NATIONAL
PHOTOGRAPHIC
INTERPRETATION
CENTER
June 1969

S I M F E R O P O L S P A C E F L I G H T C E N T E R

ABSTRACT

This report provides a detailed analysis of the Simferopol Space Flight Center from then it was in the early stages of construction, through the latest coverage. The facility, apparently the most significant tracking facility in the Soviet Union, contains the largest number of antennas, the largest area, and the most personnel of any of the Soviet tracking facilities.

The facility is one of a network of ten facilities which contain earth satellite vehicle tracking equipment and provide command/control for Soviet near-space events. Additionally, this facility apparently supports lunar programs in association with the Yevpatoriya Deep Space Tracking Facility.

INTRODUCTION

Simferopol Space Flight Center (Figure 1), the largest tracking facility in the Soviet Union, is 11 nautical miles (nm) northwest of the town of Simferopol in the Crimea. It is approximately 34 nm northwest of the Yevpatoriya Deep Space Tracking Facility which is reported to be directly associated with this center. 1/ The center is situated among rolling hills at an approximate elevation of 150 feet. The terrain to the south becomes increasingly rugged, while to the north it is more gentle.

Antennas present at this center provide an excellent capability for tracking and communicating with near- and deep-space vehicles, in addition to collecting and evaluating telemetry. The Flim Flam component can track, command, and control various types of Soviet space vehicles. Simferopol is one of ten facilities that contain this component. Construction of the facility was started prior to ********** and the center has been growing continuously since that time. These construction updates apparently parallel the "state of the art" with respect to space launchings.

BASIC DESCRIPTION

The center may be subdivided into four functional areas: the main operations area; the telemetry collection area; the interferometer area; and the general support area (Figure 1). The general support area and the main operations area are adjoining areas which comprise 287 of the 340 acres of the facility. The remaining two areas are physically separated; one on the east side of the main operations area and one on the west side. This separation is probably because of the need for isolating the sensitive receiving equipment situated at these locations.

Main Operations Area

This area (Figures 1 and 2) includes three basic components: a 105-foot tracking dish; the Flim Flam component; and the HF communications facility. There are a number of additional telemetry antennas positioned throughout the area. There are approximately **** of floorspace in the structures located within the area, and the area is separately fenced. All item numbers are keyed to Table 1 and Figures 2 or 3, as indicated; communications antennas are designated alphabetically on Figure 2.

105-Foot Tracking Dish

This component is located in the southern portion of the main operations area. It. consists of a 105-foot tracking dish mounted on an azimuth/elevation pedestal (item 153),

a large U-shaped control building (item 152), control/support buildings (items 147, 148 and 164), and several small support buildings. Adjacent to the antenna and on two sides arc rosette patterns of devices/structures which are used when the dish has been lowered for maintenance or modification. A crane used to lower and erect the dish is present on the latest coverage. An unidentified antenna/antenna mount is present on the northeast end of item 164.
A 105-foot dish antenna such as this one would permit communications and telemetry reception at lunar distances. The antenna is operational.

Flim Flam Component
The Flim Flam component is centrally located within the main operations area and contains two control buildings with roof-mounted light- and dark-colored environmental domes apparently covering tracking/receiving dishes (items 111). This component also contains an alignment/calibration mast {item 133a), two vertical dipole communications antennas (items 109 and 110), and one cooling pond (item 130). Tracking dishes observed uncovered at Khutor and Plesetsk Flim Flam facilities have measured approximately **** ***** in diameter.
This component is capable of providing command/control for earth satellite vehicles and appears to be fully operational.

HF Communications Facility
The HF communications facility is located along the northern fenceline of the main operations area. There are two groupings of HF rhombic antennas. The westernmost group contains nine upper spectrum HF bidirectional rhombic receiving antennas (items C through K, Figure 2) which are served by a control building adjacent to the south (item 132). The balance of the TIF antennas are to the east, consisting of two double rhombic antennas arranged in a day/night pair (items A and B, Figure 2) and two possible horizontal dipole antennas. A control building for these antennas cannot be specifically identified.
The nine rhombic antennas have been reported to be space receiving antennas. 1/ This is possible, considering their nearly omnidirectional pattern and the fact that they are resonant only at upper high frequencies. The day/night pair of rhombic antennas is used for terrestrial communication.

Other Equipment, Antennas, and Control Buildings in the Main Operations Area

Item 11 is a communications control building with at least five vertical dipole antennas surrounding it. Located on the north side of the main area is a telemetry control building with five antenna platform positions on its roof. At present only two of the antenna positions are occupied. To the north of this building is a five-element (Type II) pedestal-mounted helix array (item 40).
Items 106 and 107 are control buildings with SHIP WHEEL tracking dishes mounted on the roofs of each building. Their function is most likely beacon tracking.
North of the SHIP WHEEL radars is a control building with a roof-mounted fourelement helix array (item 103) which is reported to be a Doppler tracking antenna. 1/
Two additional control buildings are located in the area (items 104 and 105). A probable optical tracking building (item 131) which appears to have a slide-back roof is located a short distance to the west.
A control building (item 145) has been positioned north of the 105-foot tracking dish. Adjacent to this building is a 16-element helix array (item 144), a R400 microwave tower with two dishes, and an unoccupied pedestal. The 16-element array appears to be a telemetry receiving antenna. Another control building (item 127) which is cable connected

to the interferometer has been positioned in the same area.
Item 140 is a control building associated with the five-element Type I helix array (item 141). Two unidentified antennas (items 139 and 142) and a cooling pond which is presently empty are also observed. There appears to be some construction activity taking place in the area of item 139. The small scale of recent coverage precludes identification, but the object observed in the area appears circular and may possibly be an antenna under construction. A new control building (item 143) in this general location is now externally complete. The area appears operational although expansion activity is taking place.
A total of three self-supporting equipment towers (items 133, 165, and 166) are present at the main operations area. Their purpose is primarily to aid in the alignment and calibration of the various antennas throughout the area.
Several electronics vans are observed at the western fence line. Their purpose is unknown.

Telemetry Collection A r ea
The telemetry collection area (Figure 3) receives telemetry and communications from space vehicles. The physical separation of this component from the main operations area was most likely done to avoid interference from transmitting antennas.
This area contains a new 85-foot tracking dish and its control building, 2/ which is nearly complete on the most recent photography; two eight-element Yagi antennas and two 20-element helix array antennas together with their control building; a control building with an adjacent 16-element helix array on one end and an unoccupied pedestal adjacent to the other end; and five control/support buildings.
The area appears operational except for the new 85-foot dish which should be operational in the near future. The security fence has been extended to include all the newer facilities.
A short distance to the southeast is a separately secured area containing a small communications building with four roof-mounted vertical dipole antennas.

Interferometer Tracking Area
The interferometer tracking area (Figure 4) has been physically separated and positioned to the west of the main area to avoid interference from other antennas. The area is separately secured and contains a standard second-generation Soviet interferometer which employs six receiving antennas and two alignment devices on each of two base legs which perpendicularly bisect each other. A control building is buried just beneath the point of bisection.

General Support Area
The general support area (Figure 2) is a large area adjoining the main operations area and includes administration buildings; barracks/apartment buildings; one old and one new heat/power plant; burled probable fuel storage tanks; buried storage structures; two athletic tracks; a firing range, and numerous general support/maintenance buildings. The entire area contains approximately 100 buildings with an approximate floor area of 468,480 square feet.

Status and Activity
Before *******
The first interpretable photography of Simferopol was ******** coverage of ******
****** At that time the 105-foot tracking dish component was under construction. The HF communications facility may have been present; however, the interpretability of this photography did not permit its identification. Limited operations may have been possible

at the telemetry collection facility which contained several control buildings; however, the helix and Yagi arrays were not discernible. The Film Flam component and the interferometer tracking area were not present in ***** In all, approximately 40 buildings were either complete or under construction at this time. Security fences surrounding the main operations area and general support area were essentially the same as they are at present.

****

The Flim Flam component was first visible under construction in *******

This component was again observed on photography of poor interpretability in ***** with the two tracking buildings under construction; however, no antennas or environmental domes were observed.

During this same period the 105-foot tracking dish appeared to be externally complete.

By ********* there was still no conclusive photographic evidence that the helix and Yagi arrays were in place.

In ******* ground photography provided confirmation of the existence of the helix and Yagi arrays. Additionally, antenna pedestals under construction at the Flim Flam component were observed on ground photography. Three calibration towers (items 133, 165, and. 166); a five-element helix array (item 141); and a telemetry control building with one roof-mounted two-element helix antenna (item 167) located just east of the HF communications facility were also observed. Firm identification of the HF communications facility was possible in *** as well as the observance of early construction on the interferometer device. Continued expansion was observed at the support area.

The first large-scale photography was obtained in *** It was of good interpretability and delineated the 105-foot tracking dish (item 145) as a solid reflector resting in a stowed position. The erection crane was still at the side of the dish.

Two large HF rhombic antennas arranged in a day/night pair (items A and B. Figure 2) and nine smaller HF rhombic antennas could now be identified at the HF communications facility.

HF.

The previously identified Yagi and helix arrays observed at the telemetry collection area could now be precisely located.

The two roof-mounted SHIP WHEEL. tracking dishes (items 106 and 107) could be observed; each was mounted on a separate building. North of these a completed roofmounted four-element helix array was present. Construction of footings for an erection crane, at what was to become the site of an 85-foot mesh-reflector tracking dish was also in progress. The westernmost control building of the Flim Flam component had a completed 80-foot environmental dome on its roof. Continued construction of the interferometer tracking area was observed. A structure later identified as a buried control building was under construction near the bisection point of the base legs of the interferometer.

By ********** the erection crane at the 105-foot tracking dish had been removed; item 143, adjacent to the 105-foot tracking dish, could be identified as a telemetry control building having a 16-element helix array located near its northwest end and an unoccupied pedestal near the opposite end (item 145); the nine smaller rhombic antennas (items C through K, Figure 2) at ihe HF communications facility could he identified as bidirectional receiving antennas.

Between**** a new telemetry control building, an adjacent 16-element helix array, and an unoccupied pedestal were constructed just west of the original telemetry collection component. This arrangement is nearly identical to that adjacent to the 105-foot tracking dish. During the same period the Flim Flam component was externally completed with the positioning of a second 50-foot environmental dome on the easternmost control building. The interferometer tracking area was nearly complete with all the antenna and alignment positions present; the control building had

been buried.

****

During this period the two-element helix antenna mounted on the telemetry control building (item 39A) was removed. Just north of this building a new pedestal-mounted five-element helix array (item 40) was erected. The 85-foot tracking dish appeared to be complete but there was no evidence of a control building or feedline to support the operation of this antenna. A new heating plant was under construction in the general support area. The erection crane used to elevate the 85-foot tracking dish had been removed; however, a crane was being assembled once again at the 105-foot tracking dish.