ECONOMIC INTELLIGENCE REPORT

POST AND TELECOMMUNICATIONS SERVICES IN RUMANIA 1950-58

CIA/RR 59-9
March 1959

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

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FOREWORD

This report, one of a series on the post and telecommunications services of the countries comprising the Sino-Soviet Bloc, is concerned with those post and telecommunications facilities and services in Rumania operated and controlled by the Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications. Other departments of the Ministry and other ministries operate functional telecommunications systems, such as those serving the armed forces, shipping, railroads, and industries. 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 Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications, their use is not so restricted. The armed forces make abundant use of this system, as do all ministries and other departments of the Ministry of Transportation and Telecommunications. 50X1

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50X1

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POST AND TELECOMMUNICATIONS SERVICES IN RUMANIA* 1950-58

Summary and Conclusions

The public post and telecommunications system in Rumania,** which provides postal, telephone, telegraph, radiobroadcasting, wire-diffusion, and television services, is operated and maintained by the Department of Post and Telecommunications (Departmentul Postelor si Telecomunicatiilor) of the Ministry of Transportation and Telecommunications (Ministerul Transporturilor si Telecomunicatiilor). Telecommunications services are provided by integrated wireline, microwave radio relay, and point-to-point radio facilities. Postal services are provided by a nationwide network of main post offices, local post offices, and postal stations. The public post and telecommunications system is operated primarily to meet the needs of the government and only secondarily to meet the needs of private consumers. Organizations within the state sector of the economy are proportionally heavier users of telephone and telegraph services, and consumers within the private sector are heavier users of postal and broadcasting services.

In 1948, all telephone facilities in Rumania were nationalized and were integrated with other post and telecommunications facilities within the State Postal Administration. Since 1948, but particularly since 1951, when the public post and telecommunications system was placed under the management of the then Ministry of Post and Telecommunications, the system has been expanded and improved sufficiently to meet the minimal needs of the country. Statistical measures of the present status and development of the system are as follows:

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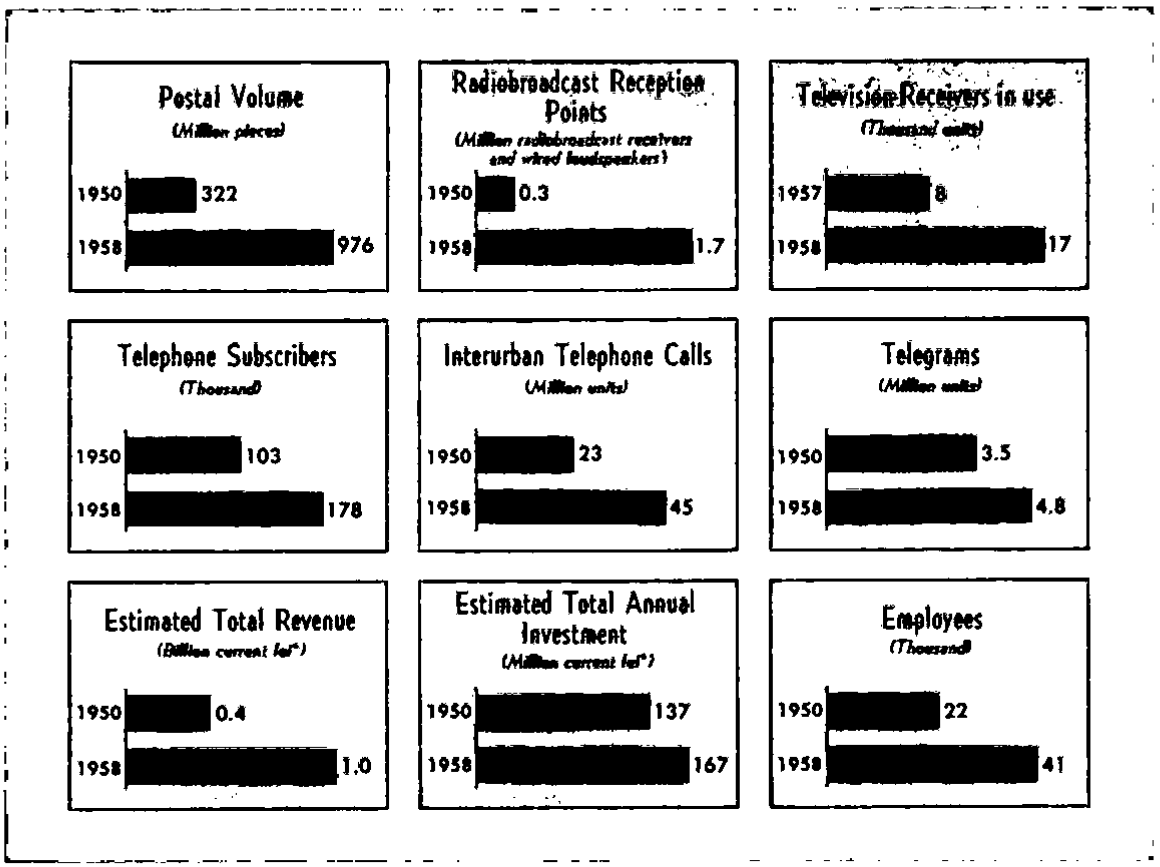
* The estimates and conclusions in this report represent the best judgment of this Office as of 15 February 1959. Technical terms are defined in Appendix A, Glossary of Technical Terms.

** The term public in this report refers to the facilities and services under the control of and operated by the Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications. It does not refer to functional systems, such as those serving the armed forces, the state police, other ministries, or other departments of the Ministry of Transportation and Telecommunications.



The average annual rate of growth** of post and telecommunications revenue and investment from 1950 to 1958 was about 11 percent and 3 percent, respectively. The average annual rate of growth in volume of individual post and telecommunications services during this same period was 15 percent for postal service, 4 percent for telegrams sent, 9 percent for interurban telephone calls, 7 percent for telephone subscribers, and 24 percent for radiobroadcast reception points.

The public post and telecommunications system of Rumania does not compare favorably with similar systems in most other countries of the Soviet Bloc. The comparison for 1957, shown below, indicates that Rumania ranks low in almost all categories of service.

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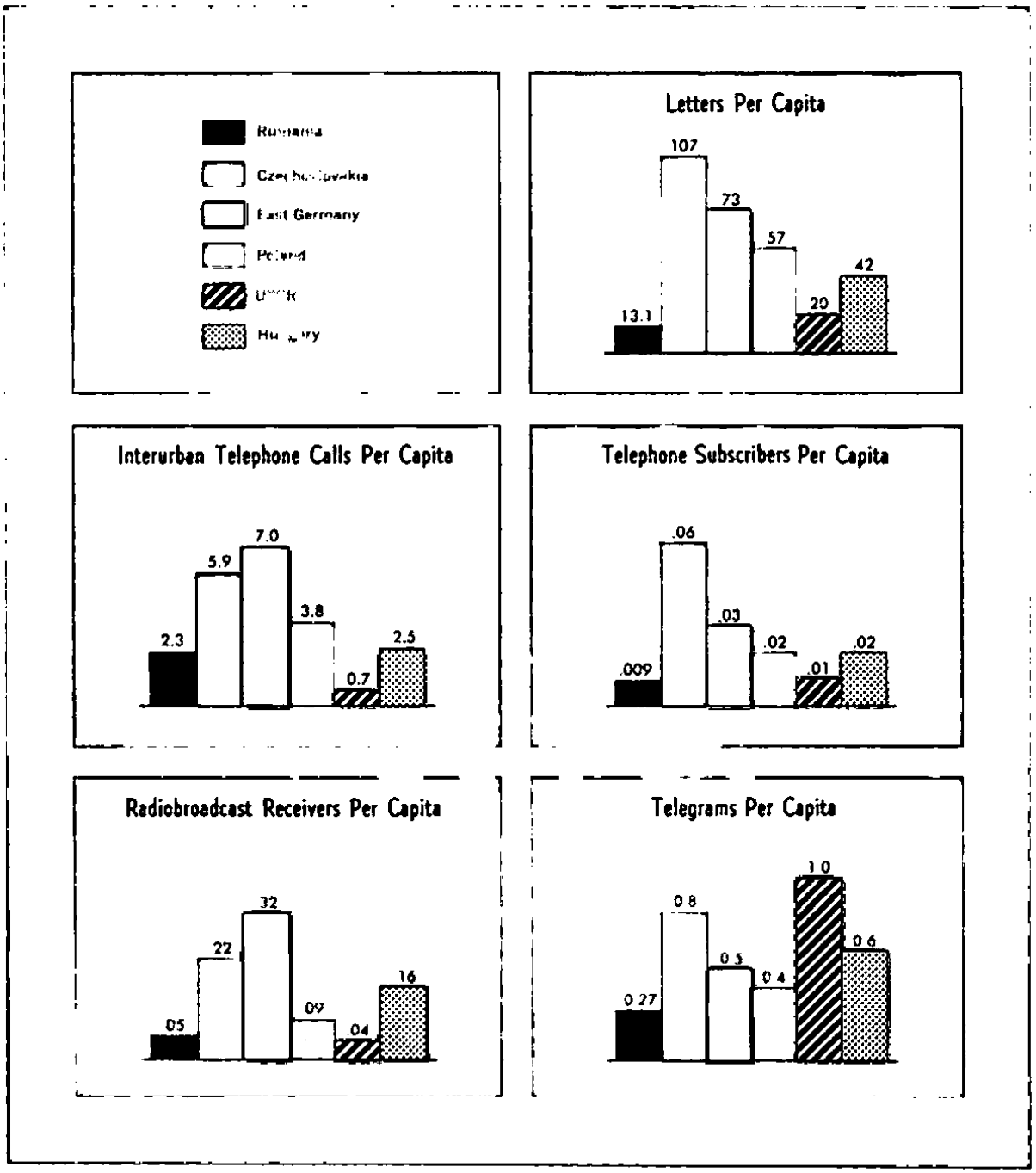
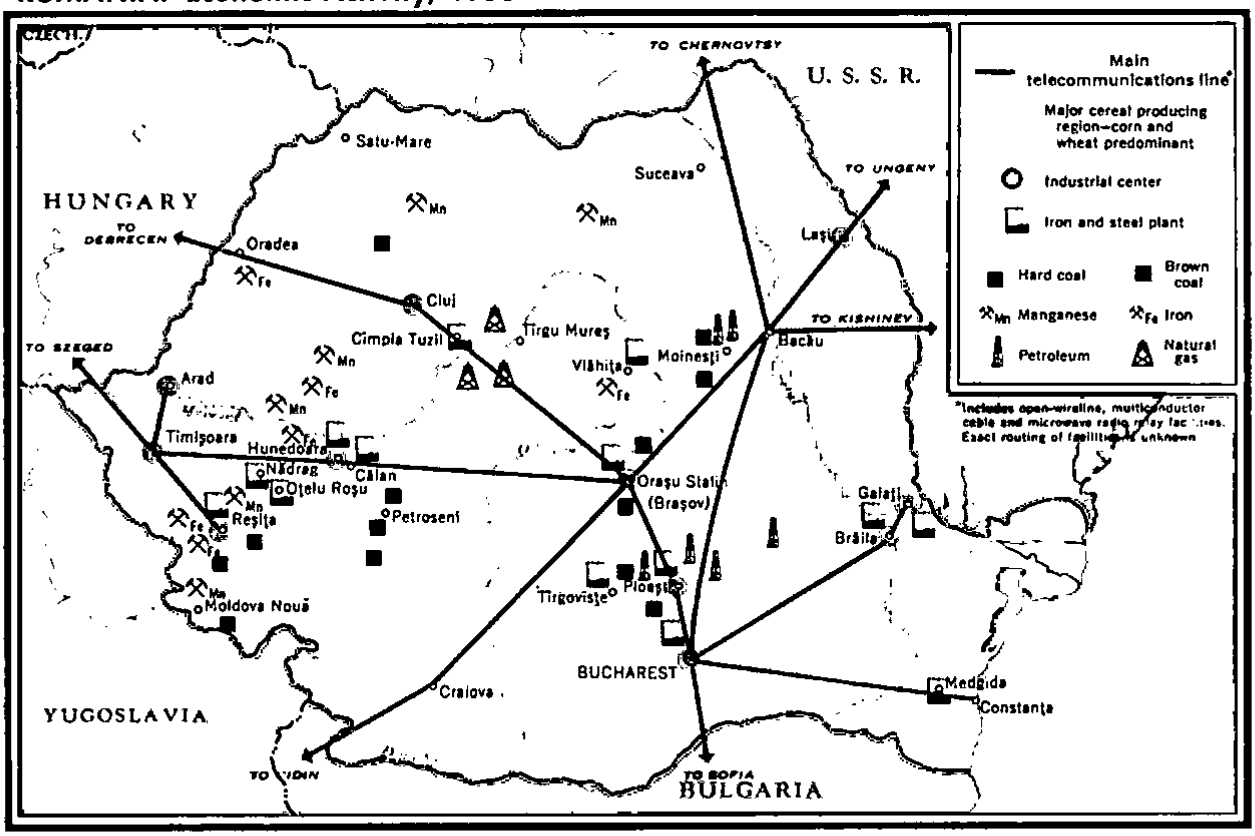
* Except where otherwise indicated, lei values in this report are expressed in terms of current lei and may be converted to US dollars at the official rate of exchange of 6 lei to US $1. This rate of exchange, however, does not necessarily reflect the true dollar value.
** All average annual rates of growth expressed in this report were computed on a compound interest basis.



The ranking in service of the countries of the Sino-Soviet Bloc shown here corresponds with the relative levels of the economies of these countries. Regardless of the unfavorable showing of Rumania in comparison with others, however, its public post and telecommunications system is making substantial contributions of control, acceleration, and coordination to the operation and continued growth of the Rumanian

economy. The accompanying map, Figure 1, shows that main public telecommunications lines in Rumania service all areas of the country engaged in major economic activities.

RUMANIA: Economic Activity, 1958



Rumania, along with the other countries of the Sino-Soviet Bloc, is a full member of the Organization for Cooperation Among the Socialist Countries in the Fields of Post and Communications (OSS). This organization, created in 1958 under the leadership of the USSR, has for its primary purpose the integration and expansion of post and telecommunications within and between member countries. Undoubtedly, Rumania will carry out its commitments as decided by the OSS.

Future plans of the Department of Post and Telecommunications emphasize the continued expansion and improvement of the telecommunications system of the country, particularly the telephone and broadcasting portions. The fulfillment of these plans, however, depends mainly on the quantity of investment funds that will be allocated to the Department for that purpose. If these funds are sufficient, the Department should be capable of meeting most of its plan goals, and the growth of telephone and broadcasting services through 1960 should continue at a rate comparable with that achieved from 1950 to 1958.

I. Introduction.

The purpose of this report is to examine the status, operation, and development of the public post and telecommunications facilities and services provided by the Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications in Rumania. Quantitative data generally cover the years 1950-58, but some references to the historical development as well as the future development of the system are included in the text.

II. Integration of Sino-Soviet Bloc Post and Telecommunications Systems.

The post and telecommunications system of Rumania is subject to external as well as domestic influences. Foremost among the external influences is a recent move by all Sino-Soviet Bloc countries, initiated by the USSR, to overcome the Bloc's lack of unified post and telecommunications systems and services. Eleven Sino-Soviet Bloc conferences on post and telecommunications held since 1956 demonstrate the desire of the USSR to overcome this lack of unification. A new body known as the Organization for Cooperation Among the Socialist Countries in the Fields of Post and Communications (OSS) has been formed. This new group apparently is associated with, but probably is not part of, the Council for Mutual Economic Assistance (CEMA), because it includes Communist China, North Korea, and North Vietnam as full members.

Under a specific plan prepared by the new organization at the March 1958 CEMA conference in Moscow, all Sino-Soviet Bloc countries are to make their telecommunications networks partly automatic by 1965 and fully so by 1975. All participating countries were required to make available immediately the required funds for this

program and to report their requirements for telecommunications equipment and their production capacity for such equipment to the proper committee of CEMA by June 1958. They are to accelerate telegraphic traffic between countries and to establish relay stations for an eastern television network referred to as "OIR-Vision" or "Eurovise" to be completed in 1965.

The priority of this program may be indicated by the fact that the Hungarian economic plan for 1958 was altered to provide funds for the fulfillment of the country's obligations under OSS. It therefore appears that each country is expected to finance its share of the program without aid from the USSR.

A major buildup of mainline telecommunications structures within and between Communist Bloc countries will increase Soviet control in these areas markedly. The program will also strengthen Bloc military potential because these facilities are used jointly with the military in peacetime, and in wartime they could be commandeered wholly to meet the requirements of military traffic.

The ultimate status of OSS is not yet clear. East Germany, Communist China, and North Vietnam all have pressed for its establishment as a Sino-Soviet Bloc counterpart of the Universal Postal Union (UPU) and the International Telecommunications Union (ITU) -- both specialized agencies of the Economic and Social Council of the UN -- because they have consistently been denied membership in those two organizations. Other Bloc countries, including Rumania, are opposed, however, for fear of jeopardizing their standing in the UPU and ITU.

Although it is not yet known what effects OSS will have on the post and telecommunications system in Rumania, it is believed that undoubtedly the future domestic and international posture of this system will be altered so as to conform to the aims of the new body. 1/*

II. Department of Post and Telecommunications.

All public post and telecommunications facilities and services in Rumania are owned by the state and are operated by the Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications. The primary responsibilities of the Department of Post and Telecommunications are to provide domestic and international telephone and telegraph services through integrated wireline and radio facilities; domestic and international broadcasting services utilizing radio, television, and wire-diffusion facilities; and domestic and international postal services. The Department, furthermore, is responsible for technical control and regulation of the

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functional telecommunications systems operated by other ministries and agencies and by other departments of the Ministry of Transportation and Telecommunications.

A. Organization.

Before 1948, public post and telecommunications services in Rumania were provided by separate and independent organizations among which there was little cooperation. The State Postal Administration provided postal and telegraphic services; the Rumanian Telephone Company, a subsidiary of the International Telephone and Telegraph Company, provided telephone service; and the state-owned and operated Rumanian Broadcast Company provided broadcasting service.

In 1948, all telecommunications facilities in Rumania were nationalized and were integrated within the State Postal Administration to form the Administration of Posts and Telecommunications. This Administration directed and controlled all public post and telecommunications facilities and services in Rumania until May 1951. At that time it was abolished and its functions transferred to the newly established Ministry of Post and Telecommunications. The organizational structure of the Ministry stressed the decentralization of post and telecommunications activities along operational and administrative lines. Operational control of ministerial activities was centered in the General Directorate for Post, the General Directorate for Telephone and Telegraph, the General Directorate for Broadcasting, the General Directorate for Material Supplies, and the Special Directorate. Administrative control of ministerial activities was maintained by several central directorates, the most important of which were as follows: the Central Directorate for Planning and Finances, the Central Directorate for Investment, the Central Directorate for Personnel, the Central Directorate for Cadres, and the Central Directorate for Schooling. All central directorates were established on a lower organizational level than either the general directorates or the Special Directorate. 2/

In March 1957 the structure of the Rumanian government was reorganized, and the Ministry of Post and Telecommunications, the Ministry of Railroads, and the Ministry of Road, Sea, and Air Transport were merged into one ministry, the Ministry of Transportation and Telecommunications. The Ministry of Post and Telecommunications, as was the case for the other merged ministries, became a department in the new Ministry.

The organizational structure of the Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications

is shown in Figure 2.* The ministerial merger established the Department as an almost purely operational unit with a minimum of administrative and staff responsibilities, and its organizational structure resembles that portion of the organizational structure of the former Ministry of Post and Telecommunications which exercised control over the operational aspects of its activities.

Emil Bodnares, General of the Armies, has been the Minister of Transportation and Telecommunications of Rumania since the formation of the Ministry in March 1957. In addition to his present position, he is also First Vice-President of the Council of Ministers. As Minister of Transportation and Telecommunications, General Bodnares is concerned primarily with coordinating the activities of the various departments of the Ministry but otherwise exercises little control over their operational activities. This coordination process is facilitated by the administrative and staff structure of the Ministry, which is directly subordinate to the Minister.

Authority for the direction and control of the operational activities of the post and telecommunications sector of the Ministry of Transportation and Telecommunications rests with Dumitru Simulescu, Deputy Minister of the Department of Post and Telecommunications. Simulescu headed the Ministry of Post and Telecommunications before its dissolution and assumed his present position at the time it was merged under the new Ministry.

In controlling the operations of the Department, the Deputy Minister receives administrative and staff support from several central directorates and receives material supply support from the General Directorate for Material Supplies. These directorates, however, are directly subordinate to the Minister for Transportation and Telecommunications and provide similar services to other departments of the Ministry.

The Deputy Minister has two deputies, Gheorghe Dima and Grigore Marin, who assist in controlling the activities of the Department. Although the specific activities which each controls are not known, it is believed that they exercise control over their assigned duties through three general directorates, one special directorate, and several independent enterprises.

The General Directorate for Post, the General Directorate for Telephone and Telegraph, and the General Directorate for Broadcasting supervise the operational activities of the Department. They maintain control of the regional and district post and telecommunications activities of the Department by means of 16 regional

* Following p. 8.

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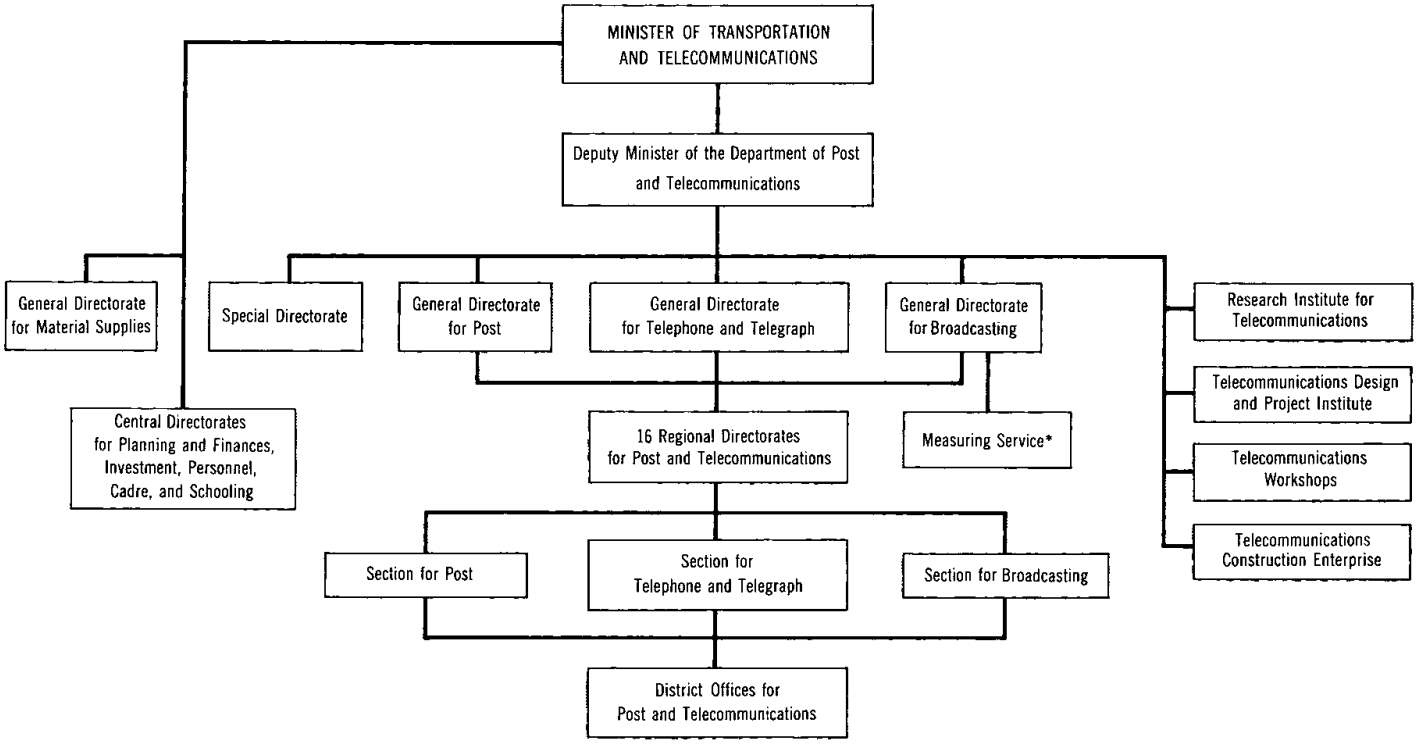
Figure 2

RUMANIA

ORGANIZATION OF THE DEPARTMENT OF POST AND TELECOMMUNICATIONS OF THE MINISTRY OF TRANSPORTATION AND TELECOMMUNICATIONS

1958



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*The Department of Post and Telecommunications provides the facilities, equipment, and technical personnel for the operation of jamming stations. The Ministry of Internal Affairs determines the extent and scope of jamming activities, including the selection of jamming targets

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directorates which are under their immediate jurisdiction. The regional directorates correspond to the political divisions of the country and have subordinate district offices which correspond to the number of districts in a region. Both the regional directorates and their subordinate district offices are organized in a similar manner, each having sections for post, telephone and telegraph, and broadcasting.

Before 1956 the responsibility for all jamming activities in Rumania rested with the Special Directorate. In that year the General Directorate for Broadcasting assumed this responsibility in addition to its responsibilities for operating and maintaining all broadcasting services and facilities in the country. The jamming responsibility, however, is nominal, and the General Directorate for Broadcasting, as was the case for its predecessor, is called upon only to provide the facilities, equipment, and technical personnel necessary for the operation of jamming facilities. Actual responsibility for jamming activities in Rumania has always rested with the Ministry of Internal Affairs, which not only determines the extent and scope of jamming activities but also selects jamming targets. 3/

The Special Directorate of the Department of Post and Telecommunications supervises the construction of all public telecommunications facilities in Rumania. The Directorate is also responsible for the installation and maintenance of all functional telecommunications facilities [redacted] 50X1
[redacted] Included in these are the following: facilities for 50X1
the jamming service; facilities for the Border Guards and Security Police; and facilities for the [redacted] Plan,"* [redacted] 50X1
[redacted] initiated by the USSR for use 50X1
in the event of general mobilization or emergency. In performing its duties the Special Directorate works closely with the Telecommunications Construction Enterprise, which does the actual construction work, and the Telecommunications Design and Project Institute, which provides all blueprints and plans necessary for the construction. 4/

Because many of the functions of the Department of Post and Telécommunications do not fall within the general area of responsibility of either the general directorates or the Special Directorate, there have been established within the Department various independent enterprises which are directly subordinate to the Deputy Minister. The most important of these are the following: the Research Institute for Telecommunications, the Telecommunications Design and Project

* Hereafter referred to as the special telecommunications network.

Institute, the Telecommunications Workshops, and the Telecommunications Construction Enterprise. In carrying out their assigned duties these enterprises support the activities of the other components of the Department.

The Radiobroadcasting and Television Committee, which is an independent organ of government directly subordinate to the Council of Ministers, is responsible for all broadcasting services in Rumania. In this capacity it works closely with the General Directorate for Broadcasting, which maintains and operates the broadcasting equipment used by the Committee, and the Radio Directorate of the Ministry of Education and Culture, which selects all programs to be prepared for broadcasting by the Committee. 5/ The organization of the Radiobroadcasting and Television Committee is shown in Figure 3.*

The ministerial merger which occurred in Rumania in March 1957 did not affect the ability of the Department of Post and Telecommunications to provide the country with post and telecommunications services. The organization of the Department appears to be consistent with these basic responsibilities. The establishment of the Department within the framework of the Ministry of Transportation and Telecommunications should result in a reduction and a more efficient utilization of the Department's administrative personnel and in a more effective and better coordinated investment program. Furthermore, the appointment of an individual of such high rank as General Bodnares to head the Ministry of Transportation and Telecommunications gives some indication of the importance now being attached to the transportation and telecommunications sectors of the Rumanian economy.

B. Revenue.

Total public post and telecommunications revenue in Rumania, as shown in Table 1,** is estimated to have increased from 444 million lei in 1950 to 1,032 million lei in 1958, an increase of about 132 percent. Although these figures are based on fragmentary data, they are of an order of magnitude comparable with that in other Soviet Bloc countries.

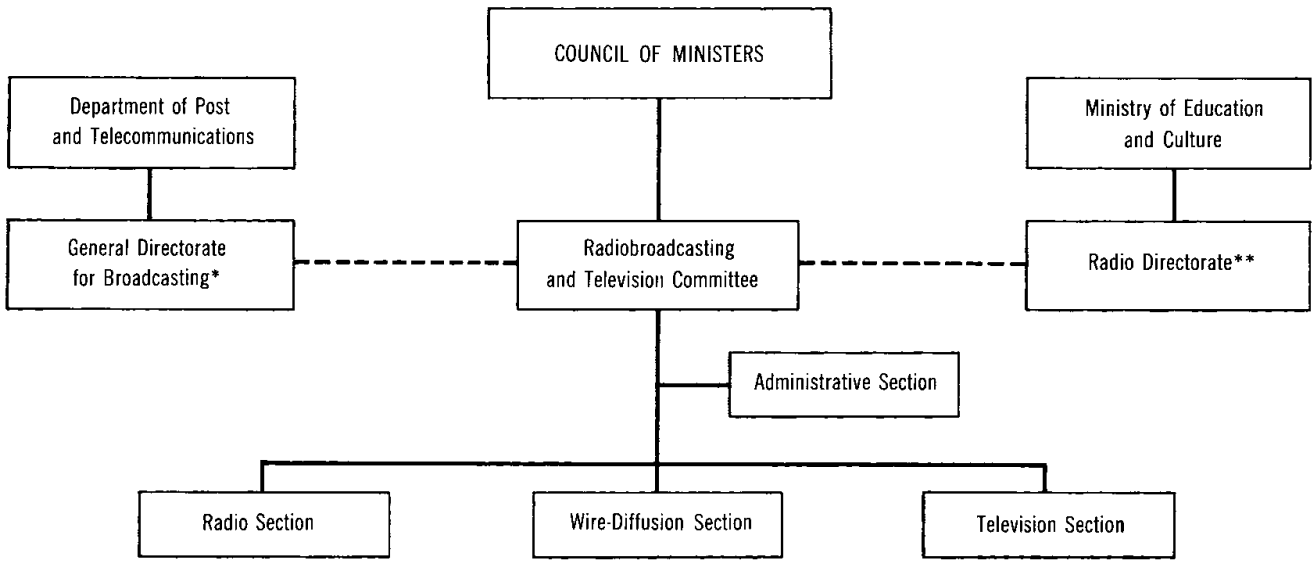
With the exception of the years 1954 and 1958, the rate of growth in total revenue was relatively stable during this period. In 1954, there was a decrease in total revenue. This decrease is believed to be attributable to the economic crisis which occurred in Rumania during that year. In 1958, revenue increased about 19 percent compared with 1957. This abnormally high rate of growth is attributed mainly to the increase of local telephone rates which occurred in December 1957.***

* Following p. 10.
** Table 1 follows on p. 11.
*** Text continued on p. 14.

Figure 3

RUMANIA

ORGANIZATION OF THE RADIOBROADCASTING AND TELEVISION COMMITTEE, 1958



*The General Directorate for Broadcasting provides the facilities for the transmission and relay of programs of the Radiobroadcasting and Television Committee.

**The Radio Directorate of the Ministry of Education and Culture makes the selection of programs to be prepared for broadcasting by the Radiobroadcasting and Television Committee.

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Table 1

Estimated Total Public Post and Telecommunications Revenue in Rumania a/
1950-58

Million Current Lei

	1950	1951	1952	1953	1954	1955	1956	1957	1958
Postal revenue b/	133.2	152.7	171.1	194.0	191.3	218.6	242.8	260.7	309.7
Telecommunications revenue c/	310.7	356.3	399.3	452.7	444.3	510.0	566.5	608.2	722.3
Telephone d/	257.8	293.6	329.7	366.7	344.1	388.1	424.3	448.5	542.8
Interurban e/	194.6	225.4	258.8	290.6	259.7	299.1	329.1	348.0	386.6
Local f/	62.7	67.7	70.6	75.6	81.7	88.4	94.6	100.0	155.4
Installation g/	0.5	0.5	0.3	0.5	0.6	0.6	0.6	0.5	0.8
Telegraph h/	20.6	24.6	22.2	27.4	27.5	26.4	28.2	28.5	27.9
Broadcast	32.3	38.1	47.4	58.6	74.8	95.5	114.0	131.2	151.6
Radiobroadcast i/	31.9	36.8	43.8	50.2	59.2	70.3	82.0	95.1	110.0
Television j/	0	0	0	0	0	0	0	0.9	2.9
Wire diffusion k/	0.4	1.3	3.6	8.4	15.6	25.2	32.0	35.2	38.7
Total post and telecommunications revenue	443.9	509.0	570.4	646.7	635.6	728.6	809.3	868.9	1,032.0

a. The term public in this table refers to the facilities and services under the control of and operated by the Ministry of Post and Telecommunications from 1950 to March 1957 and of the Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications from March 1957 through 1958. All data are rounded to the nearest hundred thousand lei.

Table 1

Estimated Total Public Post and Telecommunications Revenue
in Rumania
1950-58
(Continued)

b. Estimated on the assumption that telecommunications revenue comprised 70 percent of total revenue and that the remaining 30 percent was postal revenue. This estimate was based on fragmentary information [redacted] and on analogy with the postal revenue in Poland. 6/ 50X1
c. The revenue for each of the services was derived by applying known and estimated telecommunications price data to known and estimated telecommunications service volumes, as shown below for the specific services.
d. Because of obscurities in the data reported, total telephone revenue does not include charges in excess of the monthly base rates for both state and private subscribers.
e. Derived from the figure for interurban telephone calls from both regular and leased circuits. Revenue from regular circuits was computed by multiplying the number of calls for 1950-58 from Table 8 (p. 31, below) by the estimated average revenue of 6 lei per call. 7/ Revenue from leased circuits was assumed to be 30 percent of total interurban telephone revenue.
f. Derived by multiplying the total number of telephone subscribers by the estimated average annual telephone rate per subscriber. Telephone subscribers for 1950-58 are from Table 7 (p. 30, below). No information is available as to how many of these were state subscribers and how many were private subscribers; however, the distribution was assumed to be similar to that in the USSR, which is 70 percent state subscribers and 30 percent private subscribers. On the basis of this distribution, the estimated average annual rate of 720 lei for state subscribers and 350 lei for private subscribers was applied for 1950-57. An increase in telephone rates occurred in 1958 and was accounted for by estimating the average annual rates for state subscribers and private subscribers to be 840 lei and 950 lei, respectively. All estimated average annual telephone rates were derived from Table 6 (p. 29, below) and were weighted in accordance with their relative importance in the economy.
g. Computed by multiplying the number of new telephone subscribers by an estimated installation fee of 58 lei. 8/

Table 1

Estimated Total Public Post and Telecommunications Revenue
in Rumania
1950-58
(Continued)

h. Derived from the figure for telegrams from both regular and leased telegraph circuits. Revenue from regular circuits was computed by multiplying the number of telegrams sent for 1950-58 from Table 9 (p. 34, below) by the estimated average revenue of 5 lei per telegram. Revenue from leased circuits was assumed to be 15 percent of total telegraph revenue.
i. Computed by multiplying the estimated midyear figure for radiobroadcast receiver subscribers for 1950-58 from Table 11 (p. 43, below) by the annual subscriber tax of 108 lei. 9/ Revenue from permit fees was computed by multiplying the estimated midyear figure for the number of new subscribers by the permit fee of 50 lei. 10/
j. Computed by multiplying the estimated midyear figure for television receiver subscribers for 1957-58 from Table 11 (p. 43, below) by the annual subscriber tax of 220 lei. 11/
k. Computed by multiplying the estimated midyear figure for wire-diffusion subscribers for 1950-58 from Table 11 (p. 43, below) by the annual subscriber tax of 60 lei. There are no installation fees for wire-diffusion subscribers in Rumania.

Of the total revenue received by the Department of Post and Telecommunications, it is estimated that revenue derived from telecommunications services accounts for about 70 percent and that from postal service for about 30 percent. Telephone revenue has provided consistently the major portion of total telecommunications revenue, accounting for about 75 percent in 1958. In this same year the percentage contributions to total telecommunications revenue by broadcasting and telegraph services amounted to about 21 percent and 4 percent, respectively. The contribution of broadcasting revenue to total telecommunications revenue has increased gradually since 1950, at which time its percentage contribution was about 10 percent.

The Department of Post and Telecommunications does not retain all revenue derived from broadcasting services. Revenue received from broadcasting subscription fees is divided equally between the Radiobroadcasting and Television Committee of the Rumanian Council of Ministers and the Department. This division is believed to be commensurate with the value of the respective services performed. 12/

In the future the Department of Post and Telecommunications is expected to continue expanding its service volumes. Established rates now in force for these services are expected to continue with little or no change. For these reasons, therefore, future growth of public post and telecommunications revenue is expected to continue at an annual rate comparable to that achieved during 1950-58.

C. Investment.

Estimated annual investment in post and telecommunications in Rumania, as shown in Table 2,* increased from 137 million lei in 1950 to 167 million lei in 1958, an increase of about 22 percent. This growth, however, was not consistent and was marked by frequent fluctuations throughout this period.

During 1950-53, post and telecommunications investment increased about 80 percent, reflecting the investment needs of major projects aimed at expanding the telephone, radiobroadcasting, and wire-diffusion networks of the country. In 1954, post and telecommunications investment declined about 45 percent, resulting in a level of investment lower than that achieved in 1950. The decline in 1954, however, was the result of the general cutback of investment in all economic sectors which resulted from the critical difficulties confronting the Rumanian economy in 1953 and 1954. There was a slight increase in the level of post and telecommunications investment in 1955 and 1956. This increase resulted from expenditures for the construction of microwave radio relay facilities and

* Table 2 follows on p. 15.

Table 2

Estimated Total Public Post and Telecommunications Investment in Rumania a/
1950-58

Million Current Lei

	1950	1951	1952	1953	1954	1955	1956	1957	1958
Total post and telecommunications investment	137 b/	151 b/	203 b/	246 b/	135 b/	144 b/	189 b/	178 b/	167 c/
Index of investment d/ (1950 = 100)	100	110	148	179	98	105	138	130	122

a. The term public in this table refers to the facilities and services under the control of and operated by the Ministry of Post and Telecommunications from 1950 to March 1957 and of the Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications from March 1957 through 1958. All data are rounded to the nearest million lei.
b. Investment in post and telecommunications is estimated to be 14 percent of investment for both transportation and telecommunications. 13/ [redacted] 50X1
50X1
c. Assuming the same absolute decrease for 1957-58 as for 1956-57.
d. Computed from unrounded data.

for the program for the continued development of the special telecommunications network.* In 1957 and 1958, nevertheless, the downward trend in investment reasserted itself, and at the end of 1958 the level of investment in the post and telecommunications sector of the economy was most nearly comparable to the level of investment in this sector in 1951. 15/

In the near future, investment in the post and telecommunications sector of the Rumanian economy should increase. Substantial additions to the current level of investments are necessary if major goals of the Second Five Year Plan (1956-60) for this sector are to be met. These goals include major projects for the expansion and improvement of the local and interurban telephone networks of the country and for the development of a nationwide frequency modulation (FM) radiobroadcasting network. In addition, many other telecommunications facilities and services such as amplitude modulation (AM) radiobroadcasting, wire diffusion, television, subscriber telegraph (TELEX),** and inter-Bloc facilities under OSS will undergo continued development.

D. Manpower.

1. Labor Force.

The number of post and telecommunications employees in Rumania, as shown in Table 3,*** is estimated to have increased from 22,400 employees in 1950 to 40,600 employees in 1958, an increase of about 81 percent. This increase in personnel generally reflects the expansion of post and telecommunications facilities and services in the country which occurred during this period.

For the most part, the annual growth in personnel since 1950 has been consistent, with the exception of 1957. In 1957, there was a slight decrease in the level of post and telecommunications employment. This decrease is attributed to the uncertainties that existed in the Department of Post and Telecommunications in consequence of the ministerial reorganization which occurred in that year. In 1958, employment again rose. It is believed that this trend probably will continue in the immediate future, although at an average annual rate somewhat less than before. The basis for this assumption is the apparent leveling off since

* See V, C, 1, b, p. 36, below.

** TELEX is a term applied to a system of subscriber telegraph used in European countries. As Rumania has a subscriber telegraph network which will probably be connected with this European network, the term TELEX is used in this report to describe the Rumanian network.

*** Table 3 follows on p. 17.

Table 3

Estimated Number of Public Post and Telecommunications Employees in Rumania a/
1950-58

Thousand Units

	1950	1951	1952	1953	1954	1955	1956	1957	1958
Number of employees	22.4	25.0	27.4	30.4	33.8	36.0	38.9	38.8	40.6 b/
Index of employment (1950 = 100)	100	112	122	136	151	161	174	173	181

a. The term public in this table refers to the facilities and services under the control of and operated by the Ministry of Post and Telecommunications from 1950 to March 1957 and of the Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications from March 1957 through 1958. [redacted] 50X1

[redacted] 50X1

b. Extrapolated by applying the average annual rate of growth of 4.7 percent shown during 1955-57.

1956 of the annual rate of growth of total postal volume* and the belief that the merger of the Department within the framework of the Ministry of Transportation and Telecommunications will result in the transfer of some personnel previously employed in nonoperating duties to operating assignments.

The over-all quality and performance of the labor force of the Department of Post and Telecommunications is believed to be adequate to meet minimum requirements. Indicated shortages of qualified engineering and technical personnel have not as yet seriously hampered the operations of the Department. The substantial growth of post and telecommunications service volumes since 1950 supports this belief.

2. Wages.

Wage rates for employees in all sectors of the Rumanian economy are established in accordance with qualifications standards issued by the government. Employees qualifying under these standards are paid a predetermined official basic wage. This basic wage may be supplemented by bonuses and other allowances established by the government on the basis of performance. Although piecework rates are generally favored as a basis of compensation in most sectors of the economy, it is not clear whether this method of remuneration is used for employees in the post and telecommunications sector.

Fragmentary wage data available for recent years shows that the average annual wage of employees in the post and telecommunications sector is lower than in other economic sectors. In 1956 the average annual wage of employees in public post and telecommunications was about 6,000 lei, whereas the average annual wage of employees in other economic sectors was about 8,400 lei. The disparity between these wage levels is believed to result from the large proportion of relatively low-paid postal employees in the post and telecommunications labor force. Evidence shows that specific groups of highly skilled employees in the labor force, such as technicians and engineers who install, operate, and maintain telecommunications facilities, receive substantially higher wages than postal employees, but because their number is relatively small, their higher wage rates have little effect on the over-all post and telecommunications wage level. 17/

The average annual wage of post and telecommunications employees in Rumania will increase in 1958. This increase, however, will not result from significant increases in labor productivity but rather from the wage reform policy introduced in late 1957 by the government. This policy, initiated to counteract the imbalance which exists between

* See IV, p. 24, below.

wages and prices in Rumania, raised the official basic wage rate for all categories of employees in all sectors of the economy. 18/

3. Training.

The training facilities and activities of the Department of Post and Telecommunications of Rumania are not extensive. Nevertheless, they are considered to be adequate to provide necessary minimum skills.

Training facilities operated by the Department include technical and vocational telecommunications schools located at Bucharest and Timisoara, a postal school located at Sibiu, and a radio-jamming school located at Baneasa. In addition to the full-time training programs conducted at these schools, the Department conducts on-the-job training programs at various enterprises throughout the country. In 1955, for example, all post offices in Rumania conducted training courses for their employees. Instructors for these as well as other training programs operated by the Department are recruited from among the outstanding employees of its enterprises.

The training programs of the Department are supplemented by training arrangements at various universities and specialized schools. It is estimated that in 1957 there were about 980 students majoring in electronics and telecommunications at these institutions.

Although shortages of highly skilled personnel exist in the post and telecommunications sector, they have not seriously hampered the operations. Plans for the expansion of the post and telecommunications system do not entail the introduction of substantial amounts of more complex equipment. For these reasons, therefore, it is believed that no significant expansion in the training facilities and activities of the Department of Post and Telecommunications will occur in the future.

4. Labor Productivity.

An absolute measure of labor productivity for individual post and telecommunications services in the Department of Post and Telecommunications of Rumania cannot be computed at this time, because available data on the labor force are inadequate. Nevertheless, an indirect measure of labor productivity has been derived by dividing the estimated total annual public post and telecommunications revenue by the estimated total annual public post and telecommunications labor force.*

* Although the resultant estimated average annual revenue per worker is a means of measuring labor productivity, /footnote continued on p. 20/

Average revenue per public post and telecommunications worker, as shown in Table 4,* is estimated to have increased from 19,800 lei in 1950 to about 25,400 lei in 1958, an increase of about 28 percent. The average annual rate of growth during this period amounted to about 3 percent, and, with the exception of a decline in 1954, average revenue per worker showed an increase in every year. The decrease in 1954 was caused by a reduction in total revenue along with continued expansion of the labor force.

There were abnormally high increases in average revenue per worker in 1957 and 1958, amounting to about 8 percent and 13 percent, respectively. The increase in 1957 resulted from a slight decrease in the labor force which was accompanied by the continued growth of total revenue during the year. The increase in 1958 resulted from the exceptional growth of total revenue, which more than offset the moderate increase in the labor force.

If measured in terms of average revenue per worker, future growth of labor productivity in the post and telecommunications sector should be comparable to that achieved during 1950-58. This estimate is conditioned by the expectation that future growth in post and telecommunications employment will level off and that planned increases in the volume of post and telecommunications services will produce increases in total revenue.

E. Equipment.

Rumania produces some telecommunications equipment. This output, however, is limited to relatively simple telecommunications items and consequently is not adequate to meet the equipment needs of the Department of Post and Telecommunications. The Department, therefore, depends heavily upon imports to meet its minimum requirements for telecommunications equipment.

1. Production.

The telecommunications equipment industry of Rumania has Free World origins. Before 1948, foreign-owned plants** were the

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it should be used with the knowledge that the figure may be weighted by conditions unrelated to physical output levels. An increase in total revenue which is derived from rate increases rather than from absolute increases in physical output is an example of such a condition.

* Table 4 follows on p. 21.

** The Standard Telephone and Radio Factory, a subsidiary of the International Telephone and Telegraph Company (IT & T) of the US and the Phillips Company of the Netherlands.

Table 4

Estimated Productivity of Public Post and Telecommunications Employees in Rumania a/
1950-58

Current Lei

	1950	1951	1952	1953	1954	1955	1956	1957	1958
Average annual revenue per employee b/	19,800	20,400	20,800	21,300	18,800	20,200	20,800	22,400	25,400
Index of labor productivity c/ (1950 = 100)	100	103	105	107	95	102	105	113	128

a. The term public in this table refers to the facilities and services under the control of and operated by the Ministry of Post and Telecommunications from 1950 to March 1957 and of the Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications from March 1957 through 1958. All data are rounded to the nearest hundred units. For exceptions to the estimation of productivity in this manner, see the footnote, p. 19, above.
b. Derived by dividing total post and telecommunications revenue by total post and telecommunications labor force. For data on revenue and labor force, see Tables 1 and 3, pp. 11 and 17, respectively, above.
c. Computed from unrounded data.

major producers of telecommunications equipment in the country. In 1948 the industry was nationalized, and control passed to the Rumanian government. Although the productive capacity of the industry was expanded during the ensuing years, this expansion was limited both by a lack of investment funds and by the low level of telecommunications technology in the country. 19/

Currently the major facilities producing telecommunications equipment are located in Bucharest and consist of the Electromagnetica Plant (formerly the Standard Plant), the Radio Popular Plant (formerly the Phillips Plant), and the Telecommunications Workshops. Both the Electromagnetica and the Radio Popular plants are subordinate to the Ministry of Heavy Industry, whereas the Telecommunications Workshops are subordinate to the Department of Post and Telecommunications. The Electromagnetica Plant is the largest of these plants, employing about 2,000 workers.

Generally, the telecommunications equipment produced in Rumania is limited to relatively simple types of telephone and radio-broadcasting equipment. In recent years, however, limited quantities of more complex equipment have been produced. In 1955, for example, the Electromagnetica Plant began production of rotary 7-D automatic telephone switchboards. Furthermore, in 1956 this same plant and the Telecommunications Workshops of the Department of Post and Telecommunications began production of a 100-line semiautomatic telephone switchboard. In spite of these advances in production, the current output of the telecommunications equipment industry is unable to meet the equipment needs of the Department. In consequence, the Department is compelled to maintain a high level of imports of telecommunications equipment. 20/

Plans for the future of the telecommunications equipment industry call for increased outputs of equipment currently in production as well as for the development and production of more complex equipment. These plans, if achieved, will facilitate the planned expansion of the telecommunications system, in particular the expansion of the local telephone networks.

2. Imports and Exports.

The Rumanian Department of Post and Telecommunications imports large quantities of telecommunications equipment from various Free World and Soviet Bloc countries. Imports of the Department are administered by the Ministry of Foreign Trade and are handled by several national foreign trade enterprises, the most important of which is Industrialimport.

Imports of equipment from Free World countries include microwave radio relay equipment from Switzerland, telephone equipment from Belgium, and various types of components from Austria, West Germany, and the US. Imports of equipment from Soviet Bloc countries include telephone exchange equipment from Hungary, radiobroadcasting and television equipment from the USSR and Czechoslovakia, microwave radio relay equipment from East Germany, and jamming equipment from Hungary and Czechoslovakia. 21/

In 1957 the Department of Post and Telecommunications was allocated about 7.5 million lei for the import of equipment for use in the public telecommunications system of the country. Of this amount, about 4.5 million lei were appropriated for imports of telephone and telegraph equipment and 3 million lei for imports of radiobroadcasting equipment. In addition to these funds the Department also was allocated about 2.3 million lei for imports of jamming equipment.

In spite of its limited production capability, Rumania exports some telecommunications equipment. Although negligible in absolute amounts, these exports appear to be motivated primarily by considerations of prestige if not of economic penetration. In 1957, for example, Rumania exported telephone handsets to India, Egypt, and Indonesia. The sale price per handset was about 90 lei, whereas the production cost was about 400 lei.

Future Rumanian imports of telecommunications equipment are expected to remain at a high level because domestic production to meet the minimum equipment needs of the Department of Post and Telecommunications will continue to be inadequate. These imports will include equipment both for the maintenance and for the planned expansion of the telecommunications system.

3. Technology.

Rumania has a relatively low level of technology in the field of telecommunications in comparison with other countries of the Sino-Soviet Bloc. Currently, research programs in this field are directed generally toward the development of equipment originated by other countries rather than toward original research.

Research and development programs in the Department of Post and Telecommunications are conducted by the Research Institute for Telecommunications. It is responsible for the development of equipment which will aid in the operation and maintenance of the telecommunications facilities of the Department. Its most notable achievement to date is believed to have been the development in 1955 of an experimental television transmitter. The Institute probably

also aided in the development in 1956 of a 100-line semiautomatic telephone switchboard for use in local telephone networks. 22/

The Research Institute for Telecommunications is maintained by the Department of Post and Telecommunications for research on telecommunications, and the Academy of Sciences and the Ministry of Heavy Industry also operate institutes for this purpose. Although little information is available as to the accomplishments of these institutes, it is believed that research institutes of the Ministry of Heavy Industry have been engaged in research on microwave radio relay equipment since 1955.

Improvement in the level of research and development of telecommunications equipment in Rumania would facilitate the planned expansion of the telecommunications system. In the past, such improvement has been hampered by shortages of competent telecommunications research personnel and shortages of adequate research facilities. Because these shortages still exist, no significant change in research and development of telecommunications equipment is expected to occur in the immediate future.

IV. Postal Services.

The postal system of Rumania, which is operated and maintained by the General Directorate for Post of the Department of Post and Telecommunications, is an important link in the communications structure of the country. Besides providing service to meet governmental needs, the postal system is the major communications medium available to the public.

Postal service is available throughout Rumania and is provided by a nationwide network of main post offices, local post offices, and postal stations. Although data showing the breakdown of postal facilities in Rumania are not available, it is estimated that there were about 5,200 local post offices in the country in 1957.

The total volume of regular mail service in Rumania consists of letters, packages, newspapers and periodicals, and money orders. In addition to this regular service, the postal system also provides postal savings service, telegram delivery service, and collection service for radiobroadcasting, wired loudspeaker, and television subscription fees.

Total postal volume, excluding packages, for 1950-58 is shown in Table 5.* Letters and newspapers and periodicals comprise the major

* Table 5 follows on p. 25.

Table 5

Estimated Postal Volume
in Rumania a/
1950-58

Million Units

	1950	1951	1952	1953	1954	1955	1956	1957	1958
Letters	146	167	178	210	200	214	228	234	238 b/
Newspapers and periodicals	172	196	300	681	700	754	727	722	720 b/
Money orders	4	5	5	10	12	13	14	16	18 c/
Total	322	368	483	901	912	981	969	972	976
Index of postal volume (1950 = 100)	100	114	150	280	283	305	301	302	303

a. All data are rounded to the nearest million units

50X1
50X1

b. Computed on the assumption that the number of letters (59.6 million) and newspapers and periodicals (180 million) in the first quarter was 25 percent of the number for the whole year (a situation existing in 1957). 24/

c. Computed on the assumption that the number of money orders in the first quarter (4.1 million) was 23 percent of the number for the whole year (a situation existing in 1957). 25/

portion of this total. Letter volumes have increased regularly each year since 1950, with the exception of a slight decline in 1954. The decline in 1954 is believed to be related to domestic economic difficulties during that year. Volumes of newspaper and periodical service show marked fluctuations, ranging from an increase of 127 percent in 1953 above the level of 1952 to slight yearly decreases during 1956-58. The reasons for these fluctuations are not known, but it is believed that the sharp increase in 1953 probably resulted from a transference to the postal system of additional responsibilities for the distribution of reading matter.

The postal system of Rumania does not provide effective service. Mail delivery is slow, with a high incidence of loss. These shortcomings have resulted not only from inefficient postal techniques but also from the lack of mechanized postal transport. Cognizant of these deficiencies, the Department of Post and Telecommunications planned to introduce in 1957 postal mechanization techniques for the processing and transport of mail. The effects of the introduction of these techniques are not yet known. 26/

In spite of its shortcomings, postal service is adequate to meet the minimal needs of the country. In the First Five Year Plan (1951-55), primary emphasis was given to the extension of mail delivery service to rural areas. This goal largely was completed by the end of the plan period through the establishment of about 2,400 additional post offices and postal stations throughout the country.

No important changes in the Rumanian postal system are expected to occur in the near future. This assumption is based on the fact that the Second Five Year Plan (1956-60) gives little attention either to improving or to expanding postal service. Any improvement or expansion of this service, therefore, will depend primarily on the success achieved by the Department of Post and Telecommunications in the introduction of mechanization techniques.

V. Telephone and Telegraph Services.

Telephone and telegraph services in Rumania are provided by the General Directorate for Telephone and Telegraph of the Department of Post and Telecommunications. Extensive low-capacity wireline facilities, supplemented by microwave radio relay and point-to-point radio facilities, are used for these services. The service provided by the telephone and telegraph system in Rumania leaves much to be desired in terms of capacity, efficiency, and availability of service. It is, nevertheless, adequate to meet the minimum needs of the state sector of the economy and in addition to provide some service, particularly telegraph, to the private sector of the economy. Of the services

provided by the system, telephone is the most extensive. In 1958, for example, the volume of interurban telephone calls was more than 9 times the volume of total telegrams sent.

Future plans call for expanding and improving both the facilities and services of the telephone and telegraph system.

A. Telephone.

The telephone system provides domestic and international service which is adequate to meet the rapidly expanding needs of the economy for communications. Facilities of the system provide service to most urban and many rural areas of the country. The extent of the telephone system in Rumania is shown in the accompanying map (see Figure 4*).

Telephone service in Rumania has widespread geographic coverage. The density of coverage varies markedly between large urban areas, which have heavy concentration, and smaller urban and rural areas, with little or no concentration. In 1957, for example, there were about 57 telephone subscribers per 1,000 population in 12 large cities** in contrast to about 9 telephone subscribers per 1,000 population for the entire country.

Telephone service in Rumania increased gradually but steadily during 1950-58. The following tabulation shows the growth in service in terms of telephone subscribers per 1,000 population:

Telephone Subscribers*** per Thousand Population								
1950	1951	1952	1953	1954	1955	1956	1957	1958
6.3	6.7	7.0	7.4	7.9	8.4	8.8	9.2	9.8

In spite of a steady growth in the number of telephone subscribers, the demand for telephone service far outreaches the supply. In consequence, telephone service is more widely available for subscribers in the state sector of the economy than for subscribers in the private sector.

* Inside back cover.

** Arad, Bacau, Braila, Brasov, Constanta, Craiova, Galati, Iasi, Oradea, Ploesti, Sibiu, and Timisoara.

*** Computed from unrounded data used in Table 7, p. 30, below. Population estimates were prepared by the Bureau of the Census on the basis of official Rumanian statistics. The population for 1958 is estimated to be about 18 million.

The allocation of telephone service between state and private subscribers is governed directly on a priority basis and indirectly on a rate basis. In 1948 and 1949, and again in 1953, telephone service for many private subscribers was curtailed and was reallocated on a priority basis among state subscribers -- Party, government, military, and economic enterprises.* This action reduced the number of private, nonpriority telephone subscribers by more than 35 percent. 27/

The telephone rate structure in Rumania, as shown in Table 6,** discriminates against private subscribers. The rate schedule before 1957 favored state subscribers over private subscribers, and the rate increase in December 1957 greatly widened the difference between the two. A comparison, for example, of rates charged state economic enterprises with rates charged private economic enterprises reveals that before the rate change in 1957, private enterprises were charged about 25 percent more than state enterprises for the same service. On the basis of the 1957 rate schedule, the same comparison showed a 250-percent difference.

Total telephone subscribers and total interurban telephone calls in Rumania, as shown in Table 7*** and Table 8,**** respectively, increased substantially during 1950-58. The annual increase in subscribers averaged about 7 percent per year and compared favorably with the average annual rate of growth maintained by most other countries of the Soviet Bloc during this period. Although 1954 showed a decrease of about 10 percent, the rate of growth in the number of interurban telephone calls was high during this period and averaged about 9 percent per year. The year 1954 was unique in that the number of interurban calls decreased substantially. The cause for the decrease is probably related to the economic crisis in Rumania in that year and to the drastic changes in the plan goals which resulted therefrom. The limited growth in 1957 was caused primarily by the limited line capacity of telephone exchanges.

The local Rumanian telephone network uses both automatic and manual telephone exchanges. The automatic telephone exchanges, which serve the bulk of telephone subscribers, are located only in large urban centers. The number of automatic telephone exchanges increased†

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* Listed in order of priority.
** Table 6 follows on p. 29.
*** Table 7 follows on p. 30.
**** Table 8 follows on p. 31.
† Text continued on p. 32.

Table 6

Local Telephone Rates in Rumania, by State and Private Sector a/
1954-58

Monthly Charge (Lei)

	Unlimited Call Service		Limited Call Service	
	1 January 1954 - 30 November 1957 b/	1 December 1957 - 1958 c/	1 January 1954 - 30 November 1957 b/	1 December 1957 - 1958 c/
State sector				
Political and social institutions				
One-party line	42.50	45.00	30.00 d/	30.00 d/
Two-party line	40.00	40.00	e/	e/
Economic enterprises				
One-party line	60.00	70.00	40.00 d/	40.00 d/
Two-party line	55.00	60.00	e/	e/
Private sector				
Individuals				
One-party line	25.00	e/	20.00 f/	60.00 g/
Two-party line	18.75	35.00	e/	e/
Group party line	e/	e/	e/	25.00 h/
Professional				
One-party line	42.50	e/	30.00 d/	200.00 h/
Two-party line	40.00	e/	e/	120.00 h/
Economic enterprises				
One-party line	70.00	e/	50.00 d/	280.00 h/
Two-party line	60.00	e/	e/	160.00 h/

a. Rates apply only to services offered by the Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications.
b. 28/
c. 29/
d. Per 150 calls.
e. No service offered.
f. Per 100 calls.
g. Per 200 calls.
h. Per 300 calls.

Table 7

Estimated Number of Public Telephone Subscribers in Rumania a/
1950-58

Thousand Units

	1950	1951	1952	1953	1954	1955	1956	1957	1958
Subscribers	103	111	116	124	134	145	155	164	178 b/
Index of public telephone subscribers c/ (1950 = 100)	100	108	113	121	131	141	151	160	173

a. The term public in this table refers to the facilities and services under the control of and operated by the Ministry of Post and Telecommunications from 1950 to March 1957 and of the Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications from March 1957 through 1958. All data are rounded to the nearest thousand subscribers

b. Computed on the assumption that the number of subscribers in the first quarter (169,000) was 95 percent of the number for the whole year (a situation existing in 1955-57).

c. Computed from unrounded data.

50X1

Table 8

Estimated Number of Interurban Telephone Calls Handled over Public Facilities in Rumania a/
1950-58

Million Units

	1950	1951	1952	1953	1954	1955	1956	1957	1958
Interurban calls	22.7	26.3	30.2	33.9	30.3	34.9	38.4	40.6	45.1 b/
Index of interurban telephone calls c/ (1950 = 100)	100	116	133	150	134	154	170	179	199

a. The term public in this table refers to the facilities and services under the control of and operated by the Ministry of Post and Telecommunications from 1950 to March 1957 and of the Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications from March 1957 through 1958. All data are rounded to the nearest hundred thousand calls

50X1
50X1

b. Computed on the assumption that the number of calls in the first quarter (10.4 million) was 23 percent of the number for the whole year (a situation existing in 1955-57).
c. Computed from unrounded data.

from 17 in 1950 to about 28* in 1958. There were several hundred manual telephone exchanges in use in 1958.

The telephone exchanges of the Rumanian interurban telephone network are operated manually. In early 1957, however, semiautomatization of rural exchanges in the various divisions of Bucharest regiune (region) was begun, and by June 1958, most of the divisions of the region were equipped for semiautomatic service. At this same time the semiautomatization of the rural exchanges in the Cluj, Craiova, Iasi, Stalin, and Timisoara regions also was begun.

The telephone system as a whole is inadequate in exchange facilities and antiquated in exchange equipment. Most of the exchange equipment currently in use was installed during 1930-40 by IT & T, which at the time was operating the telephone system of the country. Since nationalization of the facilities of IT & T in 1948, Rumania has not been able to obtain from IT & T either new equipment or sufficient replacement parts for these exchanges. Although new sources of supply have been developed with Soviet Bloc countries, particularly Hungary, Czechoslovakia, and the USSR, the general mechanical efficiency of the telephone exchange equipment has deteriorated.

Plans for the future development of the telephone system are directed toward increasing the capacity of local telephone networks as well as toward continuing the semiautomatization of the interurban telephone network. The capacity of the local telephone network will be expanded through the installation of additional quantities of urban and rural exchanges. These additional exchanges, especially small 100-line rural exchanges, will be obtained from domestic production. The semiautomatization of the interurban network, as noted above, has already begun in several regions of the country. When this program is completed, it will enable the grouping of rural exchanges into many semiautomatic networks and will make possible the complete automatization of this network at some future date. The fulfillment of these plans will effect a marked improvement in the availability, speed, and efficiency of telephone service. Furthermore, it will enable the telephone system to handle the increased demands for service resulting from the continued industrial development of the country. An indication of what these demands may be was given by the Deputy Minister for Post and Telecommunications, who,

* Four of the automatic exchanges are located in Bucharest and one each in the cities of Arad, Bacau, Baia-Mare, Braila, Brasov, Buzau, Cluj, Constanta, Craiova, Deva, Focsani, Galati, Giurgiu, Iasi, Lugoj, Oradea, Pitesti, Ploesti, Sibiu, Sinaia, Suceava, Timisoara, Tirgoviste, and Tirgu Mures.

in January 1958, stated that at least 20,000 to 40,000 new subscribers lines per year would be needed to satisfy anticipated future demands. 32/

B. Telegraph.

Telegraph service in Rumania is available on a nationwide basis for private and state users. It is considered to be adequate to meet the needs of the country. Facilities of the telegraph network are located usually in post offices and railroad stations throughout the country and provide both domestic and international telegraph service. Telegraph traffic is carried by wireline facilities used in common with the telephone system as well as by wireline facilities used exclusively for telegraph traffic. Services provided by the telegraph network include regular telegraph, TELEX, and phototelegraph (facsimile) service. Of these services, regular telegraph is most extensive.

The volume of telegrams sent in Rumania, as shown in Table 9,* grew from 3.5 million in 1950 to 4.75 million in 1958, an increase of about 35 percent. Growth in traffic volume during 1951-53 averaged about 10 percent per year. Since 1953, however, the growth rate has decreased, averaging less than 1 percent per year. The decrease in the rate of growth since 1953 is probably related to the introduction of TELEX service, which occurred during this period.

TELEX service was introduced in Rumania in October 1954. Although little data are available on the growth of this service, it is believed that its development has been slow. This limited development probably reflects the ability of the telephone system to provide adequate interurban service.

International facsimile service was introduced in Rumania in February 1958. At that time, service was initiated only between Bucharest and Moscow. Domestic facsimile service probably will be introduced between all major cities of the country in the near future, and international facsimile service will be available with most of the countries of the Sino-Soviet Bloc.

The efficiency of regular telegraph service in Rumania has improved in recent years. In 1957, for example, telegrams could be delivered to all parts of the country in about 4 hours, whereas the delivery time in 1948 was more than 9 hours.

In spite of recent improvements in telegraph service, the telegraph system is largely obsolescent. This has resulted primarily from the accumulated neglect of the system which began in the early

* Table 9 follows on p. 34.

Table 9

Estimated Number of Telegrams Sent over Public Facilities in Rumania a/
1950-58

Million Units

	1950	1951	1952	1953	1954	1955	1956	1957	1958
Telegrams sent	3.50	4.19	3.77	4.66	4.67	4.49	4.80	4.85	4.75 b/
Index of telegrams sent c/ (1950 = 100)	100	120	108	133	133	128	137	138	135

a. The term public in this table refers to the facilities and services under the control of and operated by the Ministry of Post and Telecommunications from 1950 to March 1957 and of the Department of Post and Telecommunications of the Ministry of Transportation and Telecommunications from March 1957 through 1958. All data are rounded to the nearest ten thousand telegrams [redacted]

50X1
50X1

b. Computed on the assumption that the number of telegrams in the first quarter (1.04 million) was 22 percent of the number for the whole year (a situation which existed in 1955-57).

c. Computed from unrounded data.

1930's. Future plans for the modernization of the system are associated mainly with the gradual expansion of specialized telegraphic services, such as TELEX. It is expected, therefore, that the volume of regular telegraph traffic in Rumania will remain at its present level for some time, but that the over-all volume of telegraph traffic will increase gradually with the expanded use of TELEX services. 34/

C. Common Telecommunications Facilities.

Common telecommunications facilities of the Department of Post and Telecommunications of Rumania consist of wireline, microwave radio relay, and point-to-point radio networks. Of these facilities, the wireline network is the most important in providing domestic and international telephone and telegraph service. The microwave radio relay network, although of limited capacity in 1958, will carry more traffic in the future. The domestic point-to-point radio network carries some telegraph traffic but is maintained primarily as a reserve facility for domestic operations. The international point-to-point radio network provides telephone and telegraph service to areas not served by international wirelines.

1. Wirelines.

The Department of Post and Telecommunications operates two major networks in Rumania. One is a public wireline network associated with the public telephone and telegraph systems of the country, and the other is a special telecommunications network for use in the event of a general emergency. The special network is a joint telecommunications network which includes several Soviet Bloc countries and is controlled by the Ministry of Defense, whereas the public wireline network is both controlled and operated by the Department of Post and Telecommunications.

a. Public Network.

The public wireline network in Rumania is the major facility employed in providing domestic and international telephone and telegraph service. In addition, it is also used to relay radiobroadcasting programs. The major lines of the network, as shown on the accompanying map (see Figure 5*), originate in Bucharest and tend to follow railroads and highways to all urban and many rural areas of the country. There are international wireline connections to the USSR, Hungary, Bulgaria, and Yugoslavia.

* Inside back cover.

The public wireline network consists of open wire and multiconductor cable lines, with open wirelines predominating. All multiconductor cable lines are underground and carry both telephone and telegraph traffic. The size and capacity of the multiconductor cable lines vary from 8 quads (the line between Bucharest and Giurgiu) to 74 quads (the line between Bucharest and Ploesti). The capacity of all multiconductor cable lines and of the major open wirelines is augmented by multiplex equipment which provides 3, 8, and 15 telephone channels.

The total telephone channel capacity of the interurban wire and multiconductor cable lines increased substantially during 1948-57. Whereas in 1948 there were about 153,000 kilometers (km) of interurban telephone channels, by 1957 interurban telephone channels had grown to about 485,000 km. A large portion of this increase resulted from the reconditioning of old lines as well as from the equipping of these lines with multiplexing equipment. 35/

Similarly, during 1948-57 the length of telegraph wirelines in Rumania showed a substantial increase, amounting to about 80 percent. This increase was a significant achievement because the telegraph system required a large amount of new wirelines solely for the replacement of old, wornout lines.

Because the Second Five Year Plan emphasizes the increased use of microwave radio relay lines for interurban telephone traffic, the public wireline network in Rumania will not expand at the high rate achieved in previous years. There will be, nevertheless, a continuing need for additional amounts of wirelines and possibly multiconductor cable lines as a consequence of the planned semiautomatization of the interurban telephone network.

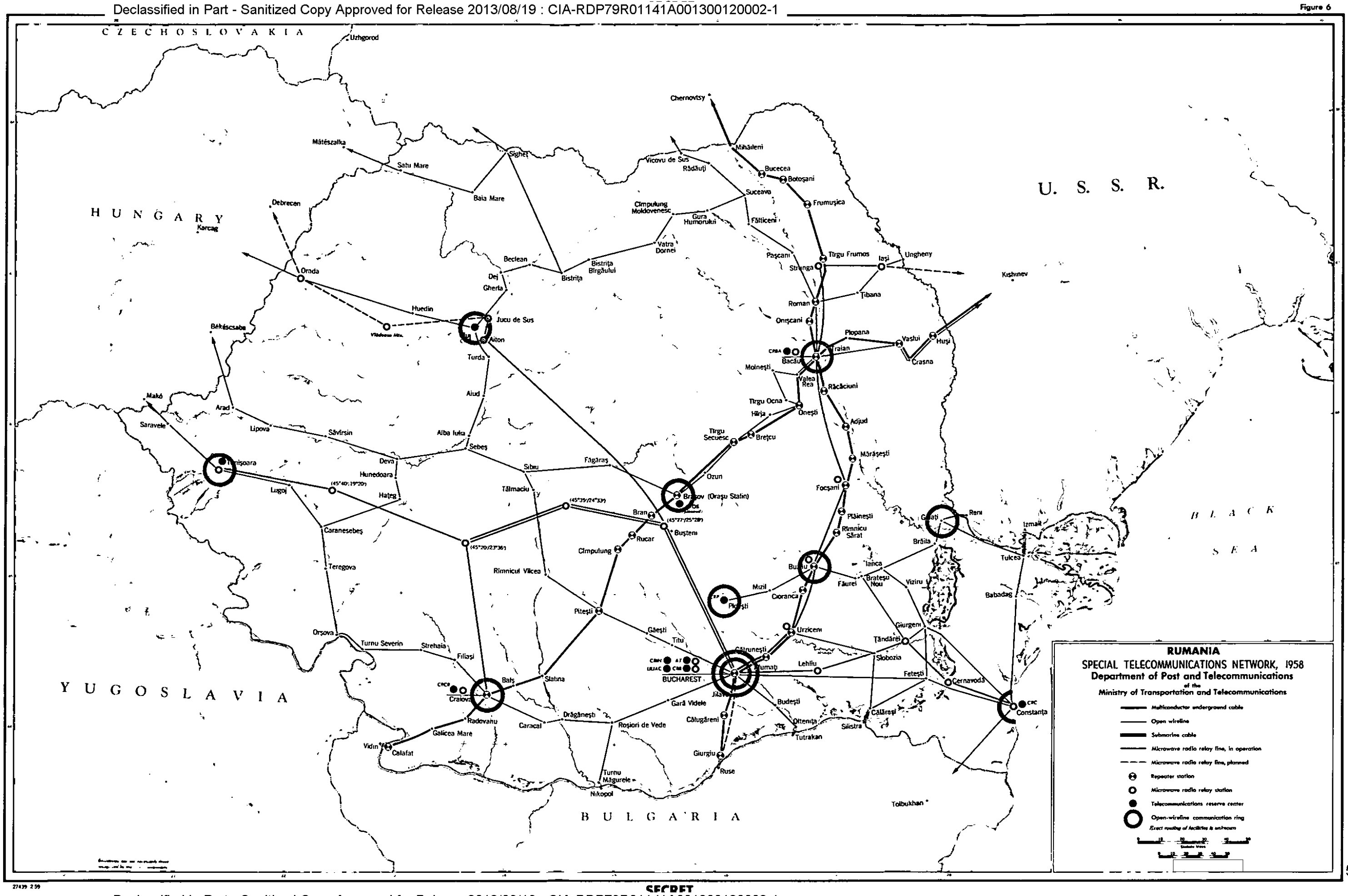
b. Special Telecommunications Network.

The special telecommunications network of Rumania, as shown on the accompanying map (see Figure 6*), is operated by the Department of Post and Telecommunications but controlled by the Ministry of Defense. This network, which consists primarily of wire and multiconductor cable lines, is capable of providing reliable emergency telephone and telegraph service domestically to all parts of the country and internationally to the USSR, Bulgaria, and Hungary. Although the facilities of the network function as part of the public telecommunications system, their use by the network is often limited.

* Following p. 36.

50X1

Figure 6



50X1

The impetus for the extablishment of the special telecommunications network* came from the USSR in 1950. At that time the network was described as part of a strategic telecommunications plan which encompassed all countries of the Soviet Bloc except Albania. The responsibility for the control of the network was assigned to the Ministry of Defense, and the responsibility for its construction was assigned to the Special Directorate of the then Ministry of Post and Telecommunications. Completion of the network was originally scheduled for 1955, but the economic crisis in Rumania in 1953-54 has delayed completion until 1960.

Original plans for the construction of the special telecommunications network called for the network to consist entirely of wire and multiconductor cable lines. In 1953, however, mountainous terrain and a lack of cable resulted in the cancellation of the planned multiconductor cable line between Bucharest and Budapest. A microwave radio relay line was substituted for this connection. The Bucharest-Cluj portion of this microwave radio relay line was completed in 1955 and subsequently was incorporated into the special network. In spite of its "special" status, the line has been used at full capacity as part of the public telecommunications system, and its use in the special telecommunications network has been reserved for emergency conditions. Since 1955, all public microwave radio relay lines in Rumania have been incorporated into the special network. These lines also have continued to operate at full capacity as part of the public telecommunications system, and their use in the special telecommunications network, as was the case for the Bucharest-Cluj line, has been reserved for emergency conditions.

Much of the special telecommunications network has been pieced together from wireline facilities already in service in the public wireline network. A few new lines were constructed, their prime purpose being to reduce the vulnerability of this network to attack. Chief among these lines were the "communications rings" around the cities of Buzau, Bucharest (2 rings), Cluj, Constanta, Craiova, Ploesti, and Timisoara. Their value, however, is reduced somewhat because they consist of aerial lines rather than of underground lines and thus are more vulnerable to blast effects. Additional communications rings around the cities of Bacau, Brasov, and Galati are believed to have been completed in 1957 or 1958.

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* It is strange that there is no intelligence information on similar plans for other Sino-Soviet Bloc countries. The special telecommunications network concept may apply only to Rumania and may be related to the defense of the large Ploesti petroleum complex located in the country, which may play a key role in the logistics of Soviet war plans.

Existing lines of the public wireline network that were incorporated in the special telecommunications network were reconditioned and changed to meet a standard band width of 60 kilocycles (kc) for wirelines and 120 kc for multiconductor cable lines. Although no reason is given for the selection of these particular band widths, it may be inferred that they were adopted to conform with a common standard for the Soviet Bloc.

Ten telecommunications reserve exchanges located in close proximity to the communications rings were constructed to service the special telecommunications network. All reserve exchanges are used in the public telecommunications system, but only to insure their operable condition. 37/

The special telecommunications network is almost completed. The largest project yet to be completed is the extension of the microwave radio relay line from Cluj to Oradea, where it may connect with a Hungarian microwave network. Other than this, the network is not likely to be expanded in the future. Should the need arise, the wide band widths of the wire and multiconductor cable lines now in existence may allow for increased channel capacity, thus minimizing the need for the construction of additional amounts of wire and multiconductor cable lines.

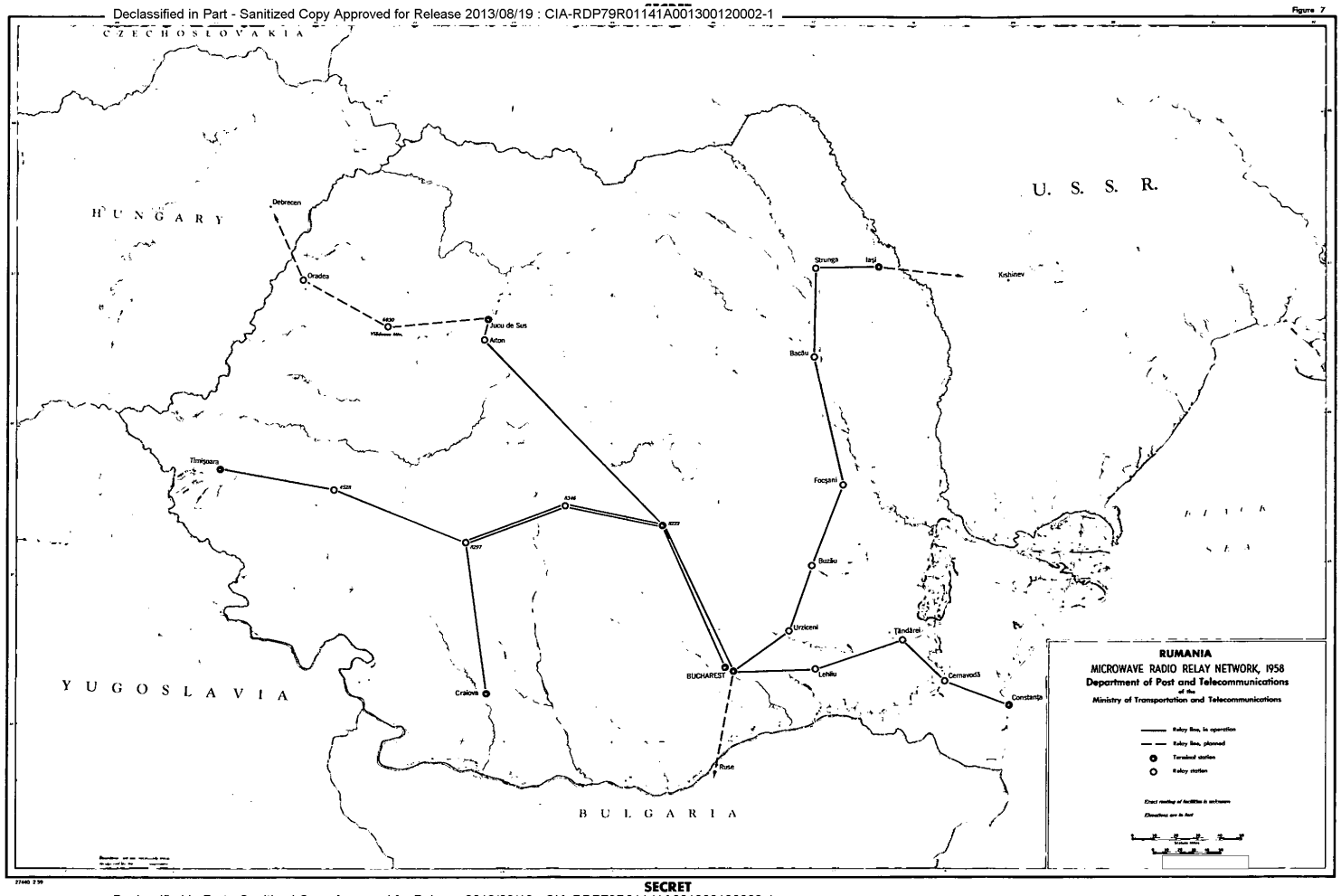
Although it is important to Rumania domestically, perhaps the real significance of the special telecommunications network in Rumania is its early indication of action taken by the USSR to establish a Soviet Bloc-wide integrated telecommunications system. In spite of a lack of direct correlation between the establishment of the special network and the establishment of OSS* (because one preceded the other by more than 5 years), the purposes and aims of the two show some striking similarities. It may well be that the experience gained by the USSR in initiating the establishment of this network was used in formulating the program for the establishment and operation of OSS.

2. Microwave.

The microwave radio relay network in Rumania, as shown on the accompanying map (see Figure 7**), is used to relay telephone traffic and radiobroadcasting programs between the major cities of the country. It functions as a public telecommunications facility but is incorporated into the special telecommunications network.*** The first lines of the microwave radio relay network were completed in 1955 between Bucharest and Cluj and between Bucharest and Timisoara and carry both telephone

* See II, p. 5, above.
** Following p. 38.
*** See 1, b, p. 36, above.

Figure 7



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traffic and radiobroadcasting programs. The lines between Bucharest and Craiova and between Bucharest and Constanta were completed in 1956 and 1957, respectively, and carry only telephone traffic. In 1958 the line between Bucharest and Iasi probably was completed. There were about 2,000 km of microwave radio relay lines in Rumania in January 1958. 38/

Equipment for this microwave radio relay network was imported from East Germany and Switzerland. East German microwave radio relay equipment having a capacity of 12 and 24 telephone channels is used on the Bucharest-Constanta and Bucharest-Craiova lines, whereas Swiss Brown-Boveri microwave radio relay equipment with a capacity of 12 telephone channels is used on the Bucharest-Cluj and Bucharest-Timisoara lines.

In the future the microwave radio relay network probably will be extended from Cluj to Oradea and from Bucharest to Giurgiu. The completion of these lines will allow connection of the Rumanian microwave radio relay network with similar networks of Hungary and Bulgaria. In addition to these extensions, the circuit capacity of the network probably will be increased so that it may handle increased volumes of telephone traffic and eventually relay television programs.

The expansion of the microwave radio relay network in Rumania is likely to be gradual because the present wireline and microwave radio relay networks in Rumania appear to be meeting the normal telecommunications service requirements of the country.

3. Point-to-Point Radio.

a. Domestic.

The domestic point-to-point radio network of the Department of Post and Telecommunications consists of 13 stations* which service most of the larger cities in Rumania. It has been used at times to carry telegraph traffic, but in recent years it has served only as a reserve facility. The network is not likely to be expanded or used for other than its present purposes. 39/

b. International.

The international point-to-point radio facilities of Rumania consist of two radio stations located at Urziceni and Bucharest.

* The point-to-point radio stations are located near Alba Iulia, Bucharest, Constanta, Craiova, Iasi, Oradea, Sanpetru, Sibiu, Suceava, Sulina, Timisoara, Tulcea, and Urziceni.

These stations, as shown on the accompanying map (see Figure 8*), provide radiotelegraph service to 25 countries and facsimile service to Moscow. International telephone service is handled over wirelines from Bucharest and is relayed through the major telecommunications centers of Europe. No major changes in the international point-to-point radio facilities of Rumania are expected. It is believed that these facilities will continue to meet requirements. 40/

VI. Broadcasting Services.

The broadcasting system of Rumania is composed of radiobroadcasting and wire-diffusion networks and a television station. The transmission base of this system, particularly that of the radiobroadcasting network, is sufficient to provide effective domestic and international service. Nevertheless, its domestic utility as a mass information medium is limited because of the inadequacy of the domestic broadcast reception base.**

In recent years, Rumania has substantially expanded its broadcast reception base. Since 1955 the average annual rate of growth in radiobroadcasting and wire-diffusion subscribers has been about 16 percent and 10 percent, respectively. In 1958 there were about 1 million radiobroadcast receivers and 675,000 wired loudspeakers in use.

Future plans for broadcasting in Rumania emphasize the development of a nationwide FM radiobroadcasting network. This network, which currently consists of two stations, will be expanded and designed for automatic operation. The completion of this network is not likely for many years.

A. Radiobroadcasting.

The radiobroadcasting network in Rumania is a mass information medium which provides effective and efficient domestic and international service. Domestic listeners can hear a minimum of one program with good reception, and foreign listeners can hear much of the international service with good reception. The locations of domestic and international radiobroadcasting transmitters in Rumania are shown on the accompanying map (see Figure 9*).

The transmission base of the radiobroadcasting network in Rumania has grown rapidly since 1948. The number of domestic AM transmitters has

* Following p. 40.

** Including radio receivers, wire-diffusion loudspeakers, and television receivers.

Figure 8

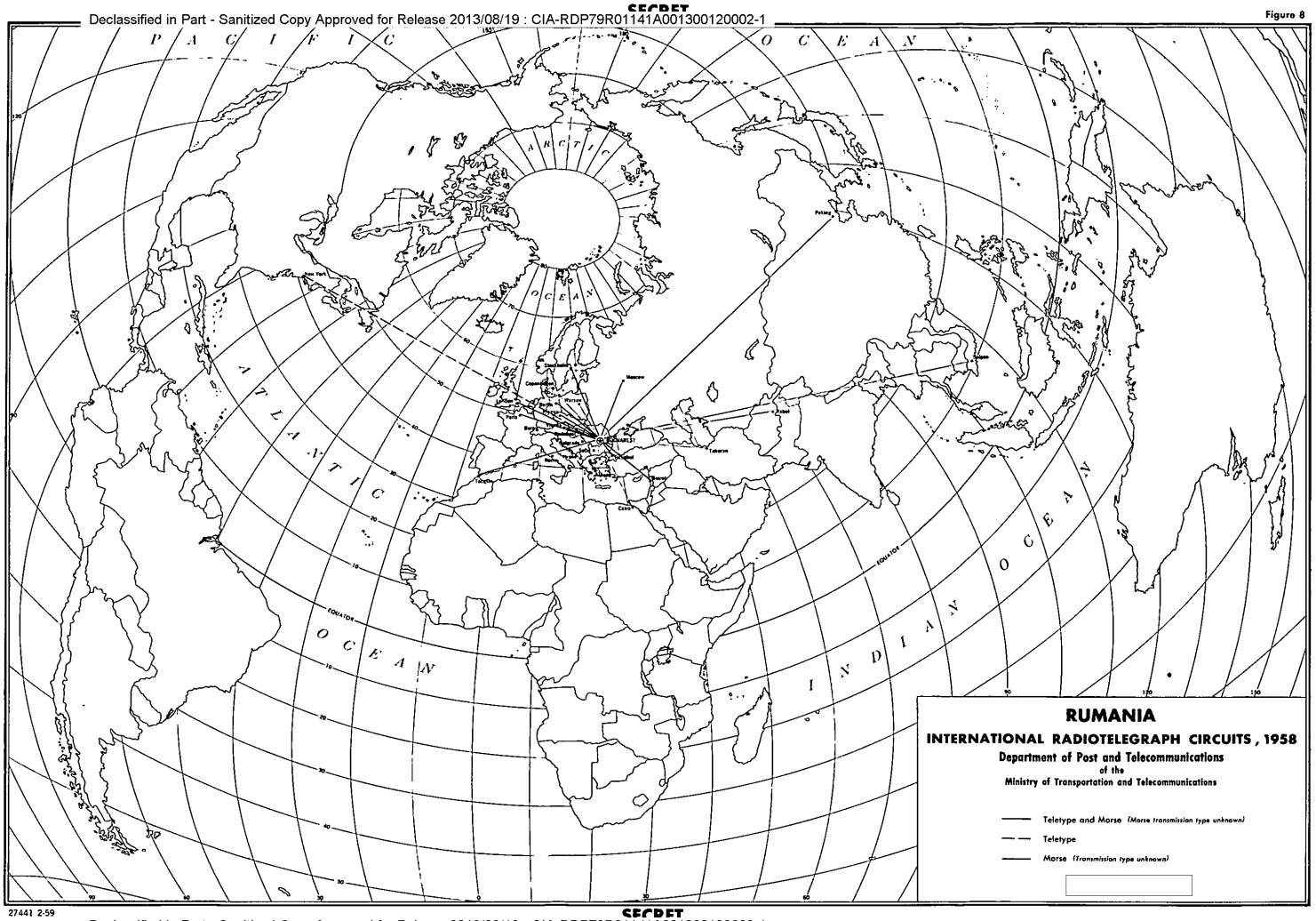

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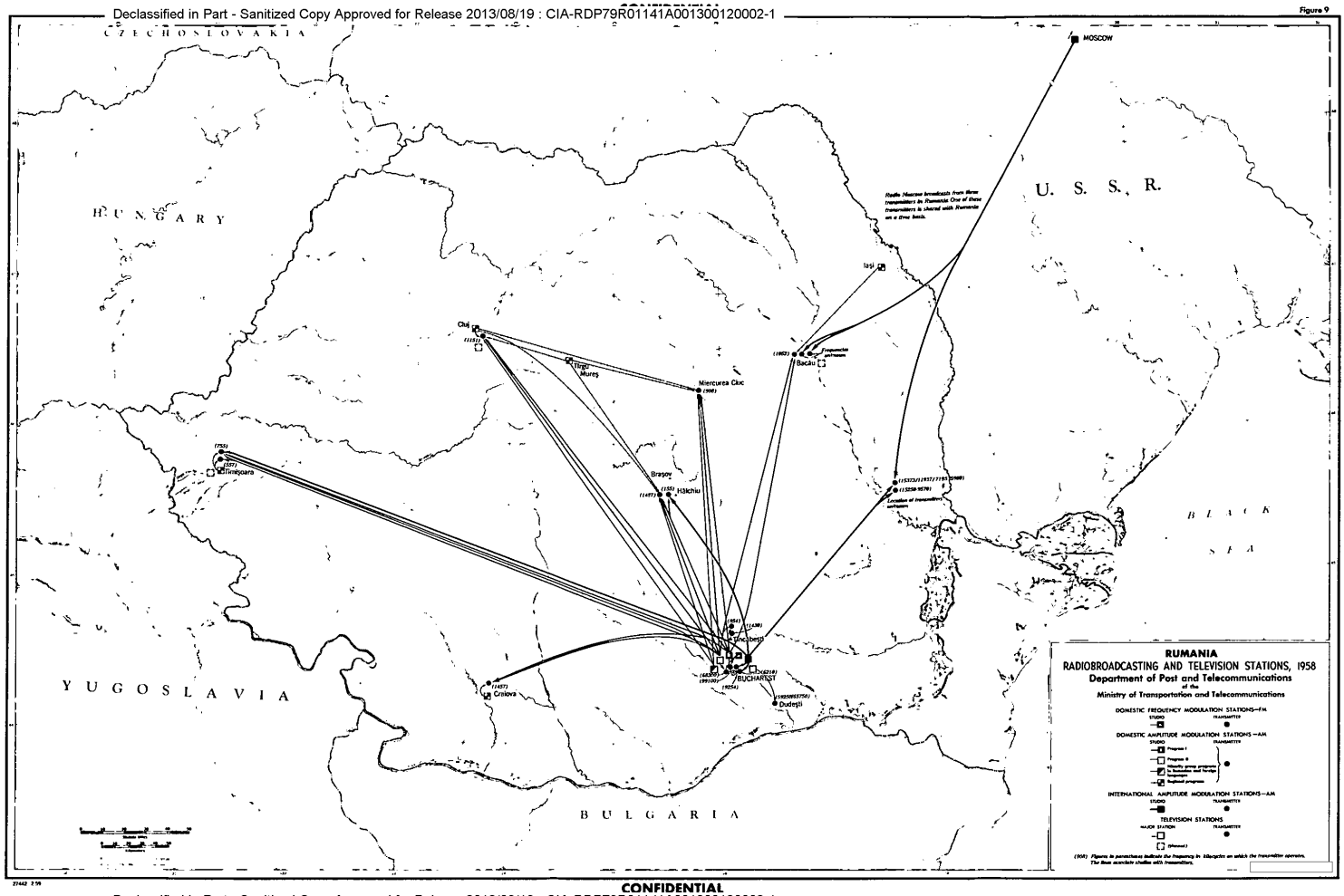
Figure 9



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more than tripled, from 3 transmitters with a total power of 167 kilowatts (kw) in 1948 to 10 transmitters with a total power of 582 kw in 1958. In addition, two FM transmitters provide radiobroadcasting service to the Bucharest area. 41/ The estimated number of radiobroadcasting transmitters in Rumania in 1958 is shown in Table 10.

Table 10

Estimated Location, Power, Frequency, and Type of Service of Radiobroadcasting Transmitters in Rumania a/ 1958

Location	Power (kilowatts)	Frequency (kilocycles)	Type of Service
Bacau	20	1,052	Domestic
Brasov	150	155	Domestic and International
Brasov	1	1,487	Domestic
Bucharest b/	50	15,373, 11,937, 7,195, or 5,980	International
Bucharest b/	50	15,250 or 9,570	International
Bucharest	4	9,254	International
Bucharest	5	6,210	International
Bucharest	150	854	Domestic
Bucharest	5	1,430	Domestic
Bucharest	Unknown	68,300	Domestic, frequency modulation (FM)
Bucharest	Unknown	99,100	Domestic, frequency modulation (FM)
Cluj	60	1,151	Domestic
Craiova	60	1,457	Domestic
Miercurea-Ciuc	5	908	Domestic
Timisoara	1	557	Domestic
Timisoara	130	755	Domestic and International

a. [redacted] All transmitters are amplitude modulation (AM) transmitters unless otherwise specified. 50X1
b. Denotes studio location; transmitter location unknown.

An unusual feature of the growth of the domestic radiobroadcasting transmission base in Rumania has been the independent development

of studios and transmitters. This development has had the effect of creating a radiobroadcasting network with most transmitters serviced by more than one studio. This unusual arrangement has resulted in an efficient and economical use of studio and transmitter facilities. In 1958 there were nine radiobroadcasting studios in Rumania.

The radiobroadcast reception base in Rumania is one of the lowest in the Soviet Bloc, but its annual rate of growth is among the highest. Growth of radiobroadcast subscribers in Rumania during 1950-58, as shown in Table 11,* has increased at a relatively constant rate and, with the exception of 1953 and 1954, has averaged about 16 percent per year. The decrease in the annual rate of growth for 1953 and 1954 was related to the general economic crisis in Rumania at that time.

The distribution of radiobroadcast subscribers is much denser in urban than in rural areas. In 1958, more than 73 percent of all subscribers were urban, but this skewed distribution is not unusual for underdeveloped areas such as Rumania. 43/

The Ministry of Education and Culture prepares all radiobroadcasting programs in Rumania. Included in these are two national programs (Home services), which emphasize cultural and doctrinal matters, and several regional service and minority group programs, which stress matters primarily of interest to regional and minority groups. The radiobroadcasting studios at Cluj, Craiova, Iasi, Timisoara, and Tirgu Mures prepare the regional service programs. In addition, three of these studios -- Cluj, Timisoara, and Tirgu Mures -- also prepare minority group programs for broadcasting in the Hungarian, Serbian, and German languages. These programs supplement the Hungarian and German minority group language programs prepared for broadcasting by the Bucharest studio.

The international radiobroadcasting service of Rumania compares favorably with that of Czechoslovakia, Hungary, and Poland in number of programs broadcast and in terms of transmitter power. Studios in Bucharest prepare international programs for broadcasting in 12 languages to Europe, the Middle East, and the Americas. Six transmitters -- 4 high-frequency, 1 medium-frequency, and 1 low-frequency -- constitute the transmission base of the service. The medium-frequency and low-frequency transmitters, however, are used primarily to provide domestic service. There are four high-frequency transmitters -- two of 50 kw, one of 5 kw, and one of 4 kw. The two 50-kw transmitters are modern, efficient transmitters and were placed in service in 1953 and 1954. These transmitters are directly responsible for the effectiveness of Rumania as an international radiobroadcaster. The low

* Table 11 follows on p. 43.

Table 11

Estimated Number of Broadcast Reception Points
in Rumania a/
1950-58

Thousand Units

	1950	1951	1952	1953	1954	1955	1956	1957	1958
Radiobroadcast subscribers	300 b/	350 c/	410 d/	465 c/	560 e/	654 b/	768 b/	885 b/	1,031 f/
Wire-diffusion subscribers	13 b/	30 g/	90 h/	190 i/	330 j/	510 b/	557 b/	615 k/	675 l/
Television receivers	0	0	0	0	0	Negligible	Negligible	8 m/	17 n/
Total	313	380	500	655	890	1,164	1,325	1,508	1,723

a. All data are rounded to the nearest thousand units.
b. 44/
c. 45/
d. 46/
e. Extrapolated by applying the absolute increase of 47,500 radiobroadcast subscribers shown during the first half of 1954 to the last half of the year. 47/
f. Extrapolated by applying the average annual rate of growth of 16.5 percent shown during 1955-57.
g. 48/
h. 49/
i. 50/
j. 51/
k. 52/
l. Extrapolated by applying the absolute increase of 15,000 wire-diffusion subscribers shown during the first quarter of 1958 to the remaining three quarters of the year. 53/
m. 54/
n. Extrapolated by applying the absolute increase of 4,500 television receivers shown during the first half of 1958 to the last half of the year. 55/

power of the 4-kw and 5-kw transmitters minimizes their value. Their continued operation in the international radiobroadcasting service probably helps to maintain a specified minimal quota of hours of international radiobroadcasting as a "socialist responsibility." These low-powered transmitters, which are relatively inexpensive to operate, may provide the means whereby Rumania can meet this responsibility at minimal cost. The power of all international radiobroadcasting transmitters in Rumania and an example of their broadcasting schedule by language and target area for November 1958 are shown in Figure 10.* 50X1

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Besides maintaining and operating transmitters for its own international radiobroadcasting service, Rumania also operates and maintains two transmitters at Bacau for the relay of international programs of Radio Moscow. These transmitters, each with a power of 120 kw, were built and installed by the USSR in 1952.

Future plans emphasize the expansion and improvement of radiobroadcasting service in Rumania. These plans not only stress the need for improving the quality of both domestic and international broadcasting services but also the need for expanding the radiobroadcast reception base of the country. Also, Rumania plans to develop a nationwide FM network. This network is to consist of a number of remotely controlled FM transmitters operated by one studio in Bucharest. It is supposed that this technique will minimize the cost of establishing and operating the network.

B. Television.

Television service in Rumania is a recent development. In 1958 it was available only in the Bucharest area. The Bucharest station began operation on 1 January 1957 and currently provides regular service 5 evenings per week. In the next few years, Rumania plans to establish television stations at Cluj, Bacau, and Timisoara. The microwave radio relay lines between Bucharest and these cities probably will be used to relay television programs. 57/

The major obstacle to rapid development of television service in Rumania is the lack of domestic production of either television

* Following p. 44.

** Ruble values in this report are expressed in 1957-58 rubles and may be converted to US dollars at the official rate of exchange of 4 rubles to US $1. This rate of exchange, however, does not necessarily reflect the true dollar value.

Figure 10

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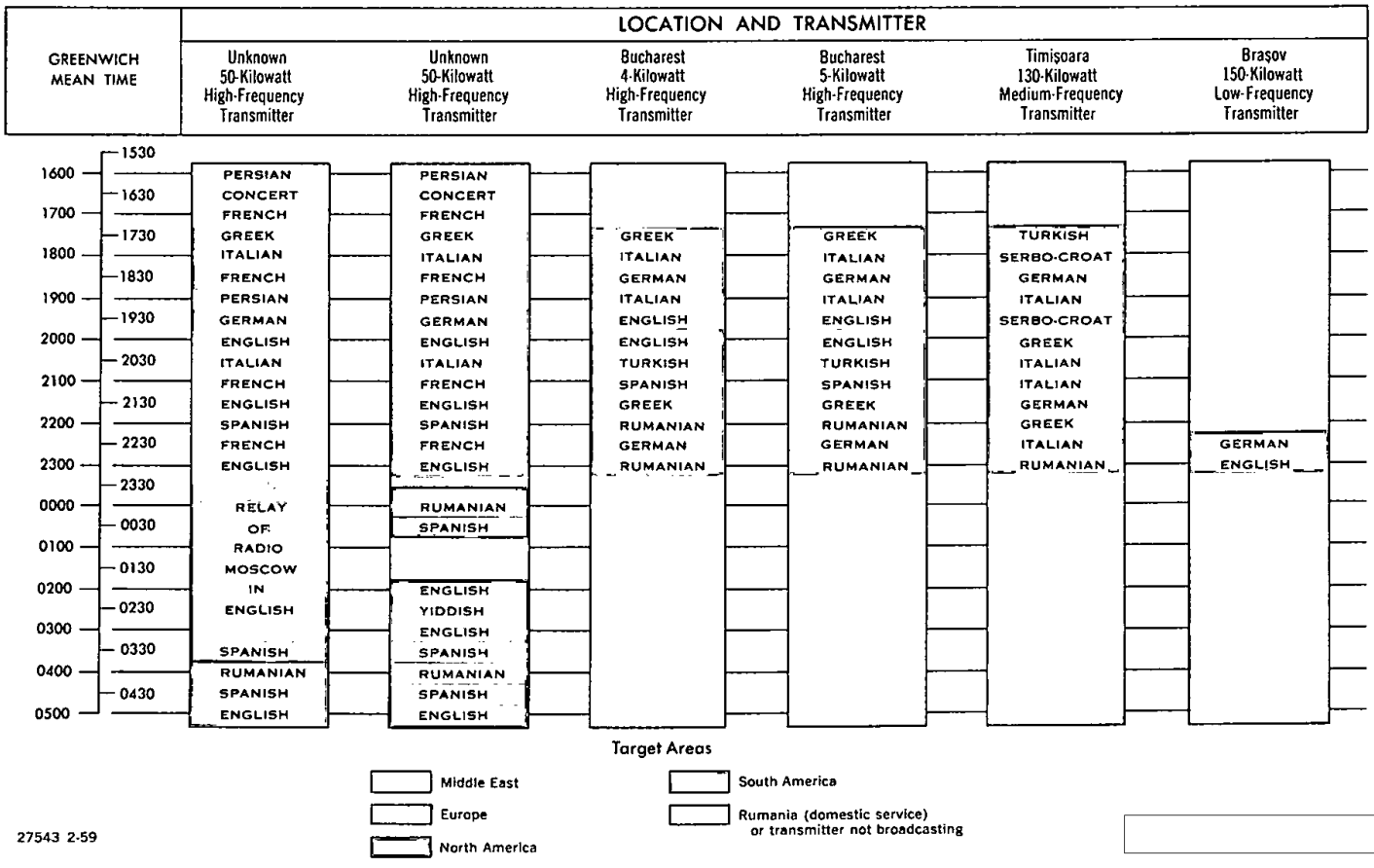
RUMANIA

TRANSMITTER SCHEDULE OF INTERNATIONAL RADIOBROADCASTING SERVICE

By Language and Target Area, November 1958



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transmitters or television receivers. The television transmitter in use at the Bucharest station was imported from the USSR, and the transmitters for the planned stations at Cluj, Bacau, and Timisoara probably will be imported from Czechoslovakia and the USSR. All television receivers now in use were imported from East Germany and the USSR. In spite of future plans which call for the domestic production of television receivers, it is believed that expansion of the television reception base of the country will depend on continued importation. The television reception base in Rumania is shown in Table 11.*

C. Wire Diffusion.

Rumania has an extensive wire-diffusion network. It was originally started in 1949 and by the end of 1958 comprised over 675,000 wire-diffusion subscribers. This figure represents about 40 percent of the total broadcast reception base of the country. The growth in the number of wire-diffusion subscribers in Rumania during 1950-58 is shown in Table 11.

Before 1956 the wire-diffusion network provided service primarily for urban subscribers. In 1956, Rumania began to expand the wire-diffusion network to the rural areas of the country. By the end of 1957, rural subscribers represented 36 percent of the total. 58/

The wire-diffusion network is patterned after that of other countries of the Sino-Soviet Bloc. Home service and regional radiobroadcasting programs are transmitted primarily by telephone wirelines to wire-diffusion centers throughout the country. From these centers, programs are retransmitted by wire to individual wired loudspeakers.

The Rumanian wire-diffusion network is an effective broadcasting medium for domestic propaganda. By its very nature it assures the government of a captive audience and thus becomes an instrument through which the living as well as the listening habits of this audience can be conditioned and controlled.

Continued growth of wire-diffusion services and facilities can be expected. In the past this growth has been facilitated by the consolidation of smaller wire-diffusion centers into larger centers. This development increased the number of localities serviced by a single center, thus effecting more efficient and less costly

* P. 43, above.

operation. In 1951 there were 80 wire-diffusion centers servicing 88 localities, and in 1958 there were 463 wire-diffusion centers servicing 1,270 localities. 59/

Plans for the future development of the Rumanian wire-diffusion network emphasize the complete automatization of the network through the installation of remote-control apparatus. In preparation for this development, recently constructed wire-diffusion centers have been grouped in pairs. After the necessary equipment is installed, these pairs will be grouped with other pairs until the network is entirely automatized. 60/

VII. Future Trends.

Since 1950, there has been considerable growth in the services and facilities of the post and telecommunications system of Rumania. Currently, this system is capable of meeting the minimal needs of the country. Future plans call for the continued growth of the system. In this respect, however, future efforts will place primary emphasis on the expansion and improvement of the telecommunications portion of the system, and little effort will be directed toward improving or expanding the postal portion.

Although available information on future plans of the Department of Post and Telecommunications is limited, indications are that the Department will pursue the following major courses of action:

1. Expand rural telephone service through the continued expansion and improvement of the local and interurban telephone networks.

2. Continue to expand microwave radio relay facilities for transmission of additional volumes of interurban telephone traffic and possibly for the transmission of network television.

3. Improve the domestic broadcasting transmission and reception base, including the further development and expansion of the wire-diffusion, television, and FM networks.

4. Expand TELEX facilities.

5. Complete the special telecommunications network by 1960.

6. Continue to play an active role in OSS. With respect to OSS activities, it has been revealed that thus far Rumania shares with other member nations of this organization the responsibility for the maintenance of research programs on the use of semiconductors and

miniature parts in telecommunications equipment, the development of systems and instruments for color television, and the development of systems and instruments for microwave radio relay lines. It is likely that other actions under OSS are being taken or will be taken by Rumania.

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.

Band (of frequencies): The entire range of frequencies between two numerically specified frequency limits. The magnitude of this range is a limiting factor on the amount of information that can be transmitted in telecommunications. With respect to frequencies of the radio spectrum as a whole, the International Telecommunication Union has for convenience divided the whole radio spectrum into eight major bands, as follows:

Frequency Bands		
Range	Type	Corresponding Wave* Band
30 kc** and below	Very low frequencies (VLF)	Myriametric waves
30 to 300 kc	Low frequencies (LF)	Kilometric waves
300 to 3,000 kc	Medium frequencies (MF)	Hectometric waves
3,000 to 30,000 kc	High frequencies (HF)	Decametric waves
30,000 kc to 300 mc***	Very high frequencies (VHF)	Metric waves
300 to 3,000 mc	Ultra high frequencies (UHF)	Decimetric waves****
3,000 to 30,000 mc	Super high frequencies (SHF)	Centimetric waves****
30,000 to 300,000 mc	Extremely high frequencies (EHF)	Millimetric waves****

* Waves are undulating disturbances: a sound wave is a disturbance in the air, which is an elastic medium, and an electric wave is a disturbance in any medium whatever. The number of waves per second is the frequency of a given wave. Because the speed of wave propagation is considered to be constant, the length of a given wave is in inverse relation to its frequency: the longer the wave length, the lower the frequency, and the shorter the wave length, [footnotes continued on p. 50]

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.

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the higher the frequency. Wave length is usually measured in linear units of the metric system.

** Kilocycles per second, or 1,000 cycles per second.

*** Megacycles per second, or 1 million cycles per second.

**** It is becoming common usage to refer to waves (frequencies) in these three bands as "microwaves."

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 or 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."

Feeder (as an adjective): Of or pertaining to telecommunications facilities of relatively low capacity which join facilities of relatively high capacity. (See Main.)

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

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.

Group: A number of channels (usually 12) or subchannels combined (multiplexed) electrically in building up the total capacity of a telecommunications circuit, lane, or supergroup.

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. (See Feeder.)

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. (See Band.)

Mobile (as an adjective): Of or pertaining to a telecommunications facility which is intended to be operational while in motion or during halts at unspecified points. (See Portable.)

Modulation: The process of altering a carrier frequency or carrier pulses by other frequencies or pulses representing the information being transmitted.

Multiplex (as an adjective): Of or pertaining to the combining of information signals, modulated or unmodulated, of two or more lanes, supergroups, groups, channels, or subchannels for transmission over the same circuit.

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.

Portable (as an adjective): Of or pertaining to a telecommunications facility which can be readily moved from place to place but is not normally operational while in motion. (See Mobile.)

Private (as an adjective): Belonging to or concerning an individual person, organization, institution, or activity; not public or common.

Pulse: A spurt of electrical energy of extremely short duration (usually measured in millionths of a second), yet capable of being used in telecommunications to transmit information.

Quad: In a multiconductor telecommunications cable, the physical association of a group of 4 conductors in any one of various arrangements for the purpose of providing 2-way multichannel operation.

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

Route: The geographical path followed by a wire, cable, or radio line.

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. (See Band.)

Subchannel: A portion, electrical or physical, of a telecommunications channel which can be used independently of and simultaneously with all other portions. An appreciable number of telephone channels can usually be subchanneled to carry from three to twenty 60-word-per-minute teletype subchannels on each telephone channel so employed.

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

Supergroup: A number of groups (often five) combined (multiplexed) electrically in building up the total capacity of a telecommunications circuit or lane.

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.

Transistor: A modern device which is capable of performing in a solid (germanium or silicon) many of the functions performed by the conventional electronic tube in a gas or vacuum.

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

METHODOLOGY

The statistical data in this report were developed in large part from information contained in the 1957 and 1958 statistical yearbooks for Rumania. [redacted] 50X1

The validity of the data presented was checked by analysis of interrelationships that are known to exist among the various statistical series and by analogy with other Soviet Bloc countries.

The specific methodology used in the determination of each statistical series [redacted] is contained in the footnotes to the tables. 50X1

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Figure 4

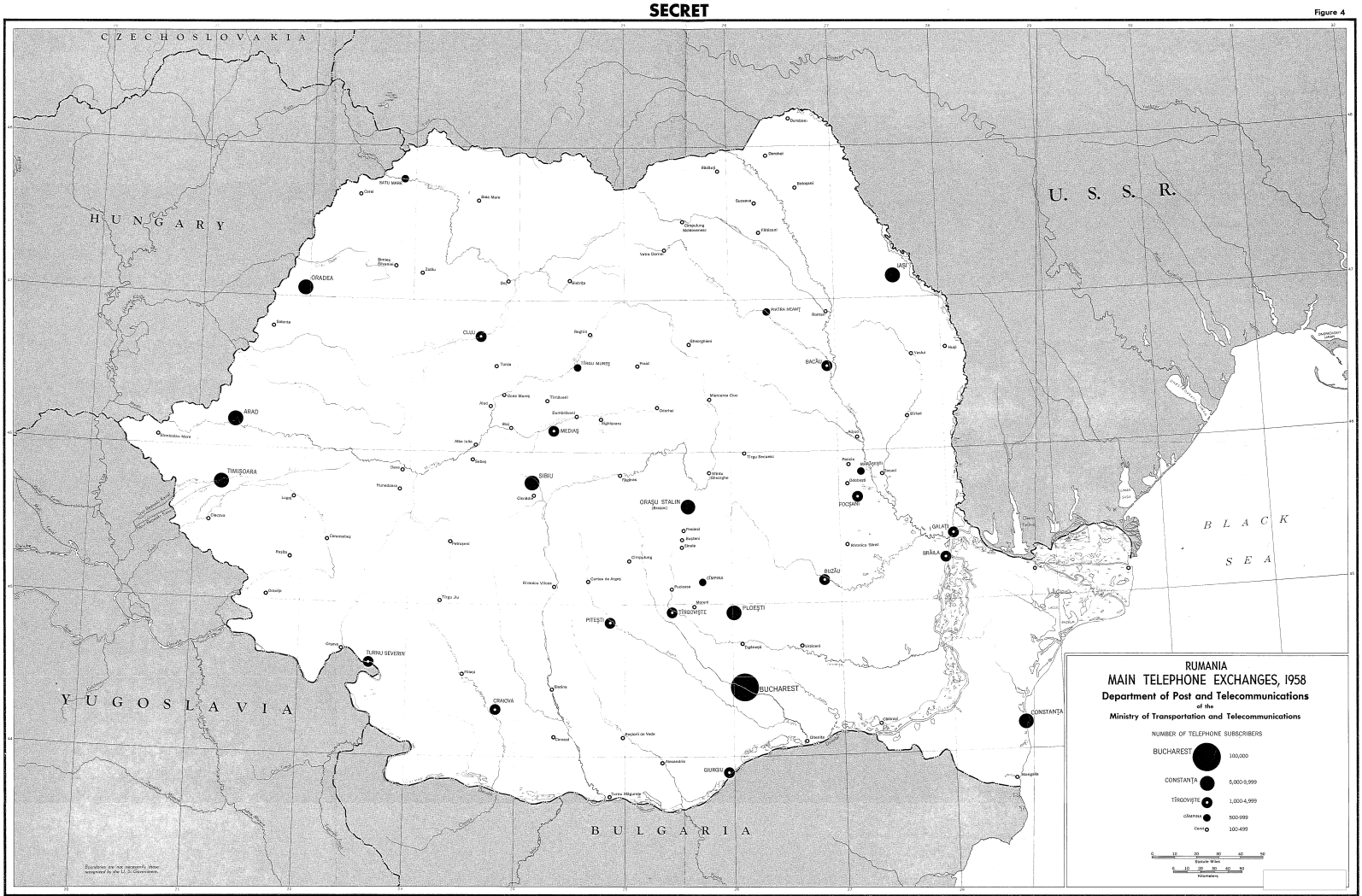

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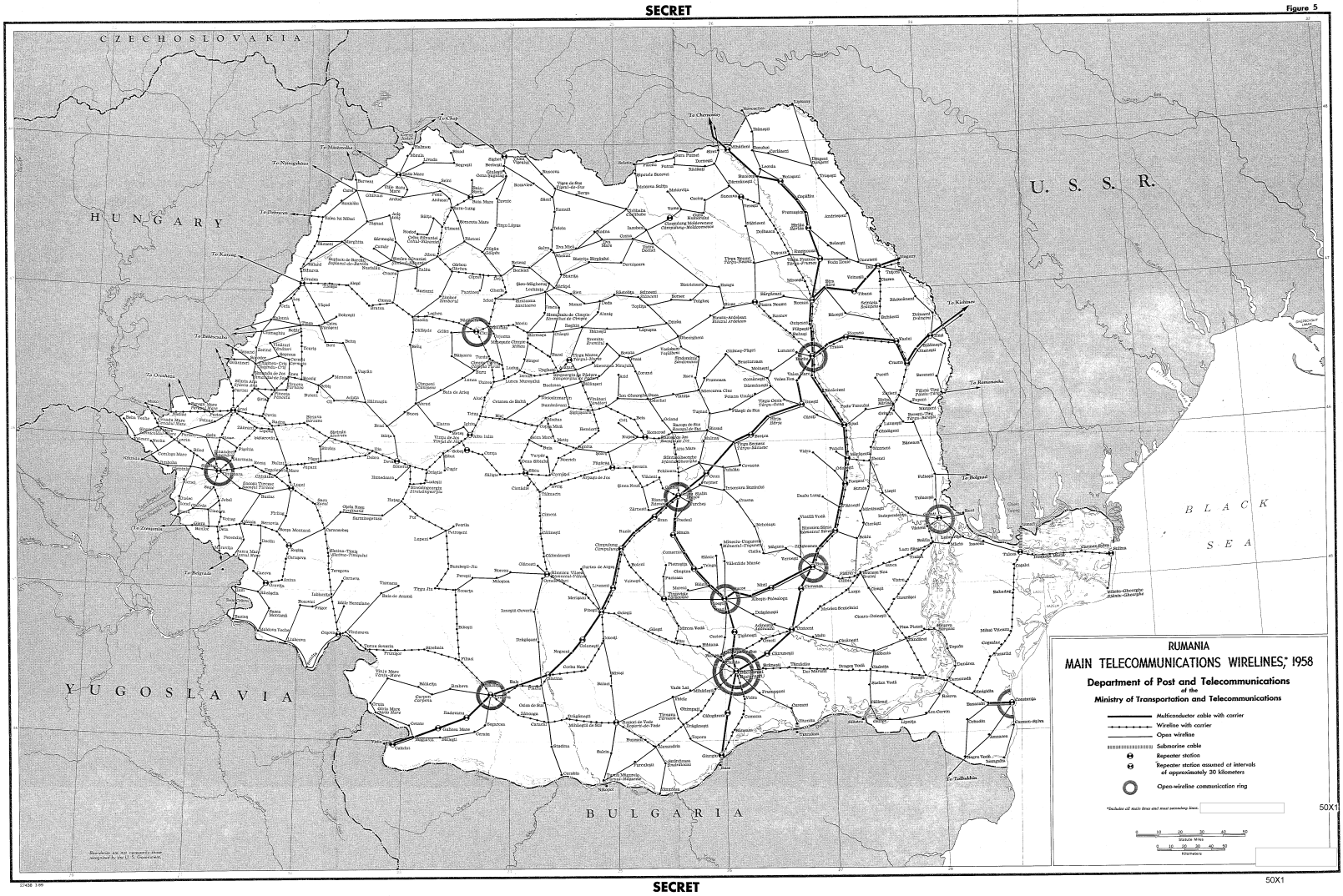
Figure 5



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