

1963

36)

no name / [Luna]

Nation: USSR (20)

Objective(s): lunar soft-landing

Spacecraft: Ye-6 (no. 2)

Spacecraft Mass: 1,420 kg

Mission Design and Management: OKB-1

Launch Vehicle: 8K78 (no. T103-09)

Launch Date and Time: 4 January 1963 /
08:49 UT

Launch Site: NIIP-5 / launch site 1

Scientific Instruments:

- 1) imaging system
- 2) radiation detector

Results: This spacecraft was the first “second-generation” Soviet lunar probe (known as Ye-6). These were designed to accomplish a survivable landing on the surface of the Moon. The Ye-6 probes were equipped with simple lander capsules (called the ALS) whose primary objective was to send back photographs from the lunar surface. Each egg-shaped ALS was installed on a roughly cylindrical-shaped main bus. Like the Mars and Venera deep space probes, the Ye-6 Luna spacecraft were also launched by the four-stage 8K78 (Molniya) booster but modified for lunar missions. Like many of its deep space predecessors, this first Luna probe failed to escape Earth orbit because of a failure in the Blok L translunar injection stage. There was apparently a failure in the

inverter in the power system of the I-100 guidance system (which controlled both the Blok L and the spacecraft), which failed to issue a command to fire the Blok L engine. The spacecraft remained in Earth orbit, unacknowledged by the Soviets.

37)

no name / [Luna]

Nation: USSR (21)

Objective(s): lunar soft-landing

Spacecraft: Ye-6 (no. 3)

Spacecraft Mass: 1,420 kg

Mission Design and Management: OKB-1

Launch Vehicle: 8K78 (no. G103-10)

Launch Date and Time: 3 February 1963 /
09:29:14 UT

Launch Site: NIIP-5 / launch site 1

Scientific Instruments:

- 1) imaging system
- 2) radiation detector

Results: This was the second Soviet attempt to accomplish a soft-landing on the Moon. This time, the spacecraft failed to reach Earth orbit. Following separation of the second stage, the booster lost attitude control and deposited its third and fourth stages in the Pacific Ocean near Midway Island. Later investigation indicated that the I-100 guidance system provided incorrect information to the booster’s trajectory control system.

38)

Luna 4

Nation: USSR (22)

Objective(s): lunar soft-landing

Spacecraft: Ye-6 (no. 4)

Spacecraft Mass: 1,422 kilograms

Mission Design and Management: OKB-1

Launch Vehicle: 8K78 (no. G103-11)

Launch Date and Time: 2 April 1963 /
08:16:37 UT

Launch Site: NIIP-5 / launch site 1

Scientific Instruments:

- 1) imaging system
- 2) radiation detector

Results: The third Soviet attempt to perform a lunar soft-landing was the first in which the spacecraft actually left Earth orbit. During the coast to the Moon, the spacecraft's Yupiter astronavigation system suffered a major failure (probably in its thermal control system) and left the probe in an incorrect attitude. As a result, Luna 4 was unable to perform its planned midcourse correction. Although communications were maintained with the spacecraft, it passed by the Moon at a range of 8,500 kilometers on 6 April and eventually entered heliocentric orbit (after being in an intermediate barycentric orbit).

39)

Kosmos 21 / [Zond]

Nation: USSR (23)

Objective(s): lunar flyby

Spacecraft: 3MV-1A (no. 1)

Spacecraft Mass: c. 800 kg

Mission Design and Management: OKB-1

Launch Vehicle: 8K78 (no. G103-18)

Launch Date and Time: 11 November 1963 /
06:23:35 UT

Launch Site: NIIP-5 / launch site 1

Scientific Instruments:

- 1) radiation detector
- 2) charged-particle detector
- 3) magnetometer
- 4) piezoelectric detector
- 5) atomic hydrogen detector
- 6) radio telescope
- 7) ultraviolet and Roentgen solar radiation experiment
- 8) technology experiment
- 9) plasma engines

Results: This was the first of the Soviet Union's "third-generation" deep space planetary probes of the 3MV series. Like the second generation, Soviet engineers projected four types of the 3MV: the 3MV-1 (for Venus impact), 3MV-2 (for Venus flyby), 3MV-3 (for Mars impact), and 3MV-4 (for Mars flyby). The primary difference over the second generation was vastly improved (and in many cases doubled) orientation system elements. While these four versions were meant to study Mars and Venus, the Soviets conceived of two additional variants of the series, similar but not identical to the 3MV-1 and 3MV-4 versions. These "test variants" were designed to verify key technological systems during simpler missions on flyby missions to the Moon and the near planets. On this particular launch, the first to fly a "test variant," the third and fourth stages separated abnormally; after the craft reached Earth orbit, ground control lost telemetry from the Blok L upper stage designed to send the vehicle past the Moon. The stage's main engine turbopump probably exploded upon ignition, destroying the payload. With this mission, the Soviets began the practice of giving Kosmos designations to lunar and planetary probes that remained stranded in Earth orbit.