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15 October 1959

CURRENT INTELLIGENCE WEEKLY SUMMARY



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PART I (continued)

SOVIET SPACE PROBE - LUNIK III Page 7

It is becoming increasingly clear that the third Soviet lunar probe, launched on 3 October, has not followed the orbit predicted in early Soviet releases which would have surveyed the moon's "far side" at approximately 6,000 miles altitude. It is not yet clear whether Lunik III circled the moon or returned on the same side as it approached; however, on 10 October the probe reached a point some 291,000 miles from earth from where 90 percent of the "far side" of the moon was observable and at a time when the area was illuminated by the sun. Lunik III is returning toward the earth and is expected to have a highly eccentric orbit of 15.5 days' duration.

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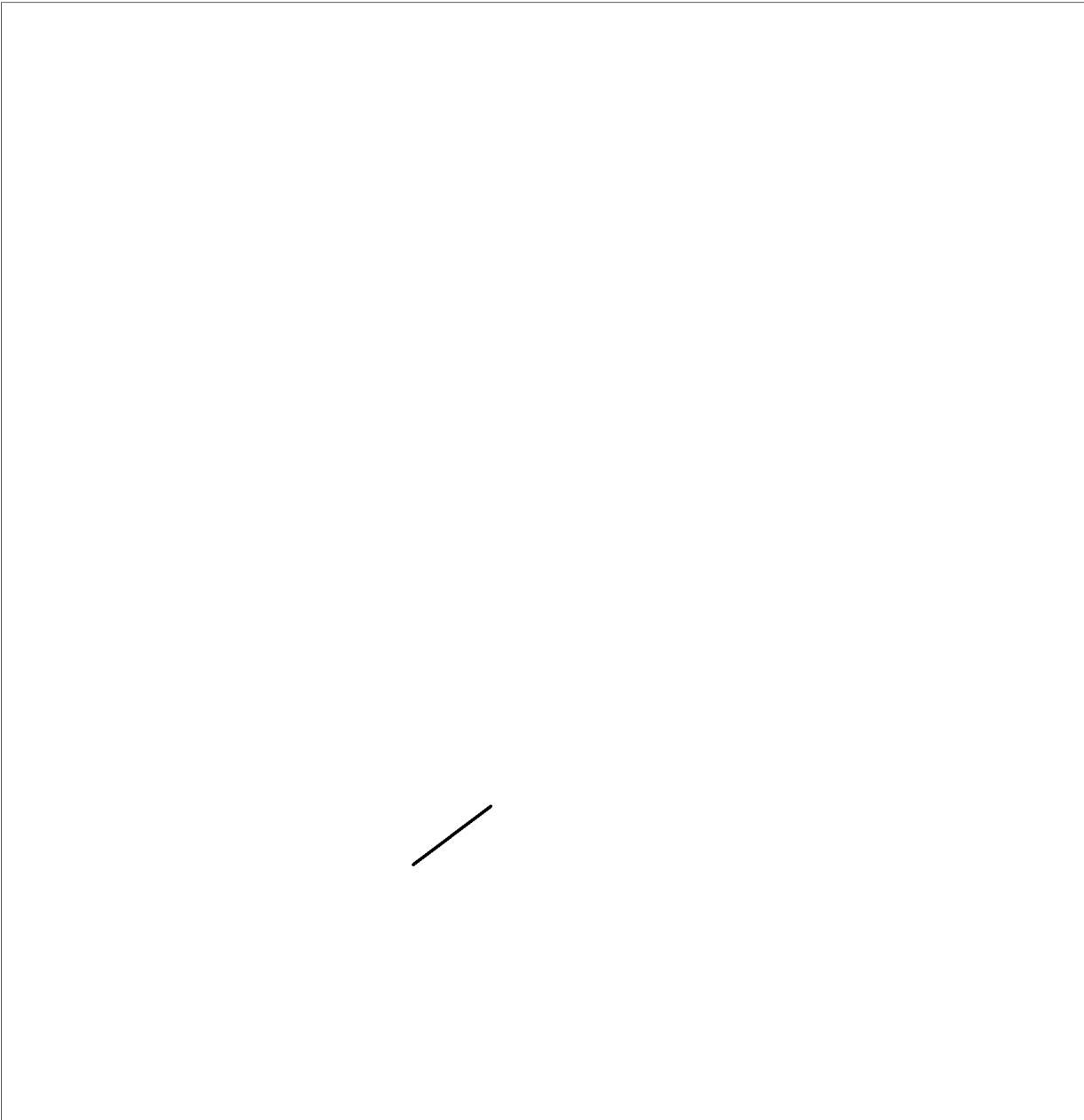
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SOVIET SPACE PROBE - LUNIK III

The USSR launched its third lunar rocket--Lunik III --on 3 October. According to Moscow announcements, Lunik III

approached closest to the moon at 1016 on 6 October, about two and a half days later. The original announcement stated

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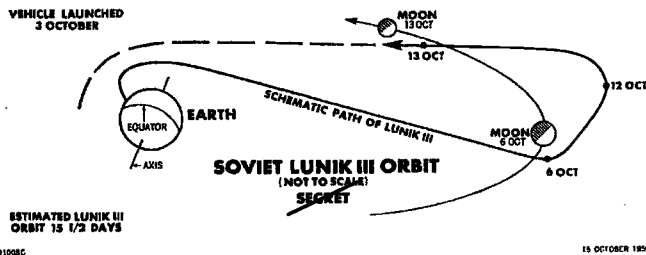
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that this experiment was part of the Soviet program for outer-space exploration and preparation for interplanetary flight. Lunik III has been variously referred to in Soviet announcements as an "automatic inter-

Although the press has constantly used the word "photograph" in referring to the capability of Lunik III, the original Russian announcement used words signifying "to record" and "print" or "copy," rather than the usual

verb meaning "to photograph." TASS later claimed that its 6 October statement concerning photography was unfounded, which suggests an attempt to retreat from the earlier stated capability--possibly because of the failure of certain systems aboard the probe or



planetary station," an "automatic observatory," and an "automatic flying laboratory."

because the probe was not following its intended path around the moon.

Early Soviet announcements indicated it was intended to pass around the moon and return to the vicinity of the earth, but there is considerable evidence that Lunik III is not performing as Soviet scientists announced.

Instrumentation

Little information is available concerning the actual instrumentation systems carried. It appears that part of the instrumentation was contained in the final stage rocket which separated from the "automatic interplanetary station," shortly after entering orbit. Major emphasis in early news releases was given to the recording of data--possibly to include securing an image of the constantly hidden side of the moon and relaying it to earth by radio.

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SOVIET LUNAR VEHICLES
PRINCIPAL CHARACTERISTICS

CHARACTERISTIC	LUNIK I	LUNIK II	LUNIK III
Date of launch	2 Jan 59	12 Sept 59	3 Oct 59
Empty weight of final stage (lbs.)	3,245	3,332	3,424
Total payload weight (lbs.)	797	860	959
Gross weight of separating instrumentation probe (lbs.)	397	Unknown	613
Estimated instrumentation weight remaining with powered final stage (lbs.)	400	Unknown	345
Increase in payload weight over Lunik I (lbs.)	--	63	162
Structure weight minus payload (lbs.)	3,448	2,472	2,465
Length and diameter of last stage (ft.)	17.5 x 8.5	Unknown	Unknown
Diameter of instrument capsule (ft.)	2.7	Unknown	Unknown
Shape	spherical	Spherical	Unknown

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The USSR has announced that data transmissions would be made on 39.986 and 183.6 megacycles. Clarification has not yet been made as to which of the orbiting bodies is transmitting on 39.986 megacycles.

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The 183.6-megacycle transmission is stated to be associated with the "station." Measurements of temperature and cosmic ray phenomena are probably included among other as-yet-unannounced measurements. The internal power supply for the instrumentation and communications links consists of both chemical and solar batteries. It was stated that communications would be programed only at definite intervals from two to four hours each day in conformity with the program of observations.

Transmissions thus far detected have occurred only while the "station" has been within the radio horizon of Soviet ground stations, thus restricting the reception by Western stations, Jodrell Bank in the UK being the sole exception. Other observation facilities have had no intercept success up to the present time.

Configuration

Although there has been a progressive increase in total and payload weights from Lunik I to Lunik III, all three are believed to have had essentially the same configuration. Visual examination of the model of the Lunik I final powered-stage vehicle indicates the use of a liquid oxygen - kerosene propellant system. The booster vehicle for the final powered stage is most probably the Soviet ICBM.

The structure weight (minus payload) for each of the final stages is very nearly the same --the differences being less than one percent of the average weight. Thus, it appears that the same type of vehicle was used for the three lunar shots, and that the payload for Lunik II was increased over that for Lunik I by less than one percent, and by less than 3 percent for

Lunik III. On the assumption that the propellant weight in the final stage of each Lunik was 15,000 pounds, the variations in burn-out velocities can be directly related to the differences in weights of the empty final stages.

Launch

Moscow radio announced the launching of Lunik III on 4 October. It also predicted that the vehicle would reach a minimum lunar altitude of about 6,000 nautical miles in approximately three days. The vehicle was to begin its scheduled two-hour transmissions on 4 October at a time when its altitude was predicted to be 64,000 miles above the earth.

Evaluation of Flight

Preliminary data analysis indicates that the closest the "station" passed to the moon was 4,890 miles.

information based on calculations by [redacted] a top Soviet astronomer, that Lunik III did not actually go around the moon at all but in its ascent passed behind the moon. This source stated, however, that the probe did reach a point from which 90 percent of the "far side" of the moon was observable and at a time when the area was illuminated by the sun.

Soviet releases made it increasingly clear that Lunik III would not fulfill its originally announced mission

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of swerving around the moon at a minimum distance of about 6,000 miles. This was later changed to 4,340 miles prior to Lunik III's arrival near the moon, and subsequently changed to 4,375 miles, after the probe had passed the moon. On 10 October, the vehicle was said to have proceeded to some 291,000 miles from the earth and to have started its return journey. The moon's apogee and perigee are 253,000 and 222,000 miles, respectively. Additional predictions of the station's orbit around the earth included a maximum distance of 248,000 and a minimum distance of 1,240 miles, later modified to 291,000 and 24,800 miles.

At present, it is not clear whether the capsule passed in front of or behind the moon, nor have any references been made to the path of the final stage, other than early releases stating it was following a similar trajectory to Lunik III.

The use of the designation "automatic interplanetary station" as applied to Lunik III does not, in terms of presently available information, appear appropriate to its apparent mission. The terminology more appropriately would be associated with an interplanetary flight mission for which the "station" could be utilized in the future.

[redacted] (Prepared by OSI)

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