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No. 53

ECONOMIC INTELLIGENCE REPORT

**POST AND TELECOMMUNICATIONS SERVICES
IN BULGARIA
1950-58**



CIA/RR 59-26
July 1959

**CENTRAL INTELLIGENCE AGENCY
OFFICE OF RESEARCH AND REPORTS**

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FOREWORD

This report is concerned with those post and telecommunications facilities and services in Bulgaria operated and controlled by the Directorate of Communications of the Ministry of Transportation and Communications. These facilities and services are used by the armed forces, other ministries, and other directorates of the Ministry of Transportation and Communications as well as by the public. Excluded from this report, however, are many functional telecommunications systems operated independently by other segments of the government, such as the armed forces, service industries, and manufacturing industries.

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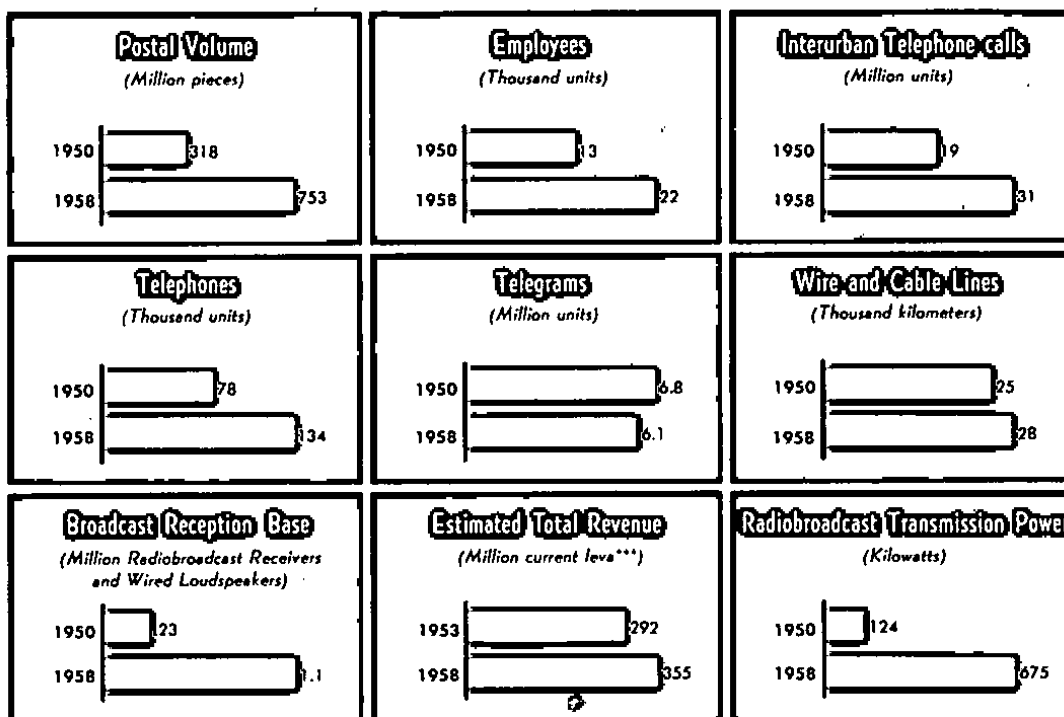
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POST AND TELECOMMUNICATIONS SERVICES IN BULGARIA*
1950-58

Summary and Conclusions

The public** post and telecommunications system in Bulgaria barely provides sufficient service to meet the demands of the predominantly agrarian economy. The system is overburdened because its growth has not kept pace with the growth of the national economy. This situation possibly will improve in the future, inasmuch as investment funds for the post and telecommunications system during the Third Five Year Plan (1958-62) are planned to be 57 percent greater than those during the Second Five Year Plan (1953-57). Statistical measures of the development of the system are as follows:



* The estimates and conclusions in this report represent the best judgment of this Office as of 1 May 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 Ministry of Post and Telecommunications (Ministerstvo na Poshti, Telegrafi, i Telefoni) from 1950 to January 1957 and by the Directorate of Communications (Upravlenie Suobshteniya) of the Ministry of Transportation and Communications (Ministerstvo na Transporta i Suobshteniya) from January 1957 through 1958.

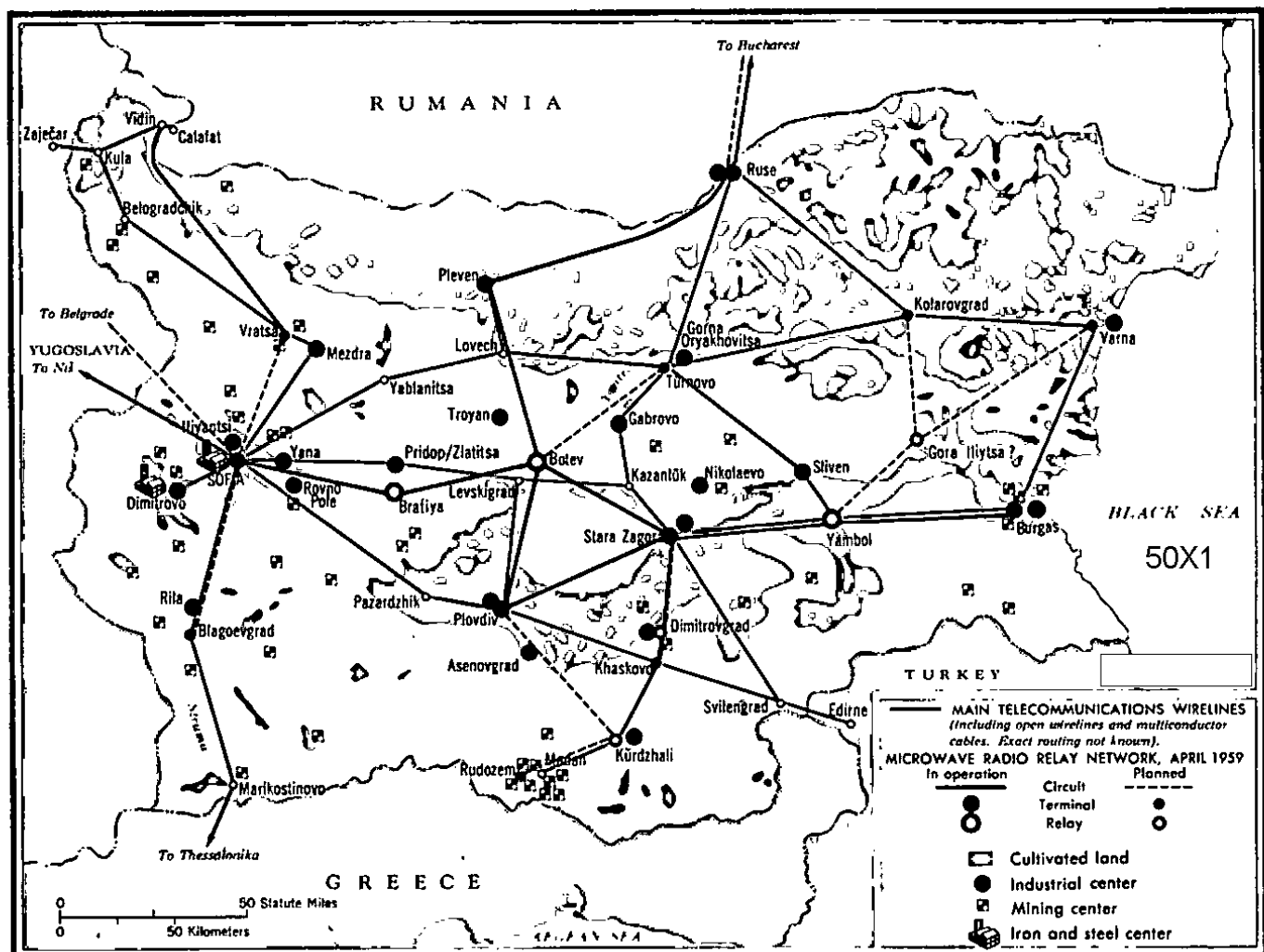
*** Except where otherwise indicated, lev values in this report are expressed in terms of current leva and may be converted to US dollars at the official rate of exchange of 6.8 leva to US \$1. This rate of exchange, however, does not necessarily reflect the true dollar value.

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The rate of growth in total revenue from 1953 to 1958, which increased at an annual rate of 4 percent,* approximates the over-all rate of growth of service volumes from 1950 to 1958. Behind this over-all growth, however, noteworthy differences exist among the various service volumes. The radiobroadcast reception base increased at an average annual rate of 21 percent, but the number of telegrams sent decreased slightly. The rate of growth in postal volume was about 11 percent per year, whereas the rate of growth in interurban telephone calls was approximately 6.5 percent.

The accompanying map, Figure 1, shows the geographical relationship of main telecommunications facilities to major economic activities of the country. The main telecommunications wirelines, which



BULGARIA: ECONOMIC ACTIVITY, 1958

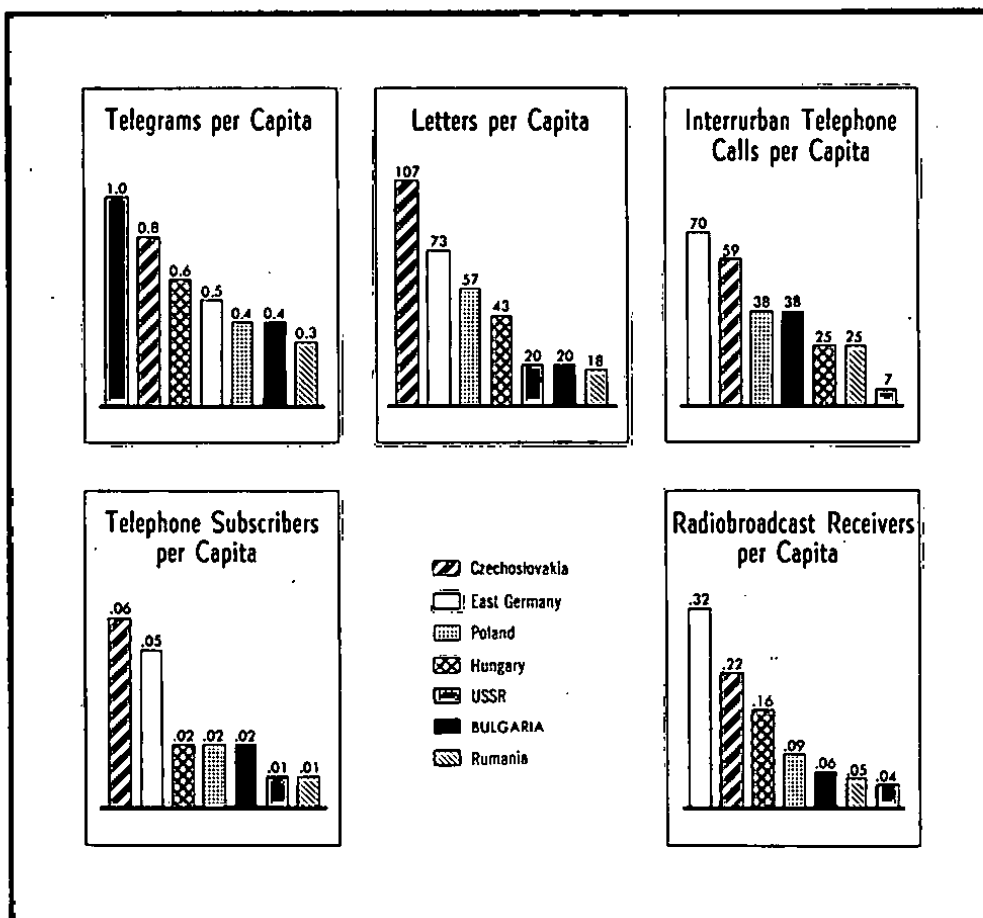
* All average annual rates of growth expressed in this report were computed on a compound interest basis.

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are old and poorly maintained, carry the bulk of telecommunications traffic. In the future the microwave radio relay network will be expanded to carry a greater portion of this traffic, but the expansion will not be sufficient to offset the negative effects of the poor wireline network on the development of the telecommunications system of Bulgaria.

A comparison of the post and telecommunications sector of the economy of Bulgaria with that of other Bloc countries for 1957 is shown below:



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Bulgaria compares favorably in service per capita with several other Bloc countries but compares unfavorably in several other equally significant aspects, such as efficiency, reliability, and extent of automation.

The future trend of the public post and telecommunications services of Bulgaria has been outlined by the Organization for Cooperation Among the Socialist Countries in the Fields of Post and Communications (OSS). This organization, composed of all Sino-Soviet Bloc countries, was created through the initiative of the USSR in 1958 to integrate and to improve post and telecommunications facilities and services within and among member countries. As contemplated under OSS planning, Bulgaria probably will establish an extensive microwave radio relay network by 1965 and will automatize telephone service by 1975. Although these programs are ambitious and will be costly for Bulgaria, it is likely that they will be implemented, under Soviet pressure if necessary.

I. Introduction.

The purpose of this report is to describe, measure, and evaluate the public post and telecommunications facilities and services of Bulgaria that are managed by the Directorate of Communications of the Ministry of Transportation and Communications.

The area of Bulgaria is about 43,000 square miles, slightly smaller than the State of Pennsylvania. It measures about 280 miles from east to west and 150 miles from north to south. The weather generally is mild, tending toward "continental" in the north and toward "mediterranean" in the south. The mountain ranges, which coincide with the borders of Yugoslavia and Greece and bisect the country from east to west, are crossed by many routes. The dimensions of the country, the character of the weather, and the topography of the mountain ranges present no serious obstacles to the construction and maintenance of postal routes and telecommunications lines.

The population of Bulgaria in 1958 was 7.8 million. More than 70 percent of these people live and work in rural areas. The population density is the lowest of the European Satellites, excluding Albania. The literacy rate is one of the highest in the Balkans, and the ethnic composition of the population is about 92 percent Bulgarian. These factors afford the basis for good mass communication by common language.

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The economy of Bulgaria is based preponderantly upon agriculture, in spite of attempts to establish a heavy industrial base during the revised First Five Year Plan (1949-52) and Second Five Year Plan (1953-57). Since 1956, however, the development of agriculture and of industry more appropriate to the resources of Bulgaria has been emphasized. The effect of this development was a rapid growth in national income, particularly in 1957. This rapid growth has multiplied the problems of the Ministry of Transportation and Communications in keeping abreast of the requirements for telecommunications service by the expanding economy. 1/*

II. Ministry of Transportation and Communications.

A. Organization.

1. Internal.

The public post and telecommunications facilities of Bulgaria are owned by the state and are operated by the Directorate of Communications of the Ministry of Transportation and Communications. The Directorate provides domestic and international telephone, telegraph, broadcasting, and postal services. The chart, Figure 2,** shows that the Directorate functions through four line Departments of Post, Telephone, Telegraph, and Radio. These departments are supported by several staffs. In addition to the line and staff components, the Directorate operates a school, the Post, Telephone, and Telegraph (PTT) Institute; a research and development component, the PTT Laboratories; and a repair component, the PTT Repair Shop.

The present departments have existed since the 1930's. Changes in organization have not affected significantly the internal structure of these departments. The most recent change in organization occurred in January 1957, when all post and telecommunications activities were placed under the Ministry of Transportation and Communications, an arrangement similar to that which existed in 1935. This and earlier changes probably have improved the performance of the departments by effecting economies through the consolidation of separate departmental staffs into merged ministerial staffs.

The formal organization of the Directorate of Communications probably will not be changed by plans announced by the central committee of the Communist Party in January 1959 for radical reorganization of the

** Following p. 6.

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political and economic structure of the country. The pattern of post and telecommunications services, however, probably will be altered if the plans for radical reorganization are implemented. Already, consolidation of cooperative farms has necessitated a rearrangement of telephone and telegraph wireline facilities in rural areas. Also, if the responsibility for cultural and political life is placed under the jurisdiction of local organs, there may be brought about a sudden increase in the broadcast reception base for rural areas and a shift in the responsibility for postal delivery to cooperative farms.

The provision of broadcasting service is shared between the Directorate of Communications and the Ministry of Culture. The Directorate is responsible for providing and maintaining broadcasting facilities, whereas the Ministry of Culture is responsible for preparing and monitoring broadcast programs. 2/

2. International.

The structure of the post and telecommunications system in Bulgaria is influenced by international as well as by internal considerations. Foremost among the international considerations is a recent movement, initiated by the USSR, to bring about a unified post and telecommunications system in and among Sino-Soviet Bloc countries. The mechanism created to coordinate and supervise this movement is the Organization for Cooperation Among the Socialist Countries in the Fields of Post and Communications (OSS). Apparently OSS is not part of the Council for Mutual Economic Assistance (CEMA), but it bears a relationship to CEMA, even though the extent of this relationship is not known. Unlike CEMA, OSS membership includes Communist China, Mongolia, North Korea, and North Vietnam as full member countries.

The plans of OSS for the Sino-Soviet Bloc countries are to establish a Bloc television network by 1965, to expand telegraph traffic between Bloc countries, and to automatize Bloc telecommunications facilities by 1975. Provision for these OSS objectives is included in the Bulgarian Third Five Year Plan (1958-62). Implementation of the plans will improve and increase communications lines within Bulgaria and between Bulgaria and the other countries of the Bloc and also will increase the military communications of Bulgaria because public facilities are used by the armed forces and can be wholly commandeered in emergencies.

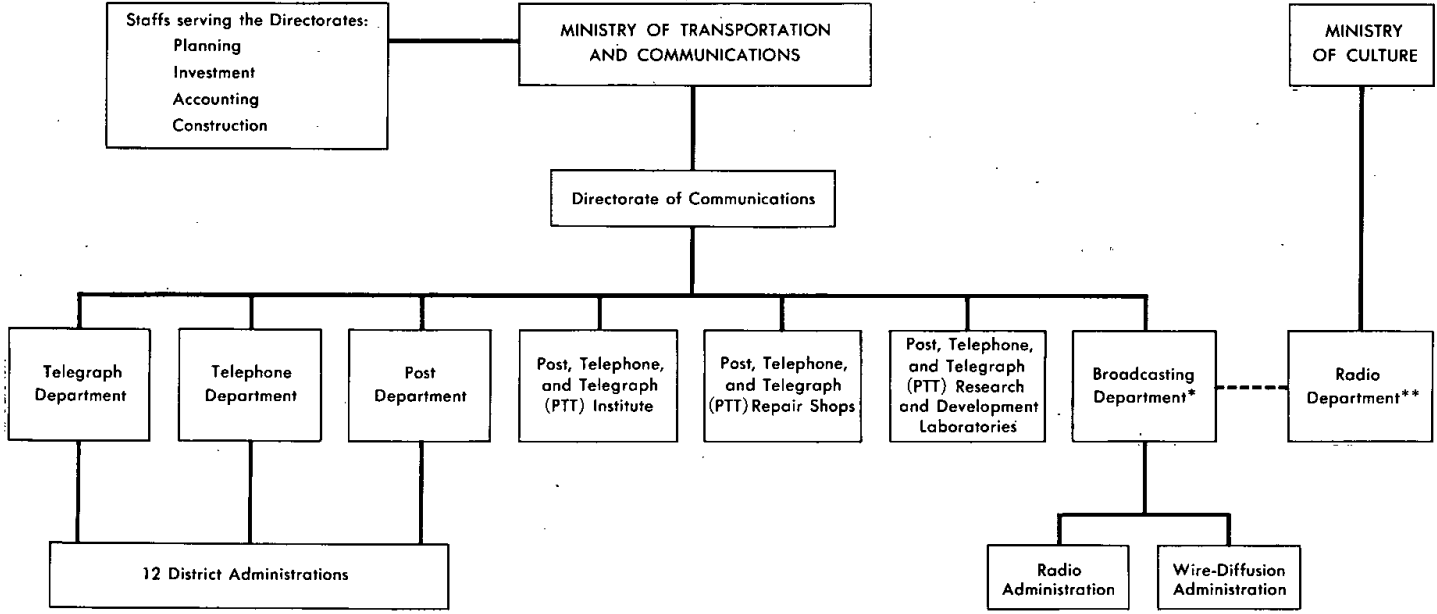
In the over-all Bloc program for integration and standardization of post and telecommunications facilities, CEMA plays an important part in the assignment of programs for the development and the production of telecommunications equipment among the various countries

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Figure 2 50X1

BULGARIA ORGANIZATION OF THE DIRECTORATE OF COMMUNICATIONS OF THE MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, 1958



*The Broadcasting Department provides the facilities for the transmission and relay of radio, wire-diffusion, and television programs.
**The Radio Department of the Ministry of Culture prepares and monitors radio, wire-diffusion, and television programs.



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of the Sino-Soviet Bloc. The Commission for Electronics in Section IX of CEMA is the working group that examines types of equipment for their applicability to the telecommunications needs of the Bloc. Although these activities of CEMA are largely in the preliminary stages, they foreshadow the future course of Bloc cooperation and interdependence.

To a lesser extent, other international organizations affect the post and telecommunications system of Bulgaria. The International Broadcasting Organization (OIR), an organization dominated by the Sino-Soviet Bloc, considers problems of common concern and sponsors cooperative action. For example, the planned television network, OIR-Vision, which includes the countries of the Sino-Soviet Bloc, Yugoslavia, Finland, and the United Arab Republic, is a cooperative endeavor sponsored by OIR. Bulgaria also is a member of the International Telecommunications Union (ITU) and the Universal Postal Union (UPU), both specialized agencies under the Economic and Social Council (ECOSOC) of the UN. These organizations establish technical standards for international communications facilities, determine prices for international services, and provide a forum for the consideration of problems of international concern. OSS has assumed for the Sino-Soviet Bloc many of the functions performed by ITU and UPU for the whole world. 3/

B. Revenue.

Total revenue from public post and telecommunications services in Bulgaria increased at an average annual rate of 4 percent from 1953 to 1958 (shown in Table 1*). This modest rate of growth resulted primarily from an average annual rate of growth of telephone revenue of only about 3 percent from 1953 to 1958. Growth in broadcasting revenue averaged about 13 percent per year from 1953 to 1958, and growth in postal revenue averaged about 4 percent per year during the same period. The rate of growth of telegraph revenue, however, decreased about 1 percent per year from 1953 to 1958.

In relation to over-all economic activity, the growth of public post and telecommunications revenue fell behind the growth of national income, as follows:

	1953 = 100				
	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Index of national income 4/	98	107	109	126	135
Index of post and telecommunications revenue**	105	107	107	115	122

* Table 1 follows on p. 8.

** Computed from data in Table 1, p. 8, below.

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Table 1
Estimated Total Revenue of Public Post
and Telecommunications Services in Bulgaria a/
1953-58

	Million Current Leva					
	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Postal revenue b/	87.4	91.6	93.3	93.8	100.6	106.4
Telecommunications revenue c/	<u>204.1</u>	<u>214.0</u>	<u>217.9</u>	<u>219.0</u>	<u>234.9</u>	<u>248.2</u>
Telephone d/	161.5	169.2	170.2	166.8	177.4	185.3
Interurban	128.4	131.9	134.1	126.7	135.1	141.3
Local e/	33.1	37.3	36.1	40.1	42.3	44.0
Telegraph f/	17.9	17.6	17.1	16.9	16.8	17.0
Broadcast	24.7	27.2	30.6	35.3	40.7	45.9
Radiobroadcasting	12.7	13.4	15.1	18.2	22.3	27.5
Wire diffusion g/	12.0	13.8	15.5	17.1	18.4	18.4
Total post and telecommunications revenue	<u>291.5</u>	<u>305.6</u>	<u>311.2</u>	<u>312.8</u>	<u>335.5</u>	<u>354.6</u>

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 1953 to January 1957 and by the Directorate of Communications of the Ministry of Transportation and Communications from January 1957 through 1958. All data are rounded to the nearest hundred thousand leva.

b. Estimated on the assumption that postal revenue comprised 30 percent of total revenue. This estimate was based on fragmentary information [redacted] and on analogy with postal revenue in Poland and Rumania. 5/

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. Price data are from [redacted] Tables 6, 7, 8, and 11, pp. 19, 21, 23, and 29, respectively, below.

d. Total telephone revenue does not include charges in excess of the base rate for telephone services or miscellaneous charges for specialized telephone service.

e. Including revenue from telephone subscriptions and installation of telephones.

f. Including only revenue from regular telegrams sent.

g. Including revenue from loudspeaker subscriptions and installation of loudspeakers.

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Because of the limits imposed on the growth in services by an inadequate wireline network, Post and Telecommunications revenue has not kept pace with the growth of the economy. By 1962 the annual rate of growth of revenue again may approach that of the economy, inasmuch as planned investment funds to be expended under the Third Five Year Plan (1958-62) are much greater than under previous plans.

Total revenue from public post and telecommunications services was greater than total expenditures for these services during 1954-58. Of all the services, only telephone service consistently earned more than it spent, and consequently it accounted for the over-all profitable position of the Directorate of Communications. Although the telegraph, broadcasting, and postal services are not now profitable, the expected increase in the use of these services probably will mean an increase in revenues in relation to expenditures from them. No change in the rate structure for the purpose of increasing revenues is likely to occur in the near future.

C. Investment.

Investment expenditures* for public post and telecommunications facilities in Bulgaria under the Third Five Year Plan (1958-62) are 57 percent greater than under the Second Five Year Plan (1953-57). The amount was 250 million leva during 1953-57 and 392 million leva during 1958-62.** 8/ During the Second Five Year Plan, major investment programs provided rural communities and cooperative farms with telephone service, with a large number of post offices, and with an expanded wire-diffusion network.

During the Third Five Year Plan the largest project, amounting to 92 million leva, will entail an increase in the number of automatic telephone exchanges. Other major projects include the expansion of the microwave radio relay network, the construction of a television transmitting center in Sofia, and the introduction of subscriber telegraph (TELEX***) service. 9/

The amount of investment funds probably is adequate in relation to the capability of the Directorate of Communications to expend these funds on well-planned projects. Nevertheless, in relation to the total need for modern communications services, investment funds are not and probably will not be adequate for many years.

* Investment expenditures include only those funds budgeted under the state investment plan.

** Yearly data are not available.

*** TELEX is a term applied to a system of subscriber telegraph used in European countries. As Bulgaria established a subscriber telegraph network in 1958 interconnected with this European network, the term TELEX is used in this report to describe the Bulgarian network.

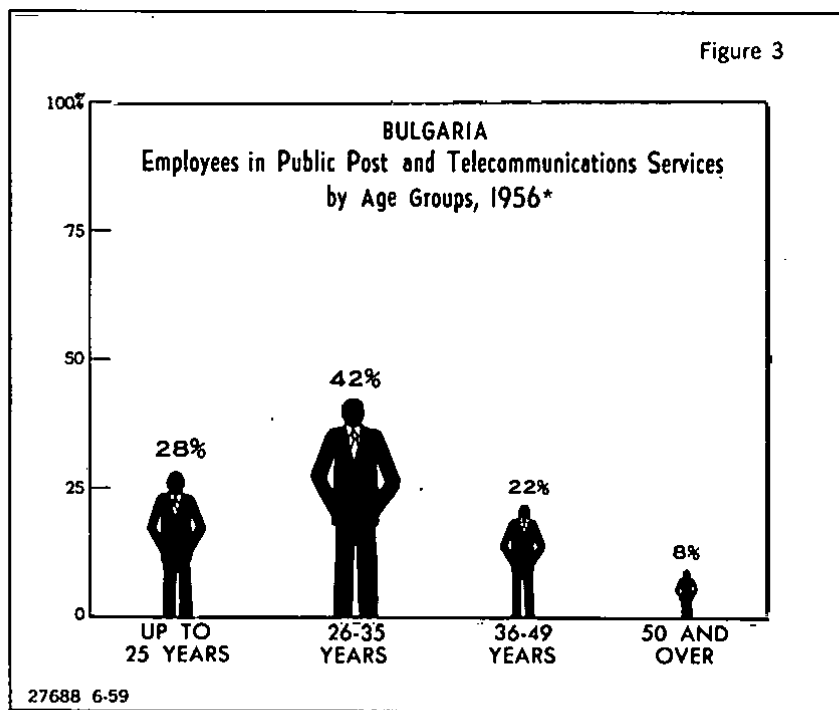
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D. Manpower.

1. Labor Force.

The number of employees in public post and telecommunications services in Bulgaria increased at an average annual rate of more than 10 percent from 1950 to 1955, but after 1955 the number of employees scarcely increased (see Table 2*). The reduction in hiring in 1956 was a result of the liberal employment program of 1950-55, when a large number of young and unskilled people were employed by the Directorate. As a consequence of this program, the proportion of employees in the younger age groups increased appreciably; the status in 1956 is illustrated in the accompanying chart, Figure 3. Also, women became a major group of employees by 1956, representing about 40 percent of the total number of employees and more than 65 percent of employees under 26 years of age.



* Table 2 follows on p. 11.

** TELEX is a term applied to a system of subscriber telegraph used in European countries. As Bulgaria established a subscriber telegraph network in 1958 interconnected with this European network, the term TELEX is used in this report to describe the Bulgarian network.

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Table 2
Estimated Average Number of Employees
in Public Post and Telecommunications Services in Bulgaria a/
1950-58

	Thousand Persons								
	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Employees	13.3	15.4	18.6	20.2	21.4	21.7	21.6	21.7 b/	21.8 b/
Index (1950 = 100)	100	116	140	152	161	163	162	163	164

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 January 1957 and by the Directorate of Communications of the Ministry of Transportation and Communications from January 1957 through 1958. All data are rounded to three significant digits. Data are from source 10/ unless otherwise indicated.

b. Assuming an annual increase of 100 employees.

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The number of employees, in January 1958, by service, is shown below:

<u>Service</u>	<u>Number of Employees</u>	<u>Percent of Total</u>
Postal	<u>9,770</u>	<u>45.0</u>
Telephone and telegraph	<u>8,680</u>	<u>40.0</u>
Broadcasting	<u>1,840</u>	<u>8.5</u>
Wire-diffusion	1,520	7.0
Radio	330	1.5
Other	<u>1,410</u>	<u>6.5</u>
Total	<u>21,700</u>	<u>100.0</u>

Data for previous years are not available for comparison, but the more dynamic services, such as telephone and broadcasting, probably represented a greater share of the total labor force in 1958 than in preceding years.

The number of employees is large enough to meet the labor requirements of the Directorate of Communications. Only small numbers of employees will be added in the future, as the efficiency and productivity of the labor force probably will rise.

2. Wages.

The average wage of employees in public post and telecommunications services in Bulgaria increased less than 3 percent annually from 1950 to 1958 (see Table 3*). As a result of this particularly low rate of growth, the wages of post and telecommunications employees decreased in relation to all nonagricultural employees in Bulgaria. The average annual wage of post and telecommunications employees was about 4 percent greater than that of total nonagricultural employees in 1950 but about 24 percent less than that of nonagricultural employees in 1958. This drastic change was caused by the rapid increase in wages paid to workers in industry.

The effect of this change was not felt as sharply as the figures indicate. Many employees of the postal services, who are the

* Table 3 follows on p. 13.

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Table 3

Estimated Total Annual Wage Bill and Average Annual Wage of Employees in Public Post and Telecommunications Services, in Bulgaria a/ 1950-58

	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Total annual wage bill. (million current leva)	69	86	100	116	127	131	135	139 b/	143 b/
Average annual wage (current leva)	5,190	5,630	5,410	5,760	5,920	6,000	6,270	6,400 c/	6,560 c/

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 January 1957 and by the Directorate of Communications of the Ministry of Transportation and Communications from January 1957 through 1958. All data are rounded to three significant digits. Data are from source 11 unless otherwise indicated.

b. Extrapolated by applying the absolute increase shown during 1954-56 (4 million current leva).

c. Computed from the total annual wage bill and the number of employees (see Table 2, p. 11, above).

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lowest paid group of employees in the Directorate, work in rural areas where their incomes in 1958 still were relatively high compared with farm incomes. Also, the higher paid employees in telecommunications services probably have incomes comparable with most incomes in industry. Although these are mitigating factors, the trend of wages will need to be reversed if the Directorate of Communications is to obtain the skills required for more efficient post and telecommunications services.

3. Training.

The Directorate of Communications of the Ministry of Transportation and Communications of Bulgaria conducts a program of full-time, part-time, on-the-job, and after-duty-hours training. All programs other than on-the-job training are carried on through the Post, Telephone, and Telegraph Institute. The full-time program consists of a 2-year technical course on aspects of methods and equipment for radio and wire communications. Normal enrollment is about 40 or 50 students. The Institute requires prospective students for this course to guarantee to work for the Directorate for at least 5 years after graduation. The part-time and after-duty-hours programs run from a few weeks to several months and range from technical briefings on new equipment to supervision courses for managers of rural post offices. The training program appears to be adequate for present and future needs of the Directorate of Communications.

4. Labor Productivity.

Labor productivity of employees engaged in public post and telecommunications in Bulgaria, measured in terms of revenue per man-hour, is shown in Table 4* for the period 1953-58. Between 1953 and 1955, total revenue from post and telecommunications services increased about 6.7 percent.** This increase was accomplished, however, by an increase in the labor force of about 7.4 percent,*** reflecting a decline in labor productivity of about 4 percent during the period. Since 1955 the number of workers in the labor force has remained relatively stable, and, in addition, the average number of hours worked per week has decreased from 48 to 46. In spite of this reduction in the total number of man-hours available, a 14-percent increase in revenue has been achieved, reflecting an increase in labor productivity since 1955 of about 18 percent. Labor productivity is expected to continue to increase, so that future increases in revenue should be attained without significant increases in the labor force.

Labor productivity in the postal services in Bulgaria in 1957 was 0.248 man-hour per unit of revenue; in the telephone and telegraph

* Table 4 follows on p. 15.

** See Table 1, p. 8, above.

*** See Table 2, p. 11, above.

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Table 4

Estimated Labor Productivity
of Public Post and Telecommunications Services in Bulgaria a/
1953-58

	Current Leva					
	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Revenue per man-hour b/	5.78	5.72	5.74	5.99	6.46	6.80

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 1953 to January 1957 and by the Directorate of Communications of the Ministry of Transportation and Communications from January 1957 through 1958. All data are rounded to three significant digits.

b. Computed by dividing revenue (see Table 1, p. 8, above) by man-hours. Data on man-hours were derived by multiplying the number of employees (see Table 2, p. 11, above) by the average number of hours of work per week (48 hours per week from 1953 to April 1956 and 46 hours per week from April 1956 through 1958).

services, 0.114 man-hour; and in the broadcasting services, 0.115 man-hour.* This difference in productivity between services probably will increase in the future because plans for mechanization in postal services are heavily outweighed by extensive plans for automation in telecommunications services. Labor productivity for all services of the Directorate of Communications, however, probably will increase.

E. Equipment.

The Directorate of Communications of the Ministry of Transportation and Communications of Bulgaria obtains equipment for public post and telecommunications services from domestic production and from imports. Domestic production includes telephone sets, small automatic telephone exchanges, telecommunications wire and cable, radiobroadcast receivers, and loudspeakers. Only telephone sets and loudspeakers are manufactured in sufficient quantities to fill the needs of the Directorate.

* Computed from data on the number of employees and on 50X1 revenue from Table 1, p. 8, above.

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Other equipment is imported, chiefly from East Germany, Czechoslovakia, and Hungary in the Soviet Bloc and from Austria and West Germany in the Free World. In the future, expansion in domestic production of automatic telephone exchanges and of wire and cable will make the Directorate of Communications less dependent upon imports for this equipment.

The Directorate of Communications does not export telecommunications equipment, although the telecommunications equipment industry does export small quantities of telephone sets and radiobroadcast receivers.

The research and development programs of the Directorate of Communications and of the telecommunications equipment industry are confined to the adaptation of foreign equipment to Bulgarian manufacture and use. 13/

III. Postal Service.

The public postal service provides most communities of Bulgaria with adequate mail delivery and savings bank services. The growth of total postal facilities is indicated by the increase in the number of post offices between 1950 and 1958 14/:

<u>Year</u>	<u>Number of Post Offices</u>
1950	1,343
1955	1,755
1956	1,829
1957	1,905
1958	1,921

The greatest growth in postal facilities occurred during the Second Five Year Plan (1953-57), when the base for serving rural areas was established.

The average annual rate of growth of postal volume from 1950 to 1958 varied between 22 percent from 1950 to 1953 and 5 percent from 1953 to 1958. The difference in the rates of growth between the two periods was caused by a decrease in the number of letters sent, beginning in 1954. The decrease continued until 1956 and is estimated to have remained at 156 million letters sent per year in 1957 and 1958 (see Table 5*). The decline probably resulted from planning adjustments that led to reductions in output in some sectors of the

* Table 5 follows on p. 17.

S-E-C-R-E-T

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Table 5

Estimated Volume of Letters, Periodicals, and Packages Sent in Bulgaria a/
1950-58

	Million Units								
	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Letters	167	183	203	224	217	185	156	156 b/	156 b/
Newspapers and periodicals	147 c/	214	281	352	413	459	503	548 d/	593 d/
Packages	4	5	5	5	4	4	4	4 b/	4 b/
Total volume	<u>318</u>	<u>402</u>	<u>489</u>	<u>581</u>	<u>634</u>	<u>648</u>	<u>663</u>	<u>708</u>	<u>753</u>

a. All data are rounded to the nearest million.

b. Assumed to be the same as in 1956.

c. Extrapolated by applying the absolute growth during 1951-52 (67 million newspapers and periodicals).

d. Extrapolated by applying the average absolute growth during 1954-56 (45 million newspapers and periodicals).

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50X1

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economy in 1954. The number of letters sent undoubtedly will increase in the future as the needs of an expanding economy and population are felt.

The efficiency of the postal system has been improved by the increased use of trucks for rural deliveries and by the expanding cooperative movement in agriculture. Postal routes have been consolidated and extended by the use of trucks, providing greater area coverage without corresponding increases in the number of employees. The cooperative movement in agriculture also has contributed to the efficiency of the postal system by a reduction in the number of collection and delivery stops.

In the Third Five Year Plan (1958-62), provisions for the development of the postal service stress improvement in mail delivery, in the quality of the labor force, and in the organization of postal activity. Mail delivery is to be augmented chiefly by the greater use of trucks. The quality of the labor force will be raised through better training and higher job requirements, and the organization of postal activity will be improved by giving more responsibility to lower operating levels of the Post Department. 16/

IV. Telephone and Telegraph Services.

The telephone and telegraph services of Bulgaria consist of local, interurban, and international telephone service and interurban and international telegraph service. These services are carried by a low-capacity wireline network supplemented by a microwave radio relay network and a point-to-point radio network. The telephone service is reasonably adequate in the rural areas of Bulgaria but is inadequate in the urban areas. The demand for telegraph service is not wholly met because of obsolete equipment and inefficient operating methods. Future plans call for the automation of the telephone network to increase its capacity for telephone traffic and for the establishment of a subscriber telegraph (TELEX) network to modernize telegraph service.

A. Telephone.

The telephone system of Bulgaria affords reasonably adequate service for rural areas but inadequate service for urban areas. Urban telephone service is severely hampered by a low-capacity wireline network. The number of interurban telephone calls, shown in Table 6,* did not vary appreciably from 1953 to 1958. The absence of any significant increase in interurban calls during this period in the face of a 34-percent increase in the number of telephones in service (see Table 7**)

* Table 6 follows on p. 19.

** P. 21, below.

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Table 6

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

	Million Units								
	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Interurban calls	18.7	23.0	26.2	29.0	29.7	29.9	27.9	29.6 b/	31.0 b/
Index (1950 = 100)	100	123	140	155	159	160	149	158	166

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 January 1957 and by the Directorate of Communications of the Ministry of Transportation and Communications from January 1957 through 1958. All data are rounded to three significant digits.

b. Computed using the ratio of interurban telephone calls to the number of telephones (see Table 7, p. 21, below) that existed in 1956 (232 interurban calls per telephone).

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suggests that the capacity of interurban lines was approaching its limit in 1953 and that this capacity has not increased noticeably since 1953.

Telephone service is more difficult to obtain in urban areas than in rural areas. Unfulfilled requests for the installation of telephone service in Sofia totaled more than 15,000 in 1958. Telephone service was equally difficult to obtain in the large cities of Plovdiv and Varna, whose 10,000-line exchanges were reported to be operating at full capacity. In rural areas, however, where telephone service was successfully extended during the Second Five Year Plan (1953-57), this service was less difficult to obtain. With the extensive decentralization of the political and economic structure of the country announced by the Communist Party in January 1959, greater demands will be made on rural telephone service. As a consequence, the fortunate position of rural areas with regard to telephone service probably will not last for many years. 18/

The line capacity of telephone exchanges and the number of telephones are listed in Table 7.* The average annual rate of growth of these facilities from 1950 to 1958 was moderate -- a 4.5-percent increase in telephone line capacity and a 6.9-percent increase in the number of telephones. In 1950 the line capacity of automatic telephone exchanges represented 45 percent of total line capacity, whereas in 1958 it represented 48 percent. The increasing proportion of automatic exchanges to manual exchanges is the result of greater domestic production of small semiautomatic exchanges for use in rural areas.

Most of the urban telephone exchanges in Bulgaria were installed before World War II. Four of the six 10,000-line exchanges in Sofia and the exchanges in Plovdiv, Varna, Ruse, and Stara Zagora were set up before World War II. Only the remaining two 10,000-line exchanges in Sofia and the exchange in Burgas were installed after World War II. Thus most of the major telephone exchanges in Bulgaria (the cities named above have approximately three-fourths of the total number of telephone lines in the country) are beginning to require more maintenance and repair to maintain satisfactory service.

During the Third Five Year Plan (1958-62) the capacity of telephone exchanges will be increased by 38,000 lines, which is more than twice the number of lines installed during the Second Five Year Plan. Most of this expansion will take place in urban areas, in contrast to the greater expansion in rural areas during the Second Five Year Plan. In 1958, construction began in Sofia on new telephone exchanges and on the enlargement of some old exchanges, which, altogether, totaled almost 10,000 lines. Thus a good start already has been made toward the goal of 38,000 new lines under the Third Five Year Plan. 19/

* Table 7 follows on p. 21.

S-E-C-R-E-T

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Table 7

Estimated Number of Public Telephones and Line Capacity of Public Telephone Exchanges in Bulgaria a/ 1950-58

	Thousand Units								
	1950	1951	1952	1953	1954	1955	1956	1957	1958
Telephones	78.0	87.4	94.2	99.9	110.1	112.3	120.3	127.7 b/	133.5 c/
Line capacity of telephone exchanges:									
Dial exchanges	41.9	48.6	52.2	54.9	54.9	55.8	58.5	60.7 d/	62.6 e/
Manual exchanges	50.7	55.0	59.2	57.3	59.4	62.0	64.5	66.5 f/	68.7 f/
Total line capacity	<u>92.6</u>	<u>103.6</u>	<u>111.4</u>	<u>112.2</u>	<u>114.3</u>	<u>117.8</u>	<u>123.0</u>	<u>127.2 b/</u>	<u>131.3 b/</u>

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 January 1957 and by the Directorate of Communications of the Ministry of Transportation and Communications from January 1957 through 1958. All data are rounded to the nearest hundred.

- b. 21/
- c. 22/
- d. 23/

- e. Computed using the percentage relationship of dial exchanges to total exchanges (47.7 percent) that existed in 1957.
- f. Computed by subtracting dial exchanges from total exchanges.

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S-E-C-R-E-T

In addition to the increase in telephone line capacity, semiautomatic interurban dialing is to be introduced by 1962. This mode of operation may provide up to 15 percent greater use of present telephone channels and will require a smaller number of interurban telephone operators. Also, interurban telephone circuits that were reserved for the Ministries of National Defense, the Interior, Forests, and Electrification and for the Directorate of Railroads will be turned over to the Directorate of Communications for joint use. The opening of these lines for public needs probably was done to increase the use of these telephone circuits. 24/

The major objectives of the Third Five Year Plan represent preliminary steps that Bulgaria must take in order to automatize its telephone system by 1975. They probably are sufficient at this stage of development. Much of the drive for the program has come and will continue to come from OSS.

B. Telegraph.

The telegraph system in Bulgaria provides insufficient service to meet the normal requirements of the economy. The number of telegrams sent, as shown in Table 8,* decreased from 6.8 million in 1950 to 6.1 million in 1958. This trend persisted in spite of increases in the number of telegrams handled (sent, relayed, and received) during 1956-58, as follows: for 1956, 16.1 million; for 1957, 16.6 million; and for 1958, 18.0 million. 25/ The declining trend in the number of telegrams sent probably resulted from slow service caused by obsolete equipment, inefficient methods, and an old telegraph wireline network.

In the Third Five Year Plan (1958-62), programs are outlined to improve the telegraph system. Obsolete equipment is to be supplemented by modern machines that can automatically relay telegrams. Duplex operation of telegraph circuits is to replace simplex operation. Furthermore, plans for improvements in the wireline network will improve the quality of transmissions and increase the number of circuits. Although the plan outlines programs to improve the telegraph system, they probably will not be achieved within the 1958-62 Plan period.

In 1958, subscriber telegraph (TELEX) service was introduced in Bulgaria. There were, however, only 15 subscribers, all located in Sofia. Also in 1958, international TELEX service was opened for these subscribers, connecting Sofia with Free World cities via Bonn, West Germany, and with other European Satellite capitals except Tirane, Albania. 26/

* Table 8 follows on p. 23.

S-E-C-R-E-T

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Table 8

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

	Million Units								
	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Telegrams sent	6.82	6.94	6.90	6.81	6.47	6.14	6.08	6.05 b/	6.13 b/
Index (1950 = 100)	100	102	101	100	95	90	89	89	90

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 January 1957 and by the Directorate of Communications of the Ministry of Transportation and Communications from January 1957 through 1958. The numbers of telegrams sent are rounded to three significant digits.

b. 28/

50X1

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S-E-C-R-E-T

C. Common Telecommunications Facilities.

The common telecommunications facilities of Bulgaria consist of wireline, microwave radio relay, and point-to-point radio facilities. The wireline facilities, shown on the map, Figure 4,* carry telephone and telegraph traffic and broadcasting programs throughout the country. Microwave radio relay facilities also carry telephone and telegraph traffic and broadcasting programs, but the facilities are much less extensive, connecting only the major cities of the country. The point-to-point radio facilities primarily provide international telegraph service to areas not reached by international wirelines.

1. Wirelines.

The wireline network of Bulgaria fails to provide enough circuit and channel capacity for the demands of the telephone and telegraph services. Since 1953 the average annual rate of increase for new wireline and cable lines was less than 1 percent (see Table 9**). Even for the modest demands of telephone and telegraph services in Bulgaria, this amount of new cable and wirelines is exceptionally small. Also, many wireline circuits are old, becoming inoperable in weather disturbances such as heavy rains. As a consequence of the dilapidated state of the wireline network, interurban telephone calls have not increased appreciably since 1953, and telegrams sent between 1950 and 1958 declined by 10 percent.

Multiconductor cable lines connecting Sofia with Ruse, Dimitrovo, Pleven, and Vratsa and with Nis, Yugoslavia, are the only cable lines in Bulgaria. The Directorate of Communications operates the cable lines connecting Sofia with Dimitrovo and Pleven and with Nis, Yugoslavia, but the armed forces operate the cable lines connecting Sofia with Ruse and Vratsa. The Directorate leases some circuits for public use on the armed forces' cable lines. The Sofia-Ruse cable connects with a Rumanian cable that is part of a special mobilization network connecting Rumania with the USSR. This route may be a connection between the Rumanian network and a similar mobilization network in Bulgaria.

Main interurban wirelines used for telephone traffic are equipped with carrier multiplexing equipment providing 10 telephone channels. The equipment was manufactured about 1936 by Siemens-Halske of West Germany. Although the carrier equipment originally was of good quality, it now requires much maintenance for even minimal reliability.

* Inside back cover.

** Table 9 follows on p. 25.

S-E-C-R-E-T

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Table 9

Estimated Length of Interurban Wire and Cable Lines
of Public Facilities in Bulgaria a/
1950-58

	Kilometers								
	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Cable lines	895	895	901	932	953	966	1,000	1,040 b/	1,080 b/
Wirelines c/	24,000	26,000	25,500	25,900	25,900	26,100	26,400	26,700	26,900
Total	<u>24,900</u>	<u>26,900</u>	<u>26,400</u>	<u>26,800</u>	<u>26,900</u>	<u>27,100</u>	<u>27,400</u>	<u>27,700</u> d/	<u>28,000</u> d/

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 January 1957 and by the Directorate of Communications of the Ministry of Transportation and Communications from January 1957 through 1958. All data are rounded to three significant digits.

b. Extrapolated by applying the annual rate of growth in 1955-56 (4 percent).

c. Cable lines subtracted from total wire and cable lines.

d. Extrapolated by applying the annual rate of growth in 1955-56 (1 percent).

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The wireline network will be improved during the Third Five Year Plan (1958-62) by the reconstruction of main interurban circuits. Along with the introduction of semiautomatic dialing, reconstruction may increase telephone channel utilization by 10 to 15 percent. It also will include an increase in the number of repeaters on interurban circuits and an increase in reserve generating facilities to improve the reliability of electric power. The cost of reconstruction will be about 3,000 leva per telephone channel.

Although the implementation of these reconstruction plans will improve the wireline network, reconstruction alone will not improve the network enough to satisfy the demands for telephone and telegraph services. Moreover, the relocation of many lines as a result of the consolidation of collective farms will further burden already overburdened construction enterprises. Therefore, the poor wireline network probably will hinder the development of telecommunications services in Bulgaria for many years.

2. Microwave Radio Relay.

The microwave radio relay network supplies mainline communications among major cities of Bulgaria (see the map, Figure 5*). In 1958 this network carried interurban telephone and telegraph traffic and radio-broadcasting programs. By 1962 it will also relay television programs.

The microwave network was conceived in 1954 as a means of insuring reliable relays of radio programs from Sofia studios to outlying transmitters. Gradually, the advantages for carrying telephone and telegraph traffic as well were recognized. Consequently, by 1955 the use of the microwave network had been broadened to serve ultimately as the basic medium for the mainline telegraph, the mainline telephone, and the television networks.

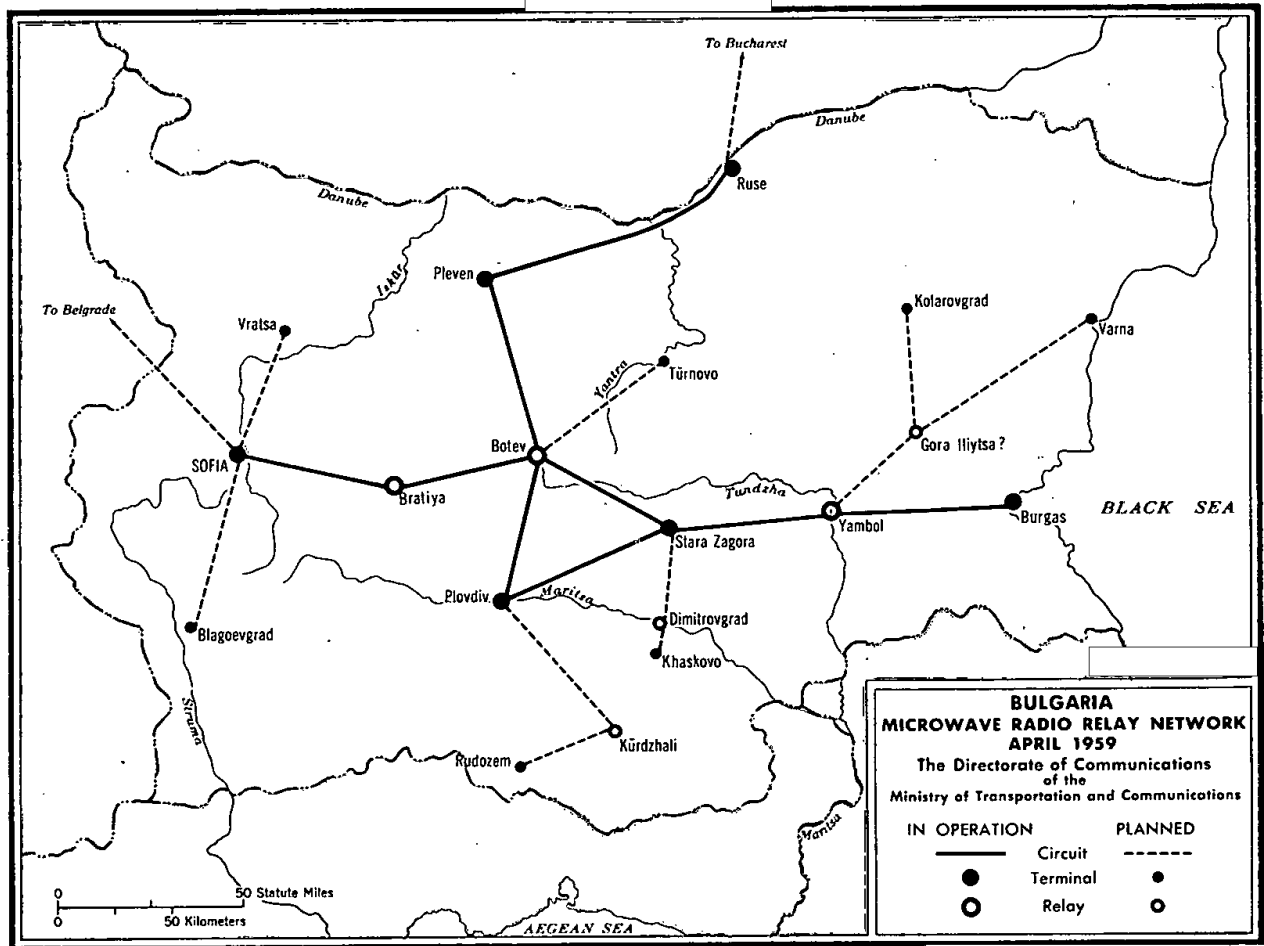
The position of the mountain range, Stara Planina (the Balkan Mountains), which bisects Bulgaria from east to west, strongly influenced the selection of the east-west route for a microwave radio relay line. The mountains offer excellent high elevations for long-hop transmission between relay points. This reduction in the number of relay points reduces equipment, maintenance, and construction costs.

The first line of the microwave radio relay network went into operation in 1956 between Sofia and Plovdiv via the Stara Planina mountain range. It was followed in the same year by the Sofia-Pleven line. In 1957 the network was extended to Ruse, and in 1958 it was advanced to Burgas via Stara Zagora and Yambol. This network provided 17,356 channel-kilometers over 850 circuit-kilometers in 1958.

* Following p. 26.

S-E-C-R-E-T

50X1



50X1

Figure 5

50X1

S-E-C-R-E-T

By the end of the Third Five Year Plan (1958-62), the micro-wave network will be substantially enlarged. Most cities in the country will be linked with one another. The network probably will have a total capacity of more than 66,700 channel-kilometers -- an increase of almost 3 times the number of channel-kilometers in 1958.

The plans for the microwave radio relay network probably will be fulfilled. The obsolescence of the wireline network should stimulate the Directorate of Communications to fulfill these plans. Furthermore, the Bloc plans of OSS state that Bulgaria will establish an adequate network for relaying television programs by 1965. 30/

3. Point-to-Point Radio.

Bulgaria maintains point-to-point radio communications with 24 countries and with the rest of the world through relays from some of these countries. The international circuits are shown on the map, Figure 6.* All these circuits use automatic morse telegraph, with the exception of a radiotelephone circuit to Cairo. The transmitting site for international point-to-point radio communications is located near Chelopechene, 8 miles northeast of Sofia, and the receiving site is located near Kostenbrod, 9 miles north of Sofia. These facilities appear to meet the needs of Bulgaria for international point-to-point radio communications. No significant changes in this service are likely.

Bulgaria maintained a domestic point-to-point radio network after World War II connecting all district capitals with Sofia. No recent information confirms the existence of this network, though it may still be in existence for emergency use in the event of an interruption of wireline facilities. 31/

V. Broadcasting Services.

The broadcasting services of Bulgaria consist of radiobroadcasting, wire-diffusion, and television services. Growth in the transmission base of the broadcasting services from 1950 to 1958 is given in Table 10,** which shows the especially rapid development of the wire-diffusion service during 1950-53. Table 11*** shows the number of broadcast reception points in Bulgaria during 1950-58 and indicates the rapid growth in the wire-diffusion service and in the number of radiobroadcast receivers from 1954 to 1958. Regular television service has not yet begun, but an experimental station has been in operation since 1953.****

* Following p. 28.

** Table 10 follows on p. 28.

*** Table 11 follows on p. 29.

**** Text continued on p. 30.

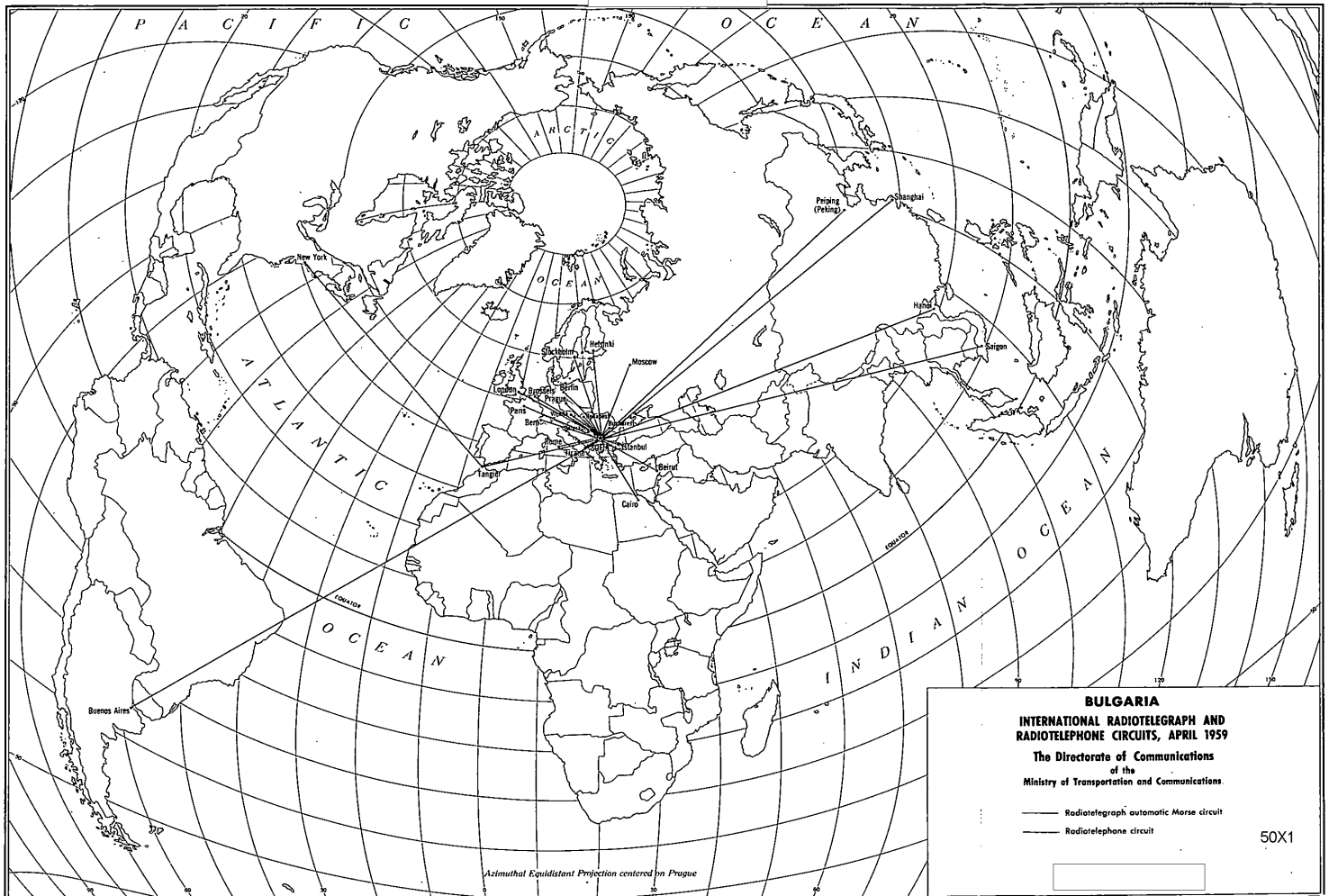
S-E-C-R-E-T

Table 10
 Broadcasting Transmission Base in Bulgaria a/
 1950-58

	Units								
	1950	1951	1952	1953	1954	1955	1956	1957	1958
Total amplitude-modulation (AM) radiobroadcasting transmitters	5	5	6	6	6	6	7	7	8
Domestic	4	4	4	4	4	4	5	5	5
International	1	1	2	2	2	2	2	2	3
Wire-diffusion relay centers	320	624	921	996	1,050	1,087	1,176	1,212 b/	1,248 c/

a. An experimental television transmitter has been in recurrent operation since 1953, and a permanent transmitter will go into operation in 1960.
 b. 33/
 c. Assuming the same absolute increase for 1957-58 as for 1956-57.

50X1



S-E-C-R-E-T

Table 11

Broadcast Reception Base in Bulgaria a/
1950-58

	Thousand Units								
	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Radiobroadcast receivers	201.0	234.0	249	261	275	327	399	492 b/	607 c/
Wired loudspeakers	26.3	68.1	125	184	242	300	355	406 b/	446 d/
Total	<u>227.0</u>	<u>302.0</u>	<u>374</u>	<u>445</u>	<u>517</u>	<u>627</u>	<u>754</u>	<u>898</u>	<u>1,050 e/</u>

a. All data are rounded to three significant digits.

b. 35/

c. Assuming the same rate of growth for 1957-58 as for 1956-57 (23.3-percent).

d. 36/

e. Including 500 television receivers in 1958. 37/

50X1
50X1

S-E-C-R-E-T

S-E-C-R-E-T

A. Radiobroadcasting.

The radiobroadcasting service of Bulgaria is the most highly developed post and telecommunications service in the country. Its transmission base provides strong, clear broadcasts that cover intended reception areas well, but its radiobroadcast reception base is small in terms of the number of radiobroadcast receivers per capita. The number of radiobroadcasting transmitters in 1950-58 is shown in Table 10,* and the locations of these transmitters are illustrated on the map, Figure 7**. The transmitting power as well as the number of transmitters increased more than 4 times, from 124 kilowatts (kw) in 1950 to 675 kw in 1958. The estimated location, power, frequency, and type of service of radiobroadcasting transmitters in February 1959 are shown in Table 12.***

The radiobroadcast reception base, although small in size in relation to that of the other Satellites, has been expanding more rapidly than in most of the Soviet Bloc countries since 1955. The number of radiobroadcast receivers, shown in Table 11,**** grew from 1950 to 1958 at an average annual rate of 15 percent and from 1954 to 1958 at an average annual rate of 23 percent. This growth since 1955 was supplied by a large increase in domestic production of radio receivers.

All technical facilities for radiobroadcasting service are operated by the Radio Department of the Directorate of Communications, but all programs are prepared, taped, and monitored by the Radio Department of the Ministry of Culture. Thus the Directorate of Communications is not concerned with the content of a program until it is ready to be broadcast.

The Ministry of Culture prepares five program services. Two programs are prepared for the whole country; a regional program for the districts of Varna and Stara Zagora; a minority program for Turkish-speaking peoples in Bulgaria; and international programs for Europe, the Near East, and the Americas. The programs for the whole country are clearly received except in the rugged mountainous areas along the western and southern border regions. The international programs are clearly received in their target areas.

* P. 28, above.

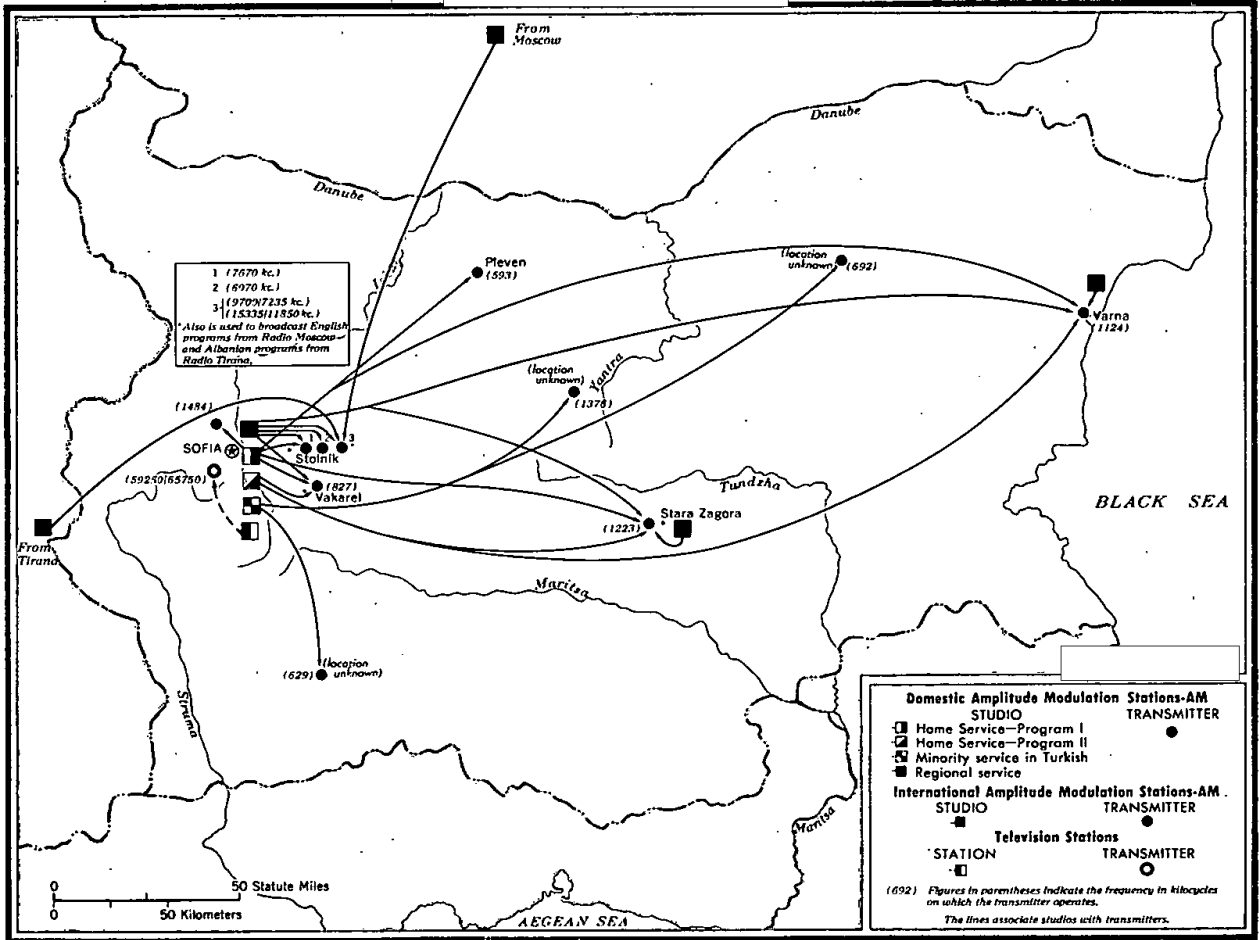
** Following p. 30.

*** Table 12 follows on p. 31.

**** P. 29, above.

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50X1

Figure 7

S-E-C-R-E-T

Table 12

Estimated Location, Power, Frequency, and Type of Service
of Radiobroadcasting Transmitters in Bulgaria a/
April 1959

<u>Location</u>	<u>Power (Kilowatts)</u>	<u>Frequency (Kilocycles)</u>	<u>Type of Service</u>
Pleven	240	593	Domestic
Sofia	20	1,484	Domestic
Stara Zagora	10	1,124	Domestic, regional, and international
Stolnik	120	7,255, 9,700, and 11,855	International
Stolnik	120	6,070	International
Stolnik	35	7,670	International
Vakarel	100	827	Domestic and inter- national
Varna	30	1,223	Domestic, regional, and international
Unknown	Unknown	1,376	Minority
Unknown	Unknown	692	Minority
Unknown	Unknown	629	Minority

a. All transmitters are amplitude-modulation (AM) transmitters.

50X1

In addition to the programs prepared by the Bulgarian Ministry of Culture, Soviet and Albanian programs are broadcast to North America by Bulgarian transmitters.

Major goals of the radiobroadcasting service in the Third Five Year Plan (1958-62) include the addition of medium-frequency and high-frequency transmitters, the introduction of frequency-modulation (FM) radiobroadcasting service, an improvement in reception along the western and southern border regions, and a continued expansion of the radiobroadcast reception base. Some of these goals already have been achieved. A high-frequency transmitter went into operation in August 1958, and medium-frequency transmitters went into operation in late 1958 or early 1959. After the completion of these important goals, the remaining objectives with respect to the transmission base probably will be fulfilled. Furthermore, the high rate of production of radiobroadcast receivers should insure a continuing supply. Thus the reception base as well as the transmission base should continue to grow in the future. 39/

S-E-C-R-E-T

S-E-C-R-E-T

B. Wire-Diffusion.

The wire-diffusion service of Bulgaria, which is small in size in relation to that in other Soviet Bloc countries, is an important medium of mass communication. Growth of the transmission base, composed of wire-diffusion relay centers, is indicated in Table 10.* Moreover, the number of wired loudspeakers served per center increased considerably, from 80 in 1950 to more than 350 in 1958.

The reception base of the wire-diffusion service, composed of wired loudspeakers,** represented 42 percent of the broadcast reception base in 1958. After the rapid increases in the number of wired loudspeakers installed during the early years of the wire-diffusion service, the number of wired loudspeakers has continued to increase since 1955 at an average annual rate of 14 percent. More than 70 percent of these wired loudspeakers were located in rural areas in 1958. A typical wired loudspeaker is illustrated in the accompanying photograph, Figure 8.

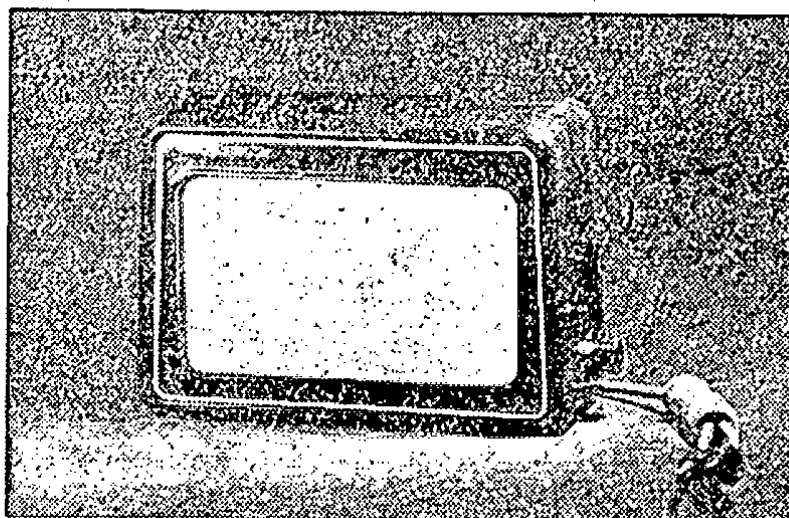


Figure 8. Bulgaria: Typical Wired Loudspeaker of the Wire-Diffusion Service, 1958

* P. 28, above.

** See Table 11, p. 29, above.

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The inability of wire-diffusion subscribers to control the selection of the programs that they hear provides the government with a unique propaganda advantage. This advantage is especially important when a new policy is introduced, such as the political and economic reorganization of the country announced in January 1959. Consequently, growth of the wire-diffusion service undoubtedly will continue at a high rate. Future growth, however, probably will require a greater amount of investment per wired loudspeaker because service will be extended to higher cost and inaccessible areas. 40/

C. Television.

The television service of Bulgaria is in the early stages of development. The first experimental broadcasts began in 1953, but regularly scheduled broadcasts will not begin before 1960. In 1958, there were only 500 television receivers in use in the country. The location of the television transmitter is shown on the map (see Figure 7*).

Construction began in 1957 on a large television center in Sofia. It will be the main program center for the country. The main building of the center will be 16 stories in height, topped by a 35-meter antenna, giving an over-all antenna height of 110 meters. A model of this center, which is to be completed in 1960, is shown in the accompanying photograph, Figure 9.

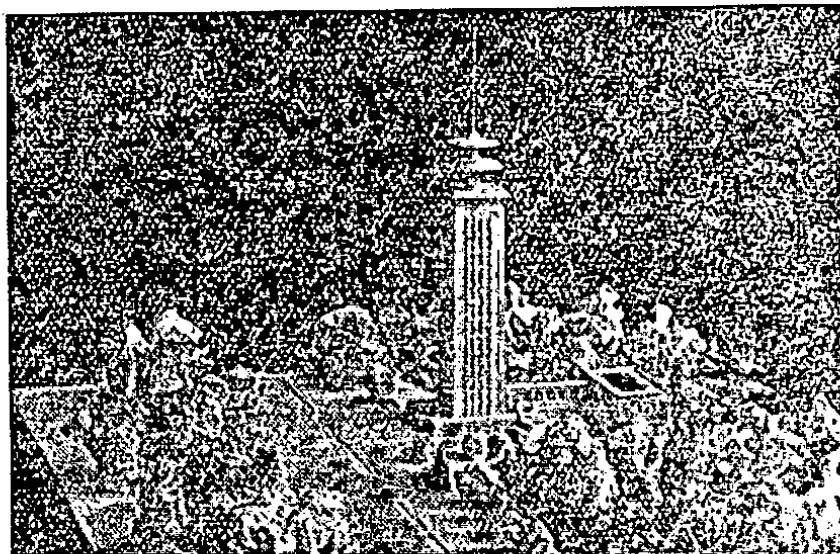


Figure 9. Bulgaria: Planned Television Center in Sofia, 1958

* Following p. 30, above.

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Programs prepared in the television center in Sofia will be relayed by microwave radio relay lines to transmitters located on Mount Botev, in Varna, and in several other district capitals. The Mount Botev transmitter will have a large radius of reception, covering parts of the districts of Pleven, Turnovo, Stara Zagora, Plovdiv, and Ruse. By 1965 these transmitters may be broadcasting television programs received over the Soviet Bloc television network, OIR-Vision, which eventually is to link all countries of the Sino-Soviet Bloc, Finland, Yugoslavia, and the United Arab Republic.

The television reception base will be increased primarily through domestic production. The Third Five Year Plan (1958-62) provides for a total production of 58,500 television receivers by 1962. The first receivers were produced in 1958. 41/

VI. Future Trends.

The future trends in post and telecommunications activities of Bulgaria have been broadly outlined in the Sino-Soviet Bloc program of OSS. As contemplated under OSS planning, Bulgaria will establish a microwave radio relay network by 1965 and will automatize its telephone facilities by 1975. Although these programs are ambitious and will be costly for Bulgaria, they probably will be carried out. Provision for their implementation is reflected in the Third Five Year Plan (1958-62) of Bulgaria. The program for the microwave radio relay network probably will be completed before 1965, but the program for the automation of the telephone network undoubtedly will extend at least until 1975.

In addition to the OSS program, Bulgaria will introduce subscriber telegraph (TELEX) service and frequency-modulation radiobroadcasting service, will complete the construction of the television transmitting center in Sofia, and will continue to expand radio and wire-diffusion facilities and services.

Aside from increases in the availability of radiobroadcast receivers and wired loudspeakers, the private consumer probably will not realize any significant expansion in postal, telephone, or telegraph service in the near future.

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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		Corresponding Wave*
Range	Type	
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. 36]

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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 alternation 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.

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."

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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.)

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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

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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.

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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.

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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 or a roll of tape, or by perforations on a roll of tape, or by 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.

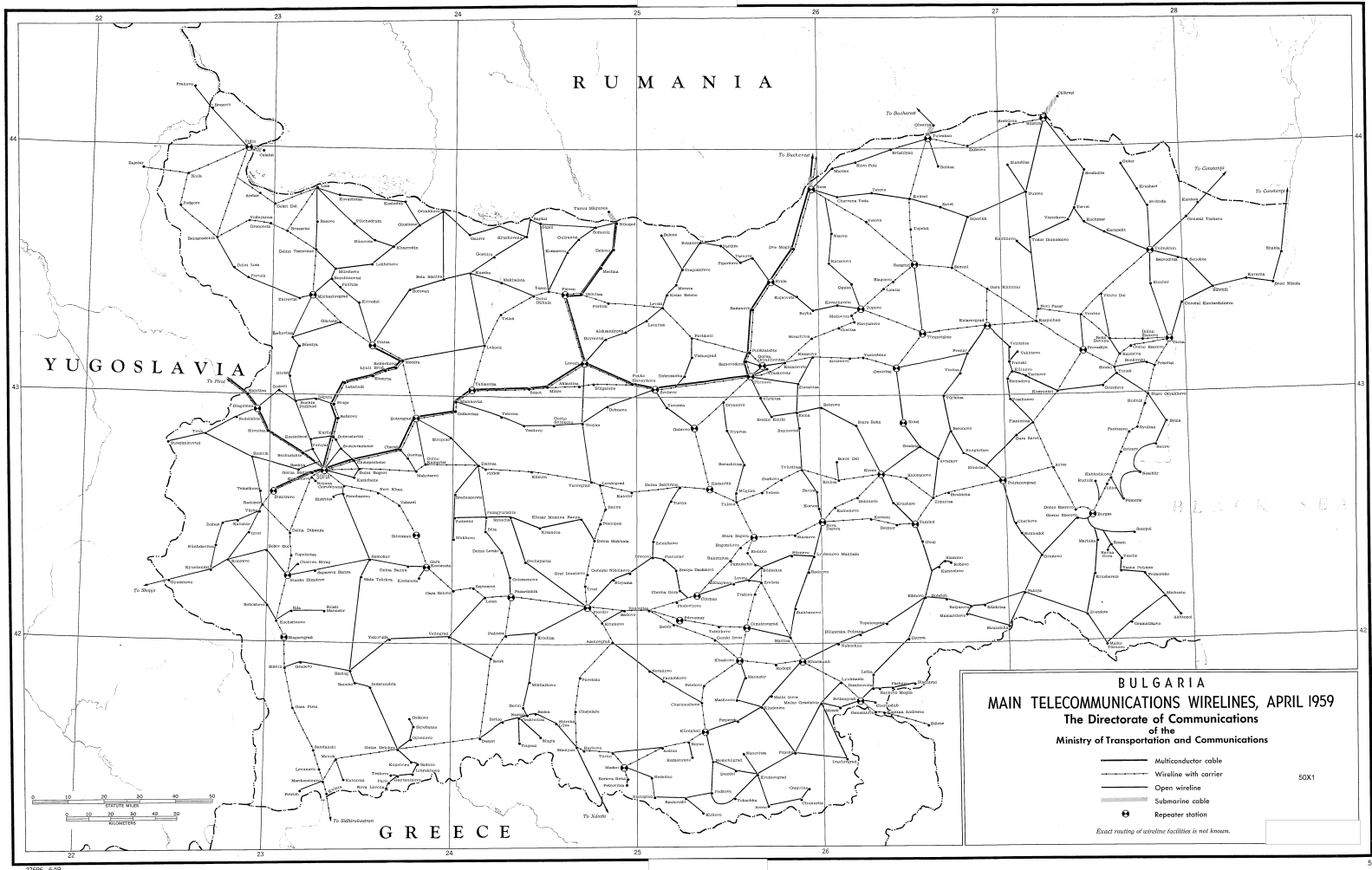
Wired Loudspeaker: A telecommunications loudspeaker which receives from a distribution point one or more broadcast programs by a wire or cable medium.

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

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