aerospace

ROCKET PROPULSION

Tribrid rocket efficient

Unusually high specific impulse, or efficiency, has been achieved in a static test firing of a tribrid rocket engine at Lockheed Propulsion Co., Redlands, Calif.

A tribrid rocket contains a liquid oxidizer, in this case fluorine, and a solid fuel with two components, here hydrogen and lithium.

Data from the test indicate that, in space, the rocket would have a specific impulse of almost 500 seconds. Specific impulse is a comparison between the amount of thrust produced by a rocket motor and the rate at which it consumes propellants.

By comparison, conventional rockets using kerosene derivatives and liquid oxygen, such as those powering the first stage of the Saturn 5, typically have specific impulses of little more than 260. The most efficient rocket motors now in operational use, such as the RL-10 in the Centaur that sent the Surveyors to the moon, produce about 466 seconds. The tribrid, which proved 28 percent more efficient than any other rocket ever tested by the company, is being developed for the National Aeronautics and Space Administration.

BALLOON RESEARCH

Recovery, photography, tracking tested

Four research balloons 175 feet in diameter are being launched from Wallops Station, Va., in the first half of August.

On two of them, the prime experiment is a test of a new parachute recovery system for retrieval of payloads returning from space. The package will be released at 90,000 feet, fall to 50,000 feet where the main parachute is deployed, and be snatched up at 10,000 feet by an airplane.

In a secondary experiment, four earth resources cameras will photograph the Delmarva Peninsula and eastern Chesapeake Bay. The purpose is to study transport of sediment from lagoons and along the coastline, and to observe the effects of tidal action on sediment movement. The balloons provide a stable platform for observing the slowly developing turbid patterns. Both of these experiments are managed by the Langley Research Center of the National Aeronautics and Space Administration.

The other two balloons will carry an experimental balloon location and tracking system developed by the Air Force Cambridge Research Laboratories.

APOLLO 11

Laser mirror works

While the Apollo 11 astronauts were on the moon, they set up a mirror (SN:7/26, p. 72) that was supposed to reflect beams of laser light sent from earth. Since the astronauts left the moon, scientists at Lick Observatory in California have been searching for the mirror with their laser beam. On Aug. 1 they finally made contact.

Successful reflection of the beam enables the scientists to measure the distance between the earth and the moon with greater precision than ever before. On Aug. 1, they say, the moon was 226,970.9 miles from earth, accurate to within 150 miles. Later refinements of the technique may bring the accuracy down to a matter of inches.

The moon's distance from the earth varies around an average figure of 238,855 miles as the moon pursues its monthly elliptical orbit around the earth. Scientists hope to use the laser mirror for precise studies of the variation and of the effects of the earth and moon on each other's motion.

According to Dr. James E. Faller of Lick, tests indicate that the reflector should be useful for a period of seven to 10 years.

SAFETY

Aviation near-misses studied

Prompted largely by 2,230 near mid-air collisions during 1968, the Federal Aviation Administration has recommended a 20-point remedial program, part of which has already begun.

The actual number of near-misses was probably considerably higher—the 2,230 were only those voluntarily reported by private, airline and military pilots. Even of those, 1,128 were classified by a special FAA study team as hazardous, with the aircraft involved passing less than 500 feet apart. The group estimates that four hazardous near-misses occurred for each of the ones that were reported.

Several of the agency's recommendations are concerned with wider use and enforcement of regulated patterns, even at private airports without control towers. Reviews are planned of flight training and operations routes, as well as of regulations governing the spacing between aircraft.

The two major contributors to the hazardous near-misses, the group found, were difficulties in seeing and avoiding other traffic, and uncontrolled mixture of air traffic under visual and instrument regulations. Together, these accounted for an estimated 41 percent of the incidents.

INTERNATIONAL PROGRAMS

Last ELDO launch at Woomera scheduled

Scientists and engineers of the European Launcher Development Organization are now preparing what is scheduled to be their last rocket launching from the Woomera range in South Australia.

Now set for November, the launching will be the 10th from the desert facility. The most recent attempt by the seven-nation group was the unsuccessful launch on July 3 of the Italian-built F-8 test satellite. The satellite fell into the Pacific Ocean when the booster's third stage failed to ignite. The November launch will aim for the same path in space, a 500-mile-high, circular, polar orbit. The satellite itself is designed to monitor temperatures, vibrations and other environmental flight conditions.

If the launch is successful, ELDO will consider that it has a commercially useful booster, to be made available to countries or agencies wishing to put satellites in orbit. Development of the booster will continue, however, with the final launch now targeted for 1971, from the equatorial range in French Guiana.