UDC 681.324 DOI: 10.30748/nitps.2018.32.07

Yu. Kucherenko, A. Nosyk, A. Dovbnia

Ivan Kozhedub Kharkiv National Air Force University, Kharkiv, Ukraine

THE MAIN ACTIVITIES TO IMPLEMENT THE PROCESS OF IDENTIFYING THE AUTOMATED MILITARY SYSTEMS CHARACTERISTICS ON ITS PRE-PROJECT DEVELOPMENTAL STAGE

The need for creation of advanced automated military systems concerning the development of modern well-equipped mobile interspecies military forces is described in the article.

The pre-project developmental stage was identified as a determinative in the process of creation of the automated military systems because it creates system characteristics which will be developed and put into effect with its relevant scientific and technical level.

The execution algorithm of implementation of the main stages and activities was proposed. Research contracting authority should follow the execution algorithm in the process of identifying advanced automated military systems characteristics at the pre-project stage of its life cycle to have an opportunity to put into practice the project of its creation in a quality manner.

Keywords: *automated military system, algorithm, implementation, forces, automated facilities, mobile interspecies military forces, characteristics, construction, development, stage, creation, control.*

Introduction

Formulation of the problem. Now in Ukraine, the process of development of the Armed Forces of Ukraine (AP Ukraine) to form a modern, well-equipped, mobile combined task (CT) forces in accordance with NATO standards, able to get things done in conditions of war and hybrid merezhetsentrychnyh [1–7]. To ensure good governance such CT Armed Forces of Ukraine is the need for rapid implementation of the development and implementation of integrated advanced automated military systems (AMS) [8–11], which should be created by integrating various automated systems, namely intelligence systems, command and control units (departments) of various kinds and types of troops and their fighting tools and analytical systems and systems of information and other kinds (meteorological, navigation, GIS, logistics, etc.). software and set up its operation by using advanced information technology and uniform procedures for the collection, processing, preservation, development and lane edachi different information to different users unified command information space in the area of ngagement for reducing the general terms of cycles of command and control facilities and CT with the aim of winning and maintaining information superiority over the enemy.

Therefore, the introduction of major events and their quality and timely resolution in determining the outline (the required version of creation) AMS perspective on the pre stage of its creation has very important significance.

Analysis of the literature. In the above literature [1–20] the questions about the conduct of modern combat operations, development and management of troops of different automated systems, project management of their creation but a detailed consideration of the order of specific performance management process to determine the outline AMS pre stage of their creation they have not paid attention.

The main goal article is consider the definition outlines AMS for identifying and ordering him to perform certain activities.

Main part

Implementation of integrated AMS information and technical basis of the functioning of which is interconnected set of multifunctional complexes for automation facilities (CAF), various information tools (OF) and sources of information (DI) as well as communications and telecommunications (PO and T), interaction which allows them to create objective operational situation in the zone of combat and monitor its change in real time lets commanders of various levels of government operational advantage over the enemy in decisions according to changing circumstances and thus allow subordinates do the job efficiently and in terms reserved for a single plan command. To AMS perform its intended task with high quality in difficult conditions for modern military operations, must be considered in the past, in its design, many factors affect the process of defining its outline on the pre stage. Outline AMS, ie its conceptual model must meet certain tactical requirements and be designed taking into account the minimum cost of resources allocated for its creation and subsequent operation. Definition outlines AMS is one of the most important task for peredproekniy stage of its development as it allows not only to develop a concept and program of its creation, define operational and tactical requirements (OTV) to it,

but also to answer important questions about the appropriateness and feasibility of the project to create AMS defined (its version that is selected). If there are errors in selections AMS that occurred when not deeply study the process of determining the outline of the system, their detection and correction at later stages (design, implementation, operation) leads to a sharp increase in the costs of the overall project of its creation and subsequent operation. Price correction of errors at each stage of the life cycle (life cycle) relative to previous increases of about several times and increases the overall cost of the project, besides being spent not only more money but also time allotted for this project, which subsequently leads performance ratio to a violation of all life cycle stages AMS and reduce its scientific and technological level (STL). Fig. 1 shows the dependence of STL AMS find it in the appropriate stages of life cycle under ideal conditions of implementation deadlines stages of its life cycle (curve 1) with an increase appropriate timing of the stages of its life cycle (curve 2) and the presence of significant errors in determining its contour (curve 3). However, taking into account that the overall life cycle of an automated system of Joint Task (ACS CT) as an example, will be accepted per unit, while the ratio of its stay in the respective phases (phase states) will make [12] For pre stage (SS) 0,04-0,06 for development stage (SR) and implementation (JI) 0,12–0,13 for the operation phase (CE) 0.7 – of its total life cycle, the stage of disposal is not included because it is not has no impact on STC system (life cycle ratio determined by their expert evaluation).

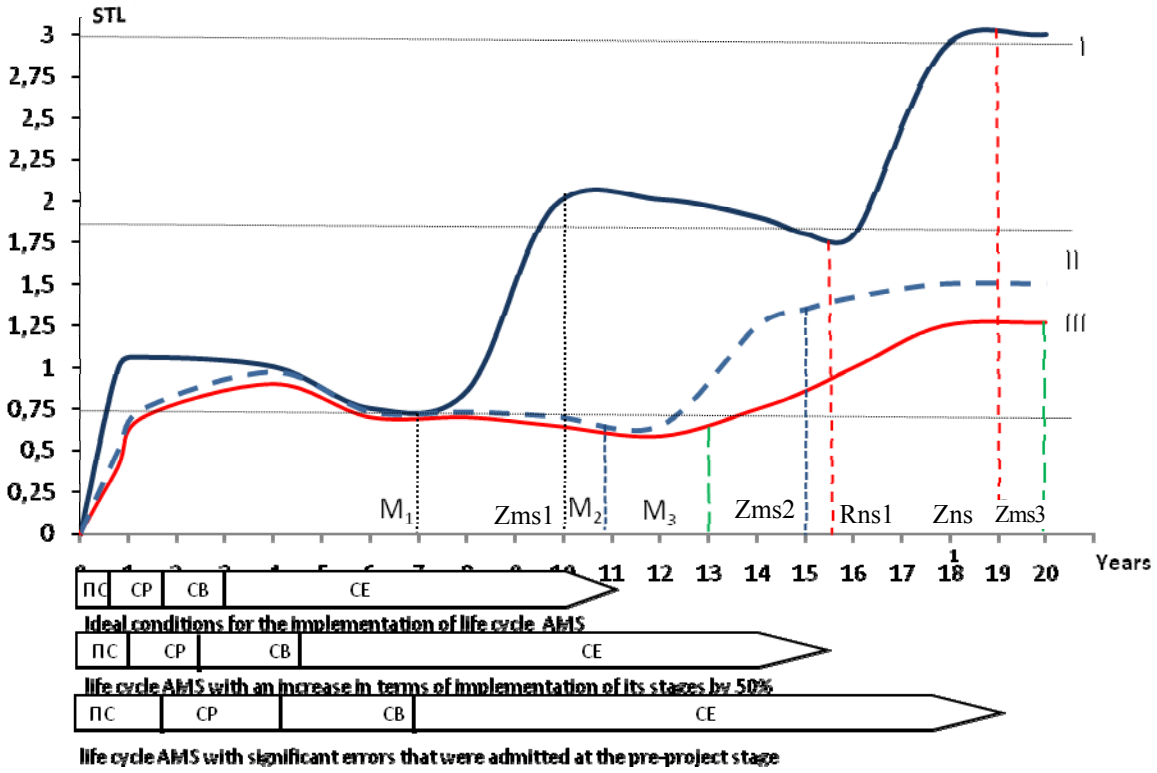

Fig. 1. Dependence of scientific and technical level of AMS find it in the relevant life cycle stages

From the figure shows that the point M1 (curve 1) there comes a time necessary modernization (this happens when the current STC system is reduced by external and internal factors and is equal to 0.75 of the desired (eg in comparison with foreign STC use of automated systems which was known at the time)) when Ideally the project and its timely changes to the modernized system (point Zms1). The area between these points, determines the design, development and implementation of the upgraded system with a total life cycle of the system is 10 years (including the effect of external factors influencing the need to replace the system to a new one in the next cycle of replacement, and the term of its life cycle is reduced by about 10–15% from the previous term life cycle). At the point Zms1 AMS is the second STR, which corresponds to the current (current) requirements for automated control of subordinate facilities management. During operation of the modernized system of NTS decreases and eventually comes a time need for developing a new system as upgrading the existing system did not lead to a significant improvement of its properties and characteristics. Is developing a new system in parallel with the operation of the upgraded system (point Rns1) and gradually replace it with a new system (point Zns1). The area between these points, determines the design, development and implementation of a new system with perfect execution of the project. At the point Zns1 AMS is the third STL, which

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When tightening deadlines rd AMS under various conditions by 50% (for ease of comparison), carried out its modernization at the point M2 (curve 2) and replace it with an upgraded system at the point Zms2 delay the timing of the respective stages can not skazatys its STL, which is equal to the value of 1.5 STD desired, with the generic term replacement system upgraded to increase and is 15 years. It happens when not calculated all the risks on the project creation AMS, namely not taken into account the absence of the heritage and experience in research organizations to implement measures customer aircraft; made no assessment of a sufficient number of qualified personnel to the customer, that can efficiently assign tasks to developers; not counted developer the opportunity to efficiently perform their functions; not evaluated the possibility of the State to finance this project. At the same time, we can observe that according to curve 1 (at present) is in the process of developing a new AMS that should be the third STL.

Curve 3 in fig. 1 shows the change in the STC AMS implementation process is not sufficient enough to determine its shape, which leads to the presence of significant errors, correction of which led to delays timing of its relevant life cycle stages of the project implementation and low STD and much higher costs. STL AMS that was introduced in the implementation process is not sufficient enough to determine its contour corresponds to the desired 0.75 of STL. Therefore, given the time correcting errors at each stage of its life cycle may see that the beginning of modernization (M3-point curve 3) and replace it with an upgraded system (point Zms3 curve 3), carried out much later. AMS total life cycle is 20 years and it is important scientific and technical level of 1.25 required at this time STL system.

So may be noted that the aircraft is crucial for shaping the outline AMS, which will be further developed, commissioned and which will be operated for some time with the corresponding STL. Unfortunately the process of determining the outline AMSin the rich not yet formalized. The existing state standards of the former USSR, guidelines and other documents [13–18], define the general organizational issues and regulate in the first team and the list of project documentation, which should be developed in the creation of automated systems (AS), the basic principles of their creation, stages and phases. State military standards to fixed features of the design AMS as complex systems (because they consist of several subsystems, each of which performs its specific task, operating under significant uncertainty and exposure to many factors, carry out a targeted selection of modes of their subsystem (facilities management), depending on the degree of exposure to external factors, consisting of several levels of government are geographically distributed and manage large number of disparate objects subordinate management) does not exist, but because no regularity and certainty in the implementation of measures to determine the outline AMS projected. Try to streamline the process of determining the outline (conceptual model) AMS using the following algorithm shown in fig. 2.

The process of implementation of forecasting research organizations and institutions ustomer AMS outline, which must meet the requirements for the implementation of automated control of troops and facilities in future wars in the long term (about 10–12 years for ACS CT) has many uncertainties they create significant problems taking into account the impact of external and

internal factors affect its current STL in the future at the time of its operation, since determining the outline AMS should be integrated using a systems approach to the study of the process.

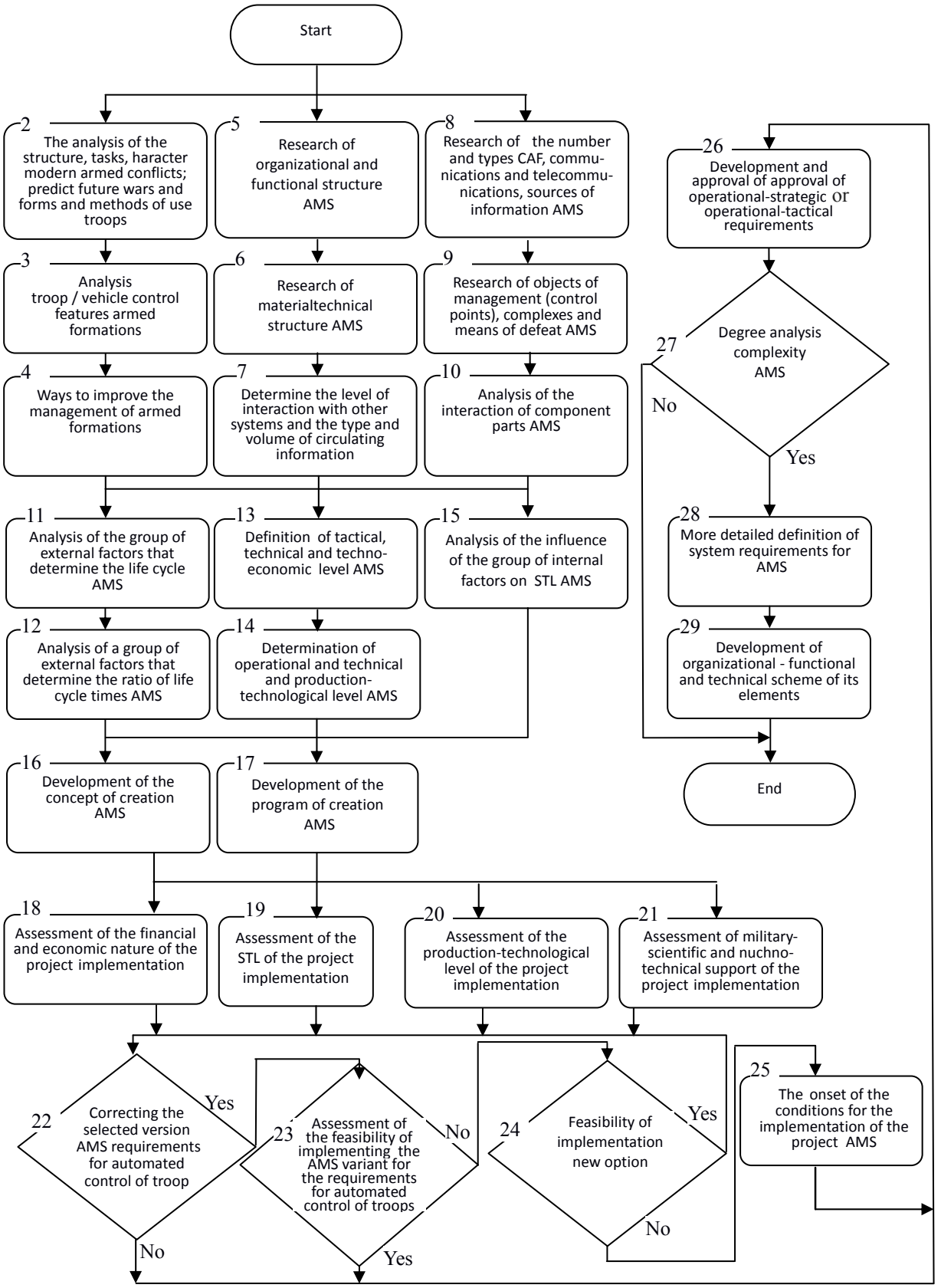

Fig. 2. The algorithm implementation process of defining the outline AMS

This algorithm to identify and implement measures of the implementation AMS outline consists of a series of interconnected general measures, combined with appropriate steps outline AMS determine whose implementation is based on the use of series-parallel principle of performance-based, taking into account the experience of military pre research on the design-production AMS; design requirements for it; study the possibility and feasibility of the option chosen system. The ultimate goal of the implementation of this process is the development of operational and strategic (Task) requirements for prospective AMS (the option chosen its creation).

Implementation of specific measures to determine the outline AMS should be carried out in the course of the research, which focused on conducting conceptual – accounting research, which should give a definite answer on the possibility and expediency of its creation.

The process of determining the outline AMS should start after the establishment of the customer need for a new system when the characteristics of the existing AMS do not meet current requirements applicable to the automation of the processes that it automates, namely the stage of determining the location of a new AMS (Phase 1), which is designed to management system appropriate military units (SU FS) and himself as a system with regard to the system of three-level approach to the study:

on the first (top) level hierarchy promising AMS considered as part of SU ZB part of which it is part, or as a species Subsystem single automated system of Armed Forces (EASU AP), the analysis of the structure (C), tasks (C) FS, character modern armed conflicts (HSZK); predict future wars and forms and methods of use (F and ES) different groups of troops (HC) in these wars (Box 2) and the peculiarities of command / tools (SO B / C) FS (Block 3), is to determine ways of improving SU ZF (Block 4);

on the second level of the hierarchy on AMS automated control of troops or facilities considered as a whole in itself, especially in the form of a complex system, with studied: organizational and functional structure (OS and FS) AMS (Block 5); materialtechnical structure (MTS) AMS (Block 6) and secondly it in conjunction with other AMS (determined by the level of interaction with other systems (IS RE) and the types and amounts of information exchanged between the system (and OI) - (Box 7);

on the third level of the hierarchy explored parts (MF) AMS (number and types (C and T) complexes of automation facilities (CAF), communications and telecommunications (PO and T), sources of information (CI) – (Block 8) facilities management (OC) (control points (PU) systems and weapons (K and memory, etc.) – (Block 9))) and analyzed the interaction between the components themselves (AB ET) – (block 10).

Subsequently, the analysis of the factors that affect the properties and performance characteristics AMS (Phase 2). During impacts on AMS projected will understand these factors (objects) external and internal nature [19–20] that affect not only the wide demands it (operational and strategic, operational and tactical and system integrators requirements), but the general outline AMS projected (its goals, purpose, structure, problem solved, scope, principles of modes and operating conditions, ensuring performance software and hardware (PTZ), and so on) of the STC, which should have a system to meet the requirements for the implementation of automated control of troops and military means at its functions nuvanni over a lifetime. When NTR AMS possible to understand the appropriate degree of technical improvement that meets the requirements of external and internal factors influence it in a certain perspective, taking into account the introduction of advanced science and technology, carried out at its creation.

The major internal and external factors affecting the shape AMS and further the processes of development, implementation and execution of operation are:

Group external factors (HZF), which determines the total life cycle (life cycle) AMS – (Block 11), the timing of replacement of its elements and its most prospective samples and correlation timing of the stages of its life cycle (ETS SZHTS) in the process of its design, development implementation and operation – (Block 12);

Group external factors affecting the properties AMS, combined with certain groups, describing her level of improvement (tactical and technical level (TTRV) and feasibility (Tervo) – (block 13), operational and technical (ETRV) and production TECHNOLOGICAL (VTRV) – (block 14), on which the comparison of its projected NTR (NTR P) to the level of its prototype (STL PR) or a new system known foreign (STL IC) to determine its overall level of improvement;

Group internal factors (GVF), which affects the change of values of elements AMS resulting moral and physical they age (M & PS), which reduces the quality of performance of assigned tasks entire system (ie, the process of change and mutual influence performance elements AMS for its service life will determine its current STC) and inconsistency of its properties with the general requirements of automated management capabilities (Block 15), identified on the basis of a careful analysis of external factors effect on aircraft.

Based on a thorough definition and implementation of the measures should be made to develop regulations (Stage 3) Concept of AMS that the general should answer the questions feasibility of developing an appropriate conceptual model AMS (Block 16) and Program creation AMS (Block 17), which gives answer to the question that must have the resources to ensure the implementation of the conceptual model AMS (certain

logistical, financial and time resources to create it), which defined concept.

After that assesses the risks associated with the implementation of the selected option AMS creation [20] this conceptual model (Step 4 – Risk Assessment project creation AMS), namely:

financial and economic (Fer), due to the possibility of insufficient funding for the development of the system and its components (Block 18);

scientific and technical (STL) associated with the probability of failure of institutions – developers creating AMS that meet the operational and tactical customer requirements that apply to it (block 19);

industrial and technological nature (ITR), which is caused by the aging of fixed assets, loss of technology companies, the lack of components and highly qualified personnel (Block 20);

the capacity of research institutions to carry out customer quality military and scientific support in the design (SPA II) AMS scientific and technical support (NTS) in its development and implementation – (Block 21).

After analyzing existing risks on the feasibility of the option chosen establishment AMS formed opinion on the need to adjust the selected option AMS (Block 22). If adjustments need it not, then the measures carried out in the fifth stage (elaboration and approval of operational and strategic (ERU) or Task requirements (OTV) to AMS (Block 26). When there is such a need, then carried out studies on its adjustments to the assessment of the feasibility of the creation of adjusted version AMS (Block 23). If the corrected version be implemented under development and approval of ERUs or OTV to AMS (Block 26), if not, assesses the feasibility of Nob th version of the system (block 24). If a positive decision to transition to a block 22 for further adjustment of the project, with a negative decision shall delay its implementation until there comes favorable conditions for its implementation (Block 25). After the onset of these conditions is drafting and approval of ERU / OTV (Block 26) to AMS with the analysis of the degree of difficulty (Block 27). When is developed very complex AMS (integrated system or species) should perform pilot project (AP) for its creation (Step 6) and its subsystems to more detailed installation system integrators requirements (STV) thereto (Block 28), namely requirements: material andtechnological software (MTZ), mathematical and software (MR software), information and linguistic support (OF, BOS), survey and navigation software (ThZ, NC) and organizational development - functional (OFS) and technical circuit (TC) its elements (Block 29).

Conclusions

Pre step process of creating AMS is crucial for shaping the outline AMS, which subsequently will be developed and put in place with the appropriate STL. Determination of the outline should be done comprehensively based on a systematic analysis of the problems of designing complex systems, in strict compliance with the measures of certain stages (defining its place in the overall system, analyzing the factors that affect its properties, parameters and characteristics, development regulations, risk implementation project of creation, development and approval of ERU / OTV to her performance on the AP its development), which should be mandatory to determine the outline of the system created (modernized) t but without the performance which is not advisable to start implementing the next stages of its life cycle.

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Received by Editorial Board 13.06.2018
Signed for printing 17.07.2018

Відомості про авторів:

Кучеренко Юрій Федорович
кандидат технічних наук старший науковий співробітник
старший науковий співробітник
Харківського національного університету
Повітряних Сил ім. І. Кожедуба,
Харків, Україна
https://orcid.org/0000-0001-9937-371X

Носик Андрій Михайлович
кандидат технічних наук старший науковий
співробітник провідний науковий співробітник
Харківського національного університету
Повітряних Сил ім. І. Кожедуба,
Харків, Україна
https://orcid.org/0000-0002-4171-1875

Довбня Олександр Володимирович
кандидат технічних наук старший науковий співробітник
начальник науково-дослідного відділу
Харківського національного університету
Повітряних Сил ім. І. Кожедуба,
Харків, Україна
https://orcid.org/0000-0003-3661-2060

Information about the authors:

Yurii Kucherenko
Candidate of Technical Sciences Senior Research
Senior Research Associate of Ivan Kozhedub
Kharkiv National Air Force University,
Kharkiv, Ukraine
https://orcid.org/0000-0001-9937-371X

Andrii Nosyk
Candidate of Technical Sciences
Senior Research
Lead Researcher of Ivan Kozhedub
Kharkiv National Air Force University,
Kharkiv, Ukraine
https://orcid.org/0000-0002-4171-1875

Dovbnia Alexander
Candidate of Technical Sciences Senior Research
Chief of Scientific Department of Ivan Kozhedub
Kharkiv National Air Force University,
Kharkiv, Ukraine
https://orcid.org/0000-0003-3661-2060

ОСНОВНІ ЗАХОДИ ЩОДО ЗДІЙСНЕННЯ ПРОЦЕСУ ВИЗНАЧЕННЯ ОБРИСУ АВТОМАТИЗОВАНИХ СИСТЕМ ВІЙСЬКОВОГО ПРИЗНАЧЕННЯ НА ПЕРЕДПРОЕКТНІЙ СТАДІЇ ЇХ СТВОРЕННЯ

Ю.Ф. Кучеренко, А.М. Носик, О.В. Довбня

У статті показана необхідність створення перспективних автоматизованих систем військового призначення у зв'язку з формуванням сучасних, добре оснащених, мобільних міжвидових угруповань військ.

Визначено, що у процесі створення автоматизованих систем військового призначення передпроектна стадія є визначальною, бо формує обрис системи, яку у подальшому буде розроблено і введено в дію з відповідним її науково-технічним рівнем.

Показано, що визначення її обрису повинно здійснюватись комплексно на основі системного аналізу проблем проектування складних систем, з чітким дотриманням виконання заходів певних етапів (визначення її місця в загальній системі, аналізу факторів, що впливають на її властивості, показники та характеристики, розробки нормативних документів, оцінки ризиків реалізації проекту її створення, розробки та затвердження оперативно-тактичних вимог до неї, виконання аванпроекту на її розробку), які повинні бути обов'язковими для визначення обрису системи, що створюється (модернізується).

Запропонований алгоритм виконання основних етапів та заходів, якого необхідно дотримуватись науково-дослідними організаціями замовника при визначенні обрису (необхідного варіанту створення) перспективних автоматизованих систем військового призначення на передпроектній стадії їх життєвого циклу, щоб мати можливість у подальшому якісно реалізувати проект щодо її створення.

Ключові слова: *автоматизована система військового призначення, алгоритм, впровадження, війська, комплекс засобів автоматизації, міжвидове угруповання, вигляд, проектування, розробка, стадія, створення, управління.*

ОСНОВНЫЕ МЕРОПРИЯТИЯ ПО ОСУЩЕСТВЛЕНИЮ ПРОЦЕССА ОПРЕДЕЛЕНИЯ ОБЛИКА АВТОМАТИЗИРОВАННЫХ СИСТЕМ ВОЕННОГО НАЗНАЧЕНИЯ НА ПЕРЕДПРОЭКТНОЙ СТАДИИ ИХ СОЗДАНИЯ

Ю.Ф. Кучеренко, А.М. Носик, А.В. Довбня

В статье показана необходимость создания перспективных автоматизированных систем военного назначения в связи с формированием современных, хорошо оснащенных, мобильных межвидовых группировок войск.

Определено, что в процессе создания автоматизированных систем военного назначения передпроектная стадия является определяющей, поскольку формирует облик системы, которая в последующем будет разработана и введена в действие с соответствующим ее научно-техническим уровнем.

Предложен алгоритм выполнения основных этапов и мероприятий, выполнения которых необходимо придерживаться научно-исследовательским организациям заказчика при определении облика (нужного варианта создания) перспективных автоматизированных систем военного назначения на передпроектной стадии их жизненного цикла, чтобы иметь возможность в дальнейшем качественно реализовать проект по ее созданию.

Ключевые слова*: автоматизированная система военного назначения, алгоритм, внедрение, войска, комплекс средств автоматизации, межвидовая группировка, облик, проектирование, разработка, стадия, создание, управление.*