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IMAGERY  
ANALYSIS  
DIVISION

PIR

PHOTOGRAPHIC INTELLIGENCE REPORT

[REDACTED]

SPACE-RELATED HIGH-POWER TRACKING  
FACILITIES, TYURATAM, KAPUSTIN YAR,  
AND PLESETSK, USSR

Declass Review by NIMA/DOD

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DATE October 1965

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SPACE-RELATED HIGH-POWER TRACKING FACILITIES, USSR

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SPACE-RELATED HIGH-POWER TRACKING FACILITIES

TYURATAM, KAPUSTIN YAR, AND PLESETSK, USSR

Preface

Three unusual electronic facilities were recently identified in the USSR and subsequently designated "New Type Interferometers." CIA/IAD photo analysts believe that, although interferometric techniques may be used at these facilities, they are electronically active rather than passive as is the case in most Soviet interferometers.

This report describes these installations as imaged on [redacted] photography and in addition sets forth some functional and operational theories. It is emphasized that these are thoughts and ideas as set forth by CIA/IAD photo analysts and are not intended to be either tentative or definite conclusions as to the function or operation of the electronics system in question. In short, this report is meant only to disseminate photographic intelligence and theories on these facilities so that their significance may be further evaluated.

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All measurements in this report have been made by the CIA/IAD analyst. They should not be construed as being mensuration data compiled by the NPIC/Technical Intelligence Division. They are considered to be accurate within plus or minus five feet or five percent, whichever is greater.

Introduction

Three large sophisticated tracking facilities, which could be capable of supporting Soviet space flights have been recently identified in the USSR. All of these facilities are located at major Soviet missile installations (Figure 1). Construction of two of them was started concurrently during the first quarter of 1965 at the Tyuratam Missile Test Center (TMTC) and at the Kapustin Yar Missile Test Center (KYMTC). Construction of the third facility, at the Plesetsk ICBM Complex, commenced during the third quarter of 1965.

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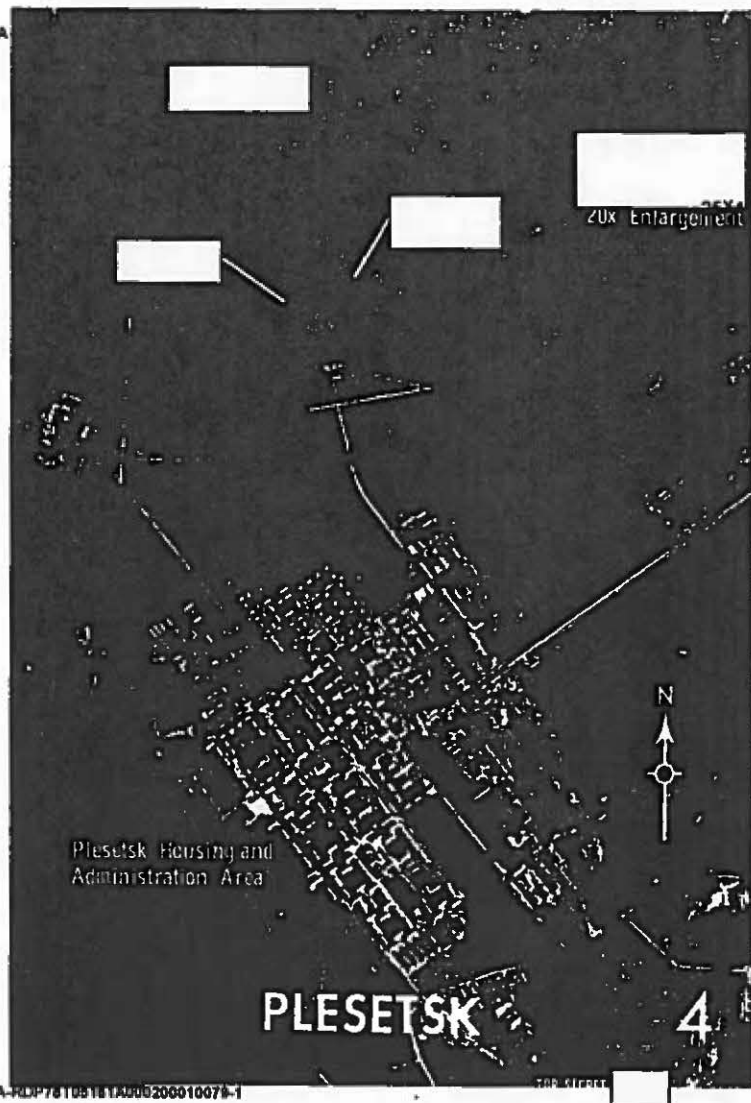
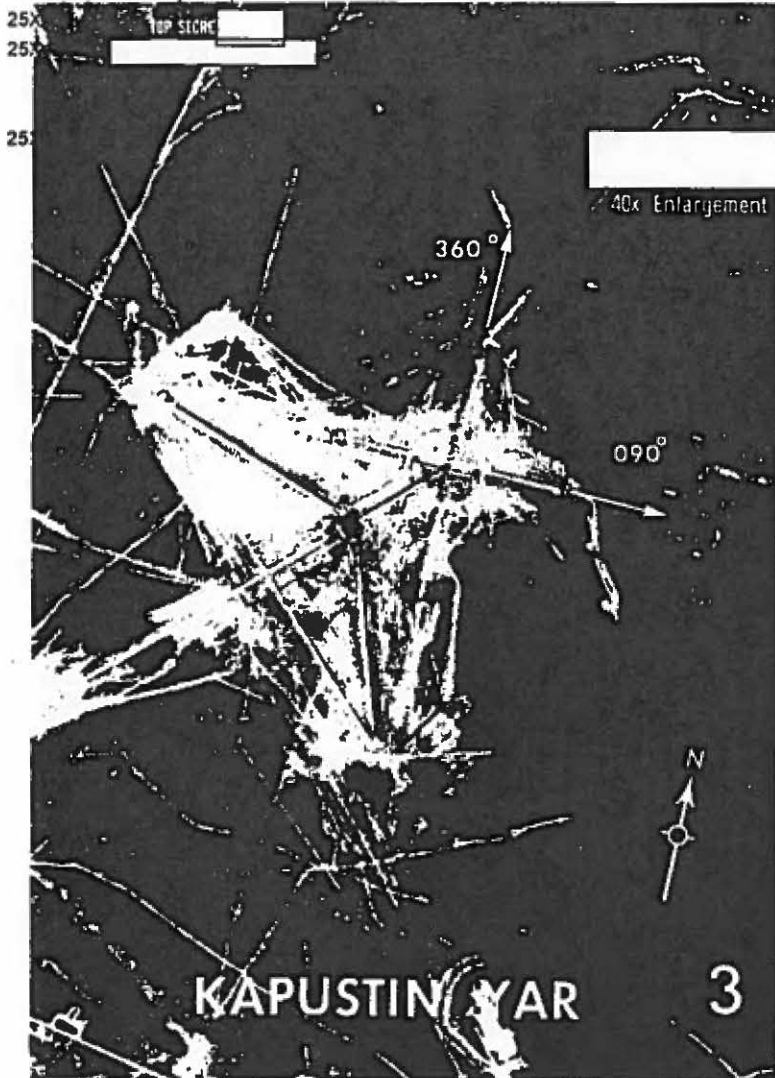
360°

20x Enlargement

090°

TYURA TAM

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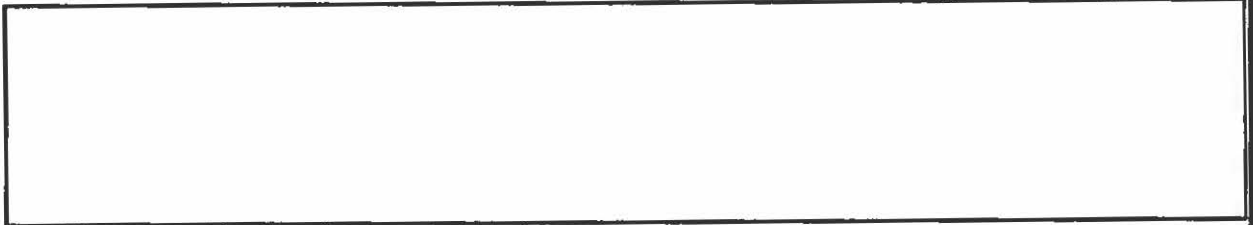


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At their present respective stages of construction, all three facilities appear to have similar components in respect to size and to intrasite location (Figures 2, 3, and 4). The only difference between facilities thus far isolated is the orientation of the sites with respect to north. The following table gives pertinent data on these installations.



On the basis of the combination, quantity, and spacing uniformity of the antenna supports (as yet, no antennas have been installed), these facilities are believed to have a function of tracking. They are believed to be space-related because of location, construction timing, and antenna orientations and furthermore are believed to be high-power because of control building size, cooling structures, and use of large waveguides. These waveguides were considered and rejected as combination access/cableways or solely cableways. Rejection is due to no visible requirement for access and overdesign as cableways. The amount of cables which could be placed in such a cableway is astronomical compared to the size and type of structure at its terminus. Use of these tunnels solely as waveguides also appears incredulous when considering conventional antennas on the terminal structures. Although no photographic evidence exists at this time, these tunnels may be combination waveguide/cableways, portions of which are designed for antennas not yet under construction. In any event, the portion of the tunnel allotted for waveguides would be major. Hence, in this report, these tunnels are described as waveguides.

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## Description and Discussion

In order to avoid repetition of descriptions, because of the near identity of these facilities, the sites will be discussed in the following paragraphs as one composite installation. Specific sites will be mentioned only when dissimilarities exist.

Each facility is road served and is secured by fencing that encloses a trapezoidal area of approximately 123 acres. The location of trenching and structures creates a definite signature referred to by some analysts as a "Bow and Arrow" (Figure 5).

The major structure at the facility is a centrally located control building 105 feet square and 35 feet high. This building has a step roof with ventilators and at least two elevator shafts. Four floors are suspected with a total floor space of approximately 40,000 square feet. Associated with this building are two probable multiple fan cooling structures. Three subsurface waveguides extend from the control building to probable antenna bases. The control building is positioned within the facility so as to keep trenching for the waveguides to a minimum. Two other single-story support buildings, 105 by 45 and 80 by 60 feet, are located near the control building. A 60 by 30 foot security building, walled vehicle parking area, and possible microwave tower 80 feet high are positioned at the entrance to the facility. Also located within the secured area at the Tyuratam facility are two large very shallow excavations near the control building which may become water treatment areas. A ditch parallels the entrance road and leads to one of the support buildings. This ditch may be utilized for either a power or a water line. At Tyuratam there is also some evidence of new scarring from a nearby large power line indicating the possibility of the start of construction of a power source for the facility.

No housing or support areas have been identified in connection with these facilities, however, ample facilities of this type are available nearby.

At least three suspect antenna types with a total of 32 individual antenna positions are under construction in the facility. Although no antennas are as yet installed, the structures on which the antennas will be placed are present.

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Antenna analysis is based on previously observed Soviet construction practices at other locations, however, the multiple application and integration of different antennas is unique and without precedence on [redacted] photography. For ease of discussion, the suspect antenna types have been arbitrarily designated A, B, and C and will be described individually in the following paragraphs.

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Suspect Antenna Type A

Type A is composed of nine antennas forming two major base lines with a configuration of both a "plus" and a large "L". At the Tyuratam and Kapustin Yar facilities, these base lines are aligned north/south and east/west. At Plesetsk, the alignment is [redacted]. Each antenna position consists of a square structure [redacted] on a side with a flat roof [redacted] above the ground. A circle, 15 feet in diameter, appears on the roof of each structure. It does not appear that antennas are as yet installed, however, based on past Soviet construction practice, they will be installed on separate pedestals, probably on the circles observed on each structure. Each antenna structure is served by a large buried waveguide which is connected to the control building. These waveguides are in reality large tunnels, 10 feet wide, and each waveguide has been covered by a stabilized earth mound with a flat top 40 feet wide. The layout of the Type A antennas is reminiscent of interferometer designs in that the configuration relationship of the "plus" to the "L" and the spacing between antennas is suggestive of pertinent wavelength considerations. However, the large size of each antenna structure and of the enormous waveguides suggest a very-high-power active integrated system far outstripping the requirements for a passive interferometer. Although the large mounds covering the waveguides which serve these antennas are probably meant to do just that, their resemblance to stabilized earth platforms used to support large antenna arrays such as HEN ROOST cannot be ignored. These mounds appear to grossly exceed any shielding requirements required for covering waveguides and thus the possibility of their being supports for additional antennas should be seriously considered.

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The baselines formed by the suspect Type A antennas have an overall length of 2,150 feet. The portion of each base line which makes up the "plus" configuration is divided into segments of 215 feet or one-tenth of the overall length. A graded-earth circle, 265 feet in radius, surrounds the Type A antennas which form the "plus" configuration.

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Suspect Antenna Type B

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Type B is composed of four groups of five antennas each, forming a square with diagonals of [Redacted] (a distance one-tenth that of the larger diagonal). Each group of five is served by two narrow parallel cable or waveguide ditches leading from the vicinity of the nearest Type A antenna. Within each group of five antennas, a small cable trench leads from the central antenna to each of the four corner ones. Each antenna structure is [Redacted] square.

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Although each group of suspect Type B antennas has a definite geometric relationship to other components of the facility, it should be pointed out that each individual group of five structures also bears some resemblance to footings for a guyed tower such as a vertical radiator. This possibility is considered unlikely but cannot be entirely discounted.

Due to their location and alignment, the Type B antennas are believed to be related to the Type A antennas in some manner. Two of the Type B groups are located at the mid-point of the two Type A major baselines. The other two Type B groups are positioned along projected extensions of the Type A major base lines. Graded earth strips extend to each group of Type B antennas from the graded earth circle which surrounds the "plus" configuration. These earth strips have the same width as the mounds covering the waveguides associated with Type A antennas. A similar graded earth strip connects the two Type A antennas which are at the extremities of the "L" formed by the two baselines. A trench was never observed at the location of any of these strips. However, it is possible that this stage was missed due to lack of suitable photographic coverage at the proper time.

Suspect Antenna Type C

Type C is composed at the present time of three cylindrical antenna support structures. Two of these structures bracket the "plus" configuration of the Type A antennas and are connected to the central Type A structure by small cable trenches. The other Type C antenna structure is located near the control building without any apparent reference to other antennas. Each structure is at present a vertical cylindrical wall [Redacted] in diameter and 45 feet high. The Type C antennas which will be installed on the top of these structures may be helix arrays if there is a requirement for telemetry,

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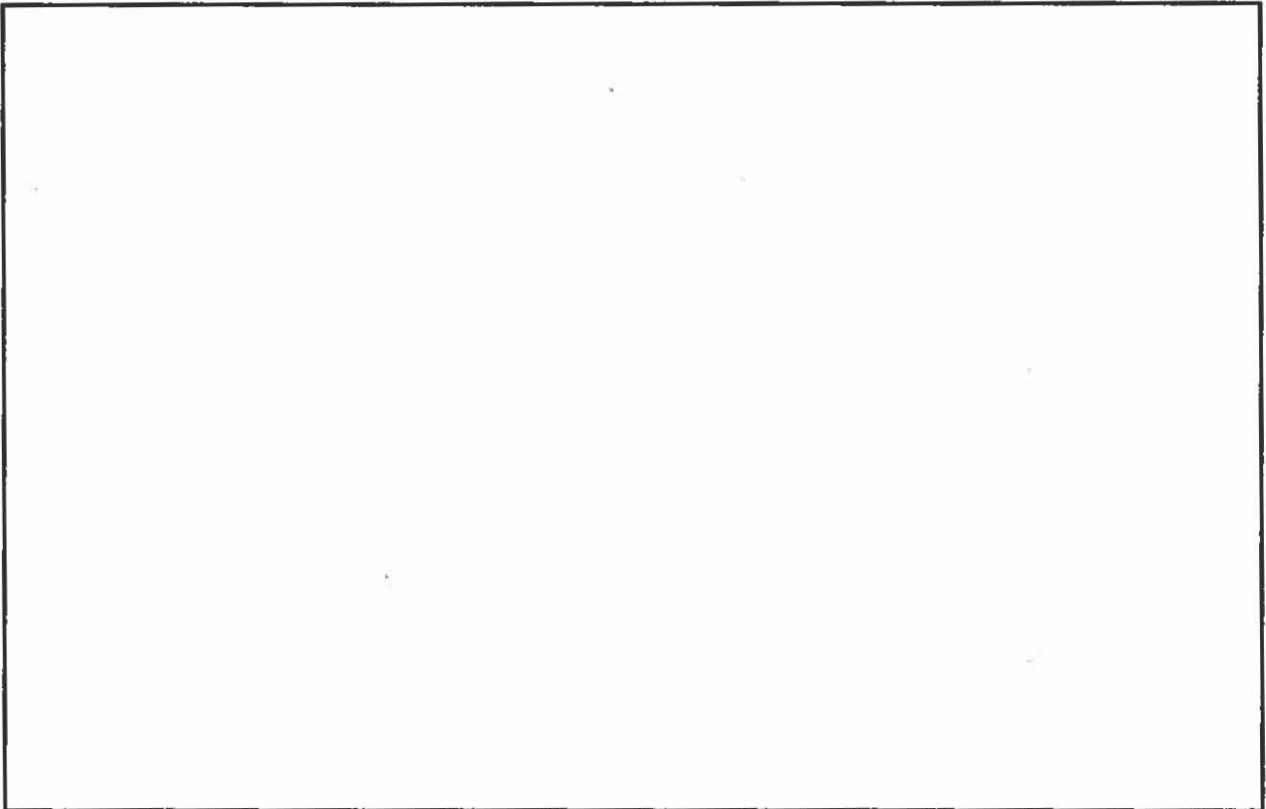
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yagi arrays if a requirement for communications with a manned space probe exists, or parabolic dish reflectors for additional tracking.

At this point it should be restated that all of these facilities are still under construction and that no actual antennas have been observed at any one of the three. As construction continues and additional coverage is obtained of Tyuratam, Kapustin Yar, and Plesetsk, the design of these facilities will become more apparent and only then will it be possible to finely define the function of these high power tracking facilities.

REFERENCES



REQUIREMENT

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CIA/IAD PROJECT

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