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CENTRAL INTELLIGENCE AGENCY

WASHINGTON, D.C. 20505

20 June 1978

MEMORANDUM FOR: The Director of Central Intelligence

FROM : John N. McMahon
Deputy Director for Operations

SUBJECT : MILITARY THOUGHT (USSR): A System for the
Collection, Processing, and Transmission of
Information in a Military District

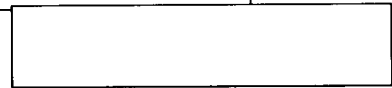
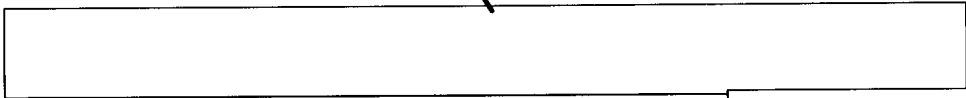
1. The enclosed Intelligence Information Special Report is part of a series now in preparation based on the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". This article expounds on the applicability of automated troop control systems, the introduction of which will make it possible to increase the efficiency of staffs and to eliminate the discrepancy between the increased troop combat capabilities and the existing means of control. Prior to embarking on automation the authors feel that there should be adequately trained personnel. The article presents the experience gained in this direction in the Leningrad Military District, and it also gives possible arrangements of the computer and communications centers. This article appeared in Issue No. 2 (72) for 1964.

2. Because the source of this report is extremely sensitive, this document should be handled on a strict need-to-know basis within recipient agencies. For ease of reference, reports from this publication have been assigned

JN
John N. McMahon

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Intelligence Information Special Report

Page 3 of 20 Pages

COUNTRY USSR

DATE OF INFO. Mid-1964

DATE 20 June 1978

SUBJECT

MILITARY THOUGHT (USSR): A System of Collection, Processing, and Transmission of Information in a Military District

SOURCE Documentary

Summary:

The following report is a translation from Russian of an article which appeared in Issue No. 2 (72) for 1964 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". The authors of this article are General-Mayor Yu. Abramov, Colonel V. Savelyev, and Colonel V. Cheremykh. This article expounds on the applicability of automated troop control systems, the introduction of which will make it possible to increase the efficiency of staffs and to eliminate the discrepancy between the increased troop combat capabilities and the existing means of control. Prior to embarking on automation the authors feel that there should be adequately trained personnel. The article presents the experience gained in this direction in the Leningrad Military District, and it also gives possible arrangements of the computer and communications centers.

End of Summary

Comment:

General-Mayor Yu. Abramov was also the co-author of an article "The Use of Automated and Mechanized Means in Organizing the Work of a Front Command Post" in Issue No. 2 (75) for 1965

Colonel V. Savelyev has written several other articles on troop control.

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A System for the Collection, Processing, and Transmission
of Information in a Military District

by
General-Major Yu. ABRAMOV
Colonel V. SAVELYEV
Colonel V. CHEREMYKH

The development and introduction of an automated troop control system will make it possible to sharply increase the efficiency of staffs and to eliminate the discrepancy between the increased troop combat capabilities and the existing means of control. However, until the adoption of an automated system, for which an extended period of time is required, it is necessary within military districts to carry out extensive preparatory work directed toward acquiring practical skills in the use of computers, keyboard calculators, punchcard calculators, and other automated means.

For this purpose, in our view, it is also possible to make very constructive use of the stationary computers which are being introduced into military districts and are already available in many institutions in large industrial cities.

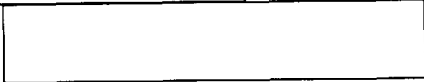
With stationary computers as a base, it is possible in advance to determine the sequence of information flow, to prepare algorithms and programs for numerous problems connected with troop control, and to acquire practical skills in solving them.

On the other hand, the work of directorates (departments) which perform a large number of complex calculations will be facilitated and accelerated when stationary computers are used in carrying out many of their everyday tasks.

The actual operation of the stationary computer must be preceded by the working out of a structural diagram for information exchange; the organizing of a communications system; and the definition, description, algorithmization, and programming of problems. It is experience from work conducted in this direction in the Leningrad Military District that we wish to share on the pages of the Journal.

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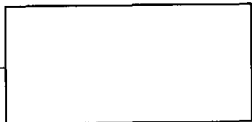
Working out a structural diagram for a system of information collection, processing, and transmission is one of the main problems in solving problems using computers. This diagram is a document in which is expressed the entire system of information flow from the original source (control organs at various levels) to the computer center and the sequence of information exchange itself within the established system.

What must be the general characteristics of the structural diagram for a system of information collection, processing, and transmission?*

One of the main requirements is that it ensure maximum operating efficiency of the district staff in peacetime and with the beginning of military operations. Fulfilment of this requirement rests on careful analysis of the functioning of the district staff as a large and complex troop control organ. Such analysis, conducted purposefully and primarily to reveal the most problematical "bottlenecks" in the functioning of directorates (departments), will make it possible to define a group of problems which it is expedient to solve by computer. For example, we have established that the use of computers is desirable in two cases: first, when the solving of a given problem on behalf of a given directorate (department) can result in a saving of time in comparison with manual labor; second, when greater accuracy can be obtained by computer than by calculating with other means. Preliminary analysis further shows that the greatest effect can be produced by computers only when the problems to be solved by them are based on information obtained from various sources located at a substantial distance from the district staff.

It is also important to emphasize that the structural diagram must be worked out on the basis of the existing organizational structure and location of the district troops. This is because the use of stationary computers in the district in the first stage is not designed to abruptly change the nature of the functioning of the directorates (departments) as it has developed by the given time, or their organizational structure. Such final goals can and will be attained later, with the introduction of an integrated automated troop control system at

*We shall henceforth refer to it in shortened form -- structural diagram.





the regiment--front command level.

In developing a structural diagram we must also determine the requirements of a communications system which provides for the exchange of information between the computer and the sources. These requirements will be the criterion in determining the number of additional communications means needed for practical realization of the structural diagram. In the process of working out such a diagram in the Leningrad Military District we have determined that the communications system for information exchange between the sources of information and the computer, even though it is set up with due consideration for that communications system operating in the district, must nevertheless possess sufficient flexibility and allow for the introduction of certain alterations. This is because the existing communications system is not designed to be used for transmitting information via computer. It must therefore be somewhat supplemented and adjusted in conformity with the requirements placed on the operation of the computer.

In order to increase the operating efficiency of communications means, it is best, in our view, to use both radio and wire channels on the same link, as well as bypass links.

The accuracy of information transmission depends directly on the reliability of the system set up. It is fully understandable that inputting garbled data into the computer will result in interruptions, stoppages, and delays, and in the case where the errors are not detected -- in more serious consequences. It therefore becomes necessary, in order to increase the accuracy of information transmission, to use methods which have been worked out and verified at exercises (the automatic error query method, the feedback check method, etc.).

Finally, an important requirement placed on a structural diagram is that it have long-range potential. The point here is that during the period when this system is being worked out and put into practice, it will not be possible to make a final determination of its load, channels, and information posts, since basic changes may occur in the location of the district troops and in the organization of the communications system. For this reason, the information collection and processing system must be constructed in such a way that any changes taking place will not



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essentially affect its overall structure.

Having reviewed the main requirements of a structural diagram, let us consider the procedure and sequence for working one out.

From the experience of the Leningrad Military District we may assume that problems will be solved mainly on behalf of the staff of the rocket troops and artillery, the rear staff and departments of the rear services directorate, the department of armored equipment, the engineer directorate, and the topographic department.

The tasks are allocated, according to type, for the performance of various calculations connected with district requirements for certain types of equipment, weapons, POL, and property, and their availability and movement.

The following problems may be cited as examples:

- calculation of the number of conventional and chemical warheads needed to provide for the combat training of the rocket troops and artillery of the district for the training year;
- calculation of the availability and movement of aviation fuel in the troops and at district depots;
- compilation of information on the supplying of the district troops with food.

From the group of peacetime tasks, we must single out those on which information will be transmitted by means of electrical communications. These tasks will usually include those for which information is received with the greatest frequency (at least once a day).

Having determined the list of tasks, we can work up a model for a diagram of the flow of information from the original sources, who will as a rule have electrical communications channels, to the computer center. It should then be established which information sources and how many of them will be drawn upon for each problem and the sequence and channels of information flow from each source to the computer, taking into account the

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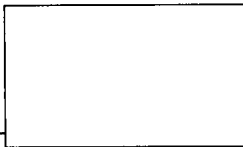
existing communications channels and means.

On the basis of this initial material, it becomes possible to work out an information flow diagram applicable to the specific conditions of location and organization of the district troops. A variant of such a diagram is shown in Figure 1.

According to the location of the troops and rear services organs and to the existing communications organization, the overall system of information flow can be divided into several independent links (in our variant there are five). These conditional links must correspond to the main links of the communications system and must clearly reflect the grouping of the information sources with regard to the district computer center.

In general, the information collection and processing system in each district may include the following levels: district, large unit (formation), unit, and separate garrisons of units of district subordination and of district rear services units and facilities. This system will include the district computer center, the information centers of formations and large units, and the information posts of regiments, garrisons, units of district subordination, and district rear services units and facilities.

In the diagram under consideration, we have taken as the primary sources of information the information posts (indicated on the diagram by triangles) to be set up in regiments which are an integral part of a division but are located separately from the headquarters of the divisions, in regiments of army subordination when they are located in separate garrisons, and also in garrisons in which only units of district subordination and district rear services units and facilities are located. It should be kept in mind that it is not desirable to set up an information post in every regiment and in every unit or facility of district subordination. This question must be decided in each instance on the basis of the situation. For example, if there are several regiments of one division at one military camp (small garrison), there should be an information post in only one of them, and units of division subordination as well as district rear services units and facilities located in these same garrisons must be attached to it.



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The information post must provide for the transmission of initial information, within the established time limit, by means of appropriate reports in a form acceptable for input into the computer. It must therefore be equipped with the necessary terminal equipment (STA telegraph sets, devices for making the information secure, and equipment for increasing the accuracy of transmission), capable of transmitting the indicated information.

A garrison information post must be relied upon for the transmission and receipt of information for all units based at the garrison. For example, an information post at a garrison at which there are depots will provide for the transmission of information on changes in the movement and availability of materiel and also for the receipt of requisitions and orders for the issue of materiel-technical means to the district troops.

It is planned to set up information centers (designated on the diagram by squares) in formations (large units). Here the incoming information must be processed. An information center may also be assigned to relay information forwarded from information posts but not subject to collation in the large unit (formation).

Information centers may be assigned to carry out the following tasks:

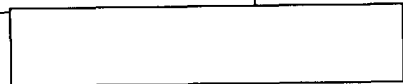
- collation and transmission of information to the computer center;
- receipt and processing of information coming in from the district computer center;
- delivery of received data to the responsible personnel of the departments (sections) and services of the staff of the large unit (formation).

While emphasizing the role of information posts (centers) in the information transmission system to be set up, we wish at the same time to guard against the false impression that the information post (center) represents some sort of autonomous independent element. In actual fact these elements are an integral part of the respective communications center, which is reinforced with the necessary equipment and servicing personnel.

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When a communications center is assigned to function as an information post (center), there should be a redistribution of responsibilities among the personnel of the communications center and appropriate training of specialists to transmit information to the computer.

To ensure the efficient operation of the information system to be set up, the sequence of information flow within it must be clearly defined.

Above all it should be noted that all information to be input into the computer must be prepared in strict accordance with the established forms. The time periods established for information collection when it is being processed manually must be sharply reduced, since otherwise the effectiveness of using computers will be lessened.

The general sequence of information flow may be as follows. Information from a unit which is an integral part of a large unit (if there is not an information post deployed at the unit) goes to the garrison information post and on to the information center of the large unit.

Units located in the same garrison with the headquarters of a large unit transmit their information directly to the information center of the large unit. After appropriate collation, the information is transmitted through to the district computer center, and from large units which are an integral part of an army or army corps it goes simultaneously to the army information center as well.

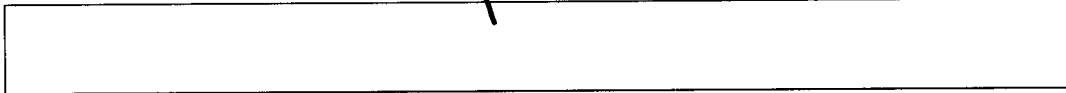
Data are either processed preliminarily at the army (corps) information center or are transmitted directly through to the computer center.

Information from units and facilities of district subordination is transmitted to the garrison information post, from which it goes by communications channels through the information center of the large unit (or directly) to the district computer center.

Units and facilities located in the same garrison with a computer center transmit information to it directly.



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On the diagram is shown the number of information posts (centers) as applicable to peacetime. There is no question that after the troops have moved up to the concentration areas, and also while mobilization is in progress, the number of information posts (centers) will increase sharply. On the basis of the specific conditions of each district, this number can be determined and added to the table given on the diagram.

Since the diagram is a necessary document for the work of a wide circle of personnel connected with its practical realization, it is best not to show the true designations of large units (units) at which information posts (centers) are being set up, in order to avoid revealing the complete location and grouping of the district troops. Information posts and centers should be given code numbers, and those in large garrisons should be designated by city names. For a limited circle of personnel it will undoubtedly be necessary to have another version of the diagram with the true designation of formations, large units, and units, and their locations.

After working out a diagram for the flow of information in the district, we can proceed to work out a schematic structural diagram for the collection, processing, and transmission of information when stationary computers are being used in carrying out tasks of the military district. The initial material for this will be selected links for passing information and a certain number of information posts (centers) on each of the links and directly connected with the computer center.

In addition, on the basis of an analysis to be made of the problems proposed to be solved by computer, it is necessary to establish the degree of interest of the directorates (departments) in any given problems.

A variant of a schematic diagram for information collection, processing, and transmission is shown in Figure 2.

The schematic structural diagram shows the number of information posts (in circles) and information centers (in rectangles) in each link, as well as the directorates and departments participating in the overall system of information transmission and the problems to be solved on behalf of the indicated directorates (departments). As is evident from the



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diagram, information flow is projected according to two variants.

The first variant is the transmission of information through the district communications centers to the computer center (if the computer center does not have a communications center).

The second variant is the transmission of information directly to the communications center of the computer center.

The flow of information to the computer center is projected through two channels: from the information centers (posts) directly to the computer center and from the information centers (posts) to the directorates (departments) concerned and then to the computer center. The intention here is that in many instances (according to the individual tasks) directorates (departments), having received the information, will collate it and then transmit it to the computer center. After this information is processed at the computer center, the necessary data will return to the respective directorates (departments).

The schematic structural diagram is worked out by the operations directorate with the participation of representatives from the communications directorate, the rear staff, and other directorates (departments).

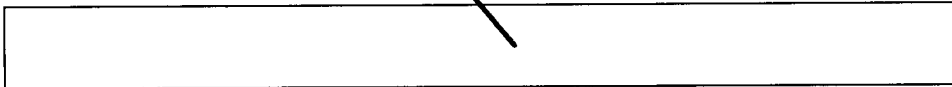
After the documents have been worked out in conformity with the structural diagram, it is advisable to discuss them with the chiefs of the district directorates (departments) and then to submit them for approval to the troop commander and the senior staff.

Having determined the main link in the methodology for working out a structural diagram for the collection, processing, and transmission of information for everyday tasks, it is next necessary to indicate, if only in general form, the sequence of information flow for the problems to be solved at command-staff exercises and war games.

The most typical of them, in our view, are the following:

1. Determination of the nuclear charge and the number of missiles needed to destroy enemy installations.

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2. Determination of the required allocation of forces and the probability of destruction of targets by nuclear or conventional warheads.

3. March calculations in regrouping troops.

4. Evaluation of the combat capabilities of the SAM systems.

5. Collection, collation, and distribution of data on the radioactive contamination of terrain (according to data from radiation reconnaissance), and many others.

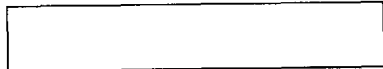
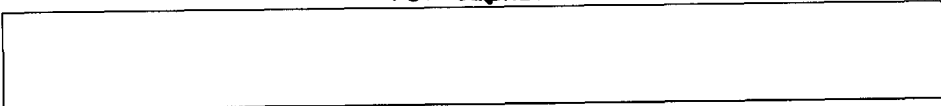
Despite the importance of the enumerated tasks, we are not able to work out information flow systems for them in detail. This is because each exercise (game) is unique as to concept, composition, scope and allocated means, layout, and relative positioning of control organs. It is therefore not possible to work out in advance, and plan for, possible organizational variants in the system for collating and processing information on assigned tasks. Under these conditions, obviously, an operating procedure for such a system can be presented only in general form.

A schematic diagram of the information flow for problems to be solved at command-staff exercises and in military districts is shown in Figure 3.

On the diagram are represented the directorates (departments) of the field headquarters of the front, the code numbers of the tasks to be handled for each directorate (department), and the proposed sequence of information flow from the troops, large units, units, and installations of front subordination. The intention here is that all information come initially to the field communications center set up for the duration of the exercise and then be transmitted to the district communications center, which is located at the permanent location point of the district headquarters, or directly to the communications center of the computer center.



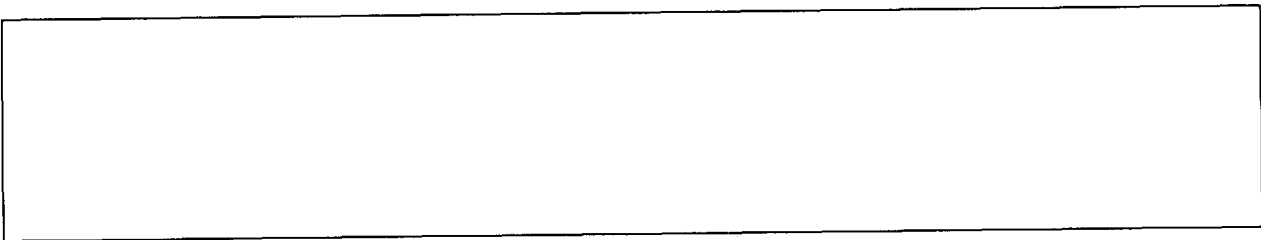
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In this article we have considered only a few of the methodological questions of working out a structural diagram for a system for the collection, processing, and transmission of information and for its practical realization when computers are being used in carrying out tasks in a military district. Only the experience of the Leningrad Military District in this field has been used. Therefore, the proposals made in this article require further refinement and study through military-scientific work, troop exercises, and games. We also consider that it will be very useful to have an exchange of the experience acquired by other military districts in the course of carrying out similar tasks.



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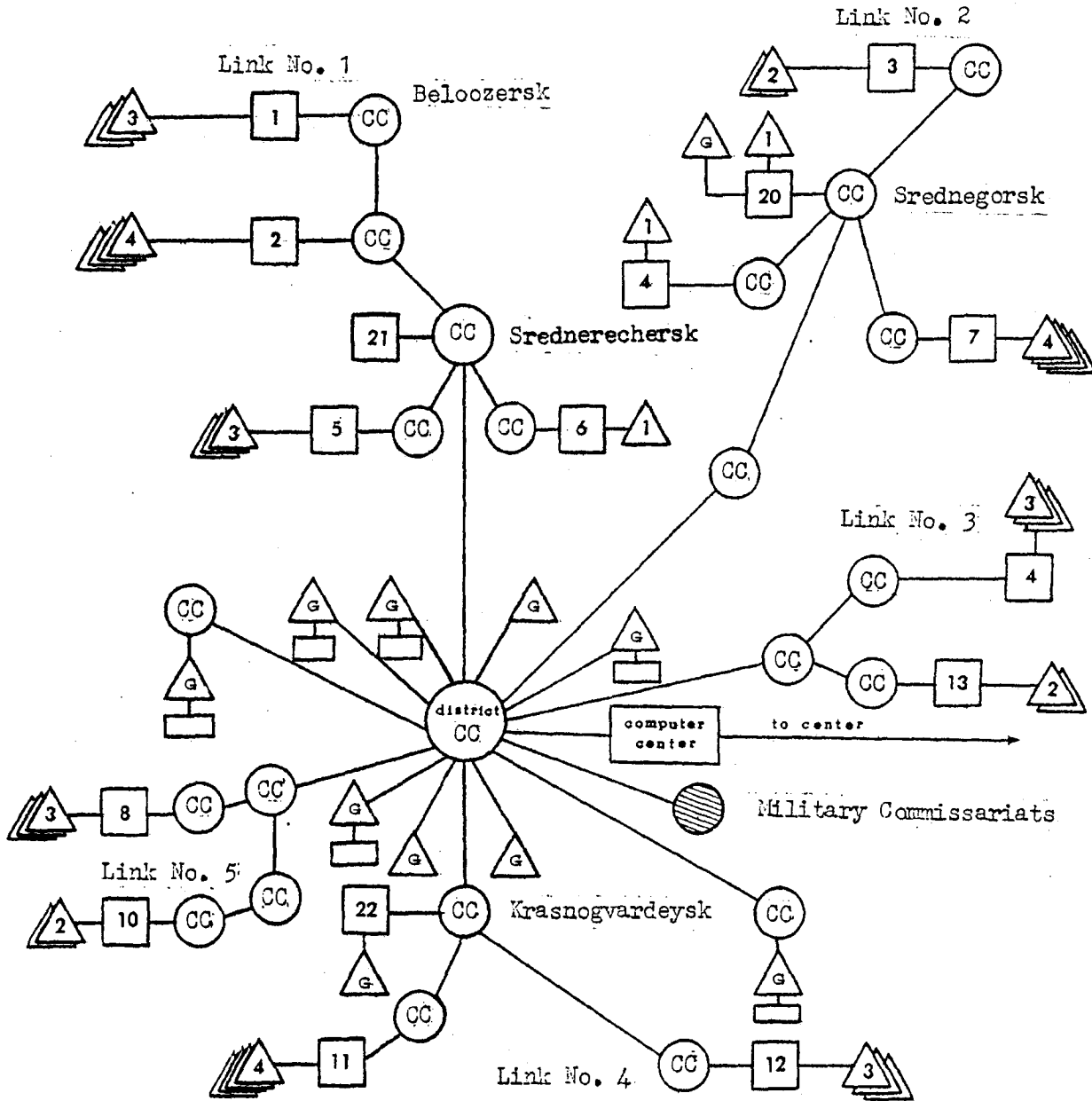


Figure 1. Diagram of information exchange within a district.

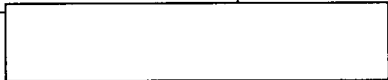
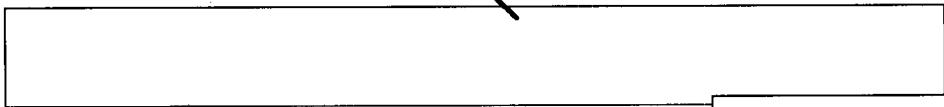


Figure 1. continued.

Number of information processing posts and centers

Links	Number of:			Preliminary information processing center
	Inf. posts	Inf. centers	Computer centers	
Link No. 1	11	2		one at army level
Link No. 2	9	4		one at army level
Link No. 3	5	2		
Link No. 4	3	3		one at corps level
Link No. 5	5	5		
Center of district comm. centers	4			
Total	37	16		

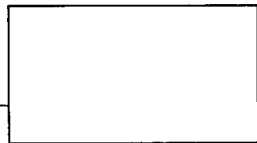
Key

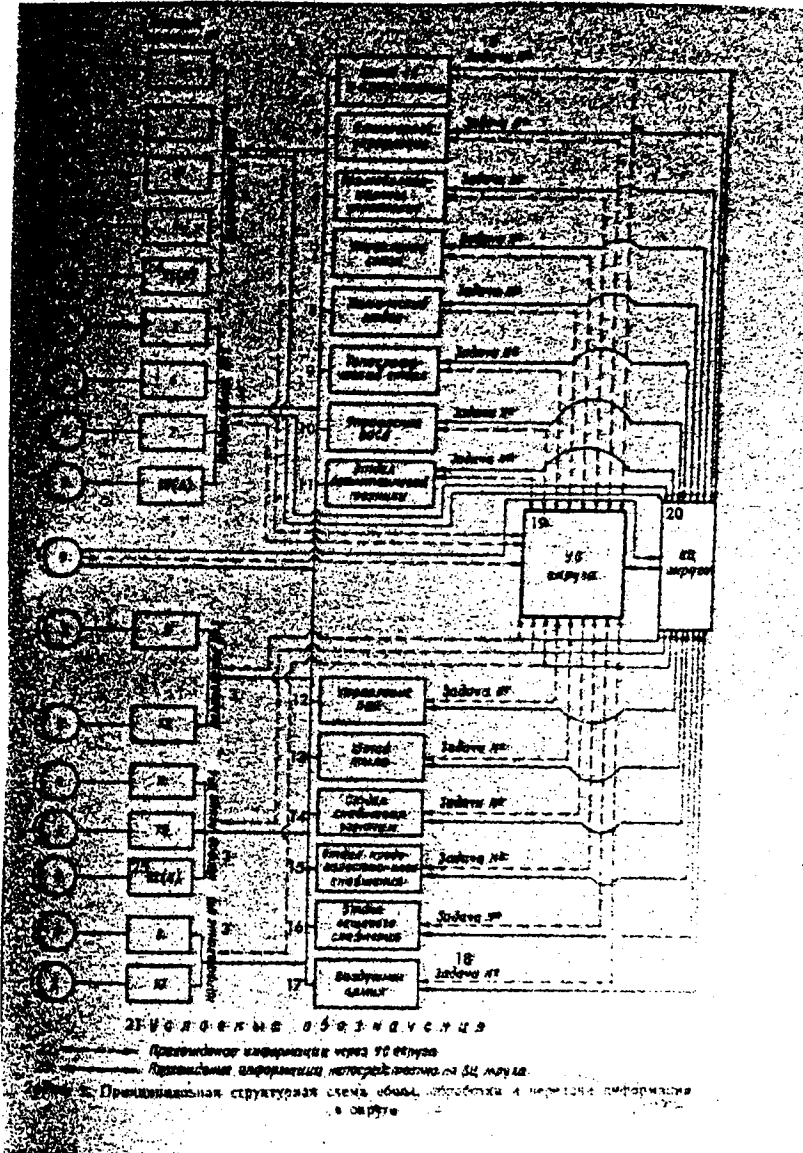
CC - communications center

△ Information post
(G - of garrison)

□ Information centers
(Nos. 1-13 of large units, Nos. 20-22 of armies and corps)

□ Rear services units and facilities of the district





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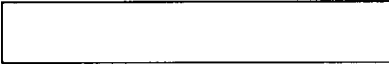
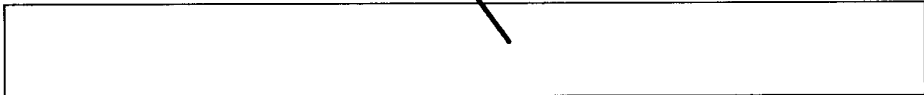
KEY

1. Information posts
2. Information center No.
3. Link No.
4. Staff of Rocket Troops and Artillery
5. Engineer Directorate
6. Organization and Mobilization Directorate
7. Communications Directorate
8. Chemical Department
9. Topographic Department
10. Military Transportation Directorate
11. Department of Armored Equipment
12. Air Defense Directorate
13. Rear Staff
14. Department of Fuel Supply
15. Department of Food Supply
16. Department of Clothing Supply
17. Air Army
18. Task No.
19. District communications center
20. District computer center
21. Legend
22. Flow of information through district communications center
23. Flow of information directly to district computer center
24. Army subordination
25. Corps subordination
26. Figure 2. Schematic structural diagram of the collection, processing, and transmission of information within a district.

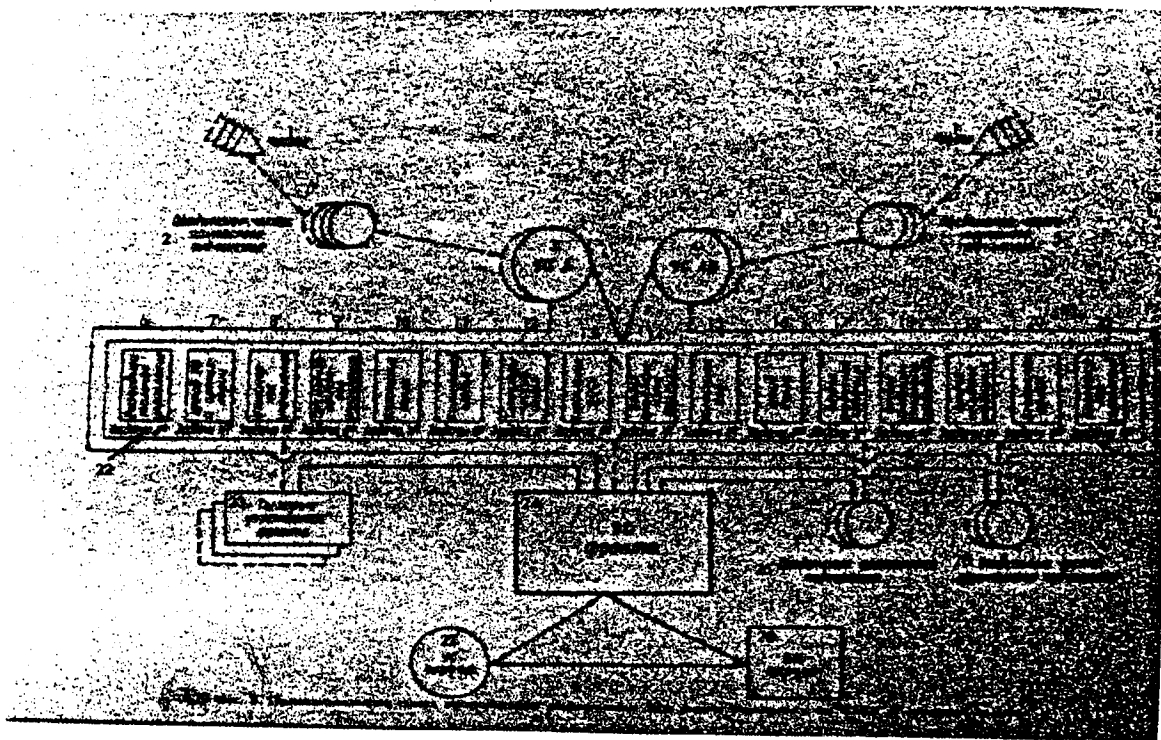
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KEY

1. Units
2. Large units, units of army subordination
3. Army communications center
4. Army corps communications center
5. Large units, units of corps subordination
6. Intelligence Directorate
7. Staff of Rocket Troops and Artillery
8. Engineer Directorate
9. Organization and Mobilization Directorate
10. Communications Directorate
11. Chemical Department
12. Topographic Department
13. Military Transportation Directorate
14. Department of Armored Equipment
15. Air Defense Directorate
16. Rear Staff
17. Department of Fuel Supply
18. Department of Food Supply
19. Department of Clothing Supply
20. Air Army
21. Operations Directorate
22. Task No.
23. Front rear services facilities
24. Front communications center
25. Large units of front subordination
26. Separate units of Front subordination
27. District communications center
28. District computer center
29. Figure 3. Schematic diagram of information flow for problems to be solved at command-staff exercises in military districts.

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