A Decade of Russian Space Achievement

from our Soviet Correspondent

MARCH 16, 1972, was the tenth anniversary of the most prolonged of all Soviet space projects to date—the Kosmos series of satellites. This series, which has covered a wide range of projects—from precursors of manned and deep-space automatic missions to apparently military or paramilitary projects—has totalled almost five hundred launches in its ten years of operation, and has become so commonplace that, except in certain special cases, the western press has long since lost interest in Kosmos launches.

The Kosmos programme started modestly enough, with a TASS report, published on March 16, 1962, under the headline "Satellite in flight". A satellite, it was stated, had been launched, as part of a programme of space research, to be carried out "in the course of 1962", which would include:

- study of the concentration of charged particles in the ionosphere with the aim of investigating the properties of radio waves;
- study of the energy states of the radiation belts of the Earth with the aim of estimating the radiation hazards for long-term space flights;
- study of cosmic rays and variations of their intensity;
- study of the magnetic field of the Earth;
- study of short-wave radiation of the Sun;
- study of upper layers of the atmosphere;
- study of the action of meteor matter on space objects;
- study of the distribution and formation of cloud systems in the Earth's atmosphere.

Oddly enough, the name Kosmos-1 was applied to this satellite only retrospectively, when, on April 7 of the same year, TASS reported the launch, on the previous day, of Kosmos-2. Now, ten years after its inauguration, the Kosmos programme has become so regular a feature of the Soviet press that it requires something out of the ordinary to make a Kosmos launch more than a routine matter; as, for example, in the case of the first launch of eight Kosmos satellites from a single carrier (Kosmos-336-343) in April 1970, nicely timed to coincide with the centenary celebrations of Lenin's birth.

Kosmos launches are normally reported in a formulaic manner which

gives little more than a statement of initial period, perigee, apogee and inclination, possibly the frequency of radio transmissions, and the note that, in addition to scientific instruments, the on-board equipment includes a radio system for measuring orbital elements and a telemetry system and that "all systems are working normally".

Occasionally this formula has given rise to considerable speculation abroad; such an announcement was made in the case of Kosmos-57 which was launched on February 22, 1965, and which blew up, or was blown up, the same day into more than 150 fragments but which was reported by TASS the following day to have "all systems functioning normally". As early as Kosmos-22 (November 16, 1963), certain Kosmos satellites have been observed to manoeuvre in orbit, but no mention of this has been made in the Soviet press. Kosmos-146, with a length of approximately 14 metres, was observed to have arrived in orbit on March 10, 1967, and after the first day contracted to approximately 9 metres by emitting two capsules. This satellite was generally assumed to have been a Soyuz precursor.

The Kosmos label has, almost certainly, covered a number of precursors and failures. Kosmos-111, for example, is suspected to have been a failed lunar probe and Kosmos-41 a rehearsal for the Molniya communications satellites. Certain groups of Kosmos satellites, known as 8-day satellites (because they re-enter precisely 8 days after launch), which do not transmit telemetered data and which are not subsequently reported in the Soviet scientific literature, are widely thought to be some type of paramilitary reconnaissance satellites. (It will be remembered that Kosmos-5 was announced to have monitored the radiation of the US Starfish atomic test, which coincided with the opening of a disarmament conference in Moscow.)

On the tenth anniversary of the programme, however, it is perhaps more appropriate to recall its successes—the spectacular automatic docking of Kosmos-186 (launched October 27, 1967) and Kosmos-188 (launched October 30, 1967). (Kosmos-187 was launched the same day as 186, but for some reason this was not used for the link-up.) Automatic docking and undocking of the pair controlled from Earth was achieved on October 30, 1967, and was headlined as "A new space achievement on the very eve of [the fiftieth anniversary of] the Great October [Revolution]." This was far more than a propaganda achievement.

Similarly, but on the manned side of the project, the flight of Kosmos-110

(February–March 1966) was a necessary step in the Tsiolkovskii-type orbital space station (later developed in Salyut). At the time of the launch, Academician V. V. Parin affirmed that every new "step" in space which involved human participation would be preceded by biological experiments. The dogs of Kosmos-110 were to test the effect of prolonged weightlessness and radiation exposure; they were purposely orbited very high in the Van Allen radiation belts, and as the Russians then were greatly interested in the development of an anti-radiation serum, it is highly possible that the administration of such a serum to one of the dogs was a prime purpose of the mission. After the inauguration of the Soyuz missions in 1967, however, there was an apparent long lull in biological experiments. In October 1970, however, there was a return to this theme with Kosmos-368, which carried "scientific apparatus for testing experimental life support systems for laboratory animals, for the further study of space flight on living organisms, and for the continuation of the investigation of the physical characteristics of space".

It is probable, in effect, that many of the Kosmos experiments are seen as the early stages of research for the relatively distant future. In 1965, when Kosmos 80-84 were launched from the same rocket (the first quintuple launch) it was stated that "the on-board system of power supply of one of the satellites is a power unit operating on power supplied by a radioactive isotope". Soviet space probes normally use solar batteries (indeed, some communications failures seem to have been due to a failure in alignment of the solar cells). Was the relevant Kosmos of this group perhaps testing out equipment to be used for some future deep-space probe, to distances where solar power would no longer be effective?

Another achievement was Kosmos-243, which carried out the first "global experiment on the reception of thermal radio-emission of the Earth and its atmosphere", permitting, in particular, the mapping of the Antarctic ice, irrespective of whether or not it was concealed by cloud-cover. Interviewed in *Pravda*, in honour of the tenth anniversary of the series, Academicians S. N. Vernov (Institute of Atomic Research, Moscow University), A. M. Obukhov (Institute of Atmosphere Physics of the Soviet Academy of Sciences) and Dr Yu. G. Shafer (Institute of Space Physics of the Yakutsk Section of the Siberian Branch of the Soviet Academy of Sciences) stressed advances of this type rather than the occasional "spectacular".