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ELDO THIRD STAGE FAILS AGAIN

The ninth launch in the Europa 1 development programme,
which took place from Woomera on July 3, ended in failure
of the third (German-built) stage to ignite, with the conse-
quent loss of this stage and the satellite test vehicle. This is
the second occasion on which malfunction of the engine on this stage has occurred; during the F.7 flight last November ignition was achieved, but thrust terminated after a few seconds. The1

cause of the latest failure was not known at the time of writing.
F.8 was the second flight of Phase 3, in which completely representative live vehicles are launched to assess their be-haviour under various conditions. The objectives of this flight were: the demonstration of lst-stage perofrmance with increased propellant weight; demonstration of ignition and performance of 2nd-stage engines: demonstration of ignition and perform-ance of 3rd-stage main and vernier engines; demonstration of the function of all launcher-separation systems, and the jetti-soning of fairings; and demonstration of guidance-system per-formance. The Italian satellite test vehicle was to have been placed in a circular, 520km orbit.
In the event the launch was postponed by three days from nominal. The first day's delay was due to the accidental opera-tion of an explosive separation bolt between the second and third stages, while low cloud which would have prevented track-ing during the early stages of the flight resulted in a delay of two further days. The countdown itself is understood to have been the smoothest yet.
Once again the British Blue Streak first stage performed flawlessly; an extra bonus in velocity was achieved by cutting lsec off the period between ignition and lift-off, and also by scheduling the first-stage cut-off signal about lsec later, as a result of growing confidence and experience with the vehicle. The extra burn time would have resulted in a velocity incre-ment of probably more than lOOft/sec at first-stage cut-off. At the present time only one more launch is scheduled from Woomera: F.9, which will occur at the beginning of next year. F.10 was cancelled to save money, and the final two vehicles (Europa 2 development) will be fired from Guyana in the autumn of 1970 and summer of 1971.

EARLY BIRD RE-COMMISSIONED

Early Bird, the world's first commercial communication satel-lite, has been brought back into service following the failure of the Intelsat 3 satellite (notification of which was received after the final news item on the previous page went to press) which was launched on December 18 last to provide a relay over the Atlantic. These third-generation satellites are spin stabilised; in order to align the beam with a given Earth loca-tion the aerials have to be rotated at the same rate as the satellite, and the opposite direction; to achieve this they are mechanically de-spun, and it is this system which has failed. While arrangements are being made to bring forward the next Intelsat 3 launch (already scheduled for the Atlantic service), the existing Intelsat 2 and Early Bird will be able to handle the majority of the present traffic, including full support of the forthcoming Apollo flight. TV from North America to Europe will be relayed from Jamesburg, USA, via the Pacific Intelsat 3 to Japan, and retransmitted from there to the Indian Ocean Intelsat 3 for relay to the new Goonhilly station in Cornwall.

APOLLO 11 FUELLING BEGINS

Steady but high-pressure progress continues with plans for the Apollo 11 flight, scheduled for launch on July 16. On June 18 the loading of fuel into the Saturn V launch vehicle began in preparation for a simulated countdown and launch, beginning on June 25. The rocket was due to remain fuelled after the test, in preparation for the launch. The three astronauts, Neil Armstrong (commander), Michael Collins (CM pilot) and Edwin Aldrin (LM pilot) are in excellent health, and are working a lOhr-day, six days per week during the final period. The flight plan has been slightly changed (see Flight, June 12, page 987) by the addition of two extra orbits of the Moon in order to improve communications during critical manoeuvres and to allow more time for decontamination of equipment deployed on the Moon. Adding one Moon-orbit

prior to the undocking of the lunar module from the command and service module will allow acquisition by the 210ft Gold-stone antenna of the LM during its descent toi the surface. The other orbit will be added after the re-docking, and before the LM is abandoned, in order to allow extra time for the LM crew to remove and brush away Moon dust from the lunar-sample boxes before transferring them to the CSM for the return journey. The flight plan now calls for 30 revolu-tions (a total time of 59hr 30min) of the CSM around the Moon. The extra 4hr will be compensated by a faster flight home, so that the original splashdown time of 1249 BST on Thursday, July 24, is unchanged. It will, however, delay the touchdown on the Moon until 2123 BST on Sunday, July 20, and Neil Armstrong will venture on to the Moon at 0717 BST on the following day.

The decision to proceed with the flight was made by NASA
on the basis of a review of the status of the Apollo 11 vehicle, crew and ground team, the state of progress and tests, and a final analysis of the anomalies discovered on Apollo 10.
In the latter mission the plane of the spacecraft did not rotate around the Moon as expected, and this caused the LM to make its low pass over Site 2 (the Apollo 11 landing area) four miles further south than had been expected. While these effects have still not been fully explained, they will be com-pensated by flying Apollo 11 at the same orbital inclination, so that the orbit can be biased to allow for the same variation as that of Apollo 10. This is expected to allow a powered descent well within the propellant-capacity margins allowed. The problem with the docking tunnel was found to be the result of a wrong fitting on the tunnel-pressurisation dump line. Glassfibre insulating material on the docking-tunnel hatch of the command module has been removed to eliminate the possibility of material escaping into the LM and CM as it did on Apollo 10.
The incident leading to the loss of attitude-control during the staging of the Apollo 10 lunar and command modules has not yet been satisfactorily explained. It is associated with switch circuitry in the abort-guidance system which provides a back-up for the lunar-module primary-guidance system. The use of the back-up system during Apollo 10 was a deliberate test to provide flight experience and data in this mode.
Finally, the vibration encountered in the S-1VB powered flight are stated to be well within safety limits; but instru-mentation and provision for continuous telemetry are being installed on the Apollo 11 S-1VB.
The prospects for Apollo 11 look good. But, according to Gen Samuel C. Phillips: "We will not hesitate to postpone the flight if we feel that we are not ready in any way. Nor, once the voyage has begun, would we hesitate to bring the crew home immediately if we encounter any problems."

RUSSIAN MOON LANDING NEXT YEAR?

Alexei Leonov, the first man ever to walk in space (Voskhod 2, launched on March 18, 1965), is quoted by a group of Japanese science reporters on June 2 as saying: "If everything goes well, it will be possible for the Soviet Union to send a man to the Moon before the end of this year or next year." His statement was made through an interpreter, through whom Leonov is reported to have said that samples of lunar rock would be displayed by Russia at the Japanese International Exposition in Osaka in 1970.

The Soyuz vehicle can be linked with space stations con-taining up to four separate elements, and this could be used for a Moon flight. Alternatively, a "direct-ascent" flight could be made, according to the same report.

SPAIN TO OPERATE NASA STATION

The Cebreros tracking station, which has played an important part in Mariner and Pioneer flights, was operated for the first time under Spanish control on June 15. The $7.5 million station had been handed over by NASA to the National Institute of Aerospace Technology on the previous day. Cebreros, with its 85ft dish, forms part of the Robledo de Chavela space-tracking complex located 45 miles north-west of Madrid, and is associated with Fresnedillas and Robledo in a natural bowl in the landscape which provides some immunity from artificial electrical interference.