

## **The Ministry of Defense of the Republic of Uzbekistan Introduces the Video Surveillance System for Combat Service Dogs**

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**Abstract.** *This article examines the proposal of the Ministry of Defense of the Republic of Uzbekistan to introduce a video surveillance system for monitoring the situation in real time remotely during the execution of combat missions (in the direction of reconnaissance, mine-search, finding weapons and explosives) of service dogs in the occupation units.*

**Keywords:** *Full HD, IP camera, COFDM modulation, NLOS, LOS, infrared light diode, video signal.*

Geopolitical situations in the world, armed conflicts, emergency situations in our country require the creation of a defense system capable of ensuring the security of our homeland, increasing our country's defense power, and eliminating any external threats.

In recent years, effective measures have been taken in the system of the Ministry of Defense to use service dogs for various purposes, i.e., in the direction of protection and guarding, guarding important military objects, mine search, ensuring the security of state objects, and in the combat tasks of the occupation units of the Special Operation Forces.

Service dogs in special actions to ensure internal security of the state:

in reconnaissance search operations;

in search and rescue operations;

in identifying and searching for illegally stored weapons (tanks, ammunition, etc.);

in the destruction of the enemy's base areas, ammunition and material and technical equipment storage warehouses;

when carrying out measures to encircle, neutralize and destroy (capture) enemy objects;

it is used in carrying out special measures for the capture (elimination) of the leaders (field commanders, chiefs) of the enemy's armed formations (destructive forces). [4]

As part of the measures, one of the urgent issues is the introduction of a high-quality, compact video surveillance system with night vision (adapted during the movement of service dogs) for real-time remote monitoring of situations by service dogs during combat missions. In this regard, remote video surveillance systems used by service dogs in the armies of a number of foreign countries with advanced experience in the field of canine were studied. In particular, the K9 Vision system video surveillance system produced by the French company "Morin" is being used in NATO troops (Fig. 1).

This company has five years of experience in implementing and improving the video surveillance

system "K9 Vision system".



1-расм: Франция давлатида ишлаб чиқариладиган “K9 Vision system” видео кузатув тизими.

In addition, service dogs of the US Army are equipped with glasses and video surveillance system, as well as virtual glasses, made by engineers of the company "Command Sight" based on HoleLens technology.

In the armies of the People's Republic of China, service dogs are provided with the MMR900 search (reconnaissance) controlled video system in order to send audio and video signals in real time in mountainous areas, buildings, caves, and other dangerous areas for reconnaissance and search-rescue work (Fig. 2).

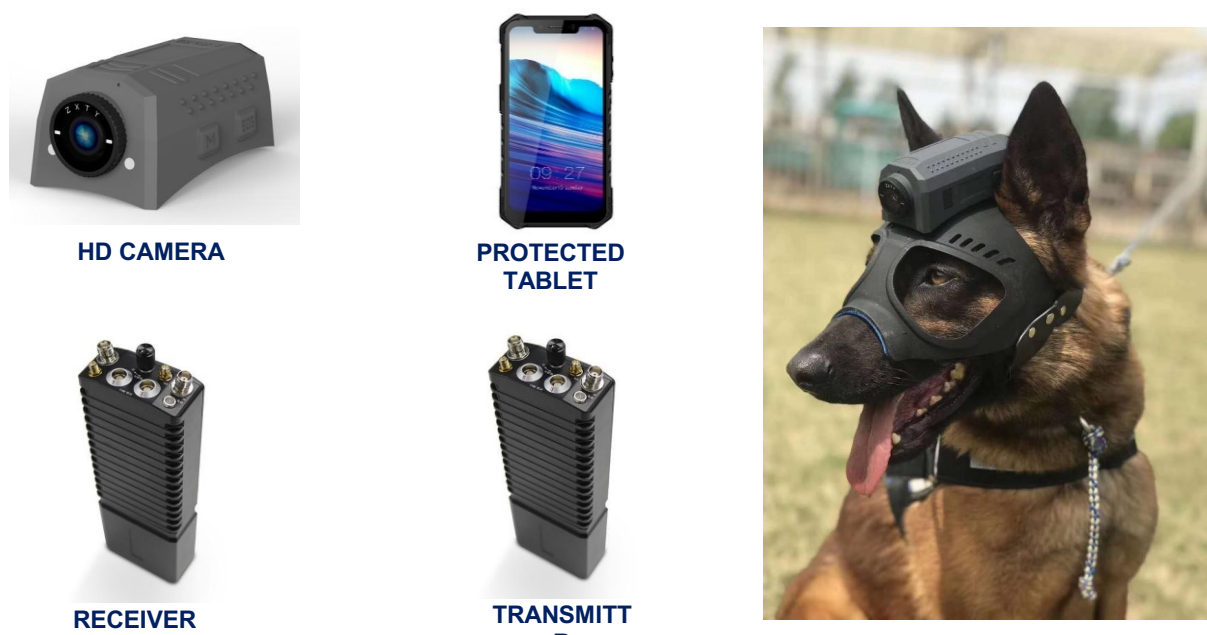


Figure 2: Video MMR900 manufactured in the People's Republic of China tracking system.

The implementation of control and video surveillance using service dogs in the military is receiving great attention and many scientific studies are being conducted in the United States, the Russian Federation, the People's Republic of China, Israel, Germany, Great Britain, France, India and other developed countries.

In accordance with the tasks of the units of the Ministry of Defense of our Republic, military servicemen can detect the areas with limited visibility on the battlefield (buildings, structures, etc.) by remote monitoring of the environment, which can be seen by service dogs. system creation, localization and implementation in the troops is a novelty in the Armed Forces system.

In order to implement this system in the troops, research and research work is being carried out by specialists of the field of the Ministry of Defense.

In order to find a specific solution by experts, 4G(LTE),

Camera and receiver and transmitter systems supporting Wi-Fi standards have been tested. As a result of the tests, the shortness of the communication distance (Wi-Fi), the lack of the camera's night vision function, the limited transmission of video signals in areas with limited visibility (buildings, shelters, areas where 4G (LTE) is not available) and video image frames are not available. technical deficiencies and defects such as delays in time intervals were identified.

Based on research and combat mission, the proposed remote video surveillance system should meet the following requirements:

video surveillance camera quality should not be less than FullHD 1080p;

during movement, the video image is concentrated at one point and the images of the body are clearly visible (action camera);

that the camera has the ability to see at night (the presence of a light emitting diode in the infrared range);

video signals must withstand interference from external influences (based on COFDM modulation);

the delay in the time interval of the video image frames is imperceptible;

it should be a small, compact and convenient system for service dogs.

COFDM (English Coded Orthogonal Frequency Division Multiplexing) is an orthogonal frequency division modulation of channels with coding. Orthogonal frequency division with channel coding makes it possible to recover from data transmission failures and errors.

An infrared light emitting diode is a semiconductor that produces light waves (infrared) in the range invisible to the human eye. Infrared light emitting diode is widely used in night vision cameras.

FullHD 1080p -1920 × 1080 pixels (2.1 Mpix) resolution 2.1, aspect ratio 16:9, 60 frames per second. FullHD 1080p is widely used for 24/27 inch monitors.

LOS-Line of Sight (direct line of sight) refers to the fact that when transmitting radio signals, the receiver and transmitter antennas see each other in a straight line.

Devices necessary for a video surveillance system based on technical requirements and combat tasks - action camera, video signal transmitting and receiving device, power source, radio station (walkie-talkie) for remote voice control of service dogs, and a monitor or tablet for monitoring images (3, 4- pictures).

The tools of the video surveillance system of the service dog and canine specialist-operator are installed on specially made trays that are stable and do not interfere during movement.



Figure 3. Tools to be installed on the service dog.



Figure 4. Cynologist-operator tools.



Figure 5. Video surveillance system connection diagram.

The transmitter and receiver in the system are connected by radio waves. The communication distance is when the antennas see each other (LOS-Line of Sight).

Up to 500 meters, when visibility is limited (NLOS- Non line of Sight) up to 150 meters. The inside of the receiver in the cynologist-operator

It is connected to the tablet via the Wi-Fi network, the installed special software is loaded, and video surveillance is carried out (Fig. 4).

In conclusion, as a result of the introduction of a remote video surveillance system for service dogs of the Ministry of Defense units, the safety of military personnel is ensured to a certain extent during combat operations, as well as obtaining complete information about the situation with real-time remote monitoring of explosives in buildings and structures, the search for the enemy, and reconnaissance. efficiency is achieved. By using special surveillance cameras and technical



equipment for service dogs during combat tasks, the visual surveillance capabilities of groups are increased, security in the area of combat tasks is achieved, and the number of combat losses is reduced.

A system will be created to provide the special units with quick and accurate intelligence information in the performance of their tasks, to identify the enemy in time in areas with limited visibility and to effectively fight against them.

Introducing these and similar modern technologies in the troops will contribute to strengthening the defense capabilities of our National Army.

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