THE PROGRAM AND ALGORITHM THAT ENSURE THE OPERATION OF THE ZENITH SIMULATOR

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Abstract:

The article discusses measures to improve the effectiveness of modern training simulators in training specialists in higher military education institutions, as well as types of training simulators used in training students of higher military educational institutions, programs and algorithms that ensure their operation, as well as theoretical knowledge and practical skills of specialists using the capabilities of these simulators. information on ways to improve their skills.

Keywords: Algorithm, modeling, simulation, virtual simulator, effectiveness, expert, education, anti-aircraft devices, military equipment.

Introduction

The creation of anti-aircraft simulators for the defense of units against air attacks, increases the efficiency of personnel training in higher military education institutions, training centers for junior specialists, and other training centers under the Ministry of Defense. The simulators help to study the designs of anti-aircraft devices existing in the air defense troops, the principles of their operation, the methods of use, and the mechanism for their application in any operational and tactical situations. Here, we look at an overview of methods and algorithms for building simulators.

Category of simulators: Simulators of Zenith devices can be of various types, including:

Simulation Simulators: Focuses on modeling the Zenith device or simulating applications and individual content evaluation systems that are more complex.

This method, called virtual simulators, is often based on the use of computer graphics and animations.

Practice Simulators: These simulators describe military techniques and include their real-time operation. Such simulators are designed for specialists in educational institutions and master complex technical capabilities of military techniques.

Interactive simulators: This type of simulator provides interactivity, that is, the opportunity to interact directly with the trainer. With the use of the simulator, the learner can make any decision, perform tactical actions and assess its effectiveness.

Modeling and Simulation: Simulate in real time air assault vehicles, anti-aircraft devices, targets and their movements in the simulator. It takes into account various conditions of real air attacks, such as time, weather conditions, daylight and night hours, as well as any possible risks during hostilities.

Correct input of parameters: When using the simulator, it is important to correctly enter the parameters of the air assault equipment (e.g. dimensions, flight speed, altitude). This increases the effectiveness of the simulator.

Controller and interface: The simulator interface should be concise and easy to use for the learner to operate the zenith devices. Let's not forget about devices, it is important to create an understandable interface for using them with high efficiency.

Algorithms for creating simulators. The following algorithms can be used to create simulators of Zenith devices:

Physics-based modeling: Computation of the behavior of each anti-aircraft device and air assault vehicle based on physics models. For example, simulation of radar signals, weather conditions, device impacts, and tracking (targeting) systems of hao attack vehicles.

Simulation states: For example, real-time computing of motion, movements at high and low altitudes are driven by new data.

Algorithms for working with data. Creating a database: Collect data for simulators, that is the technical parameters of anti-aircraft devices, mechanics of their operation, assessment of risks and errors, conditions in an air attack.

Maintenance control and real-time correction: Algorithm correction and event analysis based on the status of each zenith device. The results of this analysis help to know the relationship between the anti-aircraft device and the objects of attack.

Simulation algorithms. Virtual reality or Augmented Reality (AR): The use of AR and VR (virtual reality) technologies to use the simulator for real-time use, that is, to solve problems, adapt to any environment conditions.

Simulated scenarios. In the simulators, with the aim of training the trainees, there will be the opportunity to create various scenarios and situations, for example, high-speed attacks of air targets, modeling of low- and high-altitude air attacks, respectively, convenient opportunities to learn how to work with anti-aircraft devices. This leads primarily to economic and time savings in the training of specialists, as well as to saving the motor resources of military equipment, identifying errors and shortcomings of specialists in the learning process, improving their practical knowledge and skills by eliminating these deficiencies. The simulators help operators and commanders learn how to do the right thing in different situations. It covers the correct operation of equipment, the use of various technical means and the learning to make quick decisions in complex situations.

Mistake Correction: Through the simulator, operators are able to identify their mistakes and practice them over and over again to avoid repeating them later under real conditions. For example, during combat performance on an anti-aircraft device, they can determine what mistakes or omissions were made in the reception and make the necessary decisions to eliminate these errors and shortcomings.

Train and improve performance performance.

Physical and psychological preparation: Simulators, zenith devices are used to prepare the student physically and psychologically. They mainly develop the ability to act quickly and make the right decision in urgent situations. Simulators will help you learn how large groups work together and perform different actions in concert in any situation. This improves the interaction and coordination between operators of the zenith device and learners.

Maintenance and Repair of Installations: Through the simulator, operators can learn how to inspect, repair and reuse any military equipment. It is possible to perform the maintenance process on simulators intensively. Through modeling techniques, repair can identify parts of a device and virtually simulate the repair process, allowing operators to manually practice the actual device before putting it into service. Technologies and platforms for simulators Various technologies and platforms can be used to build simulators of the zenith device. Here's a look at some of the more important technologies and platforms:

Unity 3D vs Unreal Engine: These platforms are used to create virtual environments and perform simulations. They allow for the creation of simulations based on the interaction between precise physics models, air attack tools, and anti-aircraft devices.

MATLAB / Simulink: This platform is convenient for technical modeling, dynamic systems and algorithms. The Zenith device can be used to create, test and correct mathematical models of systems. In the future, simulators may have integrated platforms that are integrated to further enhance collaboration between online tasks, databases, and users. It helps automate operational processes, fully integrate data manipulation and evaluation.

In conclusion, it can be said that the creation of simulators of anti-aircraft devices and their use in the process of military education is of great importance for the development of the training system for military specialists, training and maintenance of operators of anti-aircraft devices and improving their ability to conduct combat work on military equipment in combat situations. The integration of modern technologies, especially VR, AR, simulation and other simulation methods, will help to elevate the efficiency of the use of simulators to a very high

level. When creating simulators of Zenith devices, it is important to use precision, excellence, as well as technology in physics, data modeling, and algorithm development. To increase the effectiveness of the simulators and test them under different conditions, these methods are of great importance.

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