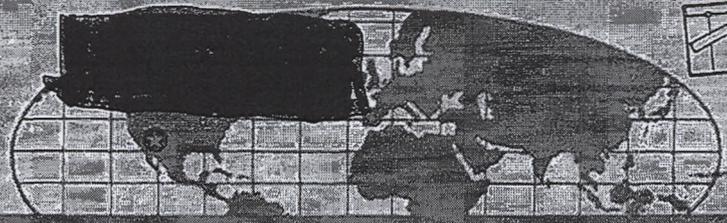


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NORTH AMERICAN AIR DEFENSE COMMAND

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Weekly
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Review

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Issue No. 1765, 1 January 1965

The WIR in Brief

Portion identified as non-responsive to the appeal

Portion identified as non-responsive to the appeal

Space

SOVIETS SAY THEY DE-ORBITED COSMOS 4 -- ONLY COSMOS FOR WHICH THIS CLAIM HAS BEEN MADE 9

24 Cosmos de-orbits tried to date.

SPACE LISTING AND OVER-ALL SPACE STATUS REPORT PRESENTED 10

As of 28 December.

MOST RECENT INTERCEPTS OF SOVIET SPACE VEHICLES LISTED 10

All transmitting vehicles in orbit less than 6 months.

LACK OF ADEQUATE SPACE SIMULATORS COULD HAVE CONTRIBUTED TO PROBE FAILURES 11

Capsule tested in clearly inadequate cloud-physics chamber.

RASS CLAIMS 'PLASMA ENGINE' ORIENTATION FOR ZOND 2 11

Engine would have low thrust level but high specific impulse.

Portion identified as non-responsive to the appeal

COVER: Scene in training unit of Moscow Air Defense District (from Red Star) (OFFICIAL USE ONLY)

NOTE: Pages 30, 31, 34, 35, and 36 of this issue are blank.

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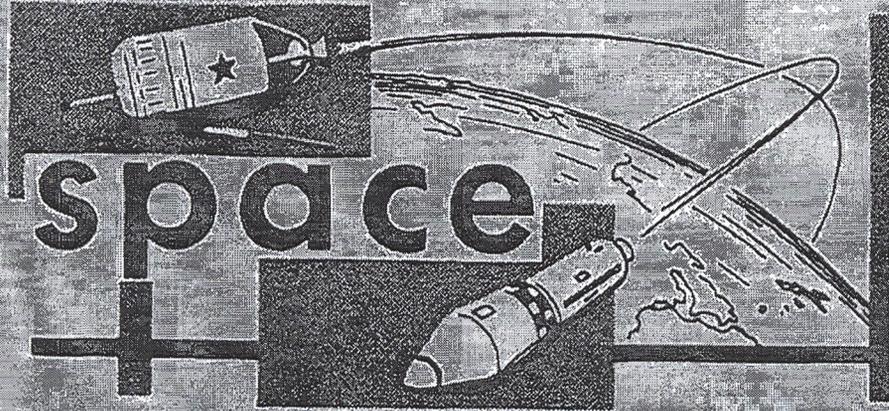
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significant
intelligence
on space
developments
and trends

Soviets Say They De-orbited Cosmos 4 -- Only Cosmos for Which this Claim Has Been Made

An FTD translation of an article in the April 1964 issue of the Soviet Air Force magazine *Aviation and Cosmonautics* stated that Cosmos 4 was launched 4 April 1962 and was "landed successfully 29 April 1962 on command from the Earth." This statement is unique in that it is the only known instance in which the Soviets have claimed -- or admitted -- de-orbit of any of their Cosmos vehicles. They have used the term "descent" with respect to some of the Cosmoes, but this usage is equivocal since it has also been used to describe natural orbital decay.

Twenty-four Cosmoes launched from Tyuratam have been the subject of de-orbit attempts -- all of them apparently successful except Cosmos 50. All of those recovered are believed to have been developmental or operational models of photoreconnaissance vehicles, except for Cosmos 47, which appears to have been a test of a Voskhod vehicle prior to its actual use for multi-manned flight.

Moscow's policy of not announcing de-orbits of Cosmos-series vehicles may have been originally a security measure to avert suspicion that their mission was photoreconnaissance.

Cosmoes which were launched from Tyuratam but which were not involved in de-orbit attempts appear to have been test or scientific research vehicles of various types or cover for probes which failed to eject from parking orbit.

No attempt has been made to recover any of the Cosmoes launched from Kapustin Yar.

(FTD; SPADATS; NORAD)

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Space Listing and Over-all Space Status Report Presented

The over-all space-vehicle status as of 1300Z, 28 December 1964, was as follows:

	<u>US</u>	<u>UK</u>	<u>Can</u>	<u>Italy</u>	<u>USSR</u>	<u>Total</u>
Payloads in Earth orbit	112	2	1	1	14	130
Payloads in Sun orbit	7				5	12
Payload in Earth-Moon orbit*					1	1
Pieces of debris in Earth orbit	340	1	2		19	362
Pieces of debris in Sun orbit	6					6
Payloads impacted on Moon	3				1	4
TOTALS	<u>468</u>	<u>3</u>	<u>3</u>	<u>1</u>	<u>40</u>	<u>515</u>
Objects decayed or de-orbited	220				235	455

* Soviets claim Lunik 4 is now in Sun orbit (WIR 51/64); claim cannot be verified but may be true.

A listing of Soviet payloads and their principal orbital parameters is shown on page 29.

(SPADATS)

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Most Recent Intercepts of Soviet Space Vehicles Listed

The following have been reported as the most recent intercepts of transmissions from Soviet space vehicles:

<u>Vehicle</u>	<u>Signal Intercepted</u>	<u>Date</u>
----------------	---------------------------	-------------

Electron 3	50X1 and 3, E.O.13526	
Electron 4		
Cosmos 36		
Cosmos 49		
Cosmos 51		





The Soviets also claim that Zond 2 is transmitting and that its transmissions are stable.

All the above transmitting vehicles have been launched within the past six months.

(Various ELINT monitors)

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Lack of Adequate Space Simulators Could Have Contributed to Probe Failures

The Soviets, as recently as a year ago, apparently did not have a chamber adequately equipped for space simulation and large enough to accommodate a space capsule the size of a Vostok. This deficiency is suggested by the fact that in 1964 they used a cloud-physics chamber -- clearly inadequate for the purpose -- to test a space capsule containing a cosmonaut.

The Soviets claim that, during the capsule test, the pressure in the chamber was reduced to the equivalent of an altitude of 40 kilometers and that the temperature was reduced to minus 45 degrees C. While the test could have served some useful purposes, the reduction in pressure fell far short of simulating the near vacuum of outer space; further, the chamber had no means for simulating the radiation conditions to be encountered in space. The cloud-physics chamber could not approach the over-all performance of US space-simulating chambers for developing space capsules.

The lack of adequate space simulators could have been a contributing factor in some of the numerous Soviet space-probe failures, that is, the Soviets may not have had reliable test data on the performance of their probes in a space environment.

(CIA)

(SECRET)

TASS Claims 'Plasma Engine' Orientation for Zond 2

A TASS announcement about Zond 2 carried in the 20 December issue of the newspaper Red Star stated that:

- 12 radio communications sessions had been held with the vehicle during the period 8-18 December.
- Radiocommunications from the probe were stable.
- The probe's celestial coordinates as of 2200 hours, Moscow time (2000 hours, Greenwich), 18 December, were as follows:

Right ascension	8 hours, 35 minutes
Declination	Minus 6 degrees, 8 minutes





The probe at this time was 5,370,000 kilometers (2,900,000 n.m.) from the Earth.

- "Plasma electro-reaction engines" were used as a means of control in the orientation system.

The very next article in Red Star went on to explain plasma engines and to state that Zond 2 carried 2 systems for orientation -- "ordinary" engines and plasma engines, and that orientation was switched over to the latter, on command from the Earth, when the probe was at a "great distance from the Earth." The article's explanation of plasma engines indicated that the Soviets were using the term in the same sense that the West does.

Apparently, the plasma engines were used only for a one-time test, but they performed successfully.

Thrust levels available from such engines are extremely low, but the specific impulses are up to 35 times greater than those available from conventional fuels.

Ion or plasma engines, if they can be developed for long-term use, are an excellent means of orienting and stabilizing Earth satellites or deep-space vehicles, since they can be powered by solar energy.

At present, many space vehicles are oriented and stabilized by cold-gas jets. The use of these jets is limited by the amount of cold gas that can be carried on the vehicle. Ion and plasma engines offer attractive possibilities for overcoming this disadvantage.

Similarly, when they are fully developed, ion and plasma engines can be used to provide low levels of thrust for long periods of time; this technique can be used to overcome small amounts of atmospheric drag on Earth satellites, or to achieve high velocities on deep space probes.

(Red Star; NORAD)

(UNCLASSIFIED)



Soviet Space Vehicle Listing, as of 28 December 1964

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Soviet Vehicles in Earth Orbit

Soviet Designation	Launch Date	Inclination to Equator (degrees)	Period (Minutes)	Apogee (kilometers)	Perigee (kilometers)	Life Expectancy or Decay Date
Cosmos 17	22 May 63	49.00	94.9	514.52	250.5	July 1965
Polyot 1	1 Nov 63	58.92	102.1	1406.2	336.1	Over 50 years
Electron 1	30 Jan 64	60.65	169.3	7120.1	400	Over 50 years
Electron 2	30 Jan 64	60.03	1356.3	67838.8	582.6	Over 50 years
Polyot 2	12 Apr 64	58.11	92.40	493.1	319.4	1969
Electron 3	10 Jul 64	60.80	168.2	7026.2	402.7	Over 50 years
Electron 4	10 Jul 64	60.80	1313.9	66260.1	458.4	Over 50 years
Cosmos 36	30 Jul 64	49.01	91.97	489.61	252.68	Mar 1965
Cosmos 41	22 Aug 64	65.20	714.8	39695.4	513.8	Over 50 years
Cosmos 42	22 Aug 64	48.98	96.9	987.2	226.5	2d Qtr., 1966
Cosmos 43	22 Aug 64	48.99	96.8	978	229.5	2d Qtr., 1966
Cosmos 44	28 Aug 64	65.01	99.48	821.7	663.2	Over 50 years
Cosmos 49	24 Oct 64	48.95	91.7	453.2	258.6	2d Qtr., 1966
Cosmos 51	9 Dec 64	48.76	92.6	536.8	260.5	3d Qtr., 1966

Soviet Vehicles in Heliocentric (Sun) Orbit

		Inclination to Ecliptic (degrees)	Period (Days)	Aphelion (in AU)*	Perihelion (in AU)*	
Lunik 1	2 Jan 59	0.01	449.5	1.315	0.9766	Indefinite
Venus 1	12 Feb 61	0.58	300	1.019	0.7183	Indefinite
Mars 1	1 Nov 62	2.683	519.1	1.604	0.9237	Indefinite
Zond 1	2 Apr 64	(Not Available)				Indefinite
Zond 2	30 Nov 64	(Not Available)				Indefinite

Soviet Vehicles in Barycentric (Earth-Moon) Orbit

Lunik 4	2 Apr 63	(Not Computed)				Indefinite
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Soviet Vehicles Resting on Surface of the Moon

Lunik 2	12 Sep 59	(Not Applicable)				
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*AU -- astronomical units. Roughly, 1 AU = 93 million statute miles (mean distance from Sun to Earth).

#Soviets claim Lunik 4 is in Sun orbit (WIR 51/64); claim may be true but cannot be verified.

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-29-

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WIR 48/64