

Missiles and Spaceflight

SATELLITE NEAR-MISS

An Aerobee 300A sounding rocket was launched from Wallops Island to the vicinity of the Explorer 17 satellite on April 18. The purpose of the firing was to obtain temperature data on electron and neutral particles and to measure ion and neutral particle densities, and to compare these with similar data obtained by the instruments aboard the satellite. The sounding-rocket payload was launched to a height of 208 miles, while Explorer 17 passed over Wallops Island at a height of 198 miles during its 236th orbit.

The Aerobee 300A is a three-stage version of the two-stage Aerobee 150A. The extra third stage is powered by a Sparrow rocket motor developed by Aerojet-General. Reception of data from the rocket at Wallops Station was stated to be excellent, and the correlation of these measurements with those of Explorer 17 will be carried out at Goddard Space Flight Center.

TIROS RECORD

On April 19 the National Aeronautics and Space Administration announced that the Tiros 5 satellite was still transmitting excellent quality weather pictures after ten months in orbit. Since its launch on June 19, 1962, the satellite had collected and transmitted more than 53,000 pictures of the Earth and its cloud cover, of which more than 42,000 were meteorologically usable. During the ten-month period it had observed many of the major tropical storms during the 1962 season, and provided important information on five of the most serious storms last August. Originally the lifetime of the Tiros satellites was estimated at three to four months.

The Tiros programme has achieved six successes in six attempts. Tiros 6, launched on September 18, 1962, is still operating in addition to Tiros 5, and the entire programme has resulted in the acquisition of more than 215,000 pictures (of which 168,000 have been usable). From these pictures more than 5,000 cloud cover analyses have been prepared, more than 700 special storm advisory notices have been issued, and 300 specific instances have been recorded in which the weather analysis has been improved.

Five more Tiros launches are scheduled as part of NASA's research and development activity. The US Weather Bureau is to pay for two additional Tiros satellites which will augment the operational data received from the R&D programme. One of the forthcoming Tiros launches will assist in the development of the horizon scanner for the Nimbus satellite, and another will test the automatic picture transmission system which is being developed to permit ground stations throughout the world to receive directly weather pictures taken by satellites within a range of 1,500 miles.

Future launches also will provide television and infra-red data in polar latitudes, and will provide views of the Earth from an eccentric orbit ranging from 300 to 3,000 miles. Now being studied is a Tiros orbit which would extend to an apogee of 22,300 miles and so enable the satellite to obtain a view of the Earth from the synchronous altitude—the altitude planned for the Nimbus system.

ITALIAN SATELLITE PAYLOAD TESTED

A preliminary test of instrumentation to be used in the joint US/Italian San Marco project was made on April 20, using a Shotput sounding rocket fired from Wallops Island. This sub-orbital launching marked the first flight test in the three-phase co-operative programme between the National Aeronautics and Space Administration and the Italian Commission for Space Research, which is expected to culminate in the launching of a scientific satellite into equatorial orbit from a towable platform in the Indian Ocean (*Flight International*, 20 September 1962).

The primary purpose of the April 20 flight was to study the operational performance of Prof Luigi Broglio's dynamic balance designed to measure the total atmospheric drag of a satellite in orbit. Further sub-orbital tests of Italian instrumentation aboard a Shotput rocket are scheduled to be made from a towable platform in the Indian Ocean later this year. If successful, these will be followed by an orbital attempt by Scout vehicle from Wallops Is-

land during 1964, prior to the final attempt at the Indian Ocean site. The basic objective of the San Marco project is to make high-altitude measurement of atmospheric and ionospheric characteristics in the equatorial region.

The Shotput is a combination of standard solid-propellant rocket motors devised by NASA's Langley Research Center. The Italian experiment utilized the sixth Shotput vehicle built by Langley and launched from Wallops Island. Previous Shotput launches occurred during the early flight tests of the project Echo inflatable satellite payload package.

Shotput is a two-stage vehicle, without guidance, stabilized by aerodynamic fins which impart a slight spin to the entire assembly. The main stage is a Thiokol Pollux E6 booster to which are attached two Thiokol Recruit motors. The second-stage motor is the Hercules Powder Company's X-248 Altair rocket. At take-off, Shotput develops 120,000lb of thrust. The complete assembly is 32ft long, 33in in diameter and weighs 11,000lb at launch.

The Shotput launch vehicle includes timers to control second-stage fairing jettison and second-stage ignition, as well as devices to cancel the spinning motion and disconnect the payload from the upper-stage motor at the proper time. Mechanical and electrical performance of the vehicle is reported by telemetry to the launching station.

COSMOS 15

The second announced Cosmos satellite launching within nine days was reported from Moscow on April 22 in the following official communiqué:—

"The Soviet Union today carried out a routine launching of an artificial Earth satellite Cosmos 15. The satellite is carrying scientific apparatus designed to continue researches in space in accordance with the programme announced by Tass on March 16, 1962.

"The satellite was launched into an orbit with the parameters: initial period of revolution, 89.77min; apogee, 371km; perigee, 173km; angle of inclination to the plane of the equator, 65°.

"In addition to scientific apparatus the satellite contains a radio transmitter operating on a frequency of 19.996 Mc/s, a radio system for the exact measurement of the elements of the orbit and a radio-telemetric system for transmitting to Earth data on the functioning of the instruments and scientific apparatus.

"The apparatus in the satellite is working normally. The co-ordinating-computing centre is processing the information coming in."

GENERAL ELECTRIC AT MISSISSIPPI

The National Aeronautics and Space Administration is negotiating with General Electric for an extension of GE's Project Apollo support effort to provide plant and test support services at NASA's Mississippi Test Facility. Estimated cost of an initial one-year contract is about \$1.5m; the extension might continue through 1968, reaching an estimated annual cost of \$20-25m.

Now under construction on a 13,500-acre area 42 miles north-east of New Orleans, the Mississippi Test Facility will be used for the static testing of Saturn V stages and engines. The \$500m facility will receive Saturn stages assembled at NASA's Michoud Operations plant in New Orleans and other points, and conduct static firing tests before the stages are shipped to NASA's Merritt Island launch area near Canaveral.

Test operations at the Mississippi facility will be conducted by various stage contractors and engine contractors under the direction of Marshall Space Flight Center. The support effort by GE at the facility would also be directed by Marshall.

Mariner Experiments Ten experiments have been selected by NASA for the flight to the vicinity of Mars scheduled to be made by Mariner spacecraft during 1964. They comprise television (California Institute of Technology), magnetometer (Jet Propulsion Laboratory), low-energy cosmic rays (State University of Iowa), cosmic-ray spectrum (University of Chicago), cosmic-ray ionization (California Institute of Technology), plasma probe (Massachusetts Institute of Technology), cosmic dust (Goddard Space Flight Center), infra-red spectrometer (California Institute of Technology), ultra-violet photometers (Jet Propulsion Laboratory), and radio propagation (Stanford University).