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NPIC/R-69/64
February 1964

PHOTOGRAPHIC INTERPRETATION REPORT

DECLASS REVIEW BY NIMA / DoD

EARTH SATELLITE TRACKING AND COMMUNICATION CENTER SIMFEROPOL, USSR

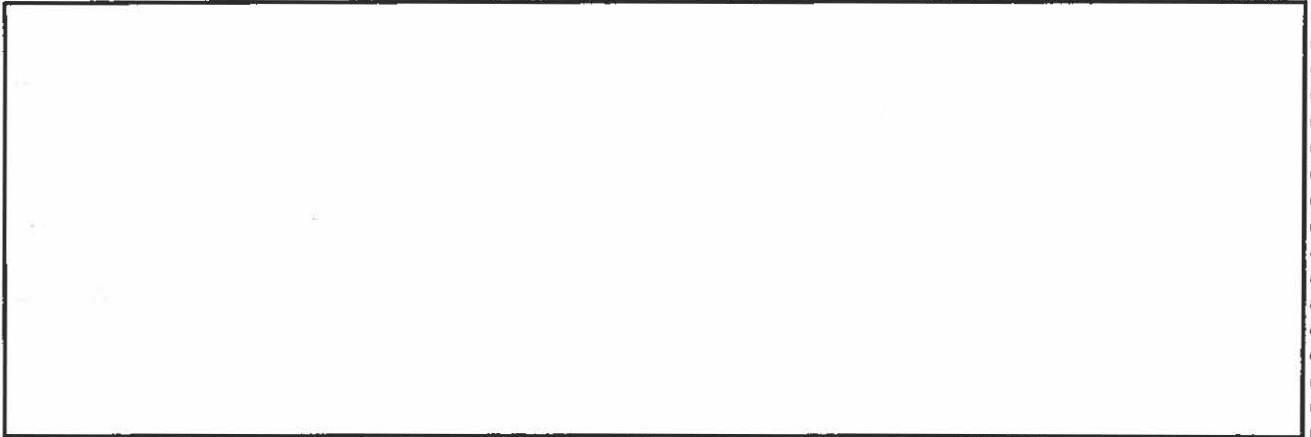


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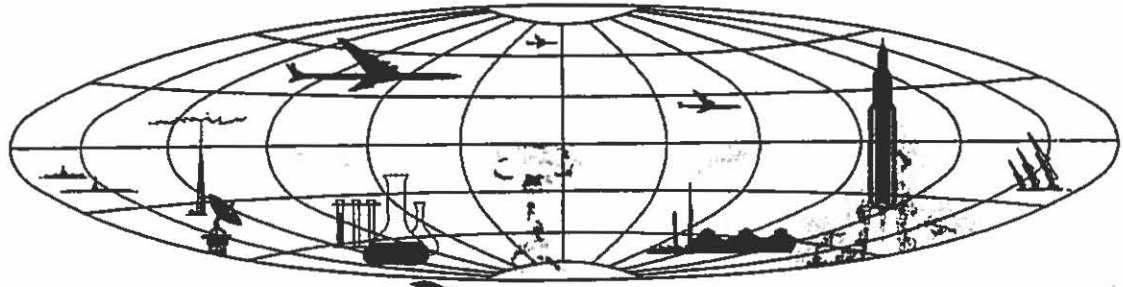


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NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER



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PHOTOGRAPHIC INTERPRETATION REPORT

EARTH SATELLITE TRACKING AND
COMMUNICATION CENTER
SIMFEROPOL, USSR

NPIC/R-69/64
February 1964

NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

PREFACE

This report, prepared in response to NSA and CIA requirements, describes both the Earth Satellite Tracking and Communications Center at Simferopol and various FLIM FLAM stations deployed across the Soviet Union.

The principal source of photographic material on the Simferopol location is [redacted] supplemented by ground photography of [redacted]. The FLIM FLAM sites were studied only on [redacted] photography. However, [redacted] coverage was reviewed, for comparative purposes, if it was available.

No attempt has been made to determine the radiation or reception frequencies of the various antenna arrays at the center, the small scale of the [redacted] photography and the low resolution of the ground photography precluding such a detailed investigation. Also, the configuration of the antennas or "dishes" used by the various FLIM FLAM stations cannot be resolved on the basis of presently available photography.

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SUMMARY AND CONCLUSIONS

The Earth Satellite Tracking and Communication Center at Simferopol is probably the most important station in the USSR for tracking near-space orbiting objects.

The center is the location of the Crimean FLIM FLAM station. Transmitting rhombic antennas oriented toward Moscow provide the communication link for this tracking activity.

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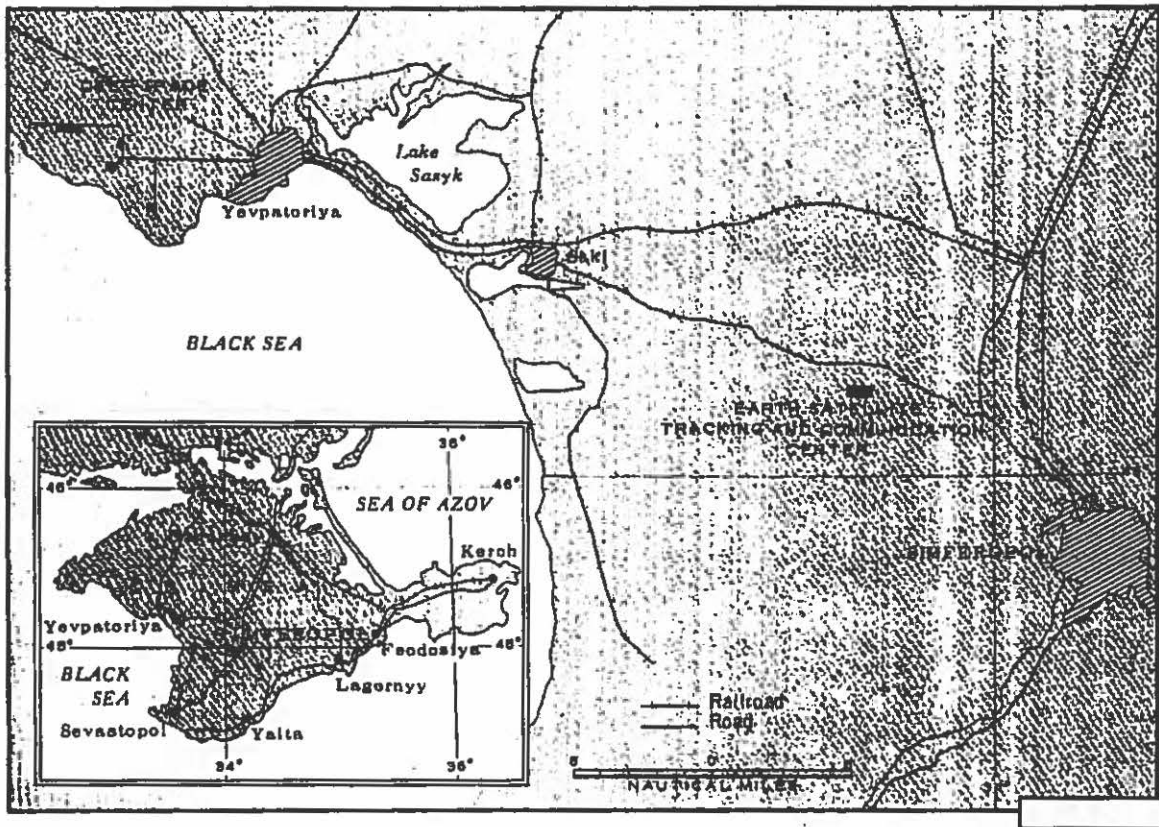
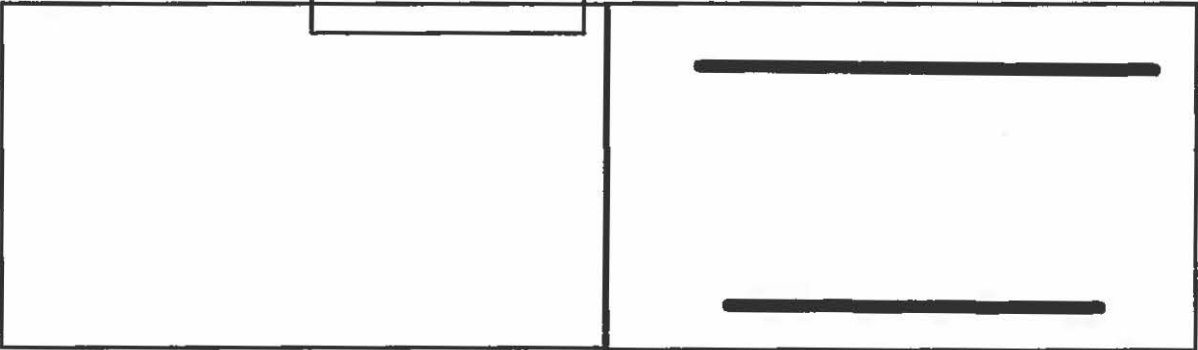


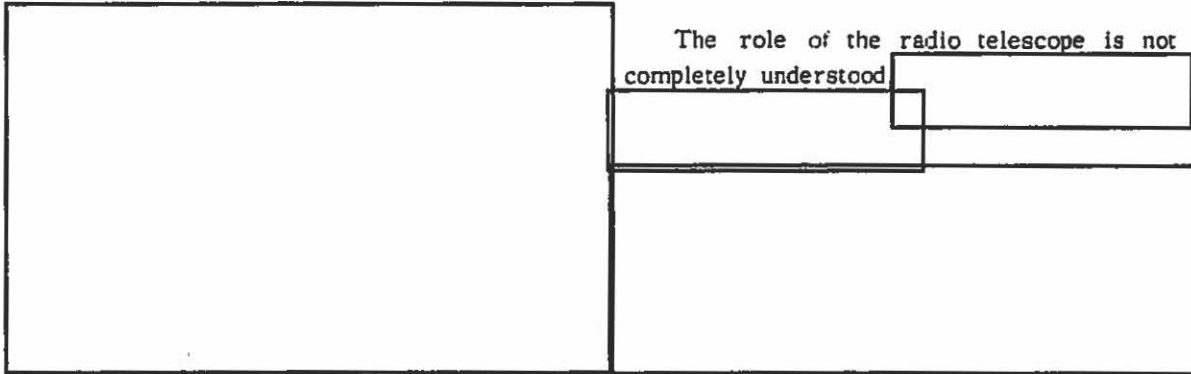
FIGURE 1. LOCATION OF SIMFEROPOL EARTH SATELLITE TRACKING AND COMMUNICATION CENTER.

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SIMFEROPOL EARTH SATELLITE TRACKING AND COMMUNICATION CENTER

The Earth Satellite Tracking and Communication Center is 11 nautical miles (nm) northwest of Simferopol at 45-03N 33-53E (Figure 1). Although the center was not identified

until [redacted] it was covered by [redacted] [redacted]. However, there were only 20 buildings in the support area in [redacted] and

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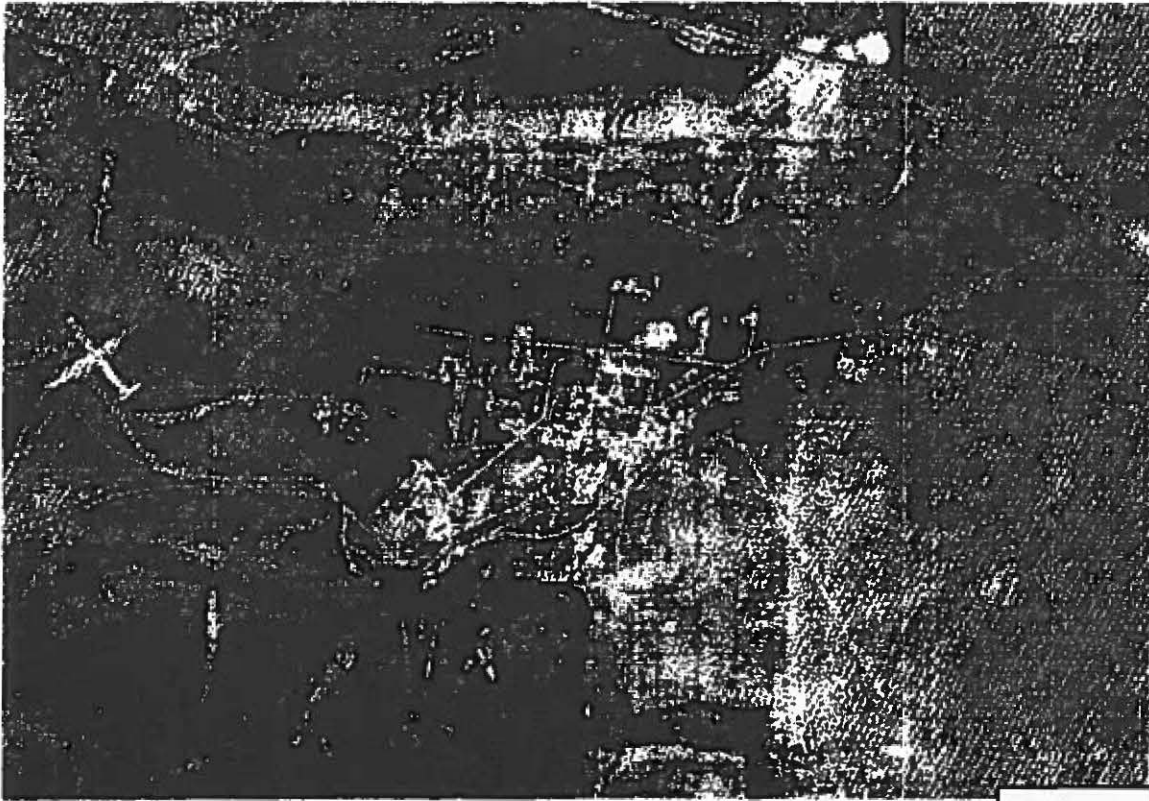


FIGURE 2. SIMFEROPOL EARTH SATELLITE TRACKING AND COMMUNICATION CENTER, [redacted]

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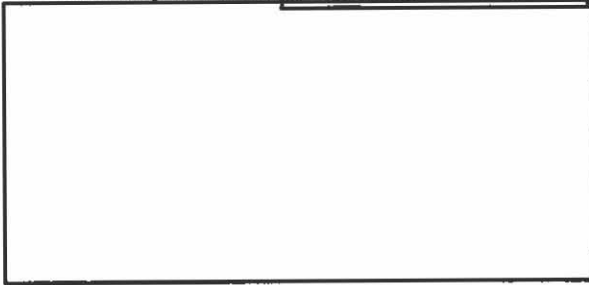
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at present there are approximately 60. Other areas were obscured by clouds in the [redacted] coverage.

This is probably the principal earth satellite tracking and communication center in the USSR. The diversity of antenna design and probable function, together with the magnitude of support and security elements [redacted]

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The Simferopol center consists of numerous space and terrestrial communication facilities, including (Figures 2 and 3): a radio astronomy station; an earth satellite tracking station described in this report as a FLIM FLAM station associated with the FLIM FLAM system; a probable satellite telemetry collection or "dump" site; terrestrial transmitting and receiving stations; a probable DRUM HEAD troposcatter antenna; a microwave tower; a steerable yagi antenna array; and an interferometer under construction. Two calibration towers are situated on a hill about 2,400 feet south of the center. Several of the above-mentioned items have been identified only on the ground photography of [redacted] but their locations have been established through [redacted] photography.

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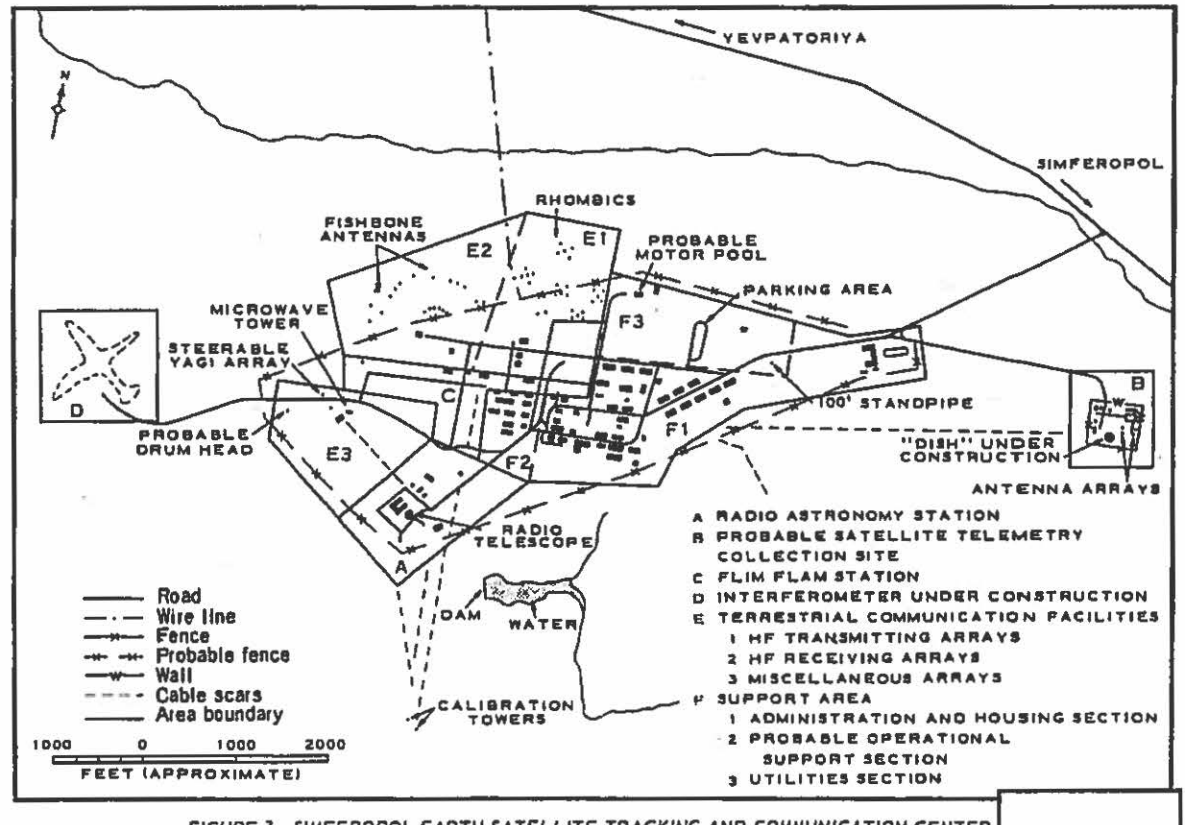


FIGURE 3. SIMFEROPOL EARTH SATELLITE TRACKING AND COMMUNICATION CENTER.

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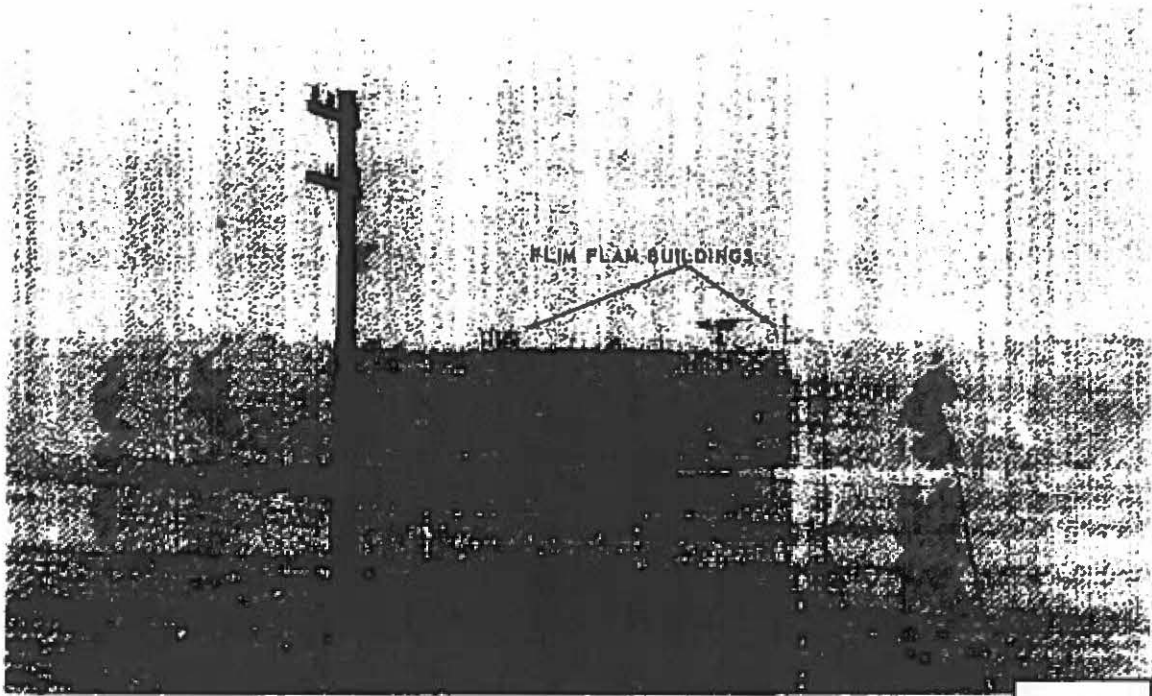


FIGURE 4. RADIO ASTRONOMY AND FLIM FLAM STATIONS AT SIMFEROPOL CENTER, [REDACTED]

RADIO ASTRONOMY STATION

The radio astronomy station is in the southwest part of the center (Figure 3, item A). In addition to a steerable radio telescope, [REDACTED] in diameter, the station contains a large U-shaped multistory building approximately 165 by 125 feet with each wing 45 feet wide, a 95- by 40-foot building, a building approximately 110 by 25 feet, and four smaller structures.

The large "dish" is mounted on a pedestal-like structure, and bulkiness visible on the ground photography (Figure 4) indicates probable trusswork support. With the "dish" in a horizontal position, the lip is approximately 65 feet above the ground. The "feed," supported by a tripod or four-legged arrangement, is about [REDACTED] above the lip of the "dish." The depth of the "dish" is approximately [REDACTED] General

construction of the "dish" resembles the 22-meter radio telescope at Serpukhov (Figure 5), but the scale of the photography precludes precise determination of any "feed" differences or whether or not the reflector surface is solid.

The support pedestal for the radio telescope appeared to exist in [REDACTED] the "dish" was apparently complete.

A 125-foot-high calibration tower for the radio telescope is situated approximately 2,400 feet to the south. A cable scar extends from the tower to the "dish."

The station has a cable line connection with the adjacent terrestrial communication section that contains the microwave, probable tropo-scatter, and steerable yagi antennas.

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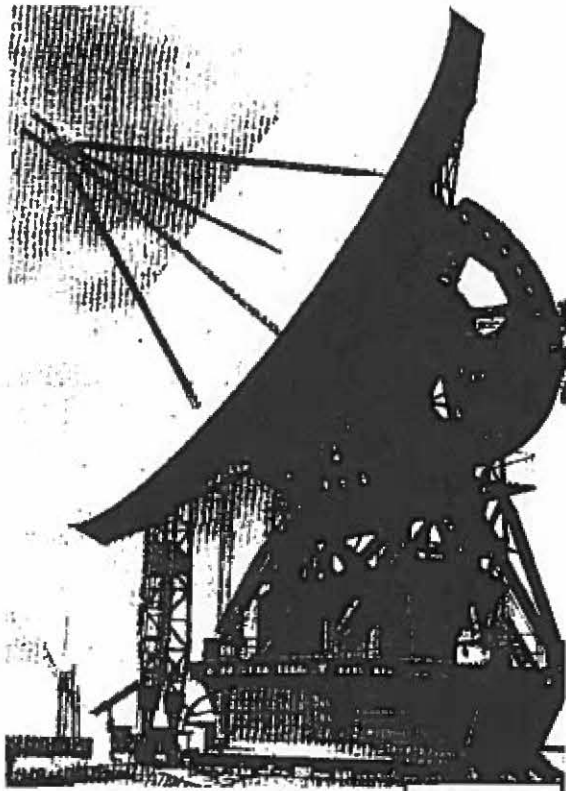


FIGURE 5. RADIO TELESCOPE AT SERPUKHOV, [redacted]

Within the site are at least 4 completed antenna arrays and a large "dish" under construction (Figure 6). Of the 4 completed antenna arrays, 2 are similar in appearance, each consisting of 8 helix antennas arranged in 2 rows of 4. If present, the helix reflectors are wire-mesh type. Minimum dimensions for each of these 2 arrays are approximately 45 by 15 feet overall. The other 2 antenna arrays appear generally similar, but consists of 14 helices mounted in 2 rows of 7 antennas each on a flat or nearly flat, rectangular, solid or punched-hole reflector. These helices are each approximately [redacted] in length and approximately [redacted] in diameter; each array measures [redacted] overall. The "dish," approximately 90 feet in diameter, was resting on the ground and being assembled, though the mount or gantry had not been constructed, as of [redacted]

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North of the antenna arrays there is a large single-story building approximately 85 by 35 feet. Adjacent to the building is an apron approximately 85 by 85 feet, probably concrete. There are five other buildings within the secured area, the four largest measuring 60 by 30 feet, 40 by 30 feet, and two 30 by 20 feet. Three of these have small adjoining aprons. The fifth building is a small, probable security building adjacent to the gate.

PROBABLE SATELLITE TELEMETRY
COLLECTION SITE

This separately secured area (Figure 3, item B), situated approximately 3,500 feet east of the administration and housing section of the center, measures 550 by 410 feet. Visual and physical security are provided by an [redacted] high wall along all of the northern and approximately 370 feet of the eastern side; a probable fence along the remaining perimeter; and guard towers and night-lighting poles located along the inside of both wall and probable fence. The site was evident on coverage of [redacted] [redacted] and is connected to the support area by road and cable line.

FLIM FLAM STATION

Two identical buildings, each with a probable dish-type antenna mounted on the roof, are situated in the western part of the center just to the north of the radio astronomy station (Figure 3, item C). [redacted]

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According to collateral sources, 2/ this is Station 8 of the FLIM FLAM system. Based on the physical layout of the complex, it appears probable that it is north-oriented (Table 1).

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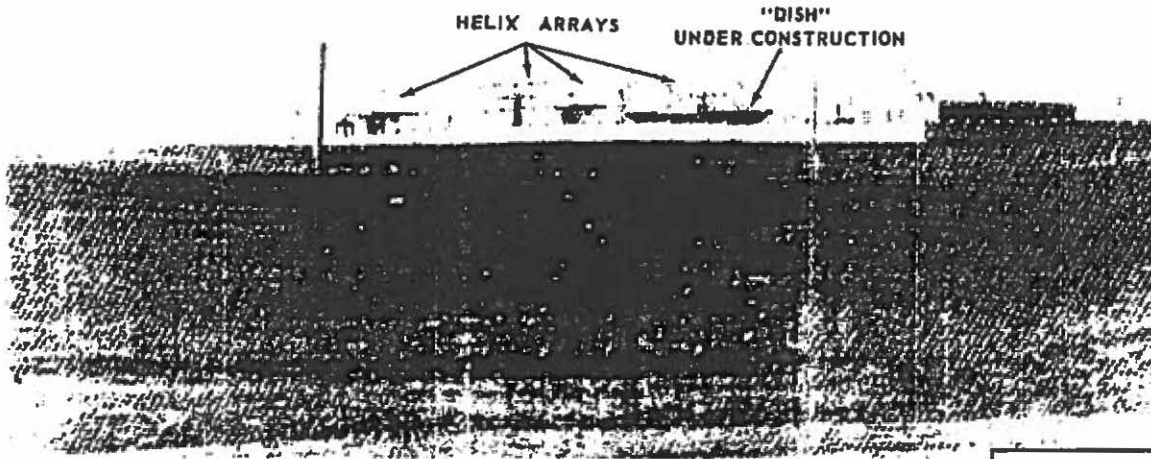


FIGURE 6. PROBABLE SATELLITE TELEMETRY COLLECTION SITE AT SIMFEROPOL CENTER. [redacted]

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Each building is a two-story structure 80 by 55 feet and 20 feet high; taking a line between the antennas as a baseline, they are separated by 390 feet. Ground photography shows there are 10 windows on the north side of each building (Figure 4), and other ground photography indicates the probability of windows on other sides of each building. On the roof of each building is a [redacted] high pedestal supporting a probable meshlike "dish" antenna, but photographic limitations preclude further identification. A small structure is located midway between the two buildings.

In addition to the two prominent buildings and the small structure between them, several other apparently associated items were noted (Figure 7): a stick-mast antenna about 1,200 feet west of center and in line with the three structures; a 175- by 50-foot building about 680

feet east of center and also in line; a possible low, reverted tower about 1,200 feet east and also in line; and a circular area with a dark center lying north of the station. (A similar pattern is evident at Sary-Shagan, and various individual components have been noted at other FLIM FLAM stations.)

A calibration tower for the FLIM FLAM station stands on a hill approximately 4,100 feet to the south. It is approximately 175 feet high and adjacent to the previously mentioned radio telescope calibration tower. A cable scar extends from the tower to the station.

Probably also associated with FLIM FLAM operations is a new interferometer under construction 3,600 feet west of the station, each diagonal of which is approximately 1,125 feet in length (Figure 3, Item D).

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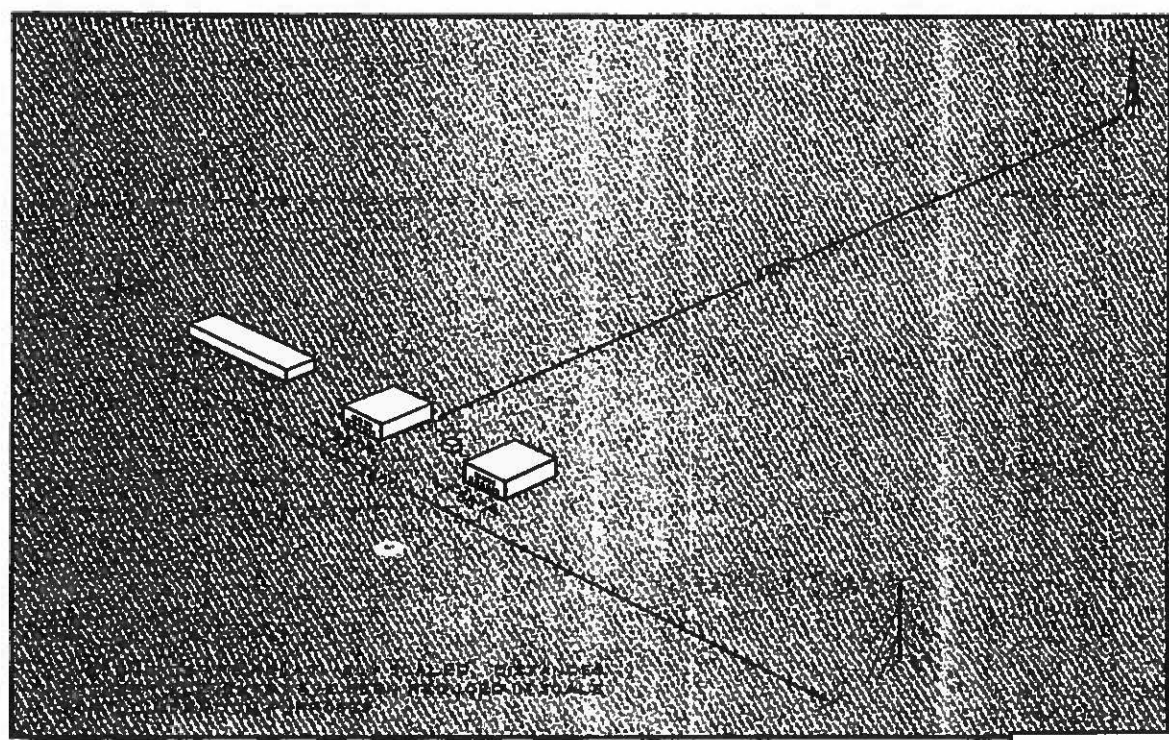


FIGURE 7. CONCEPT OF FLIM FLAM STATION AT SIMFEROPOL CENTER.

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TERRESTRIAL COMMUNICATION FACILITIES

The terrestrial communication facilities consist of two control buildings, HF transmitting rhombic antennas, HF receiving fishbone antennas, a probable DRUM HEAD troposcatter antenna, a steerable yagi antenna array, a tower supporting two microwave antennas, and an external wire line (Figure 3, items E1, E2, and E3, and Figure 8).

The HF transmitting antennas consist of a single, day rhombic and a double, night rhombic, both oriented generally toward Moscow (azimuth of 15 degrees). The HF receiving antennas consist of a fan of fishbone arrays arranged in a 135-degree arc that provides azimuthal coverage from [redacted]. The probable DRUM HEAD troposcatter antenna appears to be oriented generally toward Moscow

or Kharkov. The microwave antennas appear to be oriented toward Yevpatoriya. The wire line runs north from the center to the Yevpatoriya-Simferopol road, and is then visible leading off toward Yevpatoriya. The steerable array appears to consist of four or five yagi antennas on a single pedestal mount.

SUPPORT AREA

The center support area consists of an administration and housing section, a probable operational support section, and a utilities section.

The administration and housing section (Figure 3, item F1) contains approximately 42 buildings, most of which appear to be apartment type. The largest measurable buildings include:

- 1 U-shaped administration building, 200 by

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- 35 feet, with wings 90 by 35 and 70 by 35 feet
- 1 L-shaped building, 150 and 140 by 45 feet
- 8 apartment-type buildings, each 135 by 40 feet
- 6 apartment-type buildings, each 135 by 50 feet
- 2 apartment-type buildings, each 135 by 60 feet
- 5 apartment-type buildings, 125 by 60 feet, 105 by 40 feet, 75 by 50 feet, 70 by 40 feet, and 60 by 45 feet
- 5 miscellaneous housing buildings, two 55 by 40 feet, one 45 by 30 feet, and two 30 by 30 feet.

Because of the small scale of the photography, it is not possible to give a more definite description of the approximately 14 other miscellaneous small structures in the section.

The probable operational support section

(Figure 3, item F2), located adjacent to the FLIM FLAM station, contains 11 buildings, the largest of which include:

- 2 buildings, each 115 by 30 feet
- 2 buildings, each 95 by 40 feet
- 2 buildings, each 95 by 30 feet
- 2 buildings, 250 by 30 feet and 75 by 30 feet.

No attempt has been made to determine the precise function of each structure.

The utilities section (Figure 3, item F3) consists of a probable motor pool, a probable water supply, etc. The probable motor pool contains, in addition to a parking area, two buildings, 85 by 40 feet and 70 by 25 feet. A standpipe, 100 feet high, is situated between the administration building and the housing. A 65- by 40-foot building of unidentified function is northwest of the standpipe and adjacent to some undetermined activity. A probable water line leads from a nearby dam to the center.

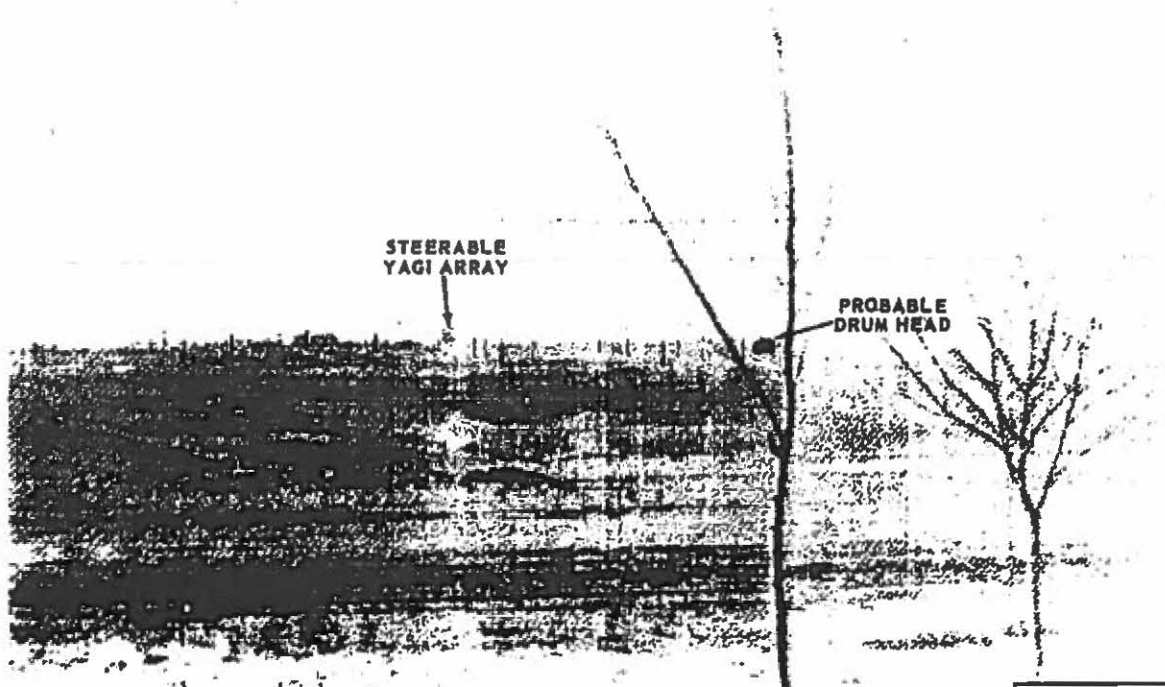


FIGURE 8. TERRESTRIAL COMMUNICATION FACILITIES AT SIMFEROPOL CENTER, [redacted]

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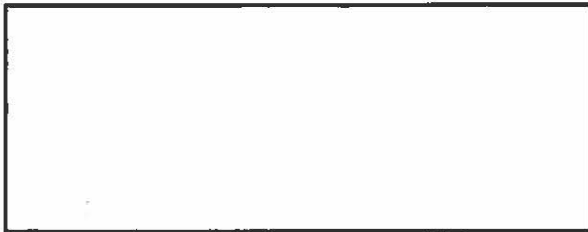
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OTHER EARTH SATELLITE TRACKING FACILITIES (FLIM FLAM) IN THE USSR



Sary-Shagan Antimissile Test Center (SSATC)

At SSATC, a station was identified adjacent to the interferometer at Instrumentation Site 1. Although two stations, 3 and 9, are reported [redacted]

The buildings apparent on photography of [redacted]



Ulan Ude

A probable candidate for Station 2 was identified at a communications facility 12.5 nm east-northeast of Ulan Ude. Since the quality of photographic resolution on [redacted]

[redacted] is only fair, a candidate for Station 18 cannot be determined. Poor quality of earlier coverage precludes a negation date.

Yeniseysk

The FLIM FLAM site is approximately 3 nm east-southeast of Yeniseysk and northwest of a possible interferometer. [redacted]

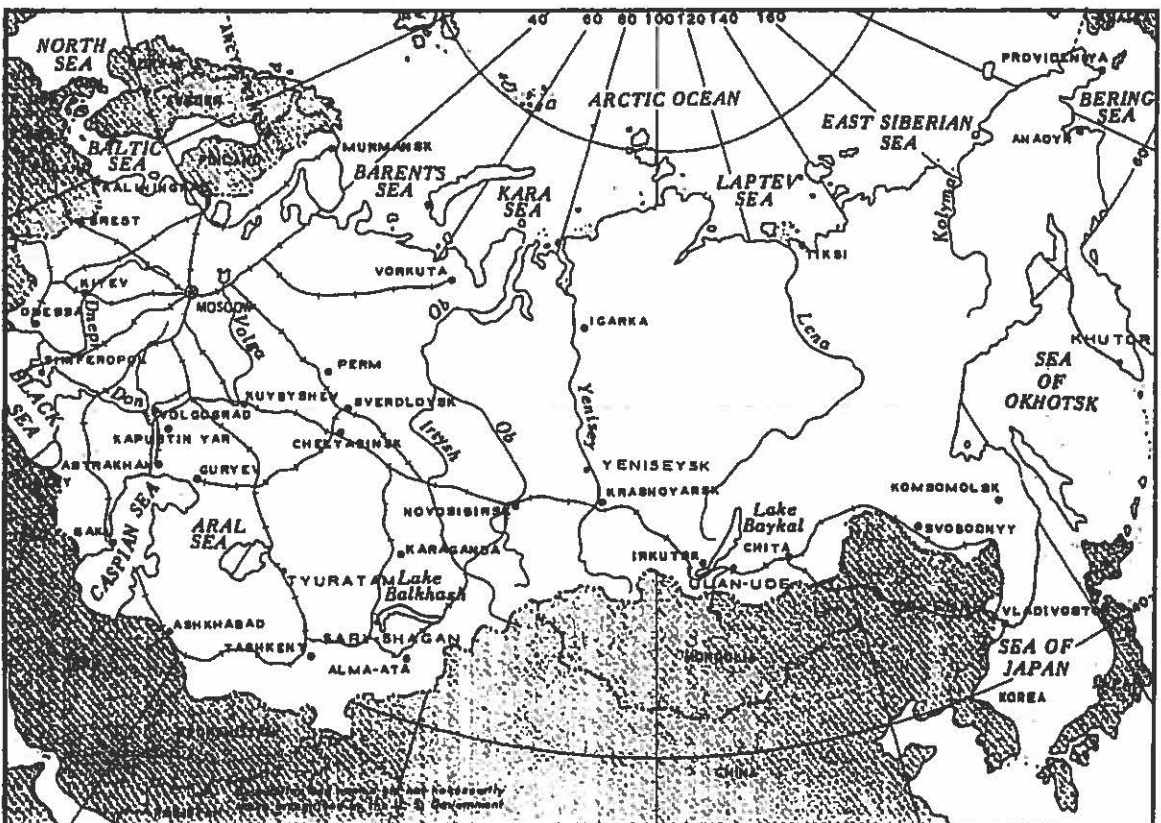


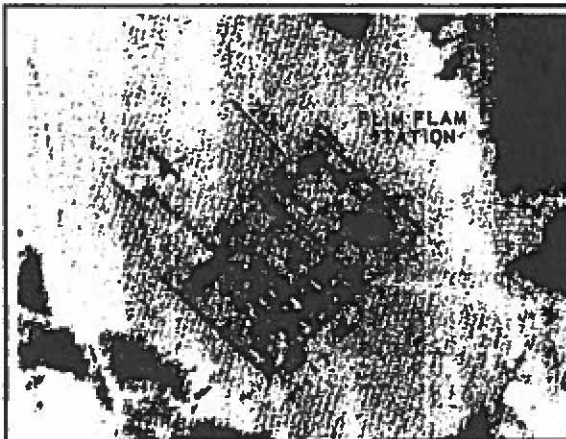
FIGURE 9. LOCATION OF OTHER FLIM FLAM FACILITIES IN THE USSR.



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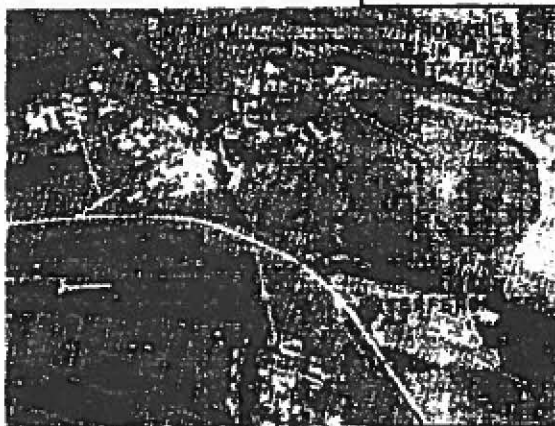
ULAN UDE



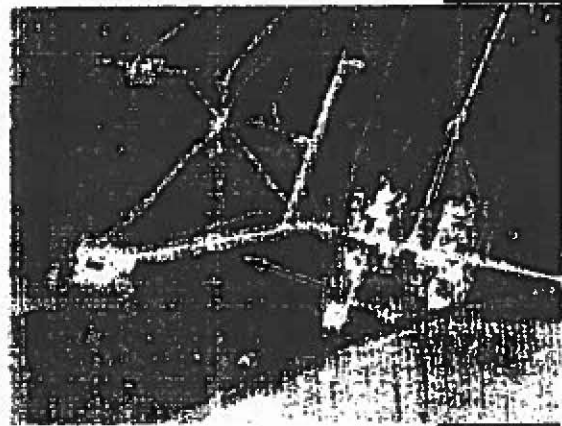
SARY-SHAGAN

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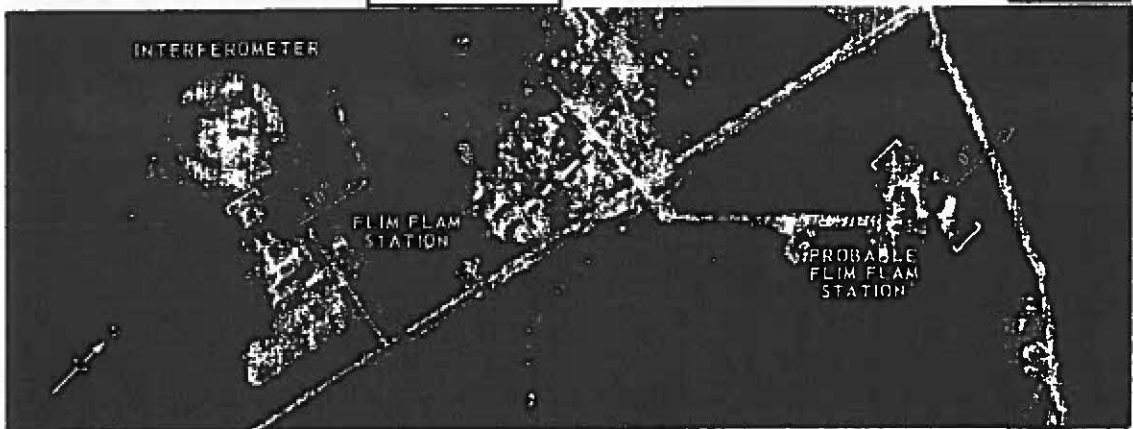


YENISEYSK



GOLENKI

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KHUTOR

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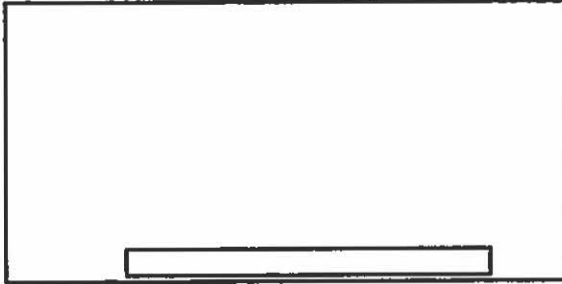
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FIGURE 10. OTHER FLIM FLAM FACILITIES IN THE USSR.

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raphy of [redacted], does not appear on [redacted] coverage.

An additional pair of objects, approximately 425 feet apart, is situated about 1,000 feet southwest of the firm station and 835 feet south of the center of the interferometer. However, lack of sufficient evidence precludes identification of this activity as another station.

Golenki

The FLIM FLAM facility is one nm south of the center of Golenki. Two stations, 10 and 16, [redacted] both have been identified. The older of the two, oriented at 285 degrees, is probably Station 10 and was visible on photography of [redacted]

[redacted] The newer station, oriented at 350 degrees, is probably Station 16. It was under construction in [redacted] and appeared complete on photography of [redacted]

The buildings at probable Station 16, each approximately 100 by 80 feet, are larger than those at probable Station 10.

Khutor

There are three FLIM FLAM stations [redacted] in the Khutor area. One firm and one probable station have been identified. The firm station (oriented at 10 degrees) is 3.6 nm south-southwest of Khutor and adjacent to an interferometer. Although visible on [redacted] coverage, it cannot be negated on [redacted] photography.

The probable station, 2.5 nm south of Khutor, has one building with a probable rooftop antenna clearly evident and a second building that appears bunkered or with its roof at ground level, though the probable antenna is visible (oriented at zero degrees). This facility, present on photog-

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FIGURE 11. PROBABLE FLIM FLAM FACILITIES AT TTMTc LAUNCH COMPLEX A, [redacted]

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Tyuratam Missile Test Center (TTMTC)

A probable site, previously unlisted, was found at TTMTC Launch Complex A (Figure 11). The buildings appear similar to previously described structures, each being approximately 80 by 60 feet and 20 feet high. The baseline between antennas is 885 feet and the orientation is [redacted] degrees. As of [redacted] the building to the northwest appeared complete, while the one to the southeast had an opening in the center of the roof

and no antenna had been erected. Construction began between [redacted]

Adjacent to the northwest are two van-mounted probable parabolic "dishes" which are located on earth mounds. These have the same orientation [redacted] but their baseline is only 870 feet. They appeared between [redacted] coverage of [redacted]

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*Table 1. Earth Satellite Tracking Facilities (ELIM FLAM)
 (all measurements approximate but based on best available sources)*

Name	Station No	Location	Coordinates		Principal Orientation (degrees)	Baseline (between antennas) (ft)	Photo Coverage	Negation Date
				from collateral*				
Ulan Ude	2	12.5 nm ENE of city	51-51-57.6N 07-56-03.46E		265	100		No earlier coverage of satisfactory quality
SSATC	1b 3 or 9	? At Instrumentation Site 1	15-52-55.2N 73-37-13.06E		?	?		[redacted]
Yoniscysk	4/5	3.0 nm ESE of town	56-26-26.32N 02-15-41.04E		295 320	865 865		No earlier coverage of satisfactory quality
Khutor	6/7/10	3.6 nm SSW of town 2.5 nm S of town	53-05-03.46N 56-20-52.08E		10 0	390 865		[redacted] negates second station only
Simferopol	6	11.5 nm NW of city	45-03-07.2N 33-53-32.64E		0	390		[redacted]
Golenki	10 16	1.0 nm S of town	44-00-54.72N 31-45-39.6E		265 350	500 650		[redacted]
TTMTC	?	At Launch Complex A		None		865 870		[redacted]

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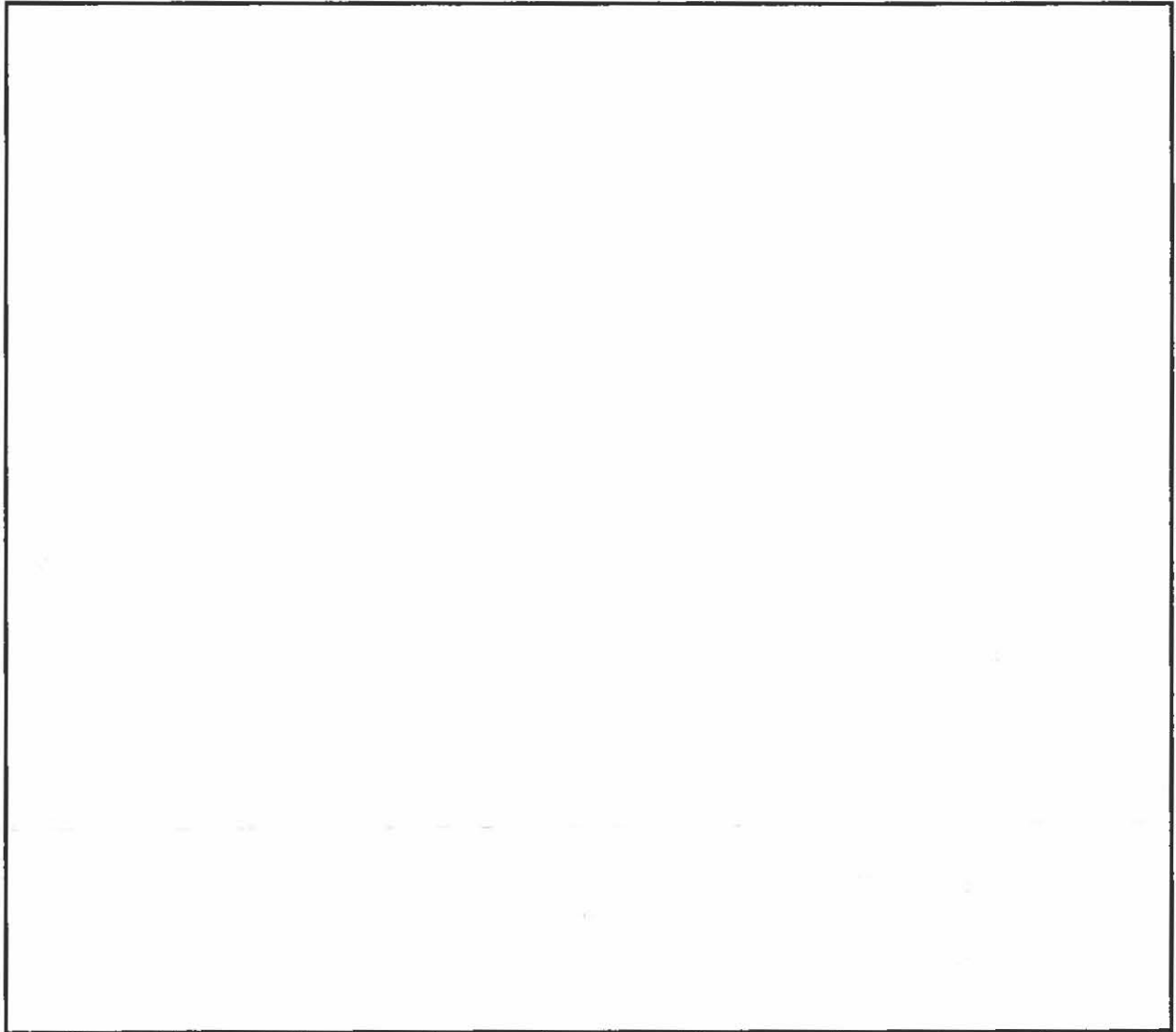
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MAPS AND CHARTS

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REQUIREMENTS

CIA. C-SI3-80,454

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NPIC PROJECT

J-289/63