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CENTRAL INTELLIGENCE AGENCY
WASHINGTON, D.C. 20505

20 October 197

MEMORANDUM FOR: The Director of Central Intelligence

FROM : William W. Wells
Deputy Director for Operations

SUBJECT : WARSAW PACT JOURNAL: Automation and Mechanization of Control

1. The enclosed Intelligence Information Special Report is part of a series now in preparation based on articles from a SECRET Soviet publication called Information Collection of the Headquarters and the Technical Committee of the Combined Armed Forces. This article relates the experience of using computers and other automated and mechanized equipment in the ODER-NEISSE exercises of 1969. The organization of work is described with examples of problems and programs, and the advantages over manual computation methods are cited. Detailed diagrams are given for the planning and control group and the information group set up to perform this work. This journal is published by Warsaw Pact Headquarters in Moscow, and it consists of articles by Warsaw Pact officers. This article appeared in Issue No. 1, which was published in 1970.

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

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Intelligence Information Special Report

COUNTRY USSR/WARSAW PACT

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DATE OF INFO. 1969

DATE 20 October 1977

SUBJECT

WARSAW PACT JOURNAL: Automation and Mechanization of Control

SOURCE Documentary

Summary:

The following report is a translation from Russian of an article from a SECRET Soviet publication called Information Collection of the Headquarters and the Technical Committee of the Combined Armed Forces. This journal is published by Warsaw Pact Headquarters in Moscow, and it consists of articles by Warsaw Pact officers. This article was written by General of Brigade V. Mruv. This article relates the experience of using computers and other automated and mechanized equipment in the ODER-NEISSE exercises of 1969. The organization of work is described with examples of problems and programs, and the advantages over manual computation methods are cited. Detailed diagrams are given for the planning and control group and the information group set up to perform this work. This article appeared in Issue No. 1, which was published in 1970.

End of Summary

[redacted] Comment:

The names of authors are given in Russian transliteration. The diagrams on pages 11 and 12 were of very poor quality and could not be fully recovered.

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Automation and Mechanization of Control (Based on Experience of the Exercises ODER-NEISSE-69)

by

General of Brigade V. MRUV
Deputy Chief of the General Staff, Polish Armed Forces

For over ten years we have been carrying on intensive work in the Armed Forces of the Polish People's Republic to research and introduce new methods and technical means of control. An important milestone in this field were the ODER-NEISSE-69 exercises. The inter-ally nature of these exercises afforded the opportunity to employ an organized array of forces and means of automation and mechanization of control processes at the command and rear control posts of a combined-arms army and divisions of four fraternal armies, and also to test the scientific and practical achievements attained in this field.

Each allied army that took part in the exercises reported its technical solutions pertaining primarily to the program base. This afforded the opportunity to acquire more complete practical experience, to test the suitability of the programs developed, and also to compare the trends in the development of automation and mechanization of the control processes of the allied armies.

The combined-arms army in which means of automation and mechanization of control processes were employed prepared and conducted an offensive operation to a depth of 250 kilometers in a zone 140 kilometers wide at a rate of up to 60 kilometers per day. In the course of actions, it conducted a meeting engagement, broke through an enemy defense from the march, made assault crossings of water obstacles, and set down an airborne landing force. In the first three days, combat actions were conducted without the use of weapons of mass destruction; and thereafter, with the use of them. The command posts of the army were relocated three times.

The following organizational structure of automation organs was adopted for the exercises: directing body, coordination group, research group, army automation and mechanization group made up of 17 persons at the command post and six persons at the rear control post, division automation

and mechanization groups of four persons at the command post and three at the rear control post, programming and operations groups, communications groups at computer centers. The exercises showed the advisability of organizing such groups in the staffs of formations and large units.

Used as means of automation and mechanization of control processes were:

-- stationary electronic computers (MINSK-22M);

-- electronic and electromechanical computers adapted for work under field conditions;

-- technical means that improved the work of staffs and were installed in the staff vehicles;

-- communications means allocated for the requirements of automation (means of telecode communications, telegraph and telecopy communications, ciphering devices, a helicopter).

The stationary system of automatic information processing, organized in an experimental way, consisted of three computer centers connected into one system with the aid of communications.

For the exercises, two basic of sets of programs were prepared:

-- set one, containing 43 programs to be solved with the aid of electronic computers -- 30 operational-tactical and 10 rear services problems for the requirements of a combined-arms army and divisions; three programs pertained to the compilation of topographic documents and calculations;

-- set two, containing 72 programs -- local operational-tactical problems (43) and rear services problems (29) to be solved (analogously to set one) with the aid of means of mechanization.

With the aid of the programs, operational-tactical and rear services problems were solved for performing various computations and calculations pertaining to:

-- assessment of combat status;

-- calculation of the balance of forces;

-- planning of regroupings;

-- assessment of the effectiveness of nuclear strikes;

-- determination of the capabilities and requirements of rocket troops and artillery;

-- assessment of the capabilities and optimum grouping of air defense means;

-- forecasting of contamination and contagion;

-- optimum variant of the assault crossing of water obstacles;

-- carrying of troops by air transport;
-- planning of materiel, technical, and medical support;
-- topographical calculations.

From what is mentioned above, it follows that there were solved not qualitative but quantitative problems pertaining, for instance, to the assessment of the condition of the sides or to certain matters of the planning of combat actions.

Individual programs were used on different scales, from the solution of single problems in one variant to the calculation of the balance of forces and means in twenty or more variants in one situation. Considering the large volume of information to be processed in a relatively short time, the latter case proved to be the most effective.

The technological cycle of the information process contained the following operations:

-- filling in of forms with the data necessary for the solution of problems;
-- punching of the input data at command posts or rear control posts;
-- delivery of the punched tape to the communications center of the command post for enciphering and transmission over communications channels;
-- receipt and deciphering of the punched tape at the communications center in the computer center;
-- feeding of programs and input data from the punched tapes into the memory of the computer;
-- processing of the information in the computer;
-- presentation of output information in the form of a punched tape;
-- delivery of the tape with the results to the communications center of the computer center for enciphering and transmission over a communications channel;
-- receipt of a punched tape with the results of calculations at the communications center of the command post (rear control post), deciphering, and delivery to the automation and mechanization group at the command post (rear control post);
-- printing of the contents of the problem solved on a teletype (in alphanumeric form) and delivery of it to the concerned organ at the command post (rear control post).

Of the operations enumerated above, the enciphering, deciphering, receipt, and transmission of the information were automated. Punching of the data was performed manually. Delivery of information in the communications centers of the command posts and stationary computer centers

was not automated.

It should be emphasized that, in the technological cycle, the solution of individual operational-tactical problems lasts an average of 80 to 140 minutes, while it takes up to 150 to 200 minutes for the non-automated operations. The work time of the automated equipment altogether amounts to only one-sixth of the total time.

To obtain the calculations needed, the individual control organs made requests for machine (automatic) processing of data pertaining to operational and fire problems, problems of materiel support, etc. through the army automation and mechanization group. The personnel of the automation group transmitted the input data (after appropriate preparation of them) to the computer centers with the aid of telecode communications or ordinary means of communications. From the computer centers, the processed results of the calculations were transmitted to the organs concerned in tabular form. The organization of work at division command posts is presented in Figures 1 and 2.

The results obtained from the use of means of automation and mechanization should, on the whole, be appraised positively in spite of the fact that they pertained not to qualitative but to quantitative problems. With the aid of the prepared programs, 232 operational-tactical and rear services problems were solved, 70 percent of them in the preparation period, and 30 percent during combat actions. The use of electronic machines in the solution of computation and calculation problems afforded a great saving of time.

Let us cite a few examples. To calculate the balance of forces with the aid of programs required one-third the time (30 to 40 minutes) of the manual method. Besides that, by using a program for calculating the balance of forces it was possible in a relatively short time to obtain results in many variants. In determining the capabilities and requirements of rocket troops and artillery concerning the number of missiles, nuclear weapons, and their allocation by targets, a threefold and even a sixfold reduction of time was achieved in comparison with the work of an officer using the corresponding tables. The combat capabilities of the forces and means of air defense, the groupings of missile units, and the planning of their relocations were assessed four times as fast as with the manual method. Calculation programs to assess and plan rear services support were solved in four hours (five to eight times as fast as heretofore).

During the planning of a regrouping of troops over a great distance, use of a program shortened the time by 30 percent. Two hours were spent on preparing the data, and 25 minutes on machine computations. Detailed march tables for each column, as well as a summary table, were obtained.

During the assessment of the effectiveness of nuclear strikes, five to ten minutes were required to prepare the input data, but to compute and transmit the data with the aid of unimproved transmitting means took two hours. The results obtained showed the optimum variant of nuclear strikes and their aftereffects.

During the calculation of the fire capabilities of artillery and its supply with ammunition, two hours were required for preparing the data and computing. The program afforded the possibility of obtaining detailed data concerning fire capabilities, favored the working out of corresponding concepts of the use of artillery, and proved suitable during both the planning and the course of the operation. But it was necessary to spend two to three hours to deliver the program by messenger means of communications.

The program of the planning of the regrouping and employment of surface-to-air missiles provided the receipt of results in a longer time -- about four hours; therefore, it did not prove very suitable during the operation.

The program to forecast losses resulting from strikes of weapons of mass destruction was used extensively. Data about contamination and predicted radiation were obtained in a relatively short time (45 to 75 minutes, i.e., five to eight times as fast as heretofore). However, this program required more voluminous input data.

In the opinion of some officers, similar data could be obtained by using a special slide rule.

In rear services support, programs were used in the integrated assessment of the capabilities of the rear services for materiel and technical support, in the planning of this support and delivery, and in the assessment of the capabilities of transport, medical, and technical support.

In this case, the use of electronic computers and means of intermediate mechanization shortened calculation time by 60 percent.

Basically, all the programs used proved suitable. They lightened the work of officers, relieving them of laborious computations.

The timeliness of getting data was affected to a great extent by the means of transmission. Data processing time was reckoned in minutes, but telecode communications time in hours. Therefore, it should be considered that the use of appropriate means of telecode communications will raise the effectiveness of electronic computer equipment in troop control.

The experience acquired shows that the programs being used during maneuvers will, after some changes, be suitable for use in everyday work. It is necessary to introduce changes in the information portion since it was too voluminous and contained: input, 50 to 3,000 characters, and output, 400 to 600,000 characters of information on various operational-tactical and rear services problems; as a result of this, too much time was spent on filling in the forms. Most often, the reason for this was the endeavor of programming specialists to give the staff officers the most exhaustive information. It seems that, if the program users are better prepared to use the results of the work of computer equipment, it will be possible to reduce the volume of output information and the number of forms.

As the experience mentioned above shows, in some cases when solving particular problems concerning, for instance, the planning of a march or the calculation of the balance of forces, it was more expedient to employ means of mechanization rather than means of automation, the more so as the problems were solved on the spot in staffs without transmission and loading of telecode channels.

The information obtained as a result of machine processing of data was the basis of evaluations of the decisions to be made. Most often, electronic computer equipment was used in the preparation period of the operation, especially during the working out of the numerous calculation data. The demand for information processing was greatest in this period.

It should be considered that stationary electronic computer equipment can be used successfully on one's own and allied territory until a field system of control is created and developed; it can be used fully in combined exercises of operational troops and territorial defense troops, and partially during staff training activities.

Stationary electronic computers can be used for troop needs even under conditions of the establishment of an automated field system of troop

control to record in the computer memory information concerning the geographical surroundings and the preparation of the theater of military operations.

The exercises have fully shown the necessity of organizing a unified tactical information processing and transmission system which would provide automatic recording, selection, sorting, and retrieval of information for processing in electronic computers.

PLANNING AND CONTROL GROUP

Composition: division commander, chief of staff, chief of operations section + 2 officers, chief of communications section, chief of chemical support, chief of automation and mechanization group + 3 officers.

Tasks: planning of combat actions and control of troops of the division.

Equipment:
1. Means of processing information: electronic and mechanical calculators, electronic computers of stationary computer centers.

2. Means of recording and presenting information: power-line and battery receivers, dictaphone, monitor.

3. Means of transmitting information: telecoding device, teleprinter, loudspeaker system, radiotelephones, remote devices from radioreceiving equipment room, secure telephone communications device.

4. Office equipment: staff tables, officer's filing cases, staff maps, transparent maps, blanks of combat documents, etc.

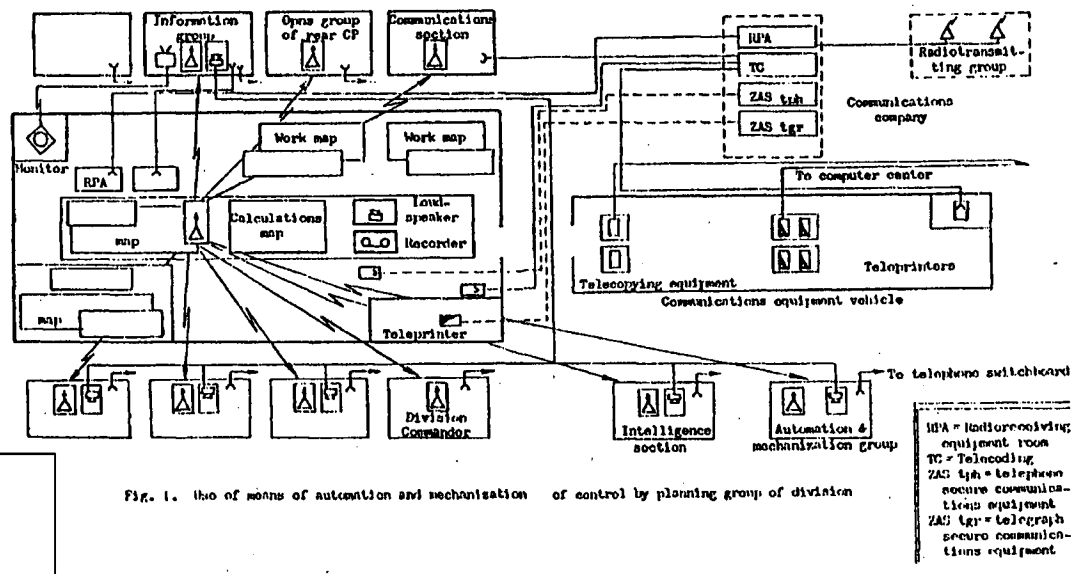

Fig. 1. Use of means of automation and mechanization of control by planning group of division

INFORMATION GROUP

Composition: senior assistant to chief of operations section, senior assistant to chief of communications, clerk-draftsman.

Tasks: collection, preliminary working out, and transmission of information about own troops.

Equipment:

1. Means of processing information: electronic and mechanical calculators, electronic computers of stationary computer centers ( ).

2. Means of recording and presenting information: recorder, television camera (experimentally).

3. Means of transmitting information: telecoding device, teleprinter, loudspeaker system, radiotelephone, remote devices from radioreceiving equipment vehicle (RPA), secure telephone communications device.

4. Office supplies: staff tables, officer's filing cases, transparent maps, maps with emulsion coating, blanks of combat documents, etc.

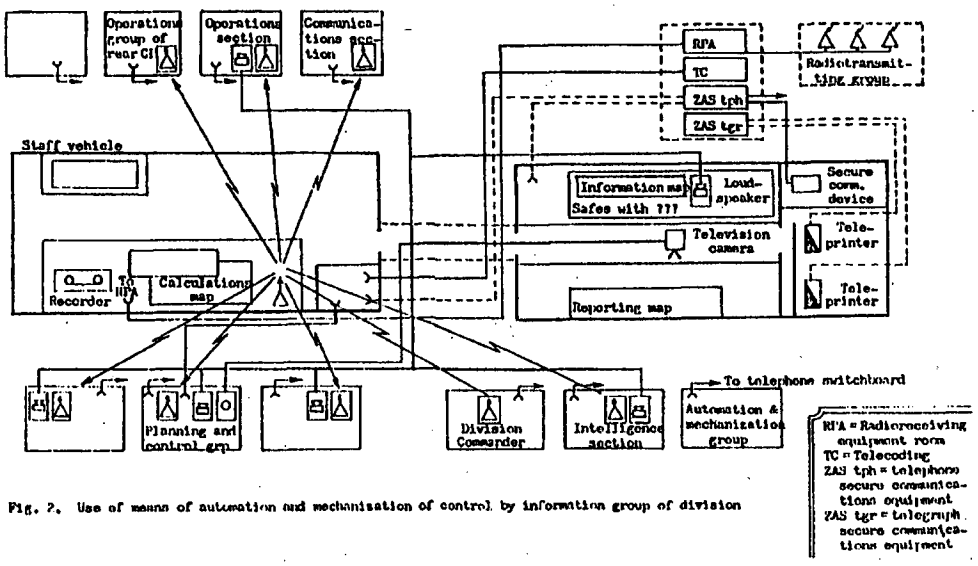

Fig. 2. Use of means of automation and mechanization of control by information group of division

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