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ECONOMIC INTELLIGENCE REPORT

POST AND TELECOMMUNICATIONS SERVICES IN THE USSR 1950-57

CIA/RR 138
21 July 1958

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

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(ORR Project 46.1056)

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FOREWORD

This report is concerned with those post and telecommunications facilities and services in the USSR operated and controlled by the Ministry of Communications. Other ministries operate functional post and telecommunications systems such as those serving the armed forces, shipping, railroads, and industry. These independent post and telecommunications systems are not covered in this report. It must be pointed out, however, that although the facilities and services covered here are confined to those under the jurisdiction of the Ministry of Communications, their use is not so restricted. The armed forces make abundant use of this system, as do all the ministries.

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POST AND TELECOMMUNICATIONS SERVICES IN THE USSR*
1950-57

Summary and Conclusions

The post and telecommunications sector of the Soviet economy, managed by the Ministry of Communications, serves the needs of the government rather than the needs of the private consumer. The Ministry employed 633,000 persons and yielded more than 11 billion rubles in revenue in 1957 by providing postal, telegraph, telephone, and broadcasting services. Its real contribution (acceleration and coordination) to the rapidly growing economy as a whole, however, greatly exceeds its revenue contribution.

This sector of the economy does not provide all the post and telecommunications service performed in the country. Other ministries conduct such services for themselves or in collaboration with the Ministry of Communications. Of these other ministries, the Ministry of Defense conducts the greatest amount of service for itself. Furthermore, the Ministry of Defense exerts direct influence on the Ministry of Communications under normal conditions and has full control under emergency or war conditions.

The geographic distribution of facilities and capacities of the post and telecommunications sector generally conforms to the location and level of economic activities served. West of the Urals and along the Trans-Siberian Railroad, facilities and capacities are relatively dense and reasonably reliable; elsewhere they are sparse and unreliable.

The amounts of service rendered by this sector are shown by its performance in 1957. Postal service, the primary medium for the private consumer, handled about 16 billion pieces of mail. Telecommunications services, which are provided by an integrated network of wireline and radio, comprise the telegraph, telephone, and broadcasting services. Telegraph service, the primary rapid medium, handled 209 million telegrams. Telephone service, the secondary rapid medium, handled 151 million interurban calls over the 2.2 million telephone sets. Broadcasting service, a one-way medium for propaganda and entertainment, reached about 37.5 million reception points. Of these reception points, wire-diffusion broadcasting** accounted for more

* The estimates and conclusions contained in this report represent the best judgment of ORR as of 15 April 1958.

** See Appendix A, Glossary of Technical Terms.

than 25 million points; radiobroadcasting for almost 10 million; and television broadcasting, a relatively new medium in the USSR, for only 2.5 million. In terms of revenue, the postal service contributed 4.7 billion rubles, the telegraph service 1.5 billion, the telephone service 2.7 billion, and the broadcasting services 2.2 billion.

Since World War II the growth in service volumes, shown in Figure 1,* has been impressive. The principal factors contributing to this growth have been increased rates of investment for more and better equipment, the application of modern techniques and procedures, and improved effectiveness of employees. In spite of this impressive growth, service has consistently lagged behind demand. Although the growth of investment in post and telecommunications since World War II led to growth in volume of service, the level of investment, constricted by persistently low priority, has been too low to remove the lag.

Insufficient progress in overcoming the lag has been recognized in recent Soviet planning. The original plan for 1956-60, which was used as a guide until it was discarded in late 1957, was the most ambitious of all previous plans for post and telecommunications. The original plan was directed toward modern, standardized, high-capacity telecommunications and implied higher rates of investment and priority for the post and telecommunications sector. Major objectives were the interconnection of all principal cities with modern facilities capable of yielding high service capacities, such as microwave radio relay, coaxial cable, or multiconductor cable lines; the provision of automatic dial telephony for local and interurban service; and the introduction of a nationwide television network. Progress was made in meeting these objectives under the discarded plan. It is expected that this progress will continue and that many of the objectives stated in the original plan for 1956-60 will be included in the proposed plan for 1959-65.

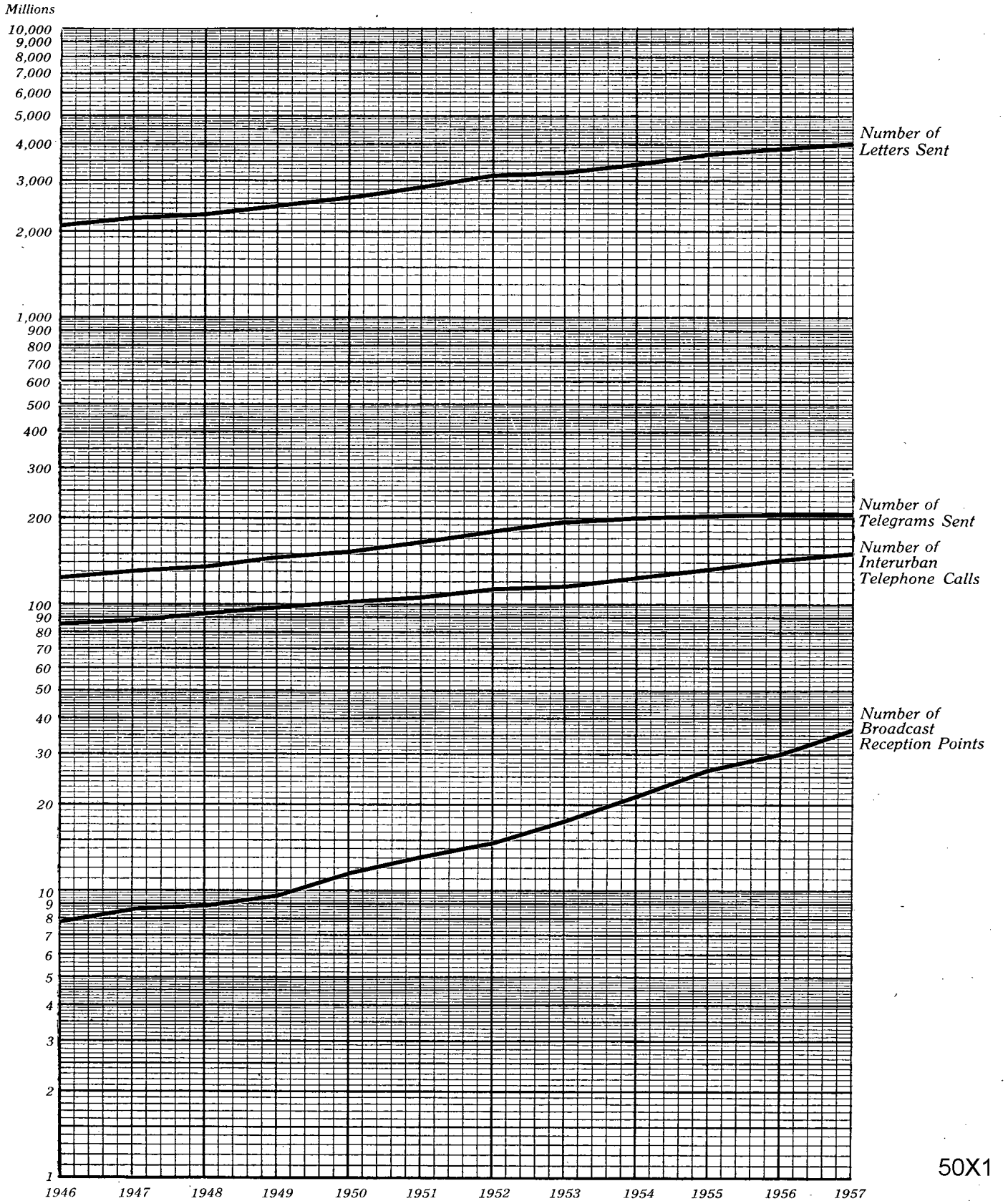
Two other developments of major consequence appear imminent. The scatter radio technique for point-to-point telecommunications probably will be introduced, principally in the Arctic areas, where wireline facilities are difficult to construct and maintain and where normal point-to-point radio is highly undependable. The provision of adequate lateral facilities for intra- and inter-regional use will certainly be undertaken to meet the new needs implied by the economic reorganization of 1957.

It is concluded that existing telecommunications resources meet the bare minimal needs of the economy today but are still inadequate

* Following p. 2.

Figure 50X1

USSR: ESTIMATED RATES OF GROWTH OF SELECTED COMMUNICATIONS SERVICES 1946-57



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to meet current demand. This condition applies not only to the requirements of the Ministry of Communications but also to those of other ministries which operate telecommunications facilities, especially the Ministry of Defense.

The success of future efforts toward closing the gap between the USSR and the US in development of telecommunications will hinge largely on the level and priority of investment. Given sufficient funds and high priority, the post and telecommunications sector in the USSR may be more adequately developed in about 5 years. Without such funds and priority, about 10 years will be required.

I. Introduction.

The real contribution which rapid, electric communications -- that is, telecommunications -- services make to the operation of an economy is acceleration. Telecommunications constitute the time factor in economic management (in the broadest sense) of the various activities of the economy which need to be managed and tied together. These activities are a complex interplay of coordination and control of men, money, material, machinery, and management in time and space. Telecommunications services are employed to reduce the time-space factor, bridging space electrically much faster than any known physical transport media.

The real price of time increases with the industrial growth of an economy. In any modern industrial economy the wheels of industry grow larger, turn faster, and become multiplied and increasingly interrelated (even apart from any intention to accelerate industrial growth at a forced rate such as in the USSR). The result of this process is mass production -- the producing of more products per unit of time.

The value of the contribution of telecommunications is influenced by numerous factors, as follows: (1) the size and complexity of the industrial establishment (that is, total output and the degree of specialization or subdivision of the production and distribution process); (2) the size of the land mass in which the economy operates (that is, the spatial limitation which must be overcome); (3) the associated communication media (that is, the transportation facilities, upon which control would rest in the absence of telecommunications service); and (4) the kind of economic control mechanism (whether state-controlled or free enterprise) which would determine the polarity and the frequency of communications requirements.

The telecommunications resources inherited by the Communists in 1917 were feeble even by the standards of that time. These resources were not widely distributed, and their capacity was sufficient to meet only emergency governmental needs, as they consisted of a patchwork of the low-capacity wireline and relatively short-range radio of the period -- mostly telegraph and a little telephone service.

A discovery at this time which was of great significance to the Communist regime was high-frequency long-range radio. The USSR could now at low cost and with great speed (because the construction of lengthy wirelines was unnecessary) provide rapid, long-distance communications to help achieve and maintain political control of the country and to help start a modern, industrialized economy. Thousands of radio circuits were set up for point-to-point broadcasting and for other services.

In spite of this great innovation, the first five of the Five Year Plans called for the provision of multiconductor underground cables to interconnect all important cities of the country by telephone and telegraph services. The purpose was to extend coverage, increase capacity, improve security, and enhance reliability of service. Although some cable and some overhead wireline facilities have been provided, it is believed that a modern underground cable network has not yet been installed across the country but is only now under way. The cable which has been installed is largely in the European USSR. Thus the telecommunications resources of the USSR have not yet reached the level of development of those in other modern countries.*

The role of telecommunications in the USSR has consistently been service for the state rather than for the people. The users of service have been chiefly the Communist Party, the armed forces, the police, the economic ministries, and other organs of the government. The urban and interurban telecommunications facilities which were provided were essentially intended to meet only the minimum needs of these users. Some of the facilities provided have been used jointly and some separately by the government and private consumers. During the 40 years' tenure of the Soviet regime, such consumer service as

* The provision of new paralleling facilities using relatively high-capacity wireline or microwave media will not render obsolete or useless, either for financial or operational purposes, the large number of high-powered long-distance, point-to-point radiobroadcasting transmitters currently in use, even though the new facilities are able to carry all the service required. It is expected that these radiobroadcasting facilities will continue, at least in nominal "exercise" service, in order to insure their immediate availability for operation under emergency or war conditions and for operation as reserve resources or even as electromagnetic warfare jammers.

has been available has been chiefly in times of slack in existing facilities -- for example, this slack has occurred mainly during nonworking hours for telephone and telegraph service.

The needs of the government and of private consumers coincide in a unique way in wire-diffusion broadcasting, in which centers distribute programs (chiefly propaganda) over wires to loudspeakers located in civilian homes and other places. This is "captive audience" mass communication. Although the USSR has only about 2.2 million telephones, mainly for government and business use, it has about 25 million wire-diffusion loudspeaker subscribers, served by about 37,000 wire-diffusion centers. Unlike the nationwide telephone and telegraph system, the wire-diffusion centers are not normally interconnected. Although private consumers derive some satisfaction from this service, it is believed that the basic motivation of the government in providing it is control of the masses through propaganda and ideological education.

The following estimate of Soviet capability in the field of telecommunications is based on known Soviet objectives: political and ideological consolidation of the people; national defense ("security of the home base"); growth of the economy, not at normal but at accelerated rates, to catch up with the West, especially the US; and the realization of international political and territorial ambitions backed by strong military force. It is estimated that the USSR has not fully exploited the potential of telecommunications to achieve these objectives, much less to satisfy private consumers. Soviet telecommunications resources lack standardization, security, flexibility, adequate capacity, modernity, and reasonably good nationwide distribution. One reason for the failure of the USSR to exploit fully its telecommunications resources is that sufficient priority has not been assigned that sector of the economy.

During the early postwar period the telecommunications resources of the USSR were in poor condition because of war destruction, obsolete equipment and facilities, dislocations, loss of some trained manpower, and lack of capacity for manufacturing equipment. The character of the reconstruction was influenced by the urgency of the need and the availability of equipment rather than by a long-range decision to build a high-capacity, modern, standardized, well-distributed resource. As time passed, more and more modern techniques (many developed by other countries and copied by the USSR) were applied to existing facilities. The increased capacities and other advantages gained, however, although achieved at low investment cost relative to the initial cost of the basic facility, were not of a nature to provide capacities and other desirable long-range advantages.

It is believed that 1955 marked the end of the period of low priorities for the long-range development of the basic telecommunications resources of the USSR. The Sixth Five Year Plan (1956-60), which was scrapped in late 1957 for a proposed new plan (1959-65), contained evidences of higher priorities for the development of these resources. It is believed that the new plan may give even higher priority to telecommunications.

The purpose of this report is to present information on the status, operation, and development of the basic public post and telecommunications sector of the Soviet economy. Primary emphasis has been placed on the presentation of this information in tabular and cartographic form. The data presented cover varying time periods from 1913 through 1957 and are limited to activities of the Ministry of Communications (Ministerstvo Svyazi).* Discussion of the functional telecommunications systems of other ministries is limited to passing references.

The public post and telecommunications sector of the Soviet economy, operated and maintained by the Ministry of Communications, provides postal, telephone and telegraph, and broadcasting services. In providing these services the Ministry places primary emphasis on meeting the requirements of the government, and the needs of the private consumer are secondary. Accurate measures of the distribution of services between the government and private consumers are not available.

II. Ministry of Communications.

A. Organization.

The primary responsibilities of the Ministry of Communications of the USSR are to provide domestic and international telephone and telegraph service through an integrated wireline and radio network; a domestic and international broadcasting network utilizing radio, television, and wire; and a domestic and international postal service. In addition, the Ministry has the responsibility for technical control** over radiobroadcasting networks and over independent point-to-point radio and wireline networks operated by other ministries. 1/***

* Unless otherwise indicated, the term Ministry of Communications includes both the Ministry of Communications of the USSR and the ministries of communications of the various republics of the USSR.

** This control involves monitoring, frequency allocation, and time scheduling.

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The present Ministry of Communications stems from the original Peoples Commissariat of Post and Telegraph established by the Communist regime in 1918. In 1924 the Peoples Commissariat of Post and Telegraph was reorganized under the title of the All-Union Peoples Commissariat of Post and Telegraph. In 1932 it was renamed the Peoples Commissariat of Communications, retaining its All-Union status; in March 1946 the designation was changed to the Ministry of Communications; and in December 1954 it was given the status of a union-republic ministry. 2/

No major changes in the functional responsibilities of the Ministry of Communications have occurred since 1918. Such organizational changes as the change of the ministry from All-Union to union-republic status 3/ have apparently had little effect on the functional responsibilities of the Ministry of Communications.

1. Ministerial.

The Minister of Communications of the USSR is Nikolay Demyanovich Psurtsev. Before assuming this position he was in charge of Soviet military communications and held the rank of colonel general in the Soviet Army. In charge of the over-all direction of the Ministry of Communications, he receives his orders directly from the Council of Ministers and is a member of that body. The Ministry of Communications is organized on a dual basis, administrative and operational. 4/ Its operational functions are carried out by operational chief directorates which manage all the production activities of the separate post and telecommunications fields. The chief directorates are supplemented by staff departments and directorates for administrative matters. The Minister is aided by two staffs: the Office of the Minister for administrative matters and the Collegium for operational and management matters. The Office of the Minister is a permanent secretariat. The Collegium is composed of the deputy ministers of communications, the heads of each of the operational chief directorates, and the heads of certain support staffs. The authority of the Collegium is purely advisory, and the final decision on any major policy question lies with the Minister. 5/ In addition to the Minister, there are six deputy ministers of communications. The deputy ministers are partly responsible for coordinating the over-all activities of the Ministry, but each deputy minister is believed to be fully responsible for a specific activity. 6/

2. Administrative.

The administrative structure of the Ministry of Communications, shown in Figure 2,* parallels the political-administrative

* Following p. 8.

structure of the USSR. There are ministries of communications at the republic level, directorates of communications at the kray and oblast levels, and communications offices at the okrug, city, and rayon levels. The ministry of communications at the republic level is believed to exercise minor control over the operational field enterprises within the republic. The principal duties of the republic ministries seem to consist of (a) liaison between the Ministry of Communications of the USSR and subordinate administrative elements within the republic and (b) the initiation and coordination of plans for communications in the republic. In this latter function the republic ministry of communications speaks with some degree of authority in allocating and utilizing local resources to meet plan goals. 7/

The basic regional administrative organizational units below the level of the Ministry of Communications of the USSR are the directorates of communications, which are found at kray and at oblast levels in the RSFSR and at the oblast levels in the other republics. The kray and oblast directorates of communications are believed to be responsible to the staff departments and directorates of the Ministry of Communications of the USSR for the administrative aspects of post and telecommunications activities within their territory. All directorates in turn manage their territories through okrug, city, and rayon offices of communications. At the same time, however, the various operational field enterprises are directly responsible to their operational chief directorates in Moscow in all operational matters. This separate responsibility of operational field units often deprives the heads of the kray or oblast directorates of communications of the authority necessary to meet their responsibilities.

3. Operational.

The functional operations of the Ministry of Communications of the USSR are controlled by the operational chief directorates located in Moscow. These chief directorates are the most important operational elements in the Ministry of Communications. They manage all of the production, installation, and technical activities of the separate fields of communications. They are also responsible for all matters relating to the direct management of subordinate operational field enterprises, including production, control of quality, research and development, planning, and material allocation. 8/ The operational organization of the Ministry of Communications of the USSR is shown in Figure 3.*

* Following p. 8.

[redacted]

Figure 2

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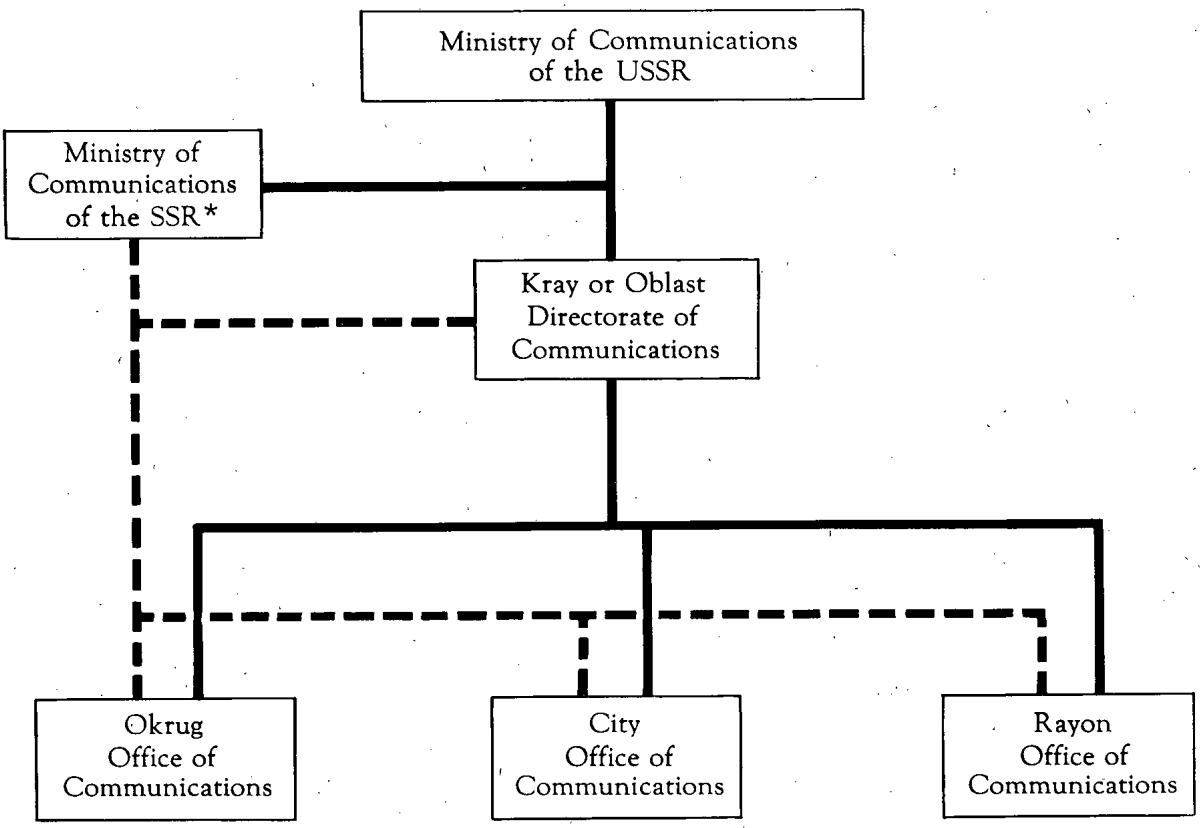
USSR: ADMINISTRATIVE STRUCTURE OF THE MINISTRY OF COMMUNICATIONS

1957



*These ministries are found in each of the 15 SSR's. Before January 1955 the Ministry of Communications of the USSR was represented at the SSR level by the Authorized Agent of the Ministry of Communications.

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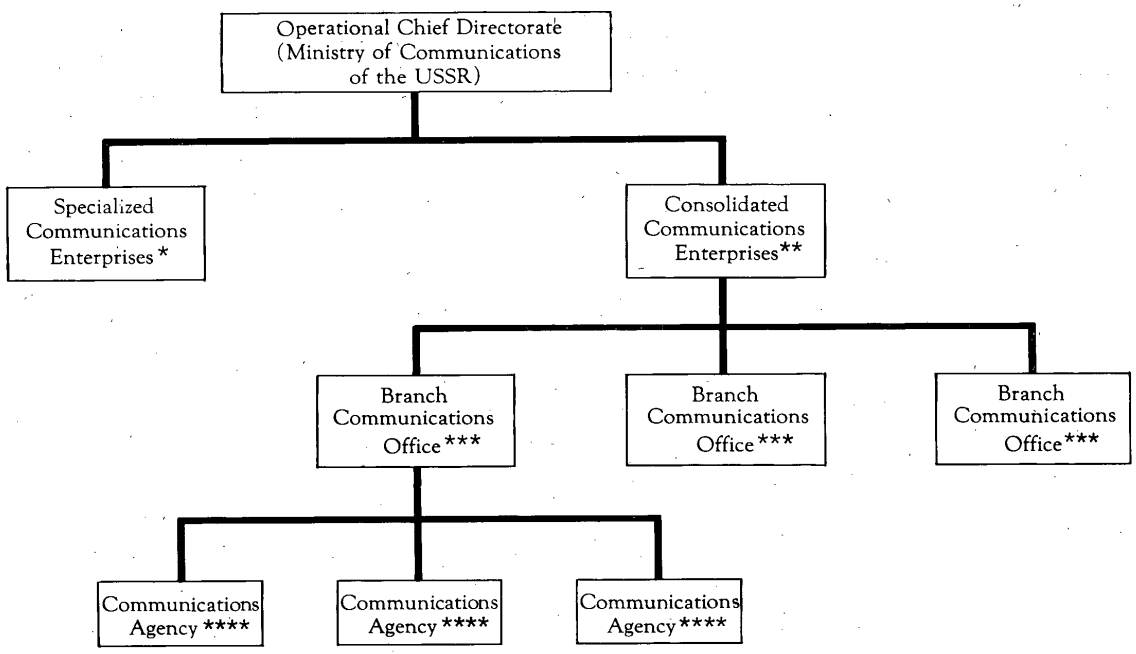
Figure 3 50X1

USSR: OPERATIONAL STRUCTURE OF THE MINISTRY OF COMMUNICATIONS

1957



* *These enterprises are responsible for one type of service, such as telephone service, in a given area. They are found in the larger cities of the USSR.*

** *These enterprises are responsible for all types of post and telecommunications service in a given area. They are found in the smaller cities and the heavily populated rayons of the USSR.*

*** *These offices are responsible for one or more types of service in a given area. They are usually found in the rural rayons and the larger village soviets of the USSR.*

**** *These agencies are responsible for one or more types of service in a given area. They are found in the small rural village soviets of the USSR.*

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The basic operational unit below the level of the chief directorates in Moscow is the field communications enterprise. These enterprises are divided into consolidated and specialized types. Consolidated enterprises carry out operations in all fields of communications service -- postal, telephone and telegraph, and broadcasting. Specialized enterprises are limited to operations connected with one specific communications service. The specialized enterprises are found primarily in large cities, whereas consolidated communications enterprises predominate in smaller cities and in rural areas. The consolidated enterprise usually has subordinate units which are designated as branch communications offices and communications agencies.

Both specialized and consolidated communications enterprises are classified according to yearly income. Branch communications offices of consolidated communications enterprises are also classified according to yearly income, as shown in the following tabulation:

Class	Yearly Income (Thousand Rubles*)
I	370 or more
II	180 through 369
III	90 through 179
IV	43 through 89
V	22 through 42
VI	12 through 21
VII	4 through 11

Organizations having a yearly income of less than 4,000 rubles are designated communications agencies and are not further classified by income. 9/

The dominant feature of the organizational structure of the Ministry of Communications of the USSR has been the high degree of operational and administrative control centered in Moscow. Such strongly centralized control is to be expected in a ministry whose services and facilities are nationwide.

* Ruble values in this report are expressed in current rubles and may be converted to US dollars at the official rate of exchange of 4 rubles to US $1. This exchange rate, however, does not necessarily reflect the true dollar value.

The high degree of centralization of control of the Ministry of Communications possesses certain defects which have become increasingly apparent in recent years. The major defect has been the reluctance of regional officials to make decisions on their own initiative. In many instances this reluctance has caused inefficient allocations of post and telecommunications resources, prolonged delays in service, and increased costs. In addition, centralized control has led to a radial configuration in the Soviet telecommunications system, with Moscow as the focal point for about 30 major telecommunications centers. Such a system is cumbersome to operate and is extremely vulnerable to natural disturbances and military attack.

The radial system of telecommunications is not well suited to the economic reorganization now under way in the USSR. A member of the Collegium of the Ministry of Communications of the USSR reported in the summer of 1957 that the present radial configuration of telecommunications from Moscow and other major centers would have to be replaced by a point-to-point system if the economic reorganization is to function properly. 10/ This need for point-to-point telecommunications is a result of increasing demands for direct telecommunications facilities and service both within and among the newly created economic regions. As an indication of the steps being taken to meet this need for direct telecommunications, the Deputy Minister of Communications of the Ukrainian SSR reported in September 1957 that direct telecommunications between economic regions in the Ukraine had been expanded sharply and that by the end of 1957, 100 new intraoblast circuits would be in operation. 11/ Another effect of the increased demand for direct telecommunications has been a proposal to consolidate under the Ministry of Communications all the functional telephone and telegraph systems which are now being operated by many other ministries. 12/

The present reorganization has not yet effected major changes in the organizational structure of the Ministry of Communications. One proposal, not yet adopted, would require that the various communications enterprises within the new economic regions be consolidated and that there be increased local authority in administrative matters. 13/ This would represent a continuation of the trend that was being followed before the economic reorganization. A probable result of these projected moves would be an increase in the authority and responsibilities of the various republic ministries.

It is too early to forecast how the USSR will actually solve these pressing problems. Solutions may be worked into a proposed new Plan (1959-65).

B. Revenue.

The revenue received by the Ministry of Communications of the USSR for its services has grown from about 5.6 billion rubles in 1946 to 11.1 billion rubles in 1957, an increase of about 96 percent. Table 1* shows the estimated total revenue for 1946-57. Tables 2, 3, 4, 5, 6, and 7** give a detailed breakdown of the sources of revenue by individual service. Appendix B shows the rate schedules for the various services: postal, telephone and telegraph, and broadcasting.

The rate of growth in total revenue, shown in Figure 4,*** was relatively stable during 1946-50. A moderate upsurge in 1951 and 1952 was followed by a slight decrease in 1953. The decrease in growth of revenue in 1953 is wholly attributable to a reduction in subscription fees for wired loudspeakers in that year. Following the decrease in 1953 the rate of growth of revenue again turned upward. For 1954-57 the rate of growth of revenue was relatively constant, being slightly greater than the rate of growth for 1946-50.

Of the individual services, postal service consistently provided the largest single portion of total revenue received by the Ministry of Communications during 1946-57. Contributions by the postal service to total revenue have ranged from 42 percent to 45 percent. In 1957 the service contributed approximately 43 percent of total revenue. Revenues from telegraph and interurban telephone services have fluctuated from 29 percent to 32 percent. In 1957, telegraph and interurban telephone services contributed about 29 percent of total revenue. Urban and rural telephone services have contributed a relatively constant percentage to total revenue and in 1957 contributed approximately 9 percent. Broadcasting service has shown the greatest fluctuation in terms of its percentage contribution to total revenue, which has ranged from 15 percent in 1954 to about 20 percent in 1957.

The Ministry of Communications is expected to continue expanding its volume of service in response to present and anticipated demands. Reduction in growth of revenue over the long run, therefore, is not anticipated. Rates for post and telecommunications services have historically registered only slight downward changes over any extended period of time. The effect on revenue of any future reductions in rates should be more than offset by revenues from increased volume of service. Growth of revenue in the Ministry of Communications should continue at a rate comparable to that in 1946-57 if not slightly higher.****

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* Table 1 follows on p. 12.

** Tables 2, 3, 4, 5, 6, and 7 follow on pp. 13, 14, 15, 16, 17, and 18, respectively, below.

*** Following p. 12.

**** Continued on p. 19.

Table 1

Estimated Revenue of the Ministry of Communications of the USSR a/
1946-57

Million Current Rubles

Year	Source of Revenue				
	Postal	Telegraph and Interurban Telephone	Urban and Rural Telephone	Broadcasting	Total
1946	2,429	1,811	532	871	5,643
1947	2,559	1,910	554	973	5,996
1948	2,702	2,011	589	1,029	6,331
1949	2,866	2,118	618	1,075	6,677
1950	3,069	2,245	650	1,158	7,139
1951	3,315	2,412	694	1,441	7,886
1952	3,550	2,586	739	1,558	8,454
1953	3,691	2,665	786	1,275	8,442
1954	4,059	2,742	854	1,335	9,016
1955	4,397	2,818	908	1,592	9,743
1956	4,580	2,983	959	1,902	10,454
1957	4,707	3,163	1,011	2,174	11,055

a. Revenue data for all categories for 1950-56 were announced. 14/ The sum of the announced revenue data from the various categories accounts for 99 percent of the total revenue. A breakdown of revenue data for all categories as presented in Tables 2 through 7 (pp. 13, 14, 15, 16, 17, and 18, respectively, below) does not in all cases agree with the totals shown. These variations, however, are negligible.

Figure 4 50X1

USSR: ESTIMATED RATE OF GROWTH OF REVENUE OF THE MINISTRY OF COMMUNICATIONS 1946-57

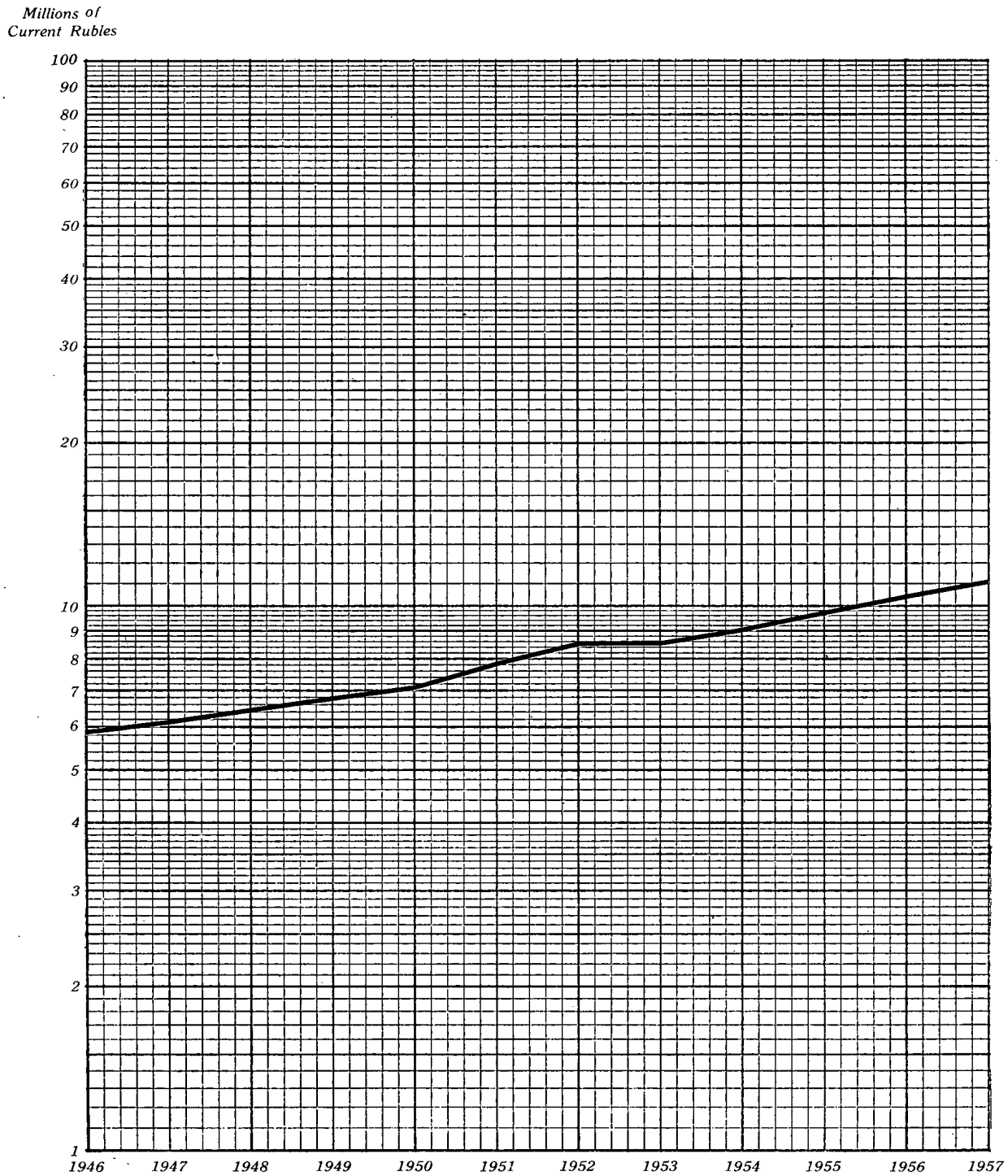

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Table 2

Estimated Revenue from Postal Service in the USSR a/
1946-57

Million Current Rubles

	Source of Revenue				
Year	Letters a/	Money Orders	Packages	Periodicals and Newspapers	Total b/
1946	954	924	512	39	2,429
1947	1,003	968	544	44	2,559
1948	1,044	1,018	592	48	2,702
1949	1,102	1,072	640	52	2,866
1950	1,173	1,128	704	59	3,069 c/
1951	1,299	1,199	816	67	3,315 c/
1952	1,424	1,270	880	74	3,550 c/
1953	1,474	1,336	944	79	3,691 c/
1954	1,544	1,402	1,040	88	4,059 c/
1955	1,705	1,408	1,216	93	4,397 c/
1956	1,753	1,441	1,216	105	4,580 c/
1957	1,800	1,512	1,280	115	4,707

a. Postal revenue was derived by multiplying the estimated average unit revenue received for letters, money orders, packages, and periodicals and newspapers by their volumes. For letters, however, it was assumed that only 90 percent of their total volume was paid. See Table 14 (p. 33, below) for the volume of postal service. The average revenue received per postal unit is estimated, on the basis of the Soviet rate schedules shown in Appendix A, to be as follows:

Postal Unit	Rubles
Letters	0.50
Money orders	5.50
Packages	16.00
Newspapers, periodicals, and the like	0.01

b. Total revenue for 1946-49 and 1957 is the sum of estimated revenue from letters, money orders, packages, and periodicals and newspapers. For 1950-56, total revenue was derived from announced data and varies slightly from the estimated sum of revenue received from the four postal categories.

c. 15/

Table 3

Estimated Revenue from Telegraph and Interurban Telephone Service in the USSR 1946-57

Million Current Rubles

	Source of Revenue						
	Telegraph			Interurban Telephone			
Year	Paid Telegrams Sent [a]	Lease of Telegraph Circuits [b]	Total	Interurban Calls [c]	Lease of Interurban Telephone Circuits [d]	Total	Total Telegraph and Interurban Telephone Revenue [e]
1946	769	85	854	718	239	957	1,811
1947	812	90	902	756	252	1,008	1,910
1948	856	95	951	795	265	1,060	2,011
1949	906	101	1,007	833	278	1,111	2,118
1950	962	107	1,069	876	292	1,168	2,245 [f]
1951	1,044	116	1,160	918	306	1,224	2,412 [f]
1952	1,131	126	1,257	978	326	1,304	2,586 [f]
1953	1,219	135	1,354	1,012	337	1,349	2,665 [f]
1954	1,256	140	1,396	1,071	357	1,428	2,742 [f]
1955	1,269	141	1,410	1,148	383	1,531	2,818 [f]
1956	1,288	143	1,431	1,216	405	1,621	2,983 [f]
1957	1,306	145	1,451	1,284	428	1,712	3,163

a. The number of paid telegrams sent is estimated to be 84.5 percent of the total number of telegrams sent (see Table 23, footnote a, p. 49, below). The estimated number of paid telegrams sent was multiplied by the estimated average revenue per telegram, 7.4 rubles. This estimate is based on known rate schedules for telegrams in the USSR (see Table 43, p. 101, below) and on analogy with US practice.
b. Estimated to be 10 percent of total telegraph revenue.
c. Computed by multiplying the number of interurban telephone calls (see Table 22, p. 47, below) by the estimated average revenue per call, 8.5 rubles. This estimate is based on known rate schedules for interurban telephone calls in the USSR (see Table 42, p. 101, below) and on analogy with US practice.
d. Estimated to be 25 percent of total interurban telephone revenue.
e. Total revenue for 1946-49 and 1957 is the sum of estimated telegraph and interurban telephone revenue. Total revenue for 1950-56 was derived from announced data and varies slightly from the sum of estimated telegraph and interurban telephone revenue.
f. 16/

Table 4

Estimated Revenue from Urban and Rural Telephone Service in the USSR a/ 1946-57

Million Current Rubles

Year	Source of Revenue: Urban Telephone: Home Telephone Subscription Fees c/	Business Telephone Subscription Fees d/	Other b/: Installation Fees e/	Other b/: Miscellaneous f/	Other b/: Total	Total Rural Telephone	Total Urban and Rural Telephone Revenue
1946	53	388	5	66	513	19 g/	532
1947	59	400	6	69	534	20 g/	554
1948	66	420	7	74	567	22 g/	589
1949	73	439	5	78	595	23 g/	618
1950	81	457	7	81	626	24 h/	650 i/
1951	89	479	8	84	660	34 h/	694 i/
1952	99	502	8	90	699	40 h/	739 i/
1953	109	523	7	96	735	51 h/	786 i/
1954	121	547	10	99	777	77 h/	854 i/
1955	133	574	10	105	822	86 h/	908 i/
1956	147	601	10	112	870	89 h/	959 i/
1957	161	628	10	118	917	94 j/	1,011

a. Totals are derived from unrounded data and may not agree with the sum of their rounded components.
b. About 15 percent of total urban telephone revenue is estimated to be derived from sources other than subscription fees.
c. Computed by multiplying the annual home telephone subscription fee of 300 rubles by the midyear number of urban home telephones (see Table 20, p. 42, below). 17/
d. Computed by multiplying the annual business telephone subscription fee of 500 rubles by the midyear number of urban business telephones (see Table 20). 18/
e. Computed by multiplying the annual number of new subscribers (urban home and business) by the installation fee of 100 rubles (see Table 20). 19/
f. Revenue from miscellaneous sources includes revenue from public telephone booths and from fees for such items as the following: an annual 50-ruble charge per kilometer for subscribers who are located more than 3 kilometers (km) from the central or substation telephone exchange, annual subscription fees for additional telephone receivers, changes in the telephone numbers of subscribers, and fees for subscribers who have internal telephone networks connecting to the network of the Ministry of Communications. 20/
g. Assuming the same percentage relationship of rural telephone revenue to urban telephone revenue as in 1950.
h. Derived by subtracting urban telephone revenue from total telephone revenue.
i. 21/
j. Assuming the same percentage relationship of rural telephone revenue to urban telephone revenue as in 1956.

Table 5

Estimated Revenue from Radiobroadcasting Service in the USSR
1946-57

Million Current Rubles

Year	Source of Revenue a/			Total Revenue
	Category I Receivers	Category II Receivers	Category III Receivers	
1946	29	7	10	46
1947	33	8	12	53
1948	35	9	12	56
1949	38	10	13	61
1950	44	11	15	70
1951	56	14	19	89
1952	73	18	25	116
1953	91	23	32	146
1954	114	29	40	183
1955	146	37	51	234
1956	194	36	51	281
1957	248	47	65	360

a. Category I receivers are for individual use; Category II receivers are for use in village reading rooms, "red corners," and radio auditoriums; and Category III receivers include all others.

The methodology for these figures follows. The midyear figures for receivers in use were computed by dividing the difference between consecutive end-of-year figures (see Table 35, p. 73, below) and adding the result to the previous end-of-year figure. The percentage distribution of receivers in each category was estimated to be as follows:

Percent

Years	Category I	Category II	Category III
1946-55	75	12.5	12.5
1956-57	80	10	10

The midyear figure for receivers was multiplied by the percentage for each category to obtain the number of receivers in each category in each year. The number of receivers in each category then was multiplied by the annual subscription fee per receiver. Average annual subscription fees are as follows: Category I, 36 rubles; Category II, 54 rubles; and Category III, 75 rubles. 22/

Table 6

Estimated Revenue from the Wire-Diffusion Service
in the USSR
1946-57

Million Current Rubles

Year	Source of Revenue							
	License Fees [a]			Installation Fees [b]			Other [c]	Total Revenue [d]
	Urban	Rural	Total	Urban	Rural	Total		
1946	552	205	757	22	5	27	41	825
1947	627	221	848	22	5	27	45	920
1948	676	237	913	7	5	12	48	973
1949	698	254	952	7	5	12	50	1,014
1950	797	270	1,067	51	5	56	58	1,181
1951	911	308	1,219	16	17	33	65	1,317
1952	963	376	1,339	14	22	36	71	1,446
1953	652	341	993	32	43	75	56	1,124
1954	578	264	842	33	57	90	48	980
1955	634	357	991	31	77	108	57	1,156
1956	684	455	1,139	27	66	93	64	1,296
1957	722	560	1,282	18	88	106	73	1,461

a. Computed by multiplying the number of urban and rural loudspeakers in use at midyear by the yearly urban and rural license fees. The midyear figures for urban and rural loudspeakers in use were computed by dividing the difference between consecutive end-of-year figures (see Table 38, p. 85, below) and adding the result to the previous end-of-year figure. The average annual license fee for urban loudspeakers in use was 120 rubles for 1946-52, 75 rubles (adjusted rate) for 1953, and 60 rubles for 1954-57. The average annual license fee for rural loudspeakers in use was 120 rubles for 1946-52, 84 rubles (adjusted rate) for 1953, and 48 rubles for 1954-57. 23/

b. Computed by multiplying the estimated net annual increase in the number of loudspeakers by 35 rubles, the installation fee for a single loudspeaker. 24/ Because of the durability of such loudspeakers, no allowance was made for depreciation or replacement of loudspeakers in computing revenues from installation fees.

c. Assumed to be about 5 percent of total revenue.

d. Computed from license and installation fees on the assumption that license and installation fees would be about 95 percent of total revenue and that the remaining 5 percent would be derived from "other sources." Totals were derived from unrounded data and may not agree with the sum of their rounded components.

Table 7

Estimated Revenue from Television Service
in the USSR
1950-57

Million Current Rubles

Year	Source of Revenue a/			Total Revenue
	Category I Receivers	Category II Receivers	Category III Receivers	
1950	1	1	2	4
1951	2	3	4	9
1952	5	8	11	24
1953	15	8	11	34
1954	30	16	21	67
1955	57	31	40	128
1956	97	52	68	217
1957	184	73	96	353

a. Category I receivers are for individual use; Category II receivers are for use in village reading rooms, "red corners," and radio auditoriums; and Category III receivers include all others.

The methodology for these figures follows. The midyear figures for receivers in use were calculated by dividing the difference between consecutive end-of-year figures (see Table 39, p. 88, below) and adding the result to the previous end-of-year figure. The percentage distribution of receivers in each category was estimated as follows:

Years	Percent		
	Category		
	I	II	III
1950-52	50	25	25
1953-56	75	12.5	12.5
1957	80	10	10

The midyear figure for receivers was multiplied by the percentage for each category to obtain the number of receivers in each category in each year. The number of receivers in each category then was multiplied by the annual subscription fee per receiver. Average annual subscription fees are as follows: Category I, 120 rubles; Category II, 384 rubles; and Category III, 504 rubles. 25/

C. Investment.

The term investment is defined in the USSR as "the process of creating or adding to a new fixed asset in the economy, whether it be in the form of construction, installation of equipment, scientific research, or capital repair." 26/ The estimated investment in post and telecommunications for 1923-37 and 1946-57 is shown in Table 8.* The level of investment, measured in current rubles, increased substantially during 1923-37, but the growth was sporadic. From 1946 through 1957 the growth in investment, measured in 1955 rubles, more than tripled, from about 305 million rubles in 1946 to about 954 million rubles in 1957. Each year of the 1946-57 period has shown an increase, with the exception of 1952. The 1952 decrease is thought to reflect the general decrease in investment that took place during that year throughout the Soviet economy.

The total amount of investment in the post and telecommunications sector of the Soviet economy is unknown, but it is necessarily greater than the centralized investment** made by the Ministry of Communications. Besides centralized investments made by the Ministry, decentralized investments*** are made by its communications enterprises. Agricultural enterprises also make investments in post and telecommunications facilities, primarily for the development of wire-diffusion and telephone facilities. For facilities that are used jointly by the armed forces and the Ministry of Communications, the Ministry of Defense is believed to supply substantial portions of the investment funds. Other ministries operate functional telecommunications systems for which investment funds are supplied largely if not entirely by the respective ministries.

Investments by the Ministry of Communications and by subordinate enterprises are expected to increase substantially in the immediate future for the following reasons:

1. [redacted] the economic reorganization currently under way will increase the requirement for direct telecommunications. This requirement will have to

50X1

* Table 8 follows on p. 20.

** Centralized investment is planned by the highest echelons of the government and is primarily composed of investments in productive facilities which contribute to an increase in the output of service.

*** Decentralized investments are planned by communications enterprises and local government bodies and are primarily composed of investments in social and cultural facilities which contribute to the needs of the workers and the community.

Table 8

Estimated Investment in the Ministry of Communications of the USSR 1923-37 and 1946-57

Million Rubles

Year	Investment	Year	Investment b/
1 October 1923 through 1928	136 a/	1947	331
1929	70 a/	1948	365
1930	123 a/	1949	481
1931	184 a/	1950	589
1932	186 a/	1951	606
1933	184 a/	1952	550
1934	278 a/	1953	619
1935	287 a/	1954	632
1936	310 a/	1955	662
1937	241 a/	1956	924
		1957	954
1946	305 b/		

a. These figures are in current rubles and represent the sum of centralized and decentralized investments (see footnotes, p. 19, above) for these years. 27/

b. These figures are in 1955 rubles and represent centralized investments only for these years. 28/ The figures are derived from a series giving combined investment figures for the Ministry of Transportation and the Ministry of Communications together. The assumption was made that investment for the Ministry of Communications was 4.3 percent of the combined investment figures, on the basis of information for 1954 which gave this relationship between the investments of the two Ministries. 29/

be met largely by the addition of new facilities. As a result of the economic reorganization, the functional telecommunications systems will probably be consolidated with those of the Ministry of Communications, a step which has been advocated for a long time by the Ministry and which will also require additional investment funds. These funds were formerly supplied by other ministries. 30/

2. The continued growth of the economy should create increased demands for post and telecommunications service. In order to meet these demands, substantial quantities of new facilities will be required.

3. The status of the public telecommunications system is a matter of major importance to the armed forces because the system is subject to military use in time of emergency or war. Thus the joint investments by the Ministry of Defense and the Ministry of Communications can be expected to increase in order to improve the speed and reliability of service, to reduce the vulnerability of the telecommunications system, and to increase capacity and flexibility.

The USSR now has in prospect the provision of modern coaxial cable and microwave radio relay systems which, if realized within the next 5 years, will greatly increase investment rates. These systems are capable of yielding very high circuit capacity for main-line application. Initial investment for such systems runs very high, but the cost per circuit is attractively low.

D. Manpower.

Employees* of the Ministry of Communications comprise one of the most heterogeneous labor forces in the USSR. The diversified activities of the Ministry, ranging from the delivery of mail on foot and by animal-drawn vehicle to the installation, operation, and repair of highly complex electronic equipment, largely account for this condition, and the variety of skills required to perform these duties necessitates specialization of labor. Specialization introduces problems of establishing equitable wage rates, of providing necessary training, and of allocating personnel among the various enterprises of the Ministry.

1. Labor Force.

The Ministry of Communications employed 633,000 persons at the end of 1957. Figures on the labor force, as shown in Table 9,** cover full-time employees only and do not include part-time or seasonal employees engaged by the Ministry or employees hired by agricultural enterprises to operate rural post and telecommunications facilities maintained by the Ministry.

The distribution of employees by type of operation is shown in Table 10*** and illustrated graphically in Figure 5.**** It is estimated that approximately half of the total full-time employees of the Ministry of Communications are women.

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* The term employees is used collectively in this report to mean both workers and employees.

** Table 9 follows on p. 22.

*** Table 10 follows on p. 23.

**** Following p. 22.

Table 9

Estimated Average Annual Number of Full-Time Employees of the Ministry of Communications of the USSR 1913, 1922-40, and 1945-57

Units

Year	Employees	Year	Employees
1913	72,000 a/	1938	414,000 c/
		1939	446,000 e/
1922	92,000 a/	1940	478,000 d/
1923	87,000 a/ b/		
1924	82,400 a/ b/	1945	426,000 d/
1925	94,200 a/ b/	1946	461,000 f/
1926	95,200 a/ b/	1947	486,000 f/
1927	95,000 b/ c/	1948	507,000 f/
1928	95,000 b/ d/	1949	525,000 f/
1929	119,900 a/	1950	542,000 d/
1930	153,400 a/	1951	557,000 f/
1931	191,200 a/	1952	571,000 f/
1932	224,000 d/	1953	585,000 f/
1933	257,900 a/	1954	598,000 f/
1934	295,000 c/	1955	611,000 d/
1935	334,000 c/	1956	622,000 g/
1936	343,000 a/	1957	633,000 f/
1937	375,000 d/		

a. 31/
b. Data for 1923-28 do not include village postmen; data for the remaining years do.
c. 32/
d. 33/
e. Interpolated, using arithmetic progression, between 1938 and 1940.
f. Estimated, on the basis of graphic analysis.
g. 34/

The number of full-time employees engaged in post and telecommunications activity has increased substantially since 1913. The greatest period of expansion occurred during 1928-40. Since 1946 the number of new employees added to the labor force each year has been decreasing. This decreasing trend is not indicative of diminishing emphasis on post and telecommunications, however, but is indicative of increased labor productivity brought about by training and the introduction of modern practices and equipment. This trend is expected to continue.

Figure 5 50X1

USSR: ESTIMATED PERCENTAGE DISTRIBUTION OF EMPLOYEES IN THE MINISTRY OF COMMUNICATIONS, BY TYPE OF OPERATION

1957

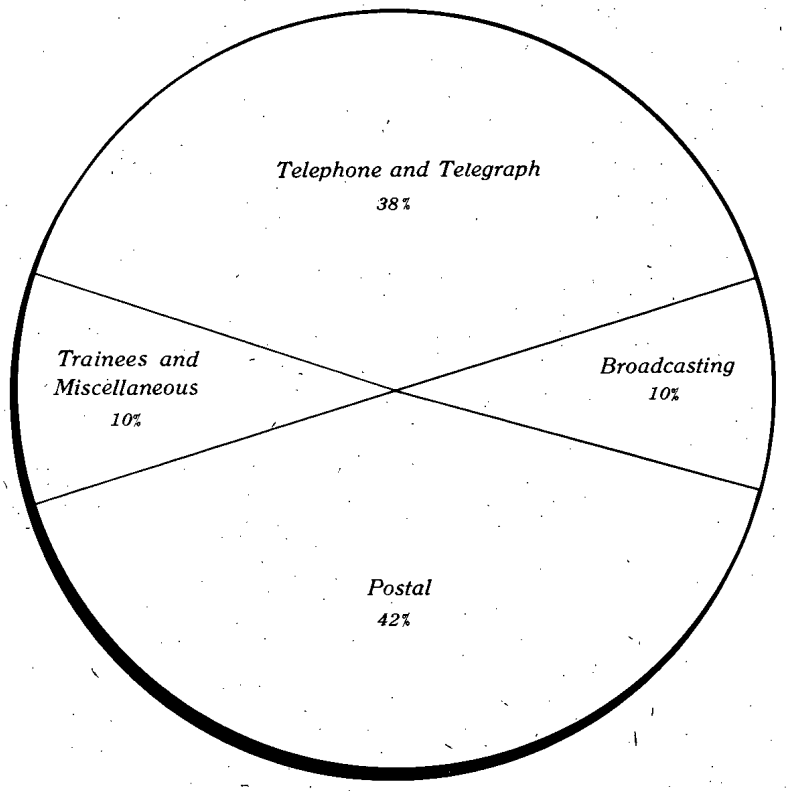

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Table 10

Estimated Number of Employees
of the Ministry of Communications of the USSR
by Type of Operation a/
1957

Units

Type of Operation	Employees
Postal	266,000
Telephone and telegraph	241,000
Broadcasting	63,000
Trainees and miscellaneous	63,000
Total	633,000 b/

a. Based on fragmentary information [redacted] and on analogy with US practice. 50X1 50X1

b. See Table 9, p. 22, above.

2. Wages.

In general, employees of the Ministry of Communications receive an average annual wage considerably in excess of the minimum wage established in 1956 for urban workers in the USSR. In 1956, for example, the estimated average annual wage of full-time employees of the Ministry was about 7,140 rubles, whereas the minimum wage of urban workers was only 3,600 rubles. The estimated average annual wage of employees of the Ministry of Communications since 1923 is shown in Table 11.*

The average annual wage, however, does not reflect the wage differentials that exist between the various functions performed by employees of the Ministry of Communications. Table 12** shows that there are substantial differentials in the wages paid to postal, telephone and telegraph, and broadcasting employees. Broadcasting employees, as a functional group, receive the highest wages, and telephone and telegraph employees are next. Trainees and postal employees receive the lowest wage of all employees.

* Table 11 follows on p. 24.
** Table 12 follows on p. 25.

Table 11

Estimated Average Annual Wage of Employees
of the Ministry of Communications of the USSR
1923-40 and 1945-57

Current Rubles

Year	Average Annual Wage	Year	Average Annual Wage b/
1923	372 a/	1939	2,800
1924	502 a/	1940	3,000
1925	615 a/		
1926	712 a/	1945	5,700
1927	747 a/	1946	5,820
1928	779 a/	1947	5,940
1929	721 a/	1948	6,320
1930	727 a/	1949	6,470
1931	1,062 a/	1950	6,560
1932	1,334 a/	1951	6,640
1933	1,453 a/	1952	6,730
1934	1,559 a/	1953	6,800
1935	1,862 a/	1954	6,860
1936	1,956 a/	1955	7,000
1937	2,356 a/	1956	7,140
1938	2,580 b/	1957	7,280

a. Computed by dividing the estimated total annual wage fund by the estimated number of employees in the Ministry of Communications. 35/
b. Extrapolated, using graphic analysis and known information on over-all wage increases in the USSR.

Wage differentials have also been established for shift work and for certain geographical areas. In addition, there are wage differentials within the same category of work according to longevity, as shown in the following tabulation 36/:

Years of Service	Pay Increase (Percent of Base Pay)
3 through 4	10
5 through 6	15
7 through 9	20
10 through 14	30
15 or more	40

The average annual wage of employees of the Ministry of Communications is believed to include, in addition to the base wage, work incentive bonuses or prizes and payments for social security benefits.

Table 12

Estimated Average Annual Wage of Employees of the Ministry of Communications of the USSR by Type of Operation 1957

Current Rubles

Type of Operation	Average Annual Wage [a]
Postal	6,900
Telephone and telegraph	7,400
Broadcasting	9,100
Trainees and miscellaneous	5,500
Average of all employees	7,280

a. On the basis of fragmentary information on the wage differential for technical skills, by specific type of operation, it is estimated that the average annual wage in each type of operation varied from the average annual wage of all employees of the Ministry of Communications as follows: postal, minus 5 percent; telephone and telegraph, plus 2 percent; broadcasting, plus 25 percent; and trainees and miscellaneous, minus 25 percent.

3. Training.

Many of the functions of the Ministry of Communications of the USSR require employees with a high degree of skill and technical competence. Furthermore, with the introduction of more modern and more complex equipment, the requirement for greater skill and technical competence of employees increases. To satisfy this requirement, the Ministry of Communications pursues an extensive training program.

The Ministry currently operates about 40 schools providing full-time training in post and telecommunications subjects. 37/

These schools are located throughout the USSR and include the Academy of Communications in Leningrad, electrotechnical institutes, and technical and trade schools. Supplementing these institutions are several schools operated by the Ministry of Culture and several universities which offer courses in post and telecommunications. 38/

Part-time courses in post and telecommunications are available through the All-Union Correspondence Technical School in Moscow. This school has well-distributed branch offices to facilitate its training activities.

The reported enrollment in the electrotechnical institutes in 1956 was about 9,000 full-time students. 39/ The technical and trade schools had an enrollment of about 17,000 full-time students in 1956. 40/ Enrollment in correspondence schools was about 10,000 in 1954 and by the end of 1955 had increased to more than 17,000. 41/ In 1956, about 9,000 employees were reported to be taking correspondence courses from electrotechnical institutes, and about 15,000 students were taking courses from the Correspondence Technical School. 42/ During 1946-56 the electrotechnical institutes reportedly graduated 10,442 engineers and the technical and trade schools 34,105 technicians. 43/

The Ministry of Communications conducts an intensive on-the-job training program. In 1956 alone, 125,000 employees of the Ministry are reported to have improved their qualifications through this program. 44/

It is estimated that the continued modernization and sophistication of post and telecommunications equipment and techniques will necessitate a continued high level of training activity. Greater emphasis can be expected to be given to increasing the size and number of technical schools operated by the Ministry itself.

4. Productivity.

The Ministry of Communications of the USSR has devoted a great deal of attention to the problem of increasing the productivity of its employees. To aid communications enterprises in their planning and control activities, an index for measuring the productivity of labor was introduced by the Ministry in 1953. 45/ The revenue of an enterprise was divided by the total number of its employees, and on this basis an index was constructed. By using the same procedure, an index reflecting the aggregate growth in the productivity of labor for the Ministry of Communications has been derived and is shown in Table 13.*

* Table 13 follows on p. 27.

Table 13

Index of Labor Productivity in the Ministry of Communications of the USSR
1950-57

Year	Average Revenue per Employee a/ (Current Rubles)	Index of Growth of Labor Productivity b/ (1950 = 100)	Percentage Growth in Labor Productivity b/
1950	13,200	100	
1951	14,200	107	8
1952	14,800	112	4
1953	14,400	110	-3
1954	15,100	114	5
1955	15,900	121	5
1956	16,800	128	6
1957	17,700	134	5

a. Computed by dividing the total revenue shown in Table 1 (p. 12, above) by the total number of employees, shown in Table 9 (p. 22, above).
b. Computed from unrounded data.

The validity of these calculations is borne out by isolated announcements of the Ministry on the subject of productivity gains. For example, it was announced that the total increase in productivity for the Ministry during 1949-55 was 35 percent 46/ and that the increase in productivity for the Moscow Central Telegraph Office during 1950-55 was 21 percent. 47/ Table 13 shows that the yearly percentage growth in labor productivity, with the exception of 1953, has been relatively stable. In 1953, total revenue decreased as a result of the reduction in the fees for wired loudspeaker subscriptions, causing a decline in the index for that year. Total revenue regained its former rate of growth in 1954. The index from that year onward is again a useful reflection of gains in labor productivity because no other significant price changes for post and telecommunications services have occurred.

The Ministry of Communications has stressed several conditions which have impeded growth in labor productivity. These include inefficient educational work of enterprises and unions, bureaucratic methods of direction employed by administrative staffs,

inadequacies in the supply of new equipment, and inequalities in wages resulting from the numerous differentials. 48/ To remedy these conditions, the Ministry has advocated the following:

a. Combining or consolidating, whenever possible, offices or enterprises performing related functions, such as wire-diffusion centers and telecommunications offices. 49/

b. Spreading new ideas and techniques through more frequent meetings and discussions among enterprises. 50/

c. Using model offices as examples for less efficient units. 51/

d. Employing monetary incentives to stimulate greater individual contributions. 52/

e. Expanding training, especially at the lower levels. 53/

To aid enterprises in achieving increases in productivity, the Ministry has established a Central Bureau of Technical Information 54/ whose function is to circulate information about technological advancements made either at home or abroad to communications offices throughout the country. In addition, the Ministry has created the position of Engineer in Charge of Inventive and Rationalization Work. One such engineer has been assigned to each enterprise employing more than 750 people. 55/

Programs designed to increase labor productivity by overcoming organizational, procedural, and training barriers will continue to be helpful. The major factor governing future gains, however, will be the part played by the increased use of labor-saving equipment.

E. Equipment.

The Ministry of Communications of the USSR currently obtains most of its telecommunications equipment from domestic production. Before World War II the development of an adequate domestic industry for manufacturing electronics equipment in the USSR was neglected, and a major portion of the electronics equipment used for telecommunications had to be imported. After the war the curtailment of foreign sources of supply, together with the desire for self-sufficiency, made the establishment of a domestic production capability in this field mandatory.

1. Production.

Several years elapsed after World War II before a substantial electronics industry was established in the USSR. By 1950 the production of electronics equipment began to increase. Between 1950 and 1955, production expanded 440 percent, 56/ and in 1955 it reached a level 20 times greater than in 1940. 57/ These figures are officially announced growth statistics and, although not necessarily exact, are believed to be of the correct order of magnitude.

As of 1958 the electronics equipment industry in the USSR is believed to consist of about 200 plants. 58/ These plants are controlled by several state committees* and the Ministry of Communications, and approximately 50 percent of total production of electronics is carried out in plants of the State Committee for Radioelectronics. The Ministry of Communications, in conjunction with the State Committee for Radioelectronics, produces the majority of telephone and telegraph equipment.

Even with the rapid growth that has occurred, the electronics industry is still not capable of producing sufficient varieties and quantities of advanced electronics equipment to meet all the requirements of the Ministry of Communications. This deficiency is attributable in part to the priority of military needs. Further expansion in the electronics industry appears to be necessary if planned growth in public telecommunications is to be fulfilled. It is reported that the production of this industry by 1960 is to be 250 percent greater than in 1955. 59/

In the future the Soviet electronics industry, in conjunction with those of Hungary, East Germany, and Czechoslovakia, may be more specialized in its production. In early 1956 the desire of the USSR to standardize the manufacture of telecommunications equipment led to an agreement between the USSR and some of its European Satellites. Hungary was to specialize in telecommunications carrier equipment (probably telephone equipment for multiplying circuit capacity), East Germany was to specialize in radio transmitters and receivers, Czechoslovakia was to specialize in television transmitters and receivers, and the USSR was to specialize in telephone equipment. 60/ There has been no subsequent indication that this program for standardization and specialization has been implemented.

* The State Committee for Aviation Technology, the State Committee for Defense Technology, the State Committee for Radioelectronics, and the State Committee for Shipbuilding.

2. Imports.

To supplement the domestic production of telecommunications equipment, the USSR imports equipment from other Soviet Bloc countries. Large quantities of microwave radio relay equipment were imported from East Germany during 1950-57. In 1956, equipment for microwave radio relay was also imported from Hungary. 61/ The use of both equipment for microwave radio relay and telecommunications wire and cable (including coaxial cable) are included in plans for the expansion of the public telecommunications system of the USSR. 62/ Imports of substantial quantities of telecommunications material from outside the Soviet Bloc are severely limited by COCOM restrictions, but some equipment for research and prototyping purposes is obtained on a single-item basis, in addition to large quantities of copper wire.

3. Exports.

The USSR has been an exporter of telecommunications equipment and material, more for political reasons than for reasons of surplus. It has exported radiobroadcasting transmitters and receivers to Eastern Europe, the Middle East, the Far East, and Communist China; television receivers to the European Satellites and Finland; and telephone equipment to Argentina, India, and Afghanistan. 63/ In the future, exports of telecommunications equipment will probably rise, primarily in consequence of increasing productive capability and of increasing aggressiveness in the use of trade with certain non-Soviet-Bloc countries as a medium of economic penetration.

4. Technology.

The USSR is well informed on modern telecommunications technology. Given the necessary priority, scientists and engineers can develop and the manufacturing industry can produce the kinds and quantities of equipment needed for the development of a modern telecommunications system.

The USSR is not believed to produce or use telephone equipment for multiplying circuit capacity which are capable of providing for more than 24 telephone channels. Telephone equipment for multiplying circuit capacity (types R-60 and R-240) which are capable of handling from 60 to 600 telephone channels are in the final stage of development for use on microwave radio relay equipment (which is known as Vesna). Similar telephone equipment to be used with coaxial cable also are being developed to provide up to 1,800 telephone channels. 64/ All of the telephone equipment

mentioned is interchangeable, with minor modifications, and may be used on either microwave radio relay or coaxial cable facilities.

Developmental work is being carried out on scatter and wave guide transmission techniques. 65/ The use of scatter, both tropospheric and ionospheric, would help provide dependable and reasonably secure communications, especially in the Arctic and eastern areas of the USSR. The use of wave guide techniques would make possible the simultaneous transmission of thousands of telephone channels and a number of television channels between major cities in the USSR.

III. Postal System.

The postal system plays a vital role in the communications structure of the USSR. The system provides substantial quantities of service for the government, and it is the predominant means of communication available to the private consumer. Postal service is available throughout the USSR.

The volume of mail handled by the postal system in the USSR is composed of letters, packages, newspapers and periodicals, and money orders. In terms of quantity, the volume of newspapers and periodicals sent is almost three times as great as the total volume of all other types of mail combined. Letters account for most of the remaining volume. Relatively few packages and money orders are sent by mail. The propaganda and educational value of newspapers and periodicals probably accounts for their predominance over all other types of mail handled. The total volume of mail handled, as shown in Table 14,* has grown at a relatively constant rate over the past 30 years. Since 1950 the growth in total volume of mail sent has averaged about 1 billion pieces per year. This growth in volume of service has been accompanied by growth in the length of postal routes and in the number of postal enterprises.

The growth in the total length of postal routes, as shown in Table 15,** has been quite constant, but substantial shifts have been made in the types of transportation employed. The most significant change has been the growth in the length of airmail and motor routes. In 1928, airmail and motor routes each accounted for only about 2 percent of the length of all postal routes. By 1957, about 23 percent of all postal routes employed air transport, and 16 percent employed motor transport. This increased percentage

* Table 14 follows on p. 33.
** Table 15 follows on p. 34.

of air and motor routes has been accompanied by decreases in the percentage of foot and animal routes. No significant change has occurred in the percentage of routes employing water and rail transport. The percentage distribution of postal routes by type of transport, however, does not reflect the relative volumes of mail carried. The railroad system of the USSR traditionally has been the basic means employed in long-distance postal conveyance and carries the largest volume of interurban mail. 66/

One of the most important aspects of the growth of postal enterprises in the USSR, as shown in Table 16,* has been the trend since 1946 toward consolidation of postal enterprises with telephone and telegraph enterprises. In 1940, about 50 percent of the total number of enterprises operated by the Ministry of Communications offered postal service exclusively. This relationship began to change after World War II. In 1957, of the total number of enterprises, only about 2 percent were exclusively postal. The urban-rural distribution of enterprises offering postal or postal and telephone and telegraph services has remained relatively constant since 1928, with only a slight increase in the percentage of enterprises located in urban areas.

It can be expected that in the future postal volume will grow at a rate comparable to that of 1946-57. Future growth will require greater capacity for handling mail and an increase in the speed of service. It is anticipated that capacity for handling mail will be improved through expansion in the number of small post offices and through use of mobile post offices. 67/ The gradual introduction of automatic services for handling mail in the larger postal centers, in conjunction with the increased mechanization of postal routes, should result in improved speed of service. 68/ One unconfirmed report on improvements in the speed of service of mail avers that the USSR has installed what may be called a rather fantastic facility between Moscow and Irkutsk in which mail is moved by a pneumatic tube system. 69/

A list of postal rates in the USSR in 1957 is given in Table 40,** and a list of postal money order rates in Table 41.***

* Table 16 follows on p. 35.
** P. 100, below.
*** P. 100, below. (Text continued on p. 36.)

Table 14

Estimated Volume of Postal Service in the USSR
1913, 1928-40, and 1946-57

Million Units

Year	Letters	Money Orders	Packages	Periodicals and Newspapers	Total
1913	615 a/	35 a/	10 a/	358 a/	1,018
1928	522 a/	37 a/	14 a/	1,320 a/	1,893
1929	660 b/	37 c/	18 c/	2,350 c/	3,065
1930	780 b/	37 c/	23 c/	3,210 c/	4,050
1931	870 b/	38 c/	30 c/	5,000 c/	5,938
1932	981 a/	38 a/	34 a/	4,695 a/	5,748
1933	1,000 b/	38 c/	34 b/	4,800 b/	5,872
1934	1,080 b/	47 c/	33 c/	4,975 c/	6,135
1935	1,120 b/	53 c/	32 c/	5,199 c/	6,404
1936	1,200 b/	65 b/	31 b/	5,500 b/	6,796
1937	1,277 a/	77 a/	31 a/	5,731 a/	7,116
1938	1,650 b/	82 b/	33 b/	6,050 b/	7,815
1939	2,080 b/	88 b/	37 b/	6,350 b/	8,555
1940	2,609 a/	96 a/	46 a/	6,708 a/	9,459
1946	2,120 b/	168 b/	32 b/	3,900 b/	6,220
1947	2,230 b/	176 b/	34 b/	4,430 b/	6,870
1948	2,320 b/	185 b/	37 b/	4,820 b/	7,362
1949	2,450 b/	195 b/	40 b/	5,250 b/	7,935
1950	2,607 a/	205 a/	44 a/	5,877 a/	8,733
1951	2,886 a/	218 a/	51 a/	6,701 a/	9,856
1952	3,164 a/	231 a/	55 a/	7,435 a/	10,885
1953	3,275 a/	243 a/	59 a/	7,894 a/	11,471
1954	3,432 a/	255 a/	65 a/	8,782 a/	12,534
1955	3,788 a/	256 a/	76 a/	9,349 a/	13,469
1956	3,896 a/	262 a/	76 a/	10,461 a/	14,695
1957	4,000 b/	275 d/	80 e/	11,500 e/	15,855

a. 70/
b. Interpolated and extrapolated, using graphic analysis.
c. 71/
d. 72/
e. 73/

Table 15

Estimated Length of Postal Routes in the USSR
1913, 1928-40, and 1946-57

Thousand Kilometers

Year	Motor Vehicle	Railroad	Water	Air	Other [a]	Total
1913		59 [b]	32 [b]			261 [b]
1928	11 [b]	81 [b]	110 [b]	11 [b]	350	563 [b]
1929	15 [c]	83 [c]	110 [c]	18 [d]	424	650 [e]
1930	21 [c]	89 [c]	114 [c]	29 [d]	507	760 [e]
1931	23 [c]	95 [c]	126 [c]	30 [d]	606	880 [e]
1932	24 [b]	100 [b]	125 [b]	35 [b]	718	1,002 [b]
1933	32 [e]	105 [d]	135 [e]	48 [e]	740	1,060 [e]
1934	50 [e]	105 [c]	150 [e]	60 [e]	735	1,100 [e]
1935	75 [e]	108 [c]	178 [e]	75 [e]	704	1,140 [e]
1936	150 [e]	109 [e]	202 [e]	95 [e]	604	1,160 [e]
1937	170 [b]	110 [b]	209 [b]	125 [b]	570	1,184 [b]
1938	163 [e]	140 [e]	208 [e]	145 [e]	594	1,250 [e]
1939	150 [e]	180 [e]	206 [e]	162 [e]	622	1,320 [e]
1940	130 [b]	240 [b]	202 [b]	178 [b]	668	1,418 [b]
1946	96 [e]	240 [e]	137 [e]	200 [e]	677	1,350 [e]
1947	102 [e]	250 [e]	142 [e]	255 [e]	631	1,380 [e]
1948	107 [e]	260 [e]	145 [e]	310 [e]	618	1,440 [e]
1949	113 [e]	270 [e]	148 [e]	360 [e]	589	1,480 [e]
1950	120 [b]	280 [b]	152 [b]	417 [b]	572	1,541 [b]
1951	130 [b]	290 [b]	154 [b]	444 [b]	554	1,572 [b]
1952	140 [b]	310 [b]	159 [b]	437 [b]	542	1,588 [b]
1953	160 [b]	340 [b]	166 [b]	439 [b]	522	1,627 [b]
1954	200 [b]	390 [b]	161 [b]	426 [b]	507	1,684 [b]
1955	240 [b]	410 [b]	173 [b]	428 [b]	486	1,737 [b]
1956	270 [b]	430 [b]	176 [b]	418 [b]	465	1,759 [b]
1957	296 [e]	450 [e]	180 [e]	420 [e]	454	1,800 [e]

a. Other routes are animal and foot routes. The figures were obtained by subtracting the length of motor vehicle, railroad, water, and air routes from the total length of routes.
b. 74/
c. 75/
d. Interpolated and extrapolated, using graphic analysis.
e. Extrapolated, using graphic analysis.

Table 16

Estimated Number
of Postal and Telephone and Telegraph Enterprises in the USSR
by Location and Type of Service a/
1913, 1928-40, and 1946-57

Thousand Units

Year	Location		Total Enterprises	Type of Service	
	Rural	Urban		Postal Only	Both Postal and Telephone and Telegraph
1913	7 b/	1 c/	8 d/	4 e/	4 d/
1928	13 b/	2 c/	15 d/	8 e/	7 d/
1929	14 b/	2 c/	16 f/	10 e/	6 g/
1930	21 b/	3 c/	24 f/	18 e/	6 g/
1931	36 b/	3 c/	39 f/	33 e/	6 g/
1932	41 d/	4 h/	45 d/	40 e/	5 d/
1933	40 b/	4 g/	44 i/	36 e/	8 g/
1934	41 b/	4 g/	45 f/	34 e/	11 g/
1935	40 b/	5 g/	45 f/	31 e/	14 g/
1936	38 b/	5 g/	43 g/	26 e/	17 g/
1937	36 d/	5 h/	41 d/	20 e/	21 d/
1938	37 b/	6 g/	43 i/	21 g/	22 j/
1939	40 b/	7 g/	47 g/	22 g/	25 j/
1940	44 d/	7 h/	51 d/	23 e/	28 d/
1946	41 b/	6 c/	47 k/	22 e/	25 c/
1947	42 b/	6 c/	48 k/	20 e/	28 c/
1948	42 b/	7 c/	49 l/	18 e/	31 c/
1949	43 b/	7 c/	50 l/	16 e/	34 c/
1950	43 d/	8 h/	51 d/	14 e/	37 d/
1951	43 d/	8 h/	51 d/	11 e/	40 d/
1952	43 d/	9 h/	52 d/	8 e/	44 d/
1953	43 d/	10 h/	53 d/	8 e/	45 d/
1954	44 d/	10 h/	54 d/	5 e/	49 d/
1955	45 d/	11 h/	56 d/	5 e/	51 d/
1956	46 d/	11 h/	57 d/	3 e/	54 d/
1957	46 b/	12 c/	58 m/	1 e/	57 c/

a. An enterprise consists of one or more subordinate communications offices and agencies which are located within a given administrative area.
b. Total minus urban.
c. Extrapolated, using graphic analysis.
d. 76/
e. Total minus the figure for both postal and telephone and telegraph.
f. 77/
g. Interpolated, using graphic analysis.
h. Total minus rural.
i. 78/
j. Total minus postal only.
k. 79/
l. Interpolated, using arithmetic progression.
m. Total for 1956 plus planned absolute increase for 1957. 80/

IV. Telephone and Telegraph Systems.

Rapid public telecommunications service in the USSR is provided by the telephone and telegraph systems operated by the Ministry of Communications. This service is utilized primarily by the government, with usage by private consumers being generally restricted to slack periods. Telephone service does not meet private consumer needs either in geographical coverage or in readiness to serve. 81/ Service is provided through the integrated use of wireline and point-to-point radio facilities.

A. Telephone.

Telephone service, although much less extensive in coverage than is telegraph service, is available in all major population centers in the USSR. The telephone system is divided into three basic networks, as follows: urban, interurban, and intrarayon (or rural). The urban telephone networks are interconnected through the interurban telephone network. Rural telephone networks are interconnected through rayon centers, which are part of the urban telephone network.

Interurban telephone call rates in the USSR in 1957 are given in Table 42.*

1. Urban and Rural.

The growth in the number and capacity of urban and rural telephone exchanges gives one measure of the ability of a telephone system to meet service demands. From 1928 to 1940 the average annual rate of growth of total telephone exchange capacity in the USSR was 14.3 percent, with the growth from 1936 to 1940 averaging about 9.9 percent. Total telephone exchange capacity has been growing at an average annual rate of about 6.7 percent since 1949. The number of telephone exchanges and the capacity of these exchanges reached pre-World War II levels in 1949.

The installation of automatic telephone exchange equipment has become significant during the postwar years. This equipment has been installed in increasing amounts in urban areas and to a lesser extent in rural areas. The shift to automation in telephone exchange equipment becomes significant when viewed in connection with data on exchange capacity. Table 17** shows the estimated total number of telephone exchanges, and Table 18*** shows the capacity of these exchanges.****

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* P. 101, below.

** Table 17 follows on p. 37.

*** Table 18 follows on p. 38.

**** Other ministries operate many private telephone exchanges as part of their functional systems.

Table 17

Estimated Number of Telephone Exchanges
Operated by the Ministry of Communications of the USSR
1913, 1928-40, and 1946-57

Units

Year	Urban			Rural			Total Urban and Rural		
	Manual	Automatic	Total	Manual	Automatic	Total	Manual	Automatic	Total
1913	1,242 a/	0	1,242 a/	N.A.	0	N.A.	N.A.	0	N.A.
1928	1,566 a/	0	1,566 a/	900 b/	0	900 c/	2,466	0	2,466
1929	1,698 c/	2 d/	1,700 c/	1,600 b/	0	1,600 c/	3,298	2	3,300
1930	1,846 c/	4 d/	1,850 c/	2,400 b/	0	2,400 c/	4,246	4	4,250
1931	2,041 c/	9 d/	2,050 c/	3,300 b/	0	3,300 c/	5,341	9	5,350
1932	2,276 a/	13 a/	2,289 a/	4,062 b/	0	4,062 a/	6,338	13	6,351
1933	2,496 c/	24 c/	2,520 c/	5,000 b/	0	5,000 c/	7,496	24	7,520
1934	2,745 c/	35 c/	2,780 c/	5,900 b/	0	5,900 c/	8,645	35	8,680
1935	3,033 c/	47 c/	3,080 c/	6,800 b/	0	6,800 c/	9,833	47	9,880
1936	3,300 c/	60 c/	3,360 c/	7,800 b/	0	7,800 c/	11,100	60	11,160
1937	3,567 a/	73 a/	3,640 a/	8,809 b/	0	8,809 a/	12,376	73	12,449
1938	3,863 c/	87 c/	3,950 c/	10,000 b/	0	10,000 c/	13,863	87	13,950
1939	4,148 c/	102 c/	4,250 c/	11,200 b/	0	11,200 c/	15,348	102	15,450
1940	4,412 a/	120 a/	4,532 a/	12,763 b/	0	12,763 a/	17,175	120	17,295
1946	4,295 c/	105 c/	4,400 c/	11,500 b/	0	11,500 c/	15,795	105	15,900
1947	4,515 c/	135 c/	4,650 c/	11,750 b/	0	11,750 c/	16,265	135	16,400
1948	4,657 c/	163 c/	4,820 c/	12,080 b/	0	12,080 c/	16,737	163	16,900
1949	4,778 c/	192 c/	4,970 c/	12,430 b/	0	12,430 c/	17,208	192	17,400
1950	4,887 a/	218 a/	5,105 a/	12,746 a/	31 a/	12,777 a/	17,633	249	17,882
1951	4,888 a/	236 a/	5,124 a/	13,145 a/	112 a/	13,257 a/	18,033	348	18,381
1952	4,905 a/	262 a/	5,167 a/	13,431 a/	199 a/	13,630 a/	18,336	461	18,797
1953	4,855 a/	280 a/	5,135 a/	13,776 a/	343 a/	14,119 a/	18,631	623	19,254
1954	4,855 a/	324 a/	5,179 a/	14,473 a/	489 a/	14,962 a/	19,328	813	20,141
1955	4,852 a/	349 a/	5,201 a/	14,904 a/	616 a/	15,520 a/	19,756	965	20,721
1956	4,725 a/	405 a/	5,130 a/	15,543 a/	753 a/	16,296 a/	20,268	1,158	21,426
1957	4,598 e/	461 e/	5,059	16,182 e/	890 e/	17,072 e/	20,780	1,351	22,131

a. 82/
b. Assumed to equal the total number of rural exchanges.
c. Interpolated and extrapolated, using graphic analysis.
d. Computed by using an average of 5,500 telephone numbers per automatic exchange, based on data for 1932. Data showing telephone numbers per urban automatic exchange are given in Table 18, p. 38, below.
e. Assuming the same absolute increase or decrease in 1956-57 as in 1955-56.

Table 18

Estimated Capacity of Telephone Exchanges
Operated by the Ministry of Communications of the USSR
1913, 1928-40, and 1946-57

Thousand Telephone Numbers

Year	Urban			Rural			Total Urban and Rural		
	Manual	Automatic	Total	Manual	Automatic	Total	Manual	Automatic	Total
1913	230.0 a/	0	230.0 a/	N.A.	0	N.A.	N.A.	0	N.A.
1928	290.0 a/	0	290.0 a/	N.A.	0	N.A.	N.A.	0	N.A.
1929	316.0 b/	6.3 b/	322.3 b/	N.A.	0	N.A.	N.A.	6.3	N.A.
1930	353.5 b/	21.3 b/	374.8 b/	N.A.	0	N.A.	N.A.	21.3	N.A.
1931	387.0 b/	47.3 b/	434.3 b/	N.A.	0	N.A.	N.A.	47.3	N.A.
1932	419.0 a/	71.0 a/	490.0 a/	53.4 a/	0	53.4 a/	472.4	71.0	543.4
1933	446.6 c/	133.8 c/	580.4 c/	70.0 d/	0	70.0 d/	516.6	133.8	650.4
1934	476.6 c/	164.2 c/	640.8 c/	88.0 d/	0	88.0 d/	564.6	164.2	728.8
1935	522.0 c/	220.5 c/	742.5 c/	106.0 d/	0	106.0 d/	628.0	220.5	848.5
1936	615.1 c/	246.1 c/	861.2 c/	123.0 d/	0	123.0 d/	738.1	246.1	984.2
1937	591.7 e/	271.8 e/	863.5 e/	140.6 a/	0	140.6 a/	732.3	271.8	1,004.1
1938	635.9 f/	299.2 f/	935.1 d/	180.0 d/	0	180.0 d/	815.9	299.2	1,115.1
1939	675.1 d/	331.7 d/	1,006.8 d/	223.0 d/	0	223.0 d/	898.1	331.7	1,229.8
1940	745.0 a/	424.0 a/	1,169.0 a/	267.9 a/	0	267.9 a/	1,012.9	424.0	1,436.9
1946	609.0 d/	341.0 d/	950.0 d/	180.0 d/	0	180.0 d/	789.0	341.0	1,130.0
1947	655.0 d/	392.0 d/	1,047.0 d/	191.0 d/	0	191.0 d/	846.0	392.0	1,238.0
1948	700.0 d/	445.0 d/	1,145.0 d/	204.0 d/	0	204.0 d/	904.0	445.0	1,349.0
1949	740.0 d/	501.0 d/	1,241.0 d/	218.0 d/	0	218.0 d/	958.0	501.0	1,459.0
1950	778.0 a/	563.0 a/	1,341.0 a/	233.2 a/	0.3 a/	233.5 a/	1,011.2	563.3	1,574.5
1951	811.0 a/	617.0 a/	1,428.0 a/	253.3 a/	1.8 a/	255.1 a/	1,064.3	618.8	1,683.1
1952	844.0 a/	689.0 a/	1,533.0 a/	273.2 a/	3.6 a/	276.8 a/	1,117.2	692.6	1,809.8
1953	854.0 a/	735.0 a/	1,589.0 a/	296.2 a/	6.7 a/	302.9 a/	1,150.2	741.7	1,891.9
1954	893.0 a/	823.0 a/	1,716.0 a/	331.7 a/	9.6 a/	341.3 a/	1,224.7	832.6	2,057.3
1955	927.0 a/	890.0 a/	1,817.0 a/	354.9 a/	12.2 a/	367.1 a/	1,281.9	902.2	2,184.1
1956	944.0 a/	960.0 a/	1,904.0 a/	395.2 a/	16.1 a/	411.3 a/	1,339.2	976.1	2,315.3
1957	961.0 g/	1,030.0 g/	1,991.0 g/	435.5 g/	20.0 g/	455.5 g/	1,396.5	1,050.0	2,446.5

a. 83/
b. 84/
c. 85/
d. Interpolated and extrapolated, using graphic analysis.
e. 86/
f. Based on a statement that, in 1938, 32 percent of total capacity was automatic. 87/
g. Assuming the same absolute growth in 1956-57 as in 1955-56.

A comparison of the percentage of total exchanges equipped for automatic operation with the percentage of total exchange capacity provided by this equipment shows the progress being made to provide more efficient telephone service. The following tabulation shows this relationship for selected years:

	Percent of Total	
Year	Automatic Exchanges	Automatic Exchange Capacity
1929	Negligible	2
1932	0.2	13
1937	0.5	27
1940	0.6	30
1946	0.6	30
1950	1.0	36
1955	4.6	41
1957	6.3	43

The installation of automatic telephone exchange equipment has been concentrated largely in urban areas. It is estimated that in 1957, 9 percent of the urban exchanges were automatic. These exchanges account for 52 percent of the total urban exchange capacity. Urban automatic exchange capacity in 1957 averaged 2,191 subscriber lines* per exchange. As late as 1955, many of the automatic exchanges in Moscow could accommodate no more than 2,000 subscriber lines. 88/

Automatic telephone exchange equipment was introduced in rural areas in 1950. Exchange capacity is still small, however, averaging 22 subscriber lines and accounting for only 4 percent of the total available rural capacity in 1957. The remaining telephone exchange capacity is provided by manual telephone exchanges.

Rural telephone service is available to agricultural enterprises, such as village soviets, kolkhozes, machine tractor

* Two or more telephone sets can be attached to a single subscriber line.

stations (MTS's), and sovkhozes. Table 19* shows the number of agricultural enterprises and the percentage of these enterprises having telephone service with their rayon centers.

Telephone service in the rural areas of the USSR does not provide very extensive geographical coverage. More than 200,000 populated localities in rural areas have no telephone service, and the lack of telephone facilities has forced many agricultural enterprises to rely on inefficient and costly messenger service and limited low-powered point-to-point radio service. 89/ Internal telephone service is available in about 2,000 kolkhozes and in some MTS's. Continued improvement in rural telephone service can be expected, but unless it is given far greater emphasis, it will probably take about 10 years to provide standard network telephone service in rural areas. This emphasis may very likely come from acute needs resulting from the economic reorganization of 1957.

Utilization of urban and rural exchange capacity provides an indication of the amount of telephone service being provided. A measure of this utilization is provided by data on the number of telephone sets connected to exchanges operated by the Ministry of Communications. These data are shown in Table 20.** Data in Table 20 taken with data in Table 18*** show that only 90 percent of the total telephone exchange capacity was utilized in 1957. Usage of urban exchange capacity was 94 percent, and usage of rural exchange capacity was 72 percent. The number of telephone sets connected to rural exchanges has never exceeded available exchange capacity.

This situation has not existed, however, in the urban areas. Usage of available urban exchange capacity was 103 percent in 1946, and from 1928 through 1932 the number of telephone sets connected to exchanges exceeded the available subscriber line capacity by from 6 to 15 percent.**** In 1957, however, an excess urban exchange capacity of 6 percent existed. This small excess could be†

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* Table 19 follows on p. 41.

** Table 20 follows on p. 42.

*** P. 38, above.

**** In making these computations, it was assumed that each available telephone exchange subscriber line was used to accommodate one telephone set. This is not the only determinant of exchange capacity. Each exchange line could be used to provide service for two or more telephone sets depending on the amount of time each line is used, the availability of necessary exchange terminating equipment, and other factors.

† Continued on p. 45.

Table 19

Estimated Growth of Telephone Service in Rural Areas of the USSR
by Type of Agricultural Enterprise a/
Selected Years, 1937-56

	Village Soviets		Kolkhozes		Machine Tractor Stations		Sovkhozes	
Year	Number Having Telephone Communications (Units)	Percent of Total Village Soviets	Number Having Telephone Communications (Units)	Percent of Total Kolkhozes	Number Having Telephone Communications (Units)	Percent of Total Machine Tractor Stations	Number Having Telephone Communications (Units)	Percent of Total Sovkhozes
1937	47,400	69.5	19,967	8.2	4,939	84.9	2,691	67.4
1940	49,024	70.0	21,795	9.2	6,355	89.9	3,173	76.3
1950	65,056	86.9	26,595	21.5	8,153	96.9	3,866	77.5
1955	48,445	95.9	51,712	59.1	8,880	99.0	4,631	90.2
1956	48,405	96.3	56,646	66.8	8,637	98.8	4,773	93.6

a. 90/. Those agricultural enterprises having telephone service with their rayon centers.

Table 20

Estimated Number of Telephone Sets Connected to Exchanges Operated by the Ministry of Communications of the USSR 1913, 1928-40, and 1946-57

Thousand Units

Year	Urban a/*				Rural	Total Urban and Rural
	Home	Business	Booths	Total		
1913	N.A.	N.A.	0	259 b/	N.A.	N.A.
1928	N.A.	N.A.	3 c/	325 d/	12 d/	337
1929	N.A.	N.A.	3 c/	370 d/	19 e/	389
1930	N.A.	N.A.	3 c/	420 d/	28 f/	448
1931	N.A.	N.A.	4 c/	470 d/	36 f/	506
1932	N.A.	N.A.	4 b/	519 b/	44 b/	563
1933	N.A.	N.A.	5 c/	560 d/	59 g/	619
1934	N.A.	N.A.	5 c/	610 d/	77 e/	687
1935	N.A.	N.A.	5 c/	660 d/	84 e/	744
1936	N.A.	N.A.	6 c/	710 d/	92 f/	802
1937	N.A.	N.A.	6 b/	769 b/	103 b/	872
1938	N.A.	N.A.	8 h/	830 d/	118 d/	948
1939	N.A.	N.A.	9 h/	910 d/	136 d/	1,046
1940	N.A.	N.A.	11 b/	1,044 b/	181 b/	1,225

* Footnotes for Table 20 follow on p. 43.

Table 20

Estimated Number of Telephone Sets Connected to Exchanges
Operated by the Ministry of Communications of the USSR
1913, 1928-40, and 1946-57
(Continued)

Thousand Units

Year	Urban a/				Rural	Total Urban and Rural
	Home	Business	Booths	Total		
1946	186	784	10 i/	980 d/	132 d/	1,112
1947	207	818	10 i/	1,035 d/	142 d/	1,177
1948	232	862	11 i/	1,105 d/	154 d/	1,259
1949	255	893	12 i/	1,160 d/	166 d/	1,326
1950	283	936	12 b/	1,231 b/	179 b/	1,410
1951	314	980	13 b/	1,307 b/	193 b/	1,500
1952	348	1,028	16 b/	1,392 b/	206 b/	1,598
1953	381	1,065	18 b/	1,464 b/	222 b/	1,686
1954	423	1,123	20 b/	1,566 b/	250 b/	1,816
1955	466	1,175	22 b/	1,663 b/	269 b/	1,932
1956	513	1,230	27 b/	1,770 b/	297 b/	2,067
1957	563	1,281	33 j/	1,877 j/	328 j/	2,205

a. The estimated numbers of business and home telephone subscribers are based on announcements that the number of home telephone subscribers accounted for 28 percent of the total number of telephone subscribers in 1955 and 30 percent in 1957. It was assumed, because no other valid method of analysis was available, that home telephone subscribers grew at the rate of 1 percent a year during 1946-57. Business subscribers made up the difference between total telephone subscribers and home telephone subscribers and booths. 91/

Table 20

Estimated Number of Telephone Sets Connected to Exchanges
Operated by the Ministry of Communications of the USSR
1913, 1928-40, and 1946-57
(Continued)

b. 92/
c. Computed from the ratio of booths to total urban telephone sets in use in 1932 and 1937.
d. Interpolated and extrapolated, using graphic analysis of known data from footnote c, above.
e. 93/
f. Interpolated.
g. 94/
h. Computed from the ratio of booths to total urban telephone sets in use in 1940.
i. Computed from the ratio of booths to total urban telephone sets in use in 1950.
j. Assuming the same rate of growth in 1956-57 as was computed for 1955-56.

expected because the installation of subscriber sets would necessarily follow the expansion of exchange capacity or the provision of new exchanges. Since 2-party, 95/ and possibly 4-party, telephone lines are used, additional excess exchange capacity probably is available.

Continued emphasis will be placed on the improvement of urban and rural telephone service. The installation of automatic telephone exchanges with greater line capacity can be expected, particularly in urban areas. The telephone service in rural areas also will be improved by the use of automatic exchange equipment.

2. Interurban.

As shown in Tables 21 and 22,* interurban telephone service in 1957 was available in approximately 41,000 interurban telephone call offices throughout the USSR, in which it is estimated that 151 million interurban calls were handled. Since 1950 the number of interurban telephone call offices has been increasing at an average annual rate of 10 percent and the number of interurban calls at a rate of 5 percent.

In spite of these growths, interurban telephone service is still severely limited in terms of coverage, capacity, and hours of service. In almost all instances it is still necessary to prearrange interurban calls. In 1957, only 64 percent of the oblast, kray, and republic centers had day and night telephone service with Moscow, and the remaining 36 percent had contact with Moscow for 3 hours or less per 24-hour day. In addition, only 50 percent of the rayon centers had day and night telephone service with their respective oblast centers. 96/ By 1960, all republic, kray, and oblast centers and other important points are to have 24-hour telephone service with Moscow, and not less than 70 percent of the rayon centers are to have 24-hour telephone service with their respective oblast centers. 97/

Interurban telephone service is limited primarily by the shortage of interurban telephone channels and the complete lack of fully automatic interurban exchange facilities as well as the limited use of semiautomatic interurban exchange facilities. The Minister of Communications reported in October 1957 that there were 3.6 million km of interurban telephone channels, including 2.6 million km in main lines, based on the application of techniques for multiplying circuit capacity. He also reported that by the end of 1960 the length of interurban telephone channels would increase by 85 percent. 98/

* Tables 21 and 22 follow on pp. 46 and 47, respectively, below.

Table 21

Estimated Number of Interurban Telephone Call Offices in the USSR
1913, 1928-40, and 1946-57

Thousand Units

Year	Offices	Year	Offices
1913	0.3 a/	1940	16.8 a/
1928	6.2 a/	1946	16.0 b/
1929	7.0 b/	1947	17.0 b/
1930	7.7 b/	1948	18.0 b/
1931	8.2 b/	1949	19.2 b/
1932	8.6 a/	1950	20.8 a/
1933	8.9 b/	1951	23.2 a/
1934	9.2 b/	1952	25.3 a/
1935	9.5 b/	1953	26.4 a/
1936	9.7 b/	1954	29.4 a/
1937	9.9 a/	1955	31.7 a/
1938	12.8 b/	1956	36.2 a/
1939	14.0 b/	1957	40.7 c/

a. 99/
b. Interpolated and extrapolated, using graphic analysis of known data from footnote a, above.
c. Assuming the same absolute growth in 1956-57 as in 1955-56.

Once the shortcomings of the interurban telephone network are substantially overcome, the number of interurban calls should grow at an accelerated rate. In addition, substantial expansion of the interurban telephone network should bring about a substantial increase in the availability of service to the private consumer.

B. Telegraph.

The integrated wireline and radio telegraph system of the USSR is extensive both in geographic coverage and in volume of service. Regular telegraph service is available in every republic, kray, oblast, and rayon center in the country. More advanced telegraphic techniques -- facsimile (phototelegraph) and subscriber telegraph -- are available in most of the major cities of the country. The availability of telegraph service to the public is greater than

Table 22

Estimated Number of Interurban Telephone Calls in the USSR
1913, 1928-40, and 1946-57

Million Units

Year	Calls	Year	Calls
1913	0.3 a/	1940	93.0 a/
1928	15.0 a/	1946	84.5 f/
1929	17.4 b/	1947	89.0 f/
1930	23.9 b/	1948	93.5 f/
1931	27.9 b/	1949	98.0 f/
1932	26.0 c/	1950	103.0 a/
1933	27.9 d/	1951	108.0 c/
1934	26.5 b/	1952	115.0 c/
1935	33.4 b/	1953	119.0 c/
1936	41.7 e/	1954	126.0 a/
1937	50.0 c/	1955	135.0 a/
1938	64.3 e/	1956	143.0 c/
1939	78.6 e/	1957	151.0 g/

a. 100/
b. 101/
c. 102/
d. 103/
e. Interpolated.
f. Extrapolated, using graphic analysis of known data from footnote a, above.
g. Assuming the same absolute growth for 1956-57 as in 1955-56.

that of telephone service, but service is slowed down during the working day by priorities given to government traffic. 104/ Rates for sending telegrams in the USSR in 1956 are given in Table 43* and rates for transmitting messages over the subscriber telegraph network in 1956 in Table 44.** Rates for telegraphic money orders in 1957 are given in Table 45*** and rates for sending facsimile telegrams in 1955 in Table 46.****

* P. 101, below.
** P. 102, below.
*** P. 102, below.
**** P. 103, below.

1. Regular.

The Ministry of Communications of the USSR has always held that the development of an extensive telegraph system is of paramount importance. During the early years of development the telecommunications sector of the economy was very heavily based on regular telegraph service, and in large areas of the country telegraph service was the only mode of telecommunications.

Dependence on regular telegraph service has diminished somewhat since World War II in consequence of expansion of the interurban telephone network. In absolute terms, however, the regular telegraph network has continued to grow both in facilities and in service volume, and it is now the most important mode of telecommunications in the country, handling more telegrams per year than any other country in the world.

Tables 23 and 24* show that the regular telegraph network has made substantial advances since the 1920's, both in telegraph volume and in number of telegraph apparatus. Nevertheless, this growth has brought many problems associated with nationwide system standardization and rapid, automatic traffic relay.

Before World War II, telegraph facilities in the USSR comprised a conglomerate of apparatus made in many other countries as well as in the USSR. It was impossible, therefore, to establish a standard nationwide regular telegraph network. Because lack of standardization made the relaying of telegraph traffic time consuming and costly, the Ministry of Communications since 1946 has placed great emphasis on the development of a standardized, high-speed telegraph system, including equipment for the semiautomatic (ultimately fully automatic) relay of traffic.

To implement this program of standardization, slow-speed telegraph apparatus (principally that known as Baudot**) has been gradually replaced by more modern high-speed teletype equipment (principally ST-35***). By the end of 1957 the program of standardizing telegraph apparatus was approaching successful completion. 105/ It is estimated that high-speed teletype apparatus handles 90 percent of all main-line telegraph traffic in the USSR.

* Tables 23 and 24 follow on pp. 49 and 50, respectively, below.

** Baudot telegraph equipment is manually operated at a speed of 33-1/3 words per minute.

*** ST-35 is the model number assigned to the 60-word-per-minute teletypewriter commonly used in the USSR.

Table 23

Estimated Number of Telegrams Sent
in the USSR a/
1913, 1924-40, and 1946-57

Million Units

Year	Telegrams	Year	Telegrams
1913	36 b/	1938	115 d/
		1939	128 d/
1924	20 c/	1940	141 b/
1925	25 c/		
1926	28 b/	1946	123 d/
1927	28 d/	1947	130 d/
1928	28 c/	1948	137 d/
1929	43 d/	1949	145 d/
1930	59 d/	1950	154 b/
1931	75 d/	1951	167 b/
1932	91 b/	1952	181 b/
1933	93 d/	1953	195 b/
1934	95 d/	1954	201 b/
1935	98 d/	1955	203 b/
1936	100 d/	1956	206 b/
1937	103 b/	1957	209 e/

a. Included in the number of telegrams sent are phototelegrams and probably paid and unpaid telegrams. For 1913, 1924-26, 1928, and 1932, paid telegrams averaged 84.5 percent of total telegrams sent. 106/
b. 107/
c. 108/
d. Interpolated and extrapolated, using graphic analysis of reported data from footnote b, above.
e. Assuming the same absolute growth in 1956-57 as in 1955-56.

The semiautomatic relay portion of the program has not fared so well. Since 1946 the use of perforated teletype tapes at relay points has made possible the introduction of semiautomatic handling of relay traffic, 109/ but development has proceeded rather slowly, and standardized equipment has not yet become available. In the meantime, in the interests of labor productivity and of speed of service, central telegraph offices of the principal cities have been

Table 24

Estimated Number of Telegraph Apparatus in Use
by the Ministry of Communications
of the USSR
1913, 1928-40, and 1946-57

Units

Year	Telegraph Apparatus	Year	Telegraph Apparatus
1913	8,000 a/	1940	21,000 c/
1928	7,000 a/	1946	20,000 b/
1929	8,000 b/	1947	22,000 b/
1930	10,000 b/	1948	23,000 b/
1931	11,000 b/	1949	25,000 b/
1932	12,000 c/	1950	26,000 c/
1933	13,000 b/	1951	28,000 c/
1934	14,000 b/	1952	29,000 c/
1935	16,000 b/	1953	30,000 c/
1936	17,000 b/	1954	32,000 c/
1937	18,000 c/	1955	33,000 c/
1938	19,000 b/	1956	35,000 c/
1939	20,000 b/	1957	37,000 d/

a. 110/
b. Interpolated and extrapolated, using graphic analysis of known data from footnote c, below.
c. 111/
d. Assuming the same absolute growth for 1956-57 as in 1955-56.

urged to design and install, locally, suitable equipment for this purpose. The magnitude of this problem is shown in Table 25,* which gives the estimated total telegraph turnover.** In 1956 it was reported that about 30 major telegraph centers were able to relay traffic with semiautomatic equipment. These centers were reported in 1957 to handle about 36 percent of the volume of Soviet telegraph traffic in this fashion. 112/

A drive for standardization and automation of the regular telegraph network since 1946 has resulted in improved speed, accuracy, and reliability of service. Increases in labor productivity, as shown

* Table 25 follows on p. 51.
** Total telegraph turnover is the number of telegrams originated, relayed, and terminated.

Table 25

Estimated Total Telegraph Turnover
in the USSR
1950-57

Million Units

Year	Telegrams Transmitted		Telegrams Terminated a/	Total Telegraph Turnover c/
	Originated a/	Relayed b/		
1950	154	462	154	770
1951	167	501	167	835
1952	181	543	181	905
1953	195	585	195	975
1954	201	603	201	1,005
1955	203	609	203	1,015
1956	206	618	206	1,030
1957	209	627	209	1,045

a. Figures are from Table 23, p. 49, above.
b. It is estimated that each telegram would require an average of three relays.
c. Total number of telegrams transmitted (relayed and originated) plus the number of telegrams terminated.

in Table 26,* have also resulted from standardization and automation. It is expected that the volume of telegraph traffic will continue to increase rather slowly. Emphasis can be expected to continue on modernization of existing facilities in the interest of more rapid, reliable, and efficient service.

2. Subscriber.

The subscriber telegraph network is a relatively new telecommunications service in the USSR.** The network was developed after World War II in response to the need for rapid, direct, two-way telegraphic service which could not be satisfied by regular telegraph

* Table 26 follows on p. 52.
** Subscriber telegraph network service is a two-way service in which a subscriber is provided with a teletype machine connected to a switchboard of a local subscriber telegraph exchange. Subscribers are connected with one another on request through the switchboards of one or more exchanges.

service. Subscriber telegraph service expedites the operational flow of telegraph traffic between enterprises and between administrative organs and their subordinate enterprises. 113/

Table 26

Estimated Average Productivity of Telegraph Operators of the Ministry of Communications of the USSR a/
1950-57

Year	Words Per Minute	Index (1950 = 100)
1950	4.7 b/	100
1951	5.7 b/	121
1952	7.0 b/	149
1953	9.9 b/	211
1954	13.0 c/	277
1955	16.2 b/	345
1956	19.4 d/	413
1957	22.6 d/	481

a. The productivity of telegraph operators is measured in terms of the number of words transmitted per minute.
b. 114/
c. Interpolated, using arithmetic progression.
d. Extrapolated by applying the absolute growth of the previous year.

The subscriber telegraph network has grown about 100 percent since 1953, both in number of exchanges and in subscribers. Similarly, as shown in Figure 6,* the number of connections made in the network grew nearly 100 percent from 1952 to 1955. 115/ As shown in Tables 27 and 28,** it is estimated that subscriber telegraph service in 1957 was being provided by 139 exchanges to 1,600 subscribers.

* Following p. 52.
** Tables 27 and 28 follow on p. 53.

Figure 6

50X1

USSR: NUMBER OF CONNECTIONS MADE IN THE SUBSCRIBER TELEGRAPH NETWORK

1952-55

(1952 = 100)

24786 6–58

50X1

Table 27

Estimated Number of Subscriber Telegraph Exchanges in the USSR
1953-57

Units

Year	Exchanges
1953	61 a/
1954	74 b/
1955	84 c/
1956	104 d/
1957	139 d/

a. 116/
b. Derived from 1955 data. 117/
c. 118/
d. Computed from the relationship between the average number of subscriber telegraph exchanges and the average number of subscribers for 1954-55.

Table 28

Estimated Number of Subscribers to the Subscriber Telegraph Network in the USSR a/
1953-57

Units

Year	Subscribers
1953	702 b/
1954	820 c/
1955	1,000 d/
1956	1,200 e/
1957	1,600 e/

a. Subscribers are primarily industrial enterprises.
b. Computed from the relationship between the average number of subscriber telegraph exchanges and the average number of subscribers for 1954-55.
c. Derived from 1955 data. 119/
d. 120/
e. Assuming an increase of 200 subscribers in 1956 and 400 subscribers in 1957.

The subscriber telegraph network can be expected to expand rapidly in the future. 121/ The requirements of the government and the enterprises for rapid, direct, two-way telegraphic service have not yet been satisfied. It is anticipated that demands for such service will rise sharply in consequence of the economic reorganization in 1957.

3. Facsimile.

Facsimile (phototelegraph) service was inaugurated in the USSR in 1929. It was introduced primarily to enable ministries and enterprises to transmit photographs, drawings, and diagrams.

Tables 29 and 30* show that the number of cities offering this service and the volume of facsimile telegrams transmitted have grown rather gradually. In 1957, 31 cities provided facsimile service and handled about 6 million telegrams per year.

Facsimile service is available in the major cities of the USSR. Its widespread use throughout the country awaits the introduction of a high-speed, more compact apparatus. Developmental work on suitable apparatus is now in progress, and production was reportedly planned for 1957. 122/ Until such equipment is available in larger quantities, however, expansion of facsimile service will probably continue at its present slow rate.

C. Common Telephone and Telegraph Facilities.

Common telephone and telegraph facilities of the Ministry of Communications of the USSR consist of an integrated wireline; point-to-point radio; and, more recently, microwave radio relay networks. At present, wirelines and point-to-point radio are the principal means of handling domestic and international telephone and telegraph traffic.

The wireline network of the USSR is most intensive in the heavily populated areas west of the Urals. Point-to-point radio is principally used between Moscow and the larger cities east of the Urals and in the sparsely populated areas of the northern, central, and eastern USSR. Microwave radio relay lines (of very low capacity) at present are found primarily in the western, Caucasus, and South-Central Asian areas of the country.

* Table 29 and 30 follow on pp. 55 and 56, respectively, below.

Table 29

Estimated Number of Cities Having Facsimile Service in the USSR
1929-41 and 1946-57

Units

Year	Cities	Year	Cities
1929	2 a/	1946	20 a/
1930	3 b/	1947	20 c/
1931	3 b/	1948	20 c/
1932	4 a/	1949	20 c/
1933	6 b/	1950	20 c/
1934	8 b/	1951	20 d/
1935	10 b/	1952	24 b/
1936	12 b/	1953	27 e/
1937	14 b/	1954	28 b/
1938	16 b/	1955	29 f/
1939	18 b/	1956	30 g/
1940	20 b/	1957	31 g/
1941	22 a/		

a. 123/
b. Interpolated.
c. Assuming no change.
d. 124/
e. 125/
f. 126/
g. Assuming the same absolute growth as in 1954-55.

1. Wireline.

The wireline network of the USSR consists of open wire and multiconductor (overhead and underground) cable lines. Copper, copperclad, bronze, steel, and iron wire are used in the open wireline system. Copper and copperclad wire are employed primarily on interurban telephone and telegraph lines. Apart from city lines, most of the wireline system, including almost all of the multiconductor cable, is located in the European USSR. Plans call for the installation by the end of 1960 of 19,000 km of cable, including 2,700 km of coaxial cable. One important underground cable facility involving 2 separate cables in 1 trench was to have been made operational between Moscow and Novosibirsk by the end of 1957 and is planned eventually to terminate at Vladivostok. 127/ Although

Table 30

Estimated Number of Facsimile Telegrams Sent in the USSR
1932-40 and 1946-57

Thousand Units

Year	Telegrams	Year	Telegrams
1932	6.4 a/	1947	1,609.0 e/
1933	26.2 b/	1948	1,829.0 e/
1934	46.0 b/	1949	2,049.0 e/
1935	65.8 b/	1950	2,268.0 e/
1936	85.6 b/	1951	2,488.0 e/
1937	105.4 a/	1952	2,708.0 e/
1938	696.8 a/	1953	3,513.0 e/
1939	1,043.0 c/	1954	4,168.0 f/
1940	1,389.2 d/	1955	4,822.0 e/
		1956	5,477.0 e/
1946	1,389.0 a/	1957	6,131.0 e/

a. 128/
b. Interpolated.
c. 129/
d. Extrapolated, assuming the same absolute growth as in 1938-39.
e. Computed, using the arithmetic mean of two alternative methodologies. 130/
f. 131/

planning calls for the use of much coaxial cable in the country, the only known coaxial cable exists between Moscow and Leningrad. The map, Figure 7,* shows the principal known wireline routes in the USSR. Table 31** shows the estimated length of wire and cable lines operated by the Ministry of Communications.

The amount of circuit capacity provided by the wireline system is unknown. It is known, however, that techniques for multiplying circuit capacity are employed. Equipment providing 3 carrier-frequency telephone channels and 1 voice-frequency channel on a pair of wires was first introduced in 1929. 132/ Since World War II, equipment providing 12 carrier-frequency telephone channels has been installed on important interurban wireline routes. 133/

* Inside back cover.
** Table 31 follows on p. 58.

Similar multiplying techniques are used to provide additional telegraph circuit capacity.*

The widespread introduction of carrier equipment took place during 1946-55. By using this technique, the Ministry of Communications was able to expand greatly its circuit capacity on existing wirelines without adding substantial quantities of new wirelines. By the end of 1955 the economic feasibility of expanding circuit capacity through continued introduction of carrier equipment on existing wirelines, without major expenditures on wireline improvement, had been largely exhausted. As a consequence, the Ministry of Communications now appears to be placing its major emphasis on the construction of microwave radio relay and coaxial cable lines of a type having a relatively low but expandable capacity. 134/ Most of the future open wireline construction will probably be restricted to rural areas where requirements for circuit capacity are relatively low.

2. Microwave Radio Relay.

Microwave radio relay lines can be utilized to transmit telephone, telegraph, television, and other broadband signaling. Such facilities may be used either instead of or in conjunction with interurban wirelines.

Experimental work on radio relay lines was conducted in the USSR before World War II. 135/ The first operational** microwave radio relay line employing equipment of modern, basic Soviet design was put into regular service in 1956 between Moscow and Ryazan'. The Moscow-Ryazan' line has facilities capable of handling 24 telephone channels (known as Strela M) and 1 television channel (known as Strela T). This circuit was installed primarily for the use of the Ministry of Transportation, but some circuit capacity is allocated to the Ministry of Communications. 136/ Plans call for the establishment of 10,000 km of microwave radio relay lines by the end of 1960. 137/ Lines completed, under construction, and planned are shown on the map, Figure 8.***

The microwave facilities shown on Figure 8 are designed primarily to augment the existing capacity of the interurban wireline network in the western, Caucausus, and Central Asian areas of****

* Up to twenty 60-word-per-minute teletype circuits can be derived from 1 telephone talk circuit.

** A low-capacity circuit was put into experimental service between Moscow and Gor'kiy in 1948.

*** Following p. 58.

**** Continued on p. 62.

Table 31

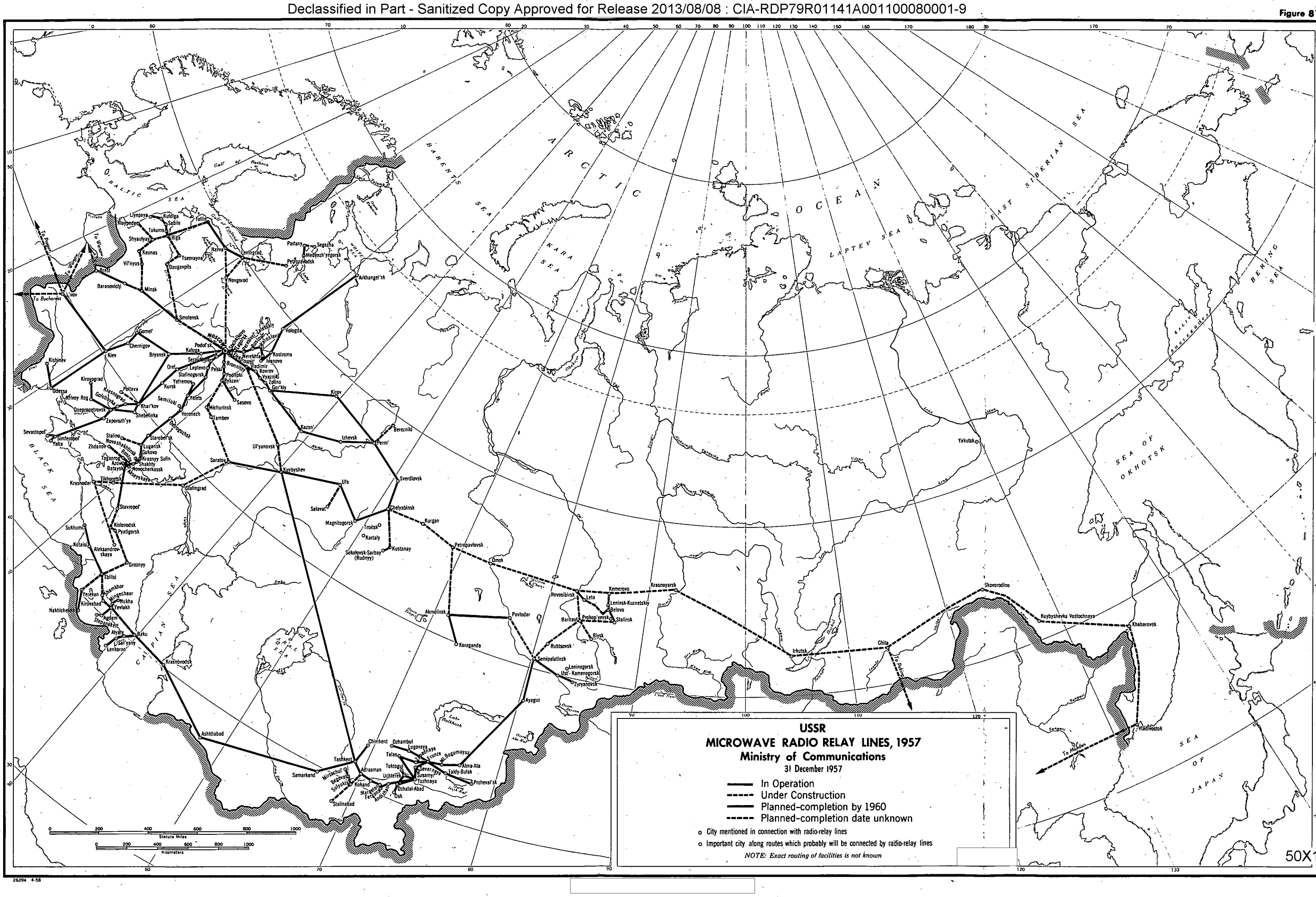
Estimated Length of Wire and Cable Lines
Operated by the Ministry of Communications of the USSR a/*
1913, 1925-41, and 1945-57

Thousand Kilometers

Year	Length of Wirelines: Trunk and Secondary Lines	Length of Wirelines: Intrarayon Lines	Length of Wirelines: Total	Total Length of Cable Lines	Composition of Wirelines: Bronze and Bimetallic	Composition of Wirelines: Copper	Composition of Wirelines: Steel and Iron
1913	N.A.	N.A.	502.5 b/	N.A.	N.A.	N.A.	N.A.
1925	N.A.	N.A.	616.3 b/	N.A.	N.A.	N.A.	N.A.
1926	N.A.	N.A.	710.2 c/	N.A.	21.3 c/	N.A.	N.A.
1927	N.A.	N.A.	845.8 c/	N.A.	34.8 c/	N.A.	N.A.
1928	N.A.	N.A.	890.1 b/	N.A.	36.2 b/	N.A.	N.A.
1929	N.A.	N.A.	955.0 c/	N.A.	42.0 c/	N.A.	N.A.
1930	754.4 d/	317.0 b/	1,071.4 c/	N.A.	54.5 c/	N.A.	N.A.
1931	931.0 e/	391.4 e/	1,322.4 c/	N.A.	64.7 c/	N.A.	N.A.
1932	1,126.8 b/	382.5 f/	1,509.3 b/	N.A.	64.2 b/	N.A.	1,444.8 c/
1933	1,172.4 b/	460.5 f/	1,632.9 b/	N.A.	75.2 b/	N.A.	1,580.6 c/
1934	1,260.4 b/	593.0 b/	1,855.0 b/	N.A.	80.0 b/	N.A.	1,794.4 c/
1935	1,375.0 c/	648.2 c/	2,024.9 c/	N.A.	85.5 c/	N.A.	1,924.6 c/
1936	1,500.0 d/	753.0 c/	2,253.0 c/	N.A.	99.9 g/	N.A.	N.A.
1937	1,480.0 c/	789.2 f/	2,269.2 c/	N.A.	114.4 c/	N.A.	N.A.
1938	1,518.0 c/	822.0 f/	2,400.0 h/	N.A.	137.7 g/	N.A.	N.A.
1939	1,655.4 g/	904.5 g/	2,559.8 g/	N.A.	161.0 g/	N.A.	N.A.
1940	1,792.7 i/	927.0 i/	2,719.7 j/	N.A.	184.3 c/	224.0 k/	N.A.

* Footnotes for Table 31 follow on p. 60.

Figure 8 50X1



50X1

50X1

Table 31

Estimated Length of Wire and Cable Lines
Operated by the Ministry of Communications of the USSR a/
1913, 1925-41, and 1945-57
(Continued)

Thousand Kilometers

Year	Length of Wirelines			Total Length of Cable Lines	Composition of Wirelines		
	Trunk and Secondary Lines	Intrarayon Lines	Total		Bronze and Bimetallic	Copper	Steel and Iron
1941	1,647.5 e/	852.5 e/	2,500.0 c/	N.A.	N.A.	N.A.	N.A.
1945	1,889.9 d/	332.0 l/	2,221.9 m/	1.7 n/	N.A.	284.0 k/	N.A.
1946	1,910.1 g/	363.0 g/	2,273.1 j/	4.0 o/	N.A.	304.2 b/	N.A.
1947	1,924.7 g/	439.0 p/	2,363.7 j/	6.3 o/	N.A.	318.8 b/	N.A.
1948	1,925.7 g/	470.0 g/	2,395.7 j/	8.0 q/	N.A.	319.9 b/	N.A.
1949	1,932.8 g/	501.0 g/	2,433.8 j/	9.6 q/	N.A.	327.0 g/	N.A.
1950	1,939.9 p/	532.0 p/	2,471.9 j/	11.3 q/	269.8 b/	334.0 k/	N.A.
1951	1,949.9 g/	592.0 g/	2,541.9 j/	13.8 r/	N.A.	N.A.	N.A.
1952	1,959.9 g/	652.0 g/	2,611.9 j/	16.2 r/	N.A.	N.A.	N.A.
1953	1,969.9 g/	712.0 g/	2,681.9 j/	18.7 r/	N.A.	N.A.	N.A.
1954	1,979.9 g/	772.0 g/	2,751.9 j/	21.8 s/	N.A.	N.A.	N.A.
1955	1,989.9 t/	832.0 u/	2,821.9 j/	24.9 s/	N.A.	N.A.	N.A.
1956	1,999.9 v/	892.0 w/	2,891.9 j/	28.6 x/	N.A.	N.A.	N.A.
1957	2,009.9 v/	952.0 w/	2,961.9 j/	32.4 y/	N.A.	N.A.	N.A.

Table 31

Estimated Length of Wire and Cable Lines
Operated by the Ministry of Communications of the USSR a/
1913, 1925-41, and 1945-57
(Continued)

a. Totals were derived from unrounded data and may not agree with the sum of their rounded components.
b. 138/
c. 139/
d. Computed by subtracting intrarayon wirelines from total wirelines.
e. Computed by using the same proportion of the total length of wirelines to the trunk and secondary and intrarayon lines as in the previous year.
f. Computed by subtracting trunk and secondary wirelines from total wirelines.
g. Interpolated, using graphic analysis.
h. 140/
i. 141/
j. Computed by adding intrarayon and trunk and secondary wirelines.
k. 142/
l. 143/
m. 144/
n. 145/
o. Computed by dividing the total for 1946-47 equally between 1946 and 1947. 146/
p. 147/
q. Computed by subtracting the computed totals for 1946 and 1947 (see o, above) from the given total for 1946-50 and dividing the result equally among the years 1948-50. 148/
r. Plan results for the first 3 years of the Fifth Five Year Plan stated that the length of cable increased 65.6 percent, giving an addition of 7,409 km. This increase was distributed equally among the years 1951-53. 149/

Table 31

Estimated Length of Wire and Cable Lines
Operated by the Ministry of Communications of the USSR
1913, 1925-41, and 1945-57
(Continued)

s. The length of cable is reported to have increased to 2.2 times its previous length during the course of the Fifth Five Year Plan, giving an increase of 13,553 km for 1951-55. From the increase of 13,553 km, the increase for 1951-53 was subtracted (see r, above) and the difference distributed equally between 1954 and 1955. 150/
t. Assuming the same growth rate for 1951-55 as for 1946-50 -- 50,000 km.
u. Estimated, on the basis of the planned increase of 300,000 km of intrarayon wireline for 1951-55. 151/
v. Assuming a growth of 10,000 km per year for 1956-57 on the basis of previous growth rates.
w. Assuming a growth of 60,000 km per year for 1956-57 on the basis of previous growth rates.
x. Estimated, on the basis of a plan statement to increase the length of cable lines by 3,800 km. 152/
y. Assuming the same absolute growth for 1956-57 as that planned for 1955-56.

the USSR. An important line is to connect Moscow with the Soviet Far East. Plans call for the eventual connection of the microwave network of the USSR with similar networks of the European Satellites and Communist China. 153/

Equipment presently used on microwave radio relay lines is capable of providing up to 24 telephone channels. New equipment, capable of providing 600 and possibly up to 1,800 telephone channels, is under development. 154/

One of the principal problems confronting the Ministry of Communications has been the lack of sufficient interurban telecommunications capacity. The microwave radio relay medium with high-capacity relay and terminal equipment provides the most effective and economical* means of overcoming this deficiency. It can be expected that these new facilities will play an important role in providing capacity for the improvement of all telecommunications services in the country and with other Sino-Soviet Bloc and non-Bloc countries.

3. Point-to-Point Radio.

The domestic point-to-point radio network in the USSR is integrated with the wireline and microwave radio relay networks. 155/ The point-to-point radio network is the primary means of telecommunications in those areas east of the Ural Mountains and the remote areas of the Soviet Arctic. The main domestic radiotelegraph circuits are shown on the map, Figure 9.** The point-to-point radio network centers on Moscow, and Alma-Ata, Anadyr, Irkutsk, Khabarovsk, Magadan, Novosibirsk, Tashkent, Petropavlovsk (Kamchatka), and Vladivostok are the major regional communications centers.

There are more than 150 radio stations within a 100-km radius of Moscow. Although these stations are not all utilized by the Ministry of Communications, their existence illustrates the significance of the Soviet capital as a radio center and as the telecommunications center of the country. The locations of these radio stations are shown on the maps, Figures 10 and 11.**

Point-to-point radio stations are also used to provide international telecommunications. Circuits providing international telephone and telegraph service are shown on the map, Figure 12.** Table 32*** shows the estimated number of point-to-point radio transmitters under the jurisdiction of the Ministry of Communications.****

* The coaxial cable medium, according to Soviet literature, is less economical but is more practical under special conditions.

** Following p. 62.

*** Table 32 follows on p. 63.

**** Continued on p. 67.

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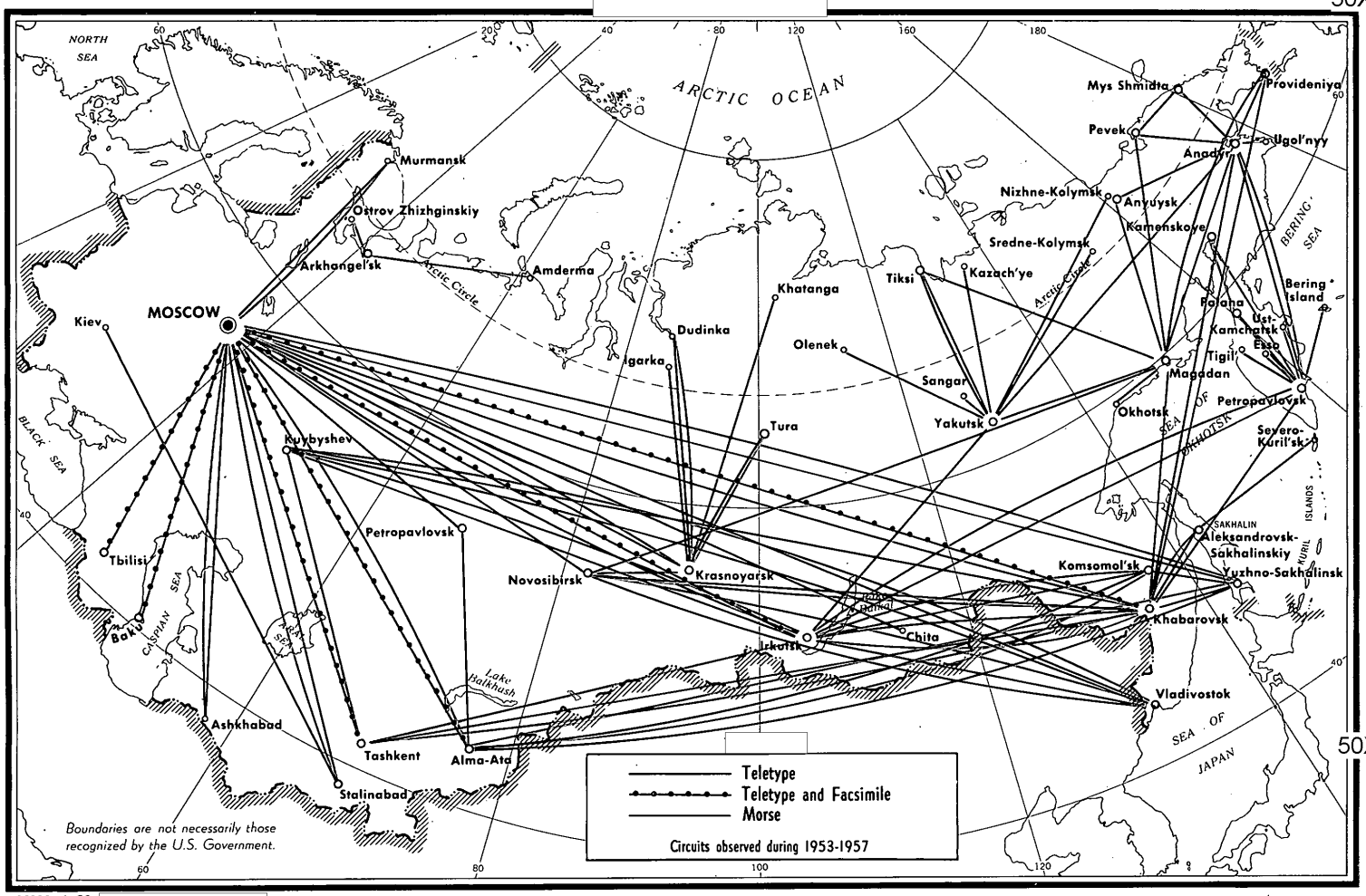

26392 4-58

USSR: Main Domestic Radiotelegraph Circuits, 1957—Ministry of Communications

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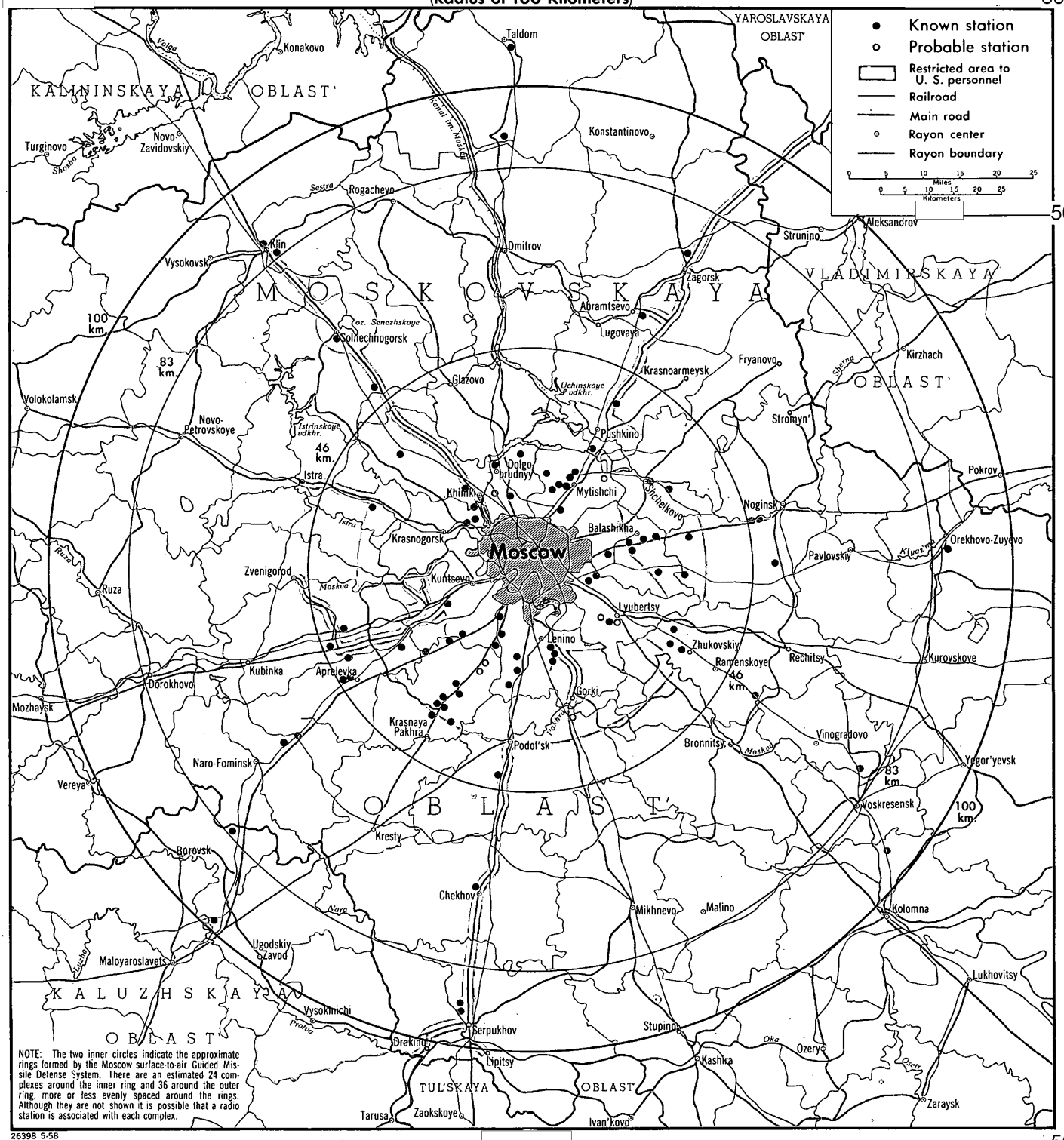
USSR: Locations of Radio Stations in the Environs of Moscow, 1957

(Radius of 100 Kilometers)



26398 5-58

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USSR: Locations of Radio Stations in Moscow, 1957

26397 4-58

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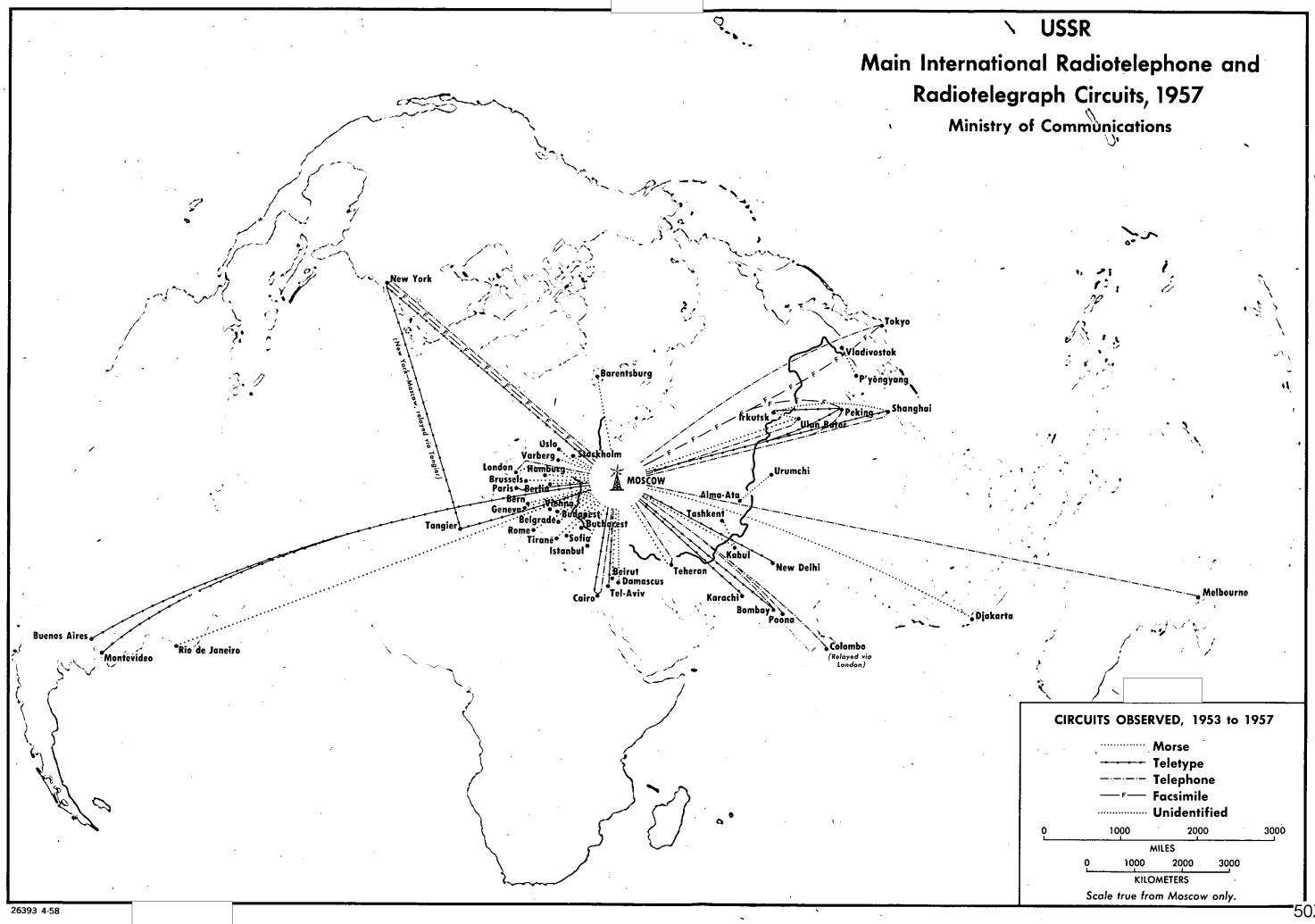

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26393 4-58

Table 32

Estimated Number of Point-to-Point Radio Transmitters
Under the Ministry of Communications of the USSR
1913, 1917-40, and 1945-57

Year	Long-Range Radio Telephone-Telegraph Transmitters		Intraoblast Radio Telephone-Telegraph Transmitters a/*		Intrarayon Radio Telephone-Telegraph Transmitters b/ (Units)	
	Units	Power (Kilowatts)	Units	Power (Kilowatts)	Medium Power Transmitters	Urozhay (Harvest) Sets c/
1913	14 d/	N.A.	N.A.	N.A.	N.A.	N.A.
1917	10 d/	N.A.	N.A.	N.A.	N.A.	N.A.
1918	6 d/	N.A.	N.A.	N.A.	N.A.	N.A.
1919	6 d/	N.A.	N.A.	N.A.	N.A.	N.A.
1920	7 d/	N.A.	N.A.	N.A.	N.A.	N.A.
1921	22 d/	N.A.	N.A.	N.A.	N.A.	N.A.
1922	35 d/	N.A.	N.A.	N.A.	N.A.	N.A.
1923	41 d/	N.A.	N.A.	N.A.	N.A.	N.A.
1924	42 d/	N.A.	N.A.	N.A.	N.A.	N.A.
1925	48 d/	N.A.	N.A.	N.A.	N.A.	N.A.
1926	47 d/	N.A.	N.A.	N.A.	N.A.	N.A.
1927	46 d/	N.A.	N.A.	N.A.	N.A.	N.A.
1928	49 e/	328.3 f/	16 g/	3.7 g/	N.A.	N.A.

* Footnotes for Table 32 follow on p. 65.

Table 32

Estimated Number of Point-to-Point Radio Transmitters
Under the Ministry of Communications of the USSR
1913, 1917-40, and 1945-57
(Continued)

Year	Long-Range Radio Telephone-Telegraph Transmitters		Intraoblast Radio Telephone-Telegraph Transmitters [a]		Intrarayon Radio Telephone-Telegraph Transmitters [b] (Units)	
	Units	Power (Kilowatts)	Units	Power (Kilowatts)	Medium Power Transmitters	Urozhay (Harvest) Sets [c]
1929	53 [g]	433.2 [f]	32 [g]	5.5 [g]	N.A.	N.A.
1930	63 [g]	641.4 [f]	97 [g]	13.2 [g]	N.A.	N.A.
1931	67 [e]	822.0 [e]	236 [g]	24.1 [g]	N.A.	N.A.
1932	73 [e]	933.0 [e]	354 [g]	35.0 [g]	N.A.	N.A.
1933	110 [h]	1,006.0 [h]	415 [d]	37.5 [d]	N.A.	N.A.
1934	125 [h]	1,131.0 [h]	470 [d]	40.2 [d]	N.A.	N.A.
1935	140 [i]	N.A.	520 [h]	N.A.	N.A.	N.A.
1936	154 [i]	N.A.	631 [i]	N.A.	N.A.	N.A.
1937	169 [d]	1,036.4 [d]	742 [d]	N.A.	N.A.	N.A.
1938	224 [i]	N.A.	N.A.	N.A.	N.A.	N.A.
1939	278 [i]	N.A.	N.A.	N.A.	N.A.	N.A.
1940	333 [d]	1,681.6 [d]	712 [j]	92.0 [d]	2,000 [k]	N.A.
1945	N.A.	N.A.	N.A.	N.A.	3,260 [l]	N.A.
1946	N.A.	N.A.	N.A.	N.A.	4,750 [m]	2,800 [n]

Table 32

Estimated Number of Point-to-Point Radio Transmitters
Under the Ministry of Communications of the USSR
1913, 1917-40, and 1945-57
(Continued)

Year	Long-Range Radio Telephone-Telegraph Transmitters		Intraoblast Radio Telephone-Telegraph Transmitters a/		Intrarayon Radio Telephone-Telegraph Transmitters b/ (Units)	
	Units	Power (Kilowatts)	Units	Power (Kilowatts)	Medium Power Transmitters	Urozhay (Harvest) Sets c/
1947	N.A.	N.A.	N.A.	N.A.	6,700 i/	6,000 i/
1948	N.A.	N.A.	N.A.	N.A.	7,900 i/	14,500 i/
1949	N.A.	N.A.	N.A.	N.A.	9,700 i/	17,800 i/
1950	N.A.	N.A.	N.A.	N.A.	11,600 i/	25,000 o/
1951	N.A.	N.A.	N.A.	N.A.	13,600 i/	27,900 i/
1952	N.A.	N.A.	N.A.	N.A.	15,750 i/	31,000 i/
1953	N.A.	N.A.	N.A.	N.A.	18,000 i/	35,000 p/
1954	N.A.	N.A.	N.A.	N.A.	20,300 i/	70,000 i/
1955	N.A.	N.A.	N.A.	N.A.	22,600 i/	90,000 q/
1956	N.A.	N.A.	N.A.	N.A.	25,000 r/	100,000 s/
1957	N.A.	N.A.	N.A.	N.A.	27,700 t/	106,000 t/

a. Vnutri-Oblast'naya Svyaz' (Intraoblast Communications).
b. Vnutri-Rayonnaya Svyaz' (Intrarayon Communications).

Table 32

Estimated Number of Point-to-Point Radio Transmitters
Under the Ministry of Communications of the USSR
1913, 1917-40, and 1945-57
(Continued)

c. Radio transceivers used at machine tractor stations for the dispatching of agricultural equipment in the fields. These types of receivers have a 24-mile range and an output of 1 watt. They are amplitude modulated (AM) and operate in the frequency range of 2.14 to 3 megacycles.
d. 156/
e. 157/
f. 158/
g. 159/
h. 160/
i. Interpolated, using graphic analysis.
j. 161/
k. 162/
l. Computed by subtracting the number of transmitters added in 1946 from the number of transmitters in operation at the end of 1946. 163/
m. 164/
n. Computed by subtracting the number of sets added during 1947-53 from the number of sets in operation at the end of 1953. 165/
o. Computed by subtracting the number of sets added during 1951-55 from the number of sets in use at the end of 1955. 166/
p. 167/
q. 168/
r. 169/
s. 170/
t. Extrapolated, using graphic analysis.

Point-to-point radio circuits will continue to play an important role, even though wireline and microwave radio relay networks may ultimately be capable of providing needed domestic telecommunications capacity. Radio will almost certainly continue to be used for backup for wireline and microwave radio relay networks, for jamming, and for use in emergency or war.

V. Broadcasting System.

The domestic broadcasting system of the USSR serves a twofold purpose, that of providing a medium of propaganda for the government and entertainment for the private consumer. International broadcasting is used almost exclusively for purposes of propaganda. Many domestic and international broadcast transmissions reach some foreign areas through the accidents of propagation rather than through intent. The Ministry of Communications is primarily responsible for the installation, operation, and maintenance of these facilities. The Ministry of Culture is primarily responsible for the preparation of the programs, both domestic and international. The State Committee for Radiobroadcasting and Television, which is directly responsible to the Council of Ministers of the USSR, has over-all responsibility for supervision of the broadcasting system.

The broadcasting system, composed of radiobroadcasting (amplitude modulated -- AM -- and frequency modulated -- FM), wire-diffusion, and television networks, covers the entire country. There are substantial differences in the extent of the geographic coverage of each type of service. The wire-diffusion network is the most extensive, with wired loudspeakers located throughout the country. Wired loudspeakers represent 67 percent of the total number of broadcast reception points. Radiobroadcasting transmissions also cover the entire country, but the reception base is much smaller than that of the wire-diffusion network. Radiobroadcast receivers represent only 26 percent of the total number of reception points in the USSR. Television is the most limited type of broadcasting service in the USSR and is concentrated mainly in the European portions of the country. Television receivers account for only 7 percent of the total number of reception points. The total number of broadcast reception points in the USSR is shown in Table 33.*

Radiobroadcast receiver rates in the USSR in 1957 are given in Table 47.**

* Table 33 follows on p. 68.
** P. 103, below.

Table 33

Estimated Number of Broadcast Reception Points in the USSR a/ 1928-40 and 1946-57

Thousand Units

Year	Reception Points	Year	Reception Points
1928	92	1946	7,880
1929	179	1947	8,702
1930	653	1948	9,121
1931	1,134	1949	9,600
1932	1,458	1950	11,467
1933	1,606	1951	13,077
1934	1,661	1952	14,812
1935	2,024	1953	17,802
1936	2,441	1954	21,618
1937	3,744	1955	26,464
1938	4,931	1956	30,895
1939	6,140	1957	37,551
1940	6,976		

a. The totals contained in this table are the sum of the estimates (see Tables 35, 38, and 39, pp. 73, 85, and 88, respectively, below) on radiobroadcast receivers, wired loudspeakers, and television receivers.

A. Radiobroadcasting.

Domestic radiobroadcasting was inaugurated in the USSR on 17 September 1922, when the first major radio program was transmitted with a power of 12 kilowatts (kw) from Moscow. 171/ Tables 34 and 35* show that a network of 23 radiobroadcasting transmitters was in operation by 1928, providing service to approximately 70,000 radiobroadcast receivers. The majority of these receivers were located in urban areas. Radiobroadcasting at that time was virtually unknown in rural areas. From 1928 to 1940 the domestic radiobroadcasting network grew rapidly. By 1940 the USSR had 90 transmitters broadcasting to a domestic reception base of slightly more than 1 million receivers. Although the majority of these**

* Tables 34 and 35 follow on pp. 69 and 73, respectively, below.
** Continued on p. 74.

Table 34

Estimated Number of Radio and Television Broadcasting Transmitters
in the USSR
1922-40 and 1945-57

Year	AM (Amplitude Modulated) Radiobroadcasting Transmitters a/* (Domestic and International)		Units			
	Units	Total Power (Kilowatts)	FM (Frequency Modulated) Radiobroadcasting Transmitters	Television Broadcasting Transmitters	Television Relay and Local Broadcasting Transmitters	Total Radio and Television Broadcasting Transmitters b/
1922	1 c/	12 c/	0	0	0	1
1923	1 c/	12 c/	0	0	0	1
1924	2 c/	N.A.	0	0	0	2
1925	5 d/	40 c/	0	0	0	5
1926	9 d/	N.A.	0	0	0	9
1927	16 d/	N.A.	0	0	0	16
1928	23 e/	126 c/	0	0	0	23
1929	41 f/	218 g/	0	0	0	41
1930	52 h/	381 g/	0	0	0	52
1931	53 g/	395 g/	0	0	0	53
1932	57 f/	901 g/	0	0	0	57
1933	57 g/	1,503 g/	0	0	0	57
1934	67 e/	1,592 g/	0	0	0	67

* Footnotes for Table 34 follow on p. 71.

Table 34

Estimated Number of Radio and Television Broadcasting Transmitters in the USSR 1922-40 and 1945-57 (Continued)

Year	AM (Amplitude Modulated) Radiobroadcasting Transmitters a/ (Domestic and International)		Units			
	Units	Power (Kilowatts)	FM (Frequency Modulated) Radiobroadcasting Transmitters	Television Broadcasting Transmitters	Television Relay and Local Broadcasting Transmitters	Total Radio and Television Broadcasting Transmitters b/
1935	73 g/	1,752 g/	0	0	0	73
1936	82 g/	2,007 g/	0	0	0	82
1937	84 i/	N.A.	0	0	0	84
1938	86 i/	N.A.	0	2 h/	0	88
1939	88 i/	N.A.	0	2 j/	0	90
1940	90 c/	4,000 c/	0	2 j/	0	92
1945	82 k/	2,700 l/	0	2 j/	N.A.	N.A.
1946	85 c/	3,200 c/	1 m/	2 j/	N.A.	N.A.
1947	100 c/	4,000 c/	2 m/	2 j/	N.A.	N.A.
1948	116 i/	N.A.	2 j/	2 j/	N.A.	N.A.
1949	132 c/	N.A.	2 j/	2 j/	N.A.	N.A.
1950	160 c/	5,000 c/	2 j/	2 j/	N.A.	N.A.
1951	161 d/	N.A.	2 j/	2 j/	N.A.	N.A.

Table 34

Estimated Number of Radio and Television Broadcasting Transmitters in the USSR 1922-40 and 1945-57 (Continued)

Year	AM (Amplitude Modulated) Radiobroadcasting Transmitters a/ (Domestic and International)		Units			
	Units	Power (Kilowatts)	FM (Frequency Modulated) Radiobroadcasting Transmitters	Television Broadcasting Transmitters	Television Relay and Local Broadcasting Transmitters	Total Radio and Television Broadcasting Transmitters b/
1952	164 d/	N.A.	3 n/	3 h/	N.A.	N.A.
1953	167 c/	5,785 c/	3 j/	3 h/	N.A.	N.A.
1954	175 d/	N.A.	3 j/	3 o/	N.A.	N.A.
1955	185 d/	N.A.	5 p/	12 q/	N.A.	N.A.
1956	196 r/	7,000 r/	24 s/	22 t/	N.A.	N.A.
1957	206 u/	N.A.	50 v/	45 w/	57 x/	358

a. Data during 1945-53 are as of 1 October of each year; all other data are as of 31 December of each year.
b. Computed by adding the preceding columns.
c. 172/
d. Interpolated, using graphic analysis.
e. 173/
f. 174/
g. 175/

Table 34

Estimated Number of Radio and Television Broadcasting Transmitters
in the USSR
1922-40 and 1945-57
(Continued)

h. 176/
i. Interpolated.
j. Assuming no increase.
k. Interpolated between 1944 (not shown) and 1946. 177/
l. Interpolated between 1944 (not shown) and 1946. 178/
m. 179/
n. Assuming that an FM transmitter was installed together with the television station in Kiev.
o. 180/
p. 181/
q. 182/
r. 183/. As of 1 April 1957.
s. 184/
t. 185/
u. Extrapolated, using graphic analysis.
v. Calculated by adding the planned number of FM transmitters in 1957 to the end-of-1956 number. 186/
w. There was a minimum of 39 major television center transmitters in the USSR at the end of 1957. Several centers are known to have more than one transmitter. The total estimated figure for 1957 is therefore believed to be about 45 television transmitters.
x. 187/. [redacted] there are 50 transmitters to local centers and to television relay stations. Additional information indicates that seven cities receive television service from unknown types of facilities. 50X1

Table 35

Estimated Number of Radiobroadcast Receivers
in the USSR
1928-40 and 1946-57

Thousand Units

Year	Urban	Rural	Total
1928	48 a/	22 a/	70 b/
1929	52 a/	25 a/	77 c/
1930	57 a/	27 a/	84 c/
1931	62 a/	29 a/	91 c/
1932	66 b/	31 b/	97 b/
1933	77 d/	33 d/	110 c/
1934	94 d/	36 d/	130 c/
1935	141 d/	49 d/	190 c/
1936	183 d/	57 d/	240 c/
1937	251 b/	70 b/	321 b/
1938	415 e/	135 e/	550 c/
1939	582 e/	218 e/	800 c/
1940	785 b/	338 b/	1,123 b/
1946	961 f/	239 f/	1,200 g/
1947	1,009 f/	251 f/	1,260 c/
1948	1,081 f/	269 f/	1,350 c/
1949	1,202 f/	298 f/	1,500 c/
1950	1,415 b/	352 b/	1,767 b/
1951	1,801 b/	580 b/	2,381 b/
1952	2,260 b/	760 b/	3,020 b/
1953	2,823 b/	913 b/	3,736 b/
1954	3,597 b/	1,132 b/	4,729 b/
1955	4,576 b/	1,521 b/	6,097 b/
1956	5,525 b/	1,855 b/	7,380 b/
1957	7,385 h/	2,475 h/	9,860 i/

a. Derived by assuming that the percentages of rural and urban to total were the same in 1928-31 as in 1932.
b. 188/
c. Interpolated, using a graphic analysis of known data from b, above.
d. Computed by applying the percentage change of rural, urban, and total receivers to each year between 1932 and 1937 on a constant basis.
e. Computed by applying the percentage change of rural, urban, and total receivers to each year between 1937 and 1940 on a constant basis.
f. Computed by applying the same percentage relationship of rural and urban to total receivers as in 1950.
g. 189/
h. Computed by applying the same percentage relationship of rural and urban to total receivers as in 1956.
i. 190/

receivers were still located in urban areas, about 338,000 receivers found their way into rural areas. Moscow remained the center of all radiobroadcasting activity in the country.

World War II seriously disrupted the domestic radiobroadcasting effort of the USSR. Transmitters were moved eastward to avoid the German invasion and their power outputs increased to enable programs to be received in the distant occupied areas of the country. By the end of 1946 the operational transmission base of the domestic radiobroadcasting network had decreased to 85 transmitters, whereas the reception base had increased to approximately 1.2 million receivers.

Before 1946, all transmitters and receivers in the domestic radiobroadcasting network were AM. In 1946 the first FM radiobroadcasting transmitter was put into operation in Moscow. Since that time the number of AM and FM radiobroadcasting transmitters has steadily increased. It is estimated that at the end of 1957 there were 206 AM and 50 FM transmitters in operation, broadcasting to approximately 9.9 million radiobroadcast receivers. The majority of the independent receivers are AM sets. Television receivers are equipped to receive FM radiobroadcasts, and a large portion of the FM reception base derives from that source.

Since 1946 there has been no substantial shift in the distribution of radiobroadcast receivers between rural and urban areas of the country. Of the total number of radiobroadcast receivers in use at the end of 1957, approximately 7.6 million were in urban areas and 2.2 million in rural areas.

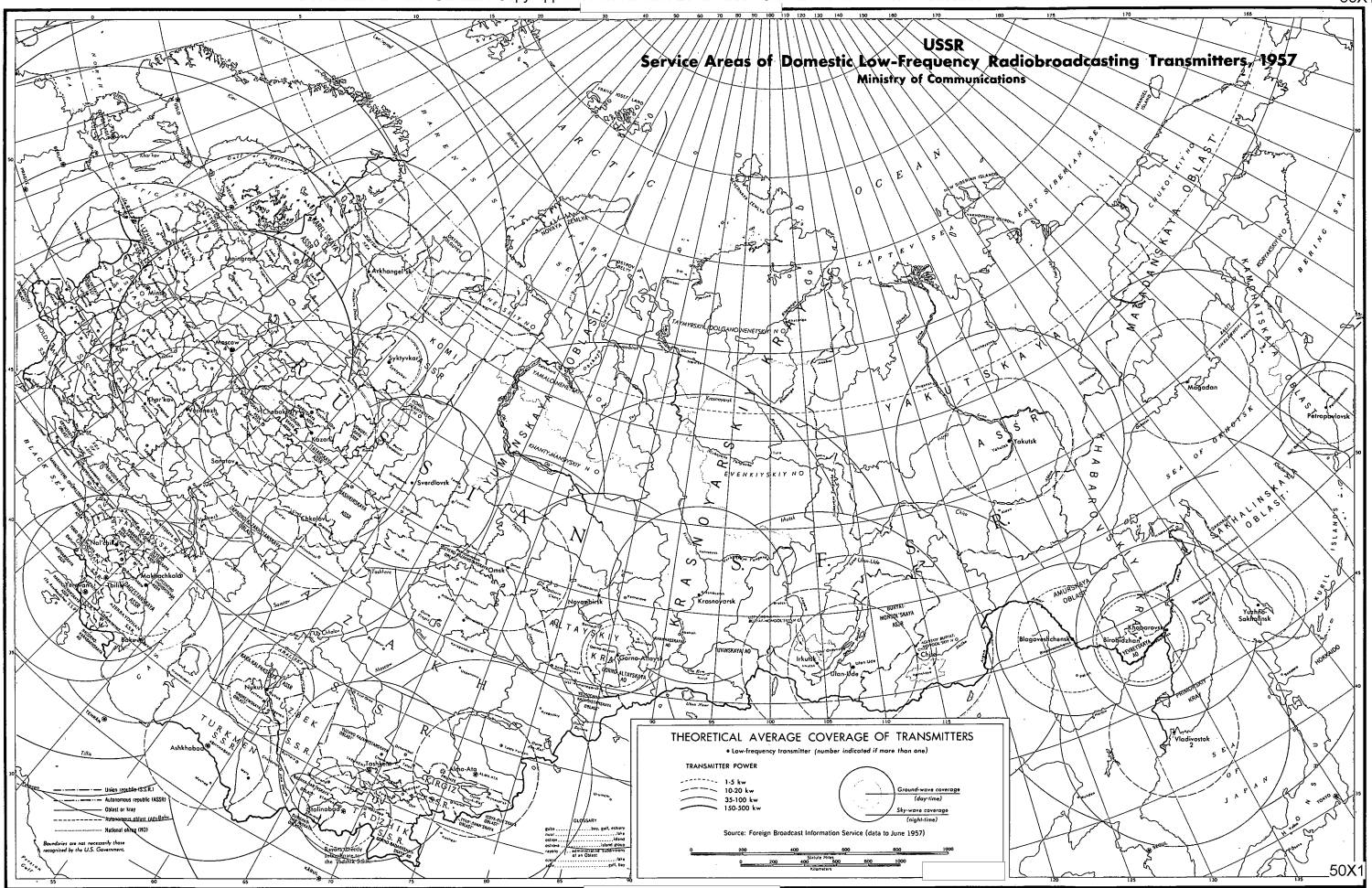
The domestic radiobroadcasting service is divided into two categories: the national radiobroadcasting service, which transmits programs on high frequencies from Moscow, and the regional radiobroadcasting service, which transmits programs from republic, oblast, and other regional centers on low, medium, and high frequencies. The maps, Figures 13, 14, 15, 16, and 17,* show the locations and areas of radiobroadcasting coverage of the national and regional domestic radiobroadcasting services.

The first Soviet international radiobroadcast was made from the USSR to Germany in 1933. 191/ Since that time the USSR has steadily increased its international radiobroadcasting service. In 1957 there were at least 57 transmitters broadcasting programs to foreign audiences. Most of the international radiobroadcasts of the USSR originate in Moscow, but it is believed that at least 20 other

* Following p. 74.

50X1

USSR
Service Areas of Domestic Low-Frequency Radiobroadcasting Transmitters, 1957
Ministry of Communications



THEORETICAL AVERAGE COVERAGE OF TRANSMITTERS

● Low-frequency transmitter *(number indicated if more than one)*

TRANSMITTER POWER

- 1-5 kw
- 10-20 kw
- 35-100 kw
- 150-500 kw

Ground-wave coverage (day-time)

Sky-wave coverage (night-time)

Source: Foreign Broadcast Information Service (data to June 1957)

- Union republic (S.S.R.)
- Autonomous republic (ASSR)
- Oblast or kray
- Autonomous oblast (AO)
- National okrug (NO)

Boundaries are not necessarily those recognized by the U.S. Government.

GLOSSARY

guba	bay, gulf, estuary
nuur	lake
ostrov	island
ostrova	island group
rayony	administrative subdivisions of an Oblast
ozero	lake
zaliv	gulf, bay

13297 7-54 (First revision 2-58)

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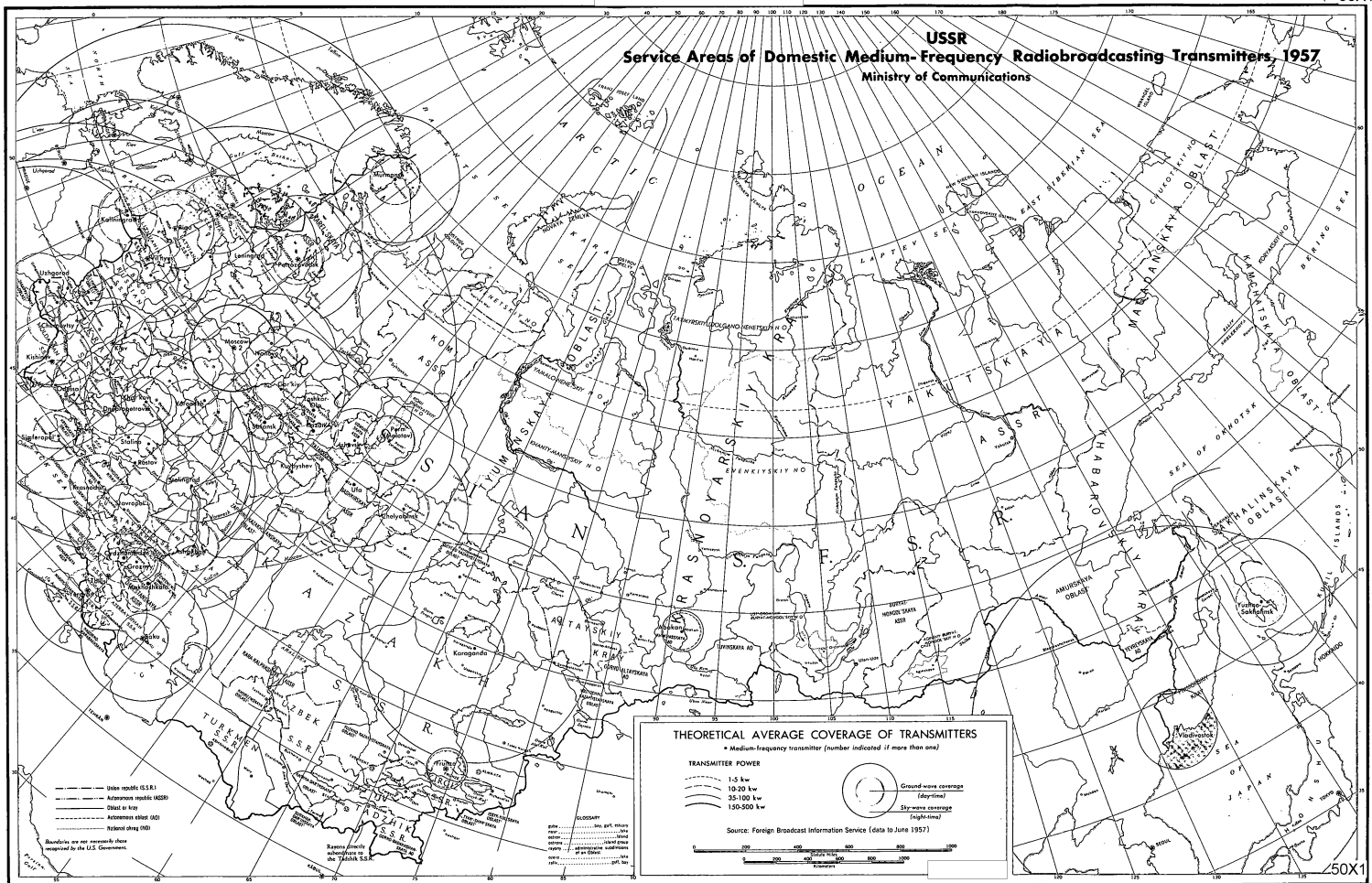
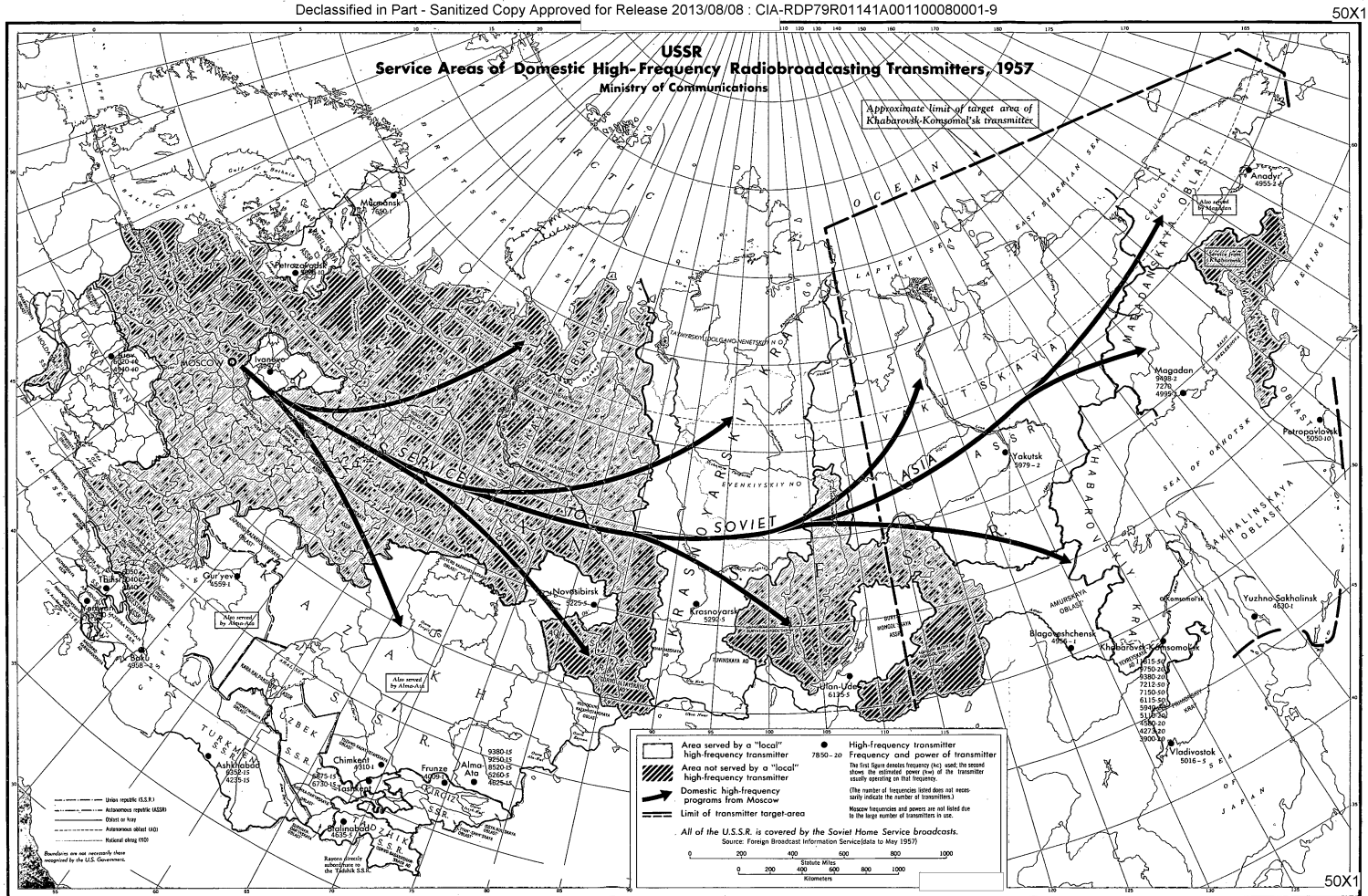


13298 7-54 (First revision 2-58)

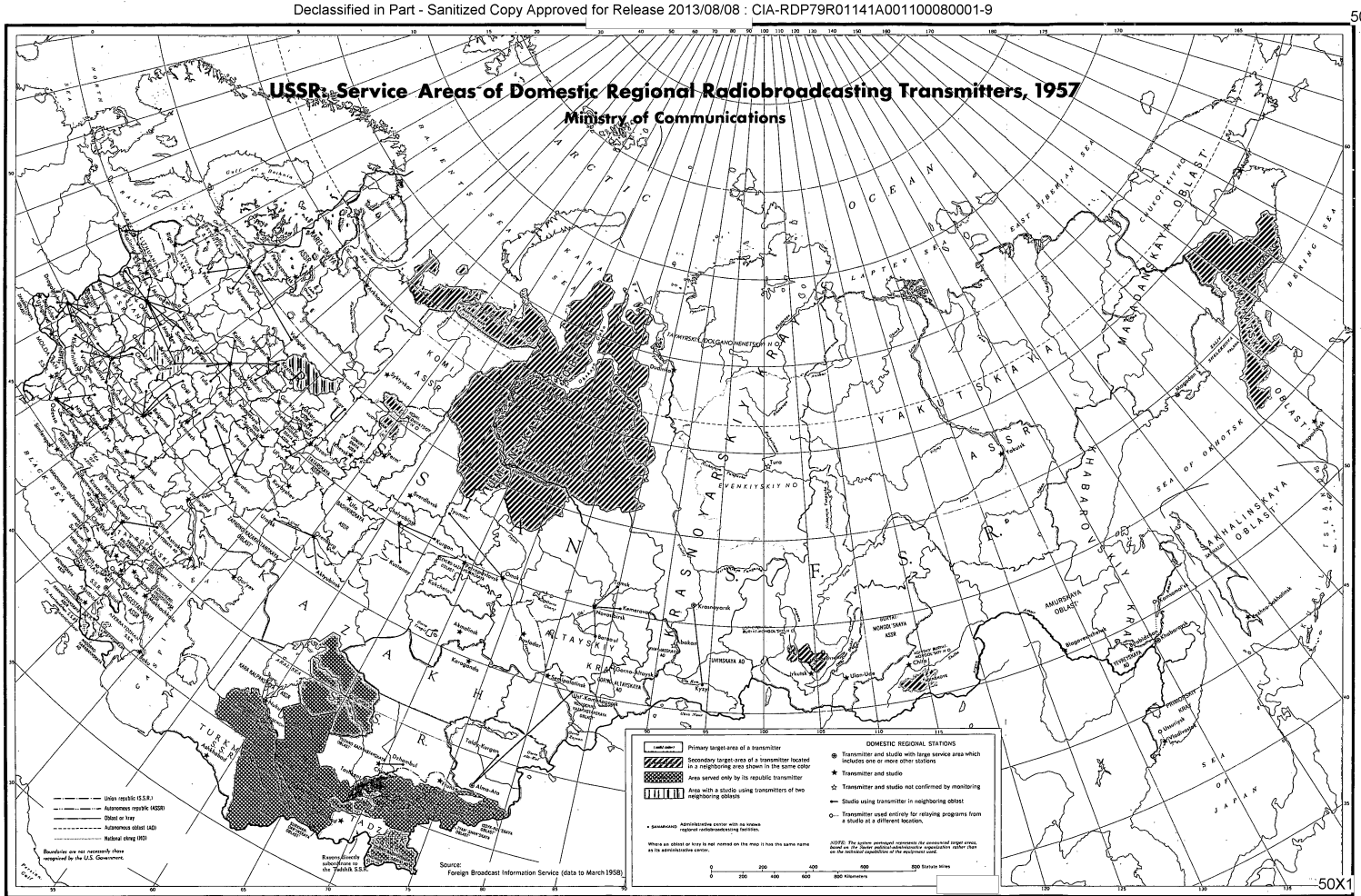


13341 7-54 (First revision 2-58)

50X1

USSR: Service Areas of Domestic Regional Radiobroadcasting Transmitters, 1957

Ministry of Communications



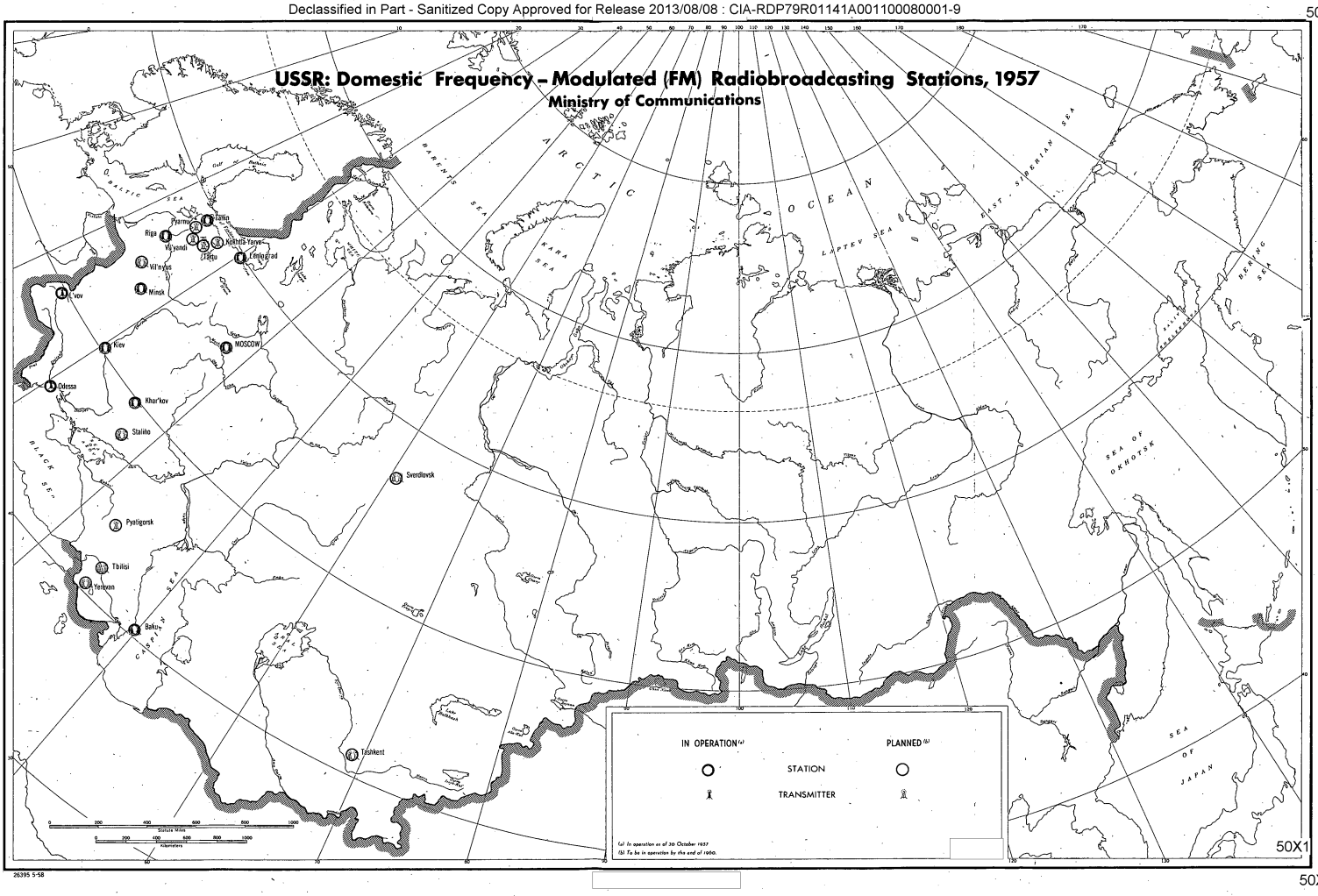
50X1

13296 7-54. (Flist revision 4-58)

50X1

USSR: Domestic Frequency – Modulated (FM) Radiobroadcasting Stations, 1957

Ministry of Communications



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cities in the USSR either originate international radiobroadcasts or retransmit international radiobroadcasts from Moscow.

The international radiobroadcasting coverage of the USSR, shown on the map, Figure 18,* extends to the major strategic areas of the world. Programs are transmitted to the Americas, Europe, the Middle East and North Africa, and the Far East. In addition, programs are transmitted to the European Satellites, Communist China, and North Korea. 192/ In April 1957, for example, the USSR transmitted about 860 hours a week to foreign audiences. The distribution of these hours, by country and by language, is shown in Table 36.**

The domestic and international radiobroadcasting network has shown a fairly rapid development in the years since its inception. At present, the domestic network extends to all parts of the USSR, and the international network extends to all parts of the world. Future emphasis in domestic radiobroadcasting will be mainly on the expansion of FM radiobroadcasting transmission and reception facilities. In AM radiobroadcasting the expansion will be restricted primarily to increasing the power output of existing transmitters and increasing the number of radiobroadcast receivers. 193/

B. Wire Diffusion.

The wire-diffusion network (a "captive" audience medium) is the most extensive broadcasting medium in the USSR -- in fact, in the world. In terms of reception points, the number of wired loudspeakers in 1957 was approximately 2-1/2 times the number of radiobroadcast receivers. The network of wire-diffusion broadcasting facilities in the USSR is composed of wire-diffusion centers and wired loudspeakers. The wire-diffusion centers function as relay points for the transmission by wire of national, regional, or local radiobroadcasts to wired loudspeakers and as originating points of local broadcasts.

Wire-diffusion broadcasting began in Moscow in 1925. In the following year, wire-diffusion service was established in Leningrad and several other large cities. 194/ Before World War II the development of the wire-diffusion network was concentrated primarily in urban areas. The major reason for this was the cost of constructing wire-diffusion centers in sparsely populated rural areas. As shown in Tables 37 and 38,*** there has been a substantial growth in the number of rural wired loudspeakers and centers in the postwar period. Rural wire-diffusion centers, owned primarily by agricultural****

* Following p. 84.
** Table 36 follows on p. 76.
*** Tables 37 and 38 follow on pp. 84 and 85, respectively, below.
**** Continued on p. 86.

Table 36

Total Soviet Radiobroadcasting Output to Foreign Audiences a/
Selected Months, 1955-57

Hours Per Week

Area, Language, and Direction	April 1955	April 1956	April 1957
To North and South America	87.50	136.50	164.50
English	56.00	98.00	112.00
To North America	49.00	N.A.	N.A.
To western North America from Khabarovsk	7.00	49.00	63.00
To eastern North America	N.A.	49.00	49.00
Spanish	14.00	21.00	28.00
To South America	N.A.	N.A.	21.00
To Mexico and Central America	N.A.	N.A.	7.00
To Latin America	14.00	21.00	N.A.
Portuguese to Brazil	7.00	7.00	7.00
Ukrainian to North America from Kiev	7.00	7.00	14.00
Lithuanian abroad from Vil'nyus	3.50	3.50	3.50

a. 195/

Table 36

Total Soviet Radiobroadcasting Output to Foreign Audiences
Selected Months, 1955-57
(Continued)

Hours Per Week

Area, Language, and Direction	April 1955	April 1956	April 1957
To Western Europe	195.00	203.00	216.75
English to the UK	31.50	31.50	38.50
French	21.00	24.50	24.50
Italian	21.00	21.00	21.00
Spanish (including Catalan)	14.00	14.00	14.00
Ukrainian to Europe from Kiev	7.00	7.00	8.00
Dutch	7.00	7.00	7.00
Portuguese to Portugal and Colonies	3.50	7.00	7.00
Armenian to Europe from Yerevan	N.A.	N.A.	0.50
German	42.00	42.00	45.50
To Germany	31.50	29.75	33.25
To Austria	10.50	12.25	12.25

Table 36

Total Soviet Radiobroadcasting Output to Foreign Audiences
Selected Months, 1955-57
(Continued)

Area, Language, and Direction	April 1955	April 1956	April 1957
	Hours Per Week		
To Western Europe (Continued)			
Finnish	21.00	21.00	21.00
From Moscow	14.00	14.00	14.00
From Tallin	7.00	7.00	7.00
Norwegian	10.00	10.50	10.50
Danish	7.00	7.00	10.50
Swedish	10.00	10.50	8.75
To Yugoslavia	28.00	28.00	27.00
Serbo-Croatian	14.00	14.00	13.50
Slovene	7.00	7.00	7.00
Macedonian	7.00	7.00	6.50
To the European Satellites	66.00	42.17	74.50
Hungarian	7.00	3.67	21.00
Directly from Moscow	3.50	N.A.	21.00
On Hungarian Home Service only	3.50	3.67	N.A.

Table 36

Total Soviet Radiobroadcasting Output to Foreign Audiences
Selected Months, 1955-57
(Continued)

Hours Per Week

Area, Language, and Direction	April 1955	April 1956	April 1957
To the European Satellites (Continued)			
Albanian	17.50	17.50	17.50
Directly from Moscow	14.50	10.50	10.50
On Albanian Home Service only	3.00	7.00	7.00
Rumanian	17.50	7.00	10.50
Directly from Moscow	14.00	3.50	7.00
On Rumanian Home Service only	3.50	3.50	3.50
Polish	7.00	3.50	11.00
Directly from Moscow	3.50	N.A.	7.00
On Polish Home Service only	3.50	3.50	4.00
Czech	10.00	7.00	7.50
Directly from Moscow	N.A.	N.A.	3.50
On Czechoslovak Home Service only	10.00	7.00	3.00
On Czechoslovak wire networks only	N.A.	N.A.	1.00

Table 36

Total Soviet Radiobroadcasting Output to Foreign Audiences
Selected Months, 1955-57
(Continued)

Area, Language, and Direction	April 1955	April 1956	April 1957
	Hours Per Week		
To the European Satellites (Continued)			
Bulgarian	7.00	3.50	7.00
Directly from Moscow	3.50	N.A.	3.50
On Bulgarian Home Service only	3.50	3.50	3.50
To the Middle East	111.42	114.92	145.25
Persian	32.67	32.67	49.00
From Moscow	13.42	13.42	15.75
From Baku	12.25	12.25	12.25
From Tashkent	7.00	7.00	7.00
From Stalinabad	N.A.	N.A.	14.00
Turkish	26.25	26.25	26.25
From Moscow	14.00	14.00	14.00
From Baku	12.25	12.25	12.25
Arabic	14.00	17.50	24.50
English from Yerevan	14.00	14.00	14.00

Table 36

Total Soviet Radiobroadcasting Output to Foreign Audiences
Selected Months, 1955-57
(Continued)

Hours Per Week

Area, Language, and Direction	April 1955	April 1956	April 1957
To the Middle East (Continued)			
Greek	14.00	14.00	14.00
Tadzhik from Stalinabad	7.00	7.00	14.00
Azerbaydzhani from Baku	3.50	3.50	3.50
To the Far East	140.00	147.00	161.00
Chinese	43.75	43.75	36.75
Mandarin	31.50	31.50	24.50
Directly from Moscow	21.00	21.00	14.00
On Chinese Home Service only	7.00	7.00	7.00
From Khabarovsk announcing as Moscow	3.50	3.50	3.50
Uighur from Tashkent	7.00	7.00	7.00
Cantonese	5.25	5.25	5.25

Table 36

Total Soviet Radiobroadcasting Output to Foreign Audiences
Selected Months, 1955-57
(Continued)

Area, Language, and Direction	April 1955	April 1956	April 1957
	Hours Per Week		
To the Far East (Continued)			
Japanese	21.00	21.00	24.50
Directly from Moscow	8.75	8.75	12.25
From Khabarovsk announcing as Moscow	12.25	12.25	12.25
Korean	17.50	17.50	17.50
Directly from Moscow	7.00	7.00	7.00
From Khabarovsk announcing as Moscow	10.50	10.50	10.50
Indonesian	7.00	10.50	12.25
Mongolian	8.75	8.75	8.75
Vietnamese	7.00	8.75	8.75
English to Southeast Asia	14.00	15.75	17.50
From Moscow	7.00	8.75	10.50
From Tashkent	7.00	7.00	7.00

Table 36

Total Soviet Radiobroadcasting Output to Foreign Audiences
Selected Months, 1955-57
(Continued)

Hours Per Week

Area, Language, and Direction	April 1955	April 1956	April 1957
To the Far East (Continued)			
Urdu	7.00	7.00	12.25
From Moscow	7.00	7.00	7.00
From Tashkent	N.A.	N.A.	5.25
Bengali	8.75	8.75	8.75
Hindi	5.25	5.25	8.75
Pushtu	N.A.	N.A.	5.25
Primarily to European Countries			
Concert transmissions	63.00	73.50	72.75
Grand total	690.92	745.09	861.75

Table 37

Estimated Number of Wire-Diffusion Centers
in the USSR
1928-40 and 1946-57

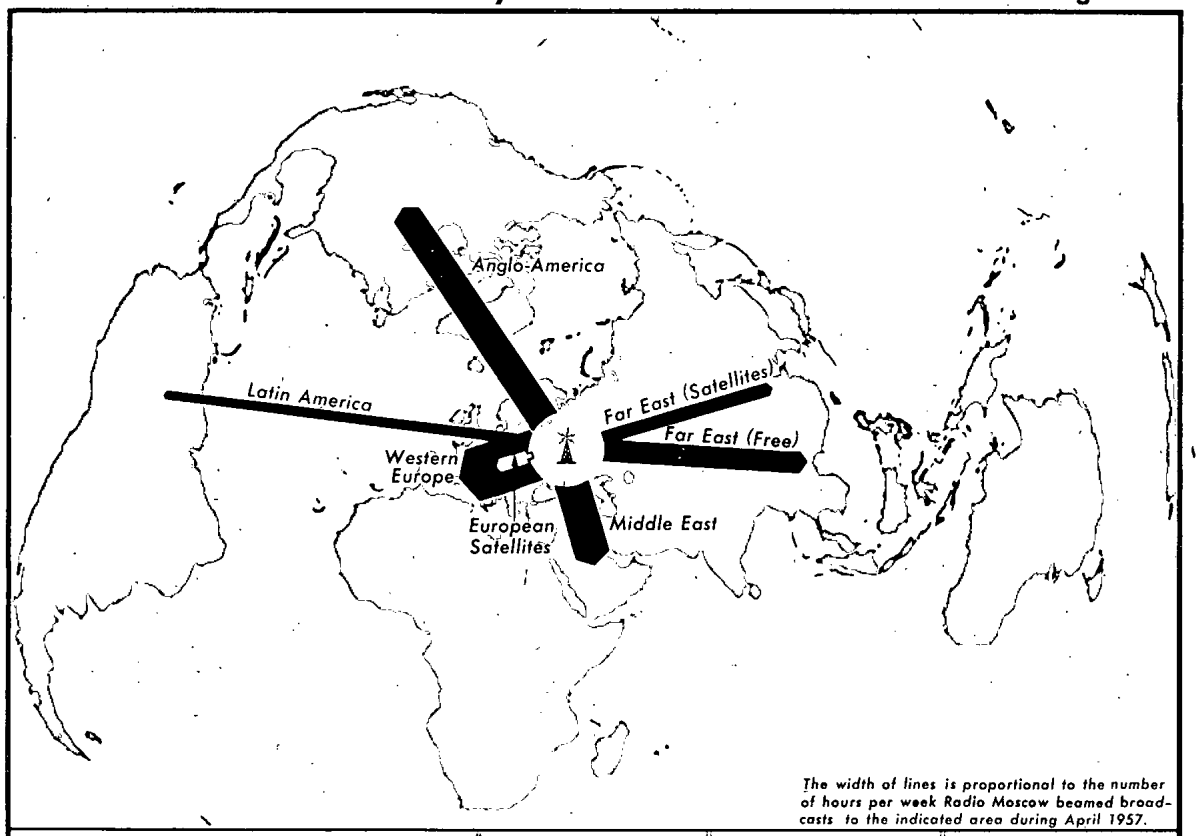
Units

Year	Owned by the Ministry of Communications	Owned by Agricultural Enterprises	Owned by Kolkhozes	Total
1928	27 a/	152 a/		179 a/
1929	227 b/	403 b/		630 c/
1930	884 b/	996 b/		1,880 c/
1931	2,151 b/	1,760 b/		3,911 c/
1932	2,962 a/	1,846 a/		4,808 a/
1933	2,970 b/	1,856 b/		4,826 d/
1934	3,180 b/	2,820 b/		6,000 d/
1935	3,293 b/	3,567 b/		6,860 c/
1936	3,395 b/	4,600 b/		7,995 e/
1937	3,599 a/	5,633 a/		9,232 a/
1938	3,700 b/	5,916 b/		9,616 e/
1939	3,800 b/	6,200 b/		10,000 f/
1940	4,007 a/	7,171 a/		11,178 a/
1946	5,061 g/	2,651 g/	2,290 g/	10,002 h/
1947	5,428 g/	2,843 g/	2,456 g/	10,727 i/
1948	6,810 g/	3,566 g/	3,082 g/	13,458 j/
1949	8,192 g/	4,290 g/	3,707 g/	16,189 j/
1950	9,567 a/	5,022 a/	4,330 a/	18,919 a/
1951	9,319 a/	6,248 a/	6,404 a/	21,971 a/
1952	9,223 a/	7,720 a/	8,409 a/	25,352 a/
1953	9,410 a/	8,316 a/	10,388 a/	28,114 a/
1954	9,620 a/	9,096 a/	12,320 a/	31,036 a/
1955	9,746 a/	9,515 a/	14,248 a/	33,509 a/
1956	9,991 a/	9,859 a/	15,393 a/	35,243 a/
1957	10,464 k/	10,354 k/	16,159 k/	36,977 l/

a. 196/
b. Interpolated, using a graphic analysis of known data.
c. 197/
d. 198/
e. Computed by adding the centers owned by the Ministry of Communications and the centers owned by Agricultural Enterprises.
f. 199/
g. Computed by applying the percentage relationship of the various types of centers to the total number of centers in 1950.
h. 200/
i. 201/
j. Interpolated.
k. Computed by applying the percentage relationship of the varibus types of centers to the total number of centers in 1956.
l. Assuming the same absolute increase between 1956 and 1957 as was shown between 1955 and 1956.

USSR: Service Areas and Program Hours of International Radiobroadcasting, 1957

Ministry of Communications — **Figure 18**



The width of lines is proportional to the number of hours per week Radio Moscow beamed broadcasts to the indicated area during April 1957.

EUROPE

- German (45.50)
- English (38.50)
- French (24.50)
- Italian (21.00)
- Finnish (21.00)
- Spanish (14.00)
- Serbo-Croatian (13.50)
- Norwegian (10.50)
- Danish (10.50)
- Swedish (8.75)
- Ukrainian (8.00)
- Dutch (7.00)
- Portuguese (7.00)
- Slovenian (7.00)
- Macedonian (6.50)
- Armenian (.50)
- Hungarian (21.00)
- Albanian (17.5)
- Polish (11.00)
- Rumanian (10.50)
- Czech-Slovak (7.50)
- Bulgarian (7.00)

FAR EAST

- Japanese (24.50)
- English (17.50)
- Indonesian (12.25)
- Urdu (12.25)
- Bengali (8.75)
- Hindi (8.75)
- Korean (8.75)
- Uighur (7.00)
- Mandarin (24.50)
- Mongolian (8.75)
- Vietnamese (8.75)
- Korean (8.75)
- Cantonese (5.25)

SATELLITES

MIDDLE EAST

- Persian (49.00)
- Turkish (26.25)
- Arabic (24.50)
- Armenian (14.00)
- Greek (14.00)
- Tadzhik (14.00)
- Azerbaidzhan (3.50)

ANGLO-AMERICA

- English (112.00)
- Ukrainian (14.00)

LATIN AMERICA

- Spanish (28.00)
- Portuguese (7.00)

EUROPE & AMERICA

- Lithuanian (3.50)

The figures in parentheses show the number of hours per week Radio Moscow beamed programs in the indicated language during April 1957.

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Table 38

Estimated Number of Wired Loudspeakers
in the USSR
1928-40 and 1946-57

Thousand Units

Year	Urban	Rural	Total
1928	17 a/	5 b/	22 c/
1929	37 a/	65 d/	102 e/
1930	429 a/	140 d/	569 e/
1931	808 a/	235 d/	1,043 e/
1932	1,015 c/	346 c/	1,361 c/
1933	1,133 d/	363 d/	1,496 d/
1934	1,159 d/	372 d/	1,531 e/
1935	1,388 d/	446 d/	1,834 e/
1936	1,666 d/	535 d/	2,201 f/
1937	2,636 c/	787 c/	3,423 c/
1938	3,404 d/	977 d/	4,381 d/
1939	4,149 d/	1,191 d/	5,340 g/
1940	4,589 c/	1,264 c/	5,853 c/
1946	4,914 d/	1,766 d/	6,680 h/
1947	5,536 d/	1,906 d/	7,442 i/
1948	5,725 d/	2,046 d/	7,771 d/
1949	5,914 d/	2,186 d/	8,100 j/
1950	7,367 c/	2,318 c/	9,685 c/
1951	7,824 c/	2,816 c/	10,640 c/
1952	8,234 c/	3,444 c/	11,678 c/
1953	9,160 c/	4,681 c/	13,841 c/
1954	10,116 c/	6,323 c/	16,439 c/
1955	11,007 c/	8,537 c/	19,544 c/
1956	11,780 c/	10,411 c/	22,191 c/
1957	12,280 a/	12,911 k/	25,191 l/

a. Total minus rural.
b. 202/
c. 203/
d. Interpolated, using graphic analysis.
e. 204/
f. 205/
g. 206/
h. 207/
i. 208/
j. 209/
k. 210/
l. 211/

enterprises and kolkhozes, accounted for about 27,000 of the nearly 37,000 centers in 1957. In 1957, there were about 12.9 million loudspeakers in rural areas and 12.3 million in urban areas.

The wire-diffusion network will probably grow at a slower rate in the future than it has in the immediate past. Some factors which will influence this anticipated slower rate of growth are as follows:

1. The approaching saturation of the country with wired loudspeakers, especially in urban areas.

2. An expected increase in the availability of preferred radiobroadcast receivers.

3. An expansion of preferred FM and television networks.

Future growth will depend primarily on rural development. Besides expansion, improvement in operational efficiency in rural areas will also be a main target. In the past, numerous breakdowns in equipment have inactivated many wire-diffusion centers for long periods of time. Much of this inactivation was attributable to the low level of training of operating personnel. 212/ Consolidation of the communications facilities of the rural wire-diffusion network serving the same area, 213/ as decreed by a resolution of the Twentieth Party Congress, is another means by which efficiency may be increased. This resolution implies that wire-diffusion centers will be joined with postal and telephone and telegraph enterprises for consolidated operation. Further, future plans call for an introduction of automatic, unattended, wire-diffusion centers. The first such center has been in experimental operation since October 1956 in a rural area of Moscow Oblast. 214/

Wire-diffusion loudspeaker rates in the USSR in 1957 are given in Table 48.*

C. Television.

The first major television center in the USSR, the Moscow Television Center, began operations in 1938. Operation of this center was interrupted during World War II and was resumed in May 1945.** The second major television center in the USSR was opened

* P. 104, below.

** The center originally transmitted a picture with 343 lines, but in 1948 the transmission characteristics were changed to the present 625 lines, 25 frames per second. 215/

in Leningrad in 1951 and was followed by a third major center in Kiev in 1952. No further expansion in television transmitting facilities occurred until 1955. During 1955, 9 additional transmitters were put into operation, and 10 more transmitters began operation in 1956. By the end of 1957, there were 39 major television centers in operation in the USSR, estimated to be utilizing 45 transmitters. The increase in the number of television transmitters in use is shown in Table 34.*

In addition to the major television centers, 34 television relay stations, which extend the service coverage area of a major center, had been established by the end of 1957. These relay stations are usually located within 100 to 120 km of a major television center.

To supplement the network of major television centers and their associated relay stations, local television centers have also been established. These local centers, numbering 16 at the end of 1957, are constructed by amateurs or by ministries other than the Ministry of Communications for the benefit of local audiences. Local television centers are usually located in areas not served by major centers or their relay stations. Relay stations and local centers utilized 50 transmitters in 1957. In addition to the known television centers and stations in the USSR, there are seven cities which receive television service from undetermined types of facilities.

By the end of 1957 the television network of the USSR, as shown on the map, Figure 19,** covered all republic capitals and almost all major cities in the country. Plans for the further development of the television transmission base call for a total of no less than 75 and possibly (according to the report) 105 major television centers and 300 television relay stations to be in operation by the end of 1960. 216/

Expansion of the television transmission base has been accompanied by an expansion in reception facilities. In 1950, as shown in Table 39,*** there were only 15,000 television receivers in use in the USSR, but by the end of 1957 the number had increased to 2.5 million. Plans call for the further increase in the total number to more than 8 million by the end of 1960.

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* P. 69, above.
** Following p. 88.
*** Table 39 follows on p. 88.

Table 39

Estimated Number of Television Receivers
in the USSR
1940 and 1950-57

Thousand Units

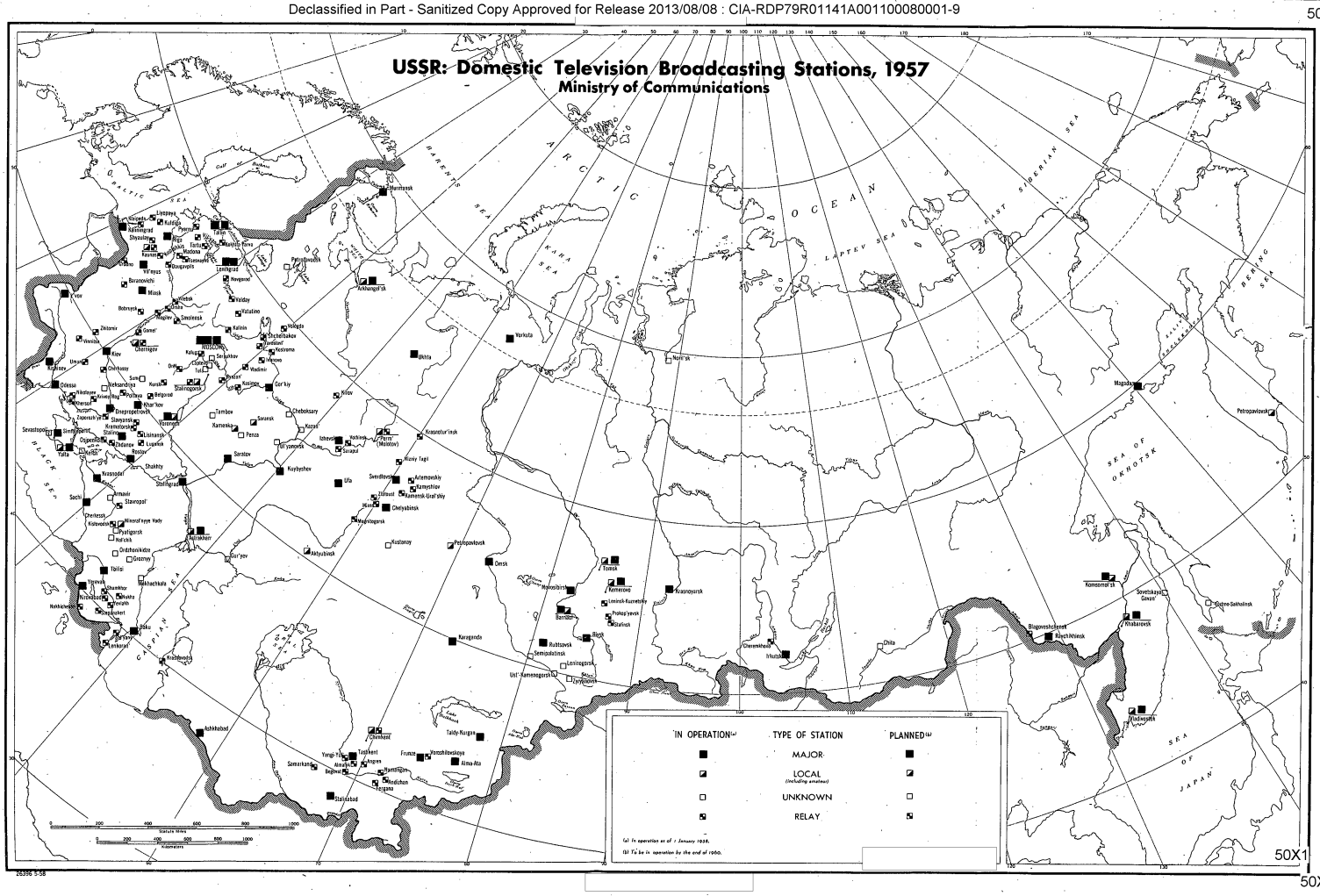
Year	Urban	Rural	Total
1940	N.A.	N.A.	0.4 a/
1950	N.A.	N.A.	15 a/
1951	54 a/	2 a/	56 a/
1952	109 a/	5 a/	114 a/
1953	213 a/	12 a/	225 a/
1954	420 a/	30 a/	450 a/
1955	763 a/	60 a/	823 a/
1956	1,226 a/	98 a/	1,324 a/
1957	2,000 b/	500 c/	2,500 d/

a. 217/
b. Extrapolated on the basis of graphic analysis.
c. Derived by subtracting urban sets from the total number of receivers in use.
d. Interpolated, using 1956 and planned 1960 figures (8 million television receivers) and assuming an increasing annual rate of growth.

The growth in television, especially since 1955, reflects an awareness on the part of the USSR of the propaganda and entertainment value of this, the most effective medium of mass communication. Plans for the expansion of this medium show that even greater emphasis is to be placed on its development. Of major importance is the intention to provide network television service through the interconnection of television centers by coaxial cable and microwave radio relay lines.

Television receiver rates in the USSR in 1957 are given in Table 49.*

* P. 104, below.



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VI. Future Trends.*

The current status of plans related to the post and telecommunications sector of the USSR is uncertain. Recent Soviet announcements state that the original Sixth Five Year Plan (1956-60) has been altered and that new plans, possibly running for 7 years (1959-65), may be prepared. In consequence, the status of previously announced plans for this sector of the economy is somewhat in doubt with respect to priorities and dates of fulfillment.

Estimates of future trends are based on qualitative and quantitative analysis of recent trends and various announced objectives. It is believed, therefore, to the qualified degree given, that future courses of action of the Ministry of Communications will be as follows:

1. It is certain that there will be an expansion of the television transmission and reception base.

2. It is certain that there will be an expansion of the FM radiobroadcasting transmission and reception base.

3. It is certain that there will be an expansion of the AM radiobroadcast reception base.

4. It is certain that there will be an acceleration in the installation of urban and rural automatic telephone exchange facilities and in the use of semiautomatic interurban exchange facilities.

5. It is certain that there will be an introduction of fully automatic interurban telephone dialing.

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* The statistical tables and figures contained in this report could not be projected accurately into the future for two principal reasons. First, it is expected that the 1957 economic reorganization (decentralization) will cause significant alterations in the mode, quantity, and pattern of flow of post and telecommunications traffic. This alteration will require the addition and reorientation of facilities, and the nature and magnitude of these alterations are as yet undiscernible. Second, the proposed new economic plan (1959-65), reportedly to supersede the 1956-60 Plan which terminated prematurely in 1957, may conceivably alter markedly past and present plans and intentions in direction, specific objectives, priorities, and rates of growth.

6. It is certain that there will be a standardization of equipment, facilities, and procedures in the interest of economy, flexibility, and quality of service.

7. It is certain that there will be a search for physical and communications security of telecommunications facilities.

8. It is certain that there will be an emphasis on the development of a technically qualified manpower base.

9. It is almost certain that there will be an acceleration in the provision of greatly increased interurban telecommunications circuit capacity through the construction of microwave radio relay and coaxial and multiconductor cable lines and the use of carrier frequency telephone techniques.

10. It is almost certain that there will be an acceleration in the availability and use of telecommunications service throughout the country, especially in remote areas not now equipped or inadequately equipped, as a result of the increased availability of interurban circuit capacity.

11. It is almost certain that there will be an acceleration in the provision of telecommunications service within and between newly created economic regions.

12. It is almost certain that there will be a rapid increase in subscriber telegraph service resulting from the increased availability of interurban facilities and from the increased needs generated by the economic reorganization.

13. It is almost certain that there will be a retention of point-to-point radio facilities for backups, emergency, and jamming purposes.

14. It is almost certain that there will be an acceleration in research and development on modern telecommunications techniques.

15. It is almost certain that there will be an increase in labor productivity resulting from better training of employees and greater use of modern technology.

16. It is almost certain that there will be an increase in the annual rate of investment to provide a broad base of readily expandable telecommunications facilities capable of meeting future needs.

17. It is probable that there will be an improvement in the speed of handling of mail, especially in rural and remote areas of the country, and the extension of mail routes and facilities into newly developed areas.

18. It is probable that there will be a further development and expansion of television network service.

19. It is probable that there will be an introduction of scatter radio communications facilities, especially in the Arctic regions, where wireline facilities are less practical and normal radio propagation is unreliable.

20. It is probable that there will be an integration of telecommunications facilities of other ministries with those of the Ministry of Communications.

21. It is probable that there will be a leveling off in the expansion of the wire-diffusion network as saturation is approached and as more radiobroadcast and television receivers become available.

No specific date can be estimated for the completion of the above actions. The prime determinate is priority. It is believed that the economy of the USSR has the capability to accomplish these actions. Given a high order of priority, these actions could be completed in about 5 years; with a lower priority, in about 10 years. Future announcements should give some indication of the priority to be given many of these courses of action.

APPENDIX A

GLOSSARY OF TECHNICAL TERMS

Amplitude modulation (AM): The process by which a selected carrier frequency is varied in magnitude (amplitude) by other frequencies that contain the information to be transmitted in telecommunications. (See Frequency modulation.)

Apparatus: Instruments, machines, appliances, and other assemblies used in providing a telecommunications facility.

Automatic (as an adjective): Of or pertaining to any process involved in producing telecommunications service which does not require direct, immediate human assistance.

Basic system: That telecommunications system in a country which has the greatest geographic coverage and the highest capacity. It is usually available for service to private consumers.

Cable: A bundle of sheathed, insulated wires and/or coaxial tubes, used as a telecommunications medium. It is sometimes referred to as "multiconductor cable."

Carrier (as an adjective): Of or pertaining to a technique for dividing a circuit, lane, supergroup, group, or channel into portions which can be used independently of and simultaneously with all other portions. Different frequencies or different pulses are selected for each portion to "carry" the information to be transmitted, after alteration by the information frequencies. The carrier itself need not be transmitted.

Channel: A portion, electrical or physical, of a telecommunications circuit, lane, supergroup, or group which can be used to transmit information independently of and simultaneously with all other portions. A channel may be used to provide two or more subchannels.

Circuit: A telecommunications connection between two or more distant points by a wire, cable, or radio medium facility used to carry information. The circuit is the fundamental telecommunications connection between distant points. By the application of appropriate techniques, a circuit may be arranged in many different combinations to meet the need for various kinds and quantities of telecommunications service. In its simplest form a circuit may carry only single telecommunications units in sequence. In its most complex form it may by apportionment carry simultaneously thousands of telephone channels and telegraph subchannels; a number of television programs; and other specialized

kinds of service, such as high-fidelity broadcast programs, radar signals, and data-processing signals.

For the most complex application, a circuit is often arranged into lanes, each of which can carry, in 1 direction, 1 television program or 600 telephone channels. In turn, these 600 telephone channels are subdivided into 10 supergroups of 60 telephone channels each. Each supergroup is subdivided into 5 groups of 12 telephone channels each. One or more telephone channels may be further subdivided into three to twenty 60-word-per-minute teletype subchannels. Other specialized kinds of service may be accommodated by combining two or more telephone channels.

Coaxial (as an adjective): Of or pertaining to a modern telecommunications cable medium technique using one or more tubes (sometimes called "pipes"). Each metal tube surrounds a conducting wire supported concentrically by insulators. The space in the tube usually contains nitrogen gas under pressure. Generally, coaxial cable is used for the transmission of information in complex form, such as radar, computer data, or television signals, and/or for the transmission of telephone channels and telegraph subchannels. A single tube usually carries information in only one direction at a time. The capacity of a tube depends in part upon the distance between repeater stations. In the standard facility, which may have from 2 to 8 tubes in the cable, a single tube carries a lane of 600 telephone channels or 1 television lane, for which the repeater station spacing is about 7 statute miles. In a new developmental coaxial cable facility, a single tube may carry 3 lanes of a total of 1,800 telephone channels or 3 television lanes, for which the repeater station spacing is expected to be about 3 statute miles.

Electronics: A general term used to identify that branch of electrical science and technology that treats of the behavior of electrons in vacuums, gases, or solids. Today, telecommunications makes extensive use of electronic technology.

Facility: An association of apparatus, material, and electrical energy required to furnish telecommunications service.

Facsimile (as an adjective): Of or pertaining to a telecommunications (telegraph) service in which photographs, drawings, handwriting, and printed matter are transmitted for graphically recorded reception. In one method (Type A), images are built up of lines of dots of constant intensity. In another method (Type B), images are built up of lines or dots of varying intensity, sometimes referred to as "telephoto" and "photoradio."

Frequency: The rate in cycles per second at which an electric current, voltage, wave, or field alternates in amplitude and/or direction.

Frequency modulation (FM): The process by which a selected carrier frequency is varied in frequency by other frequencies that contain the information to be transmitted in telecommunications. (See Amplitude modulation.)

Functional (as an adjective): Of, pertaining to, or connected with special, unique, or particular telecommunications facilities managed and operated by a single agency, organization, company, department, committee, ministry, or other entity, in contrast to the facilities of a basic system. (See Basic system.)

Ionosphere: Those layers of the earth's atmosphere occupying the space about 210 statute miles in thickness extending from about 30 statute miles above the earth's surface to the outer reaches (exosphere) of the atmosphere. Reflection from these layers makes possible long-distance transmission of radio signals. The layers, however, are responsible for fading of signals, skip distance, and differences between daytime and nighttime radio reception. They are also used as a scattering reflector for ionosphere scatter-transmission techniques to transmit to distances of about 1,000 to 1,500 statute miles.

Joint facility: A telecommunications facility owned, controlled, or operated by two or more agencies, organizations, companies, departments, committees, ministries, or other entities.

Lane: A 1-way portion, electrical or physical, of a 2-way telecommunications circuit which can be used independently of and simultaneously with all other portions. The largest lane today can handle 600 telephone channels or 1 television program. In some applications the direction of a lane may be reversed.

Leased (as an adjective): Of or pertaining to the direct operation by a user of a telecommunications facility owned by another agency.

Line: A general term used to delineate a telecommunications circuit facility (wire, cable, or radio).

Main (as an adjective): Of or pertaining to telecommunications facilities at and between principal cities and centers which have relatively high capacity compared with feeder facilities.

Medium: Any substance or space that can be used practically to transmit a form of electrical energy for the purpose of providing telecommunications service.

Microwave radio relay (as an adjective): Of or pertaining to a radio medium technique in modern telecommunications employing radio frequencies higher than 300 mc. These frequencies do not normally afford practical direct transmission to great distances, principally because they do not bend well around the earth's surface and because they do not reflect well from the ionosphere. They are, however, capable of reliable transmission from horizon to horizon (line-of-sight) by the use of special antennas which concentrate the radio energy and give it desired direction. Great distances can, in consequence, be reached by this technique by the interposition of relay stations along the route of the line with a spacing interval of from 25 to 40 statute miles, depending upon terrain conditions. This technique can be employed practically to carry from a small number of telephone channels and telegraph subchannels to thousands of such channels and subchannels through 2 or more lanes and to carry 1 or more television and other specialized lanes and channels.

Network: An interconnection, electrical or physical, of two or more circuits or portions thereof for the purpose of facilitating telecommunications service.

Point-to-point (as an adjective): Generally, of or pertaining to telecommunications service between fixed points, using the radio medium.

Reception base: The aggregate telecommunications receiving facilities employed in providing a broadcast service.

Scatter (as an adjective): Of or pertaining to a radio medium technique in modern telecommunications by which energy in radio frequencies above 30 mc is deliberately scattered into one or the other of two reflecting portions of the atmosphere (troposphere and ionosphere) at a predetermined angle such that a usable portion of the energy arrives at the desired receiving location. This technique is especially applicable to regions in high latitudes (Arctic and Antarctic) where facilities of other media suffer from the rigors of weather and terrain and where the conventional long-distance radio media of the lower frequency bands (200 kc to 30 mc) are subject to serious disruptive propagational anomalies.

Subscriber: Any customer who directly operates telecommunications apparatus in obtaining telecommunications service.

System: All of the facilities and networks managed by a single agency, organization, company, department, committee, ministry, or other entity in rendering either functional or basic telecommunications service.

Telecommunications: Transmission, reception, or exchange of information between distant points by electrical energy over a wire, cable, or radio medium facility to produce telephone, telegraph, facsimile, broadcast (aural and visual), and other similar services.

Teletype (as an adjective): Of or pertaining to a technique for effecting telegraph service by the use of an apparatus similar to a typewriter in which information is transmitted by keyboard and received by type printer on a roll of paper, on a roll of tape, or by perforations on a roll of tape, or both. (Sometimes called a "teleprinter" or "teletypewriter.")

Transmission base: The aggregate telecommunications transmitting facilities employed in providing broadcast service.

Troposphere: The layer of the earth's atmosphere occupying the space from the earth's surface to a height of about 6 statute miles. This layer is used as a scattering reflector for tropospheric scatter transmission techniques to distances of about 200 to 500 statute miles.

Wave guide (as an adjective): Of or pertaining to a telecommunications medium, now under development in several countries, which may be capable of transmitting extremely large amounts of conventional and complex information. It consists of a circular or rectangular hollow metallic tube in which electrical energy travels in the form of waves, much as do sound waves in a speaking tube.

Wire diffusion: Distribution of broadcast programs by a wire or cable medium to wired loudspeakers.

Wired loudspeakers: A telecommunications loudspeaker which receives from a distribution point one or more broadcast programs by a wire or cable medium.

Wireline: A general term used to identify a line consisting of either an aerial cable (and/or separate wires) or underground cable, used as a telecommunications medium.

APPENDIX B

RATE SCHEDULES FOR POST AND TELECOMMUNICATIONS SERVICES IN THE USSR

(STATISTICAL TABLES)

Table 40

Postal Rates in the USSR a/
1957

Rubles

Type of Mail	Ordinary Mail		Air Mail	
	Regular	Registered	Regular	Registered
Letters				
Local and out-of-town, up to 20 grams	0.40	1.00	1.00	2.00
Each additional 20 grams or part thereof	0.20	0.20	0.45	0.45
Third-class matter (such as packages and periodicals)				
Up to 20 grams			1.00	2.00
Each additional 20 grams or part thereof			0.45	0.45
Local and out-of-town, up to 50 grams	0.30	1.00		
Each additional 50 grams or part thereof	0.15	0.15		

a. 218/

Table 41

Rates for Postal Money Orders in the USSR a/
1957

Rubles

Amount Sent	Rate
Less than 30	0.60
30 through 49	1.00
50 through 100 b/	2.00

a. 219/
b. For each ruble exceeding 100 rubles, there is a charge of 0.02 ruble.

Table 42

Rates for Interurban Telephone Calls in the USSR a/
1957

Distance (Kilometers)	Rates (Rubles)	
	For 1 Minute	For 3 Minutes
Less than 25	0.20	0.60
25 through 49	0.50	1.50
50 through 199	1.20	3.60
200 through 599	1.50	4.50
600 through 1,199	2.50	7.50
1,200 through 2,000 b/	2.80	8.40

a. The rates do not reflect a 50-percent reduction which is allowed on calls made between the hours of 2400 and 0700. Interurban telephone rates have remained constant since World War II. 220/
b. For calls made over a distance of more than 2,000 km, the rate is an additional 0.1 ruble per minute for each additional 200 km or part thereof.

Table 43

Rates for Sending Telegrams in the USSR a/
1956

Type of Telegram	Rate per Word b/ (Rubles)
Ordinary	0.30
Urgent	1.00
Lightning	1.50

a. Rates do not vary with the distance.
b. Rate per word includes the address. There is a basic charge of 1 ruble per telegram in addition to the rate per word. If a telegram is requested over the telephone, an additional 0.50 ruble is charged. 221/

Table 44

Rates for Transmitting Messages
over the Subscriber Telegraph Network in the USSR a/
1956

	Distance (Kilometers)		
	0 Through 599	600 Through 1,199	1,200 Through 2,000
Minutes	Rate b/ (Rubles)	Rate c/ (Rubles)	Rate c/ (Rubles)
5	10	25	28
10	20	36	45
15	30	47	60
20	40	58	74
25	50	68	89
30	60	78	104
45	90	108	149
60	120	138	194

a. The rate schedule for computing the cost of a subscriber telegraph connection is based on the duration of the call and the distance of the connection.
b. The rate schedule for the 0- through 599-km connection was computed at the rate of 2 rubles per minute. This rate was obtained from information describing a computing device that operated at a fixed rate of 2 rubles per minute within an unspecified area. It was assumed that this area referred to the 0- through 599-km area. 222/
c. 223/

Table 45

Rates for Telegraphic Money Orders in the USSR a/
1957

Rubles

	Rates	
Amount Sent	Regular Telegrams	Urgent Telegrams
Less than 100	6.00	12.00
100 through 299	10.00	20.00
300 through 499	15.00	30.00
500 or more	220.00	40.00
With a message, per word	0.30	1.00

a. 224/

Table 46

Rates for Sending Facsimile Telegrams in the USSR a/
1955

Size of Telegram Blanks b/ (Inches)	Rates by Contents (Rubles)	
	Photographs and Imprints	Written and Combined Imprint-Written Messages
8.6 by 1.5	3	6
8.6 by 2.0	5	10
8.6 by 3.0	7	20
8.6 by 3.9	10	25
8.6 by 5.9	15	50
8.6 by 8.9	20	75
8.6 by 11.8	30	100

a. Rates do not vary with the distance sent. 225/
b. Blank sizes were converted from millimeters to inches and rounded to the nearest tenth.

Table 47

Rates for Annual Subscriptions to Radiobroadcast Receivers in the USSR a/
1957

Rubles

	Category of Receiver b/		
	I	II	III
Radiobroadcast receivers	36	54	75

a. 226/
b. Category I receivers are for individual use; Category II receivers are for use in village reading rooms, "red corners," and radio auditoriums; and Category III receivers include all others.

Table 48

Rates for Wire-Diffusion Loudspeakers
in the USSR
1957

Rubles

Type of Loudspeaker	Annual Subscription Fee a/	Installation Fee b/
Urban	60	35
Rural	48	35

a. 227/
b. 228/

Table 49

Rates for Annual Subscriptions
to Television Receivers in the USSR a/
1957

Rubles

	Category of Receiver b/		
	I	II	III
Television receivers	120	384	504

a. 229/
b. Category I receivers are for individual use; Category II receivers are for use in "red corners" and reading rooms; and Category III receivers include all others.

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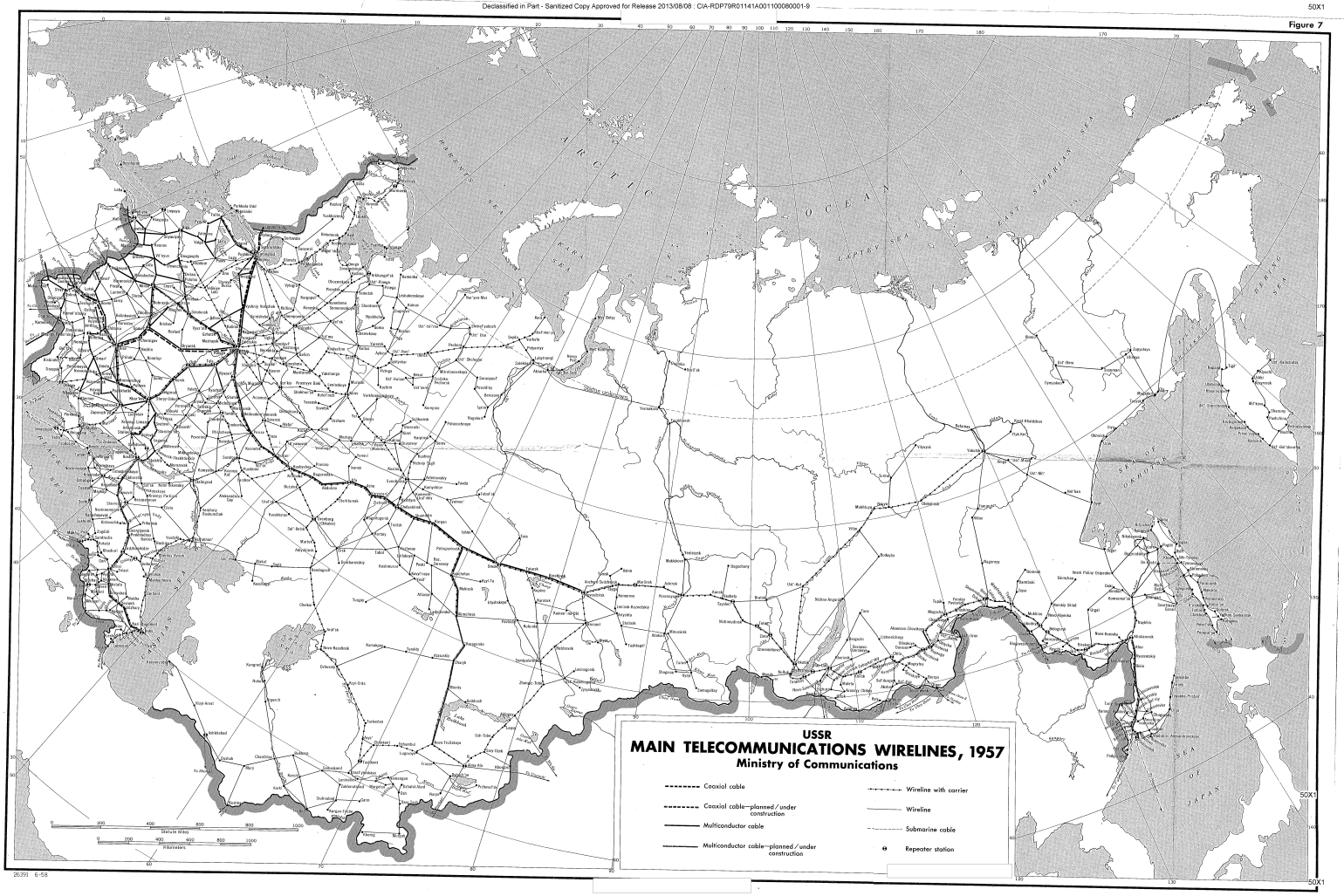
Figure 7



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