

A New Realm of Flight



COMPARABLE in its significance to the harnessing of atomic energy, the successful launching of the first man-made satellite of the Earth was a unique scientific and engineering achievement. It marked Man's entry into a completely new realm of flight. On these four pages are presented the first week's news of the satellite, a general discussion of the underlying principles, and quotations concerning the achievement.

THE first surprising week in which the Russian satellite orbited the Earth was one of contradiction and speculation. By the end of it, however, a clearer picture was emerging. More accurate scientific measurements were enabling the orbit to be precisely established, and considered comment was following the almost hysterical reaction which in certain places had greeted the first announcements.

The early announcements, reported in last week's issue, gave the satellite's weight as 184 lb and diameter as 22.8in, and contained forecasts (which proved to be accurate) concerning the times at which the object would pass over points beneath its orbit. The Russian name for the satellite was *sputnik* (or fellow-traveller) and its two radio transmitters were working on frequencies of 20.005 and 40.002 Mc/s. Its speed was approximately 18,000 m.p.h. and its height 560 miles.

On Monday, October 7, Moscow Radio stated that the final section of the satellite's carrier rocket was also in orbit. The first substantial reports of sightings of the satellite or its rocket came from Australia, and continued reception of the satellite's radio signals was reported from many countries, including the United Kingdom. In Barcelona, the International Astronautical Conference opened, with two Russian papers concerning Earth satellites on its programme. The Russian delegates to the International Geophysical Year conference in Washington visited the Naval Research Laboratory, which is responsible for the U.S. Project Vanguard satellite programme [the American satellite project was the subject of a paper at the recent Rockets Symposium at the College of Aeronautics, Cranfield, reported in *Flight* of August 2].

At a Press conference organized by the Royal Society in London on Tuesday, October 8, British knowledge of the Russian satellite was discussed. Among the speakers were Dr. D. C. Martin, assistant secretary of the Society, who spoke of the U.K. contribution to the International Geophysical Year; and Sir Owen Wansborough-Jones, chief scientist to the Ministry of Supply, who emphasized that, while his Ministry was contributing rocket information to the I.G.Y. programme, M.o.S. interest in satellites was "not very much concerned with defence."

Techniques and results in the tracking of the satellite were described by Dr. R. L. Smith-Rose, director of the Radio Research Station at Slough; Mr. Martin Ryle, director of the Mullard Radio-astronomical Laboratory of Cambridge University; and by B.B.C. engineers. Mr. Ryle said that the time taken for one orbit was 96 min and that the satellite's height had been estimated at 250 miles (approaching from the south-west) and 400 miles (from the north-west). Predictions of the precise orbit as an aid to visual observations were being carried out with the help of scientists from the Royal Observatory. Dr. Martin pointed out that the I.G.Y. authorities had been informed in advance of the radio frequencies on which the satellite would transmit.

As the Royal Society meeting was taking place in London, preparations were being made at Jodrell Bank, Cheshire, to use Manchester University's radio telescope to track the satellite by radar.

On Wednesday, October 9, Moscow stated that a third object, the protective nose-cone, was in orbit. Highest point of the orbit of the satellite was given as 625 miles, while British measurements of the radio transmissions were said to indicate a minimum height of 160 miles and a mean height of about 400 miles. According to *Pravda*, temperatures and other data were being transmitted by the satellite. Preliminary analysis had indicated lower temperatures and density than expected at heights between 200 and 300 miles.

Also on October 9, President Eisenhower stated that the first American satellites, small test spheres, would be launched in December. These would be used to check rocket instrumentation and ground tracking equipment, and would be followed by the first fully instrumented satellite in March next year. At the Royal Observatory, Edinburgh, two scientists reported the first visual observation in Britain of the satellite or its rocket.

By the afternoon of Friday, October 11, the satellite had completed 100 circuits of the Earth, and Moscow Radio reported that evening that it had covered 2,734,000 miles, equivalent to more than ten times the distance to the Moon. At a meeting of the Royal Astronomical Society in London, Mr. Martin Ryle said that the elliptical path of the satellite was making available "enormous information about the ionosphere." Radar tracking of the satellite's rocket had begun at Jodrell Bank on Thursday evening.

In the United States, Dr. John Hagen, director of Project Vanguard, said that the American programme was about five months behind schedule, and went on to accuse Russia of "unethical conduct" in launching her satellite at this time.

By Monday, October 14, the satellite had completed 150 circuits, and observations showed that the rocket was now ahead, i.e., its speed had increased and it was nearer the Earth. Uncertainty as to whether the satellite was transmitting data such as temperatures by variation of the transmitted signals remained (for contradictory Russian statements, see page 614), although general opinion was that it was not. (Continued overleaf)

The satellite—a Moscow photograph released on October 9. In the heading is the first view of it—or, more likely, of its rocket—in orbit, taken (with a 60 sec exposure) by a photographer in Melbourne, Australia. The faint semicircular trace is unexplained; it could be merely a scratch on the negative.

