

The Research of the Use of Training Simulators and VBS2 in the Security Forces

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Abstract— This article presents a research focused on the use and the suitability of the training simulators in the security forces. In the first part, there is a list and description of the types of the current training simulators and categories of simulations that are used in security forces. In the second part, the research itself is presented with representatives of the most significant types of simulators of each part of security forces. The last part describes the scenario of the TCV modelled in virtual simulator VBS2 and its evaluation by an expert with important recommendations for the future research.

Keywords— Army, Police, Private security services, Security forces, Simulation categories, Training simulation, Types of simulation, Virtual Battlespace 2.

I. INTRODUCTION

ONE of the main advantages of simulators is the possibility of training life-threatening while no life, health or property is at risk, what is the reason why are training simulators broadly used in the training of security forces – army, police and private security services (PSS). [1] Nowadays, especially due to increasing risk of terrorist attacks, there is an increasing need of a perfectly skilled security forces.

This survey reveals the current state of the use of training simulators in security forces and the applicability of the current types of simulators for training the most important duties assigned to the security forces. Moreover, the research aims on the simulator VBS2 and discuss its benefits for private security industry.

II. CATEGORIES AND TYPES OF TRAINING SIMULATORS

In this chapter, the existing categories of simulations and types of simulators used for training security forces are described.

A. Categories of Simulation

A simulation can be divided or classified into 3 groups – live simulation, virtual simulation and constructive simulation. Not every of this category can be used for each simulation purpose as can be seen in the next sub-chapter.

Live simulation

Live simulation involves real people operating real systems. Military training events using real equipment are live

simulations. They are considered simulations because they are not conducted against a live enemy. [2]

Virtual simulation

Virtual simulations involve real people operating simulated systems. A video game or a cockpit mockup used to train pilots are examples of virtual simulation. [2]

Constructive simulation

Constructive simulations involve simulated people operating simulated systems. A constructive simulation is a computer program. For example, a military user may input data instructing a unit to move and to engage an enemy target. The constructive simulation determines the speed of movement, the effect of the engagement with the enemy and any battle damage that may occur. [2]

B. Types of Simulators

There are a lot of training simulators used all over the world using the same function principle. This allows place these simulators into the groups that could be called types. Below, the list of the types of simulators and their description can be found.

Driving simulators

These simulators are focused on the training and improving driving abilities and automating all operations in the driving process. Simulators are usually precisely imitating the interior of the real vehicle and its properties. There are 3 main types of driving simulators – simulators of the air vehicles, land vehicles and naval vehicles. Driving simulators help to train participant to drive the vehicle not only in ideal conditions, but even in the abnormal conditions such as slippery road, foggy weather, etc.



Fig. 1 – Driving simulator. [3]

Fire-arms simulators

This type of simulators (including both electronic simulators and shooting ranges) is one of the most commonly used in the world. The latest technology, which is popular especially thanks to money saving, is the laser/infrared technology with projected target on the projection screen. These simulators can be used not only for reaction/aim training; they can help to maintain tactical and decision-making abilities by making difficult situations with civilians, etc. Moreover, this type of simulators can be used for training the identification of the person from the simulated scenario.

Live simulators (interior/exterior)

This type of simulators represents all interior and exterior areas and buildings, which contains necessary equipment. This equipment – especially guns – allows participants learn tactic and communication skills in a small military group. Live simulation is similar like paintball games or airsoft games, however there is used more sophisticated systems such as laser or infrared guns (e.g. MILES simulator). That means that non-lethal projectiles are used during this simulation, so there is no risk of injury.

Tactic simulators

These simulators are focused especially on improving tactical and strategy skills of their participants during commanding big armed forces. This type of simulators can be classified as a constructive simulation. In implemented editors, a terrain, rivers, hills and other for strategic teaching important elements can be edited.

“Wargame” simulators

This kind of simulators represents all virtual simulators in which participants control their own avatars. In cooperation with other participants and their avatars, the students are completing scenarios and goals. Wargame simulators usually contain a set of models (buildings, animals, vehicles, etc.) that can be edited and placed into the chosen map. In these simulators, the interaction between objects can be scripted and complex scenarios can be made.

Cultural simulators

Cultural simulators are focused on the training of communication and behaviour skills in varying cultural environment. This is helpful especially in army missions where e.g. European soldiers operate in Afghanistan – a country with greatly different habits. This helps soldiers not to provoke local inhabitants.

Decision making simulators

Decision making simulators can be – and often are – implemented in fire-arms simulators. They are focused on the fast decision-making training, such as talking to a suspect and reacting to his attacks by drawing and accurate using a participant’s weapon (model of weapon).

Equipment simulators

Using equipment such as flashlight or fire-extinguisher can be successfully simulated in this type of simulators, which can be integrated into the fire-arms simulator. It usually consists of projector, projection screen and models of equipment. In these simulators, model of flashlight lights in the virtual environment and participants can use fire-extinguisher to extinguish virtual fire.

Virtual live simulators

Virtual live simulator is a new type of simulators. It started as a game (e.g. Second live), but later, the use was extended in classrooms where the avatars which are represented real people are sharing information and knowledge. In this progressive type of simulator, there is a big potential for future applications of training methods.

III. THE SUITABILITY AND THE REAL USE OF THE SIMULATORS IN SECURITY FORCES

This research was made by using email surveys, paper surveys and interviews in security forces - army, police and companies of a private security services.

In this subchapter, the most important and significant representatives of the real used simulators in each field (army, police and private security forces) are listed and described.

A. Army

In army, the training simulators are used very often. There is a list of used simulators below.

MILES

The Multiple Integrated Laser Engagement System is used by armies all around the world for live simulation. This simulator is based on the laser emitter which is mounted on the gun and sensors, which are placed on the participants of the simulation. When the participant is hit by the laser, the evaluation unit signalize it and stops the simulation for this

person.



Fig. 2 – MILES simulator.

VBS 2

Virtual Battlespace 2 (VBS 2) used by military forces of many countries (e.g. Australian Defence Force, United States Army and French Armed Forces) is currently one of the best tools for training security forces. [5] This virtual simulator based on the Arma 2 game allows participants to train and improve their tactic and communication skills during performing their tasks in created scenario.

WASP

WASP simulator is a constructive simulator which serves as a tool for strategic training of commanders. By using the real terrain of the mission, these simulators allow commanders to improve their offensive and defensive skills.

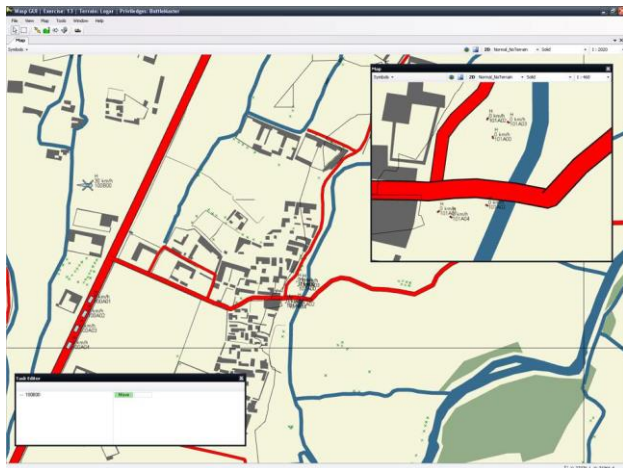


Fig. 3 – WASP simulator screenshot. [4]

B. Police

There are two main types of simulators that are widely used in police – role-playing simulations and fire-arms simulators.

Role-playing

This type of simulation is based on the participants

simulating situations by playing assigned roles. This type of simulators is based on the decision-making simulators and serves as a tool for training scenarios such as arresting offenders, stopping the car by police officer, etc.

Fire-arms

As was written above, this type of simulator is used for training police officers, usually with extension of decision-making simulator and equipment simulator. Some operators use this simulator also for training an identification of perpetrator during stressing scenarios.

Canadian Forces Direct Action

This virtual simulator based on the commercial game S.W.A.T. 4 allows participant to train tactical skills and communication skills in scenarios like hostage standoffs.

C. Private security services

Generally, in the private security services, no simulators are used but the fire-arms and role-playing simulators in some countries.

	Army	Police	PSS
Live	√/√	√/√	√/√
Virtual	√/√	√/√	√/X
Constructive	√/√	√/X	X/X

Table 1 - The suitability and the real use of the simulators in security forces

The suitability and the real use of simulators of the three categories are presented in the Table 1 –The suitability and the real use of the simulators in security forces like suitability/the real use. As can be seen, all of the categories of simulators are used in army, while in the companies of the private security services, only live simulators are used.

IV. DISCUSSION OF THE USE OF THE VBS2 IN PRIVATE SECURITY INDUSTRY

VBS2 as a representative of the latest virtual simulators with sophisticated 2D and 3D editor was used to model scenario of the TCV (transport of cash and valuables). This scenario was presented to the employers of the company of private security industry.

A. The scenario of the TCV

The scenario itself was defined and can be divided into steps that can be seen below:

Specification of the convoy

Convoy consists of:

- 1x armoured vehicle
 - o 1x commander

- 1x driver
- 1x courier
- 2x escort vehicle
 - 1x driver
 - 1x guardian

The equipment was specified:

- Courier
 - 1x case with valuables
 - 1x small hand gun
 - 1x lightweight bulletproof vest
 - 1x radio
- Commander, drivers
 - 1x small hand gun
 - 1x lightweight bulletproof vest
 - 1x radio
- Guardians
 - 1x small hand gun
 - 2x extra clips
 - 1x heavy bulletproof vest
 - 1x radio



Fig. 4 – 3D editor – the convoy.

Specification of the enemy group

The enemy group consists of:

- 1x armoured vehicle
- 1x driver
- 1x enemy
- 4x enemies on strategic positions

The equipment was specified:

- 1x driver + 5 enemies
- 1x AK-47
- 1x heavy bulletproof vest
- 1x radio



Fig. 5 – Enemy vehicle blocks the street.

B. Definition of the scenario

The convoy with case with valuables should move from city A to city B. In city B, the enemy group is ready for attacking the convoy. The scenario itself starts with blocking convoy by armoured vehicle, and shooting all cars. The participant – driver of the transport vehicle – positions vehicle for taking cover behind it. Guards eliminate enemies and call police.

C. Scenario modelling

This part of the paper shows the screenshots from the scenario modelling.

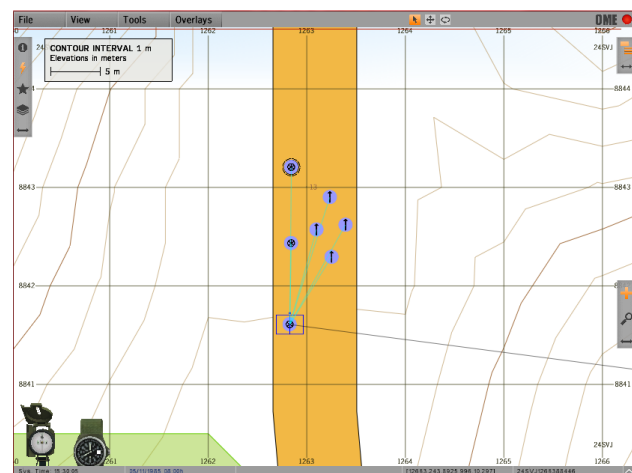


Fig. 6 – 2D editor - the convoy.

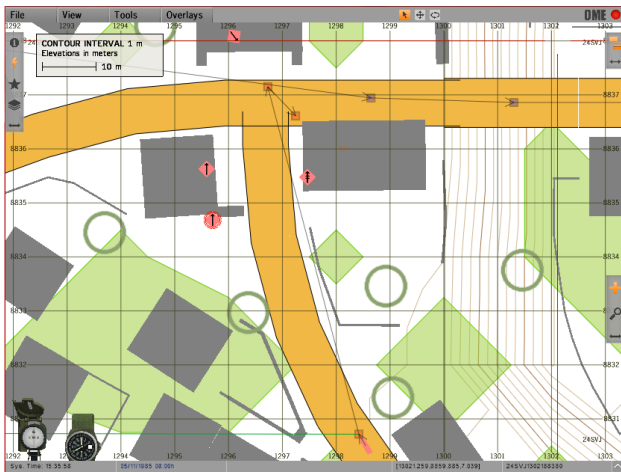


Fig. 7 – 2D editor – enemy group.

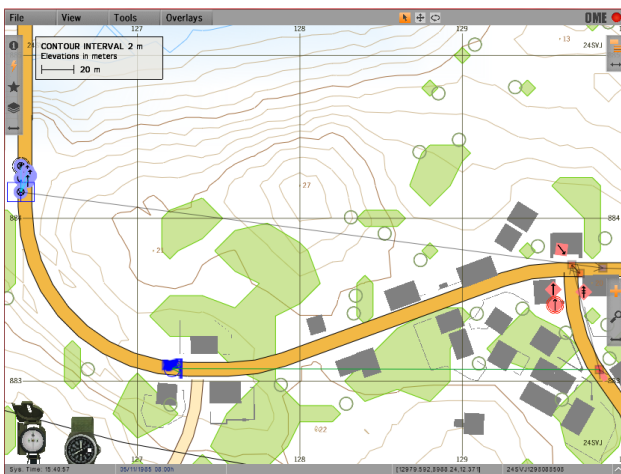


Fig. 8 – 2D – whole scenario situation.

D. Scenario discussion

The chosen employer was the participant of the simulation on driver position of the transporting vehicle. After the simulation, the questionnaire was given to the participant. There are two kinds of questions – due to the way of answering, some were evaluated (from 1 to 10, ten is the best evaluation) and the rest was answered.

Questions / Answers

1. Q: How do you evaluate the level of credibility of simulation?
A: 8.
2. Q: How do you evaluate the possibility of the training tactics in simulator?
A: 10.
3. How do you evaluate possible benefits of the simulator for PSS?
A: 9.
4. How do you evaluate editability of scenario in VBS2?
A: 8.
5. What is the main benefit of the implementation of the simulator into training of PSS?

A: It could help to professionalize PSS.

6. What are the disadvantages of the simulator?

A: Price? Control of the simulator (takes time to acquire control). The way how to evaluate simulation is complicated.

7. What could be done better?

A: To use additional peripherals for improving control system of simulation. The use of 3D glasses/projector.

8. How do you evaluate training in simulators while comparing to current ways of training?

A: Currently, there is almost no way of training but reality.

9. Which scenarios would you recommend to model in VBS2?

A: Bodyguarding. Special crews reacting for alarms in secured buildings.

10. Recommendations

A: For those, who are not able to control simulation, commented videos would be handy.

Evaluation of the questionnaire

Generally, the scenario was very well evaluated. The questionnaire showed high potential of the use of training simulators in PSS.

V. CONCLUSION

As can be seen in this paper, the simulators are widely used in training of security forces. In army, all of the three simulators are used especially thanks to the high budget and the real needs. On the other hand, almost no simulators are used by companies of private security services, however they usually take almost the same risk as a police. Generally, simulators are useful and should be more used for training security forces, because for years, they help – especially in army – to improve various skills.

The most important results of the research are in the use of Virtual Battlespace 2 in private security industry. The discussion showed high potential of this simulator for the real use for training of the transportation of the money and valuables and brought important recommendations for the future research.

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