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NORTH AMERICAN AIR DEFENSE COMMAND

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WEEKLY INTELLIGENCE REVIEW (U)

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NORAD Weekly Intelligence Review

Issue No. 37/65, 10 September 1965

The WIR in Brief

Portion identified as non-responsive to the appeal

Portion identified as non-responsive to the appeal

Portion identified as non-responsive to the appeal

COVER: KYNDA-Class guided-missile destroyer (from "Ogonek")

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NOTE: Pages 30, 31, 34, 35, 38, 39, 42, and 43 of this issue are blank.

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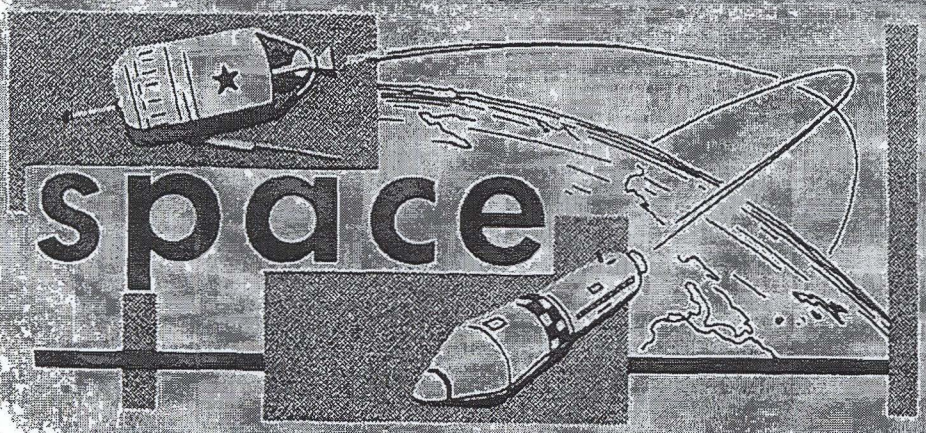

significant intelligence on space developments and trends

Cosmos 80-84 Event is Fifth Multiple Launch from Tyuratam; Purpose Unknown

The Soviets launched 5 payloads (Cosmoses 80, 81, 82, 83, and 84) from Tyuratam at about 1400Z, 3 September 1965, using a single launch vehicle.

This is the fifth in a series of apparently interrelated Soviet launches of multiple payloads from Tyuratam. The other launches occured as follows:

18 Aug 64 -- 3 payloads (Cosmoses 38, 39, 40)
21 Feb 65 -- 3 payloads (Cosmoses 54, 55, 56)
15 Mar 65 -- 3 payloads (Cosmoses 61, 62, 63)
16 Jul 65 -- 5 payloads (Cosmoses 71, 72, 73, 74, 75)

The purpose of these vehicles is not known but might include one or more of the following:

- Communications (such as delayed-repeater)
- Navigation assistance
- Infrared detection of missile launches or of nuclear detonations

Orbital parameters of the satellites have been reported as follows:

	By SPADATS	By TASS
Orbital inclination	56.02 degrees	56 degrees
Period	113.6 minutes	116.6 minutes
Apogee	1451 kilometers (784 n.m.)	1500 kilometers (810 n.m.)
Perigee	1336 kilometers (721 n.m.)	1500 kilometers (810 n.m.)

Cosmoses 80-84 were launched by the same vehicle apparently used for all the multiple-payload launches from Tyuratam -- a 2-stage restartable rocket known in the West as the SE-8. (Most Tyuratam launches use the SS-6 ICBM booster-sustainer and, with heavy payloads, an upper stage for injecting the payload into Earth orbit.) The second stage of the SE-8 relights after vernier ignition. A second vernier ignition follows relight of the upper stage, during which the payloads are separated.

TASS Announcement. The Soviet news agency TASS announced about 1818Z, 3 September (about 4 hours, 18 minutes after launch) that the 5 payloads had been orbited. The announcement gave orbital parameters, said that the vehicles were performing the usual Cosmos mission of space research, and added that one of the satellites carried a power station which used the energy emitted by a radioactive isotope. No radio transmitting frequencies were announced for any of the satellites. [redacted]

The Generator. The power device which one vehicle carried, according to TASS, is probably a radioisotope thermoelectric generator (RTG), judging by Soviet state-of-the-art. Testing of this system probably is not the primary mission of the payload involved: rather, the device is probably used as an auxiliary power system for other satellite equipment.

Soviet use of this RTG is significant but is not a breathrough. Such a power system has many advantages over the solar cell and battery power systems normally used:

- Power system life is not limited by the charge-discharge cycle life of the battery.
- It is inherently radiation resistant and thus may operate within the Van Allen belts with impunity.
- No solar orientation mechanism is required and no additional power source is needed for operating when the satellite is shaded by the Earth.

The Soviets did not state what isotope was used, but there is a possibility that it was Polonium 210, which the Soviets said they used in a Soviet-built RTG described at the 1964 Geneva Conference on Peaceful Uses of Atomic Energy. Any one of several radioisotopes could be used for fueling an RTG: the choice would depend upon the amount of electrical power required, the lifetime required of the generator, and the radiation tolerance of other spacecraft components. The US used Plutonium 238 in the SNAP-3 and SNAP-9A systems. Plutonium 238 has a longer operating

life (89 years vs 0.38 year), but Polonium 210 provides more power per unit weight (141 thermal watts per gram vs 0.56 thermal watt per gram). Both isotopes emit alpha particles as they decay, but most of these can be stopped by the metallic container used to hold the isotope.

Possible Relationship to Other Launches. The last preceding multiple-payload launches were followed very briefly by other significant launches:

	Possibly Related Mission	Period Between Launches
Cosmoses 54, 55, 56	Cosmos 57 (precursor of (Voskhod 2)	1 day
Cosmoses 61, 62, 63	Voskhod 2 (manned flight)	3 days
Cosmoses 71-75	Proton 1 (heavy cosmic-ray research vehicle)	8 hours

While the multiple-payload events may have been associated in some way with the other missions indicated, it is also possible that the timing was dictated simply by the fact that Soviet instrumentation ships were then on station in the Pacific and were available for any participation that may have been needed, such as monitoring restart of upper-stage propulsion. (SPADATS; FTD; NORAD)
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Cosmos 79, 11th Soviet Photorecce Satellite of 1965, Recovered Routinely

Cosmos 79, which the Soviets launched from Tyuratam at about 1010Z, 25 August, was deorbited on Revolution 127, impacting in the USSR at about 1039-1044Z, 2 September, after nearly 8 days in orbit. Of the 23 Soviet photorecconnaissance satellites (including Cosmos 79) launched in 1964 and 1965, 21 were brought down after about 8 days in orbit. (SPADATS; NORAD) (Chart on page 36.)
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Ion Flux Sensor Tested, Would Permit Precise Spacecraft Orientation Under Any Conditions

An "ion device" which the Soviets claimed to have used on Voskhod 1, the 3-man craft which the Soviets orbited last October, was probably a sensor which determined alignment of the spacecraft in yaw with respect to the direction of flight.

The 1-man Vostoks were oriented with sun and horizon sensors, which could supply precise attitude data only along the sunlit portions of each orbit. An ion-flux sensor would be effective under any lighting conditions, even when the spacecraft was flying in the Earth's shadow. Further, the probe could save payload weight, since it requires little power.

This type of sensor takes advantage of the fact that the velocity of an orbiting vehicle is greater than the velocity of ions in the "plasma sheath" which surrounds an orbiting spacecraft. The average direction of the ion flux will thus always be opposite to the direction of the spacecraft's motion. A planar plasma probe, being directional by nature, can be used to identify this direction and compare it with the spacecraft's attitude.

The sensitivity required for this type of instrument has been within Soviet state-of-the-art for several years.

A US device employing the same principle is scheduled for test as a Department of Defense experiment on the 7th and 9th manned Gemini operations.

(CIA, NORAD)

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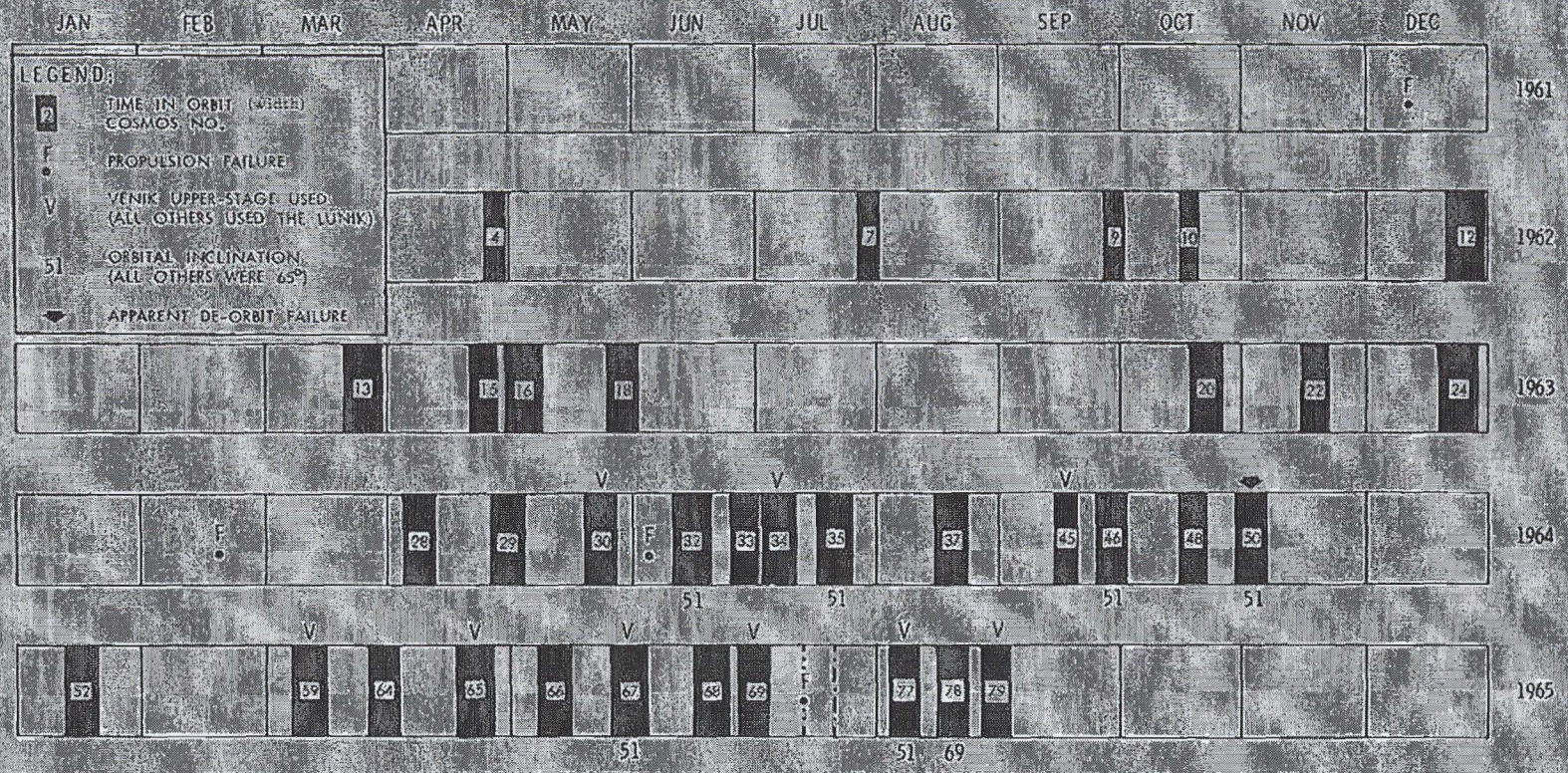
Soviet Photoreconnaissance Satellites (most recoverable Cosmoses launched from Tyuratam)



All these vehicles were launched by the SS-6 ICBM booster-sustainer and injected into orbit by an upper stage. Launches were timed for optimum conditions for photography when passing over the US and southern Canada. Perigees were relatively low. Payloads were horizon-oriented.

for Venik-injected payloads, which could weigh up to 15,000 pounds. Camera systems would occupy only fraction of payload, hence equipment for other missions could be carried. Soviets claim all Cosmoses are "scientific research" vehicles. Some have gathered radiation data.

All vehicles were de-orbited successfully (and film presumably recovered) except for Cosmos 50. Resolution of camera systems believed to be 20-30' for Lunik-injected payloads, which weigh about 10,000 pounds, and 5-6'

Note infrequency and short duration of early launches and 4.5-month gap in mid-1963, after which system probably became operational. Most 1964 and 1965 missions have lasted 8 days.

50X1 and 3, E.O.13526

The Soviets apparently did not have a stand-by vehicle ready when the launch of 13 July failed

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