

FIELD MODULAR ARMY COMMUNICATION CENTERS

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ABSTRACT

One of the main directions of the military management system development is the improvement and wide automation of field communication networks of the military authorities. States continue to advance their tactical networks to counter these emerging threats, enable new forms of maneuver and maintain integration with military IT services available stateside-all while taking advantage of rapid innovation from the commercial IT industry. Specific to network modernization, communicating securely with command-and-control and other units within the increasingly communications-reliant battlefield landscape is critical to ensure the success of the mission and the safety of war fighters. However, as the army evolves and missions require units to be mobile and support many tactical capabilities, critical communications infrastructures are becoming more difficult to establish and maintain. In this paper, it has been shown a role of modern telecommunication technologies in development of army signal centers. It has been proposed to set up a field army radio communication center in the form of modules.

Keywords: Field radio communication center, Radio communication network, Radio system, Data transmission, Modular radio center, Electromagnetic compatibility.

INTRODUCTION

At present, the innovations cover all aspects of the Armed Forces, as well as the modernization of the communications and telecommunications networks, which are the main means of managing the Armed Forces. The rapid development of information technology requires from radio communications centers certain work on timely, accurate and confidential exchange of all types of information. It provides further enhancing the effectiveness of its activities. Also, it includes replacement of field radio communication centers elements by means of modern requirements or re-processing electromagnetic compatibility and reconstruction of field radio communication centers during modernization (Imanov and Bayramov, 2020).

Improvement and development of the military radio system is one of the most important challenges facing each state in ensuring the defense capacity. Nowadays, one of the main directions of the development of military radio management modular system is the improvement and wide automation of field army radio communication networks of the military authorities (Samochin, 2008). Therefore, states continue to advance their tactical networks to counter these emerging threats, enable new forms of maneuver and maintain integration with military IT services available stateside-all while taking advantage of rapid innovation from the commercial IT industry. The army evolves and missions require units to be mobile and support many tactical capabilities (Wi-Fi, LTE-Long Term Evolution, a standard for high-speed wireless communication for mobile devices and data terminals, etc.), critical radio communications infrastructures are becoming more difficult to establish and maintain (Zlobin et al., 2005).

In this paper, it has been shown a role of modern telecommunication technologies in development of army signal centers. The aim of the paper is to propose to set up a field army radio communication center in the form of modules.

LITERATURE REVIEW

A field army radio network centers in modular type

Taking into account the achievements of modern digital technologies, the implementation of the process of integration of communication and automated management systems into single information and telecommunication system is one of the important issues. This single system contains information, telecommunications and organizational measures. One of the main directions of development of perspective information and telecommunication systems is the improvement of the field army communication and management system, which is an integral part of the overall management system. There are some shortcomings of the currently operating radio communication systems, which are make difficulties to integrate them into the single system, and it is necessary to revise these issues.

These are a number of old modifications of communication facilities in communications divisions and sections, the fact that some of the communication equipment are analogue and others are digital, modern technologies. Additionally, since the modern radio communications facilities used in the army communications networks themselves have different indicators and different tactical requirements, issues of electromagnetic compatibility remain unresolved. The above mentioned problems in many cases, creates difficulties in fulfillment of electromagnetic compatibility issues for all radio electronic means, vitality of communication networks, intelligence protection, convenient use of radio communication, broadband maneuvers with communication channels, as well as radio communication security, timely and precise data transmission. The field military radio communication system should ensure that the authorities have the opportunity to communicate by required channels and means at the scheduled time. Communication centers are the basis of the radio communications system; therefore it is required to undertake a number of measures to address the aforementioned issues (Samochin, 2008). It is also important to take into consideration the requirements of the modern forms and methods of predicting operations, the organization and implementation of combat operations, and the requirements of modern era in the management of troops and the weapons. In addition, operational and technical requirements to the prospective field army communication centers, the capabilities of modern communication facilities, the organizational and technical structure of the field communication centers and the technical supply of its elements should be specified. Besides, this system should also provide the transmission of various data and the provision of integrated communication channels for the full satisfaction of the information needs of the troops (Williams, 2004). It should be noted that it is advisable to set perspective field army communication centers in the form of unified digital communication facilities, complexes and newest telecommunication technologies, as well as accessible automated systems for everyone. The apparatus, software tools, which is being implemented on the basis of technologies of integration of channels, communication, encryption and management, will allow creating new structure based communication centers. These tools, in turn, will create conditions for the groundbreaking review of the structure of the field communication centers, the rejection of their centralized construction and the creation of modern structured army communication centers, taking into account the development tendencies of the control stations (Vasilev, 1987). As the main option for their further development and improvement it is possible to set up a field army communication center in the form of modules. In this case, the field army communication center can be presented as a set of coordinated components. This, in turn, can make it easier for customers to use the types of communications they provide, as well as improve intelligence protection, survival and flexibility of communication centers. It is also reasonable to implement the principle of hybrid switching (switching of channels and packages) in perspective digital communication centers (Imanov and Bayramov, 2020).

During the creation of modern military-purpose radio communication networks in field modular type, the following must be implemented:

- Increasing network capabilities and overall communication capabilities by applying integrated switch devices and broadband digital channels.
- Wide automation of radio communications management and radio communication processes with the use of high-efficiency computing techniques.
- Integration of encryption, switching, communication transformation functions into one device by switching to the modular design of communication means.
- Provision the establishment of communication equipment on a new element base.
- Increase the level of utilization of communication means, reduction of their service life.
- Automation of repair and maintenance process to achieve more reliable radio communication.
- Provision of direct access by separate means by the operator.
- Application of radio communication means with higher interference and intelligence protection.

The installation of field radio communication centers on the modular basis can provide not only radio communication interconnection, but also the integrity of the communication system's external interference, the higher level of vital in the conditions of the barriers, the agility, and the unification of their organizational-technical structure. The development and improvement of the army communication centers implies the establishment of a single telecommunications network, which are based organization of digital networking technologies, modern digital channels, automation of switching process, distribution of channel resources and access to broadband access to the network, supporting and integrating all types of power supply with their own resources.

In this time, the demands of electromagnetic compatibility must be realized. The technical methods of electromagnetic compatibility are as follows:

1. Reduce the sensitivity of the reception channels which are not based on the parameters of the irradiation, modulation parameters and type of signals, the selection of generators and amplifiers, the reduction of the power of extra and nonlinear beams.
2. Application of oriented antennas.

3. Reducing the radiation level of the side beams of the antennas with the directional diagram that affects the radio-electronic means.
4. Implementation of temporary selection schemes for pulse duration and recurrence frequency.
5. Synchronizing radio-electronic means startup interactions.
6. Determining the interrupted signal (by switching the selected impulses) and setting the alarm time.

Modern information and telecommunication technologies, as well as hardware and software which were developed on their basis, allow for all types of information processing and communication issues to be carried out directly at the workplaces. A new class of modular, tactical data centers is becoming available for tactical and expeditionary programs, capable of hosting cloud and storage, artificial intelligence and analytics applications. Using ultra-small form-factor modules for computer, storage and networking functions that reduce size, weight and power requirements, these systems can be deployed dismounted, at forward operating bases, in command posts, and on ground vehicles and aircraft-supporting a diverse array of use cases in disconnected, intermittent and limited environments. The widespread expansion of the nomenclature of telecommunication services to users requires from army radio communication centers multicast communication networks (Zlobin et al., 2005).

DISCUSSION

First, the minimum network capability for each type of traffic should be ensured. Because, the multi-threaded networks need to be set up for each traffic type, the transmission speed agreed upon with each intermediate network device. Transmission of a traffic type should not negatively affect others. Each attachment (video, data base, etc.) running on the network must be separately provided with a specific agreed network of that network. Second, minimal possible downtime for multimedia traffic should be provided. The use of long information packets for data transmission is more efficient. Thus, the execution of these operations may reduce the useless use of the network. However, transmission of voice or video traffic may become a problem.

Documents sharing networks can be created at the expense of the properties of the respective local computing networks, which have access to the army communication networks for the exchange of information with the top headquarters, interacting and controlling entities of the subordinate units. This organization can provide an informational-computing system with distributed functions, which optimally assists in the solution of exchange tasks with all types of information. The application of multi-modular local computing networks in communication centers and in their elements can be used to reduce the number of communications devices, as well as to raise the operational-tactical and technical characteristics of the army communications networks.

CONCLUSION

The modern perspective of telecommunication technologies and their integration capabilities create high-speed radio networks in a local compact site in form of modules of radio communication element. In turn, these networks can provide transmission of all types of information and a range of military radio communication services. The field army radio communication centers always must be ready to launch at the right time and be ready to expand the radio communication system. Therefore, it is necessary to take into consideration the conditions provided for the solution of the issues of the application of new technologies and techniques in the development and improvement of the army radio signal centers in form of radio communication modules.

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