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CENTRAL INTELLIGENCE AGENCY
WASHINGTON, D.C. 20505

11 July 1978

MEMORANDUM FOR: The Director of Central Intelligence
FROM : John H. Stein
Acting Deputy Director for Operations
SUBJECT : MILITARY THOUGHT (USSR): Introduction of
Electronic Computers into Staff Work

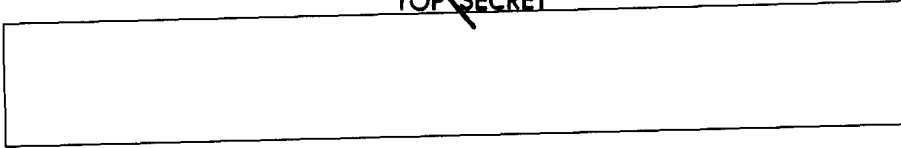
1. The enclosed Intelligence Information Special Report is part of a series now in preparation based on the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". This article maintains that computers, in spite of their obvious advantages, are not properly exploited in war games because officers do not know how to use them and because communications breaks often delay access to them. To remedy this situation, officers must become proficient in the use of computers through instruction and practice -- through some sort of time sharing arrangement until more computers are available -- and computers must be placed on motor vehicles or train cars so they can accompany staffs in the field. 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

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Intelligence Information Special Report

Page 3 of 10 Pages

COUNTRY USSR

DATE OF INFO. Mid-1964

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SUBJECT

MILITARY THOUGHT (USSR): Introduction of Electronic Computers into Staff Work

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". This article, by Colonel A. Laptev, maintains that computers, in spite of their obvious advantages, are not properly exploited in war games because officers do not know how to use them and because communications breaks often delay access to them. To remedy this situation, officers must become proficient in the use of computers through instruction and practice -- through some sort of time sharing arrangement until more computers are available -- and computers must be placed on motor vehicles or train cars so they can accompany staffs in the field.

End of Summary

Comment:

Colonel Laptev also wrote "The Use of Electronic Computers in Military Science Research" in Issue No. 1 (80) for 1967

~~TOP SECRET~~

~~TOP SECRET~~

Page 4 of 10 Pages

Introduction of Electronic Computers into Staff Work

by

Colonel A. LAPTEV

Experience from exercises and war games conducted in recent years shows the real need for extensive introduction of electronic computer equipment into the practical work of operational staffs.

The ideal solution to this problem is to develop specialized small-sized mobile computers designed for military use. Much work is being done in this direction. However, until they are developed and introduced among the troops, extensive use must be made of existing general-purpose computers. The computers available in the various scientific research institutions of the Ministry of Defense and in the military academies, as is known, possess excellent technical features, and they are already being used to perform many calculations, not only technical but also operational. There is also experience in using them to solve certain problems of troop control at command-staff exercises and war games.

However, the use of general-purpose computers in support of troop control, particularly in the ground forces, is somewhat hampered by the lack of high-speed equipment for information input and output and of a clear way of representing the operational situation and also by the bulkiness of the computers. As a result, not all calculations (problems) can be done on these machines, and a relatively large amount of time is still required to carry out some of them.

The most suitable for work under field conditions are transistorized general-purpose computers. They are small in size and can be accommodated in a motor vehicle. They include the MINSK-2, the BESM-3, the RAZDAN, and others which have tactical-technical features (with regard to high speed and memory) making it possible to perform operational-tactical calculations of any volume and for different operational staffs.

~~TOP SECRET~~

~~TOP SECRET~~

Page 5 of 10 Pages

Experience from command-staff exercises and war games has shown that the use of computers to do calculation and information tasks significantly increases the efficiency of staff work. Machine calculations make it possible to more thoroughly and correctly estimate the effects of nuclear weapons, the probable losses in personnel and combat equipment, and the doses of radiation our own and enemy troops receive, and they also make possible a more reasonable distribution of nuclear warheads among targets.

If officers, staffs, and specialists are working with computers efficiently and in a well-organized manner, and if communications means are in continuous operation, general-purpose computers provide a saving of time and sharply increase the accuracy of operational calculations. As confirmation of this, let us cite a few examples.

In planning an initial nuclear strike at one of the exercises (Leningrad Military District), the manual method of performing the calculations for 10 strikes required the participation of eight people, and it took three hours to solve the problem. Machine solution of the same problem, but for 74 strikes, done on the M-20 computer at an exercise in the Military Academy of the General Staff took only two hours, and only two people took part in the work. Another example. An hour and a half was required for manual determination of the radiation dose of personnel from 15 to 20 nuclear strikes (an exercise of the Kiev Military District); using computers, this problem was solved in half an hour.

At one of the operational exercises, an army of the front second echelon found itself in a zone of high radioactive contamination. The army commander made the decision to immediately remove the troops to another area. However, calculations performed by computer indicated that it would be less dangerous for the army to remain (until the radiation level fell) in the original area, which even though contaminated had engineer preparations, than for it to move to a new area.

The need to use computers was demonstrated the most convincingly at one of the war games in carrying out the task "Estimating the Balance of Forces in Terms of Nuclear Means." Initial calculations on the strength of the groupings of the two

~~TOP SECRET~~

~~TOP SECRET~~

Page 6 of 10 Pages

sides showed that under the given concept, taking enemy counteraction into account, only 11 percent of the aircraft carrying nuclear weapons could reach their targets. The directing body of the exercise had to review the concept and the plan for conducting the game in order to create a more realistic balance of forces of the sides and a proper distribution of troop efforts in the initial nuclear strike. Calculations for the new conditions gave a different picture: the effectiveness of front aviation in delivering nuclear weapons increased to 63 percent.

Despite this operating efficiency of computers, their introduction into troop control is proceeding slowly. The principles of using computer calculations in command and staff work are poorly developed. Machine calculations are often used for checking and monitoring manual calculations. Naturally enough, all of this fails to produce the required effect in improving the quality and efficiency of staff work.

The exercise directing body and the front (army) troop command still do not always require that participating staffs show evidence of the effectiveness of the initial nuclear strike results or provide data on the distribution of nuclear means, on the determination of the number of nuclear warheads required for the enemy targets, and on the suitability of the air defense grouping set up, etc. In many instances, these questions are resolved at exercises without the necessary precision; and as a result there is an overexpenditure of nuclear means, enemy targets are struck with low reliability, insufficient consideration is given to the effect of the radiation situation on troop actions, etc. For example, at one of the exercises of the Leningrad Military District, a manual variant of distributing nuclear warheads among enemy targets was checked by computer for monitoring purposes. The calculations showed that six of the 15 planned targets could not be struck with the assigned degree of destruction, while yields were considerably overestimated for two targets.

At an exercise of the Military Academy of the General Staff, in determining the required number and yield of nuclear warheads needed for 30 targets, manual and machine calculations were performed. Comparison showed that with manual calculation, the nuclear warhead yields for eight targets were overestimated by 95 percent, while they were greatly underestimated for 11 targets.

~~TOP SECRET~~

~~TOP SECRET~~

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Page 7 of 10 Pages

At an exercise of the Kiev Military District, the commander's decision called for striking 22 targets with nuclear means, while machine calculations showed that the front actually had the capability to strike only 16 targets with the warheads allocated.

In order to remove the existing shortcomings in the use of computer equipment in troop control, it is necessary first of all to carry out more purposeful training of generals and staff officers in the methods of using computers to perform operational-tactical calculations.

The Minister of Defense demands that in working out military problems we make every possible effort to introduce research methods, more fully exploit the capabilities of small computers, and conduct command-staff exercises and war games using small computers, including computers of scientific research institutes.

It appears to us that in order to fulfil this important task it is necessary to set aside a special time within the system of command training in order to instruct officers and generals in the use of the means of automation and mechanization and impart to them the skills required to work with these means. Activities must obviously be conducted by directorate and department, so that operational-tactical tasks can be carefully studied in relation to the functional responsibilities that the officers and generals will have to carry out in practice. In order for them to consolidate the knowledge obtained, standardized documents should be filled out at staff training sessions (short problems) and the results obtained should be analyzed by computer. In some instances, if possible, practice in solving different problems must also be planned during training sessions.

Computers are of particular importance in the educational and scientific research work of academies. Students must not only know the principles of using computers, but must also be able to work with them in practice. Our scientific research organizations studying problems of automating troop control processes must improve the methods of using existing computers in staff work.

The use of computers is the most difficult when playing out combat actions. According to experience from a number of exercises conducted by the Kiev, Leningrad, and other military

~~TOP SECRET~~

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~~TOP SECRET~~

Page 8 of 10 Pages

districts, the number of problems solved by computer drops sharply when the operation begins. The reason for this is primarily the unreliable operation of communications means when control posts are relocated and, as a result of this, the impossibility of solving the necessary problem in time.

It is known, however, that using computers to solve problems for assessing the effectiveness of the nuclear strikes of the two sides, predicting the radiation situation, determining the required number of nuclear strikes for each target, and distributing the nuclear means among the targets makes it possible not only to record the progress of the operation but also to analyze it more thoroughly. And the problems for calculating the anticipated losses in troops and combat equipment from enemy nuclear strikes and determining the expected radiation dose of personnel make it possible to accumulate such data throughout the operation and to issue them as needed, expressed both in absolute terms and in percentages for each item previously fed into the machine.

The question of using the computers of scientific research institutes also requires more precise resolution. At the present time, all calculations needed for staffs, and for many military educational institutions as well, are performed almost entirely in the form of separate assignments by the scientific personnel of these institutes. The future expansion of the volume of this work makes it necessary to change these methods. In our opinion, the solution of problems by computer must be carried out by personnel of the interested staffs and academies themselves but using allocated machine time in the respective scientific research institutes. To this end, computers of these institutes must be allotted to definite staffs and academies after continuous telegraph communications have been established between them. If this is done, the district staff or the academy will be able to solve its own problems as necessary, using machine time allotted for them.

It must be noted, however, that, as shown by the experience of the exercises and war games which have been conducted, the use of computers located at any great distance from the staffs is made very difficult by poor communications. It is obviously necessary to think about using the machines of local scientific organizations, about bringing these machines nearer to troop

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~~TOP SECRET~~

Page 9 of 10 Pages

control organs, and about using mobile computers.

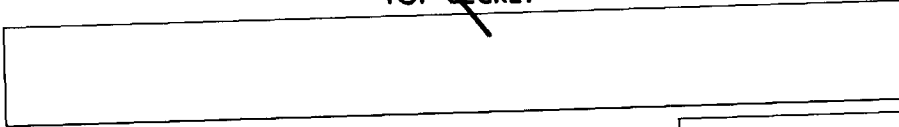
The best solution of this problem would be to place computers directly at command posts near the main directorates and departments, which would, of course, make it much easier to use them for solving problems and significantly shorten the time needed to perform the required calculations. Work being done at the present time to create specialized computers which will be transportable will help resolve this problem.

Experience in using computers located near areas in which exercises are conducted shows that shortening the distance between machines and control posts makes it possible to reduce time spent on receiving and transmitting information and to increase the efficiency of cooperation between staff officers and the groups at the computers. All of this leads to a significant increase in working efficiency. Thus, at an exercise of the Leningrad Military District in September 1962, twice as many problems were solved for the staff of the rocket troops and artillery on the URAL-2 computer of the Military Artillery Academy as were solved at an exercise of the Kiev Military District in July 1962 using an NII-3 computer located in Moscow.

Good experience in joint work on the preparation and solution of problems on computers has been acquired in the staff of the Kiev Air Defense Army and the Kiev Higher Engineering Radiotechnical School, where operational descriptions of problems are worked out by officers of the army staff while the algorithm development and programming of the problems are done in the departments of the school. This makes it possible to organize and carry out exercises on a higher level and to instruct a staff in troop control with the use of modern means of automation. Such relationships must be established in the other districts as well, especially those in which the computer base is good enough that the machines can be used for everyday practical work as well.

Close collaboration between staffs of military districts and scientific research organizations in the preparation and computer solution of problems during command-staff exercises and in everyday activity will help to prepare personnel for work with computer equipment.

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In our view, the best way to solve the problem of bringing general-purpose computers closer to staffs is to mount small-sized machines on railroad flatcars or motor vehicles, so that they can be relocated along with control posts during exercises. At the present time, as indicated above, a substantial number of transistorized computers are available whose features make it entirely possible to use them in this way to solve the main problems at the front-army level. For purposes of operating reliability and stability, it is desirable to place a minimum of two computers on each vehicle or flatcar. Initially their operation must be made the responsibility of scientific research institutes, and then, after a series of exercises and operational testing have been conducted under various different circumstances, the machines can be turned over to the staffs of the military districts. The use of such computers at command-staff exercises and in daily work will thereby be considerably simplified, and the time required to solve problems will not depend on communications channels. All of this will enable generals and staff officers to reduce time spent preparing summaries and reports and to improve troop control in an operation, and it will also make it possible to solve more correctly the problems of using modern means of armed combat -- nuclear weapons, missiles, aviation.

Further improvement of small-sized general-purpose computers must proceed in the direction of equipping them with screens for displaying the situation and devices for high-speed input and output of information.

