Sylvania contract for ground station antennae (Friday's *SPACE Daily*) is with Sylvania's Electronic Systems Division's Eastern Operations branch. Under the award, Sylvania will both supply the two 85-foot dishes and their supporting structures and act as integrator of the other station systems (electronics and multiplex equipment: see elsewhere this issue) with the antennae (as reported: *SPACE Daily*, Aug. 20, p. 246). Also called for are two 100-foot boresight towers, one for each station, to help align and test the antennae. These towers will be delivered by the 1st of next May. The antennae will be able to withstand winds of up to 120 mph and will have manual, programmed, and automatic modes. The design lifetime of each station is 15 years, with operation to begin about a year from now (January '67).

SECOND S-IVB FLIGHT STAGE TEST FIRED

Douglas Missile & Space Systems has conducted a full-duration test firing of its second **SATURN S-IVB** flight stage at the company's Sacramento Test Center. W. L. Duval, director of the Test Center, said objectives of the acceptance firing included verification of engine performance, of propellant tank pressurization systems, data acquisition systems, stage power and control systems, and structural integrity of the stage. The **S-IVB** stage, which will be shipped to NASA-Kennedy following detailed evaluation and approval of the test results, generated full thrust for about 7.5 minutes.

DOD NEGOTIATIONS

Phillips Petroleum Co., Bartlesville, Okla.--with Air Force Systems Engineering Group for flame radiation characteristic of high mach number fuels.

The Franklin Institute--with Aberdeen Proving Ground for research and development of computational techniques for predicting the response of missile and re-entry bodies to arbitrary multiple loading.

Cornell Aeronautical Laboratory--with Navy Bureau of Ships for research investigations and studies in the areas of intercept control and threat evaluation for the Naval Tactical Data System.

Motorola, Military Electronics Division, Western Center--with Bureau of Naval Weapons for support of **SIDEWINDER I-C** (semi-active radar) **AIM-9C** guided missile, guidance and control sections.

NASA NEGOTIATIONS

General Precision Inc.--with Houston for development of a high temperature adhesive for structural use in the temperature range from 600 degrees F to 1000 degrees F.

Lockheed-Georgia--with Marshall for data compilation and evaluation of space shielding problems.

TRW Systems Group--with Goddard for orbit operational support for the Orbiting Geophysical Observatories, Missions A, B, and C.

Analytical Mechanics, Westbury, N.Y.--with Houston for advanced studies in orbit determination mission planning analysis and optimization.

DOD CONTRACTS

Army

Kaiser Aerospace & Electronics Corp.--\$351,396 for motor nozzles for **PERSHING** missile.

Navy

The Mitre Corp., Bedford, Mass.--\$52,750 for research study of an optical sensor system for the detection and measurement of nuclear bursts.

LTV Ling Altec, Ling Electronics--\$32,538 for linear acceleration test system.

MORE

DOD CONTRACTS - Contd.

Air Force

Philco Corp., Aeronutronic Division--\$77,324 for investigation of thermodynamic properties of rocket combustion products.

Whittaker Corp., NARMCO Research and Development Division--\$190,838 for radar absorbing materials.

Raytheon Co., Missile Systems Division--\$99,000 for study and design of an integrated radome, antenna and RF circuitry.

Sperry Rand Corp., Sperry Gyroscope Co.--\$121,350 for study and design of an integrated radome, antenna and RF circuitry.

NASA CONTRACTS

Goddard

Radio Corporation of America, AED--\$372,724 for integration support for **AUCS** and **APT** camera systems into the **TIROS** Operational Satellites.

Thiokol Chemical Corp., Ogden, Utah--\$448,822 for **TOMAHAWK** rocket motors and associated hardware.

Bell Aerospace Corp.--\$47,028 for a miniature electro-static accelerometer experiment for the **ATS**.

American Standard, Mountain View, Calif.--\$60,000 for mechanical design verification of a long-life sensor for **ATS**.

California Computers, Anaheim, Calif.--\$125,000 for engineering model of the telemetry unit for MRIR for **NIMBUS**.

California Computers, Anaheim, Calif.--\$380,964 for command and clock subsystem.

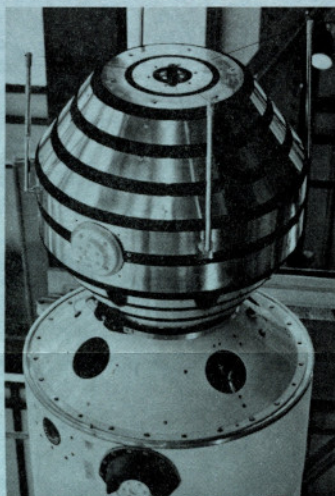
Adcale Corp., Waltham, Mass.--\$192,149 for monitor for ultraviolet solar energy instrument.

Marshall Laboratories, Torrance, Calif.--\$600,690 for **PIONEER** (C/D micrometeoroid detector system).

Nuclide Corp., State College, Pa.--\$47,970 for design and fabrication of high sensitivity mass spectrometer system.

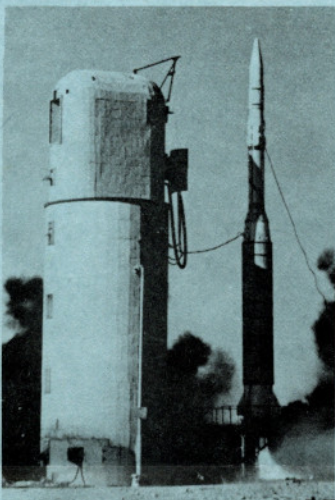
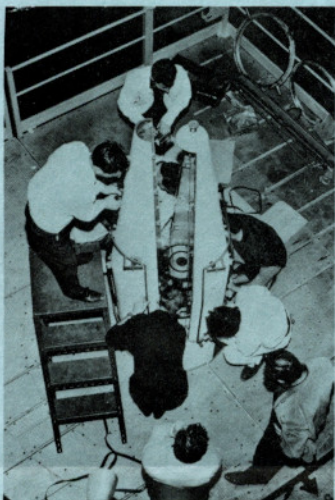
Adcale Corp., Waltham, Mass.--\$57,851 for solar aspect systems.

THE LAUNCH OF A-IA (CITRON) (PHOTO REPORT)



On November 26 France became the third nation of the world to put a payload into space as its **DIAMANT** rocket successfully carried an 87-pound **A-IA** satellite into orbit (SPACE Daily, Nov. 30).

At top right is the flight model **A-IA** aboard the solid-fueled **RUBIS** third stage. — The **RUBIS** is shown (top left) being hoisted aboard the solid-fueled **TOPAZE**, second stage of the **DIAMANT**. At middle left, French technicians emplace the shroud for the **A-IA**. Ignition of the **DIAMANT** (middle right) and blastoff (lower photos) from Pad Brigitte at Hammaguir, Algeria, went off slightly behind schedule (due to a faulty diode in the third stage), but the rocket performed as planned and France had its first satellite in space. (In the lower photos, note the shredding of the insulation shields as the **DIAMANT** lifts from its launch pad.)



With a perfect (one for one) record in the satellite launch department, France has begun earnest preparations for the launch of its second satellite, the **D-IA**, next month (SPACE Daily, Nov. 30). The 37-pound **D-IA** will serve primarily to permit testing of satellite systems in orbit. The **DIAMANT** will again be the launch vehicle and Hammaguir the launch site. The third stage **RUBIS** of the **DIAMANT II**, which has been at Hammaguir as a back-up for **DIAMANT I**, is being returned to France for mating with the **D-IA**.

