

## ENVIRONMENTAL TESTING

### Space simulator for large vehicles

One of the largest space simulators in the U.S. is being completed to test large spacecraft at the Lockheed Missiles and Space Co., Sunnyvale, Calif.

The cylindrical chamber, 30 feet in diameter and 66 feet long inside, can produce a vacuum equivalent to the atmosphere at an altitude of 300 miles, using a process called selective pumping.

By this method, the nitrogen and oxygen that comprise 98 percent of the atmosphere will be freeze-trapped on the chamber's inner surfaces by cryogenic refrigeration, while other components such as hydrogen and helium will be removed by pumping.

A computer will control an array of 1,500-watt quartz lamps to simulate the sun's heat for different spacecraft orientations and orbital positions during a mission.

The flat black lining of the \$8 million facility will simulate the blackness of space, absorbing heat instead of reflecting it and thereby helping to reproduce the extreme temperature differentials found between the light and dark sides of a vehicle in space. Temperatures are expected to range from minus 320 degrees to plus 150 degrees F.

## AIRLIFT

### Flying oil rigs foreseen

British engineers are investigating the possibility of applying the hovercraft principle to move complete, 136-foot-high, 400-ton oil rigs across the Alaskan tundra in regions where there are no roads.

In a study for British Petroleum, the British Hovercraft Corp. is designing two huge pads, each measuring 120 feet by 50 feet, to be powered by a total of eight gas turbine engines. The turbines produce some 13,600 horsepower and will provide 144 pounds per square foot of lift. This is more than four times the lift available on the 10-ton passenger-carrying Winchester hovercraft.

Once the hovercraft engines had been used to ferry the proposed rigs over the normally impassable terrain, the assembly would be towed by a pair of huge tractors, with two smaller units at the rear to provide directional stability.

## MANAGEMENT

### Apollo program officials depart

Having seen the first manned moon landing carried out successfully, the program director and mission director of Project Apollo have both left the National Aeronautics and Space Administration.

Lt. Gen. Samuel C. Phillips, former Apollo Program director, has assumed command of the Air Force Space and Missile System Organization. He has been replaced by Rocco A. Petrone, former Apollo Program manager and more recently director of launch operations at Cape Kennedy.

Filling Petrone's position is Walter J. Kapryan, former deputy director of launch operations and a veteran of the Mercury, Gemini and Apollo Programs.

Former Apollo Mission Director George H. Hage has left NASA to become a vice president of the Boeing Co.,

from which he came to the space agency in 1967. At Boeing he was active in aircraft, missile and space programs, and was engineering manager of the Lunar Orbiter program. In his NASA position is former Assistant Mission Director Chester M. Lee.

## LONG-LIFE ENGINEERING

### Self-checking computer in operation

A computer that detects its own failures and repairs them (SN: 4/6/68, p. 322), a precursor of similar systems needed for long space missions, has begun full-scale ground operation at Jet Propulsion Laboratory in Pasadena, Calif.

The computer, called STAR for Self-Testing-And-Repairing, spots malfunctions by the errors they cause in its digital control commands and bypasses faulty components in favor of identical backup units. The goal of the JPL researchers is to achieve 90 percent probability of lasting out a 15-year mission.

## LAUNCH VEHICLES

### Old Reliable on the carpet

The Delta launch vehicle, one of the most reliable boosters in the space agency's inventory, is now the subject of a special investigation as a result of three costly failures in the last year.

On Sept. 18, 1968, a loose wire in a rate gyro circuit caused the destruction of the Intelsat III-A communications satellite. More recently, on July 25, an identical satellite, Intelsat III-E, failed to reach orbit when a third-stage motor in the Delta did not fire. Then on Aug. 27, hydraulic difficulties with the booster's third-stage attitude control system cost NASA the \$7 million Pioneer E deep-space probe.

The Pioneer E mishap was the third Delta failure in 15 launchings. Prior to the loss of Intelsat III-A, there had only been two failures in 58 attempts, and the booster had compiled unbroken strings of 22, 8 and 25 consecutive successes.

One team will investigate the Pioneer failure, while another will probe general problems with the Delta. Putting pressure on both groups, however, is the fact that the British Skynet communications satellite is scheduled to be launched by a Delta Sept. 24.

## SOLAR ASTRONOMY

### OSO-6 is alive and well

The sixth Orbiting Solar Observatory, latest step in the National Aeronautics and Space Administration's plan to monitor the sun from space throughout an entire 11-year solar activity cycle, is successfully operating with all of its experiments working.

Launched Aug. 9, OSO-6 is the first in the series to be capable of aiming its experiments to within one-half second of arc on the sun's surface. This is particularly valuable for an ultraviolet spectroheliograph provided by the Harvard College Observatory, which can thus chart reasonably high-resolution solar spectra over a range of from 280 to 1,300 angstroms.