USE OF NETWORK VIRTUAL SIMULATORS IN THE PROCESS OF TRAINING SPECIALISTS IN RADIO COMMUNICATIONS

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This article proposes the use of network virtual simulators when training cadets of military educational institutions. The use of this approach will make it possible to bring the practice of trainees as close as possible to the conditions of a real organization and provision of radio communications without additional expenditure of material resources.

Material and methods. To improve the effectiveness of education and the quality of training of cadets of military universities, information and communication technologies and electronic means are now widely used.

Since the elements of a promising special-purpose communication network are modern digital means of communication (Figure 1), the actual task of training is to ensure the possibility of operation and maintenance by students of all types of radio stations and digital devices during practical exercises [1].

Figure 1 – Digital radio station R-181-50/50VU-2

A network virtual simulator is a complex of hardware and software that allows training communication specialists without the use of standard means [2].

The main tasks of the simulator are:

- theoretical training of specialists in the training program;
- familiarization with the procedure for setting up radio stations and digital devices;
- control over the assimilation of educational material;
- construction of a scheme of communication organization;
- ensuring the entry into communication and the implementation of negotiations (transmission of signals and commands) according to the rules of radio communication.

The simulator includes the following elements:

- automated workplace of the commander;

- automated workplace of the radio operator;
- Database server
- field switch P-215;
- microtelephone headsets.

The automated workplace (AWP) of the commander (head of the lesson) is designed to form radiograms to communication network operators, build a communication organization scheme, and provide control over the exchange of speech messages by digital communication network operators (Figure 2).

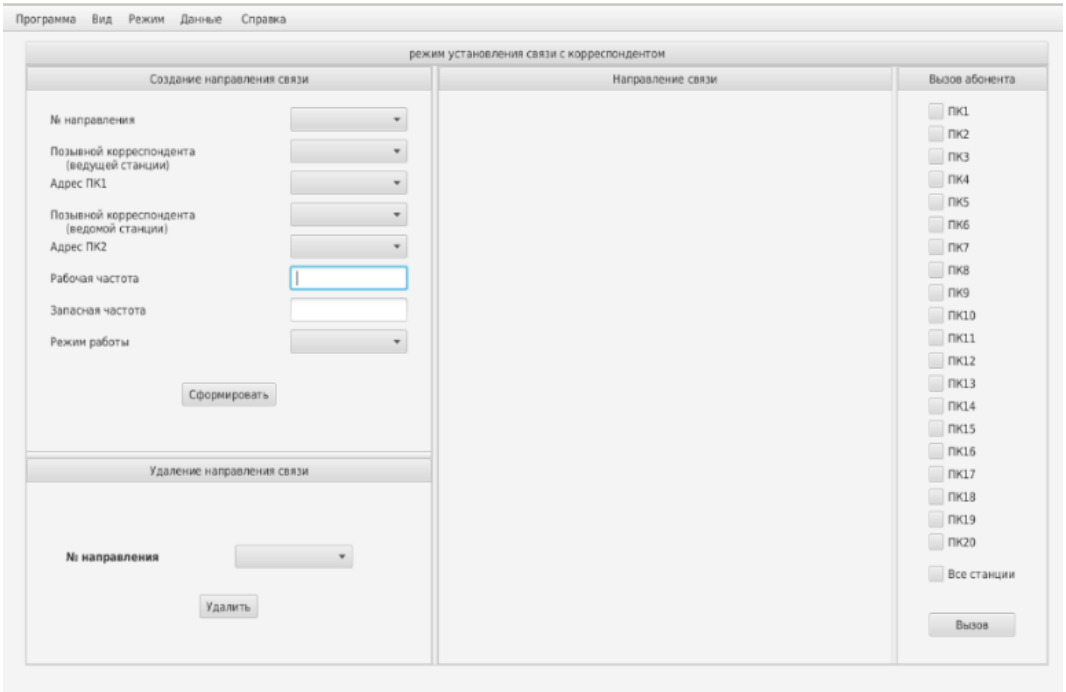

Figure 2 – Commander's Workstation (Lesson Leader)

Findings and their discussion. A feature of the network software (SPO), as well as the application of this workstation as a whole, is the ability to scale the network, develop and add new network elements through the use of modern approaches to the design of software [1, 2].

The data generated by the application is processed on the server, which is part of the complex.

The database implemented on the server part of the complex has a complex hierarchical structure and processes data from all workstations of the digital network.

The operator (student) workstation consists of the following elements (Figure 3):

- control, which is used to configure the radio station both with the mouse and with the keyboard of a personal computer;
- noli receiving adiogram used to display the data generated by the commander (for example, such as call signs, modes of operation of digital stations, operating and spare frequencies);
- a link diagram field that displays the current state of the communication organization in the communication directions. In case of incorrect configuration of radio equipment, this field indicates possible errors;

• noli spectrum from the signal of the selected mode of operation, which serves to display (visualize) the main characteristics of the signal (for example, when working out laboratory work).

In case of successful adjustment of the radio station in the direction of communication in the operator's application, the exchange of voice information according to the rules of radio communication is provided.

The data generated by the operator's application is processed on the database server.

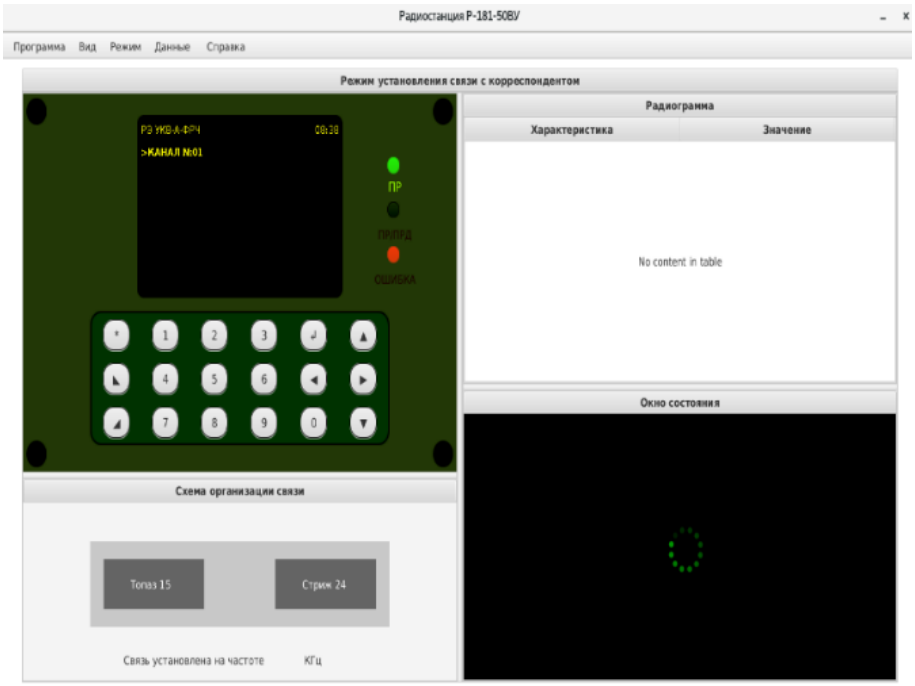

Figure 3 – Workstation of the operator (trainee).

The control panel allows you to fully configure the radio station in all modes of its operation (Figure 4).

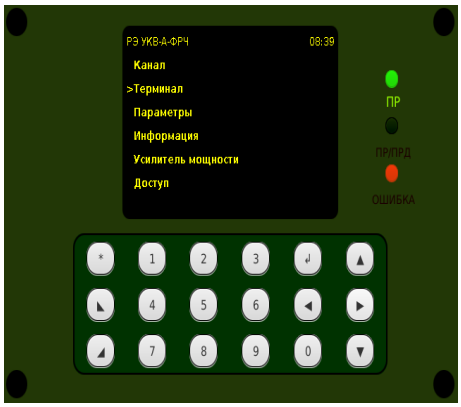

Figure 4 – Radio control panel

In addition to configuring the parameters of the radio station, the remote control provides setting of access parameters and adjustment of the device interface.

Conclusion. The use of network virtual simulators in the educational process during training will increase its effectiveness not only by ensuring the possibility of practicing practical issues by all students without using real samples of radio equipment, but also by bringing them as close as possible to the conditions of real organization and provision of radio communications [3].

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ALGORITHM FOR DETECTING AND MEASURING THE COORDINATES OF A GROUND OBJECT IN DIFFICULT PHONO TARGET CONDITIONS

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Keywords: algorithm, TV, temporal and spatial filtering, phonotarget condition.

The article proposes an algorithm based on temporal and spatial filtering for detecting ground objects in complex phonotarget conditions.

Currently, the use of video surveillance systems is used all the more widely, covering many about the nature of human activity. The most significant and relevant application of video surveillance systems are security systems. The disadvantage of using such systems is that the burden of processing information falls entirely on the operator and if the operator does not cope with the video data stream, the concept of working in real time ceases to operate, and we can only talk about analyzing the situation with a certain delay, which is unacceptable for security systems.

Material and methods. In [1], an algorithm for detecting an object was proposed, while the task of detection was set as the task of testing a hypothesis about whether the object is present in the image or not.

$$\max_{\alpha,\beta} F(\alpha,\beta) > \sqrt{\frac{2N_xN_y}{S_gS_h}\ln C\sigma_\xi}. \quad (1)$$

And the algorithm of detecting an object and measuring its coordinates consists in maximizing the criterion function and comparing the maximum value with the threshold.$F(\alpha,\beta)$

However, this algorithm is derived under the assumption of the constancy of the background component. In case that the background component is a changing process, this algorithm requires modification in which it can work effectively.

Therefore, it is proposed at the initial stage to filter the observed image in time according to the formula:

$$\hat{l}(i,j,n) = \gamma\hat{l}(i,j,n-1) + (1-\gamma)l(i,j,n), i = \overline{0,N_x-1}, j = \overline{0,N_y-1} \quad (2)$$

where is $\hat{l}(i,j,n), \hat{l}(i,j,n-1)$ – image anti-aliased in time to $n-$ my and $n-1$ frame, respectively;