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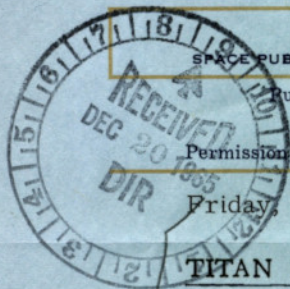
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TITAN III-D IN FY 1967 BUDGET.

The special payload vehicle for Air Force defense programs, the **TITAN III-D** (SPACE Daily, Sept. 29), is still in the DOD budget for fiscal year 1967 and plans are being advanced for early implementation of its capability. The latest move in this direction is the release of a 13-week engineering study contract for the **TITAN III-D** to Western Electric by Space Systems Division.

The **TITAN III-D** is a growth version of the earlier **TITAN III-X**, now formally identified as the **TITAN III-B** (SPACE Daily, Sept. 30). As presently planned it would be boosted with two 120-inch, two-segment strap-on solids using submerged nozzles. The **TITAN III-D** is expected to be the vehicle that will send the ADCSP (Advanced Defense Communications Satellite Program) payloads into orbit and other payloads larger than can be orbited by the **TITAN III-B**. The development and fabrication of the two-segment 120s is now expected to go competitive as a result of opposition by other solid manufacturers of an Air Force plan to procure them from United Technology, producers of the **TITAN III-C** 120s (SPACE Daily, Oct. 21). The **TITAN III-D**'s predecessor, the **TITAN III-B**, is earmarked to carry the more advanced Air Force surveillance and reconnaissance payloads into orbit from Vandenberg.

156 BUDGET IN FY '67 PUSHED.

A segment of the military space vehicle family says it would be more economical to develop the 156-inch solid to provide the capability for the increasing demands of **MOL** rather than switching from the five-segment 120 to the seven-segment (SPACE Daily, Sept. 29), citing new attachment difficulties with the longer units. The DOD budget "was fixed", with the \$6 million requested by the Air Force still missing (SPACE Daily, Sept. 29 & Oct. 21). However, Congressional pressure is now being applied with the result that DOD is examining the request with "more favor."

RCA TO BE AWARDED SPARTA CONTRACT.

The Army Missile Command will open negotiations with the Radio Corporation of America for the planning of the test phase of the **SPARTA** detection and tracking program for the Advanced Research Projects Agency's Project **DEFENDER**. RCA will also plan the experiments for the 20-month program and reduce and analyze the data from the test program.

TRW was recently awarded a \$6.5 million contract by the AMC for the test program to demonstrate the feasibility of the **SPARTA** anti-ICBM discrimination program (SPACE Daily, Dec. 7).

NEXT AGENA TARGET ENGINE PASSES ACCEPTANCE TEST

Bell Aerosystems' modified multistart rocket engine for the **GEMINI AGENA** target vehicle has been accepted by NASA and is now being prepared for delivery to Lockheed's Sunnyvale, Calif., plant. At Lockheed it will be installed on the vehicle that will attempt to rendezvous with **GEMINI VIII** early next year. The acceptance test was conducted in Bell's Buffalo, N.Y., facility last week. Five burns were made: the first for 60 seconds, the next three for 2 seconds each, and the last for 60 seconds with gimbaling.

APOLLO DOCKING SIMULATOR DELIVERED

A space docking simulator designed to uncover "human engineering" problems involved in **APOLLO** docking maneuvers is being shipped to NASA-Houston.

The computer-driven simulator, built by F. B. MacLaren, Huntington, L.I., N.Y., will be used to verify docking procedures as well as human problems associated with location and sensitivity of controls. It also may be used for training astronauts for future space docking missions.

When the simulator is in use, an astronaut in a mock-up of his space capsule views a 1:50 scaled model of the vehicle he will attempt to link up with--a **LEM** (Lunar Excursion Module), Command Module, Command and Service Module, or an **AGENA D**--on one or more 21-inch monitor windows and manipulates his control for docking. The controls feed signals into an electric computer which sends signals to the servos that produce the image motion of his control commands. The unit also has a capability to simulate a miss that carries the astronaut's vehicle past the target spacecraft.

The MacLaren team--which includes Scanoptic, Inc., Woodside, L.I., optical system design; and Photomechanisms, Inc., Huntington Station, L.I., drives, structures and models--has built **GEMINI** and **APOLLO** simulators for IBM, North American and Grumman.

The vidicon camera systems for the **APOLLO** docking simulator were built by Dage-Bell Corp., Michigan City, Ind., a Raytheon subsidiary, Miratel Electronics provided the display monitors for the system.

PIONEER VI SUCCESSFUL

PIONEER VI, the first of the new series of interplanetary satellites (SPACE Daily, Dec. 13, 16), developed by TRW Systems, was successfully launched at 2:31 AM EST yesterday into a heliocentric orbit. The spacecraft systems are performing nominally and all six experiments have been turned on. Perhelion of the Sun's newest satellite is 75.6 million miles; aphelion is 90 million miles.

FINAL IQSY PROBE LAUNCHED

The final launch in a long series of NASA sounding rocket probes conducted in connection with the 1964-65 International Quiet Sun Year (IQSY) was conducted this week from Wallops Station. The 51-pound payload, a cooperative project of the GCA Corp., University of Illinois and NASA, was designed to measure ionospheric electron densities and solar radiation.

FURTHER AA STUDIES AWAIT BUDGET

Official go-ahead on a number of studies under the **APOLLO Applications (AA)** program is still being held up due to last minute budgetary maneuvering. NASA's request of more than \$400 million for **AA** in FY '67 has met with considerable opposition from the Bureau of the Budget (SPACE Daily, September 24).

While negotiation procedures are being carried out on the following contracts, no money will be released by NASA until BOB firms the FY '67 **AA** budget: Early lunar shelter design and comparison study, RFQ DCN 1-5-21-00024, NASA-Marshall, due August 26 (SPACE Daily, July 28);--Study of lunar dust removal prevention techniques for radiators (AES payloads), RFQ DCC 1-6-52-01000, NASA-Marshall, due August 16 (SPACE Daily, July 23 & August 23);--Study of lunar wheel and drive system experimental test program (AES payload), RFQ DCD 1-6-53-01001, NASA-Marshall, due August 9 (SPACE Daily, July 9 and August 20);--Lunar mobility system evaluation and evolution study, NASA-Marshall, due October 20 (SPACE Daily, Sept. 24).

According to officials, go-ahead approval for **AA** should be forthcoming from NASA "fairly soon." But it is possible that NASA may decide to hold off on its BOB-limited budget until after it has a chance to make its presentation to Congress next month.

HAWKER DELIVERS ESRO II TEST MODEL

As a part of the development program for the **ESRO II** satellite, Hawker Siddeley Dynamics has submitted a thermal test model for evaluation at the European Space Technology Center in the Netherlands. Vibration tests on the structure and field handling trials are already well advanced, and the entire program is on schedule. The **ESRO II**, which will be launched before **ESRO I**, is scheduled to be put into orbit from the Western Test Range aboard a **SCOUT**. **ESRO I & II** are the only projects approved thus far by the European Space Research Organization.

THE LOG OF GEMINI VII/VI

December 15, 1965--8:00 PM EST: **GEMINI VI** pulls away from **GEMINI VII** after about five and a half hours of close-in maneuvers.

December 16, 1965--9:53 AM: **GEMINI VI** retro-rockets fired to start re-entry.

10:29 AM--**GEMINI VI** splashes into the Atlantic 12 miles downrange from the pickup ship Wasp.

11:34 AM--**GEMINI VI** astronauts Schirra and Stafford are brought aboard the carrier Wasp.

11:54 AM--**GEMINI VII** astronauts say they saw neither the retro-rocket fire of **GEMINI VI** nor its re-entry into the atmosphere.

2:30 PM--Problems with two fuel cells and yaw thrusters on the **GEMINI VII** have cropped up. The craft may be brought down Friday morning (today) instead of Saturday as planned.

SECOND CORALIE TEST "PARTLY SUCCESSFUL" (Special International Report)

Nord Aviation's **CORALIE**, the second stage of the initial ELDO (European Launcher Development Organization) launch vehicle **EUROPA-1** (SPACE Daily, Oct. 8 & 21), is presently undergoing a series of 12 test firings at Nord's Vernon, Eure, plant and has just completed the second, which was only "partly successful." Unlike the first firing, a checkout of the propulsion system on October 28, this test involved gimbaling the engines and operating the thrust vector control system.

The test was originally set for December 9, but poor weather forced a 24-hour postponement. Then, on the 10th, trouble with two valves pushed the date back to the 14th. The first test was successful.

CORALIE has a four-nozzle propulsion system that burns nitrogen peroxide and UDMH. Sea level thrust is between 50,000 and 54,000 pounds (in space, an estimated 62,000 pounds). Burn duration is 100 seconds. The engines are built by Atelier de Constructions de Tarbes under contract to LRBA (Laboratoire de Recherches Balistiques et Aerodynamiques), teammate with Nord for **CORALIE**.

Six **CORALIE**s are being used for the static firings, and more may be required since the stage is designed to operate only once (although some components--e.g. the fuel tanks--are reuseable). However, Nord-LRBA chief engineer Talbotier told SPACE Daily-France he is hopeful fewer firings will be necessary. As presently planned, the next six will be tests and the last four will be qualifications.

First Two CORA Shots Reset for October

CORA, the four-launch (G-1, -2, -3 and -4) flight test program for **CORALIE** (SPACE Daily, Oct. 21), will begin next fall, not next spring as previously scheduled. G-1 and -2, formerly set for May or June, are now planned for October, and -3 and -4 for early '67. The first two will occur from the Hammaguir range in Algeria and the last two from the CEL (Centre d'Essais des Landes) range in France (SPACE Daily, Oct. 27). The four flight stages, now in production at Nord, will not be test fired before launch and will not be recovered afterwards.

In addition to the six static-test **CORALIE**s and the four **CORA CORALIE**s, six flight models are being prepared for the **EUROPA-1** flight test program of 11 launches (F-1 to F-10, which include two -6 shots, -6.1 and -6.2) (SPACE Daily, Oct. 21). The first three launches, already conducted, used only **EUROPA-1**'s first stage, Hawker Siddeley's **BLUE STREAK**, and were suborbital shots from the Woomera range in Australia. F-4 and -5--the former now set for late March next year (SPACE Daily, Dec. 10)--will also be suborbital from Woomera but will use dummy **CORALIE**s and third stages (which are German built and nameless). The dummy **CORALIE** for F-4 will be shipped to Woomera next month (SPACE Daily, Dec. 10). F-4's **BLUE STREAK** is already en route there.

The two F-6 launches will use live **CORALIE**s atop **BLUE STREAK**s and no third stages. F-7 through F-10 will use full, flight-configured, three-stage vehicles. Thus, the six flight-model **CORALIE**s now under production will not begin to see service until F-6.1, and it may not come until next summer or fall. The third stage for F-7 is presently planned for extensive preflight testing in a vacuum chamber that has already been built in Germany. F-7 is expected in 1967.

Problems have hindered the development of the **EUROPA-1** third stage and affected therefore the progress of the vehicle's overall preparation (SPACE Daily, Oct. 21), but, as one ELDO technical administrator told SPACE Daily, the stage is more complex than the first two by virtue of its more involved role--i.e. it must orbit the payload. This is one reason, he said, why the vacuum chamber is required. He added that **EUROPA-1** should be able to put 2200 pounds into a 435-mile orbit.

SATURN IB/TOSS/OAO SET FOR FIRST QUARTER--(Special Report)

National space program has scheduled a number of significant milestones during the first quarter of 1966, including the first **APOLLO SATURN IB** flight, the first **TOSS** operational weather satellite, the first Orbiting Astronomical Observatory (**OAO**), and the "breadboard" test of the **NERVA** nuclear rocket.

The schedule for manned flights remains uncertain--the official schedule calls for the next flight in the second quarter but this may be advanced to sometime in February or March to include a rendezvous and docking with a passive vehicle.

Manned Space Flight

The **GEMINI VIII** and **IX** flights, both planned as two-day, rendezvous and docking flights with extravehicular activity and tests of astronaut maneuvering systems, were both planned for the second quarter of 1966 originally. Then the **GEMINI VII** mission was pushed forward to early December and it was expected that **GEMINI VIII** would be advanced to the first quarter of 66. But the failure of the **AGENA** target vehicle for the **GEMINI VI** flight threw this plan into confusion.

It now appears that the earliest date that the modified and redesigned **AGENA** target vehicle can be available for a rendezvous and docking flight is late March or early April. However, NASA is developing an Augmented Thrust Target Docking Adapter (**ATDA**) (*SPACE Daily*, Dec. 14) which could act as a mock **AGENA** for a simple rendezvous and docking demonstration. This allows NASA the option of either waiting until the **AGENA** is ready or using the **ATDA** for a **GEMINI VIII** flight in February.

Perhaps more significant for the future US space program will be the launch early in the 1st quarter of **SA-201**, testing the first **S-IVB**, 200,000-pound thrust, vehicle for the **SATURN IB**. This flight will be a suborbital test of both the **S-IB** first stage and the **S-IVB** second stage as well as a test of the **APOLLO** heat shield which will be mounted on an **APOLLO** test vehicle.

Advanced Research and Technology

The outstanding mission for OART during the first quarter of 1966 will be the **NERVA** nuclear rocket engine system (*SPACE Daily*, Nov. 19). This will include a test of all components of the **NERVA** system, although they will not be flight-type components.

On February 15, Aerojet-General will fire its second 260-inch diameter solid rocket motor (*SPACE Daily*, Sept. 28, Oct. 6, Dec. 10) in a demonstration to prove the reliability and the reproducibility of the results of the successful first firing.

The first free flight of the **M-2** lifting body space shuttle concept (*SPACE Daily*, June 16, Sept. 20) will follow soon after the first captive flight attached to the B-52 "mother aircraft" scheduled for the first quarter.

OART will also conduct another in its series of **SCOUT** re-entry tests. The test scheduled for the first quarter of 1966 will be the fifth in the series designed to test ablative materials and return re-entry heating data.

Air Force

The Systems Command is scheduling the fourth **TITAN III-C** launch for sometime in the next three months. The **TITAN III-C-4** launch, around February, will place eight communications satellites into orbit as the first launch in the IDCSP **MORE**

SATURN IB/TOSS/OAO SET FOR FIRST QUARTER--(Special Report)-Contd.

(Initial Defense Communication Satellite Project) series (SPACE Daily, Dec. 13) and the **GGTS** (Gravity Gradient Test Satellite) (SPACE Daily, Dec. 3).

The Air Force Office of Aerospace Research will orbit two radiation research satellites, **OV1-4** and **OV1-5** (SPACE Daily, Nov. 22), aboard an **ATLAS D** launch vehicle.

Space Sciences and Applications

One of the first items on the OSSA schedule will be the launchings, fairly close together, of **TOSS I** and **TOSS II**, the first two in the **TIROS** Operational Satellite System series. Similar in construction to **TIROS IX** (SPACE Daily, Jan. 19), **TOSS I (OT-2)** will contain the regular **TIROS** videcon camera system, while **TOSS II (TOSS-A)** will carry the new APT (Automatic Picture Transmission) system. **TIROS IX** was considered the last of the NASA experimental weather satellite series, while **TIROS X** (SPACE Daily, July 7, June 25) was an interim operational satellite, paid for by the Weather Bureau. **TOSS I** and **II** are the beginning of the operational Weather Bureau system.

Another milestone for NASA will be passed with the launching of the first **OAO** (Orbiting Astronomical Observatory), the **OAO-A1**. The **A1** will be a 4000-pound satellite carrying four 8-inch ultraviolet telescopes, one 16-inch telescope, two ultraviolet spectrometers, a high energy gamma ray telescope, a low energy gamma ray telescope and a soft X-ray telescope. Launched aboard an **ATLAS AGENA**, it will be placed into a circular 500-mile orbit.

Another test shot in the troubled **SURVEYOR** program will be the **SURVEYOR** mass model launch. This will place a spacecraft which simulates the exact shape, weight and mass of the **SURVEYOR** into a circular orbit and then into an elliptical 100/5700-mile orbit as a test of the two-burn capability of the **CENTAUR** upper stage launch vehicle.

Following the **SURVEYOR** shot may be the second launch of the French satellite **FR-1B** which is similar to the **FR-1A** launched by NASA in December (SPACE Daily, Sept. 15, Dec. 7).

Late in the 1st quarter will come the launch of **PIONEER-B**, the second **PIONEER** launch (SPACE Daily, Dec. 6, 13). **PIONEER-B** will be aimed for the strip of space between the orbit of Earth and Mars.

Slated for the second quarter of 1966 are the launches of **NIMBUS**, **OGO**, **OSO**, **PAGEOS**, another **SURVEYOR** mass model, and the first launch of **LUNAR ORBITER**.

APOLLO ABORT-6 SCHEDULED FOR SATURDAY

The **APOLLO** Abort-6, originally scheduled for December 8 (SPACE Daily, Dec. 3, 7) but scrubbed because of the malfunction of an electrical component in the **LITTLE JOE II** launch vehicle, has been rescheduled for 12:00 noon EST, Saturday, December 18. The last in the series of tests of the **APOLLO** launch escape system may run into some launch difficulties due to a low overcast predicted for Saturday.

PLANNING RESEARCH FILES STOCK PLAN

Planning Research Corp. has filed a statement with the Securities and Exchange Commission seeking registration of 115,087 shares of common stock, to be offered in accordance with its Selected Employees' Stock Option Plan.

GP CONTRACTED FOR GAS BEARING MATERIALS RESEARCH

NASA-Cambridge has awarded a \$29,940 contract to General Precision's Aerospace Group for a gas bearing materials research study. Twelve firms submitted bids for ERC/R&D 66-30 (SPACE Daily, Oct. 7).

10 BID ON ERC HIGH TEMPERATURES MATERIALS STUDY

Ten firms--Autonetics; Battelle; Dow Corning; Electro-Optical Systems; GT&E Labs; National Research Corp., Norton Exploratory Research Division; Stanford Research Institute; Texas Instruments; Tyco Labs; and Eagle-Picher, Miami Research Labs--have submitted proposals to NASA-Cambridge for its high temperature materials study for device applications. Sixteen firms were on the Center's original source list for ERC/R&D 66-100.

NASA/FAA/USAF TO STUDY RADIATION

NASA, the Federal Aviation Agency and the Air Force Systems Command have agreed on a series of flights with the RB-57 aircraft in order to study radiation in the region of the atmosphere where the planned supersonic transport (SST) will fly. The flights, to begin in 1966, will investigate radiation environment between 40,000 and 80,000 feet.

DOD NEGOTIATIONS

Aerojet-General Corp.--with Air Force Space Systems Division for the continuation of design, development, fabrication and testing phases of the Stage I and II engine systems for the **TITAN III** program.

Rohm & Haas--with Army Missile Command for solid propulsion technology.

TRW Systems Group--with Air Force Flight Test Center for solid rocket motor component storability program.

TRW Systems Group--with Air Force Ballistic Systems Division to continue non-development support of the **MINUTEMAN** weapon system program.

Westinghouse Electric Corp., Dayton, Ohio--with Air Force Systems Engineering Group for fire and explosion detection for advanced manned flight vehicles.

Avco Corp., Research and Advanced Development Division--with Air Force Systems Engineering Group to research, design, fabricate and install a large helium or hydrogen driven nozzle for the AFAPL 120-inch shock tunnel.

MORE

DOD NEGOTIATIONS - Contd.

Burroughs Corp., Paoli, Pa.--with Air Force Space Systems Division for additional engineering launch support at Eastern Test Range.

Adcole Corp., Waltham, Mass.--with Air Force for research and development to provide continued research and fabrication of the upper atmosphere.

General Electric Co., Ordnance Department--with Bureau of Naval Weapons to engineer, fabricate models, test and supply services necessary to improve operability, reliability and safety on missile launching system Mk 12.

Texaco--with Air Force Flight Test Center for a literature search and evaluation on ultra-high energy for use as a propellant.

NASA NEGOTIATIONS

Lockheed Missiles and Space Co.--with Marshall for effect of shock induced separation on vehicle dynamics.

Dynamics Research Corp.--with Marshall for development of accelerometer test methods.

Stanford Research Institute--with Langley for a research study for the development of human augmentation techniques.

Avco Corp., Wilmington, Mass.--with Langley for the design and fabrication of three flight models and a prototype for the **PACEMAKER-APOLLO** project.

Electro-Optical Systems--with Western Operations Office for the development of light-weight rigid solar panels.

DOD CONTRACTS**Air Force**

Monsanto Research Corp., Dayton Laboratory--\$74,000 for identification of volatile contaminants of space cabin materials.

Lockheed-California Co.--\$95,000 for a study to establish methods and procedures to permit rapid estimates of the performance of powered and unpowered maneuvering hypervelocity flight vehicles.

Thiokol Chemical Corp., Reaction Motors Division--\$200,000 for data analysis for YLR liquid rocket engines.

Thiokol Chemical Corp., Reaction Motors Division--\$30,000 for services of testing, maintenance and overhaul of YLR liquid rocket engines.

Thiokol Chemical Corp., Reaction Motors Division--\$525,000 for spare parts for YLR-99 X-15 liquid rocket engines.