

## **Abstract**

### **Actuality of theme**

In this final work, the possibility of application and realization of wireless technology J-NET-SP in fire safety systems is considered.

The project considers the theory, the principle of construction and features of the wireless network, existing varieties of technology, as well as the choice and justification of network implementation based on the standard 802.15.4.

In the technical and economic part was compiled calculation of capital costs for the construction of the network. In addition, issues of safety of work and life were considered.

### **The purpose and tasks of the study**

The purpose of the study is to increase the probability of the results of ultrasound defectoscopy by using the methods of statistical phaseometry for the processing of informative signals.

During the research the following tasks were solved:

1. To develop the basis of the fire safety system management program. To justify the use of circular statistics for the detection of a dangerous situation.
2. Explore already known types of wireless networks for data transfer to the control panel.
3. To develop a method of detecting a dangerous situation with the use of fire systems and its further development.
4. Analyze the probability of detecting malfunctions. List the spooks and disadvantages of using this system.

The object of research is the process of fire detection and data transmission using wireless networks.

The subject of research is the method of fire detection and data transmission using wireless networks.

The research methods are based on the use of theoretical foundations for the construction of a fire safety system. Addition of the system will be the use of wireless networks for data transmission to the remote control DSNS. Writing a code to process results in a Delphi environment.

#### **Scientific novelty of the obtained results:**

1. The method for detecting fire hazards using wireless networks was first proposed. Which, in turn, allow you to increase the likelihood of detecting a hazard and warn them in a timely manner.
2. The use of wireless networks for data transmission is substantiated. What ensures system performance in critical conditions.
3. For the first time, it is proposed to choose the threshold of decision-making by a system that determines the faithfulness of the performed actions while not threatening human life. This, in turn, will increase the likelihood of localization of a dangerous situation and detect a fire at the beginning of smear.

#### **Practical significance of the results of the dissertation:**

1. A computer simulation is performed that depicts the dependence of the signal on the distance between the transmitters and the distance to the walls. The simulation was performed for the five-channel model and for the six-channel model.
2. The proposed method of detecting a dangerous situation can increase the likelihood of the results of the fire detection and timely warning it, which is confirmed by theoretical and model research;
3. An algorithm for calculating the adaptive threshold is proposed, depending on the estimates of the mathematical expectation. Noise calculation and loss line data transmitted.
4. The recommendations for selecting the parameters of the modes of the processing of signals, namely the gain factor and the aperture of the window function, are made,

which allows to maximize the probability of detecting noise and losses in the absence of a priori information about the carrier signal frequency.

### **Approbation of the results of the dissertation**

The main provisions and results of work were reported at the following conferences: Scientific and Practical Conference of Students, Postgraduates and Young Scientists "A View to the Future of Instrumentation" (Kyiv, 2018);

### **Publications**

On the topic of dissertation research published 1 scientific work, of which: 1 thesis of the report in the collection of conference materials.

### **Keywords**

Fire safety system, methods of detecting a dangerous situation, network and standards of construction, selection and calculation of basic elements, module of wireless transmission.