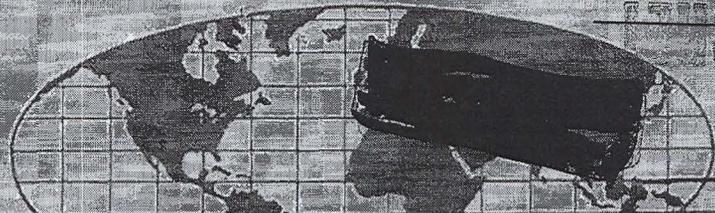


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space

significant
intelligence
on space
developments
and trends

Lunar, Venus Probes Pending; Manned Flight(s) Also Possible

The Soviets almost certainly plan to launch lunar and Venus probes before the end of the year, and it is possible, though less certain, that they will launch one or more manned satellites.

Lunar Probes. The Soviets can be expected to launch one or more lunar probes, probably soft-landings of instrumented packages, before the end of 1965. This estimate is based on the following factors:

- Need. The USSR -- and the US, as well -- needs firm information on the load-bearing characteristics of the lunar surface, which only a soft-lander can obtain. This information is needed before more advanced lunar missions, which the Soviet press has discussed, can be undertaken.
- Desire. The US plans to launch a soft-lander, a Surveyor-series vehicle, to the Moon in October. The Soviets undoubtedly want their probe to arrive there before the US's does and to send back more data.
- Intent. The Soviets earlier this year launched 4 lunar probes in less than 3 months in their most concentrated assault yet on the Moon. All 4 attempts (launched 12 March, 10 April, 9 May, and 8 June) were probably intended to be soft-landers.

The Soviets have attempted their lunar soft landings when the moon was near its first quarter. The stand-down during the summer apparently results from the fact that a probe could be monitored fewer hours daily during this period by Soviet deep-space communications facilities in the Crimea, owing to the southerly declination of the Moon at the time of the first quarter in recent months. The Moon is now

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moving north in declination at the time of first quarter; thus, Earth-Moon geometry is again becoming favorable for Soviet launches.

Times most favorable for Soviet launch of lunar soft-landers before the end of 1965 are as follows:

- 0731Z, 04 October
- 0800Z, 03 November
- 0738Z, 02 December

The 4 October date would be particularly propitious from a propaganda standpoint, since it will be the 8th anniversary of the launch of Sputnik 1, the first man-launched satellite. Also, the Supreme Soviet may be in session at the time; an announcement to that body of a successful soft-landing on the Moon would be highly beneficial, from the government's point of view. There is, obviously, some risk of failure, but the Soviet leadership no doubt is prepared to conceal such a failure from Soviet citizens.

Missions other than soft-landings are also possible, including circumlunar flights which would furnish more detailed photography of the unseen side of the Moon and new scientific information about the exact size and shape of the Moon.

The Soviets may have tried for still another type of mission in connection with their lunar launch of 21 March 1964. This launch, which failed to achieve parking orbit, was not well timed for a soft landing. If the hypothesis that this is another mission is correct, a repeat could be expected about as follows:

- 0639Z, 03 October
- 0707Z, 02 November
- 0641Z, 01 December

The Soviets to date have made 15 lunar probe attempts (not counting Zond 3, a test bed and deep-space probe which photographed part of the Moon's unseen side as it passed by), with the following results:

2 apparently complete successes:

- 1) Lunik 2, which hit the Moon.
- 2) Lunik 3, which transmitted pictures of the Moon's unseen side.

4 apparently partial successes:

- 1) Lunik 1, which was intended to hit the Moon but missed and went off into independent solar orbit.





- 2) Luna 4, a soft-lander which missed the Moon and is now probably in solar orbit.
- 3) Luna 5, a soft-lander which crashed on the Moon.
- 4) Luna 6, a possible soft-lander which missed the Moon when the mid-course guidance engine failed to shut off.

9) propulsion failures (2 sustainer, 5 third-stage, 2 fourth-stage)

Pending Soviet lunar probes could well be heavier, and, therefore, possibly more highly instrumented, than the US's Surveyors. The Soviets' propulsion system has more thrust than the US's.

Venus Probes. The Soviets can also be expected to launch one to three probes of the planet Venus when the launch window opens in October and November. Probable Soviet intent is indicated as follows:

- The Soviets have tried to launch interplanetary probes each time since late 1960 that launch windows have been open for either Venus or Mars. As many as 3 probes have been launched during single launch-window openings.
- Soviet preparations for interplanetary launch(es) are indicated by the Zond 3 launch of 18 July. The Soviets announced that Zond 3's mission was to test spacecraft systems and components for flights of extended duration and for transmission of data over interplanetary distances.

The most favorable dates for launch of Venus probes this year occur in October and November. Optimum date is 12 November, and optimum launch time for that date is 0335Z.

A Soviet Venus probe presumably could weigh as much as a ton. Mars 1, which the Soviets launched on 1 November 1962, reportedly weighed 893.5 kilograms (1,970 pounds).

The Soviets to date have launched 13 interplanetary probes, all of them failures. Nine never reached interplanetary trajectory; the others did, but ceased transmitting long before reaching their targets.

Manned Flights. The Soviets could very well launch manned spacecraft before the end of the year, but the prospects are less predictable than lunar and Venus launches.

The US's 3 Gemini flights this year have given the US some important "firsts" (first orbital changes by manned spacecraft, first use of propulsion unit by an astronaut outside a spacecraft) and have taken away from the Soviets some of their most highly vaunted records --





for total number of manhours in space, by cosmonauts/astronauts of one nation, and for number of consecutive manhours in space by one man.

Further, impending Gemini flights will attempt "firsts" in rendezvous and docking and manned flight of 2 weeks' duration.

The Soviets, not wishing to accept second-place standing in a field in which they long were pre-eminent, might respond soon with manned flights which would have one or more of the following objectives:

- Recapturing the lead in duration of manned flight.
- Pre-empting possible US "firsts" in rendezvous and docking.
- Executing other space "firsts," such as 4 or 5 cosmonauts in one vehicle.

Such flights would not only help restore Soviet prestige but would also contribute substantively to the over-all Soviet space program. (NORAD)

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Cosmos 85 May Have Tested Missile-Detection Device; De-orbited Routinely

Cosmos 85, which the Soviets launched from Tyuratam at about 0930Z, 9 September 1965, was de-orbited on Revolution 127, impacting in the USSR at about 0700-0705Z, 17 September, after nearly 8 days in orbit. Of the 24 Soviet photoreconnaissance satellites (including Cosmos 85) launched in 1964 and 1965, 22 were brought down after about 8 days in orbit.

Cosmos 85, although it is assessed as a photorec satellite carrying a camera system of high resolution (5-8 feet), could also have carried equipment for performing other missions. Specifically, it is suspected of having carried and tested a satellite-borne infrared (IR) system for detecting missile launches and missiles during powered flight.

A Soviet SS-4 MRBM launched from Kapustin Yar at about 1326Z, 15 September, while Cosmos 85 was making a descending pass over the USSR on its 99th Revolution, was "visible" to (i. e., within line of sight of) the satellite for about 4 minutes, beginning about 2 minutes after launch. The SS-4, when it first came into "view" of Cosmos 85, was still in powered flight and was about 1,119 n. m. away.

If Cosmos 85 did carry and test an IR detector, it may have been the third Soviet photorec Cosmos to do so. The other 2, Cosmoes 67 and 77, on 26 May and 5 August, respectively, passed within about 30 n. m. and 160 n. m. of SS-4 MRBMs launched from Kapustin Yar. (See WIRs





24/65 and 34/65.) An attempt to test the detector at a range of 1100 n.m. would be a logical step if the first 2 tests were successful. (SPADATS, NORAD, FTD)

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Cosmos 86-90 Event, 3d Quintuplet Launch, May Have 'Classified' Mission

The Soviets launched 5 payloads (Cosmoses 86, 87, 88, 89, and 90) from Tyuratam at about 0800Z, 18 September, using a single launch vehicle. This was the Soviets' 6th multiple-payload launch from Tyuratam. The list now reads as follows:

18 August 1964	3 payloads
21 February 1965	3 payloads
15 March 1965	3 payloads
16 July 1965	5 payloads
03 September 1965	5 payloads
18 September 1965	5 payloads

The mission(s) of these vehicles is (are) not definitely known, but they appear to be interrelated in purpose, and Soviet secrecy regarding these vehicles now suggests that their mission is classified.

Parameters. Orbital parameters of Cosmoses 86-90 have been reported as follows:

	<u>By SPADATS</u>	<u>By TASS</u>
Orbital inclination	56.10 degrees	56 degrees
Period	116.76 minutes	116 minutes
Apogee	1678 kilometers (900 n. m.)	1690 kilometers (910 n. m.)
Perigee	1395 kilometers (748 n. m.)	1380 kilometers (740 n. m.)

Propulsion. The new quintuplets were launched by the same 2-stage restartable vehicle -- the SE-8 -- used with all 6 Tyuratam multiple launches. The payloads were separated individually and in sequence; reflight of the upper stage was in evidence on the last five launches.

Mission. TASS, Soviet news agency, announced that the 5 new payloads were accomplishing the usual Cosmos mission of near-Earth space research, gave orbital parameters, and said that one of the payloads carried a power station which was energized by a radioactive isotope.





as did one of the payloads of the preceding quintuplet launch. No operating frequencies of telemetry or beacons were announced.

The facts are, however, that not all Cosmos satellites are primarily research vehicles, and a number of vehicles performing Cosmos-type missions were given non-Cosmos names (for example, the 4 Electrons of 1964, and Proton 1 of 16 July 1965). Some of the Cosmoses, particularly the smaller ones launched from Kapustin Yar, are actually research vehicles, as announced. But the Cosmos name is frequently used to conceal the true missions of a variety of vehicles, including:

- Satellites with classified primary missions, such as photo-reconnaissance vehicles, test beds, prototypes, and precursors of manned flights.
- Satellites which reach orbit but fail to accomplish their mission.

It is not believed that the triplet/quintuplet launches are executing unclassified space research. The Soviets have not accorded these unusual vehicles the publicity, nor assigned them the distinctive names given to other unusual research vehicles, such as the Electrons, Proton 1, and Zond 3. The multiple payloads certainly would be as deserving of publicity as the 2 Polyots, which were announced with much fanfare but did no more than execute a very few minor orbital changes. The Soviets, on the contrary, have been most secretive about their triplets/quintuplets. Aside from the announcements about test of an isotope generator, the Soviets have given only the barest of information about them -- no more than they have given about their photorecce Cosmoses. And now the bare details are being reduced: announcements regarding beacon signals have decreased with each launch, and were entirely absent for the last two launches.

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Nor is it believed that Soviet silence and secretiveness about these vehicles indicates that they represent a series of mission failures. All indications are that the system is progressing toward initial operational capability, if it has not already reached IOC:

- The tempo of launches is increasing sharply.
- The number of payloads per launch has escalated.
- Method of injection into final orbit has become more sophisticated.

