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ORTH AMERICAN AIR DEFENSE COMMAND

W **Weekly**
I **Intelligence**
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Weekly
Intelligence
Review

Issue No. 23/64, 5 June 1964

The WIR in Brief

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POSSIBLE NEW ICBM/SPACE BOOSTER SYSTEM
TESTED IN APRIL AND MAY

First missile failed shortly after launch; 2d and 3d
were successful.

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as non-responsive
to the appeal

Space

50X1 and 3, E.O.13526

POSSIBILITY CONSIDERED THAT 'VENIK' FIRINGS
MAY HAVE TESTED RE-ENTRY VEHICLE

One explanation for unusual use of heavy third
stage.

Portion identified
as non-responsive
to the appeal

HIGH-PURITY ARGON WELDING TO IMPROVE
STRUCTURES FOR AEROSPACE VEHICLES

More efficient materials may now be used.

COVER: Soviet radio operators (from 'Red Star')
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NOTE: Pages 28, 29, 32, 33, and 36 of this
issue are blank.

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Possible New ICBM/Space Booster System Tested in April and May

A possible new type of Soviet ICBM/space-booster, not yet designated, was tested on 11 April, 15 May, and 30 May. The first missile failed shortly after launch; the second and third were successfully fired to the 3400-n. m. impact area on the Kamchatka Peninsula.

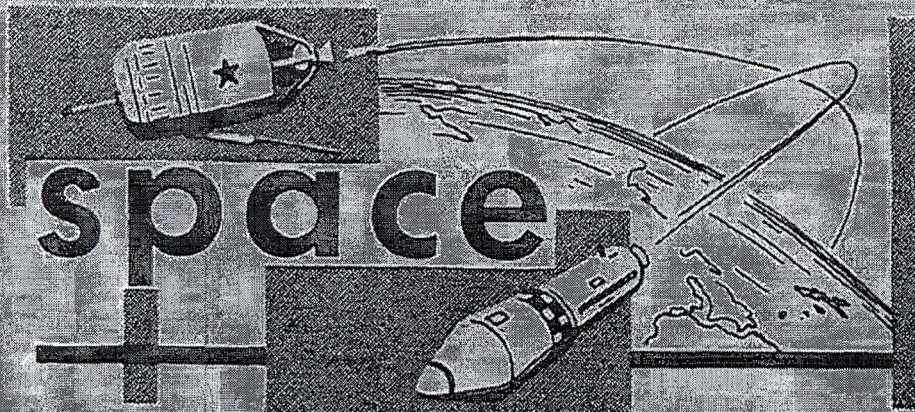
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significant
intelligence
on space
developments
and trends

50X1 and 3, E.O.13526

The TT Cosmoses are undoubtedly the vehicles which have been accomplishing the photoreconnaissance of US military bases alluded to by Premier Khrushchev in recent talks with former US Senator William H. Benton.

50X1 and 3, E.O.13526

(See WIRs 16/64 and 21/64.)

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Possibility Considered that 'Venik' Firings May Have Tested Re-entry Vehicle

The Soviets on 11 November 1963 and 19 February 1964 attempted space events involving use of the Venik-type third stage, which heretofore had been used only for placing into parking orbits the fourth stage and payload of interplanetary and lunar probes. Since launches on these dates were not particularly well suited for such probes, the possibility is now being considered that the Soviets on these two occasions were using the Venik propulsion to test in orbit a new-generation recovery vehicle.

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The Need for a New Vehicle. The currently used Vostok re-entry vehicle is approaching the end of its usefulness, at least insofar as manned flight is concerned. It has served well the purpose for which it was designed, but it has little potential for the type of manned space flights that the Soviets probably plan for the future. The Soviets now have a definite need for a new and somewhat larger manned space vehicle, one which can:

- Accommodate at least two cosmonauts.
- Remain in orbit for at least a month.
- Engage in rendezvous and docking operations while in orbit.

This is the type of vehicle which the Soviets will need if they are to progress to the construction of manned orbital stations, which are essential stepping stones to still more advanced space projects.

The Vostok, although it could support slightly longer manned flights than have taken place to date, does not have much growth potential. Theoretically, it could be redesigned to accommodate two cosmonauts but it would be more difficult to provide it with some rendezvous and docking capability. At any rate, the effort involved in redesign would be almost as great as that required for development of a new vehicle, and the redesigned vehicle would be less capable than the new one.

Suitability of 'Venik' Propulsion for a New Re-Entry Vehicle The SE-3 propulsion system -- the SS-6 ICBM booster/sustainer, and a Lunik-Class third stage -- has usually been used for launching Soviet recovery-type vehicles, manned and unmanned. This system, it is estimated, can orbit little more than 5 tons -- the estimated nominal weight of the Vostok. The SP-1 system -- the SS-6 ICBM booster/sustainer and the Venik third stage -- probably can orbit a payload of up to 16,700 pounds, according to FTD estimates.

Compatibility of Theory with Soviet Design Philosophy. Soviet design philosophy envisions that new requirements should be met, whenever possible, by maximum exploitation of existing systems and equipment rather than designing and developing completely new, tailored systems and equipment. Adherence to this philosophy has served the Soviets well in the past, usually resulting in adequate (though less than optimum) performance, early operational capability, a high degree of reliability, and a minimum of logistics and training problems. (For more on this subject, see page 5, WIR 12/64.)

Designing a new recovery vehicle in such fashion that it could be launched by an existing, relatively proved propulsion system would be completely compatible with proved Soviet design philosophy.





Questionability of Alternate Missions. The Venik third stage had been used prior to last November only for interplanetary and lunar probe attempts. Up until that time there had been 5 Venus probe attempts, 5 Mars probe attempts, and 3 lunar probe attempts made with this vehicle. All failed in some degree or other, but in only 3 cases did the Venik third stage fail, and these included the first 2 launches (10 and 14 October 1960) of the vehicle.

The 11 November launch could not have been a probe of Mars or Venus owing to the unfavorable location of these planets. Lunar probes can be attempted at almost any time, but 11 November was not a good date for launch of the type which is believed to be next on the Soviets' time table for conquest of the Moon -- a soft, instrumented landing.

The 19 February launch could not have been a Mars probe. It was not the optimum time of the month for a lunar probe, although one could have been attempted at the time. A Venus probe could have been attempted on the date and at the time of this launch, but much better launch times could have been chosen.

The mission of the 19 February launch is not known, since propulsion failed. The 11 November vehicle was successfully launched into a low, nearly circular orbit but it seemed not to have accomplished any other mission. Telemetry ceased on the first orbit.

Similarity of 11 November Launch to Another Test Vehicle. The 11 November launch decayed unusually rapidly, an indication of a high drag-to-weight ratio. In other words, the vehicle was empty or relatively so. The only other Soviet vehicle known to have decayed with comparable rapidity was the first vehicle of the Cosmos series, which may have been tested in an empty or relatively empty condition.

The 11 November and 19 February Launches as a Series. It cannot be proved that the 11 November and 19 February launches were similarly configured and were members of a series, mainly because the propulsion of the second vehicle failed. A number of similarities should be noted, however: both used the Venik third stage at times not particularly propitious for the usual Venik-type mission, and both vehicles were launched at about the same time of day -- some 3 hours earlier than normal Tyuratam launches. There is at least a possibility, then, that the 19 February launch was a repeat of the 11 November launch.

Arguments Against the Theory. Radar signature analysis is not available for the 19 February vehicle. The radar signature of the 11 November payload differed from that of any previous Soviet vehicle. This would tend to suggest a new class of vehicle, although analysis does not indicate that it was larger than the Vostok; yet a new type of re-entry vehicle almost certainly would be larger. Radar signature analysis has proved to be an



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extremely useful tool in analyzing Soviet space activity, but it faces certain difficulties. For example, using a material of relatively low radar reflectivity on the surface of a target could give the impression of a smaller vehicle.

Retrospect and Prospect. The possibility that the Soviets tried to orbit a new recovery vehicle on 11 November and 19 February is regarded only as a hypothesis. The evidence is far from conclusive, and there are arguments against it that are not easily disposed of.

If the theory is correct, then similar attempts should be forthcoming in the not-too-distant future.

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technical intelligence NOTES



items of interest
on technical developments
around the world

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High-Purity Argon Welding to Improve Structures for Aerospace Vehicles

Soviet adoption of standards for high-purity welding argon gas commensurate with US criteria should remove a significant constraint on Soviet selection of structural materials for aerospace vehicles.

The Soviets previously relied on such welding methods as electroslog, carbon dioxide, and submerged arc for aerospace-vehicle fabrication -- methods which tended to limit Soviet vehicles to low-strength materials which raised vehicle weight. The use of high-purity argon for welding should allow the use of materials which can produce higher structural efficiencies and lower structural weights.

Personnel responsible for the new standards have been associated with GKAT (Government Committee on Aeronautic Technology) and GKOT (Government Committee on Defense Technology).

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