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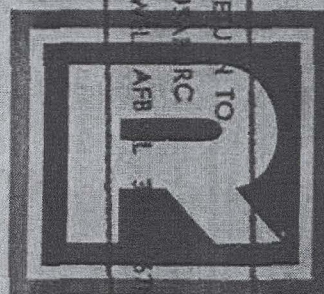


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NORTH AMERICAN AIR DEFENSE COMMAND



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The WIR in Brief

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Space

SPACE WELDING STUDIED -- FOR SPACECRAFT ASSEMBLY, REPAIR OF METEORITE DAMAGE

Many welding methods said to have potential value. 'PROTON' SPACECRAFT PROGRESSIVELY ADVANCED IN COSMIC-RAY STUDIES

#2 produced greater volume of data;

#3 started search for "kwarke."

FRANCO-SOVIET SPACE AGREEMENT HAS MORE POLITICAL THAN SCIENTIFIC SIGNIFICANCE

General terms outlined, details to be negotiated later.

Portion identified as non-responsive to the appeal

COSMOS 124 ANOTHER MILITARY RECONNAISSANCE SATELLITE

Portion identified as non-responsive to the appeal

COVER: Refueling line-up, Soviet Air Force (from Red Star) (OFFICIAL USE ONLY)

NOTE: Pages 30, 32, 33, 36, and 37 of this issue are blank.

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significant
Intelligence
on space
developments
and trends

Space Welding Studied -- for Spacecraft Assembly, Repair of Meteorite Damage

The Soviets apparently are developing welding techniques to be used in the space environment to assemble spacecraft components and to seal holes in space vehicles caused by meteorite hits.

Academician B. Ye. Paton in 1962 said publicly that the Soviets were developing the welding techniques necessary to assemble spacecraft components in orbit and since then has been increasingly specific about the techniques which may show promise. For example, in a paper presented at the Autumn 1965 meeting of the British Institute of Welding he indicated that electron-beam, plasma-jet, and cold and pressure welding as well as diffusion bonding and diffusion brazing can be used effectively for assembling interplanetary rockets in an orbital-station environment of 10^{-7} to 10^{-8} mm Hg. He assumed that arc welding with a consumable electrode could also be used in space. He said that the Soviets "have an idea regarding how the molten metal in the weld pool and on the consumable electrode will behave under weightlessness."

Paton's statements merit attention because he is the Director of the Institute of Welding in Kiev, which has made a number of important contributions to the development of diversified and advanced welding techniques, and because he has a number of welding "firsts" attributed to him, one of which is the introduction of electroslog welding to the West.

With regard to sealing holes in advanced spacecraft caused by meteorites, Paton in 1964 said that an electronic sensor would locate the damage within a fraction of a second, compute the degree of damage by the amount of pressure drop, and transmit the appropriate command to the "robot-welder" in an instant.

The Soviets obviously have an extensive space-welding effort with fundamental studies in progress and impressive long-term goals as the objective.

(FTD)

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'Proton' Spacecraft Progressively Advanced in Cosmic-Ray Studies

Each Soviet-launched Proton-series spacecraft is equipped to carry on the work of its predecessor and to undertake some new aspect of the unique cosmic-ray studies associated with these heavy (12-ton) spacecraft, according to an interview with Academician Konstantinov which was published in the 10 July issue of Izvestia.

Proton 1 made the first direct measurements of the energy spectrum of primary cosmic ray particles at energies up to 100 trillion electron volts, beginning the systematic study of the constituents of primary cosmic rays in the region of very heavy nuclei. This one flight substantially increased man's knowledge about cosmic rays.

The mission of Proton 2, according to Konstantinov, was to verify and refine the findings of Proton 1. Accordingly, the volume of scientific data obtained by the second Proton reportedly was hundreds of times that obtained by Proton 1.

Proton 3, according to the interview, developed further the studies of Protons 1 and 2 with a number of controlled experiments. It also established new studies intended to detect "kwarks" -- hypothetical fundamental particles which, if they exist, would have fractional electrical charges. "Only experiment can answer the question as to whether such particles exist in nature," said Konstantinov. "If they do exist, then they must appear in the collision of superhigh-energy cosmic rays with atoms of the interstellar medium."

On Proton 3, the effective area of sensors for the study of super-heavy nuclei in primary cosmic rays reportedly was increased by almost 10 times.

The scientific experiments on the Protons, in sum, are obtaining valuable scientific data on superhigh-energy cosmic-ray particles which could lead to key discoveries about the fundamental nature of matter.

The primary mission of the Proton flights, however, is to proof-test a large, 2-stage rocket which undoubtedly will figure in space events of the future. Only limited data are available to determine the size and characteristics of this launch system, which may have a liftoff thrust between of 2-4 million pounds with a second-stage thrust of more than 0.5 million. With such performance, the launcher might place up to 35,000 pounds in a 100-n.m. circular orbit, but acceleration would exceed 10 Gs, which is rather high for manned flights. By adding a third stage, the Soviets could greatly increase the low-orbit payload capability and ease the acceleration loading. A Venik third stage might permit the Soviets to orbit 44,000 pounds but a more optimum one could raise this to well over 50,000. If they chose to develop this launch vehicle into a "Saturn-V" type system, they might, inserting a huge new first stage under it, put 150,000 to 200,000 pounds in Earth orbit without exceeding 6 Gs.

Use of the Venik third stage might permit circumlunar operations with



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a direct return to Earth. If a huge new liftoff stage is developed, the Soviets could then return payloads from lunar missions via an Earth-orbit re-entry or even conduct near-planetary flights with a free return to Earth.

This propulsion system is probably being man-rated, that is, tested to determine whether it is reliable enough for manned flight. Eventually it may be used to orbit a multimanned laboratory to study the human capability to live and work in space.

Three of the four launches to date which have involved the Proton booster have been successful.

(Izvestia; DIA)

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Franco-Soviet Space Agreement Has More Political than Scientific Significance

The Franco-Soviet space agreement signed by de Gaulle during his recent Moscow visit is very short. In the main it outlines intentions only in general terms, leaving the details to be determined later. It provides for:

- Soviet launch of a French satellite, possibly in 1968 or later. No funds will be exchanged, but a reciprocal exchange of scientists and technicians is expected. A joint work program will be established after the mission details have been decided. Launch data will be given to the French only after the orbit and payload have been determined. The Soviets have agreed to permit French technicians at the launch site, but only if it is deemed necessary.
- Joint meteorological studies, which will consist of simultaneous launches of sounding rockets from French and Soviet territories and an exchange of payloads, instruments, and technicians.
- Communications studies, using Soviet satellites. Both black-and-white and color TV transmissions will be exchanged on an experimental basis, but no French communications satellite will be launched by the Soviets, and no French instruments will be placed on Soviet communications satellites. There are no plans for any regular exchanges of public programs.

The agreement, which is largely political in motivation, does not represent any significant amount of Franco-Soviet cooperation in space.

- The Soviets will probably contend that the presence of French technicians at the launch of the French satellite is not essential.
- Simultaneous launches of sounding rockets will have some scientific value, but launchings by many more nations on an international cooperative basis would be much more valuable.



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- The communications studies appear to be only an extension of a program which began in early 1965, when experimental relay of TV between Moscow and Paris via the Soviets' Molniya communications-relay satellites began.

The most significant point is the apparent beginning, however slight, of a somewhat more liberalized Soviet attitude toward cooperating with other nations in space activity. Soviet cooperation in space -- even with Communist nations -- has been virtually nonexistent in the past.

(State; CIA)

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Cosmos 124 Another Military Reconnaissance Satellite

Cosmos 124, which the Soviets launched from Tyuratam at about 1025Z, 14 July, is believed to be a military reconnaissance vehicle despite Soviet claims that it is a research vehicle collecting data on the near-Earth space environment. Orbital parameters reported for the new vehicle:



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	<u>NORAD Space Detection Center</u>	<u>TASS</u>
Inclination	51.80 degrees	51.8 degrees
Period	89.15 minutes	89.4 minutes
Apogee	278.6 kilometers	303 kilometers
	150.4 n.m.	163.6 n.m.
Perigee	200 kilometers	208 kilometers
	107.9 n.m.	112.3 n.m.

It is the 12th Soviet military reconnaissance Cosmos launched this year.

One slightly unusual aspect of this launch is the fact that, though the vehicle was injected into orbit by a heavy Venik upper stage, [] it carries a camera system of medium-resolution; such vehicles usually carry high-resolution cameras. Medium-resolution cameras are usually carried by Lunik-injected recce vehicles. (NORAD)

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