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Krysenko On Air-Defense Control Systems

At the present time, a particularly important role belongs to the air defense of the country. The fast development and improvement of means of attack equipped with thermonuclear weapons which are capable of inflicting irreparable damage on a country, destroying in a very brief time the most important military objectives and the largest industrial, economic, and cultural centers, require the corresponding development of means of defense.

Included at the present time among means of delivering weapons of mass destruction are strategic bombers, ballistic missiles of various ranges, and intercontinental and global missiles. Moreover, as the foreign press indicates, space means of attack are being developed which are also capable of carrying nuclear weapons.

Despite the appearance of new, more modern means of attack, modern strategic aircraft, as carriers of weapons of mass destruction, still constitute a large portion of the armaments system, and in the majority of countries are the sole means of air attack. Strategic bombers will still constitute for a relatively long time a serious and dangerous means of attack. Therefore, along with other types of defense (antimissile and antispace), antiaircraft defense of the country will still be of great importance for many years.

The great progress in the development and tactics of the use of means of air attack (increase in the speeds of strategic bombers, capability of mass air attack, etc.) requires a drastic improvement in the air-defense system. The necessity arose many years ago for developing new methods and means of operational control of PVO Troops which correspond with modern methods of conducting combat operations. This method of modernizing air defense consists of centralization and automation of control of all air defense means. It should be noted that the PVO Troops were one of the first branches in the system of the Armed Forces where automation of control of combat equipment and troops was introduced.

Control of the troops in modern conditions is a very complex process which is proceeding to a large extent in a dynamic manner, with the participation of a large amount of forces and means, with vast streams of information, and with a high degree of inter-relationship of all factors and all elements of the complex system.

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Accuracy of control depends to a large degree on the complete and prompt calculation of all factors which influence the course of operations, i.e., on complete and prompt receipt of information about environmental conditions and events. Without the information there can be no control, and therefore the questions of transfer of military information along communications channels and its processing in various links of the control system are very important for the process of control.

Electronic computers hold a central place in the automation of the processing of troop control. Their introduction in the troops was necessary not only because they facilitate or, in certain cases, replace the work of many people, but also because without them it is impossible to compute in a limited time and find the most effective variations of operational-tactical decisions.

Depending on the correlation of manual and machine work in the process of control, the system can be either automatic or partially automatic. If the electronic computers in the control system can completely replace man and exclude him from the closed control cycle, this is known as an automatic system.

However, in the system of control of military operations, by virtue of their characteristics (dependence of processes on a large number of factors, multiplicity of flows of various categories of information, complex interrelationships, influence of results of decisions on the life of the people, etc), the adoption of the optimum operational-tactical decision is a particularly creative process. The main function of control -- the final decision -- remains with the human-commander. Therefore, each system of troop control, including the air-defense system, cannot ever be completely automatic, it will be merely partially automatic.

The amount of missions carried out by the electronic computer in controlling the troops will depend mainly on the development of operational-tactical and mathematical principles of using computer techniques for troop control. The degree of use of computers or the degree of automation of a system in troop control will depend on how completely and thoroughly all the processes of control are analyzed, on how successfully the methods are found for resolving all the missions which arise in conducting an operation, on how correctly criteria are determined for evaluating the combat capabilities of one's troops and the forces of the enemy, and on how completely developed are the algorithms for resolving these missions....

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A typical example of an automated system of troop control is the US semi-automatic system for control of active air-defense means, the SAGE system. A detailed account of this system, in accordance with data of the open foreign press, is presented in this book....

Because specific obvious or concealed interrelationships exist in military affairs among various branches of troops, i.e., they are all individual links of the overall system of the Armed Forces, it is no accident that there has recently been a tendency to create complex systems of automated control with a high degree of centralization of control. Characteristic in this regard, for example, is the aspiration to unite into a single complex the aircraft defense, missile defense, and space defense systems with centralized control from a single central command post. This is partially being realized by uniting the systems of detection and creating a single system for obtaining data for aircraft, missile, and space defense. Moreover, there is a tendency, and work is already being done, to create a single automated system of control of all the armed forces of the United States.

With such tendencies in development of the troop control system, the study of the structure and operation of the SAGE system and other automated systems for control of air-defense means whose principles can to a large extent be transferred to other troop control systems is of great important and is of interest not only to specialists working in the air-defense field, but for those in the field of other military control systems....

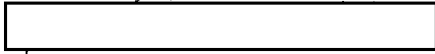
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