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ECONOMIC INTELLIGENCE MEMORANDUM

THE MINISTRY OF COMMUNICATIONS OF THE USSR: PRESSURES AND PROSPECTS 1957-65

CIA/RR EM 60-9

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CENTRAL INTELLIGENCE AGENCY

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WARNING

This material contains information affecting the National Defense of the United States within the meaning of the espionage laws, Title 18, USC, Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

FOREWORD

This memorandum is concerned only with those telecommunications facilities and services in the USSR that are controlled and operated by the Ministry of Communications. The independent, functional facilities and services operated by other governmental organs, such as those dealing with the armed forces, transportation, and meteorology, are not included in the memorandum. It must be pointed out, however, that although the facilities and services covered here are confined to those under the jurisdiction of the Ministry of Communications, their use is not so restricted. The armed forces make abundant use of this system, as do all the ministries. The memorandum treats the many facilities, especially mainline circuits of relatively high capacity, that are jointly owned or operated by two or more governmental organs but fall under the over-all control of the Ministry of Communications. The postal and broadcasting services are not discussed in the memorandum.

It is not the purpose of this memorandum to provide detailed analysis.

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Appendixes

Charts

THE MINISTRY OF COMMUNICATIONS OF THE USSR: PRESSURES AND PROSPECTS* 1957-65

Summary and Conclusions

The basic telecommunications service of the USSR is adequate to support the fulfillment of the current economic plans of the country. Because of limited allocations of resources, however, little service is available for private consumption and other purposes. The Ministry of Communications, which is the prime supplier of basic telecommunications facilities, has been under many pressures to expand its services. These pressures have been intensified by the industrial reorganization of 1957 and the continued rapid growth of the economy.

Up to 1959 the Ministry of Communications placed primary emphasis on expanding the capacities of existing facilities, which were primarily of low capacity. In the Seven Year Plan (1959-65) the emphasis has shifted to the construction of high-capacity facilities. These new facilities, coupled with the continued improvement and expansion of other facilities, should improve the contribution of telecommunications service to the economy.

I. Introduction

The Ministry of Communications supplies public** telecommunications service in the USSR. As one of the basic service sectors of the economy, this service makes its contribution by providing the rapid means by which diverse economic, military, political, and social activities are directed, coordinated, and controlled.

The telecommunications sector is particularly significant because of the huge size of the Soviet land mass, the large military demand for

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* The estimates and conclusions in this memorandum represent the best judgment of this Office as of 1 June 1960. For definitions of technical terms used in this memorandum, see Appendix A.

** The term public as used in this memorandum refers to the post and telecommunications facilities and services under the control of and operated by the Ministry of Communications.

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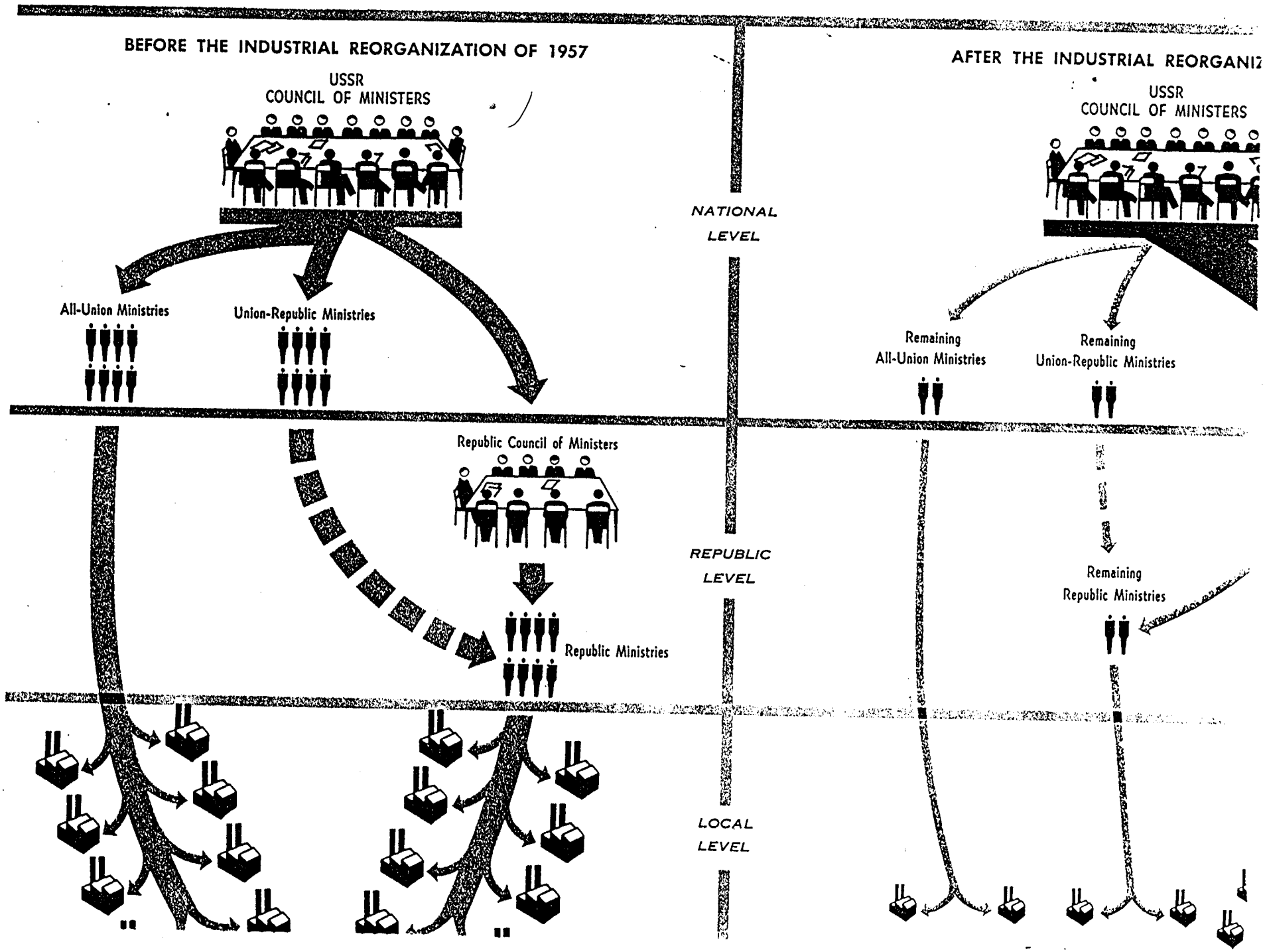
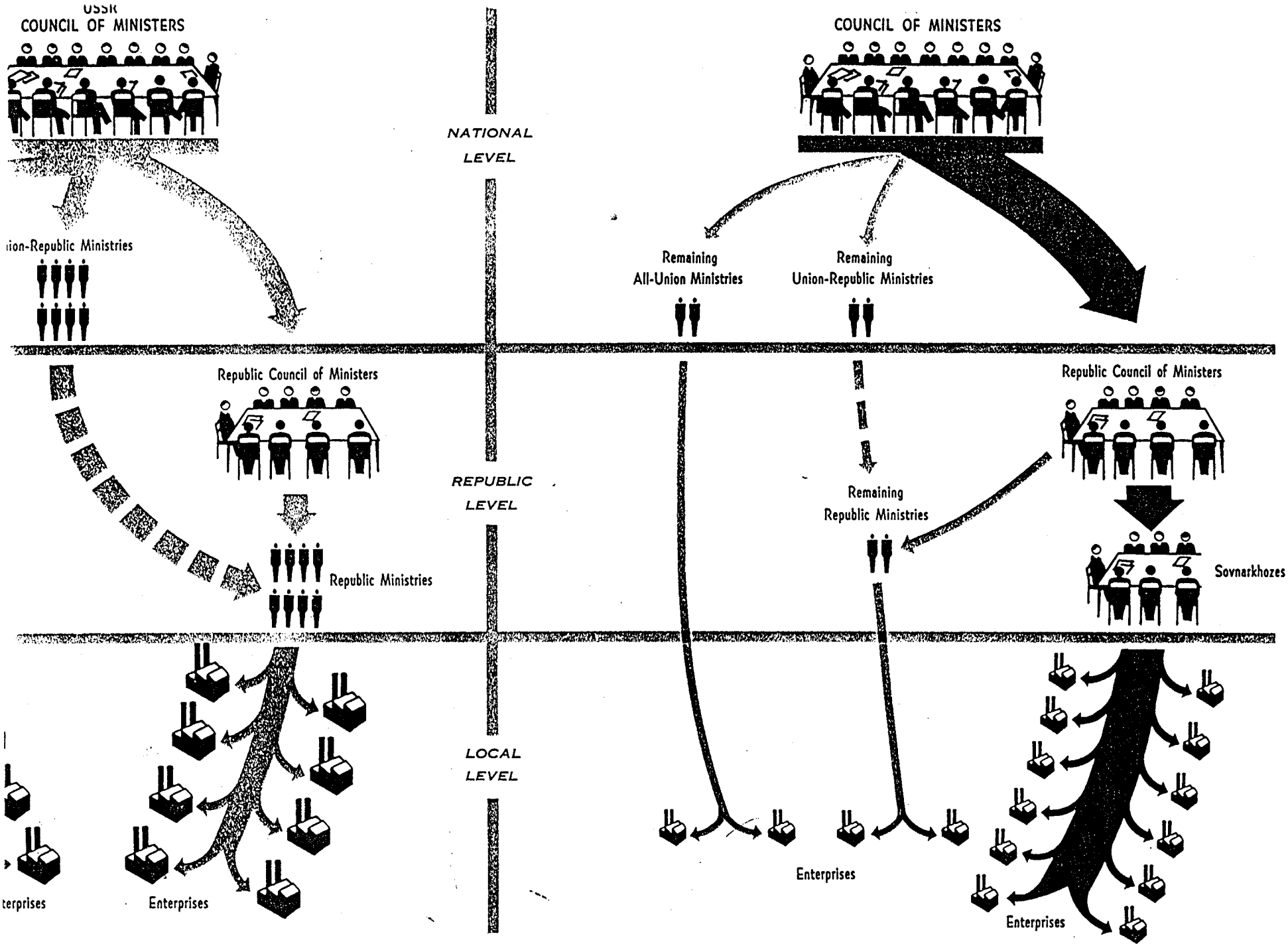
LINES OF AUTHORITY IN SOVIET INDUSTRY





Blue lines indicate the lines of authority of industrial ministries.

Red lines indicate the new line of authority established by the reorganization.

Dashed lines represent actual control exercised by union-republic ministries at the national level.

The width of the lines represents the relative amounts of industrial activity under ministerial control and under control of the sovnarkhozes.

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telecommunications service, and the accelerated tempo of economic development under a closely controlled central plan.

The system of priorities for the allocation of resources in the USSR has not allowed the telecommunications sector of the economy to grow much beyond the level necessary to meet demands for essential services. The Ministry of Communications has not been given enough resources to provide for future demands in the most economical way, to satisfy fully private consumer demand, to provide excess facilities for use in emergencies, or to compensate for possible seizure of facilities by the military services in time of crisis. Thus the Ministry of Communications has been operating under pressures to provide increasing service with limited facilities.

II. Pressures

Two recent events have intensified the pressures on the Ministry of Communications of the USSR. The industrial reorganization of July 1957, which was rather sudden in conception and implementation, caught the Ministry with many demands by the new sovnarkhozes for service where none then existed. At the same time, the Ministry was confronted with intensified demands resulting from new economic plans that are intended to continue the rapid rate of growth of the Soviet economy. Even though the overly ambitious original Sixth Five Year Plan (1956-60) was discarded in late 1957, the less ambitious Seven Year Plan (1959-65) still maintained heavy pressure on the Ministry.

A. Industrial Reorganization

On 1 July 1957 the control structure of the Soviet economy was reorganized. The reorganization deliberately introduced substantial changes in the lines of authority in Soviet industry, as shown in the chart, Figure 1.* An increased share of authority and responsibility for administering industrial enterprises was transferred from functional-administrative organizations on the national level to the sovnarkhozes on the regional level. Decisions on the implementation of approved plans and on day-to-day direction and operation of the enterprises were delegated to organizations on the republic, sovnarkhoz, and enterprise levels. Decisions on national issues such as capital investment, wage rates, and the distribution of production remain, as before, in the hands of the central authorities in Moscow.

* Following p 2

Although the industrial reorganization did not change the organizational structure of the Ministry of Communications (which continues to be a union-republic ministry*), it greatly affected the operations of the Ministry. The patterns of the flow of information before and after the reorganization are illustrated in the chart, Figure 2.** Much information that formerly terminated at the administrative center in Moscow now terminates at the republic, sovnarkhoz, and enterprise levels. This redirection has increased the flow of communications between republic capitals and their subordinate sovnarkhozes and among the sovnarkhozes themselves. The sovnarkhozes also needed new flows, especially lateral communications, with other sovnarkhozes as well as with subordinate enterprises and with marketing and supply organizations located in the same republic and even in neighboring republics. The consequent changes in the direction and quantity of the flow of communications traffic have required the Ministry of Communications to adjust its services accordingly.

B. Rapid Growth of the Economy

The rate of economic growth in the USSR is continuing at an impressive level. Except for a slight dip in 1957 that was more than made up for in 1958, Soviet gross national product has maintained an average annual rate of growth of 6 to 7 percent since 1951. About the same rate of growth is estimated for the period of the Seven Year Plan. Industrial growth is even higher, increasing at a rate of slightly more than 9 percent since 1951. This rate of growth is expected to continue through 1965. Increased economic activity has exerted growing pressure on the Ministry of Communications to meet new demands for service.

III. Problems in Providing Service

The Ministry of Communications of the USSR has faced a number of problems in providing telecommunications service for the economy. These problems have included shortages of facilities, radial patterns of communications, inefficiencies of functional networks, and shortages of certain types of equipment and manpower.

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* A union-republic ministry, which is on the national level, directs its affairs through corresponding, or counterpart, ministries organized on the republic level. For a full discussion of the administrative and operational structure of the Ministry of Communications, see source .

** Following p. 4.

A. Shortages of Facilities

The USSR does not have an extensive network of modern, high-capacity telecommunications facilities. Instead, a large proportion of the mainline and feeder facilities are low-capacity, open wirelines and point-to-point radio. Many of the available wirelines are already used to capacity and allow little room for expansion. Point-to-point radio, because of its lack of reliability, is not a desirable medium for long-distance communications.

B. Radial Flow of Traffic

A radial flow of telecommunications traffic, shown in the chart, Figure 2, evolved in the USSR in response to the centralized administrative organization of the country. In the radial pattern, rayon centers and interrayon centers had telephone and telegraph communications only through Moscow. Multiple relaying resulted, with attendant increases in errors, delays, and costs. The reorganization changed the flow of communications from a radial to a semilateral pattern, causing the abandonment of the inefficient radial system but requiring the rearrangement of telecommunications facilities and the construction of some new facilities.

C. Functional Systems

Before the reorganization, many industrial ministries in the USSR owned and operated their own telecommunications facilities. This situation resulted in a duplication of public and functional telecommunications service. Some cities had as many as seven parallel telephone and telegraph lines owned and operated by individual ministries in addition to lines operated by the Ministry of Communications. The Ministry charged that this duplication was wasteful and that costs of operation of parallel facilities were excessive.

After the reorganization, facilities that had belonged to the abolished ministries were ordered to be transferred to the control of the Ministry of Communications. The intention of this order was two-fold -- to eliminate wasteful duplication and to aid in meeting the needs of the sovnarkhozes. By February 1958, some interurban facilities had been transferred, but the Ministry had not been able to gain control of all functional facilities within the oblasts and the rayons. Consequently, there has not as yet been any significant increase in service resulting from the integration of facilities. Soviet officials have urged that integration be completed.

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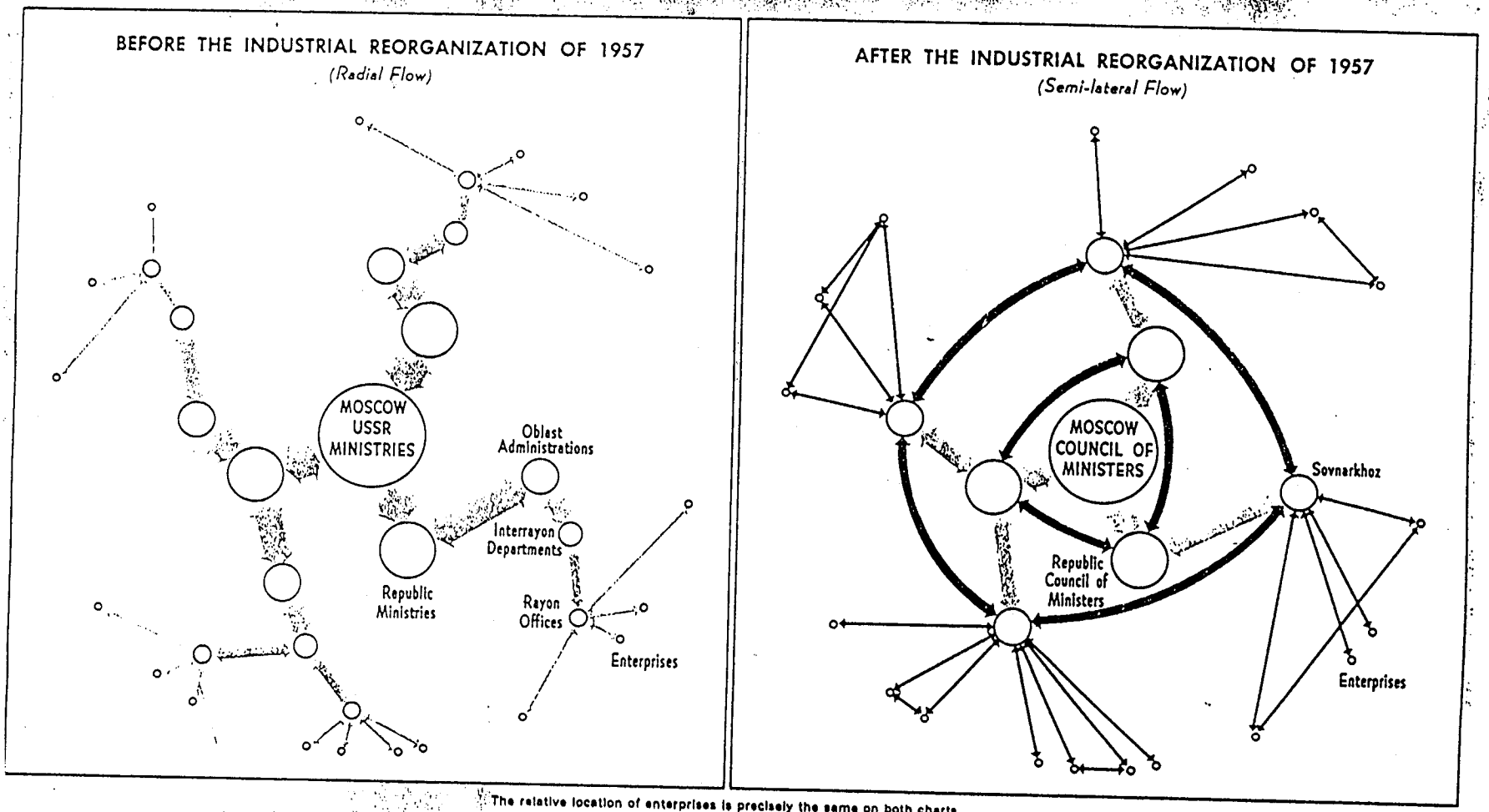
Figure 2

SCHEMATIC CHART OF THE FLOW OF INFORMATION IN SOVIET INDUSTRY



The relative location of enterprises is precisely the same on both charts

The width of the lines represents the relative amount of information passing between points.

Red lines indicate either an increased flow of information between points or a direct flow of information between points that previously did not exchange information directly.

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D. Shortages of Equipment and Manpower

Shortages of equipment and, to a lesser extent, of skilled manpower have been recurring problems faced by the Ministry of Communications of the USSR. In many instances, even though communications organs were allocated sufficient funds for the construction of new facilities, equipment was unavailable. A continued shortage of this nature will have serious consequences. Considering the emphasis now being placed on the completion of the Seven Year Plan, it is unlikely that such shortages will be allowed to persist.

The demand for skilled manpower is increasing as more modern and complex telecommunications facilities are developed and as automation, telecomputing, and mechanization are pushed forward. Technically trained personnel who can install, regulate, and service highly complex equipment are in great demand. As the Seven Year Plan progresses, this demand should rise. The Ministry probably will expand its already extensive training facilities to meet this problem.

IV. Prospects

The Ministry of Communications of the USSR has made some progress in meeting the increasing demand for more telecommunications service. Existing facilities have been improved and rearranged. Circuit multiplexing equipment has been installed on wirelines, increased use has been made of automatic exchange equipment, and many circuits have been reorganized. Some long-haul service has been provided sovnarkhozes and enterprises by connecting low-capacity lead-in and drop-off circuits to interurban routes. These actions, however, which required only small investment and could be rapidly implemented, have not solved all of the problems. The provision of additional facilities is clearly indicated. Consequently, an extensive construction and installation program is planned during 1959-65. Planned investment during this period, about 14 billion rubles* compared with only 7 billion rubles for the preceding 7 years, appears, in general, to be adequate to carry out the program.** Emphasis will be placed on the construction of mainline coaxial and multiconductor cable and microwave radio relay lines, which will provide greatly increased interurban circuit capacity for telephone and telegraph services in those areas where it is most needed. Although the cost of these facilities is relatively

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

** For a full discussion of capital investment in the Ministry of Communications, see source .

high per kilometer, the facilities are attractively low in cost per channel. Expansion of direct circuits among enterprises will be accomplished by the construction of low-capacity wirelines and microwave radio relay lines (low in cost per kilometer but high in cost per channel). The installation of automatic exchange equipment and circuit multiplexing apparatus will be carried out on many circuits.

Facilities at republic levels and the lower administrative levels also will be expanded. In accord with the reorganization, communications organizations at these levels were delegated increased responsibility to plan, acquire, and expend local funds. Through the use of these funds, a part of which is being supplied by the sovnarkhozes, some local service is being provided.

Subscriber telegraph service (a two-way communications service between subscribers) commenced a few years ago and is expected to grow rapidly. By providing a rapid service with a written record, subscriber service is especially adaptable for sending and receiving documentary data, inquiries, orders, and telecomputer data. The importance of these services is shown by plans to increase the number of subscribers between 1959 and 1965 by 20 times.

With the partial resolution of the problems of the Ministry of Communications and the fulfillment of present plans, telecommunications service in the USSR is expected to improve during 1959-65. The service essential to the fulfillment of the economic plans will continue to be provided. In addition, more service will be available in many areas as reserve capacity and for private consumers. The rapidly expanding economy of the USSR, however, will continue to require ever increasing amounts of telecommunications service. As a result, the Ministry of Communications will be under continuing pressure to provide such service.

APPENDIX A

GLOSSARY OF TECHNICAL TERMS

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 that does not require direct, immediate human assistance.

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

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

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

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

Coaxial (as an adjective): Of or pertaining to a modern telecommunications cable medium technique using one or more tubes (sometimes called "pipes"). Each metal tube surrounds a conducting wire supported concentrically by insulators. The space in the tube usually contains nitrogen gas under pressure. Generally, coaxial cable is used for the transmission of information in complex form, such as radar, computer data, or television signals, and/or for the transmission of telephone channels and telegraph subchannels. A single tube usually carries information in only one direction at a time. The capacity of a tube depends in part on 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.

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

Feeder (as an adjective): Of or pertaining to telecommunications facilities of relatively low capacity that 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.

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.

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.

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 that 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 megacycles. 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 that 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 stature miles, depending on 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 two or more lanes and to carry one or more television and other specialized lanes and channels.

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.

Subchannel: A portion, electrical or physical, of a telecommunications channel that 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.

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.

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

GAPS IN INTELLIGENCE

The main gaps in information on the role of the Ministry of Communications of the USSR in the industrial reorganization of 1957 relate to the degree of responsibility delegated to local communications organizations for acquiring, planning, and expending investment funds and to the extent of actual transferral of the telecommunications facilities of the abolished industrial ministries to the control of the Ministry of Communications. Fragmentary data on these gaps are available but do not include sufficient detail. Such information is necessary for evaluating the economic capabilities of post and telecommunications in the USSR in relation to the economic and military programs.

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APPENDIX C

SOURCE REFERENCES

The sources cited in this memorandum are only a small number of those actually used. Selection for citation was based on the significance of the contribution that each made. The complete list of sources used is available in the files of this Office.

Evaluations, following the classification entry and designated "Eval.," have the following significance:

Source of Information	Information
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this memorandum. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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