CREATING STAND OF CCTV FOR TRAINING SPECIALISTS IN SECURITY AT NUCLEAR FACILITIES

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СОЗДАНИЕ УСТАНОВКИ ВИДЕОНАБЛЮДЕНИЯ ДЛЯ ПОДГОТОВКИ СПЕЦИАЛИСТОВ В ОБЛАСТИ ОБЕСПЕЧЕНИЯ БЕЗОПАСНОСТИ НА ЯДЕРНОМ ОБЪЕКТЕ

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Аннотация. *Решению задач по обеспечению физической защиты ядерных материалов и режима нераспространения в наши дни уделяется пристальное внимание в ядерной энергетике. Подготовка специалистов в области безопасности является важнейшей задачей. Поскольку подготовку специалистов на самом ядерном объекте осуществлять невозможно по некоторым причинам, для выполнения этой задачи удобным является использование стендов. Целью работы являлось создание стенда видеонаблюдения.*

Today, nuclear energy is a priority approach of obtaining energy in many countries. Russia is not an exception. There is an issue of non-proliferation and physical protection of nuclear materials at nuclear facilities. For realization of physical protection at nuclear facility physical protection system is implemented.

The objectives of physical protection at nuclear facilities are the following:

a) prevention of unauthorized activities;

b) timely detection of unauthorized activities;

c) slowing down penetration, detention of the offender;

g) responding to unauthorized actions and neutralization violators to prevent unauthorized actions [1].

PPS of nuclear facilities includes a "complex of engineering tools, and organizational activities aimed at their application and improving" to prevent sabotage or theft of nuclear materials, nuclear plants and storage facilities [2].

Physical protection system is an essential tool for providing non-proliferation of nuclear materials and technologies that can be used to create nuclear weapons. To ensure safe use of nuclear energy in the near and distant future, the appropriate barriers to prevent this threat are required. Video surveillance is a mean of promoting the objectives of the physical protection of nuclear facilities.

Video surveillance is one of the most popular and effective security measures. Video surveillance systems are used not only for security objectives. Video surveillance systems are a set of instruments designed to receive and display images as well as additional devices that increase the efficiency of security systems [3].

Installation of CCTV allows achieving the following objectives:

1) continuous visual control of the territory as well as processes in the workplace;

2) recording everything by video cameras for later viewing;

3) performing the alarm functions through sensors installed.

The image quality is determined primarily by the television camera. It is a complete unit which is connected to the video monitor or TV and allows you to observe the area on screen at a distance from the object.

All CCTV systems can be divided into three groups taking as a criterion place and method of installation:

– internal video surveillance installed indoors;
– street surveillance installed outdoors (streets, yards, etc.);
– hidden video surveillance – cameras which are mounted unobtrusively.

Depending on the type of surveillance equipment may be analog or digital. In analog systems video recorders, multiplexers, and monitors are used and the signal that is transmitted from the camera to the monitor is a standard television signal. But analog surveillance systems have become obsolete, they are characterized by low speeds and a fuzzy picture. They were replaced by a video surveillance based on digital technologies that use binary encoding information. These technologies allow increasing the recording speed and image quality several times making it possible to add additional sensors and cameras. The cost of the digital video operation is very small.

To date, there are digital video surveillance systems, which both work in real time and allow archiving recordings produced several months ago which is not possible using analog systems. The image from the camera can be black and white as well as colored. IR camera operating in a day / night mode is the most popular one for the protection of both the facility perimeter and inside the premises [4].

Commercially available cameras have been studied. Equipment company «Vesta» was chosen to create the stand. Elements used to create the "stand CCTV monitoring equipment" (Figure 1) are shown in Table 1.

Table 1

Components of the stand "Monitoring equipment CCTV"

№	Element	Quantity, pcs
1	Dome IP Camera color day / night modes VC-6207	1
2	Outdoor IP Camera with IR LED VC-6309	1
3	Outdoor Video Camera with IR LED VC-313	1
4	Outdoor Video Camera with IR LED VC-310C	1
5	Outdoor Video Camera with IR LED VC-303s	1
6	Outdoor Video Camera with IR LED VC-302s	1
7	Video Camera VC -302 C	1
8	Dome Camera with IR LED VC -200c IR	1
9	Dome Camera IR LED c VC-202s	1
10	Four Channel Hybrid DVR	2
11	Monitor	1
12	Power supply unit	1

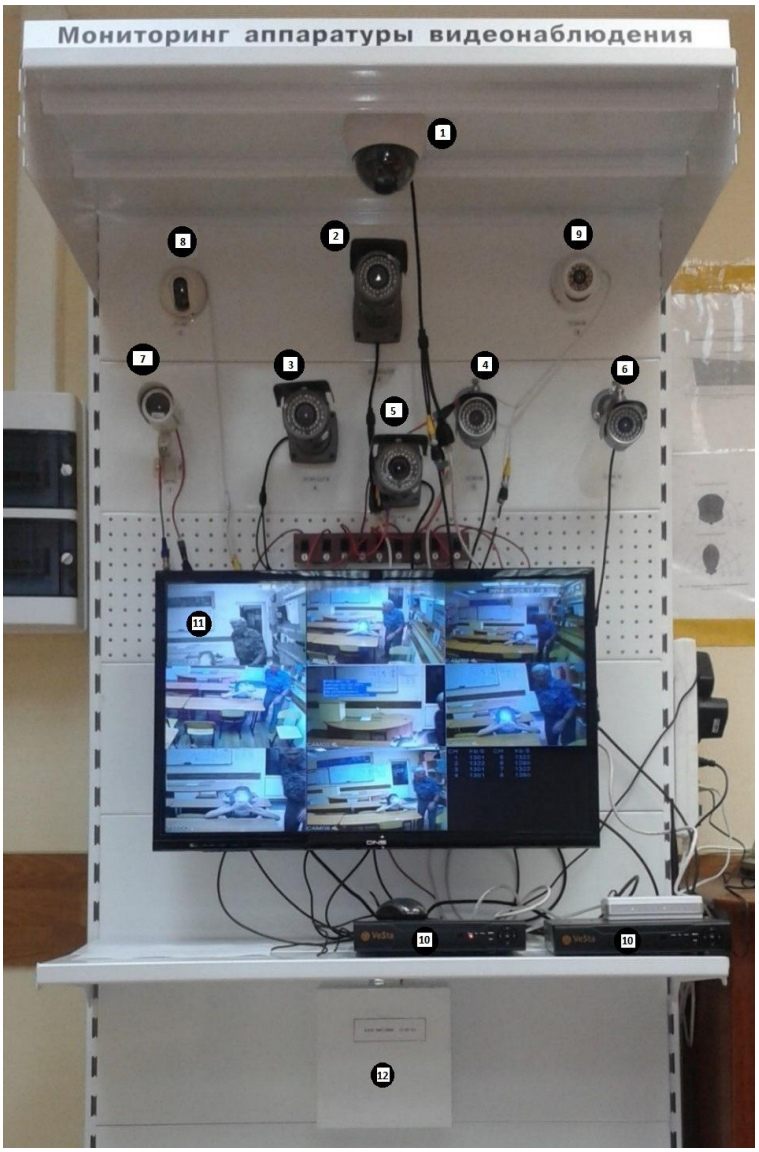

Figure. 1. Stand monitoring surveillance equipment organization

CONCLUSION. One of the challenges in the field of physical protection is to educate students in specially equipped laboratories and train professionals working in the field of security. To solve this problem «Stand monitoring surveillance equipment» was designed and installed. This stand allows studying the principles and features of the system.

LIST OF REFERENCES

1. Rules of physical protection of nuclear materials, nuclear plants and storage of nuclear materials.
2. Government Decree of 19.07.2007 №456 «On approval of rules of physical protection of nuclear materials, nuclear plants and storage of nuclear materials."
3. Orlov S. surveillance: not only the security of network solutions // Journal LAN. - 2012. - №. 12. - P. 48.
4. Ryzhov VA Design and research of integrated security systems.