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This report (PIC/JR-1020/61) is reissued to correct an error on page 10 (Figure 6). It replaces the identically numbered report, copies of which should be destroyed.

PIC/JR-1020/61
May 1961

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JOINT PHOTOGRAPHIC INTELLIGENCE REPORT

FIVE SOVIET HIGH-FREQUENCY BROADCASTING STATIONS

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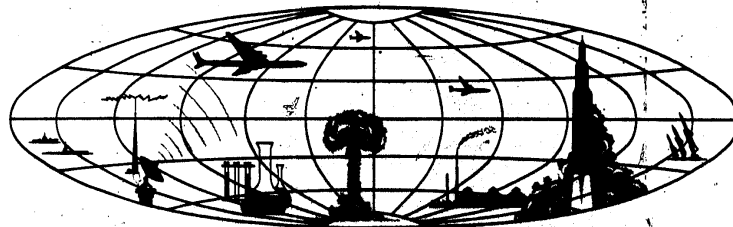
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JOINT PHOTOGRAPHIC INTELLIGENCE REPORT

FIVE SOVIET HIGH-FREQUENCY BROADCASTING STATIONS

PIC/JR-1020/41
May 1961

Published and Disseminated by
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PREFACE

This joint photographic intelligence report has been prepared by the Army, Navy, and Central Intelligence Agency in response to requests for a photographic analysis of five selected high-frequency broadcasting stations located at Novosibirsk, Alma-Ata, Stalinabad, Tbilisi, and Komsomolsk, USSR.

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FIGURE 1. GENERAL ORIENTATION MAP. This map shows the location of the five high-frequency jamming stations discussed in this report.

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INTRODUCTION

This report is based on aerial photography of five selected, similarly designed high-frequency broadcasting stations located at major com-

munications centers in the USSR. These centers are Novosibirsk, Alma-Ata, Stalinabad, Tbilisi, and Komsomolsk (see general orientation map, Figure 1). A

sixth station of similar design, located at Tashkent, and a seventh station, located at Sverdlovsk, are described in other reports. 1/ 2/ Since the self-supporting

lattice towers at all five stations are identical except for measurements, they are described in detail only under the first station -- Novosibirsk.

SUMMARY

In the design of the five high-frequency broadcasting stations described in this report, attention apparently has been focused on flexibility, a high degree of standardization, and maximum plant usage. These have been achieved in the following manner: (1) by erecting two separate groups of lattice towers, probably for separate frequency range bands; (2) by antenna switching; (3) by construction of two identical transmitter buildings; and (4) by the common utilization of power, water, and general support facilities.

Each station exhibits similar physical

characteristics, although the layout, number of towers, and other facilities vary, probably on the basis of the requirement of the particular station. A major similarity of each station is that each has two roughly parallel groups of self-supporting lattice towers, from which high-frequency curtain arrays are suspended. Also, one group is predominantly taller than the other, and at all but one station (Komsomolsk) there are two identical transmitter buildings.

All but one of the five stations (that at Komsomolsk) appear to be in various stages of construction. Some

of those under construction may be in partial operation. The large size of each station indicates an extended effort by the USSR to increase its high-frequency broadcasting capability. Also, it is to be noted that azimuthal orientations of some of the antennas at these stations are only a few degrees apart. This fact indicates that the stations may use space diversity transmissions.

These five stations may serve one or more of the following functions: international broadcasting, domestic broadcasting, and jamming. A significant increase in multilingual Soviet broad-

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casting to Asia and Africa was noted in

Radio Moscow increased its output to the Middle East (Iran) from Stalinabad and Tashkent. 3/ The Tashkent area is completely covered by aerial photography, and the high-frequency broadcasting station near Tashkent (similar to the type discussed in this report) is the only Tashkent station which is oriented toward the Middle East and which is suitable for international broadcasting.

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NOVOSIBIRSK HIGH-FREQUENCY BROADCASTING STATION

This station is located at 54-55N 82-52E, 7 nautical miles south of Novosibirsk (see location map, Figure 2). It is situated on nearly level terrain, approximately 500 feet above sea level.

each with 2 associated cooling ponds; and miscellaneous storage/support-type buildings. A 30-foot-wide paved road serves the station and connects with the road net leading to the urban area of Novosibirsk.

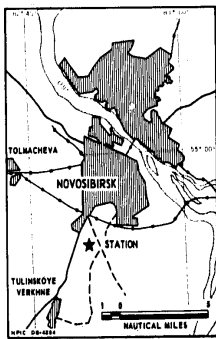


FIGURE 2. LOCATION MAP SHOWING THE NOVOSIBIRSK STATION.

The station includes a fenced operations area and a housing and administration area (see photograph, Figure 3). The operations area is roughly rectangular and covers approximately 400 acres (8,300 by 2,100 feet). Security measures for this area consist of a perimeter fence with five guard towers and a check point at the entrance. The area contains 39 self-supporting lattice towers, arranged in two groups, from which high-frequency curtain arrays are suspended; 4 rhombic antennas; 2 identical transmitter buildings,

each with 2 associated cooling ponds; and miscellaneous storage/support-type buildings. A 30-foot-wide paved road serves the station and connects with the road net leading to the urban area of Novosibirsk.

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OPERATIONS AREA 25X1D

Antennas

Curtain Arrays: The 39 self-supporting lattice towers are arranged in two groups, designated as Tower Groups "A" and "B" (see line drawing, Figure 4). Both groups are oriented north-northeast/south-southwest and are generally parallel. The towers range in height from 200 to 365 feet. In some places the tower groups are as near to each other as 1,100 feet and in other places as far apart as 1,800 feet. Neither group duplicates the spacing or arrangement of the other. The towers in Group "A" are more uniform in height and spacing than those in Group "B".

Tower Group "A," which consists of 17 self-supporting lattice towers (items 1-17) extending over a straight-line distance of 5,100 feet (accumulated, 5,860 feet), is located along the eastern side of the operations area. Each tower supports parallel horizontal crossarms (see perspective drawing, Figure 5). The positioning of these towers and the spacing of the crossarms indicate that the towers support curtain arrays. The topmost crossarm supports the cables which are



FIGURE 3. PHOTOGRAPH OF THE NOVOSIBIRSK STATION.

being used to suspend and hold the antennas vertically. Horizontal tension is probably maintained by steel cables on the subsequent lower crossarms. Towers 1 and 2 support top crossarms 20 feet long and towers 3-17 support top crossarms 100 feet long. Smaller horizontal crossarms are positioned along the vertical axis of each tower. The bases of towers 1 and 2 are 20 feet square and of towers 3-17, 100 feet square. Between towers 4 and 5, 5 and 6, 10 and 11, and 14 and 15 are small unidentified objects, probably switching and phase-changing devices. This suggests that the curtain arrays may be capable of transmitting in two directions. Table 1 gives the azimuth orientation of a perpendicular to a line projected from one tower to the next, together with the tower measurements (tower numbers are keyed to Figure 4).

Tower Group "B," which consists of 22 self-supporting lattice towers (items 18-39) extending over a straight-line distance of 5,200 feet (accumulated, 5,700 feet), is located along the western side of the operations area. Each tower supports parallel horizontal crossarms

from which curtain arrays are suspended. Towers 21-28, and 32-39 support top crossarms which measure 100 feet. The length of the top crossarms on towers 18-20 and 29-31 cannot be determined. The bases of towers 21-27 and 32-39 measure 100 feet square and the bases of towers 18-20 and 28-31 measure 20 feet square.

Again, in Tower Group "A," probable switching and phase-changing devices are positioned on the ground (between towers 29 and 30, 33 and 34,

TABLE 1. DATA ON TOWER GROUP "A," NOVOSIBIRSK

Tower No.	Height (ft.)	Distance Between Towers (ft.)	Azimuth Orientation* (°)
1	210	270	
2	220	270	
3	360	270	
4	360	360	
5	360	360	
6	360	360	
7	360	360	
8	360	360	
9	360	360	
10	360	360	
11	360	360	
12	360	360	
13	360	360	
14	360	360	
15	360	360	
16	360	360	
17	360	360	

*Perpendicular to a line projected between centers of towers.

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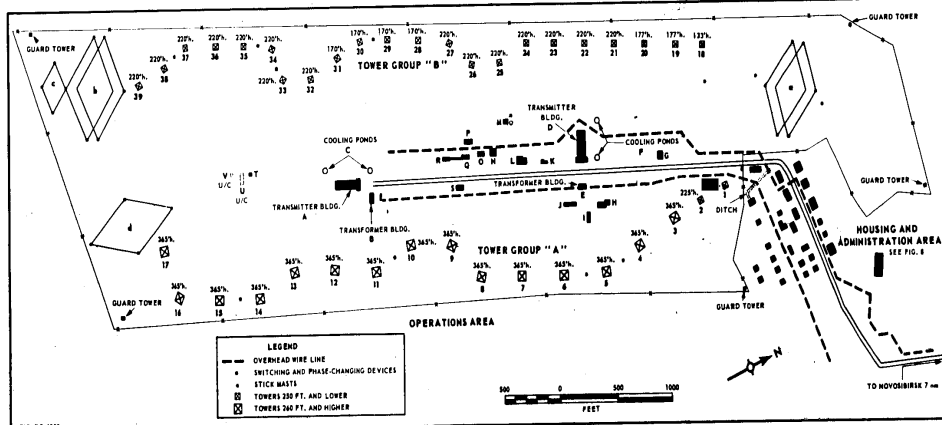


FIGURE 4. OPERATIONS AREA AT THE NOVOSIBIRSK STATION. This drawing shows the 29 self-supporting lattice towers.

TABLE 2. DATA ON TOWER GROUP "B", NOVOSIBIRSK.

Tower No.	Height (ft.)	Distance Between Towers (ft.)	Azimuth Orientation* (°)
18	230	110/290	
19	205	110/290	
20	220	106/283	
21	220	110/290	
22	220	110/290	
23	220	110/290	
24	220	110/290	
25	220	110/290	
26	220	110/290	
27	220	110/290	
28	170	110/290	
29	170	110/290	
30	170	110/290	
31	170	205	
32	220	205	
33	220	205	
34	220	205	
35	220	205	
36	220	205	
37	220	205	
38	220	205	
39	220	205	

*Perpendicular to a line projected between centers of towers.

34 and 35, and 37 and 38), suggesting that the curtain arrays may be capable of transmitting in two directions. Table 2 gives the azimuth orientation of a perpendicular to a line projected from one tower to the next, together with the tower measurements (tower numbers are keyed to Figure 4).

In Tables 1 and 2, both front and back azimuthal readings are tabulated. These azimuths are grouped, tabulated for both tower groups, and totaled in Table 3.

TABLE 3. ORIENTATIONS OF TOWERS, NOVOSIBIRSK.

Azimuth Orientation (°)	Group "A"	Group "B"	Total
6	8	8	16
9	1	1	2
14	1	1	2
1	1	1	2
TOTAL	18	21	39

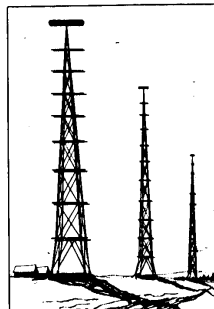


FIGURE 5. PERSPECTIVE DRAWING OF SELF-SUPPORTING LATTICE TOWERS. Each of the five towers illustrated in this report has two angles of towers of this type. The towers support high-frequency curtain arrays.

The above azimuths have been averaged and plotted on a gnomonic projection map which indicates the general areas which may be covered by the arrays suspended from the towers (see Figure 6).

Rhombic Antennas: Two single and two double rhombic antennas are located in the operations area. One double rhombic is located in the northern end of the area, and one double and two single rhombics in the southern end. One double and one single rhombic are arranged in a pair for day and night frequencies. No feed or dissipation lines can be identified. Rhombic antenna measurements are listed in Table 4 (antennas are keyed to Figure 4, and their orientations are shown on the map, Figure 6).

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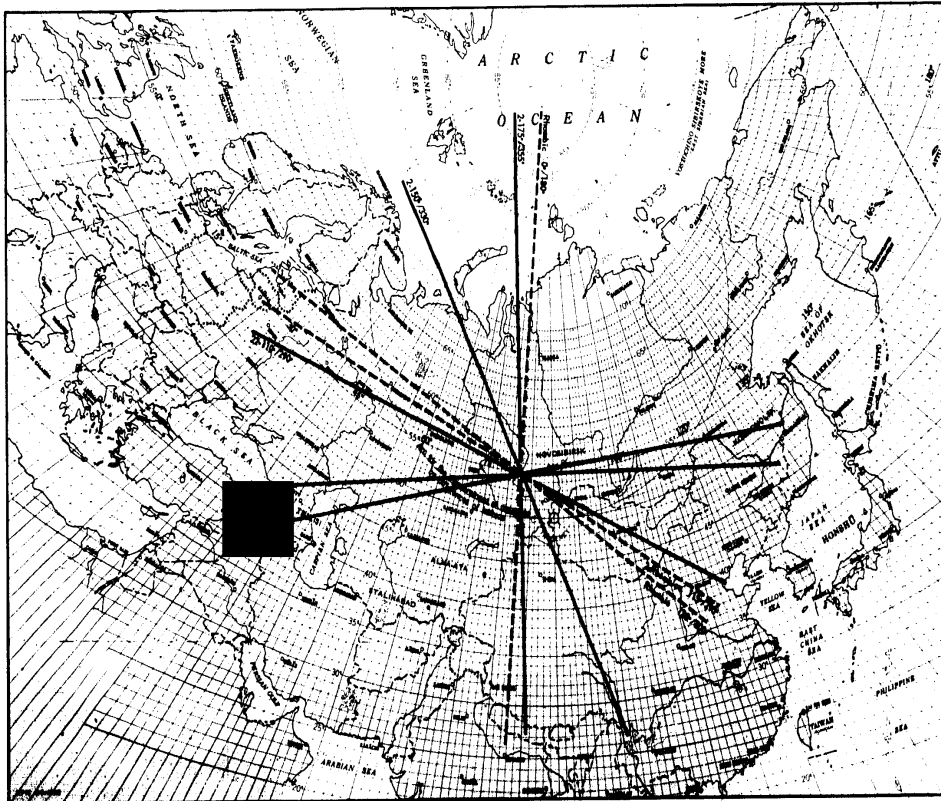


FIGURE 6. GNOMONIC PROJECTION MAP, showing areas covered by antennas of Naval Air's high-frequency broadcasting stations.

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TABLE 4. DATA ON RHOMBIC ANTENNAS, NOVOSIBIRSK

Antenna	Major Axis (ft.)	Minor Axis (ft.)	Length of One Side (ft.)	Distance Between Top Poles (ft.)	Height of Rod Poles (ft.)	Height of Side Poles (ft.)	Computed Tilt Angle (" ' ")	Orientation of Major Axis (°)
a	710	355	400	85	90-100	115		120/300
b*	720	358	400	82	80	115		118/298
c	478	210	255	--	75	75		112/288
d*	780	400	430	--	85	85		900/180

*Approximate measurements

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Structures

The two transmitter buildings (Figure 4, items A and D) are situated between the two tower groups and are connected by a service road. For a perspective of this type of building, see Figure 7.



FIGURE 7. PERSPECTIVE DRAWING OF MONITOR-ROOFED TRANSMITTER BUILDING. Two identical buildings of this type are located at four of the five antenna groups in this report.

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Associated with transmitter building A is a transformer building (item B) and two cooling ponds (item C). Transmitter building A has a modified T-shaped appearance, measures 230 by 100 and 115 high, and provides 17,710 square feet of covered floor space. This building

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has a flat roof with a flat-roofed longitudinal monitor which is 100 high and 100 wide, probably for ventilation and light. Two vents 100 square and 100 feet apart are located on the western side of the lower roof. The two cooling ponds, 55 feet in diameter and 440 feet apart, are located outside the building on the same side as the vents in the roof. In the center of each pond is a fountain used to facilitate the cooling of the water.

25X1D 25X1D

Transformer building B, located 110 feet in front of transmitter building A, is a gable-roofed building 100 high, with a chimneylike structure extending upward from the roof of either end of the northern side of the building.

Associated with transmitter building D is transformer building E and two cooling ponds (item F), which are identical to those associated with transmitter building A and described above, except that the ponds are closer together and the transformer building is farther from the transmitter building.

It is impossible to identify any feed lines from the transmitter buildings to any of the towers, rhombic antennas, or probable switching and phase-changing devices. Thus it cannot be determined which antennas are used by a particular transmitter building. Also within the operations area, besides the transmitter and transformer buildings and ponds, are 16 miscellaneous buildings which provide a total covered floor space of 33,730 square feet. A description of each building is given in Table 5 (buildings are keyed to Figure 4).

Overhead Power and/or Communications Lines

Two overhead wire lines enter the station from the northeast. These lines supply power and possibly land-line com-

TABLE 5. STRUCTURES IN OPERATIONS AREA, NOVOSIBIRSK

Building	Description	Dimensions (ft.)	Function
A	One story, monitor roof		Transmitter bldg.
B	One story, gable roof		Transformer bldg.
C	Two ponds		Cooling ponds
D	One story, monitor roof		Transmitter bldg.
E	One story, gable roof		Transformer bldg.
F	Two ponds		Cooling ponds
G	One story, gable roof		Undetermined
H	One story, gable roof, shed		Undetermined
I	One story, flat roof		Storage bldg.
J	One story, flat roof		Storage/maintenance bldg.
K	Billevel, flat roof		Undetermined
L	One story, hipped roof, w/flat main	100 x 80	Probable administration or local communications bldg.
M	One story, flat roof		Undetermined; wash house, probable buried tank in flat, and small shed near bldg.
N	One story, gable roof	88 x 60	Storage/maintenance bldg.
O	One story, flat roof		Storage bldg.
P	One story, gable roof		Storage bldg.
Q	One story, gable roof	78 x 30	Undetermined; connected to bldg. by a 10'-long x 10'-wide partially covered passageway.
R	One story, flat roof		Possible hatch plant; served by an unheated exhaust ramp; two excavations near base.
S	One story, gable roof		Storage/maintenance bldg.
T	One story, hipped roof		Undetermined
U	One story, gable roof, U/C		Undetermined
V	One story, gable roof, U/C	90 x 90	Undetermined

*auxiliary

**shed

munications to the station. Both lines appear to emanate from a wire line located 2 nautical miles from the station. For one of these two lines, which supply both transformer buildings, there are masts averaging 55 feet high and spaced at intervals of 450 feet outside of the station and 300 feet apart within the operations area. For the other line there are poles averaging 50 feet high and spaced at irregular intervals but not more than 350 feet apart.

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HOUSING AND
ADMINISTRATION AREA

The housing and administration area (see line drawing, Figure 8) is located outside the operations area at its northeast corner. There are 31 buildings in this area, totaling over 94,000 square feet of floor space. Eighteen buildings appear to be used for housing. These houses consist of 56 family-type units and sufficient billets for 100 personnel. A description of each building is given in Table 6 (building numbers are keyed to Figure 8).

TABLE 6. STRUCTURES IN HOUSING AND ADMINISTRATION AREA, NOVOSIBIRSK

Building	Description	Dimensions (ft.)	Function
9-10	10 structures, single story, gable roof, 4 vents on each	48 x 38	2-family housing
11	One story, gable roof, one vent	80 x 40	Undetermined
12	One story, flat roof, extended front	78 x 40	Facilities command hall
13	One story, flat roof	88 x 28	Maintenance bldg.
14	One story, 1-shed, gable roof	80 x 38, 28 x 38	Storage bldg.

*log

**postwood

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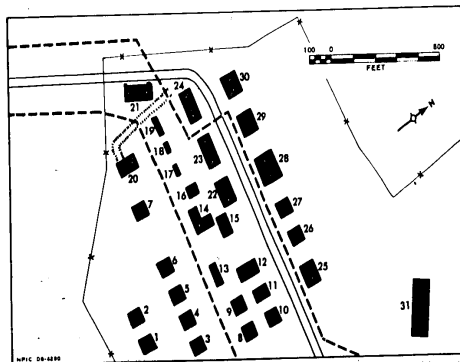


FIGURE 8. HOUSING AND ADMINISTRATION AREA AT THE NOVOSIBIRSK STATION. Figure 8 shows the location of this area in relation to the apartment area.

TABLE 8. (CONTINUED)

Building	Description	Dimensions (ft.)	Function	Building	Description	Dimensions (ft.)	Function
15	One story, flat roof	85 x 55	Possible vehicle shed	24	Multistory, hipped roof, w/4 dormers	90 x 40	Barracks
16	One story, gable roof	55 x 28	Storage bldg.	25	Multistory, hipped roof, w/4 dormers	88 x 55	5-family apartment
17	One story, flat roof	30 x 20	Undetermined	26	One story, gable roof, w/4 dormers	48 x 35	2-family housing
18	One story, flat roof	50 x 20	Undetermined	27	One story, gable roof, w/4 dormers	45 x 35	2-family housing
19	One story, flat roof	85 x 30	Undetermined	28	Multistory, hipped roof, w/4 dormers	85 x 60	5-family apartment
20	Multistory, hipped roof, w/open ditch	75 x 45	Executive quarters	29	Multistory, hipped roof, w/4 dormers	75 x 55	4-family apartment
21	One story, hipped roof, one vent, and 2 gabled entrances	90 x 40	Possible mess hall	30	Multistory, hipped roof, w/4 dormers	75 x 55	5-family apartment
22	Multistory, hipped roof, w/4 dormers	80 x 80	Administration bldg.	31	One story, gable roof	160 x 90	Warehouse
23	Multistory, hipped roof, w/4 dormers	90 x 40	Barracks				

ALMA-ATA HIGH-FREQUENCY BROADCASTING STATION

This station is located at 43-30N 77-00E, 13 nautical miles north of Alma-Ata (see location map, Figure 9). The station includes a fenced operations area

and miscellaneous storage-support-type buildings. The station is served by an all-weather road from Alma-Ata.

OPERATIONS AREA

Antennas

Curtain Arrays: The 26 self-supporting lattice towers and 4 tower bases are arranged in two groups, designated as Tower Groups "A" and "B" (see line drawing, Figure 11). The two tower groups are roughly parallel, but neither group duplicates the spacing or arrangement of the other. Small unidentified objects located between the towers are probable switching and phase-changing devices. Except in measurements, these towers are identical to those at Novosibirsk (see page 9).

Tower Group "A" consists of nine self-supporting lattice towers (items 1-6 and 8-10) and concrete bases for four additional towers (items 7 and 11-13). All tower bases measure approximately square, and top crossarms measure approximately 45 feet in length. This group is situated in a relatively straight line along the eastern edge of the operations area and is oriented south-southwest/north-northeast. Tower Group "A" dimensions are given in Table 7 (tower numbers are keyed to Figure 11).

Tower Group "B" consists of 17 self-supporting lattice towers (items 14-30) arranged in a relatively straight line and located on the western edge of the



FIGURE 10. PHOTOGRAPH OF THE ALMA-ATA STATION.

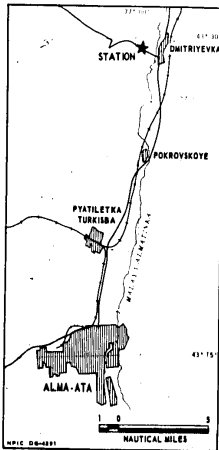


FIGURE 9. LOCATION MAP SHOWING THE ALMA-ATA STATION.

and a housing and administration area (see photograph, Figure 10). The operations area is roughly rectangular and covers approximately 470 acres (7,500 by 2,750 feet). It contains 26 self-supporting lattice towers, arranged in two tower groups, which support high-frequency curtain arrays; bases for 4 additional towers; 6 rhombic antennas; 2 transmitter buildings;

TABLE 7. DATA ON TOWER GROUP "A", ALMA-ATA

Tower No.	Height (ft.)	Distance Between Towers (ft.)	Azimuth Orientation* (°)
1	350	380	
2	350	378	
3	350	376	
4	350	376	
5	350	376	
6	350	380	
7	U/C	378	
8	350	378	
9	350	378	
10	350	378	
11	U/C	378	110/290
12	U/C	378	135/315
13	U/C	378	138/218

*Perpendicular to a line projected between centers of towers.

TABLE 8. DATA ON TOWER GROUP "B", ALMA-ATA

Tower No.	Height (ft.)	Distance Between Towers (ft.)	Azimuth Orientation* (°)
14	210	258	
15	210	260	
16	210	265	
17	180	265	
18	125	248	
19	180	265	
20	210	265	
21	210	260	
22	210	245	
23	210	255	
24	210	255	
25	210	265	
26	210	260	
27	210	260	
28	210	265	
29	210	265	
30	210	268	

*Perpendicular to a line projected between centers of towers.
**Tower probably under construction.

operations area. Group "B" is oriented in the same general direction as Group "A." Tower bases measure approximately 20 feet square, and the top crossarms are approximately 20 feet in length. Dimensions of Tower Group "B" are given in Table 8 (tower numbers are keyed to Figure 11).

In Tables 7 and 8, both front and back azimuthal readings are tabulated. These azimuths are grouped, tabulated for both tower groups, and totaled in Table 9.

TABLE 9. ORIENTATIONS OF TOWERS, ALMA-ATA

Azimuth Orientation (°)	Group "A"	Group "B"	Total
110	1	0	1
135	0	1	1
138	0	1	1
TOTAL	12	16	28

The above azimuths have been averaged and plotted on a gnomonic projection

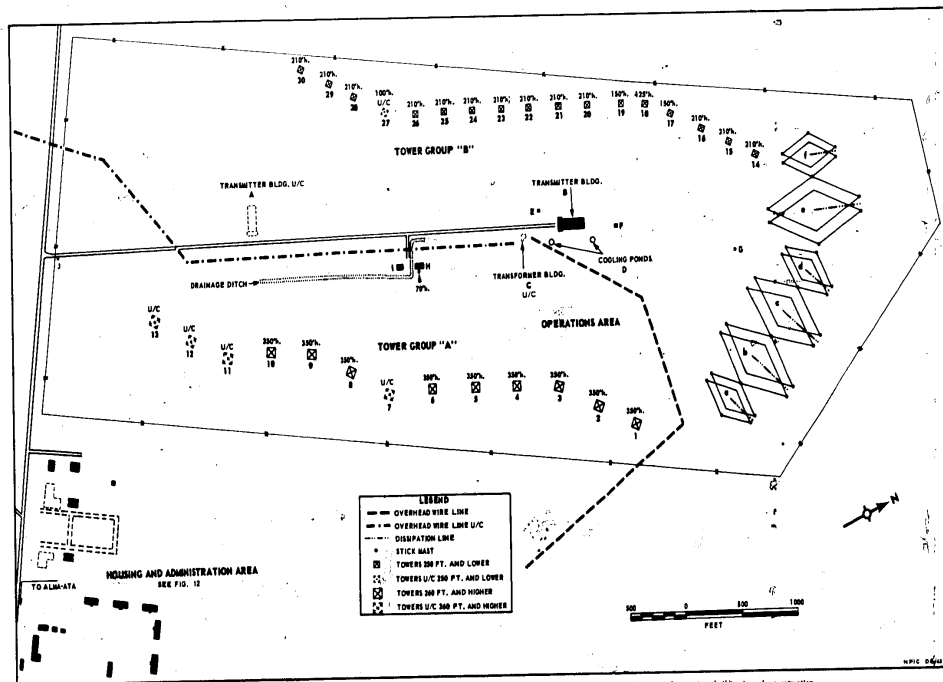


FIGURE 11. OPERATIONS AREA AT THE ALMATY STATION. This plan view shows the 36 self-supporting lattice towers. Note that the second transmitter building is under construction.

map which indicates the general areas which may be covered by the arrays (see Figure 13). Azimuth orientations 130°/310° and [redacted] have been included on the map with the azimuth orientation group [redacted]

Rhombic Antennas: The six double rhombic antennas (see Figure 11, items a through f), which are located in the northern portion of the operations area, are arranged in three pairs (one day and one night in each pair). Disipation lines

are evident, indicating that these rhombica are probably utilized for transmitting. Rhombic antenna measurements are given in Table 10, and the azimuthal orientations are shown on the map, Figure 13, page 16.

Structures

The two transmitter buildings (Figure 11, items A and B) are located approximately midway between Tower Groups "A" and "B." For a perspective of this type of building, see Figure 7. Transmitter

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25X1D

TABLE 10. DATA ON RHOMBIC ANTENNAS, ALMA-ATA

Antenna	Major Axis (ft.)	Minor Axis (ft.)	Length of One Side (ft.)	Distance Between End Poles (ft.)	Height of End Pole (ft.)	Height of Side Pole (ft.)	Computed Tilt Angle (°)	Orientation of Major Axis (°)
a	500	220	275	75	75	75		
b	745	350	415	100	105	105		
c	760	340	405	85	105	105		
d	500	270	285	90	75	75		
e	880	470	655	85	105	105		
f	880	470	655	85	75	75		

building A is under construction; transmitter building B, however, appears to be completed. Associated with the completed transmitter building is a transformer building under construction (item C), two cooling ponds (item D), two possible tuning houses (items E and F), and one possible switching building (item G). Also within the operations area are several miscellaneous buildings. A 70-foot-high stick mast is adjacent to one of these buildings (item H). A description of each structure is given in Table 11 (building letters are keyed to Figure 11).

TABLE 11. STRUCTURES IN OPERATIONS AREA, ALMA-ATA

Building	Description	Dimensions (ft.)	Function
A	U/C		Transmitter bldg.
B	One story, monitor roof		Transmitter bldg.
C	One story, gable roof, U/C		Transformer bldg.
D	Two ponds		Cooling ponds
E	One story, flat roof		Possible tuning house for one tower group
F	One story, flat roof		Possible tuning house for one tower group
G	One story, flat roof		Possible switching bldg. for rhombic antenna
H	One story, flat roof, w/mast		Possible local communications and administration bldg.
I	One story, hipped roof		Repair facility
J	One story		Guard bldg.

*monitor
**shed

25X1D

Overhead Power and/or Communication Lines

An overhead wire line enters the operations area from the south. Another line, under construction, enters from the southwest. Both lines terminate at the transformer building (item C). The function of these lines is to supply power and possibly land-line communications to the station. The poles supporting the wire line from the south are 90 feet high and are spaced 520 feet apart. The line from the southwest has its pole-line bases spaced 520 feet apart.

HOUSING AND ADMINISTRATION AREA

South of and adjacent to the operations area is the housing and administration area (see line drawing, Figure 12), which contains 18 buildings. Several of the buildings are incomplete, and in one case, only the foundation is apparent. Six of the buildings are temporary quarters, possibly for construction workers. A description of each building is given in Table 12 (building numbers are keyed to Figure 12).

TABLE 12. STRUCTURES IN HOUSING AND ADMINISTRATION AREA, ALMA-ATA

Building	Description	Dimensions (ft.)	Function
1	One story, U/C	75 x 80	Undetermined
2	One story, hipped roof	80 x 85	Possible quarters
3	L-shaped, continued	Undetermined	Undetermined

TABLE 12. (CONTINUED)

Building	Description	Dimensions (ft.)	Function	Building	Description	Dimensions (ft.)	Function
4	One story, modified H-shaped, hipped roof	80 x 85	Undetermined	12	One story, hipped roof	150 x 45	Temporary barracks
5	One story, flat roof	35 x 35	Storage bldg.	13	One story, gable roof	95 x 35	Temporary barracks
6	L-shaped, roof incamp	70 x 80 + 110 x 80	Undetermined	14	One story, flat roof	85 x 20	Storage bldg.
7	One story, modified H-shaped, hipped roof	80 x 85	Undetermined	15	One story, flat roof	55 x 20	Storage bldg.
8	One story, hipped roof	130 x 45	Temporary barracks	16	One story, roof incomplete	90 x 30	Storage bldg.
9	One story, hipped roof	130 x 45	Temporary barracks	17	One story, L-shaped valley roof	180 x 30 + 35 x 30	Possible administration bldg.
10	One story, hipped roof	130 x 45	Temporary barracks	18	One story, flat roof	80 x 25	Undetermined
11	One story, hipped roof	130 x 45	Temporary barracks				

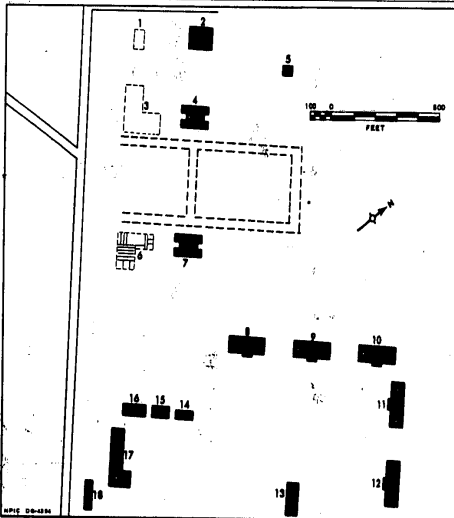


FIGURE 12. HOUSING AND ADMINISTRATION AREA AT THE ALMA-ATA STATION. Figure 17 shows the location of this area relative to the operations area.

25X1C

SECRET

NOFORN (DISSEMINATION RESTRICTED)

STALINABAD HIGH-FREQUENCY BROADCASTING STATION

This station is located at 38-29N 68-47E, 6 nautical miles south of Stalinabad (see location map, Figure 14). It consists of a fenced operations area and

an administration area, which is adjacent to the operations area and is joined to it by a hard-surface road, contains approximately 40 buildings and several small sheds.

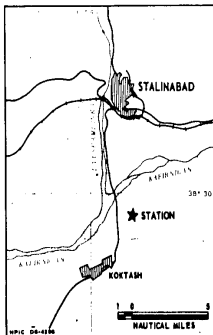


FIGURE 14. LOCATION MAP SHOWING THE STALINABAD STATION.

a housing and administration area (see photograph, Figure 15). The operations area is roughly rectangular and covers approximately 275 acres (6,000 by 2,000 feet). It contains 30 self-supporting lattice towers, arranged in two groups, which support high-frequency curtain arrays; 4 guyed vertical radiators; 2 identical large transmitter buildings, each with two associated cooling towers; one small transmitter building; and miscellaneous storage/support-type buildings. The four guyed vertical radiators and small transmitter building are part of a local broadcasting facility. The housing and admin-

OPERATIONS AREA

Antennas

Curtain Arrays: The 30 self-supporting lattice towers are arranged in two groups, designated as Tower Groups "A" and "B" (see line drawing, Figure 16). Small unidentified objects located between the towers are probable switching and phase-changing devices. Except in measurements, these towers are identical to those at Novosibirsk (see page 9).

Tower Group "A" consists of 15 self-supporting lattice towers (items 1-15). This group is in an L-shaped configuration along the eastern edge of the operations area extending roughly south-southeast to north-northwest. The towers average 350 feet in height and the bases 45 feet on a side. Measured center to center, the towers are [redacted] apart. All but three towers have a 45-foot-long top crossarm (towers 1, 2, and 15 have a 20-foot top crossarm). Smaller crossarms are positioned along the vertical axis of each tower. Measurements for Tower Group "A" are given in Table 13 (tower numbers are keyed to Figure 16).

Tower Group "B" consists of 15 self-supporting lattice towers in a relatively straight line on the western edge of the operations area and roughly parallel

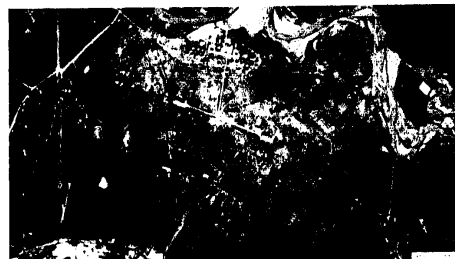


FIGURE 15. PHOTOGRAPH OF THE STALINABAD STATION.

25X1D



* Perpendicular to a line projected between centers of towers.
** Applies to 10 and 12.

back azimuthal readings are tabulated. These azimuths are grouped and tabulated for both groups and totaled in Table 15.

to Tower Group "A." The towers in this group are shorter than those in Group "A." They are 150-240 feet in height, average 250-300 feet apart, and have bases approximately 35 feet square. Each tower has a 20-foot crossarm on top, with additional crossarms positioned along its vertical axis. Measurements for Tower Group "B" are given in Table 14 (tower numbers are keyed to Figure 16).

In Tables 13 and 14, both front and

Antenna Orientation (°)	Group "A"	Group "B"	Total
1	-	1	1
2	-	3	3
4	8	8	12
8	6	6	12
TOTAL	14	14	28

The above azimuths have been averaged and plotted on a gnomonic projection map which indicates the general area

25X1C

SECRET

NOFORN (Downgrading Prohibited)

25X1D

PIC/JR-1020/61

25X1D 25X1D 25X1D 25X1D

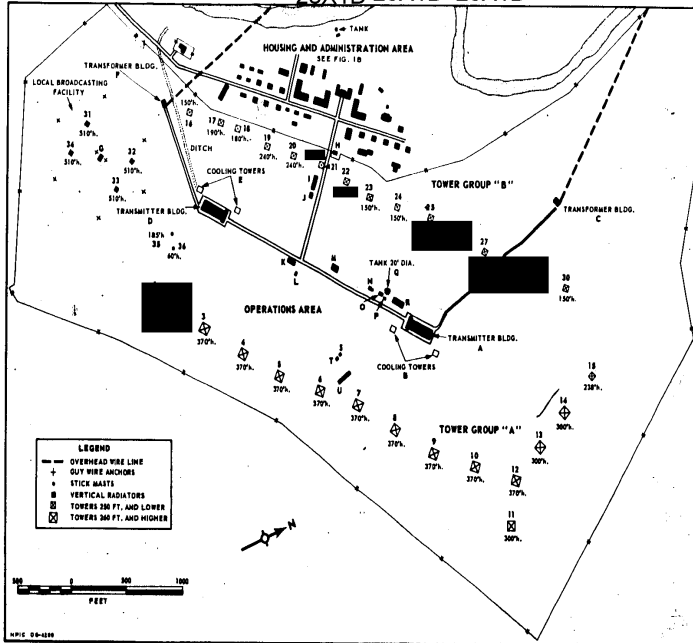


FIGURE 16. OPERATIONS AREA AT THE STALINBAD STATION. This drawing shows the 30 ft/wire towers.

which may be covered by the arrays suspended from the towers (see Figure 17).

Vertical Radiators: The local broadcasting facility is located in the southwest portion of the operations area. The facility includes the four guyed sectional lattice vertical radiators (Figure 16, items

31-34), each 510 feet high, arranged in a rectangle 475 by 250 feet. There appear to be no cooling provisions for this facility. Centrally located in the rectangle is the transmitter building (item C), 45 by 30 feet.

In addition to the two tower groups and the vertical radiators, there are two stick masts (items 35-36) located roughly

300 feet south of the westernmost transmitter building (item D). One is 185 feet high and the other is 60 feet high.

Structures

The two large transmitter buildings (items A and D) are about 1,830 feet apart

TABLE 16. STRUCTURES IN OPERATIONS AREA, STALINBAD

Building	Description	Dimensions (ft)	Function
A	One story, monitor roof	220 x 75	Transmitter Bldg.
B	Two towers	200 x 20	Cooling towers
C	One story, gable roof	45 x 30	Transmitter Bldg.
D	One story, monitor roof	230 x 75	Transmitter Bldg.
E	Two towers	200 x 20	Cooling towers
F	One story, gable roof	45 x 30	Transformer Bldg.
G	One story, flat roof	45 x 30	Transformer Bldg.
H	One story, gable roof	85 x 33	Guard Bldg.
I	One story, shed roof	120 x 20	Storage/Supply Bldg.
J	One story, shed roof	60 x 20	Storage/Supply Bldg.
K	One story	85 x 35	Undetermined
L	One story	30 x 10	Undetermined
M	One story, gable roof	85 x 40	Undetermined
N	One story, flat roof	40 x 20	Possible incinerator shed, storage, Le-shed
O	One story, gable roof	30 x 30	Undetermined
P	One story, flat roof	10 x 10	Undetermined
Q	Tank	20 dia.	Storage facility
R	One story	100 x 50	Undetermined
S	One story, shed roof	20 x 20	Undetermined
T	One story, shed roof	20 x 20	Undetermined
U	One story, shed roof	128 x 20	Undetermined

and are connected by a service road. Each measures 220 by 75 feet and 15 feet high, and has a 200- by 20-foot monitor roof. For a perspective of this type of building, see Figure 7.

Each large transmitter building has two associated cooling towers (items B and E), 20 square and 30 feet high and one transformer building (items C and F). Also, there are several miscellaneous storage/support-type buildings within the operations area. A description of each building is given in Table 16 (buildings are keyed to Figure 16).

25X1D

SECRET

25X1C

NOFORN (Downgrading Prohibited)

SECRET

NOFORN

(S) (C) (U) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z) (AA) (AB) (AC) (AD) (AE) (AF) (AG) (AH) (AI) (AJ) (AK) (AL) (AM) (AN) (AO) (AP) (AQ) (AR) (AS) (AT) (AU) (AV) (AW) (AX) (AY) (AZ) (BA) (BB) (BC) (BD) (BE) (BF) (BG) (BH) (BI) (BJ) (BK) (BL) (BM) (BN) (BO) (BP) (BQ) (BR) (BS) (BT) (BU) (BV) (BW) (BX) (BY) (BZ) (CA) (CB) (CC) (CD) (CE) (CF) (CG) (CH) (CI) (CJ) (CK) (CL) (CM) (CN) (CO) (CP) (CQ) (CR) (CS) (CT) (CU) (CV) (CW) (CX) (CY) (CZ) (DA) (DB) (DC) (DD) (DE) (DF) (DG) (DH) (DI) (DJ) (DK) (DL) (DM) (DN) (DO) (DP) (DQ) (DR) (DS) (DT) (DU) (DV) (DW) (DX) (DY) (DZ) (EA) (EB) (EC) (ED) (EE) (EF) (EG) (EH) (EI) (EJ) (EK) (EL) (EM) (EN) (EO) (EP) (EQ) (ER) (ES) (ET) (EU) (EV) (EW) (EX) (EY) (EZ) (FA) (FB) (FC) (FD) (FE) (FF) (FG) (FH) (FI) (FJ) (FK) (FL) (FM) (FN) (FO) (FP) (FQ) (FR) (FS) (FT) (FU) (FV) (FW) (FX) (FY) (FZ) (GA) (GB) (GC) (GD) (GE) (GF) (GG) (GH) (GI) (GJ) (GK) (GL) (GM) (GN) (GO) (GP) (GQ) (GR) (GS) (GT) (GU) (GV) (GW) (GX) (GY) (GZ) (HA) (HB) (HC) (HD) (HE) (HF) (HG) (HH) (HI) (HJ) (HK) (HL) (HM) (HN) (HO) (HP) (HQ) (HR) (HS) (HT) (HU) (HV) (HW) (HX) (HY) (HZ) (IA) (IB) (IC) (ID) (IE) (IF) (IG) (IH) (II) (IJ) (IK) (IL) (IM) (IN) (IO) (IP) (IQ) (IR) (IS) (IT) (IU) (IV) (IW) (IX) (IY) (IZ) (JA) (JB) (JC) (JD) (JE) (JF) (JG) (JH) (JI) (JJ) (JK) (JL) (JM) (JN) (JO) (JP) (JQ) (JR) (JS) (JT) (JU) (JV) (JW) (JX) (JY) (JZ) (KA) (KB) (KC) (KD) (KE) (KF) (KG) (KH) (KI) (KJ) (KK) (KL) (KM) (KN) (KO) (KP) (KQ) (KR) (KS) (KT) (KU) (KV) (KW) (KX) (KY) (KZ) (LA) (LB) (LC) (LD) (LE) (LF) (LG) (LH) (LI) (LJ) (LK) (LM) (LN) (LO) (LP) (LQ) (LR) (LS) (LT) (LU) (LV) (LW) (LX) (LY) (LZ) (MA) (MB) (MC) (MD) (ME) (MF) (MG) (MH) (MI) (MJ) (MK) (ML) (MM) (MN) (MO) (MP) (MQ) (MR) (MS) (MT) (MU) (MV) (MW) (MX) (MY) (MZ) (NA) (NB) (NC) (ND) (NE) (NF) (NG) (NH) (NI) (NJ) (NK) (NL) (NM) (NN) (NO) (NP) (NQ) (NR) (NS) (NT) (NU) (NV) (NW) (NX) (NY) (NZ) (OA) (OB) (OC) (OD) (OE) (OF) (OG) (OH) (OI) (OJ) (OK) (OL) (OM) (ON) (OO) (OP) (OQ) (OR) (OS) (OT) (OU) (OV) (OW) (OX) (OY) (OZ) (PA) (PB) (PC) (PD) (PE) (PF) (PG) (PH) (PI) (PJ) (PK) (PL) (PM) (PN) (PO) (PP) (PQ) (PR) (PS) (PT) (PU) (PV) (PW) (PX) (PY) (PZ) (QA) (QB) (QC) (QD) (QE) (QF) (QG) (QH) (QI) (QJ) (QK) (QL) (QM) (QN) (QO) (QP) (QQ) (QR) (QS) (QT) (QU) (QV) (QW) (QX) (QY) (QZ) (RA) (RB) (RC) (RD) (RE) (RF) (RG) (RH) (RI) (RJ) (RK) (RL) (RM) (RN) (RO) (RP) (RQ) (RR) (RS) (RT) (RU) (RV) (RW) (RX) (RY) (RZ) (SA) (SB) (SC) (SD) (SE) (SF) (SG) (SH) (SI) (SJ) (SK) (SL) (SM) (SN) (SO) (SP) (SQ) (SR) (SS) (ST) (SU) (SV) (SW) (SX) (SY) (SZ) (TA) (TB) (TC) (TD) (TE) (TF) (TG) (TH) (TI) (TJ) (TK) (TL) (TM) (TN) (TO) (TP) (TQ) (TR) (TS) (TT) (TU) (TV) (TW) (TX) (TY) (TZ) (UA) (UB) (UC) (UD) (UE) (UF) (UG) (UH) (UI) (UJ) (UK) (UL) (UM) (UN) (UO) (UP) (UQ) (UR) (US) (UT) (UU) (UV) (UW) (UX) (UY) (UZ) (VA) (VB) (VC) (VD) (VE) (VF) (VG) (VH) (VI) (VJ) (VK) (VL) (VM) (VN) (VO) (VP) (VQ) (VR) (VS) (VT) (VU) (VV) (VW) (VX) (VY) (VZ) (WA) (WB) (WC) (WD) (WE) (WF) (WG) (WH) (WI) (WJ) (WK) (WL) (WM) (WN) (WO) (WP) (WQ) (WR) (WS) (WT) (WU) (WV) (WW) (WX) (WY) (WZ) (XA) (XB) (XC) (XD) (XE) (XF) (XG) (XH) (XI) (XJ) (XK) (XL) (XM) (XN) (XO) (XP) (XQ) (XR) (XS) (XT) (XU) (XV) (XW) (XX) (XY) (XZ) (YA) (YB) (YC) (YD) (YE) (YF) (YG) (YH) (YI) (YJ) (YK) (YL) (YM) (YN) (YO) (YP) (YQ) (YR) (YS) (YT) (YU) (YV) (YW) (YX) (YZ) (ZA) (ZB) (ZC) (ZD) (ZE) (ZF) (ZG) (ZH) (ZI) (ZJ) (ZK) (ZL) (ZM) (ZN) (ZO) (ZP) (ZQ) (ZR) (ZS) (ZT) (ZU) (ZV) (ZW) (ZX) (ZY) (ZZ)

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25X1D

25X1D

25X1D

25X1D

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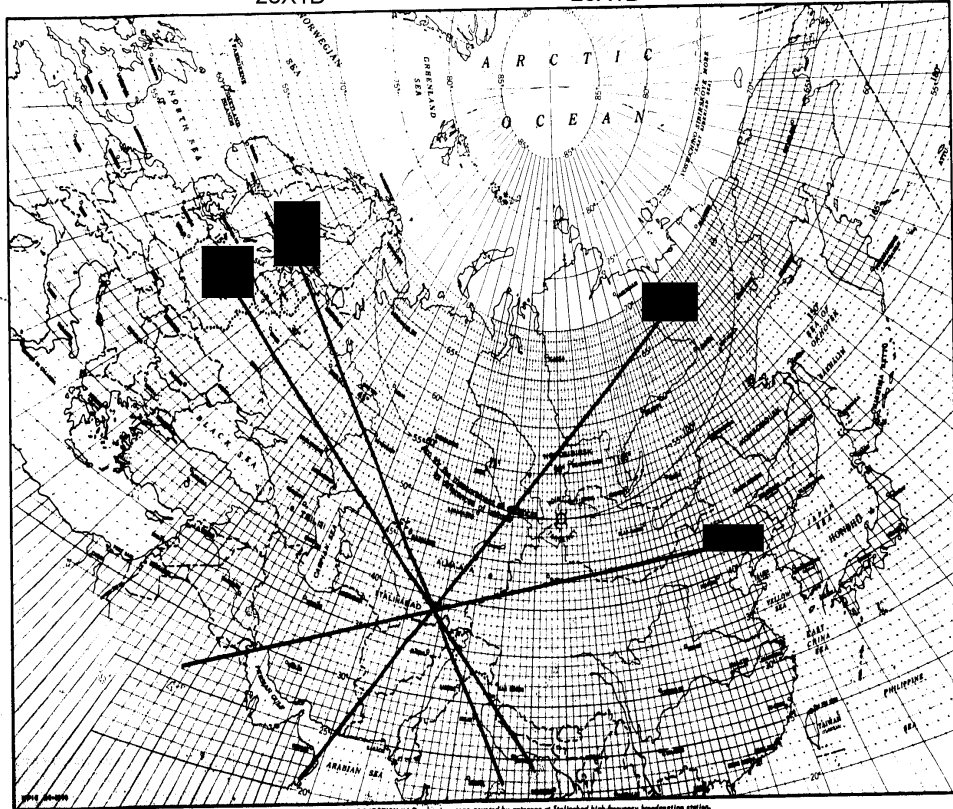


FIGURE 17. GNOMONIC PROJECTION MAP, showing areas covered by antennas of Enclined high-frequency broadcasting station.

25X1C

SECRET

NOFORN

Overhead Power and/or Communication Lines

Two overhead wire lines enter the operations area, one from the north and one from the northwest. Each line terminates at one of the transformer buildings (items C and F). These lines supply power and possibly land-line communications to the station.

HOUSING AND ADMINISTRATION AREA

The housing and administration area (see line drawing, Figure 18) contains approximately 40 buildings and various small shed-type structures. The main administration building (item 25), which is E-shaped, is centrally located. To the

TABLE 17. STRUCTURES IN HOUSING AND ADMINISTRATION AREA, STALINABAD

Building	Description	Dimensions (ft.)	Function	Building	Description	Dimensions (ft.)	Function
1	One story, shed roof, w/ handstand	120 x 28	Motor pool and vehicle shed	22	One story, gable roof	78 x 20	Barracks/ support bldg.
2	One story, gable roof	20 x 20	Undetermined	23	Military, L-shaped, blipped roof	135 x 50 * 85 x 50	Barracks
3	One story, gable roof	20 x 20	Undetermined	24	Military, L-shaped	135 x 50 * 85 x 50	Barracks
4	One story, gable roof	20 x 20	Undetermined	25	One story, blipped roof	180 x 18 ** 30 x 20 *** 50 x 20	Administration/ headquarters bldg.
5	One story, gable roof	20 x 20	Undetermined	26	Military, L-shaped, blipped roof	135 x 50 * 85 x 50	Barracks
6	One story, gable roof	20 x 20	Undetermined	27	One story, gable roof	40 x 20	Storage bldg.
7	One story, gable roof	20 x 20	Undetermined	28	Military, L-shaped, blipped roof	135 x 50 * 85 x 50	Barracks
8	One story, gable roof, w/ 4 vents	40 x 30	Duplex housing	29	One story, flat roof	20 x 20	Barracks/ support bldg.
9	One story, gable roof, w/ 4 vents	40 x 30	Duplex housing	30	Military, blipped roof, w/ 2 dormer entrances	62 x 82	Quarters
10	One story, gable roof, w/ 4 vents	40 x 30	Duplex housing	31	One story, gable roof	20 x 20	Quarters
11	One story, gable roof, w/ 2 dormer entrances	58 x 20	Undetermined	32	One story, gable roof	20 x 20	Quarters
12	One story, gable roof, w/ 4 vents	40 x 30	Duplex housing	33	One story, gable roof	20 x 20	Quarters
13	One story, gable roof, w/ 4 vents	40 x 30	Duplex housing	34	One story, gable roof	20 x 20	Quarters
14	One story, gable roof, w/ 4 vents	40 x 30	Duplex housing	35	One story, gable roof	20 x 20	Quarters
15	One story, gable roof, w/ 4 vents	20 x 20	Undetermined	36	One story, gable roof	20 x 20	Quarters
16	One story, gable roof, w/ 4 vents	20 x 20	Undetermined	37	Military, blipped roof, w/ 2 dormer entrances	78 x 58	Quarters
17	One story, gable roof, w/ 2 dormer entrances	58 x 20	Undetermined	38	One story, gable roof, w/ 2 attached shed 80 x 40	78 x 48	Undetermined
18	One story, gable roof, w/ 4 vents	20 x 20	Undetermined	39	One story, cross-shaped, blipped roof	75 x 38 45 x 20	Quarters/ administration bldg.
19	One story, gable roof	28 x 48	Undetermined	40	One story, blipped roof	28 x 20	Security bldg.
20	Military, gable roof, w/ dormer and side vent with mast	68 x 88	Barracks and possible in-camp communications	41	One story, shed roof, with adjacent 27'-dia. water tank	30 x 20	Pump house
21	One story, gable roof	78 x 20	Barracks/ support bldg.				

* 1/2 leg
** 2 legs
*** center leg

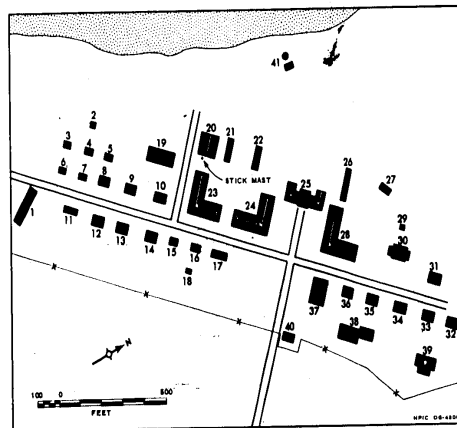


FIGURE 18. HOUSING AND ADMINISTRATION AREA AT THE STALINABAD STATION. Figure 18 shows the location of this area in relation to the operations area.

rear of this building near a stream is a small pump house with a water storage tank (item 41). At the extreme south of the area and southeast of the road is a motor pool (item 1), where one truck and several smaller vehicles or pieces of equipment are discernible. West of the road and south of the area is an unidentified fenced area 180 by 65 feet which contains one single-story, valley-roofed

L-shaped building, [redacted] with leg 30 by 20 feet, and 3 small sheds (see Figure 16). This fenced area seems to be completed and gives the appearance that it has been constructed for some time. Adjacent to one building (item 21) is a tall stick mast. This building may be utilized for local communications. A description of each building is given in Table 17 (buildings are keyed to Figure 18).

25X1D

TBILISI HIGH-FREQUENCY BROADCASTING STATION

This station is located at 42-03N 44-01E, near the village of Dusheti, 21 nautical miles north-northwest of the center of Tbilisi (see location map, Figure 19). The station includes a fenced operations area and a housing and administration

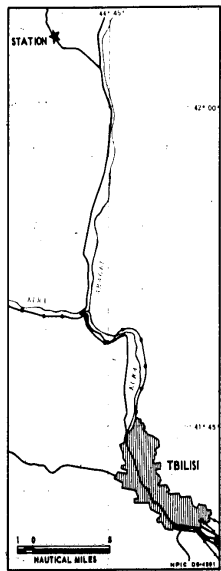


FIGURE 19. LOCATION MAP SHOWING THE TBILISI STATION.

area (see line drawing, Figure 20). The operations area is rectangular and covers approximately 450 acres (8,500 by 2,300 feet). Security measures for this area consist of a perimeter fence and guard towers. The area contains 36 self-supporting lattice towers, arranged into groups, which support high-frequency curtain arrays; 2 rhombic antennas possibly under construction; a probable local broadcasting facility; an area of possible stick-mast excavations; 3 transmitter buildings; and miscellaneous storage/support-type buildings.

The station is served by a secondary road, which passes directly through the center of the operations area and the housing and administration area. The road connects the station with the village of Dusheti, 1.5 nautical miles to the north-northeast, and with the Grozny-Tbilisi highway, 2.5 nautical miles to the southeast. Owing to the extreme obliquity of the photography, all measurements included are approximate.

OPERATIONS AREA

Antennas

Curtain Arrays: The operations area is not completely covered by photography, and may contain more than 36 self-supporting lattice towers. Although the towers do not fall into two distinct groups as in the other installations described in this report, the point between towers 20 and 36 has been arbitrarily

selected as a point of demarcation between two groups of towers, designated Tower Groups "A" and "B." Except in measurements, these towers are identical to those at Novosibirsk (see page 9).

Tower Group "A" consists of seventeen 330-foot towers (Figure 20, Items 2-16 and 19-20), two 130-foot towers (items 17-18), and one 200-foot tower (item 1) positioned in the southern portion of the operations area. Although each tower apparently supports a crossarm at its apex, the crossarms cannot be measured, owing to halation and extremely small scale. All distinguishable crossarms are oriented at right angles to the tower line. Small unidentified objects located between the towers are probable switching and phase-changing devices. Tower Group "A" measurements are given in Table 18 (tower numbers are keyed to Figure 20).

TABLE 18. DATA ON TOWER GROUP "A," TBILISI

Tower No.	Height (ft.)	Distance Between Towers (ft.)	Azimuth Orientation* (°)
1	200		
2	330	200	
3	330	268	
4	330	270	
5	330	270	
6	330	278	
7	330	278	
8	330	283	
9	330	283	
10	330	288	
11	330	288	
12	330	288	
13	330	288	
14	330	288	
15	330	278	
16	330	283	
17	130	283	
18	130	190	
19	330	228	
20	330	228	

*Perpendicular to a line projected between centers of towers.
 **Omitted because power line between the towers indicates probable lack of curtain.

Tower Group "B," positioned in the northern portion of the operations area, consists of eight 130-foot towers (items

26-29 and 33-36) and eight 200-foot towers (items 21-25 and 30-32). Towers 21-25 are located within an area 2,200 feet southwest of tower 26. As in Tower Group "A," the crossarms are apparently present but cannot be measured. Tower Group "B" measurements are given in Table 19 (tower numbers are keyed to Figure 20).

TABLE 19. DATA ON TOWER GROUP "B," TBILISI

Tower No.	Height (ft.)	Distance Between Towers (ft.)	Azimuth Orientation* (°)
21	200	155	
22	200	210	
23	200	210	
24	200	155	
25	200	**	
26	130	230	
27	130	120	
28	130	225	
29	130	200	
30	200	220	
31	200	190	
32	200	190	
33	130	170	
34	130	128	
35	130	128	
36	130		

*Perpendicular to a line projected between centers of towers.
 **Omitted because towers are too widely separated.

In Tables 18 and 19, both front and back azimuthal readings are tabulated. These azimuths are grouped, tabulated for both tower groups, and totaled in Table 20.

TABLE 20. ORIENTATIONS OF TOWERS, TBILISI

Azimuth Orientation (°)	Group "A"	Group "B"	Total
1	1	2	
2	1	1	
3	4	4	
4	2	4	
5	11	10	21
6	1	1	
TOTAL	19	16	35

The above azimuths have been averaged and plotted on a gnomonic projection map which indicates the general areas which may be covered by the arrays suspended from these towers (see Figure 21). Azimuth orientation [redacted] has

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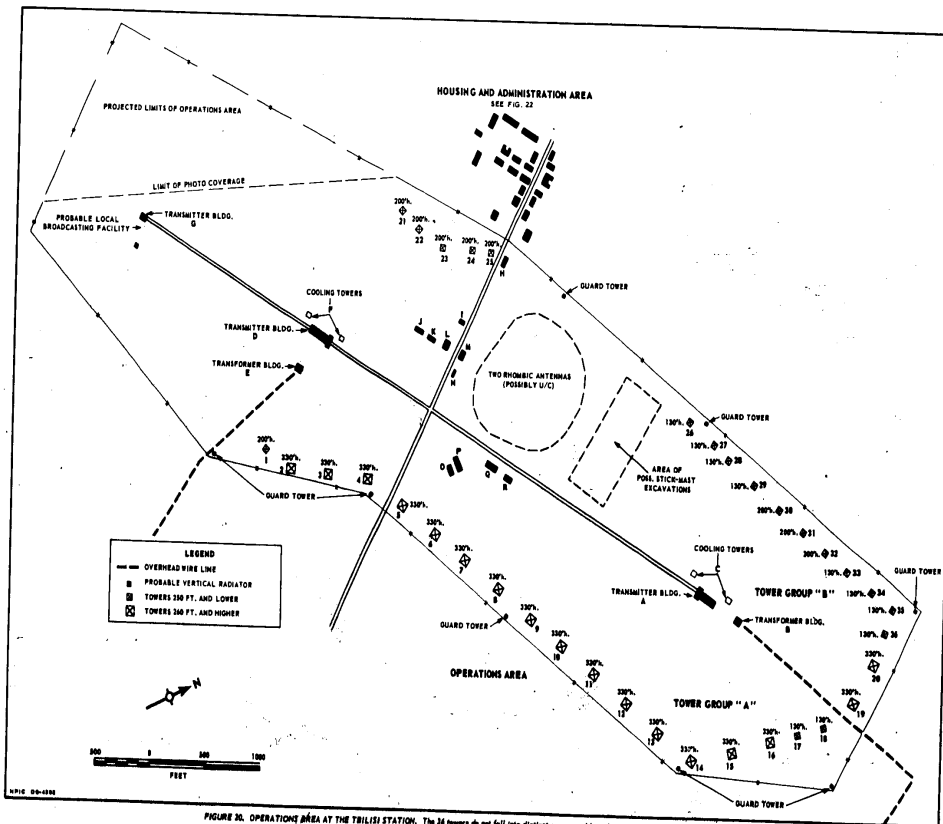


FIGURE 20. OPERATIONS AREA AT THE TRIBLES STATION. The 36 powers do not fall into distinct groups and have been arbitrarily divided between 20 and 26.

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NOFORN [REDACTED]
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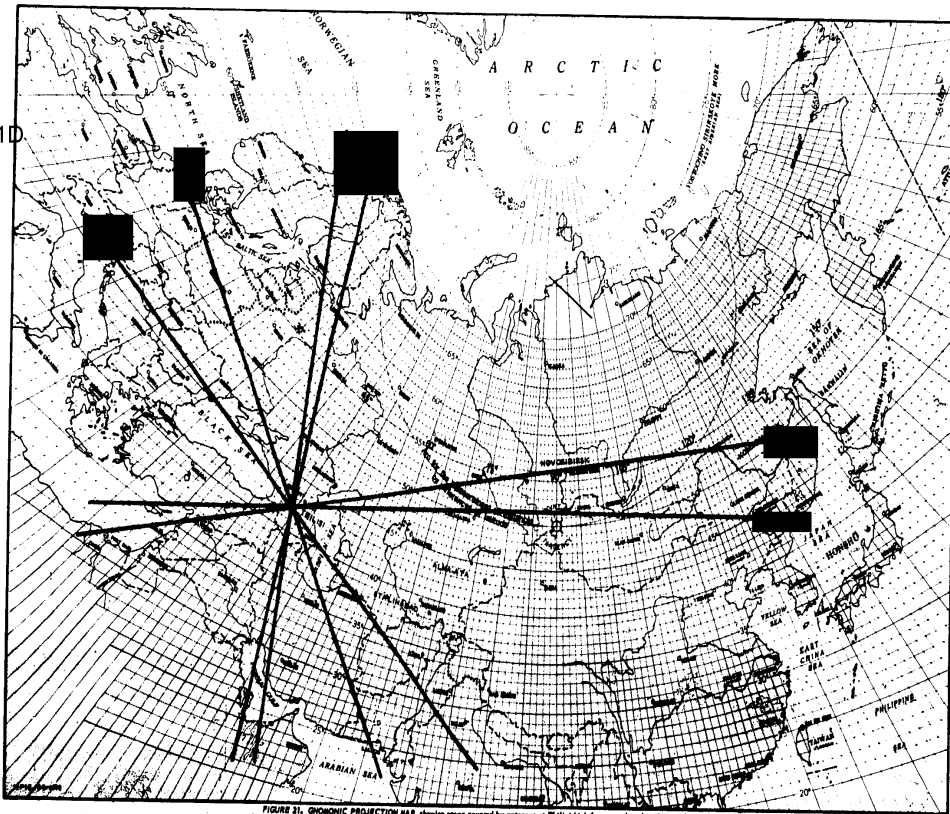


FIGURE 21. GNOMONIC PROJECTION MAP, showing areas covered by antennas of T-1192 high-frequency broadcasting stations.

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been included on the map with the azimuth orientation group [redacted] and azimuth orientation [redacted] has been included with the [redacted] group. No azimuth orientation has been included for a line between towers 18 and 19 in Group "A" because of the existence of a power line passing between the towers which indicates the probable lack of a curtain between them. Also, no azimuth orientation has been included for a line between towers 25 and 26 in Group "B," since these towers are too widely separated.

Between towers 25 and 26 (2,200 feet) there are ground scars which indicate that two rhombic antennas exist or are under construction. The orientation and measurements of these antennas cannot be determined. Between these scars and tower 26 there is a rectangular area, 1,050 by 500 feet, of numerous scars which may be excavations for stick masts and guy-wire anchors.

Probable Vertical Radiator: In the southwest portion of the operations area there is a probable guyed vertical radiator, with a height in excess of 500 feet. A small transmitter building is located nearby (item G). The presence of the vertical radiator with the associated building indicates the existence of a probable local broadcasting facility.

Structures

Besides the small transmitter building, there are two large transmitter buildings (items A and D), identical in size and configuration, situated between Tower Groups "A" and "B." These buildings are approximately 4,000 feet apart and are connected by a service road. For a perspective of this type of building, see Figure 7. Associated with each transmitter building is a transformer building (items

B and E) and two cooling towers (items C and F).

TABLE 21. STRUCTURES IN OPERATIONS AREA, THLHM

Building	Description	Dimensions (ft.)	Function
A	One story, monitor roof	210 x 65	Transmitter bldg.
B	Undetermined	*210 x 22 30 x 20	Transformer bldg.
C	Two towers	Undetermined	Cooling towers
D	One story, monitor roof	210 x 65	Transmitter bldg.
E	Undetermined	*210 x 22 30 x 20	Transformer bldg.
F	Two towers	Undetermined	Cooling towers
G	Undetermined	Undetermined	Transmitter bldg.
H	One story, probable gable roof	85 x 30	Probable storage and/or maintenance bldg.
I	One story, probable gable roof	30 x 15	Probable storage and/or maintenance bldg.
J	One story, probable gable roof	30 x 15	Probable storage and/or maintenance bldg.
K	One story, probable gable roof	30 x 15	Probable storage and/or maintenance bldg.
L	One story, probable gable roof	30 x 15	Probable storage and/or maintenance bldg.
M	One story, probable gable roof	55 x 30	Probable storage and/or maintenance bldg.
N	One story, probable gable roof	85 x 25	Probable storage and/or maintenance bldg.
O	One story, probable gable roof	60 x 30	Probable storage and/or maintenance bldg.
P	One story, probable gable roof	80 x 30	Probable storage and/or maintenance bldg.
Q	One story, probable gable roof	80 x 30	Probable storage and/or maintenance bldg.
R	One story, probable gable roof	30 x 30	Probable storage and/or maintenance bldg.

No feed lines can be identified leading from the transmitter buildings to any of the towers; thus it cannot be determined whether each transmitter building serves a specific tower group. A description of each structure is given in Table 21 (building letters are keyed to Figure 20).

Overhead Power and/or Communication Lines

Two overhead wire lines serve the operations area. Although both lines approach the area from the south, one enters from the south and terminates at transformer building E, and the other enters from the east and terminates at transformer building B. These wire lines supply the station with power and possibly with wire-line communications.

HOUSING AND ADMINISTRATION AREA

The housing and administration area (see line drawing, Figure 22) is located adjacent to the operations area on the northwest. There are 22 buildings of various types. A description of each building is given in Table 22 (building numbers are keyed to Figure 22).

TABLE 22. STRUCTURES IN HOUSING AND ADMINISTRATION AREA, THLHM

Building	Description	Dimensions (ft.)	Function
1	One story	60 x 80	Undetermined
2	One story	80 x 40	Undetermined
3	One story	100 x 30	Possible barracks
4	One story	100 x 30	Possible barracks
5	Multistorey, probable gabled roof	65 x 15	Quarters
6	Multistorey, probable gabled roof	65 x 30	Quarters
7	Multistorey, probable gabled roof	65 x 30	Quarters

TABLE 22. (CONTINUED)

Building	Description	Dimensions (ft.)	Function
8	Multistorey, probable gabled roof	65 x 30	Quarters
9	One story	90 x 40	Undetermined
10	Multistorey, probable gabled roof	65 x 30	Quarters
11	Multistorey, probable gabled roof	65 x 30	Quarters
12	Multistorey, probable gabled roof	65 x 30	Quarters
13	Multistorey, probable gabled roof	65 x 30	Quarters
14	One story, gable roof	60 x 60	Storage bldg.
15	One story, gable roof	55 x 40	Storage bldg.
16	Multistorey, probable gabled roof	65 x 30	Quarters
17	Multistorey, probable gabled roof	65 x 30	Quarters
18	Multistorey	90 x 60	Administration bldg.
19	Multistorey, probable gabled roof	65 x 30	Quarters
20	Multistorey, probable gabled roof	65 x 30	Quarters
21	One story, gable roof	65 x 30	Storage bldg.
22	One story, gable roof	60 x 30	Storage bldg.

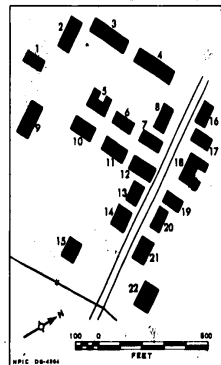


FIGURE 22. HOUSING AND ADMINISTRATION AREA AT THE THLHM STATION. See Figure 20 for location of this area in relation to the operations area.

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KOMSOMOLSK HIGH-FREQUENCY BROADCASTING STATION

This station is located at 50-39N 136-55E, 2,000 feet east of the Khabarovsk-Sovetskaya Gavan rail line and 7 nautical miles northwest of Komsomolsk (see location map, Figure 23). The station includes a fenced operations area and a housing and administration area (see photograph, Figure 24). The operations area covers approximately 185 acres (3,300 by 2,500 feet). It contains 13 lattice towers, arranged in two tower groups, which support high-frequency curtain arrays; a transmitter building; and miscellaneous storage/support-type buildings. The station is served by an all-weather road from Komsomolsk.

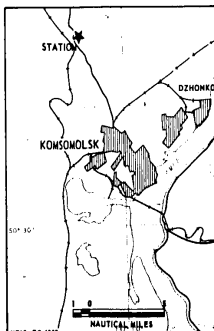


FIGURE 23. LOCATION MAP SHOWING THE KOMSOMOLSK STATION.

OPERATIONS AREA

Antennas

Curtain Arrays: The 13 self-supporting lattice towers are arranged in two groups, designated as Tower Groups "A" and "B" (see line drawing, Figure 25). The two tower groups are roughly parallel, but neither group duplicates the spacing or alignment of the other. Small unidentified objects located between the towers are probable switching and phase-changing devices. Except in measurements, these towers are identical to those at Novosibirsk (see page 9).

Tower Group "A" consists of eight self-supporting lattice towers (items 1-8). Tower bases measure approximately 40 feet square, and top crossarms measure

35 feet long on the tallest towers and 20 feet long on the shorter towers. This group is situated in a relatively straight line along the northeastern edge of the operations area and extends in a north-northwest/south-southeast direction. Tower Group "A" measurements are given in Table 23 (tower numbers are keyed to Figure 25).

TABLE 23. DATA ON TOWER GROUP "A", KOMSOMOLSK

Tower No.	Height (ft.)	Distance Between Towers (ft.)	Azimuth Orientation* (°)
1	360	155	
2	360	175	
3	360	106	
4	360	278	
5	360	370	
6	330	248	
7	330	180	
8	330	180	

*Perpendicular to a line projected between centers of towers.



FIGURE 24. PHOTOGRAPH OF THE KOMSOMOLSK STATION.

Tower Group "B" consists of five self-supporting lattice towers (items 9-13). Tower bases measure approximately 40 feet square, and the top crossarms measure 35 feet long on the tallest towers and 20 feet long on the shorter towers. This group is situated in a relatively straight line in the western portion of

TABLE 24. ORIENTATIONS OF TOWERS, KOMSOMOLSK

Azimuth Orientation	Group "A"	Group "B"	Total
0	0	0	0
1	1	1	2
2	3	3	6
3	1	1	2
4	1	1	2
TOTAL	7	4	11

the operations area and extends in a north-west/southeast direction. Tower Group "B" measurements are given in Table 24 (tower numbers are keyed to Figure 25).

In Tables 23 and 24, both front and back azimuthal readings are tabulated. These azimuths are grouped, tabulated for both tower groups, and totaled in Table 25.

The above azimuths have been averaged and plotted on a gnomonic projection map which indicates the general areas which may be covered by the arrays suspended from the towers (see Figure 26).

Structures

A transmitter building (item A) is located in the northwest portion of the operations area between the tower groups. This station differs from the other stations included in this report in that one transmitter building is present and this building is smaller. Instead of being a one-story monitor-roofed building, it is a one-story gable-roofed building with a multi-story end section. Associated with the transmitter building are two cooling ponds (item B), a possible cooling tower (item C), a transformer yard (item D), and three tuning houses (items E, F,

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and G). Feed lines emanate from these tuning houses and terminate at various points within the two tower groups. Also within the operations area are several miscellaneous buildings. A description of each structure is given in Table 26 (building letters are keyed to Figure 25).

TABLE 26. STRUCTURES IN OPERATIONS AREA, KONGMOLSK.

Building	Description	Dimensions (ft.)	Function
A	One story, gable roof, w/ventilatory gable-vent and section	100 x 40	Transmitter bldg.
B	Two ponds	60 dia.	Cooling ponds
C	Tower	25 x 10	Possible cooling tower
D	Fenced yard	140 x 105	Transformer yard
E	One story, gable roof	15 x 10	Tuning house
F	One story, flat roof	15 x 10	Tuning house
G	One story, flat roof	15 x 10	Tuning house
H	One story, gable roof	30 x 20	Under-mixed
I	One story, flat roof	15 x 15	Guard house
J	One story, flat roof	30 x 25	Under-mixed
K	Cylindrical object	8 dia.	Under-mixed

Overhead Power and/or Communication Lines

Two parallel overhead wire lines enter the operations area from the south. Both lines terminate at the transformer yard (Item D). These two wire lines supply the operations area with power and possibly with wire-line communications.

HOUSING AND ADMINISTRATION AREA

The housing and administration area is located northeast of and adjacent to the operations area. It supports three additional communication facilities, as well as the high-frequency broadcasting station.

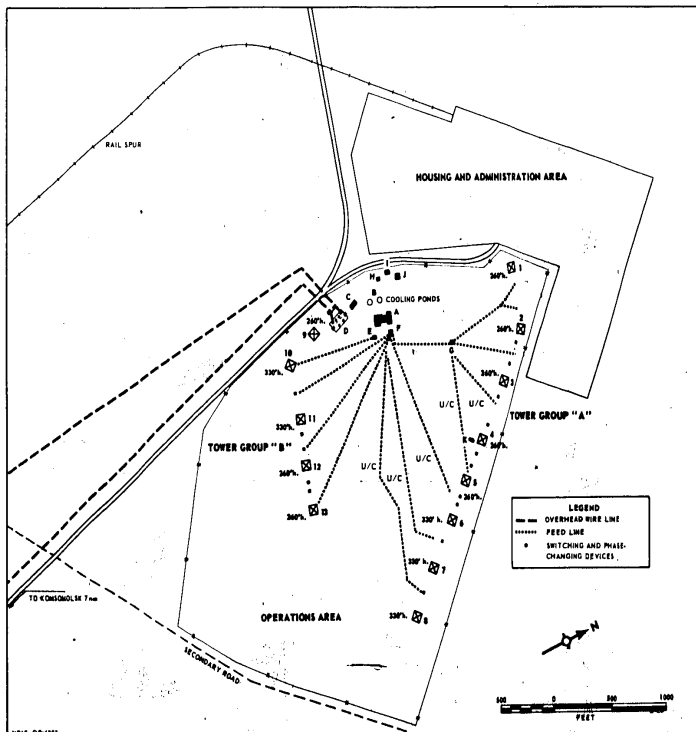


FIGURE 25. OPERATIONS AREA AT THE KONGMOLSK STATION. THIS DRAWING SHOWS THE 13 TOWER TOWERS. THE HOUSING AND ADMINISTRATION AREAS SURVIVE THREE ADDITIONAL FACILITIES AND IS NOT DISCUSSED IN DETAIL WITHIN THIS REPORT.

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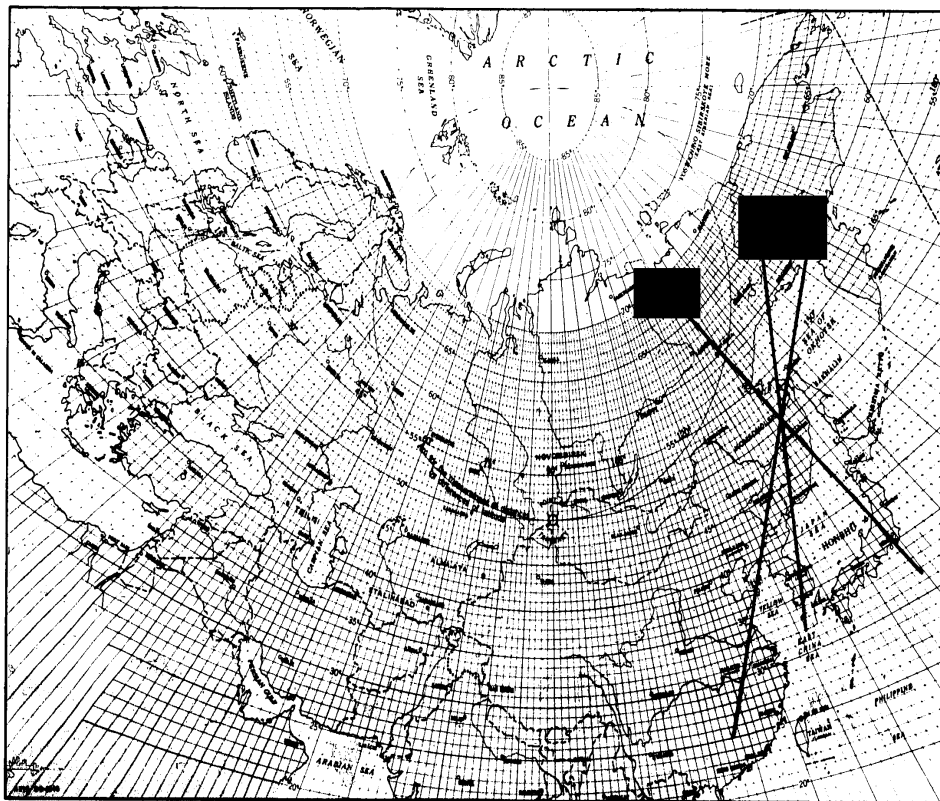


FIGURE 26. GNOMONIC PROJECTION MAP, showing areas covered by services of Kammenok-14 high-frequency broadcasting station.

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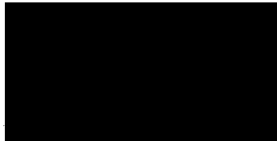
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2. CIA. PIC/JR-1001/60, High-Frequency Broadcast/Broadcast-Relay Station, Sverdlovsk, USSR, Nov 60 (S/Noform [redacted] -- Downgrading Prohibited)

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