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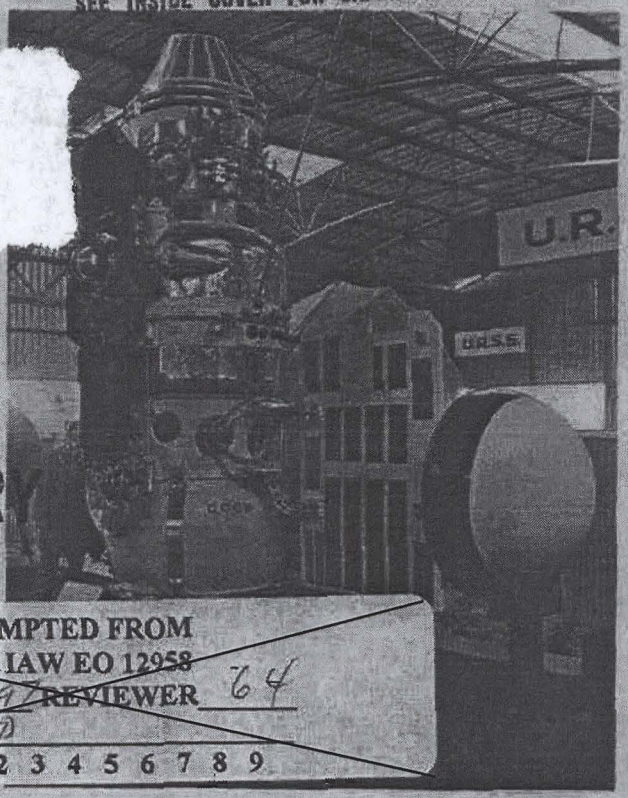

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The WIR in Brief

Portion identified as non-responsive to the appeal

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significant intelligence on space developments and trends

Cosmos 166 Mission Supports Effort to Improve Prediction of Solar Flares

Cosmos 166, which the Soviets launched from Tyuratam at about 0445Z, 16 June, is, according to Pravda of 2 October, part of a "broad program of study of the physical processes which take place in the solar corona and adjacent layers of the solar atmosphere." The Soviet paper said that the craft carried:

- An X-ray photometer, using photon Geiger counters for sensors.
- An ultraviolet diffraction spectrometer.
- An X-ray heliograph (2 identical X-ray Geiger counters mounted outside the satellite shell).

The satellite is oriented on the sun, a flywheel system and gas jet thrusters being used for controlling the craft's attitude. The sensors scan the solar disk three times per orbit at an angular velocity of 0.04 degrees per second, said Pravda. Data is stored when the satellite is beyond line-of-sight of the collaborating ground stations. (UNCLASSIFIED)

Analysis of data gained during the first 3 months of operation, according to Pravda, indicates that:

- The build-up time for most solar flares is between 0.5 and 30 minutes.
- There is evidence that "warning" flares precede the main phase of a solar flare.
- Some flares are relatively "hot," some are relatively cold.
- There is a special class of X-ray flares not accompanied by "optical" (visible) flares, indicating that part of the X-ray flare is localized in the corona. (This verified observations made previously by the Electron 2 research spacecraft, which was launched in January 1964, according to Pravda.) (UNCLASSIFIED)

Pravda said that the coronal origin of X-ray flares implies that these flares are closely related to the coronal disturbances which cause the corpuscular flares that are dangerous to manned spaceflight. This X-radiation, the paper said, might help in warning cosmonauts about the approach of corpuscular streams, which travel more slowly than X-rays. Travel time from the Sun is 8.3 minutes for X-rays, an hour or more for corpuscular streams. (UNCLASSIFIED)

[redacted] The initial orbital parameters of this satellite (apogee 578 km, perigee 283 km) would be suitable for the mission described. (SECRET)

The Pravda article is somewhat unusual in that the Soviets rarely give out details on the payload characteristics, specific missions, or mission results of their Cosmos satellites, though they claim, each time one is launched, that these vehicles are participating in the overall Cosmos program of study of the near-Earth space environment and of the Earth's cloud cover. The evidence suggests that, except for a few genuine research vehicles, launched mostly from Kapustin Yar or Plesetsk, the Cosmos designation is a cover-up for satellites whose missions are classified (such as reconnaissance), certain types of failures (deep space probes which are placed in parking orbit but fail to achieve deep-space trajectory), or vehicles whose missions or expected accomplishments would have little propaganda value. As a rule, research satellites with a definite propaganda potential are given non-Cosmos designations, such as Electron or Proton. (SECRET) (Pravda; NORAD)
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Recce Satellites Cosmos 181 and Cosmos 182 De-orbited

Soviet military reconnaissance satellites Cosmos 181 and Cosmos 182 which were launched, respectively, from Plesetsk at about 1130Z, 11 October, and from Tyuratam at about 0759Z, 16 October, were de-orbited after nearly 8 days of spaceflight -- Cosmos 181 on 19 October, Cosmos 182 on 24 October. Eight days is the normal flight time of Soviet reconnaissance satellites.

Cosmos 182 was the 21st Sovietrecce satellite of 1963. A total of 23 was launched last year.
(NORAD)
~~(SECRET)~~

Vertical Launches This Year Unprecedented in Number

A near-vertical launch from the Kapustin Yar (KY) missile test range on 19 October was the 22d such launch from that range this year. This is an unprecedented number of vertical launches. Not included in this total is the 12 October vertical launch from Tyuratam (p. 11, last week's WIR).

The purpose of these launches is not known. Previous operations of this type were associated with such missions as astrophysics, geophysical research, biomedical experiments, and nuclear detonations. Testing of spacecraft/missile components in the space environment is another possibility.

(NORAD)

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Cosmos 183 Marks New Step in Development of Orbital Bomb system

Cosmos 183, which was launched from the Tyuratam Missile Test Range at about 1330Z, 18 October, was the Soviets' 6th consecutive successful test of their OB-1 fractional-orbit bombardment system (FOBS). It was de-orbited on Revolution 1, impacting in the USSR at about 1504Z.

[redacted] the unpowered flight phase of this vehicle suggests that the OB-1 system has taken a new step in its rapid march toward IOC (initial operational capability).

The OB-1 system consists of the large two-stage SS-9 ICBM and a third stage which deboosts the re-entry vehicle to bring it down on its target. The use of the SS-9, which reached IOC in late 1965 and is now being deployed, is consistent with Soviet design philosophy, which prefers to adapt proven components to a new mission whenever feasible, rather than developing completely new systems from the ground up.

NORAD estimates that the OB-1 will:

- Reach limited IOC (about 10 weapons) by the end of 1967, full IOC (50-60 weapons) in 1968.
- Be able to orbit and de-orbit a re-entry vehicle which weighs 7200 pounds and deliver a warhead of 3000 pounds (assuming that the second stage was purposely ballasted for the current flight test series).
- Have a CEP of 1-3 n.m.

(NORAD)

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7th Molniya Communications-Relay Satellite Launched

The Soviets launched their 7th Molniya-series communications relay satellite from Tyuratam at about 0840Z, 22 October. It appears to be working properly, as announced by the Soviets, who gave its orbital parameters as follows:

Inclination	65 degrees
Period	11 hours, 54 minutes
Apogee	39,740 km (21,450 n.m.)
Period	456 km (245 n.m.)

The USSR now has four active Molniya relay-type communications satellites in orbit; these were launched between 20 October 1966 and 22 October 1967. A fifth one was launched on 31 August 1967 (p. 6, WIR 36/67) but was named Cosmos 174 when it failed to transmit any signals [redacted]; it is considered to be inactive, as far as communications-relay is concerned.

Previously, the Soviets had launched Molniyas at the rate of two per year. The launch of four successful ones in 12 months undoubtedly is related to the Soviet desire to provide world-wide TV coverage on 7 November of the celebrations of the 50th anniversary of the Bolshevik Revolution.

The launches of the Molniyas, with their 12-hour 65-degree orbits, were so timed that these craft spend most of their time over the Northern Hemisphere, very little of it over the Southern Hemisphere, with its sparsely inhabited oceans. Yet these satellites afford coverage of Australasia, South Africa, and South America.

Four appropriately spaced Molniyas could provide continuous coverage to all civilized countries, and continuous double coverage to all countries north of 20° N., thereby ensuring service in the event of an outage. Also, four vehicles could give continuous triple coverage of the latitudes of London, New York and Tokyo, ensuring relay of transmissions round the world, even with one of the four satellites out. (NORAD)

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Very High Vertical Launch Possibly Some Sort of Hardware Test

TASS claimed that the vertical launch of 12 October (1. 11, last week's WIR) to an altitude of 4400 kilometers (2,375 n.m.) was intended to obtain data on the characteristics of the ionosphere, the intensity of cosmic rays, and radiation doses for various regions of the Earth's radiation belts.

It is possible however, that the vehicle was launched for purposes other than those announced by the Soviets.

- It may have been intended to study aerodynamic phenomena or conditions encountered during re-entry into the Earth's atmosphere.
- It may have been an initial test of the SL-8 in the role of a direct-ascent satellite intercept system.

SL-8, the launch vehicle for the 12 October event, would have some advantages for use as a direct-ascent satellite interceptor:

- It uses storable propellants, which would enable the vehicle to be maintained in an advanced state of readiness for long periods of time.
- The upper stage is restartable, a capability needed for the terminal-homing phase of intercept.
- Its first stage would be easily producible if, as estimated, it is the SKEAN/SS-5 IRBM, a missile which has been operational since 1961 and has proved reliable in its many troop-training firings since them.

The use of the SS-5 for this purpose would also be consistent with that facet of Soviet design philosophy which prefers to adapt a proven, available weapon system to accomplish a new mission, not to design an entirely new system. This design philosophy usually results in an earlier IOC (initial operational capability).

More information will be needed, however, before any determination can be made of the true objective of the 12 October launch. (NORAD)
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Nuclear Reactor for Spacecraft Probably Motivates Niobium-Alloy Studies

Recently described Soviet research with niobium-base alloys are probably oriented toward the development of a nuclear reactor for use in space. Three recently developed alloys, according to the Soviet technical journal Atomnaya Energiya, had the same high corrosion resistance to liquid lithium metal at 1,000 degrees C. as does pure niobium.

Lithium is most often associated with the development of advanced space reactors, since its low density and excellent thermal and physical characteristics make it a desirable liquid-metal coolant. Since natural lithium contains Li-6, a strong neutron absorber, only Li-7 can be used in a reactor; but Li-7 is too expensive to use in a reactor except in one intended for space use or other compact one.

Niobium-base alloys are attractive candidates for fuel-element cladding and structural components of metal-cooled nuclear reactors because of their compatibility with lithium and other liquid metals, as well as their low thermal neutron absorption cross section and very good strength at the high temperatures of an operating reactor.

The precipitation-hardened niobium alloys described in Atomnaya Energiya are believed comparable to those developed to date in the US. (CIA)

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