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NORTH AMERICAN AIR DEFENSE COMMAND

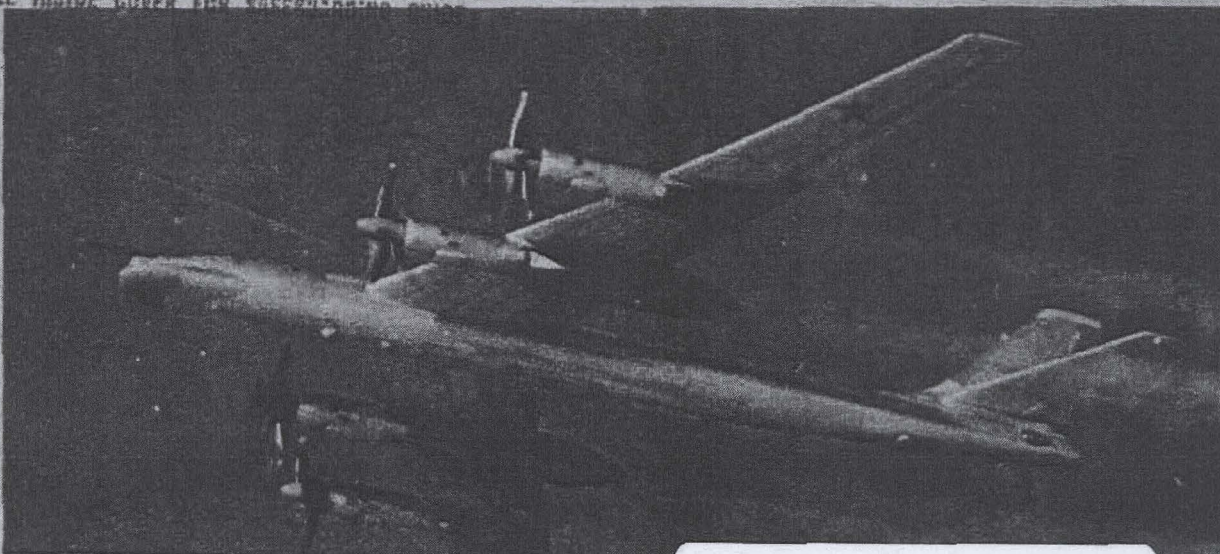
W O R

WEEKLY INTELLIGENCE REVIEW (U)

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Weekly
Intelligence
Review

Issue No. 6/66, 11 February 1966

The WIR in Brief

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Space

LUNA 9 PROBABLY LANDED 'SEMISOFTLY,'
GOT VALUABLE INFO ON MOON'S SURFACE
Seems to have had no other mission than to
land on Moon and send video to the Earth.

Portion identified as non-responsive to the appeal

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COVER: Soviet BEAR bomber over North
Atlantic (furnished by COMICEDEFOR)
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NOTE: Pages 28, 30, 31, 34, 35, 38, 39, 42
and 43 of this issue are blank.

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space

significant
intelligence
on space
developments
and trends

Luna 9 Probably Landed 'Semisoftly,' Got Valuable Info on Moon's Surface

Luna 9 made two significant points:

- It showed that the Soviets know how to land a package safely on the Moon.
- It dispelled oft-expressed apprehensions that the Moon's outer surface is an extremely fragile crust or, if hard, might be covered with a soft, deep layer of dust; in either case, it was feared, an ordinary spacecraft would, on landing, be engulfed and rendered useless unless extraordinary precautions were taken to spread its weight over a large surface.

The Mission. Luna 9 appears to have had no missions other than to land on the Moon at a reasonably slow speed, and to take pictures of the lunar surface and transmit them to the Earth. The Soviets have said that the working payload included only communications gear, a programmer-timer, a heat regulator, a power supply, and a video system. The project appears to have been a complete success.

The Landing. Luna 9's actual landing speed is not known, but it is suspected that it was scheduled for, and made, a "semisoft" rather than a "soft" landing.

The Soviets said that retrorockets slowed the craft's speed from about 2600 meters (8600 feet) per second to "several meters per second." It is believed that landing speed was in the range of 100-400 feet per second. In drop tests conducted several years ago, a Soviet-built TV transmitter reportedly successfully withstood a free fall of 6500 feet in which the speed at impact would have been about 400 feet per second. The Soviets may have put a transmitter of this or similar type on Luna 9. At the other end of the speed range, sophisticated on-board rate-measuring devices and computers would not have been needed if landing speeds of more than 100 feet per second

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were envisioned. (The US plans to land its Surveyor lunar lander at speeds of 20-110 feet per second.)

The Payload. The Soviets said Luna 9's payload weighed about 1580 kilograms (3482.6 pounds). This figure probably included the weight of the inflight guidance-correction and retrofire systems. The weight of the instrumentation package, including container and landing structure, was probably about 600-1,000 pounds. (Drawing on page 36.)

The Soviets also said that the retrofire package was separated from the instrumentation package before impact and landed some distance from it. Some of the Luna 9 video supports this claim.

The Video System. The Soviets have claimed that the Luna 9 pictures show nearby objects on the lunar surface with a "precision" (resolution) of 1-2 centimeters (0.39-0.79 inch). The Soviets also claimed that the TV system was designed for 360-degree coverage; however, the instrumentation package was tilted when it came to rest, so a 60-degree sector of coverage in the "West" shows none of the Moon's surface, only a black sky. At any rate, Luna 9 afforded a good picture of the lunar surface.

The Power Supply. The Soviets report that a total of 7 communications sessions were held with Luna 9 before its batteries went dead on 7 February, 2 days after impact. They lasted long enough for mission accomplishment, but the Soviets may have hoped for a somewhat longer battery life. The probe was landed, apparently deliberately, at a point on the Moon's surface which would be in sunlight for about two weeks after Luna 9's impact. Video coverage of changes in the length and direction of shadows on the Moon's surface as the angle of the Sun's rays changed would have enabled the Soviets to make more accurate estimates of the size of objects on the lunar surface.

Retrospect and Prospect. Luna 9 is believed to have been the 12th Soviet attempt in the past 40 months to land instrumentation on the Moon. (See page 33.) Soviet persistence in this effort, particularly in the last 12 months, when 7 attempts were made, indicates that lunar exploration enjoys a high priority in the USSR, despite the high costs involved.

Luna 9 is probably only the first of several programmed Soviet landings. More video of the lunar surface will be sought, particularly of the "continental" areas, where the surface is expected to be much different from that of the Sea of Storms, Luna 9's landing field. But video will eventually give way to sensors which will determine various properties of the lunar surface at widely separated points. Such sensors will include:



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- Thermometers which will register the temperature at the surface and at various depths below the surface, including the changes that occur as the Moon's surface shifts from full sunlight to complete darkness and back again.
- Seismographs to determine whether moonquakes occur and, if they do, to measure their frequency and intensity.
- Probes to determine whether objects on the lunar surface are loose or fused to the surface.
- Equipment to determine the chemical and crystalline nature of the Moon's rocks, particularly with a view to determining whether it will be feasible to extract oxygen and/or water from them to support life.

The "windows" for the lunar launches from the USSR, assuming use of a 52-degree parking orbit, will next be open as follows:

1146Z/02 March or 1222Z/03 March
1050Z/31 March or 1119Z/01 April

(NORAD; FTD; TASS; US press)

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The Soviet Lunar Record

(Does not include Zond 3, a test probe which photographed back side of Moon.)

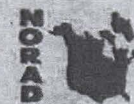
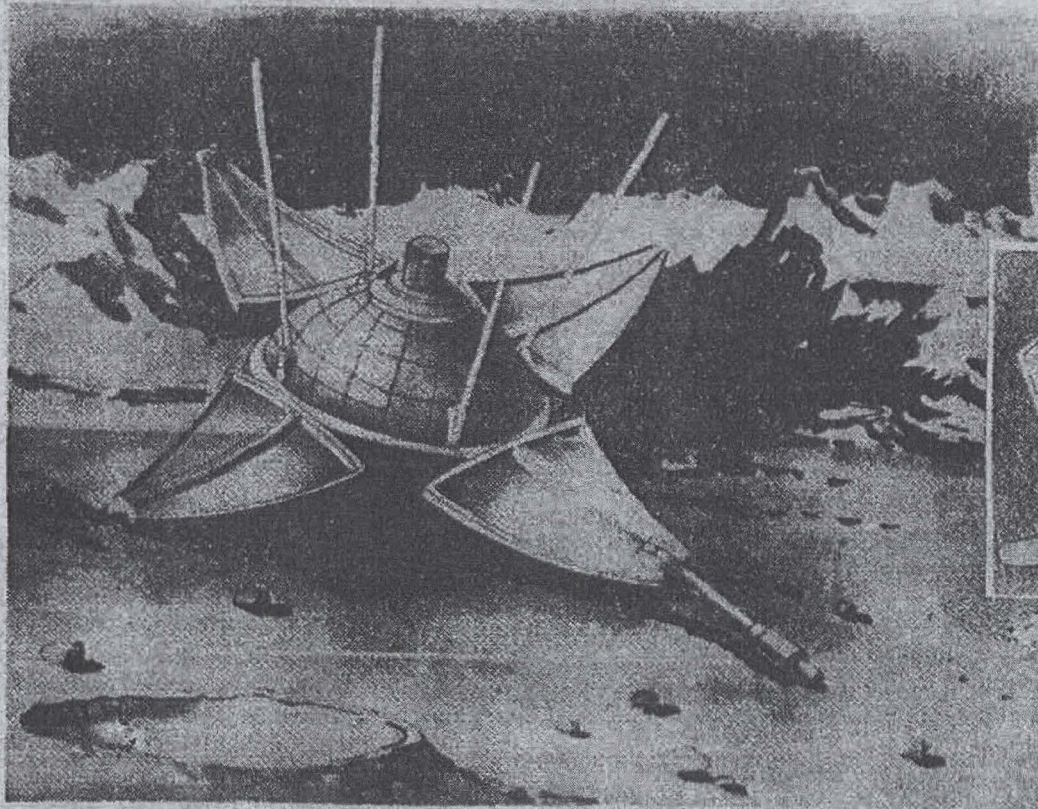
Date of Launch	Soviet Designations	Achievements, Reasons for failure, Remarks
<u>DIRECT-ASCENT TECHNIQUE</u>		
04 Dec 58		Sustainer failed. Probably an attempt to hit the Moon, in a test of propulsion and guidance.
02 Jan 59	Luna 2	Probably an attempt to hit the Moon, in a test of propulsion and guidance. Missed, went into orbit around the Sun. First man-made vehicle to escape earth's gravitational field. Telemetered some data about Van Allen belt radiation.
18 Jun 59		Sustainer failed. Probably an attempt to hit the Moon, in a test of propulsion and guidance.
12 Sep 59	Luna 2	Impacted on Moon, its apparent mission. Telemetry from magnetometer indicated that Moon has little or no magnetic field.
04 Oct 59	Luna 3	Flew around Moon and returned to vicinity of Earth, suffering orbital decay about 6 months later. Photographed part of far (unseen) side of Moon and sent video pictures to Earth.
15 Apr 60		3d stage failed.
<u>PARKING-ORBIT TECHNIQUE</u>		
04 Jan 63		Did not achieve transfer trajectory -- 4th stage failed.
03 Feb 63		Did not achieve parking orbit -- 3d stage failed.
02 Apr 63	Luna 4	Missed Moon by about 8500 km (4560 n.mi.), according to TASS. Midcourse guidance maneuver may have failed. Went into heliocentric (Earth-Moon) orbit. Soviets claim it is now in heliocentric (Sun) orbit.
21 Mar 64		Did not achieve parking orbit -- 3d stage failed.
20 Apr 64		Did not achieve parking orbit -- 3d stage failed.
12 Mar 65	Cosmos 60	Did not achieve transfer trajectory -- 4th stage failed. Launch announced to comply with UN Resolution. True mission concealed by Cosmos designation.
10 Apr 65		Did not achieve parking orbit -- 3d stage failed.
09 May 65	Luna 5	Crashed on Moon when retrorockets failed to slow it for its scheduled soft landing.
08 Jun 65	Luna 6	Missed Moon by 160,000 km (98,000 n.mi.) when midcourse guidance engine failed to turn itself off on command.
04 Oct 65	Luna 7	Crashed on Moon. Soviets said firing of retrorockets was mistimed.
03 Dec 65	Luna 8	Impacted on Moon, apparently at desired speed, but transmissions ceased at, or shortly after, touchdown.
31 Jan 66	Luna 9	Successful soft-landing and transmission of video signals.

*Not named

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Luna 9 on Moon's Surface (Soviet Artist's Sketch)



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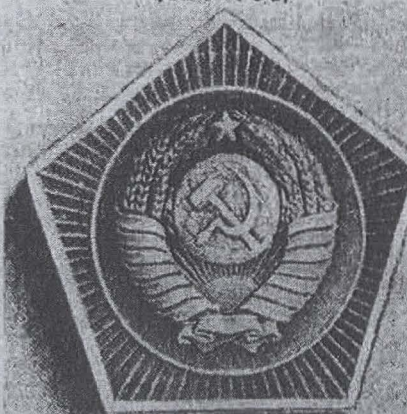
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Soviet Emblems Delivered
to the Moon by Luna-9
(from Red Star)



(reverse)

(obverse)



(obverse of emblem)



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