

## 15. The Breakthrough

### Simplest Satellite PS

4 October 1957

page 334

isters asking for the permission to launch such a satellite. To obtain a positive decision on his request, Korolev was pushing all the “hot buttons” in the Kremlin, emphasizing the progress of the rival American program. The Soviet government acted promptly and approved the OKB-1's proposal on 15 February 1957. The new satellite was called *Object PS*, (*Prosteishii Sputnik*), or the *simplest satellite*. (In Russian, *sputnik* literally means a *fellow traveller* or a *travel companion*.) The development of the originally planned Object D also continued, and it would ultimately be launched on 15 May 1958, as Sputnik 3, with mass 1327 kg (2924 lb) and operated for 692 days.

The new PS-1 was built as a hermetically sealed sphere with a diameter 58 cm (22.8 in.) and pressurized by dry nitrogen at 1.3 atm (19 psi). Two pairs of antennas were 2.4 m (7.9 ft) and 2.9 m (9.5 ft) long. The radio-system transmitter had 1 W of power and sent signals with the duration 0.4 s alternatively at 7.5-m and 15-m wavelengths (approximately 40 and 20 MHz). Three silver-zinc batteries provided power for the satellite and were expected to last for two weeks.

The top-level breakdown of the satellite total mass of 83.6 kg (184.3 lb) was as follows: structure — 13.9 kg (30.6 lb), antennas — 8.4 kg (18.5 lb), and payload — 58.4 kg (128.7 lb). The spacecraft power unit, with mass 51.0 kg (112.4 lb), accounted for 87% of the payload mass.

Launched from Tyuratam on 4 October 1957, the SP-1 has reached the orbit together with the sustainer stage of the rocket. The side sections of the modified R-7 separated from the sustainer on the 116th second of the flight. The main engine of the sustainer, or the second stage, was cut off at an altitude 228.6 km (142.1 miles). The satellite separated from the rocket 20 s later on the 315th second after launch. In addition to 2.73-m/s (9-ft/s) separation velocity, the rocket body was slowed down a little by venting gas remaining in the oxidizer tanks through valves opened in the forward direction.

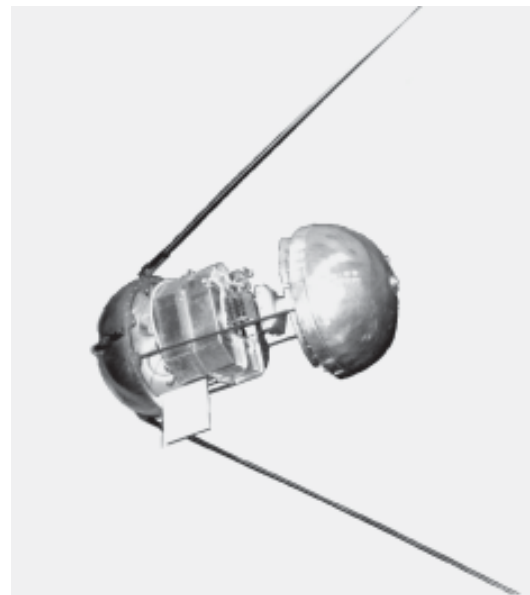


Fig.15.5. First artificial satellite Sputnik 1 in the museum of the Energia Corporation. The spacecraft consists of two hemispheres made of aluminum alloy and attached together by 36 bolts. The sphere diameter is 58 cm (22.8 in.) and the satellite mass is 83.6 kg (184.3 lb). One can see two horizontal bars supporting the expanded spacecraft and the hanging technical specifications sheet. Photo courtesy of Mike Gruntman.