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25X1C

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PREFACE

This joint photographic intelligence report has been prepared by the Army, Navy, and Central Intelligence Agency, under CIA chairmanship, in answer to requirements requesting an analysis of microwave facilities within a 50-nautical-mile radius of Moscow. Distances used in this report are from the Kremlin, and have been expressed in kilometers to facilitate easier collation with information from collateral sources.

25X1D

25X1D

Numbers have been assigned to all microwave stations for convenient map and table reference. Both geographic and UTM coordinates are given for station locations. The UTM coordinates are from AMS map Series N501, scale 1:250,000.

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stations are Station 22 at Domodedovo Antenna Farm, Station 40 at Vnukovo Airfield, and Station 55 in Moscow.

The following is a description of some of the various types of microwave masts, towers, and antennas in the Moscow area identified from ground photography. One type of microwave equipment frequently seen on this photography is the Strela-M, which is capable of handling 24 telephone channels. A Strela-M relay station usually includes a self-supporting steel tower and two circular flat-surfaced reflectors suspended from a platform mounted on the top of the tower (see photograph, Figure 1A).

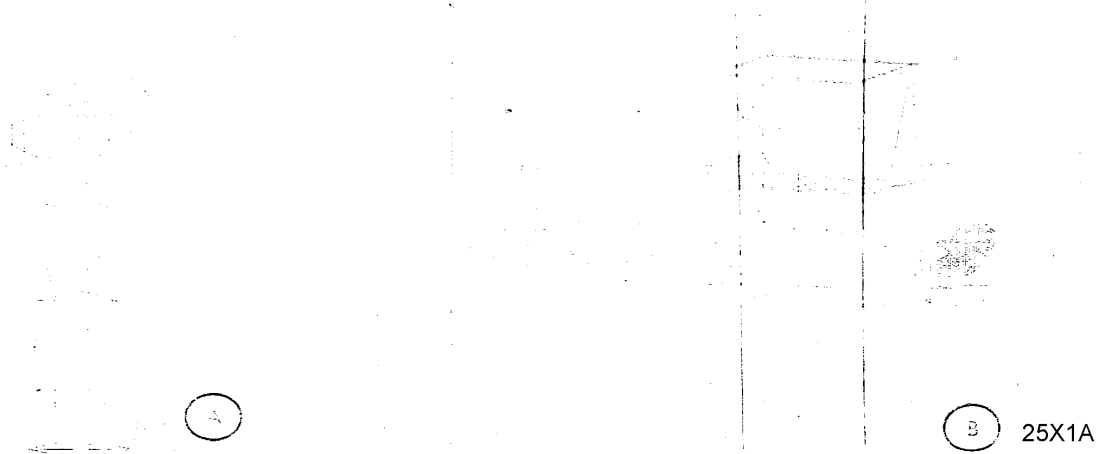


FIGURE 1. STRELA-M RELAY EQUIPMENT - Located at the 130 km marker on the Moscow-Opel highway

The reflectors are inclined at an angle of 45 degrees and are oriented in opposite directions. On the ground and immediately below the circular reflectors are two parabolic reflectors inclined at 45 degrees. Located on a line-of-sight to the parabolic reflectors are two horn-type antennas which project from a nearby building that houses the radio-relay apparatus (see photograph, Figure 1B). Strela-M equipment has been identified along the routes of most of the reported Moscow links.

Equipment used at Station 26 includes two circular flat-surface reflectors and two corner reflectors supported by a self-supporting steel

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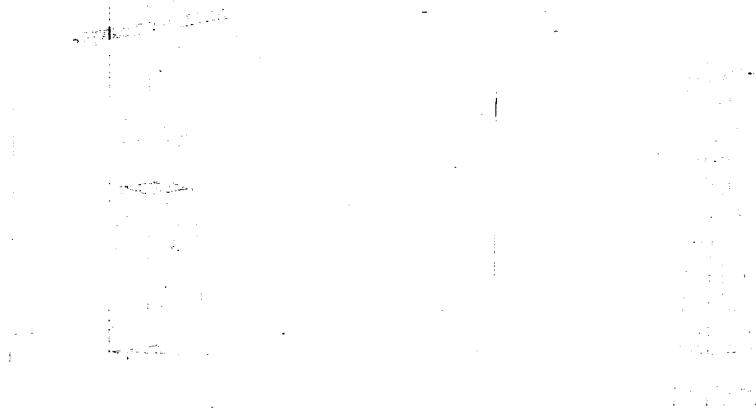
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25X1D

tower. The circular reflectors are mounted near the top of the tower, and the corner reflectors are mounted below the top. One circular reflector is attached directly to the tower, and the other is supported by two steel arms extending about [REDACTED] off the side of the tower. Both circular reflectors are oriented in the same direction. The two corner reflectors are stacked one above the other and are oriented in the opposite direction

[REDACTED]

25X1A



25X1A

FIGURE 2. FLAT SURFACED REFLECTOR AND TWO OPEN MESH CORNER REFLECTORS.
Station 26, located north of Detkovo [REDACTED].

Station 21, near Borisovo, employs a parabolic open-mesh reflector and two horn and lens reflectors mounted on top of a self-supporting steel tower. In addition, the station has an antenna of a type not previously noted, consisting of a vertical V-shaped mesh reflector mounted on one side of the tower and extending down the entire side. This antenna is reported to be a forward scatter antenna, but it may be a stacked corner reflector (see photograph, Figure 3). Station 60 has two large reflectors mounted side by side atop the clock tower of the university (see photographs, Figure 4). These two reflectors are oriented toward Station 42, which has two similar horn and lens reflectors mounted atop a building near Kobyakovo

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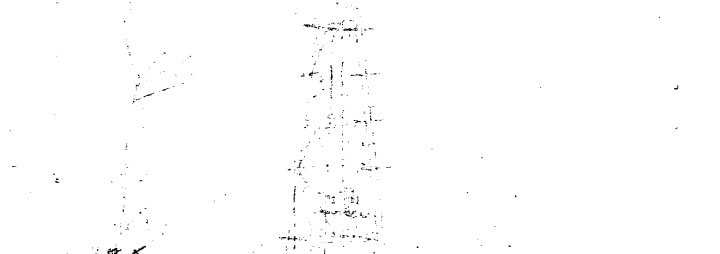


FIGURE 3. PARABOLIC OPEN MESH REFLECTOR, TWO HORN AND LENS REFLECTORS, AND ONE POSSIBLE STACKED CORNER REFLECTOR - Station 21, located near Borisovo

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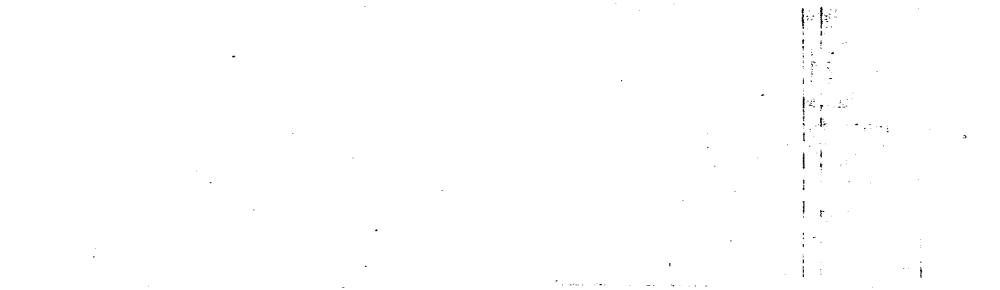


FIGURE 4. HORN AND LENS TYPE REFLECTORS - Station 60, located on clock tower of Moscow University

25X1A

(see photograph, Figure 5). Also in the same immediate area is a reported "goalpost" antenna array and a circular microwave reflector inclined at a 45-degree angle and mounted on one side of a guyed steel tower. Other types of microwave equipment noted in the Moscow area are stacked dipoles with plane reflectors (see photograph, Figure 6) and solid parabolic reflectors (see photograph, Figure 7).

25X1B

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ported to be the most important Soviet Army communications research institute conducting research on radar, telephone, microwave, and other equipment. [REDACTED] shows microwave antennas of various

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FIGURE 5. TWO HORN AND LENS REFLECTORS, ONE CIRCULAR FLAT SURFACED REFLECTOR, AND ONE REPORTED "GOAL POST" ARRAY - Station 42, located near Kobayakovo [REDACTED]

25X1A

FIGURE 6. FOUR STACKED DIPOLES WITH PLANE REFLECTORS - Station 9, located near Moscow/Izmaylovo Airfield [REDACTED]

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FIGURE 7. TWO SOLID PARABOLIC REFLECTORS - Station 55, located on the building housing the Ministry of Transport Machine building [REDACTED]

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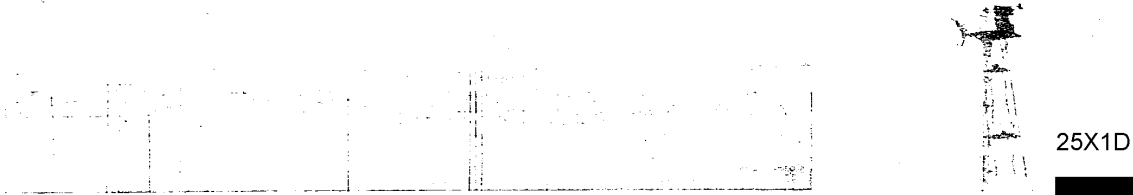
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types mounted on either guyed masts or self-supporting towers, dispersed over the institute grounds (see photographs, Figure 8).

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25X1D

FIGURE 8. MICROWAVE ANTENNAS - Station 6, located at Mytishchi Military Communications Institute



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The table on the following pages presents data on the 60 microwave stations covered in this report. The type and height of antenna supports and the type and orientation of antennas are given when known.

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MICROWAVE STATIONS WITHIN A

NO.	LOCATION	COORDINATES	REMARKS
			25X1D
1	83 km NE of Moscow near Rogachevo	56°25'N/38°17'E 37UDC550522	probable microwave mile E of Moscow/ Yaroslavl road at 88 km marker. 25X1D
2	73 km NNE of Moscow near Zagorsk	56°19'N/38°14'E 37UDC528409	microwave relay tower.
			25X1D
3	65 km NE of Moscow near Ryazantsy	56°14'N/38°06'E 37UDC446324	shows 2 parabolic reflectors mounted on a guyed steel mast.
			25X1D
4	48 km NNE of Moscow on Moscow/Zagorsk highway	56°09'N/38°00'E 37UDC375235	microwave tower may be used in conjunction with a field exercise.
			25X1D
5	26.8 km NNE of Moscow near Tarasovka	55°58'N/37°49'E 37UDC262025	Bed Rest micro- wave antennas.

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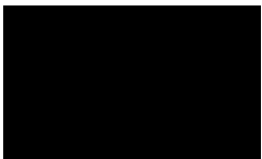
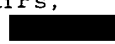
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100-KILOMETER RADIUS OF MOSCOW

TYPE AND HEIGHT of SUPPORT	ANTENNA TYPE, SIZE AND ORIENTATION	PHOTO COVERAGE	COLLATERAL REFERENCES
-----	-----	None	
		25X1D	
Sectional steel mast, 200'	Possible parabolic reflector	None	
Guyed steel lattice mast	2 parabolic reflectors	25X1D 	
Steel mast, approx. 60'	4 parabolic reflectors mounted in pairs, approx.  oriented SW	None	
Mast, 40'	Possible stacked dipole with plane reflector	None	
	25X1D		

25X1C

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25X1C

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NOFCRN [REDACTED]

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NO.	LOCATION	COORDINATES	REMARKS
6	20.3 km NNE of Moscow, just NW of Mytishchi	55°56'N/37°44'E 37UDB213985	This installation is the Mytishchi Military Communications Institute. The mast with 2 parabolic reflectors probably is the microwave terminal station for the institute. The remaining microwave antennas probably serve no other function than research and development.
7	15 km N of Moscow near Vatutino	55°53'N/37°40'E 37UDB167945	25X1D [REDACTED] microwave relay station.
8	13 km NNE of Moscow at Babushkin	55°52'N/37°42'E 37UDB191911	25X1D [REDACTED] shows microwave station at Babushkin Radio Station consisting of a tall guyed steel mast topped with two horn reflectors.
9	13.8 km NE of Moscow on the N side of Shchelkovskoye Shosse	55°49'N/37°49'E 37UDB256858	25X1D [REDACTED] shows 4 stacked dipole antennas on 50' mast opposite NE side of Izmaylovo A/F.

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25X1C

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NOFCRN [REDACTED]

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TYPE AND HEIGHT of SUPPORT	ANTENNA TYPE, SIZE AND ORIENTATION	PHOTO COVERAGE	COLLATERAL REFERENCES
	25X1D	25X1D	
4 guyed steel masts, 60' 1 guyed steel mast, 60' 1 self-supporting steel tower 1 self-supporting steel tower 1 self-supporting steel tower, 250' 1 mast	4 parabolic reflectors, [redacted] dia. 1 horn reflector 1 parabolic reflector 1 mesh parabolic reflector 2 parabolic reflectors, [redacted] dia. 2 parabolic reflectors, oriented S		
Sectional steel mast, 200'	Possible parabolic reflector		
	25X1D		
Guyed steel mast	2 horn reflectors		
Guyed mast, 50'	4 stacked dipole arrays with plane, reflectors, 2 oriented W and 2 S		

25X1C

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NO.	LOCATION	COORDINATES	25X1D	REMARKS
10	12 km ENE of Moscow and just S of Izmaylovo A/F	55°47'N/37°48'E 37UDB243845		[REDACTED] shows a guyed steel mast with parabolic reflector. 25X1D
11	22 km E of Moscow at Balashikha	55°49'N/37°57'E 37UDB344867		[REDACTED] terminal station. 25X1D
12	20.1 km E of Moscow at Nikolayevka	55°48'N/38°56'E 37UDB335840		Two [REDACTED] back-to-back Bed Rest antennas mounted on a 40' mast located at an antenna farm in Nikolayevka. 25X1D
13	25.9 km E of Moscow near Novaya	55°48'N/38°01'E 37UDB396856		Two [REDACTED] back-to-back Bed Rest antennas on a mast at an antenna farm near Novaya. 25X1D
14	11 km E of Moscow at Perovo	55°46'N/37°47'E 37UDB237778		[REDACTED] probable dipole array on steel mast in Perovo.
15	19 km SE of Moscow at Panki	55°40'N/37°54'E 37UDB303695		Possible stacked dipole array on guyed mast.

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25X1C

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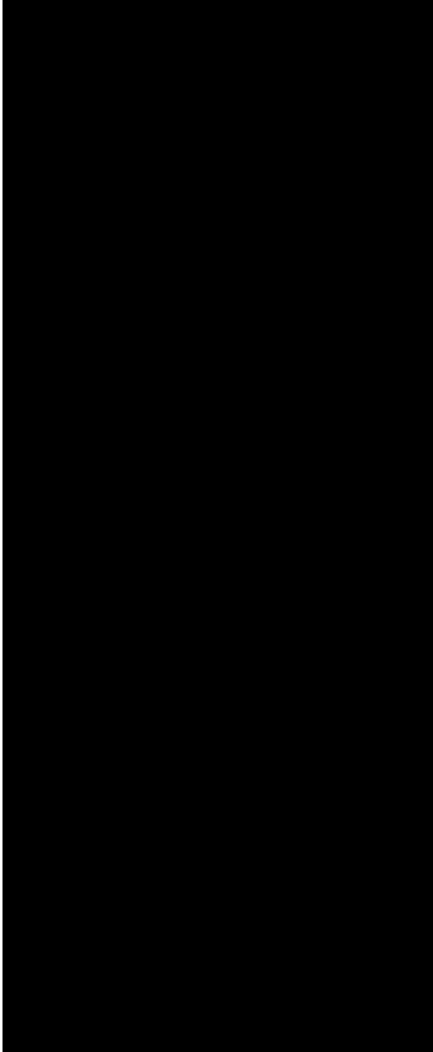
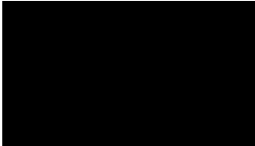
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TYPE AND HEIGHT of SUPPORT	ANTENNA TYPE, SIZE AND ORIENTATION	PHOTO COVERAGE	COLLATERAL REFERENCES
Guyed steel mast	Parabolic re- flector	25X1D 	
Self-supporting steel tower	Antenna oriented E	None	
Mast, 40'	2 stacked dipole arrays with plane reflectors mounted back to back, oriented W-E	None	
Mast	2 stacked dipole arrays with plane reflectors mounted back to back, oriented W-E	None	
Steel mast, 75'	Probable stacked dipole array with plane reflector, oriented W	None	
Guyed mast	Possible stacked dipole array with plane reflector	25X1D 	

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NO.	LOCATION	COORDINATES	REMARKS
			25X1D
16	20 km SE of Moscow near Kotel'niki	55°38'N/37°52'E 37UDB290670	possible decimetric array mounted on top of a building. 25X1D
17	58.3 km SE of Moscow near Bronnitsy Station	55°30'N/38°22'E 37UDB595515	This installation is as a repeater station in the Moscow Ryazan microwave link. Strela-M equipment is being used at this site.
		25X1D	
			25X1D
18	79 km SE of Moscow and 25 km SE of Konobeyevo	55°22'N/38°42'E 37UDB805373	shows a possible reflector on a mast at Moscow SAM site M-63. This antenna is probably the boresight for the Yo-Yo radar.
19	85 km SE of Moscow just N of Voskresenskoye	55°19'N/38°42'E 37UBD806310	rectangular antenna 100 yards E of Moscow/ Kolomna rail line. 25X1D
		25X1D	
20	94.5 km SE of Moscow just N of Peski	55°13'N/38°46'E 37UDB857197	microwave relay station in the Moscow/Ryazan link using Strela-M equipment.
		25X1D	
21	16 km SSE of Moscow near Borisovo	55°38'N/37°43'E 37UDB185660	show tall self- supporting tower with an open mesh parabolic reflector and 2 horn and lens antennas at the top. A V-shaped possible stacked corner reflector, as a forward scatter antenna, extends the length of the tower.
		25X1D	
			25X1D

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25X1C

SECRET

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TYPE AND HEIGHT of SUPPORT	ANTENNA TYPE, SIZE AND ORIENTATION	PHOTO COVERAGE	COLLATERAL REFERENCES
4 masts atop building	One antenna oriented W and 3 NW	None	
Self-supporting steel tower, 120'	4 circular reflectors, one oriented NW and one SE	None	
Mast, 40'	Possible parabolic reflector	25X1D	
Mast, 25'	Probable stacked dipole array with plane reflector, [redacted]		
Self-supporting steel tower, 210'	4 circular reflectors		
Self-supporting steel tower, 120'	1 mesh parabolic reflector, oriented N 2 horn and lens reflectors, [redacted] oriented S 1 V-shaped possible stacked corner reflector [redacted], oriented ENE	None	
25X1D		25X1D	
25X1D			

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25X1C

SECRET

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