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NORTH AMERICAN AIR DEFENSE COMMAND

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The WIR in Brief

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COVER: Soviet strategic missile (from Red Star)(OFFICIAL USE ONLY)

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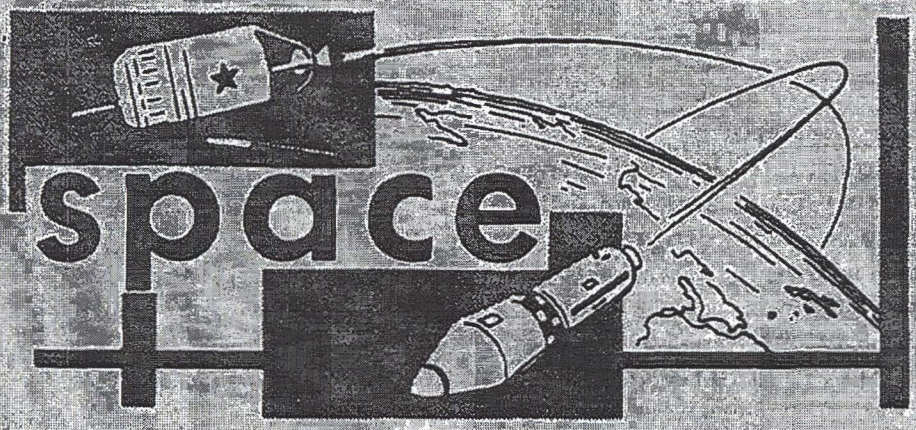

significant intelligence on space developments and trends

Cosmonauts' Parachute Distinguished for Stability During Terminal Descent

The personnel parachute of Soviet cosmonauts exhibits outstanding stability during the terminal phase of descent, according to recently acquired photography. Examination of a sequence of photos taken during a probable training jump by cosmonautress Tereshkova indicates stability within 2 degrees -- that is, the chute oscillates only 2 degrees from the vertical -- in contrast with US personnel parachutes which oscillate 10-20 degrees. Stability is desirable in preventing injury to personnel when they contact the ground.

The personnel parachute normally is used by Soviet cosmonauts in landing. All have used it except for the first cosmonaut, Gagarin, and the occupants of the 3-man Voskhod. Gagarin's craft may have suffered an ejection-seat failure; Voskhod, the Soviets claim, made a gentle, near-zero-velocity landing, using reverse-thrust rockets which fired when the vehicle was "quite close" to the ground. Ejecting cosmonauts normally leave their space craft at an altitude of about 23,000 feet, when the velocity of the craft is about 722 fps; when clear, the cosmonaut separates from his ejection seat and descends by means of his personnel parachute.

The excellence of stability of the Soviet cosmonauts' personnel parachute is probably accounted for by a novel vent construction in the textile canopy. An area of about 9.5 square feet in the vent section appears to incorporate a series of small openings -- some 12 of them in each of 9 reinforced fabric squares (within the 9.5-square-foot section).

(FTD)

~~(SECRET~~ NO FOREIGN DISSEMINATION -- Releasable to NATO, Aus & NZ)

Reconnaissance from Space -- Soviet Needs, Activities, and Capabilities

The belief was often expressed in the early days of the Space Age -- the late 1950's -- that the Soviets had no compelling need for military reconnaissance. The Soviets, it was believed, had access -- overt or covert -- to adequate weather data and targeting information for mounting attacks by manned bombers, which were still the primary strategic weapon systems. This reasoning had some validity at the time, but its premises are less valid today and they did not, even then, envision all potential Soviet military reconnaissance needs.

SOVIET RECONNAISSANCE REQUIREMENTS

Geodetic Mapping for Targeting. Increasing Soviet dependence on missiles rather than bombers for strategic attack has brought about a need for more refined data on target locations. Bomber crews could easily find a target if they knew its general location and had some knowledge of the visual or radar-echo characteristics of the target or of surrounding terrain features. However, where ballistic missiles are to attack pinpoint targets, such as hardened ICBM sites, the location of the target with respect to the launch site of the attacking missile must be known with a high degree of accuracy. This was an important consideration in the US's siting of ICBMs; it was known that most unclassified maps of the western half of the US, where most of the US's ICBMs were eventually sited, were geodetically inaccurate by as much as 3 miles. Once the geodetic tie-in between continents is established, however, mapping of targets by Earth satellites would be the best means of targeting against hardened ICBM sites and would be of the highest priority to the Soviets.

Observation of Fast Carrier Task Forces. The nuclear strike capabilities of NATO aircraft carriers would be a high-priority target for the Soviets in time of war. For early warning, detection, and tracking of carrier task forces, the Soviets currently depend mainly upon visual sightings by their surface vessels and on communications intelligence collected by land-based HF direction-finding and by Soviet naval and maritime units, including special SIGINT trawlers. These resources would be seriously degraded in time of war by fleet silence, attack, or other countermeasures. Soviet reconnaissance aircraft could not fill this gap, due to inadequacies in aircraft range, equipment, and numbers, and the Soviet submarine force would be still more inadequate. Thus, the Soviets might choose to develop a satellite system to detect and track these carriers and to give timely reports on their positions and courses and on the composition of the task force.

"Trouble Spot" Reconnaissance. The Soviets could well use a standby reconnaissance satellite system for collecting information on movements of forces and on logistics buildups at bases and facilities related to "hot-spot" situations in which they have a direct or indirect interest.

Standing Military Reconnaissance. The Soviets have a standing need in peacetime for collecting information on the location of mobile Western strategic forces (such as deployed SAC aircraft) and the status of strategic support bases.

Damage Assessment. The use of a satellite system to assess damage accomplished by Soviet strategic attack would release strategic aircraft, upon which the Soviets currently must rely for damage assessment, to strategic attack missions.

Technical Intelligence Collection. Satellite reconnaissance systems carrying high-resolution cameras could collect useful technical intelligence, which might not otherwise be available, on classified ground installations. But camera resolution would have to be better than 5 feet.

ELINT and SIGINT. Satellites carrying ELINT and SIGINT gear could intercept messages and collect useful information about the characteristics and performance of Western electronic equipment. This gear might be installed on satellites executing other types of missions.

Weather Information. Aside from peacetime meteorological reconnaissance, meteorological satellites could collect weather data when uncoded weather reports would not be available -- in wartime or when war seems imminent.

EVIDENCE OF SOVIET RECONNAISSANCE SATELLITE ACTIVITY

Khrushchev, while still head of the Soviet Communist Party and Soviet Government, told Westerners on more than one occasion that the USSR was photographing the US from space, and on at least one occasion he offered, through his listener, to show such photos to President Johnson. The vehicles which took these pictures are almost certainly members of the Cosmos series launched from Tyuratam. There is strong evidence that all but a few of these vehicles have been involved in development and/or operation of a spaceborne photoreconnaissance system:

- Orbital parameters consistently were favorable for photoreconnaissance: orbital inclinations (51 and 65 degrees) allowed for coverage of the most important Free World target areas, and altitudes were low.

- Launches were so timed that the satellites were near perigee, and in sunlight, during ascending (south-to-north) passes over the US and southern Canada.
- All payloads were de-orbited (except for one failure -- Cosmos 51), thus permitting recovery of film.
- Each satellite remained in orbit more than long enough to map the entire Northern Hemisphere (up to 51 or 65 degrees latitude, depending upon the satellite's orbital inclination) with an 85-degree field-of-view camera.
- The vehicles were stabilized within the range 0.01-0.02 degrees per second, according to telemetry analysis. This rate is well within the allowable limits of sophisticated reconnaissance satellites.
- Payload activity of at least some of these satellites occurred when they were making daylight passes over the US, southern Canada, and other Free World target areas, according to a timing analysis of intercepted signals.
- Some of the newer TT Cosmoses executed slight, programmed rolls about their line of flight, apparently to obtain photography to one side of the satellite's flight path. These roll maneuvers were performed about 2 minutes before apparent camera activity aboard the satellite commenced, probably long enough to orient the vehicle properly and to stabilize it in the new camera-aiming direction. After payload operation, the vehicle returned to its original orientation.
- Payloads of the TT Cosmoses have not received the publicity which the Soviets have given the payloads of apparently authentic research vehicles -- the Electron-series vehicles and at least some of the Kapustin Yar-launched Cosmoses. Thus, the mission of these vehicles would appear to be classified, as would be the case with photoreconnaissance.

The Soviets have announced that all Cosmos series vehicles are collecting data on space and/or on the Earth's cloud cover. Some of the TT Cosmoses may have recorded some scientific data -- such as measurements of radiation in space in support of the Soviet Air Force's man-in-space program -- but these vehicles do not have the diversity of orbital parameters expected of vehicles participating in a systematic study of the Earth's radiation belts or of the near-Earth space environment. The little scientific research data that the Soviets have publicly attributed to these vehicles could have been collected much more economically by the smaller, longer-lived KY Cosmoses than by the 5-ton TT Cosmoses. The Cosmos designation, therefore, appears to be a cover to conceal their true mission(s).

The TT Cosmoses may have also performed other reconnaissance or data-collection missions. Four of them (Nos. 4, 7, 9, and 15) transmitted video signals, some of which were demodulated by the West to show ground photography and cloud cover. This fact indicates a Soviet interest in continuous surveillance reconnaissance systems. These vehicles could also have collected ELINT or SIGINT, since the camera systems apparently would not have occupied all the available space and payload-weight capability.

SOVIET RECONNAISSANCE CAPABILITIES AND LIMITATIONS

Photoreconnaissance and Geodetic Mapping. The Soviets are believed to have the cameras, lenses, film, image-motion compensation devices, and other equipment needed for photography from satellites. Some of the TT Cosmoses are believed to be able to produce photography with ground resolutions of 10-30 feet from orbital altitudes, while equipment aboard some of the newer vehicles of the series may have ground resolutions as fine as 5-8 feet.

Resolutions of 10-30 feet would be adequate for most missions which could be satisfied by one-time or intermittent coverage: geodetic mapping, identifying fixed targets, and locating and determining the current status of bases and installations. For technical intelligence collection, the higher caliber equipment, of 5-8-foot resolution, would be used.

Video Systems. Photographic reconnaissance, despite better-quality coverage, would be less satisfactory than near real-time video coverage for targets which require continuous reconnaissance or surveillance such as locating fast carrier task forces, reporting on the location of deployed strategic aircraft, and for meteorological reconnaissance.

50X1 and 3, E.O.13526

Further, this system might not be suitable for long-lived satellites, even weather satellites, since it uses photographic film rather than direct video: it transmits, in effect, facsimiles of photographs taken of the ground or of cloud cover.

ELINT and SIGINT Systems. The Soviets are believed to have the technology for developing electronic and signal intelligence collection satellites. Such systems would ordinarily be passive and their "take" recovered after de-orbit of the satellite. Thus, they could already be in use and their operation not detected. In a hot-war situation, however, where time would be more important than security, the "take" might be dumped over the USSR or relayed thereto by communications satellites,

if the latter should become operational. Intercepts relayed by communications satellites would be received on a real-time basis.
(CIA; NORAD)
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Communist China Apparently a Photo Target of Cosmos 35

Cosmos 35, the second apparent Soviet photoreconnaissance satellite launched into an orbit of 51 degrees Equatorial inclination, may have photographed parts of Communist China. A timing analysis of its [redacted] indicates that the satellite's payload was active when it was 60 miles southeast of China's nuclear site at Lop Nor and again when the satellite was flying north of and parallel to the ChiCom-North Korean border.

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The US and Middle East, as usual, were prime targets, but Cosmos 35 was also more active over Europe than its predecessors, [redacted]

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Although a few of the periods of payload operation seem to have occurred when lighting would have been marginal for photography, the programing and payload activity seems to have been accurate and reliable. Activity occurred for 6-10 seconds while the satellite passed over some small islands in the Atlantic and Pacific, probably pinpointing the Azores, Canary Islands, Hawaii, Midway, New Caledonia, Espiritu Santo Island, and Ellice Island.
(FTD)
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Zond 2 Signals Intercepted 18 January

A cooperating sensor on 18 January [redacted] from Zond 2, a Soviet space probe which was launched 30 November 1964 and is headed in the general direction of Mars. [redacted]

The Soviets have not, as of this writing (20 January) released any information about communicating with this probe since 20 December 1964, when it was reported that 12 communications sessions had been held with the probe between 8 and 18 December.
(Cooperating sensor)
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Cosmos 52 De-orbited, Strictly a Routine Operation

The Soviets' first space operation for 1965 appears to have followed faithfully the pattern set for Tyuratam-launched Cosmoses during 1964. Cosmos 52, which was launched at about 0930Z, 11 January, was de-orbited on 19 January during the early part of Revolution 127, probably touching down at about 0703-0708Z. Most of the Cosmos-series vehicles launched from Tyuratam in 1964 were de-orbited on Revolutions 126-128, about 8 days after launch; further, the hour of launch and orbital parameters of the 1964 vehicles were similar to those of Cosmos 52 except that four of them had orbital inclinations of 51 instead of 65 degrees for increased coverage of the middle latitudes.

Cosmos 52's primary mission was probably photoreconnaissance, although it could easily have carried instrumentation for a number of other intelligence- or data-collection missions.

(SPADATS; NORAD)

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World Record Claim for Voskhod to be Submitted to FAI

The Soviets are preparing to submit to the FAI (Federation Aeronautique Internationale, which recognizes world record claims) a claim for unlimited world records achieved by the flight last year of the multimanned spaceship Voskhod 1, according to the Soviet press. The press item did not specify the nature of the claims but they undoubtedly will refer to the number of passengers carried by a single spaceship and, probably, to the apogee (about 220 n.m.) of the flight. It said that records and materials related to the world record claims have been reviewed by the Aviation Sports Commission of the V.P. Chkalov Central Acroclub of the USSR and will be forwarded to the FAI.

(Soviet press)

(UNCLASSIFIED)