

# THE EXPEDIENCY OF IMPROVEMENT OF ARMED FORCES MANAGEMENT BY AUTOMATIZATION OF THEIR BASE FUNCTIONS

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**Abstract:** The article deals with the management process of the team of people that represents as a system of certain sequential interrelated activities called management functions. It is introduced general (basic) management functions that are specific for the Armed Forces. It is disclosed operation of Commander and his staff on the organization preparations for the operation (combat actions). It is proved the necessity of automation of basic management functions of the Armed Forces, as well as modelling of possible actions and processes. It is shown the relevancy of studying at leading military higher education institutions the discipline "Mathematical Principles of Military Art" for future use of military cybernetics in their practice by specialists of command and staff structure.

**Keywords:** general management functions, automation of management, operational planning, single automated management system.

## 1 INTRODUCTION

Together with mathematicians, scientists from different fields of human activity reach moving results. Development and improvement of modern management systems are linked inseparably with the development of automation technology and process modelling of complex systems operation.

Analysis of global trends shows that in order to ensure national security in the military sphere are extensively being used innovation in government and military management, information technology and system which architecture creates conditions to obtain qualitative advantages without using of significant resources by achieving automation of management systems.

At this time, the comprehensive automation of management processes and subjects of management system of the Armed Forces of our country (hereinafter - AF) needs further improvement. The level of automation of government activity is only 20-35 % of the needs.

## 2 THE SYSTEM AND FUNCTIONS OF MANAGEMENT

Management as a complex, universal phenomenon has many definitions.

In systematology, management is the structure and function of ordering, maintenance and purposeful development of a system.

Management process is a purposeful activity on coordination of joint operation and development of all parts (units) of controls that vary in space and time [2,3].

During a management process used sequence of administrative actions that are logically linked together to achieve this goal through the transformation of resources at the "entrance" to the products and services of the "exit" of system.

Modern management process consists of a sequence of subprocesses: forecasting, planning, decision making, accounting, control, etc., which

nowadays are called management functions or management functions of processes.

In such a way, the control function is a special kind of activity that reflects the orientation to make managerial influence. This is a stable ordered complex of operations based on the division of labour in the controlled system. This is a real purposeful impact on controllable phenomenon. We can say that the function of management – a specialized part of the management process associated with the regular organizational activity of information and managerial kind and differs by homogeneity of targets, actions or use of objects of such actions.

In order to distribution of functions by common characteristics their classification is made. The main two features of control function are:

1. The type of management activity, which makes it possible to distinguish one from the other work in the division process of management activities;
2. Activity types orientation on the managed object or environmental factors.

By these characteristics it is identified general (basic) and additional (specific) management functions.

The general management functions include:

- Forecasting;
- Planning;
- Organization;
- Monitoring etc.

Additional functions of management:

- Human resources management;
- Financial management etc.

General functions determine the type of administrative activity regardless of place of its manifestation, the type of organization, nature of activity, scale etc. They are inherent to implementation of the management of any organization and like to divide the content of management activity.

Pursuance of management functions requires certain spending of time and effort, which forms

control influence, and control body is transferred into the desirable state, that process management is considered as a process of uninterrupted series of development of control influence. To perform the functions in the management apparatus or body it is created appropriate departments and services. All functions of the management process by specific organizational systems are the sequence of actions and operations that are interrelated.

In real conditions of management the functions are not alone, they are closely intertwined and mutually complementary. All managers perform almost the same function regardless of their activity and position. They are involved in planning, organizational issues, control and etc.

### **3 THE ORGANIZATION AND IMPLEMENTATION OF MANAGEMENT FUNCTIONS OF THE ARMED FORCES OF UKRAINE**

The USA has great experience regarding the creation and successful operation of situational centres, where they are regarded as a key element of support for management decisions at the strategic level management. Similar approaches to strategic planning carried out in the Russian Federation, European Union and others.

With the aim of automation of the Armed Forces the Norwegian Defence Research Establishment has conducted research on architectural topics related to the Norwegian Defence Information Infrastructure (INI) [7]. These activities have focused on service orientation; in line with strategic decisions in NATO. NATO has focused on Service-Oriented Architecture (SOA) as the key enabler for interoperability in NATO coalition networks. The focus on standardization within SOA makes it possible to achieve interoperability throughout the coalition, while at the same time supporting the need for autonomy of national systems. Building a federation-of-systems, where each system remains autonomous, relies on the fact that the interfaces between systems are clearly defined if interoperability is to be achieved. The high level of standardization, and the focus on interface descriptions, means that SOA is well suited to build such federated systems.

Sustainable Development Strategy "Ukraine – 2020", which was approved by the Decree of the President of Ukraine on January 12, 2015 establishes the reform of the national security of Ukraine and contains conceptually new position. By the Decree of Cabinet of Ministers of Ukraine on September 7, 2011 № 942 "On Approval of the list of priorities of scientific research and teaching materials for the period till 2015" the establishment and organization of the situation centres has been identified as priority area of research.

The emergence of situational management and its tools – situational centres of the Armed Forces caused by the fact that the existence of such centres is a key element of strategic management tools in defence sphere, its intellectual support. Situational centres of Main Command Centre of the Armed Forces of Ukraine, designed to ensure the effective work of senior officials of the Armed Forces of Ukraine, management and operational structure of the central apparatus of the Ministry of Defence of Ukraine and the General Staff of the Armed Forces of Ukraine.

And in this time automated information systems that created in the Ministry of Defence of Ukraine, unfortunately do not work or do not operate at full (project) power.

The authority to direct AF is divided between the Ministry of Defence of Ukraine (MD) and General Staff of the Armed Forces of Ukraine (GS AF) by the levels, functional features and directions (Fig. 1).

Based on the above mentioned and conducting a thorough analysis of the main functions of AF and tasks which are performed by MD and GS AF, having carefully considered the work of the authorities regarding the process of solving these problems it has been identified logical sequence of interrelated activities relevant officials and departments of government. In such a way, according to the classification of the functions of government control [1] we have established the basic management functions of AF that can be automated at the strategic, operational and tactical levels. On the beginning of implementation of automation in AF it is expedient to automate the following issues:

1. Data gathering of current situation;
2. Conduction, displaying of operation situation;
3. Support of information data of operation structure of control point (CP);
4. Carriage of information-analytical support of the work of operation structure of CP;
5. Carriage of information accounting;
6. Carriage of electronic workflow;
7. Geo-information support
8. and others.

For example, let us consider the operational planning. It includes three consecutive and interconnected stages:

- Organization of operational planning;
- Development and approval of the Concept of operations (combat operations);
- Development of operational plans.

The first stage of operational planning includes phases: analysis of the problem, evaluation of the situation, forming the initial data for planning.

The second stage includes phases: Concept of production operations (combat operations), forming of solution.

The third stage includes phases: a development of operation plan (combat operations), clarifying the operation plan (combat operation).

The sequence of work of Commander and his staff during decision-making and preparing of army (forces) for operation conduction, shown on Fig. 2.

In its turn each phase of work consists of certain consecutive tasks.

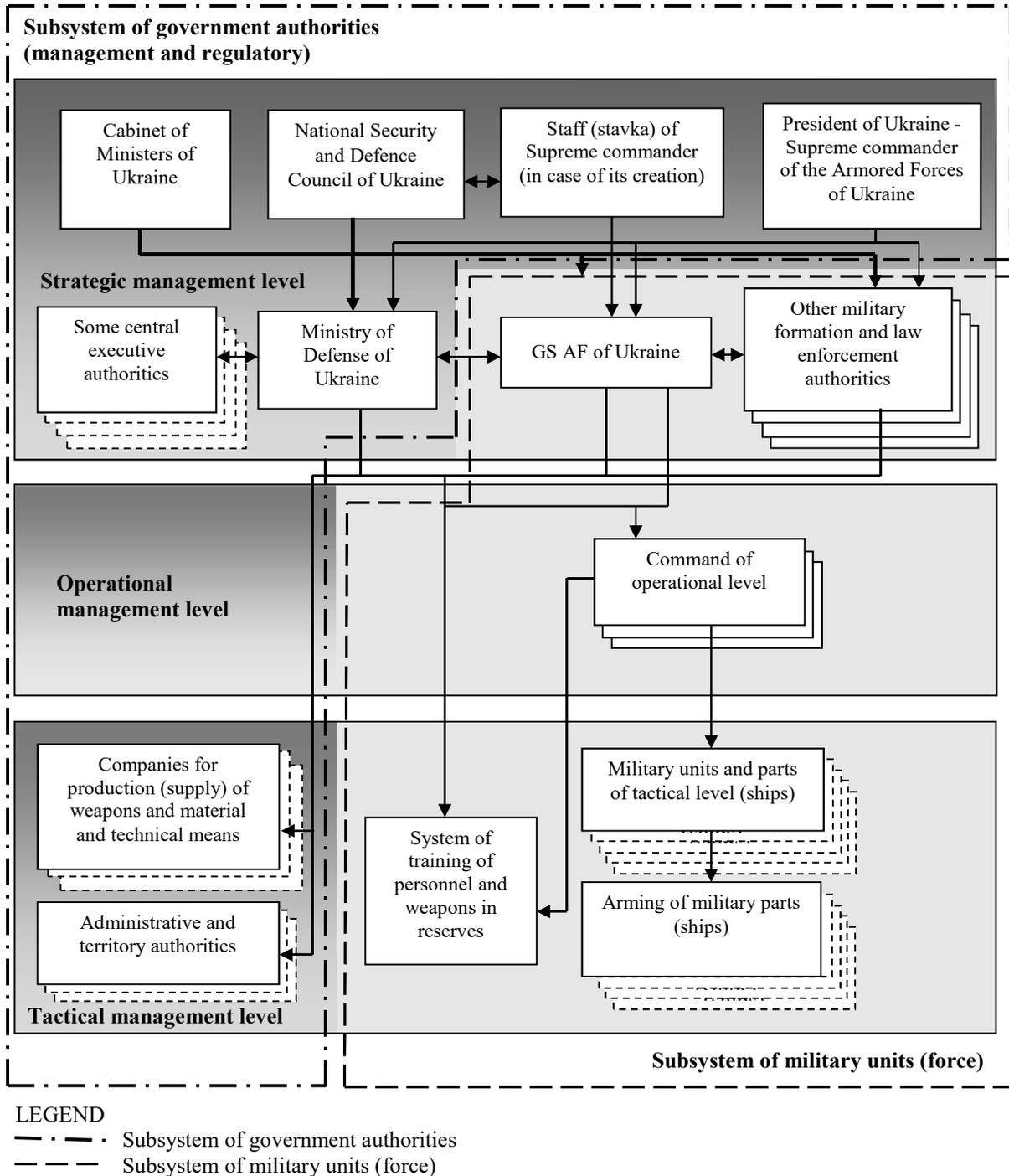


Fig. 1 Schematic diagram of the military organization of Ukraine (two subsystems)

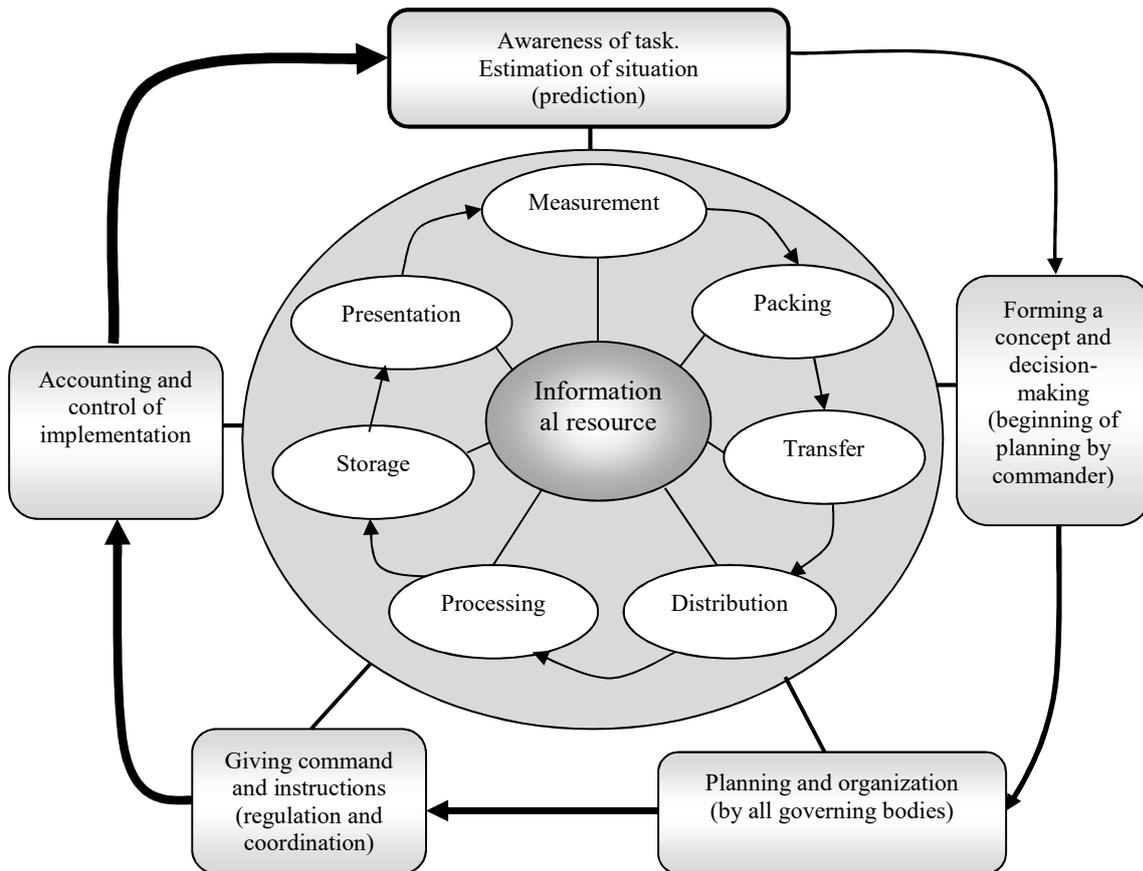


Fig. 2 The sequence of actions and using of information resource during an operation preparation

Therefore, analyzing the operational planning process and the work of officials on its implementation it has been identified basic management functions at the operational level.

Methods of commanders' work and staffs during planning of operations (combat) may be at higher and middle levels of management - parallel work, in the middle and lower levels – of parallel-counter, at the bottom – consecutive.

At the tactical level tasks of planning and conducting a combat for commanders and staffs are defined in the relevant Battle statutes. The analysis of tasks of military departments and their units and also work of commanders and staffs of the organization of combat (actions), made it possible to determine the basic management functions at this level.

Operational command and control of army is performed through a system of battle control. The realities of life in the twenty-first century require from military personnel to improve and seek new forms of warfare constantly both on tactical and operational levels. You need to imagine that in today's conditions, during the usage of armies (forces) there is a very complicated dynamic situation, there are sudden unexpected and diverse operational tasks. It is necessary to make decisions and bring it to performers (subordinates) during combat operations,

often without adequate (complete) information and time for its detailed analysis and selection of optimal variant, in the so-called "manual control mode". To be ready for immediate response, perhaps in the most unexpected time, that has created the situation. All this complicates the management activity of commanders and executive activities of officials, bodies of the management system, increasing psychological stress and reduces the efficiency and quality of management actions of army (forces) using of "combat" system. It is the need of modern, including computer software of officials' activity, authorities of the management system for organizing and operational control of forces of "combat system". Management cycle of preparation of decision for operation (combat action), shown on Fig. 3.

Automation of management work of a commander must provide:

- Support of acceptance of decision using of people and information-calculated tasks;
- Fast transfer of the order to subordinates and other tasks;
- Objection control over the implementation of tasks by subordinates.

And here it needs a modern automation of management process as collecting of fast, objective, comprehensive and surely protected

information that provides to the higher levels of management, and also pass to subordinates quickly and for sure. The level of automation of activity of organs of army control is

low, and the level of information support of management systems of national defence subjects, compared with the army forces of leading countries is very low.

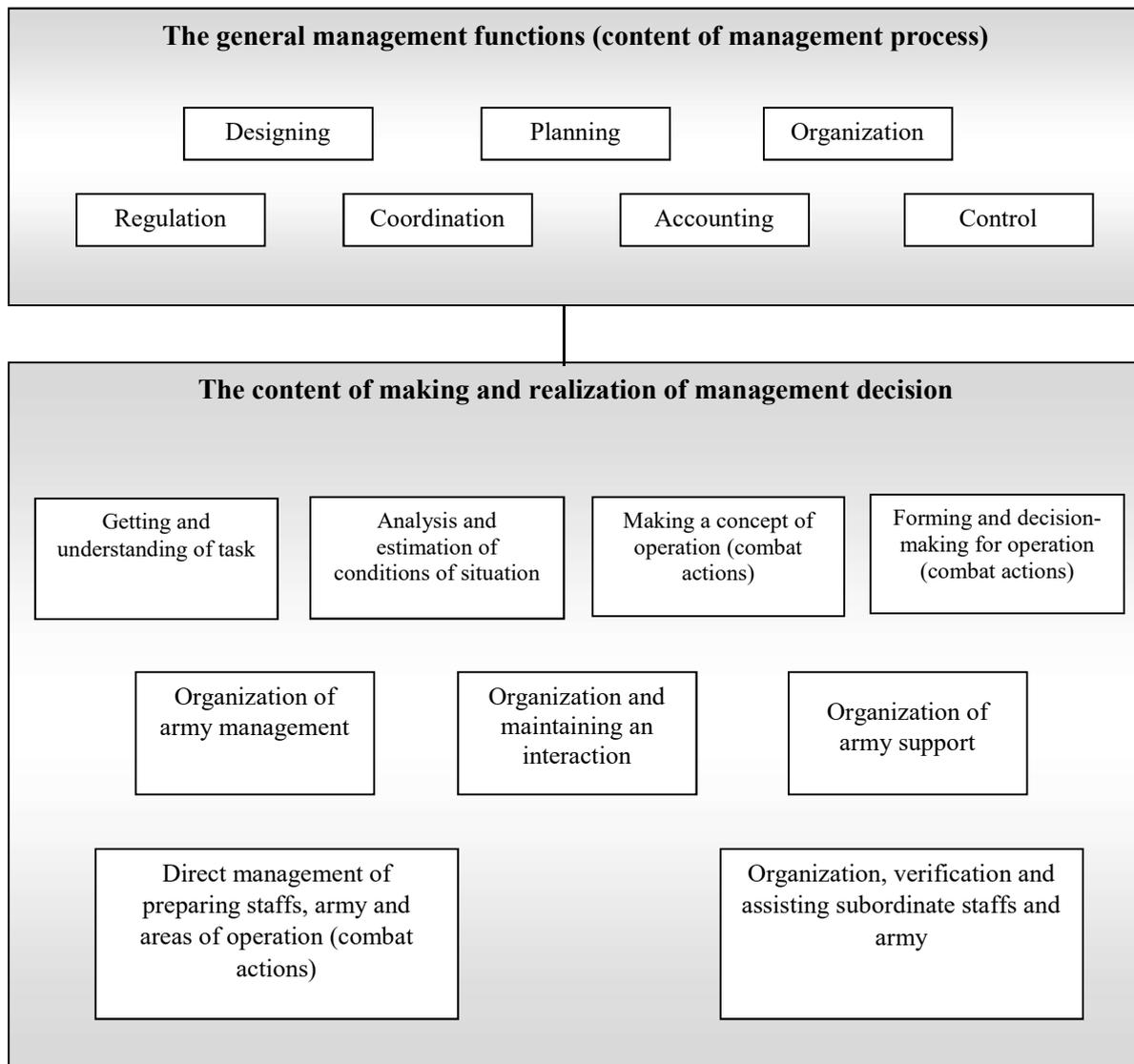


Fig. 3 The process and content of cycle of operation (combat actions) preparing

#### 4 SOME ISSUES OF AUTOMATION AND MODELING OF MANAGEMENT PROCESS OF AF

For solving defence issues the most important are technologies of control of army (forces), forces of combat alert and process of conduct of a battle, and also various technology of creation and application of modern systems of all subjects of management system of country defence. However, at this time, a complex automation of management processes and subjects of management system of AF is almost absent. Acting management systems of defence subjects of AF of Ukraine are not completely meet the requirements of modern military management systems, they are not enough focused on the

interaction between them. In order to improve the management of the Armed Forces, namely the improvement of efficiency and quality of operation, it is necessary to create a single automated management system of the Armed Forces (hereinafter –SAMS).

With this aim it is necessary to change (improve) the system of AF management. To lead automation it is necessary to determine and establish a list of processes (research-constructor works). In every project military must make a description of processes of management and tasks. Analysts this verbal description change into formulas, and programmers develop special soft ware. To succeed in such work it is organized relation of executors. Simultaneously it is necessary to educate key users.

To implement the policy in the area of state defence on direction of activity of MD and GS AF the

components of the control system are divided into those that provide: military-political, administrative and operational management (Table 1).

**Table 1** Distribution of powers of leaders of Armed Forces of Ukraine

Ministry of Defence of Ukraine		GS AF of Ukraine
Military and political leadership	Administrative managers	Direct military leadership
Ensuring the implementation of state policy in the Armed Forces	Comprehensive support of the Armed Forces activity	Determination of the basis of a Armed Forces use
Providing the implementation of political and strategic objectives in the field of defence	Comprehensive functioning and development of the Armed Forces within the implementation of the main tasks of the state policy in the field of defence	Determination of the basis of a Armed Forces control
Ensuring the implementation of the principles and directions of the Armed Forces		Taking measures to ensure the complete support of Armed Forces
		Taking measures to prepare Armed Forces

According to the assignment area SAMS's components of the system should be divided into those that provide: comprehensive automation of state leaders to manage the defence and the AF of Ukraine, control of army (forces), administrative and economic processes and so on [4,5].

We draw attention to the relevance of modelling issues, their importance for work of leaders of AF. For fast complete analysis of possible situations, comparing the options of operation (fight) conduction, selection of the optimal (in the opinion of the commander – the best) solution, professional simulated or mathematical models of operation (combat) that involve the most possible amount of information that contain in matrix can and must assist them.

These "helpers" not only minimize the time of the decision, but also enable almost in real-time to consider various options for grouping, manipulate options of change of the direction and force of impact or concentration of forces, observe mathematically calculated and appropriately justified variants of possible outcomes of the army in operation (fight) at different areas, in different seasons and different weather conditions.

It is clear that any model will not replace man-commander in the war. But modelling will allow passionlessly, that is why objective enough, to show military potentials of the parties, possible losses and many other very important parameters, so – to tell the commander sufficient information to make informed decisions and win not by the number but skills.

To make programs for such models is quite difficult. It is necessary complete understanding among military commanders and mathematicians, the

ability to speak the same language on this issue. One of the factors that complicate the construction of models is the presence of management elements. Taking this into account, special means are used for management system description. Therefore, the quality of their usage in integral system depends on the quality of models even on design stage [6].

Today it is too difficult to manage army (forces) and weapons effectively and skilfully without the proper knowledge and use of military cybernetics. Exactly the military cybernetics is reliable assistant of commanders as a science of management. It will also help and allow military officers to create and apply sophisticated combat system "armies" ("power") properly and reliably in the planning, preparation and operation conduction, promptly and adequately respond to all possible changes in the situation.

To prepare for such work of all command and staff of the Armed Forces in the operational (professional, military) system of training now it is advisable to introduce discipline "Mathematical Principles of Military Art" (systemic approach). Then commanders will take an active part in the creation of simulation models and together with mathematicians to make logical and mathematical description of the system that can be investigated during the experiments on computers. They will professionally come to the key point: the definition and description of the system state. An understanding that it can be built using different approaches is important during development of specific simulation model.

It is necessary officials of command and staff profile to engage to work with these models at all staff training and games, command post and other

exercises constantly and persistently so that they obtain good skills in working with models.

It is essential to say about making the automation of calculation management tasks in the operation. Due to them, you can accurately calculate, for example, the necessary data about military power, resource power, time of operation and more.

Such calculations make it possible to objectively and accurately plan the distribution of means on complex objects of use and distribution of forces on the operational tasks to improve their effectiveness in battle. The results of calculation tasks for official that makes decision are documented reasonable.

With a aim of permanent work with models, it is the time to define in guiding documents about the use of the Armed Forces (army, forces), that after hearing the proposals of relevant subordinate a commander must personally work on computer with models of operation (battle) and personally select or specify a variant over which to focus the work of management apparatus (staff) association (part).

This cannot be achieved without the creation of conditions to ensure the management of military bodies by appropriate facilities and software products that will reduce the time spending on various types of calculations, mathematical modelling of possible actions and others. In its turn, the improvement of efficiency and quality of functioning of management system can be realized only under conditions of gradual creation of SAMS. The SAMS's structure must correspond to the appointment with the ability to adapt to changes in the structure of command and control bodies.

## 5 CONCLUSIONS

Creation and implementation of SAMS and essential modelling will allow providing the efficiency of the Armed Forces leadership, operational (combat) control of army (forces) and military equipment (weapons) and will give an opportunity to get the following results:

- To reduce the time spent on the collection, processing, transmission and display of operational information on its automated workplace of employees of military administration from the lowest to the highest level;
- To decrease terms of decision-making at the realization of simulation and mathematical modelling of the likely actions of the Armed Forces and the timing of carrying tasks, commands, signals to subordinate army (forces);
- To ensure a raise of implementation of the combat capabilities of army (forces);
- To improve the efficiency of work of commanders and staffs of all levels and validity of operational (combat) documents that are being developed;
- To set indicators of efficiency, stability and secrecy of control to the proper level as components of management efficiency.

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