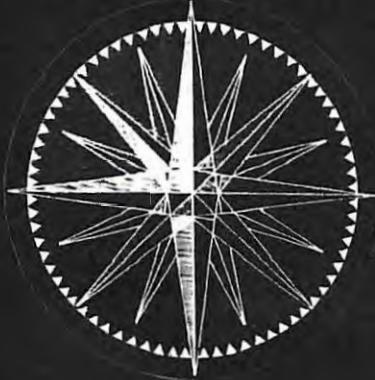


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CURRENT INTELLIGENCE WEEKLY
SPECIAL REPORT

RUSSIA'S KAPUŠTIN YAR SCIENTIFIC SATELLITE PROGRAM

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CENTRAL INTELLIGENCE AGENCY
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RUSSIA'S KAPUSTIN YAR SCIENTIFIC SATELLITE PROGRAM

The USSR continues to attach a low priority to the Kapustin Yar satellite program--now in its fifth year. Late in starting and saddled with the smallest space booster in the Soviet arsenal, the Kapustin Yar program has made only marginal contributions to man's knowledge of near-earth space phenomena and shows little promise of achieving better results in the future.

The Cosmos Program

The first two launchings in the Kapustin Yar program, in October and December 1961, were failures. The third attempt, on 16 March 1962, inaugurated the "Cosmos" series of space vehicles.

However, the Kapustin Yar satellites have made up only a quarter of the subsequent Cosmos series; the remainder have been vehicles launched mainly from Tyuratam--including weather, communications, and photoreconnaissance satellites. Some of these others do carry equipment for scientific experiments, but they have little relationship with the Kapustin Yar program. The Soviets identify them as part of the Cosmos series of scientific research in order to disguise their mission of military programs or new developments, or to conceal failures such as lunar or planetary probes that have not ejected from earth parking orbits.

The Soviet announcement of Cosmos 1 on 16 March 1962 stated that the Cosmos program would include investigations of corpuscular streams and low-energy

particles, cosmic rays, the earth's magnetic field, earth cloud systems, emissions from solar and other cosmic bodies, and meteorites and their effects upon spacecraft. Also, there would be an examination of charged-particle concentration in the ionosphere and its effects upon radio-wave propagation, and of the Van Allen radiation belts and their hazards to manned space flights. 50X1

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that most of these phenomena have been investigated and has also made it possible to categorize most of the satellites by mission (see table). In addition, the Cosmos program was to test spacecraft components and subsystems.

Results of the Kapustin Yar Program

The contributions of the Kapustin Yar program to the fund of knowledge of the near-earth envelope has been marginal and, in comparison with equivalent US efforts, the program has displayed numerous shortcomings.

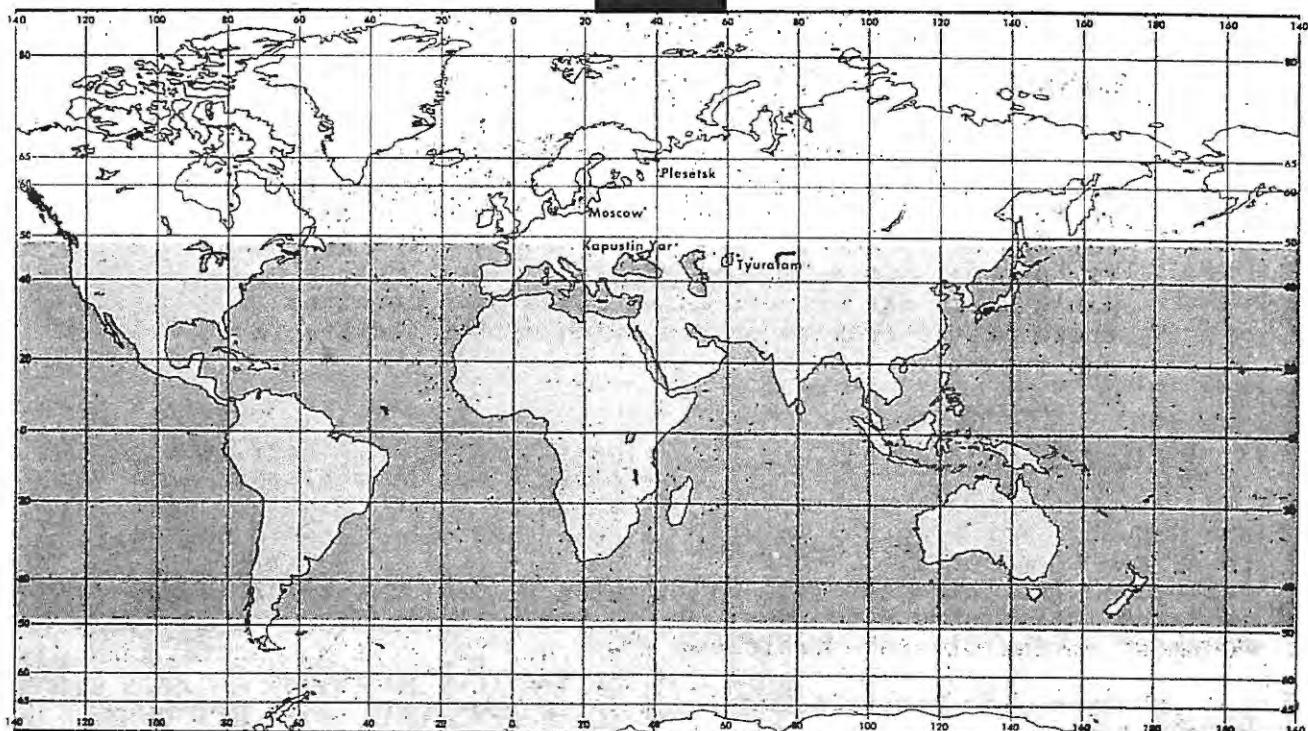
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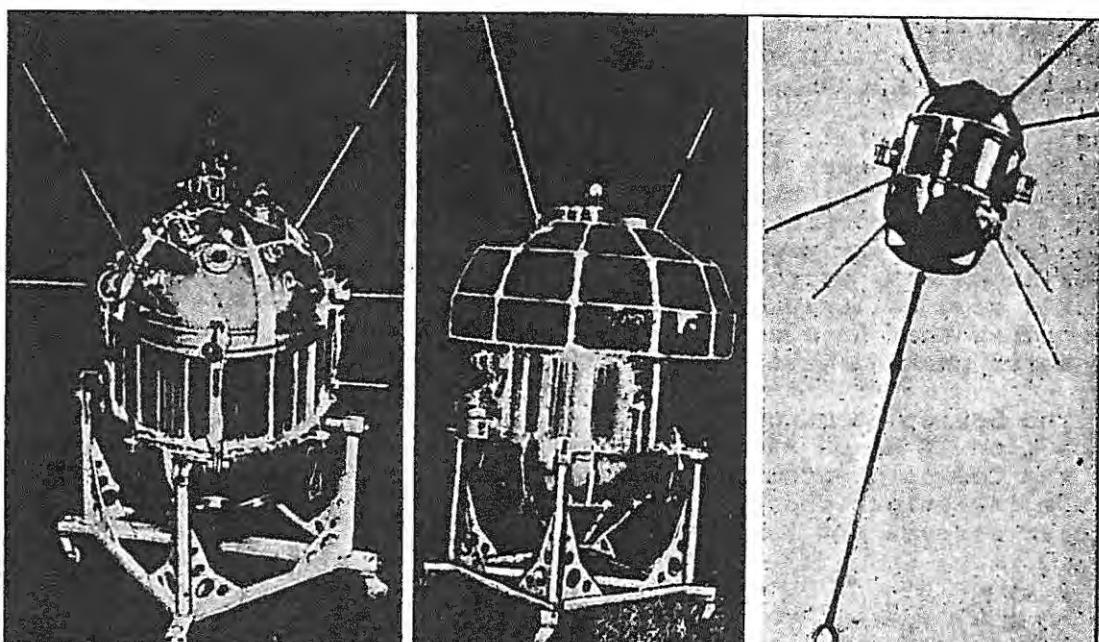
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CIA Statute



REGION COVERED BY KAPUSTIN YAR SCIENTIFIC SATELLITES



COSMOS (KAPUSTIN YAR SERIES) SPACECRAFT CONFIGURATIONS

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So far, 33 unmanned, non-recoverable satellites have been launched in the Kapustin Yar series. Twenty-nine have achieved orbit, the most recent--Cosmos 123--on 8 July 1966. However, only 23 of the orbited vehicles operated successfully, and many of these did so for only a few days. The experiments carried out by some of these satellites have been rather crude and have utilized instrumentation--primitive by US standards--that not only reduced the quality of the data received but occasionally nullified its usefulness.

The payloads have generally been short-lived--few operating longer than three months. Moreover, the ratio of payload to total weight has been much smaller than on equivalent US satellites. For example, the payload of Cosmos 26--which had a total weight of 300 to 500 pounds, standard for Kapustin Yar satellites--weighed only about 50 pounds. In addition, the Kapustin Yar vehicles have been orbited on an inclination of 49 degrees, while the inclinations of similar US satellites have varied widely in order to obtain more diverse samplings that could establish bases for the correlation of data.

Vehicles launched from Kapustin Yar on the 49-degree inclination--nearly due east from the launch point--get maximum additional velocity from the earth's rotation, increasing the payload capacity of the booster. In addition, vehicles orbited on this inclination can be tracked during the launch phase

by instrumentation facilities serving the Kapustin Yar surface-to-surface missile range.

On the other hand, restricting launches to this inclination has limited the scientific investigations of the Kapustin Yar program to only half of the near-earth envelope; the exploration of higher latitudes is left to scientific payloads placed aboard vehicles orbited from Tveratam and Plesetsk. 50X1

50X1 The eight-day orbital life of these other satellites, however, still restricts the Soviets to no more than frequent samplings of the higher latitudes rather than the continuous measurements afforded by the US scientific satellites exploring the same regions. Moreover, Soviet reconnaissance satellites seldom reach altitudes higher than 200 miles, further limiting their scope.

The Kapustin Yar experiments have been concentrated at low altitudes probably in order to study the environmental conditions that Soviet manned space flights would encounter. However, the diversity of experiments in the program has suffered as a result. Eighteen of the satellites have orbited at altitudes below 400 miles, eight between 400 and 800 miles, and three between 900 and 1,300 miles. In contrast, 15 of the 32 US Explorer satellites orbited since January 1958 have reached altitudes greater than 1,300 miles, and several have gone out more than 120,000 miles.

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Stepchild of the
Soviet Space Effort

Two factors probably combine to limit the altitudes of the Kapustin Yar vehicles: first, Soviet unwillingness to expend larger boosters to launch these scientific payloads into higher orbits; second, Soviet failure--either for technological or bureaucratic reasons--to reduce the size and weight of the satellite relative to its payload. In any case, the Soviet acceptance of a restricted scope for the Kapustin Yar satellite program is another indication of a low priority.

The Soviets' delay in starting the Kapustin Yar program is a further indication of its stepchild status. By the time the first Kapustin Yar launch was attempted in late 1961, equivalent US programs

were well under way and had already amassed a store of knowledge that put the USSR at least two and a half years behind in the field of space radiation studies alone. Despite its late start, however, the Kapustin Yar program has had a consistent--if low--rate of launchings: seven in 1962, five in 1963, six in 1964, eight in 1965, and five so far in 1966.

The Kapustin Yar Cosmos program has not kept pace with progress achieved in other fields of the Soviet space program--military, weather and communications satellites, manned flights, and lunar and planetary probes. In fact, the Kapustin Yar program has not changed substantially since its inception, suggesting that the Soviets are willing to allocate to it only a small, fixed sum. CIA Statute 50X1

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