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NORTH AMERICAN AIR DEFENSE COMMAND

WIR

WEEKLY INTELLIGENCE REVIEW (U)

PRIVILEGED INFORMATION

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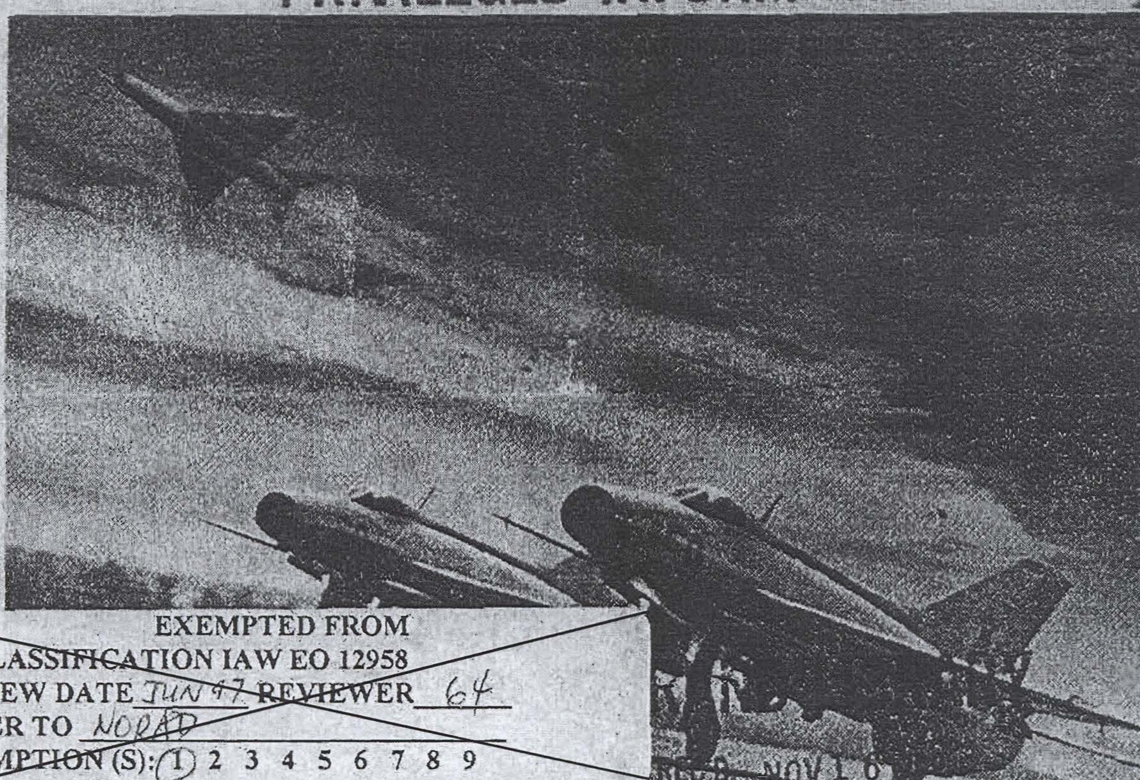

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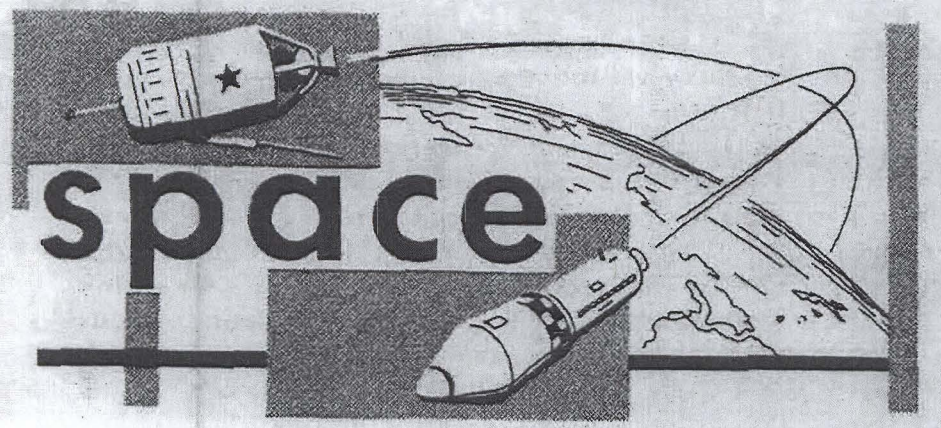
NORAD Weekly Intelligence Review

Issue No. 45/66, 11 November 1966

The WIR in Brief

COVER: MIG-21s taking off (from Red Star) (OFFICIAL USE ONLY)

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



significant intelligence on space developments and trends

Another Possible Orbital Bombardment Systems Test Held; Failure Probable

The Soviets conducted their 5th possible test of an orbital bombardment system on 2 November when they launched an unnamed, unannounced vehicle at about 0044Z into Earth orbit from Tyuratam. The test apparently failed, however, possibly culminating in an explosion when de-orbit was attempted. Diyarbakir (Turkey) radar counted 47 pieces on Revolution 1, 94 minutes after launch. Had de-orbit been successful, the vehicle would probably have impacted in the USSR in the area in which Soviet military reconnaissance vehicles are believed to be recovered.

As in all 4 previous tests, the launch occurred at Tyuratam, using the 3-stage SL-11 vehicle (formerly known as TT-4) which consists of the SS-9 ICBM as the first two stages and an added third stage.

The first 3 vehicles of this series were launched into slightly sub-orbital trajectory toward the Kamchatka Peninsula, with the debris falling into a previously announced impact area in the northwestern Pacific. The first test vehicle (16 Dec 65) exploded when de-orbit was attempted; the second (5 Feb 66) may have succeeded (the available evidence is inconclusive); the third (19 May 66) apparently was successful, with the re-entry vehicle successfully de-orbited, impact occurring on the Kamchatka Peninsula, apparently as intended.

The 4th and 5th test vehicles apparently were to be de-orbited after completing one revolution, with impact occurring in the estimated recovery area for Soviet military recce vehicles, where the re-entry could be monitored by existing equipment. Both vehicles were launced into 49-degree orbits, which would permit impact in this particular area. (In the 9 years of launch of missiles and space vehicles from Tyuratam, only these 2 vehicles have had orbital inclinations of 49 degrees.) Both were launched from Tyuratam at times which would involve re-entry in darkness, but shortly before sunrise, when optical tracking of the re-entry could be executed.

In both cases, however, the re-entry vehicle exploded when de-orbit was attempted. (See p. 13, WIR 39/66)

Orbital bombardment systems require greater propulsion energy per unit of payload weight than ICBMs (therefore, would be smaller if both weapons use essentially the same propulsion system). However, because of their higher speeds and lower trajectories, they would be less susceptible than ICBMs to detection by ABM radars and less vulnerable to interception by ABM missiles. Also, the defender's ABM facilities would have to be deployed more widely because orbital bombardment systems could attack from directions not possible for ICBMs.

The Soviets have not announced any of these 5 launches.

(NORAD)

(~~SECRET~~ NO FOREIGN DISSEMINATION -- Releasable to US, UK & Canada)

Space Status Report

The over-all space status report was as follows, as of 1000Z, 7 November 1966:

	USA	UK	Can	Italy	France	USSR	Total
Payloads in Earth orbit	210	2	2		3	44	261
Payloads in deep-space flight*	13					12	25
Debris in Earth orbit	729	1	2		11	130	873
Debris in deep-space flight	~~14~~					~~5~~	~~19~~
TOTALS	966	3	4		14	191	1178
Payloads de-orbited or decayed#	208			1		131	340
Debris decayed	~~309~~					~~708~~	~~1017~~
TOTALS	1483	3	4	1	14	1030	2535

* Includes vehicles in heliocentric (Sun), selenocentric (Moon), and barycentric (Earth-Moon) orbit.

\# Includes vehicles which have impacted on Earth, Moon, and Venus.

(NORAD Space Defense Center)

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Yantar 1 Tested 'Plasma Engine,' Studied Solar Flare; Not a Satellite

Yantar (Amber) 1 was not a satellite, as reported in the US press, but a vertically launched probe. The Soviet press and TASS broadcasts said it was an "automatic ionospheric laboratory" launched by a geophysical rocket to altitudes of 100-400 kilometers (62-248 n. m.) to test a "gas plasma ion engine" and to "study the outlook for guided flight in the upper layers of the atmosphere. The launch was made under the Soviet space research program." The test has made it possible, said TASS, to "study the working of a gas-electric jet engine in the ionsphere."

The time of the launch, however, suggests that the probe also collected data on solar flare activity, then at a high level (see below).

Yantar 1 apparently was carried aloft by a SHYSTER/SS-3 MRBM which was launched from Kapustin Yar on 13 October, the first Soviet vertical rocket firing since 18 March 1966. Launches of this type usually do not receive individual names, nor are they ordinarily reported by the Soviets except in general terms on an annual or other basis. In the past, vertically launched payloads have been used to explore the atmosphere and the space environment, to observe the effects of space flight on living organisms (including dogs), and, it has been estimated, to test-flight space systems and components.

Yantar 1 is the third Soviet payload said to have tested advanced electrical thrust devices: 1) on the manned Voskhod-1 (12-13 October 1964) an "ion" device seemed to have been used to sense the vehicle's orientation; and 2) on the Mars probe (Zond 2) launched 30 November 1964, six "electric jet plasma engines" reportedly were used to keep the payload oriented. The Yantar test shows a strong continuing Soviet interest in plasma propulsion, but there is no evidence yet that the USSR has developed an electric propulsion system of the type needed for long-duration interplanetary flights.

The Solar-Flare Mission. The rocket probably carried a well-planned experiment to study the X-ray intensity and the electromagnetic distribution of an intense solar flare (designated "importance one") which had been under observation for several days in a "hot" area of the sun. The Soviets appear to have timed the launch so that Yantar 1 could collect data when the flare reached maximum activity; they have been credited with the prediction capability necessary for launching a rocket shortly before a flare would reach maximum intensity. At any rate, the 13 October rocket was launched at 0415Z, only 14 minutes before the flare reached its maximum. A radio blackout which occurred after the rocket launch apparently was caused by the flare.

(Soviet Press; CIA; DIA; NORAD)

~~(SECRET)~~

4th Molniya Carries Video for Real-Time Cloud-Cover Photos, as Did 3d Molniya

The Soviets' 4th Molniya-series communications satellite, launched 20 October, is carrying a TV-camera system with wide- and narrow-angle lenses which will enable it to pass to the USSR photos of cloud cover in the Northern Hemisphere, according to a TASS announcement of 22 October. The 3d Molniya, launched 25 April, carried an experimental system of this type but the pictures received from it were not suitable for weather forecasting. (Photos on pp. 33 and 36)

The orbit of the 4th Molniya provides 8 hours of coverage over the USSR, including 3 hours during which continuous real-time weather coverage of the USSR and adjacent areas could be provided.
(CIA)
~~(CONFIDENTIAL)~~

First Maser/Laser Operation in Space Tested by Cosmos 97, Soviets Claim

Cosmos 97, a small satellite which the Soviets launched from Tyuratam on 26 November 1965, was the first to carry a quantum generator (Russian term for either a maser or a laser) into space, according to the 1 November 1966 issue of Pravda. Apogee of Cosmos 97 was 2160 km (1160 n.m.), perigee was 221 km (119 n.m.).

The device apparently was an ammonia-based device, according to Pravda's commentary by N. G. Basov, co-captain of the team which devised the Cosmos 97 unit and, according to the Soviets, co-inventor of the maser in 1954. It was mounted on the satellite's external surface, covered by a housing. A lead-in connected it with electronic gear stowed inside the vehicle. The maser/laser was controlled by radio command from the ground, and also autonomously by a program-timer. Solar batteries provided the necessary power. (Pravda's drawing of the Cosmos 97 payload is shown on page 37.)

The exact use to which the maser/laser was put was not stated, but Basov said that masers/lasers will permit communications with and control of spacecraft at great distances, at the same time improving the precision of program-timers and aiding in more precise determination of satellite orbital parameters. The quantum generator's advantages include, according to Basov, high frequency stability (assuring much more sensitive reception by ground stations), resistance to vibration, compactness, and long service life.

The purposes of the Cosmos 97 project included test of the maser/laser operation in the natural vacuum of space and the effects on its operating characteristics of weightlessness and other space-environment factors. The device's operating frequency was compared with that of a ground calibrating station via a 2-way radio circuit. An analysis of telemetric data and

frequency measurements, said Pravda, has led to conclusions necessary for eventual development of on-board frequency standards, with a view to making industrial models of instrumentation for a wide variety of applications. (Pravda; NORAD)
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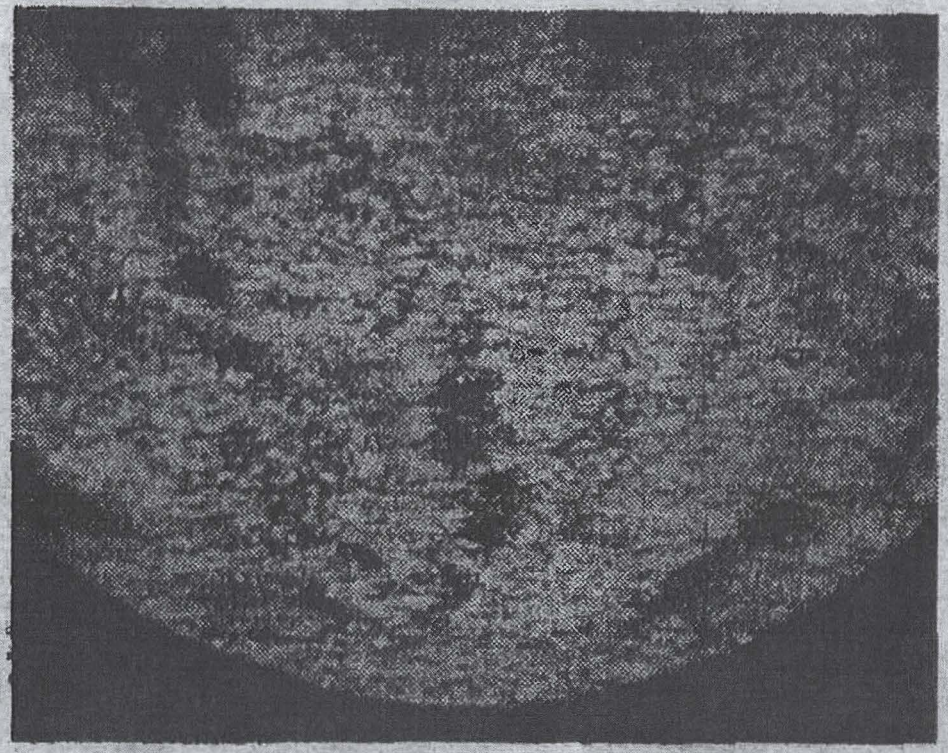
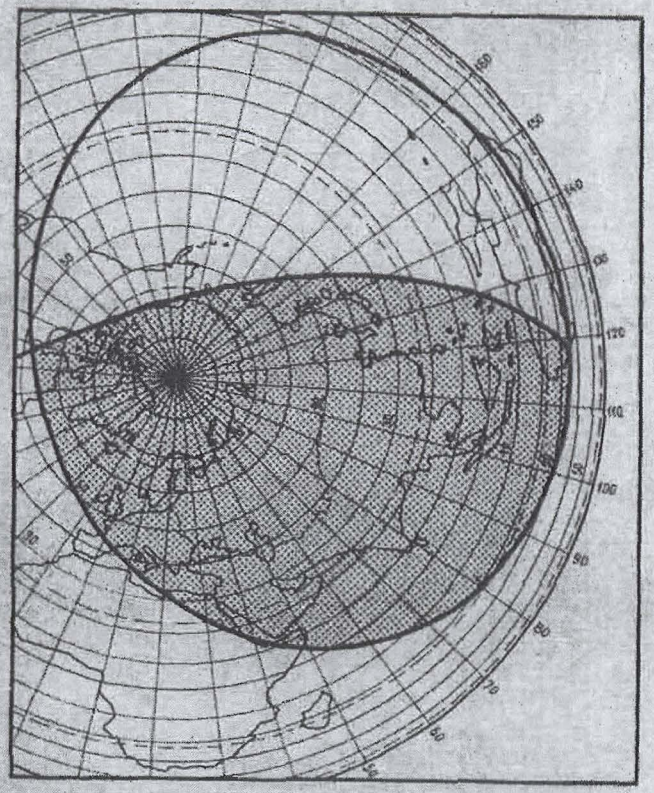
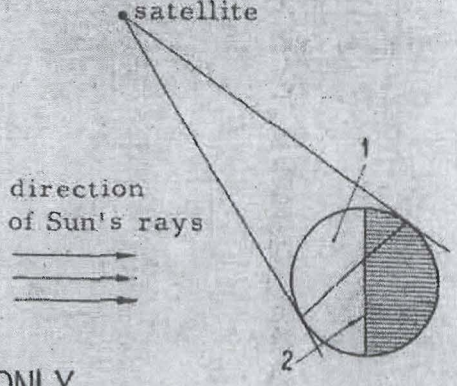
View of the Earth from the 3d Molniya (below)
Area covered in photo (right)







(from Soviet press)

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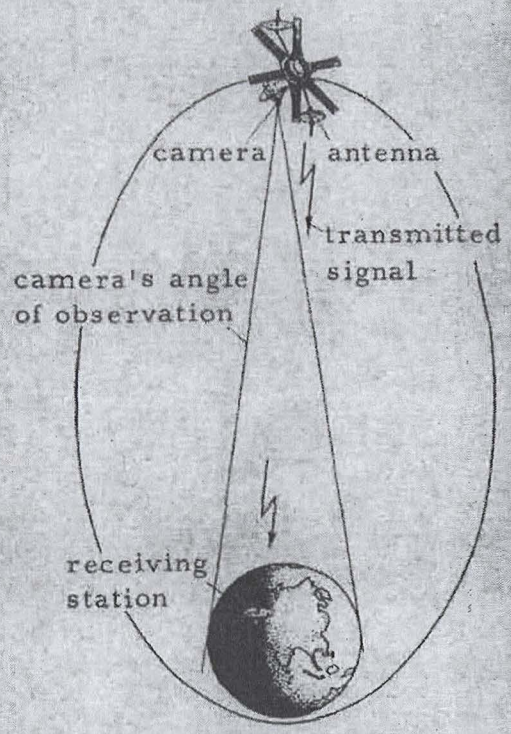
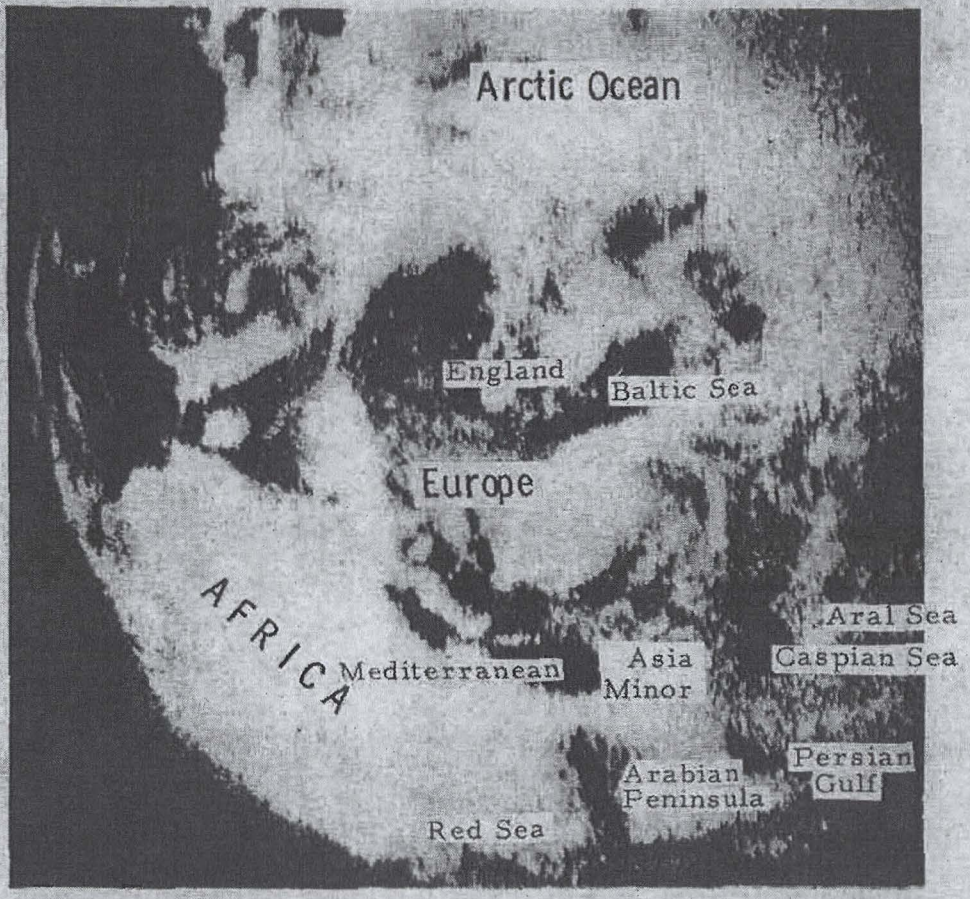
View of the Earth from the 3d Molniya

(from Soviet press)





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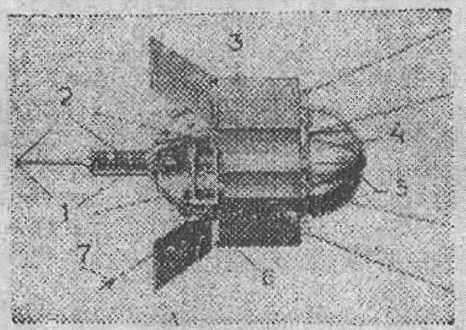
Cosmos 97



1. Compartment for scientific appartus.
2. Molecular generator.
3. Solar battery.
4. Storage battery group.
5. Heat-regulating system.
6. Servicing devices.
7. Orientation sensor.

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