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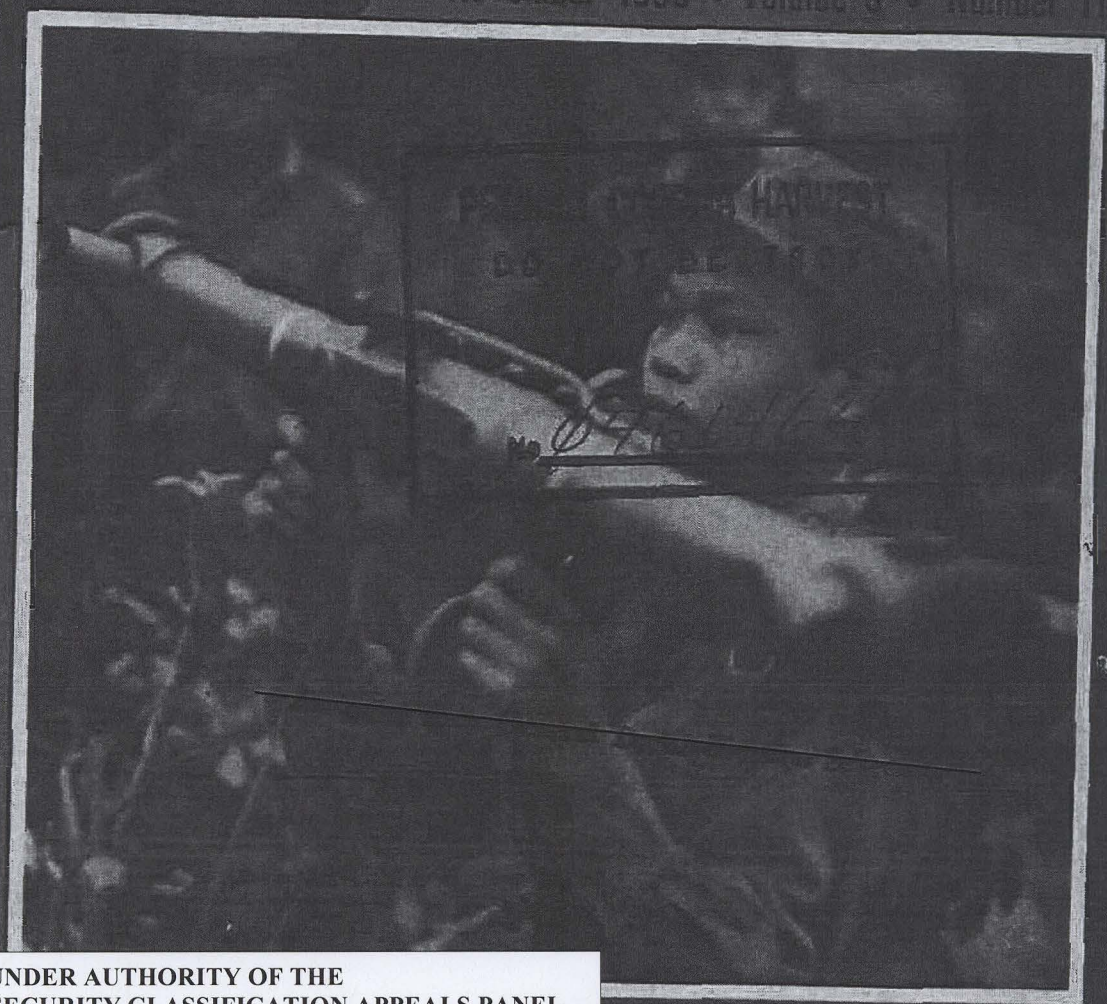

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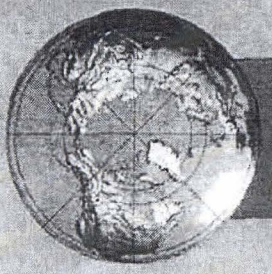

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Pathet Lao soldier training to increase and defend communist areas in a 30-year-old war. For details see article, page 4. [S]

FOREWORD

MISSION: The mission of the monthly *Defense Intelligence Digest* is to provide all components of the Department of Defense and other United States agencies with timely intelligence of wide professional interest on significant developments and trends in the military capabilities and vulnerabilities of foreign nations. Emphasis is placed primarily on nations and forces within the Communist World.

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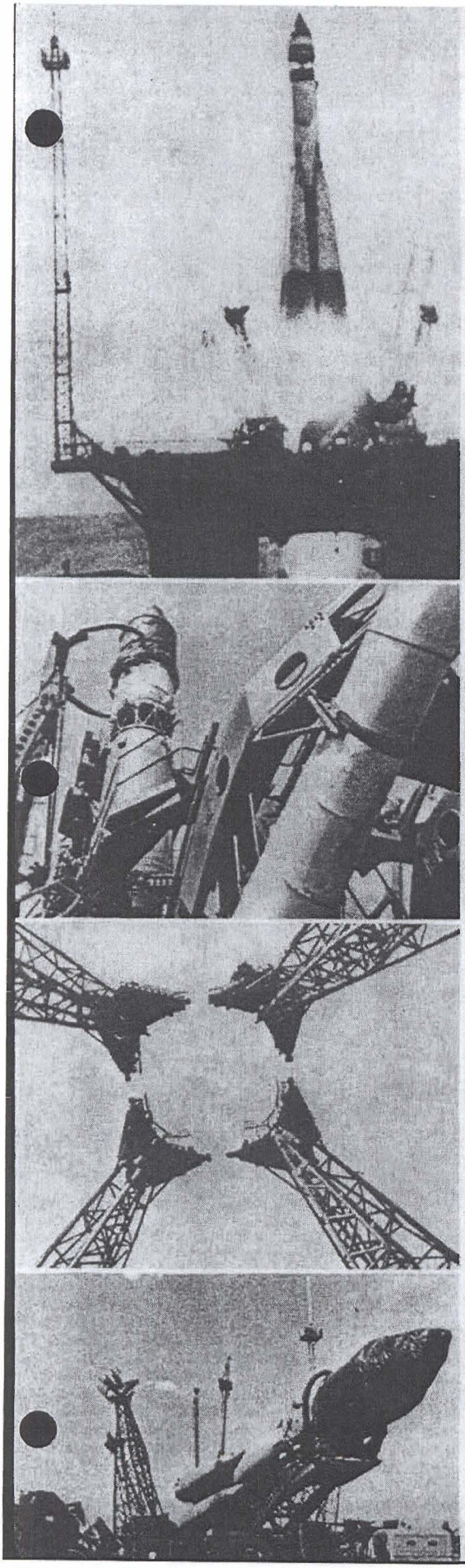
Joseph F. Carroll

JOSEPH F. CARROLL
Lt General, USAF
Director



SOVIET SPACE ENVIRONMENT EXPLORATION

THE Soviet Union is continuing its systematic exploration of near-earth, lunar, and deep-space environments. Investigations of the near-earth environment have been conducted by the Kapustin Yar and Plesetsk Environmental Cosmos, Vertical, Proton, and Electron programs. While environmental research is the primary mission of these four programs, they have an additional mission of testing candidate subsystems and sensors for future spacecraft design. To date, four Cosmos vehicles—numbers 14, 23, 97, and 149—are known to have performed such testing functions.

Environmental data gathered in support of military programs may be applied to navigation, communications, and missile detection and tracking systems. Data gained on solar physics may be specifically applied to manned-spacecraft design and solar flare detection.

The Soviets are continuing to employ one basic space capsule configuration in their near-space Cosmos efforts. It measures five feet in length and 2.5 feet in diameter and consists of a cylindrical midsection with two hemispherical ends. Various instruments and hardware are assembled within and on this basic structure, depending upon the intended mission. Such commonality permits the Soviets to perform a wide variety of missions using existing hardware and off-the-shelf space equipment.

Until recently, the various Cosmos flights could be classified into mission-oriented groups. However, with the exception of one continuing group which studies natural radiation from cosmic and solar sources, Cosmos vehicles have become more specialized and unique in their missions. For example: Cosmos 135 was launched to investigate the existence of a dust cloud around the earth; Cosmos 142 measured the intensity of radio emissions at 1.68 megahertz; Cosmos 166 studied the nature of solar flux with special equipment and was the first Kapustin Yar environmental capsule known to contain an active cold-gas attitude-control system; and Cosmos 215, equipped with eight telescopes, became the first astronomical platform to be launched into space.

Launch sequence of Vostok, workhorse of the Soviet space program. [U]

In recent months, two additional events of significance have occurred in the Cosmos program. First, during the French nuclear tests on 7 and 15 July 1968, the Soviets had six active environmental satellites in orbit. Previously, the normal number of active Soviet orbital vehicles at any one time was two or three, suggesting that the Soviets monitored the French tests. The Soviets will probably maintain a similar number of active satellites for monitoring future French nuclear tests, which currently are scheduled to be completed by the end of 1968.

Second, a new launch technique for environmental satellites may have been exhibited with the launching of reconnaissance vehicles Cosmos 208 and 228. Attached to each of these vehicles, in a "piggy-back" fashion, was a capsule which apparently was ejected into orbit just prior to the re-entry of the parent vehicle. These smaller capsules may have performed environmental research. Thus, the Soviets may have achieved a more active research program without requiring separate launch vehicles.

Vertical program

The Soviets have conducted an extensive vertical rocket program since 1949. Prior to 1962, the program could be categorized into four basic areas of research: bio-medical, geophysical, nuclear experimentation, and systems engineering. Since 1962, the vertical program's major effort has

been associated with geophysical measurements.

The program has been most active during the last three years, with seven vertical launches in 1966, 31 in 1967, and 24 as of 1 August 1968. All but two of these were launched from Kapustin Yar and ascended to apogees of 80–100 nautical miles. The two exceptions were launched from Tyuratam and ascended to altitudes of about 2,300 nautical miles.

The vertical rocket program's recent emphasis on geophysical missions has included investigations of the physical properties and chemical composition of the atmosphere, and measurements of the sun's temperature, pressure, electron concentration, electromagnetic and electrostatic parameters, cosmic rays, ultra-violet and X-ray emissions, and corpuscular radiation.

Lunar exploration

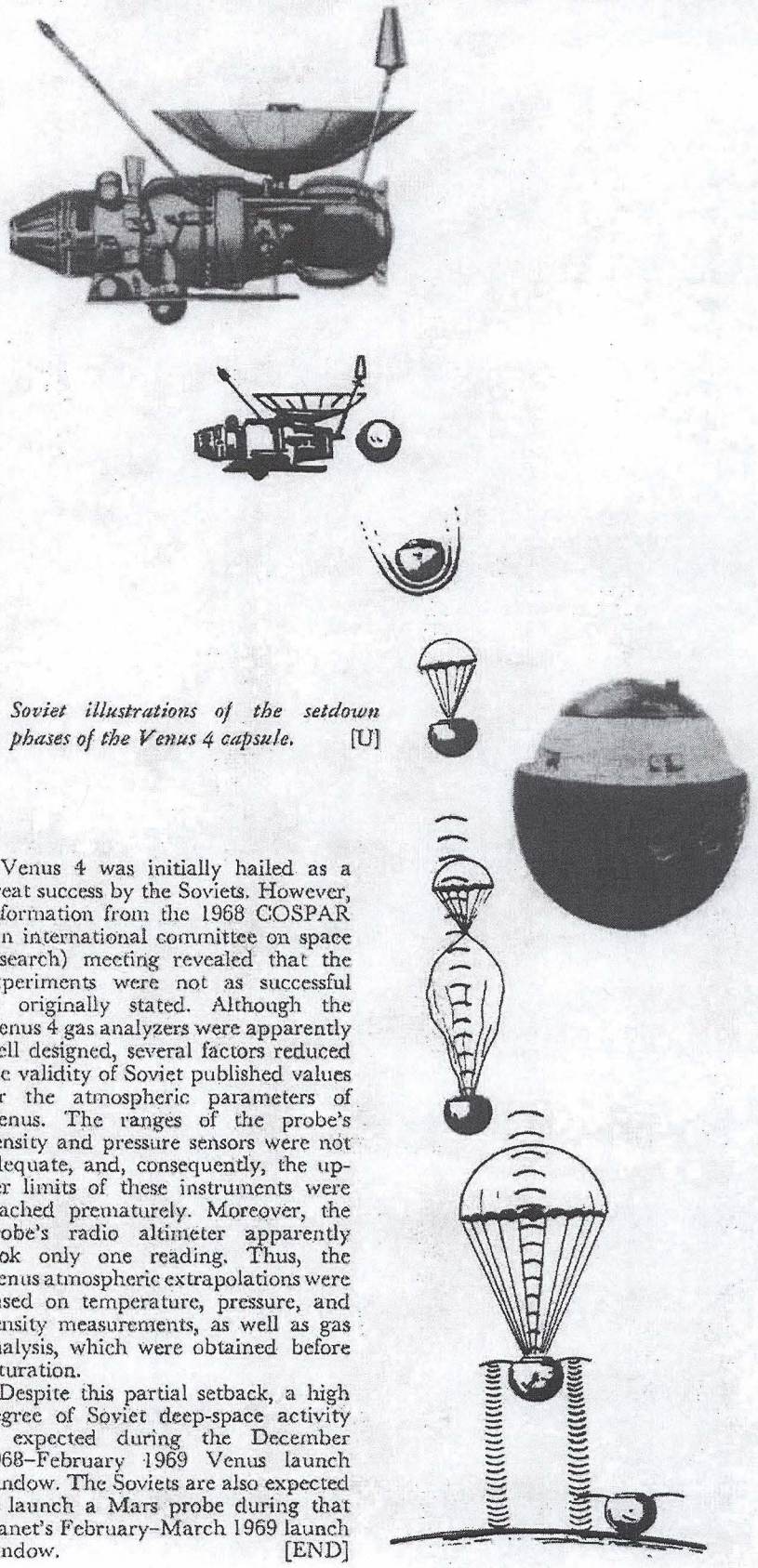
With the unsuccessful launching of the SL-6 on 7 February 1968, the Soviets resumed their unmanned lunar exploration program, after a 13½-month period of inactivity. Two months later, on 7 April, the Soviets were successful in launching Luna 14, which became their fourth lunar orbiter.

The resumption of the SL-6 lunar program may be indicative of insufficient environmental data to support manned lunar operations. Luna 14, which apparently exhausted its power supply on 26 June, was reportedly measuring cosmic radiation, refining knowledge of the gravitation field and theory of motion of the moon, and testing communications from the lunar vicinity.

In mid-September 1968, the Soviets successfully employed the SL-12 launch vehicle to place a Soyuz spacecraft, designated Zond 5 and weighing about 14,200 pounds, in the lunar vicinity. Zond 5 subsequently splashed down in the Indian Ocean and was recovered. Such activities are expected to further support manned lunar operations.

Deep space probes

The Venus 4 flight from June through October 1967 was a major event in the Soviet deep-space program. It was the first successful Soviet interplanetary probe to travel to another planet and take direct measurements of its atmosphere.



Soviet illustrations of the setdown phases of the Venus 4 capsule. [U]

Venus 4 was initially hailed as a great success by the Soviets. However, information from the 1968 COSPAR (an international committee on space research) meeting revealed that the experiments were not as successful as originally stated. Although the Venus 4 gas analyzers were apparently well designed, several factors reduced the validity of Soviet published values for the atmospheric parameters of Venus. The ranges of the probe's density and pressure sensors were not adequate, and, consequently, the upper limits of these instruments were reached prematurely. Moreover, the probe's radio altimeter apparently took only one reading. Thus, the Venus atmospheric extrapolations were based on temperature, pressure, and density measurements, as well as gas analysis, which were obtained before saturation.

Despite this partial setback, a high degree of Soviet deep-space activity is expected during the December 1968–February 1969 Venus launch window. The Soviets are also expected to launch a Mars probe during that planet's February–March 1969 launch window. [END]