

approaches to solving those issues. The analysis of combat operations using UAVs shows that they are used for reconnaissance and strike purposes, as well as directing the fire of high-precision weapons, as well as for destroying manpower and enemy equipment in groups of UAVs. From this point of view, the use of UAVs in the form of a group (swarm) to fight against manpower is justified in the research work, the issues solved by the application of a military UAV herd are given, and the principles and approaches for solving each issue are presented.

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## **AUTOMATED UNMANNED SHOOTING EVALUATION ROBOTIC COMPLEX**

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In recent years, the development of automated robotic systems for effective training in precision shooting from small arms has become increasingly important. The presented complex is intended for training in the skillful and effective use of small arms. The shooting evaluation system carries out shooting and automatic evaluation according to the shooting task at various types of targets using automated software, technical equipment and a PTZ camera.

**The purpose of the report** is to present an unmanned robotic complex designed and manufactured to evaluate fire from small arms (machine gun, sniper rifle, pistol). This complex can be controlled without an operator; the coordinates of bullets hitting the target can be determined automatically, thanks to which the accuracy of the shot can be assessed and the arrow's score can be calculated. When assessing shooting accuracy, the terrain features and seismic vibrations of the soil are taken into account [1-4]. The software has been developed for unmanned control of a robotic complex. The complex is designed for effective training of soldiers and officers in shooting at short and long distances (20 ÷ 1500 m). The target is made of polymer carbon fiber and has a long service life. The proposed unmanned robotic complex has significant advantages compared to foreign analogues [5-7].

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## **ARTILLERY FIRE CONTROL SYSTEM USING UAV**

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In recent years, automated control systems based on artificial intelligence (AI) have been increasingly used to improve the effectiveness of artillery fire [1–7]. Unlike existing methods, the use of artificial intelligence in the automation of artillery fire control systems allows for the rational use of artillery weapons of different calibers, depending on the required specific firepower per unit of front width and the changing situation at the tactical level of the front. Considering the changing situation, rational control of artillery destruction power can be achieved using an unmanned aerial vehicle (UAV) with an artificial intelligence-based PID controller.

**The purpose of the report** is to present a remote control system for unmanned artillery fire, developed using UAVs with artificial intelligence. The developed unmanned robotic complex includes sensor modules for assessing the environment, collecting and processing data, planning and decision-making, and training commands for the commander of an artillery battery, battalion, division or brigade. To solve the problem of optimal synthesis of an automated workstation for the commander of an artillery battery (brigade, division), it was proposed to use the total firepower of its components as an objective function.

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