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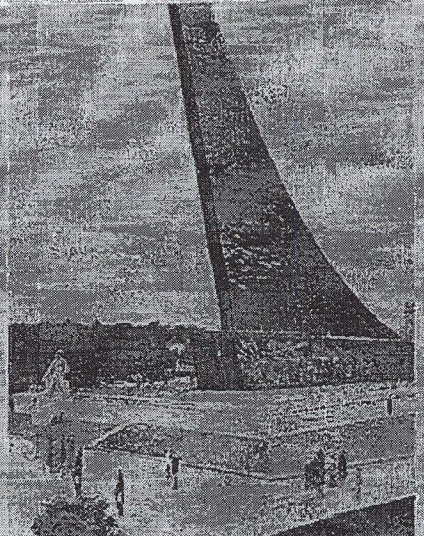

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NORAD Weekly Intelligence Review

Issue No. 40/65, 1 October 1965

The WIR in Brief

Portion identified as non-responsive to the appeal

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Space

COSMOS 91 IS 13TH SOVIET PHOTORECCE SATELLITE OF 1965
3d in a row to use Venik 3d stage.

SOVIET INFRARED MAY BE ADEQUATE FOR MAPPING FROM SATELLITES
Technology apparently adequate.

VERTICAL LAUNCHES, APPARENTLY FOR SPACE RESEARCH, ACCELERATED
6 this year, 4 in September.

SPACE WALK SUIT NEEDS BETTER VISOR, BETTER HEAT CONTROL, LESS RIGIDITY
Soviets at international symposium hint at inadequacies.

COVER: Moscow monument to Soviet space program. (Soviet press) (OFFICIAL USE ONLY)

NOTE: Pages 31, 32, 34, 35, 38, 39, and 42 of this issue are blank.

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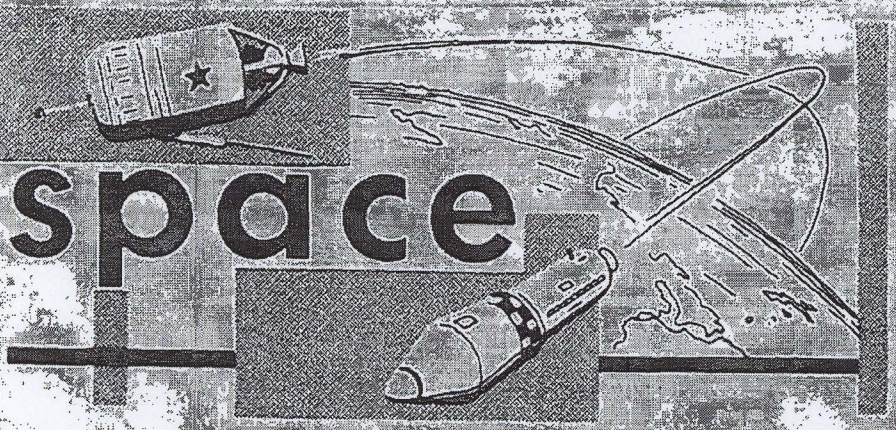

significant intelligence on space developments and trends

Cosmos 91 is 13th Soviet Photorecce Satellite of 1965

The Soviets launched Cosmos 91, their 13th photoreconnaissance satellite this year, from Tyuratam at about 0900Z, 23 September -- 2 weeks after launch and 6 days after de-orbit of their 12th one (Cosmos 85). Cosmos 91 will probably be de-orbited on 1 October.

Orbital parameters of the new satellite have been reported as follows:

	By SPADATS	By TASS
Inclination to Equator	65 degrees	65 degrees
Period	89.77 minutes	89.8 minutes
Apogee	324.7 kilometers (175.3 n.m.)	342 kilometers (184 n.m.)
Perigee	202.9 kilometers (109.6 n.m.)	212 kilometers (114.5 n.m.)

Cosmos 91 was launched by an SS-6 ICBM booster/sustainer and injected into orbit by a heavy Venik upper stage, the use of which usually indicates that a camera system of high resolution (5-8 feet) is carried.

Two slightly unusual features of this event:

- The 0900Z launch occurred a little earlier than usual. Most photorecce Cosmoses are launched between 0930Z and 1100Z.
- Cosmos 91 was the 3d consecutive photorecce satellite to be injected into orbit by the heavy Venik upper stage. This is unprecedented. Earlier this year the Venik and lighter Lunik have normally been used alternately. Last year, only one fourth of the Soviets' photorecce Cosmoses were orbited by Venik staging, never consecutively. None of the 1963 photorecce vehicles were injected into orbit by Veniks.

The only other photorecce vehicle launched as early as 0900Z this year was Cosmos 59, which was launched 7 March 1965. Cosmoses 59 and 91 are very similar in a number of respects:

	Cosmos 59	Cosmos 91
Inclination	65 degrees	65 degrees
Period	89.8 minutes	89.77 minutes
Apogee	323.4 kilometers	324.7 kilometers
Perigee	206 kilometers	202.9 kilometers
Upper staging	Venik	Venik
Time of launch	0900Z	0900Z

Cosmos 59 was launched 2 weeks before the spring equinox, Cosmos 91 was launched 2 days after the autumnal equinox.
(SPADATS)
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Soviet Infrared May Be Adequate for Mapping from Satellites

The Soviets probably now are able to construct adequate infrared or thermal mapping systems for use from aircraft and possibly from satellites.

At least for priority needs, the Soviets have available fast photon detectors for the 4-6 and 8-13 micron windows of the atmosphere and can supply the cryogenic cooling necessary for these detectors. The Soviets also appear to be knowledgeable of various mechanical scanning techniques for use with such systems.

The Soviets have also taken the apparently preliminary step of collecting data on the optical reflection and infrared characteristics of numerous natural and manmade materials (soils, selected vegetation and residues, brick, concrete, and asphalt) likely to be visible in or around potential target areas. An IKS-12 spectrometer was used to obtain the data from the optical to the 20-micron region, a range which covers all the atmosphere's infrared windows. This type of data is essential for the successful interpretation of inputs from thermal mapping.
(CIA)
~~(CONFIDENTIAL~~ NO FOREIGN DISSEMINATION -- Releasable to UK, Can, Aus & NZ)

Vertical Launches, Apparently for Space Research, Accelerated

Six rockets have been fired vertically from Kapustin Yar (KY) this year, 4 of them in September. Only 4 such firings from KY have been detected previously -- all in 1963.

Payloads launched vertically from Kapustin Yar have apparently been associated with space research, such as spacecraft testing and the collection of biological, geographical and meteorological data. The objectives of this year's vertical firings have not been determined yet, but analysis of telemetry intercepted from the 3 most recent firings is expected to provide some information on their missions.

Preliminary analysis of RADINT indicates that the most recent launch (20 September) had an apogee of 270-290 n.m., suggesting that it may have continued the 1963 test series. The five other vertical firings of 1965 -- launched 8 June, 4 August, and 3, 7, and 9 September, had apogees of 95-120 n.m., suggesting a related but as yet unidentified purpose.
(DIA)
~~(SECRET)~~

'Space Walk' Suit Needs Better Visor, Better Heat Control, Less Rigidity

The extravehicular suit (EVS) which Soviet cosmonaut Leonov wore when he ventured outside Voskhod 2 may need a better system of thermal control before it can be used in open space for extended periods, a helmet visor with better light transmission characteristics, and less rigidity in the mid-section. The need for improvement was evident in comments made by Soviet representatives to the Second International Symposium on Basic Environmental Problems of Man in Space, which was held in Paris 14-18 June.

Thermal Control. The Soviets said that difficulties were encountered in controlling cosmonaut perspiration during the extravehicular experiment because of both intensive physical activity and the limited capability of the suit's thermal control system. They claimed, however, that Leonov's work assignment was so planned that the limited capability of the suit's thermal control system was not exceeded. The cosmonaut, they said, was not too uncomfortable to perform his assigned tasks.

The Soviet suit is ventilated by circulating oxygen through a series of tubes with tiny holes located so that more ventilation is delivered to those parts of the body requiring greater cooling. This system is

reminiscent of an old design which was abandoned by the US Air Force several years ago. The newly acquired information confirms previous suspicions that the gaseous thermal control system for the Soviet EVS would probably cause heat-exchange problems.

Helmet Visor. Remarks and persistent questioning by Soviet representatives concerning the light-transmission characteristics of the helmet visor of the Gemini EVS made it obvious that the Soviets considered it far superior to that used for the Voskhod 2 experiment. The shaded light-filtering material of the Soviet helmet visor has not been identified, but it apparently will not provide variable light transmission. This is evident from Soviet remarks indicating that a supplemental, manually adjustable, mechanical device varied light transmission to an acceptable level.

Light control in the US visor was accomplished by using a material which automatically darkens milliseconds after being exposed to light. Future Soviet space helmets are expected to incorporate this feature.

Suit Mobility and Rigidity. Soviet representatives indicated that elbow and knee mobility of the Voskhod 2 EVS was satisfactory but that bending in the trunk area was restricted by suit rigidity and required considerable effort. They would not say how they were working to solve this problem.

Other Soviet Comments on Man in Space. Soviet representatives at the Paris Symposium also had the following to offer on man in space:

- A decision must be made soon on the requirement for artificial gravity.
- The Soviets are willing to accept a radiation dosage for a single critical mission (possibly lunar) which would be so high as to prohibit any further radiation exposure for the lifetime of the cosmonauts concerned.
- There was no back-up oxygen in Voskhod 2's umbilical line.

Additional information on the technical aspects of Voskhod 2, together with the use of an air lock, suggests preparation for more advanced missions.
(FTD; DIA)
~~(SECRET)~~