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.

Simplest Satellite PS

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.

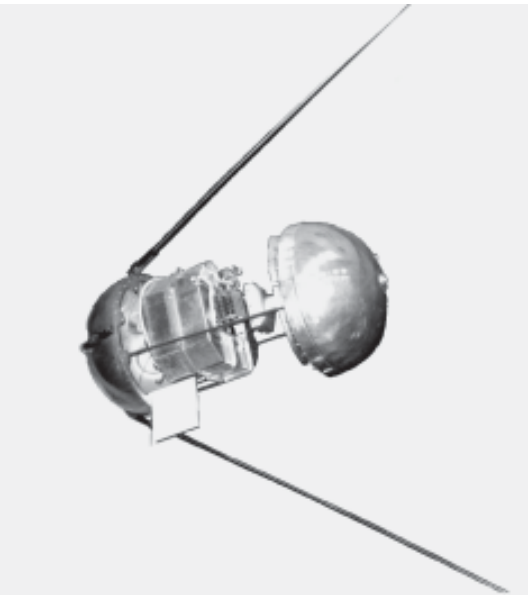

Fig.15.5. First artificial satellite Sputnik 1 in the museum of the Energia Corporation. The spacecraft consists of two hemispheres made of aluminum alloy and attached together by 36 bolts. The sphere diameter is 58 cm (22.8 in.) and the satellite mass is 83.6 kg (184.3 lb). One can see two horizontal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

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.

4 October 1957

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.

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M. Gruntman, *Blazing the Trail. The Early History of Spacecraft and Rocketry*,
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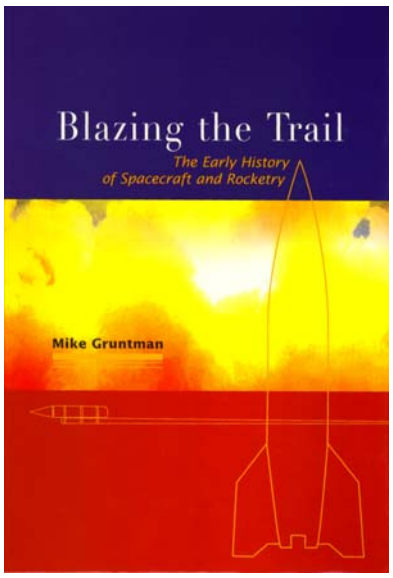
Blazing the Trail

The Early History of Spacecraft and Rocketry

Mike Gruntman

AIAA, Reston, Va., 2004
ISBN 156347705X; 978-1563477058

505 pages with 340 figures
Index: 2750+ entries, including 650 individuals



This book presents the fascinating story of the events that paved the way to space. It introduces the reader to the history of early rocketry and the subsequent developments which led into the space age. People of various nations and from various lands contributed to the breakthrough to space, and the book takes the reader to far away places on five continents.

This world-encompassing view of the realization of the space age reflects the author's truly unique personal experience, a life journey from a child growing on the Tyuratam launch base in the 1950s and early 1960s, to an accomplished space physicist and engineer to the founding director of a major U.S. nationally recognized program in space engineering in the heart of the American space industry.

Most publications on the topic either target narrow aspects of rocket and spacecraft history or are popular books that scratch the surface, with minimal and sometimes inaccurate technical details.

This book bridges the gap. It is a one-stop source of numerous technical details usually unavailable in popular publications. The details are not overbearing and anyone interested in rocketry and space exploration will navigate through the book without difficulty. The book also includes many quotes to give readers a flavor of how the participants viewed the developments. There are 340 figures and photographs, many appearing for the first time.

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