aerospace

MILITARY LAUNCH VEHICLES

Titan III-C launches five satellites

A five-in-one satellite launch, including two nuclear detection satellites and three scientific probes, marked the successful final developmental flight of the Air Force Titan III-C booster May 23.

The original development schedule of the Titan III-C called for 12 flights to qualify the booster as a standard launch vehicle. However, the first launch, in 1965, was successful enough that engineers felt confident about using the test flights to give essentially free rides to some satellites. In the dozen subsequent flights (one was added later), more than 50 scientific, military and communications satellites have been carried into earth orbit.

Besides the two Vela nuclear detection probes, the most recent launch included one satellite to study the solar wind's interaction with the geomagnetic field, and two to chart solar radiations, while dipping in and out of earth's magnetic field, during solar flares.

EARTH RESOURCES SATELLITES

Data-handling requirements studied

Proposals for a computer system capable of handling the vast amount of data expected to come from an earth resources technology satellites system are due to be submitted to the National Aeronautics and Space Administration by June 18.

The first of two planned ERTS spacecraft is expected to be ready for launch in late 1971 or early 1972.

Most of the satellite's data will be in the form of television images, which will have to be correlated to provide different kinds of information from different combinations of wavelength bands. The data-processing system on the ground will have to be able to analyze the information and put in some form that will be useful to the users, such as agricultural agents, land use planners, civil engineers and so on.

In addition, the initial satellite will probably carry an experimental data collection system to gather measurements from hundreds, or even thousands, of remote, unattended sites such as river gauges, instrumentation on ocean buoys, icebergs and hard-to-reach mountain peaks.

ROCKET ENGINES

Variable-thrust design

Variable-thrust rocket engines for space are rather uncommon; the Surveyor moon-landers and the Apollo lunar module descent stage have them, as will the Viking probe which will land on Mars in 1973. However, the West German firm of D.F.L. is working on just such a system.

The heart of a rocket engine is the injector, which, like an automobile carburetor, mixes the fuel with the oxidizer. The D.F.L. injector, like that on the LM descent engine, would have the fuel entering through holes in a round, flat plate, with the oxidizer injected through holes in a tube sticking out from the center of the plate. A sleeve moving to cut off different numbers of oxidizer holes varies the engine thrust.

Unlike the LM engine, however, which uses two propellants that ignite on contact, the D.F.L. engine is being designed for an oxidizer of liquid oxygen, which requires a separate ignition system, as well as introducing cryogenic design problems.

APPLICATIONS TECHNOLOGY SATELLITES

New projects planned

The varied capabilities of Applications Technology Satellites are being made available by the National Aeronautics and Space Administration to outside experimenters for research, now that the satellites' basic technical missions have been fulfilled.

Two of the multi-purpose probes are currently operating, ATS-1 and ATS-3, launched in December 1966 and November 1967, respectively, and another is scheduled for an August launch. ATS-2 and 4 suffered booster problems, placing them in unplanned orbits that made their data largely unusable.

The ATS series has facilities for experiments dealing with communications, including links with aircraft and ships; weather photography and navigation, among others. A briefing has been scheduled for June 13 at NASA headquarters to describe the satellites' capabilities to potential experimenters.

DESALINATION

Old turbines for fresh water

Aircraft turbine engines which can no longer be used for flying can be applied to large-scale desalination of seawater, according to the Soviet newspaper Pravda.

A Ukranian technical center has reportedly shown that even when an engine has gone beyond its useful fiying life, it can still provide large amounts of power during a long service life in ground installations.

At one test center in Odessa, the article says, a turbine-powered desalination unit is already turning out 4.25 million gallons of fresh water a day.

POWER PRODUCTION

Solar power from moon to earth

An almost unlimited supply of electricity could be generated on the moon's surface by huge arrays of solar cells and beamed to earth by laser, suggests Prof. Zdenek Kopal of Manchester University, England.

Sunlight falling on a crater the size of Copernicus or Tycho, he says, could produce from 10,000 to 100,000 megawatts of power. By comparison, a large hydroelectric dam on earth produces about 100 megawatts, and one of the larger atomic power stations produces 1,000 megawatts.

Solar cells would be more efficient on the moon than on earth, Kopal points out, because of the lack of dimming clouds. Three lunar stations, spaced about 120 miles apart on the moon's equator, he says, could guarantee a continuous supply of power.

The electricity could be beamed earthward via laser beam, the researcher maintains.