The Use of the Virtual Battlespace 2 in TCV

Petr Svoboda, Alena Paduchova, Jiri Sevcik

Abstract— This article presents a possibility of using the simulator Virtual Battlespace 2 in training companies of commercial security industry in the transport of cash and valuables. The article contains a general evaluation of use of the simulator in the general principles of TCV in the first part and the possibility of using the VBS2 simulator for the training of pull over and the ways of simulating armed robberies.

Keywords— Scenarios, security forces, training simulation, transport of cash and valuables, 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. One of the best tools for training these situations is Virtual Battlespace 2, which is used by military forces of many countries, e.g. Australian Defence Force, United States Army and French Armed Forces. [1]

According to the previous research firms of the commercial security industry do not use simulation in training, however, there is increasing need of a perfectly skilled security forces. This survey reveals the applicability of VBS 2 within training of a transport of cash and valuables as the one of the most important duties assigned to the security forces

II. GENERAL PRINCIPLES OF THE TRANSPORT OF CASH AND VALUABLES

There are some important rules and proven guidelines for transport of cash and valuables (TCV), which increases the chances of successful transport of valuables and manage potential risks associated with the transport. Below, a list of these guidelines, their description and outline of usability simulator VBS 2 for security training of these principles can be found.

A. The principle of safety

This principle requires us to accurately assess security risks and to determine the correct procedure for carrying out the contract. This is one of the most important principles, which is focused on the precise evaluation of the riskiness of the action to use appropriate technologies and human resources.

The principle of security is linked with the overall

concept and preparedness for the own transportation. In a simulator VBS 2 the punctuality of the simulation can differ in detail in activities such as the route choice, technical and equipment preparedness, moving tactics and crew communication, etc. Generally, this principle can be simulated in VBS2 well.

B. The principle of responsibility

The principle of responsibility requires insurance contract, both from the company and from the customer.

Environment simulator does not simulate scenarios in any way to comply with the principles of responsibility, because it does not include this kind of economic functions. But, this principle can be simulated by operator outside of the VBS2 environment.

C. The principle of human resources

This principle focuses on the appropriate choose of the personnel by the HR manager. Personnel must contain only trustworthy members with relevant experience.

The use of a simulator for multiple users requires specifically chosen participants of the simulation. The selection process could be better if the study group would consist of the greater number of members. This process would be simulated outside of the simulator.

D. The principle of logistics

Manager must pay attention in logistics of the contract, i.e. choosing human resources, their equipment, armaments and fleet and to secure the communication with the headquarters. The simulator allows participants to manage their simulation equipment and the fleet and assign it to the chosen participant of the simulations or the AI.

E. The principle of cost-effectiveness principle

In TCV, it is necessary to consider whether the contract is profitable comparing risk and financial rewards. However, the simulator VBS 2 is not focused on the financial issues, the operator could theoretically create his own scenario adding prices of the components, etc.

F. The principle of general prevention

This principle ensures the maximum safety of workers and TCV. The important parts of this principle are experienced staff, equipment of a top quality, great tactic and cooperation with the police.

This principle is a summary of the previous principle and can be simulated in the VBS2 simulator or outside the simulator as a part of the scenario preparation.

	Simulator	Simulator + outside
Safety	√	(√)
Responsibility	X	√
Human resources	X	√
Logistics	√	(√)
Cost effectiveness	X	√
General prevention	(√)	√

Table 1 – The suitability of the principles simulation.

III. PULL OVER

The basis for the successful transport of money and valuables is to keep the flow of transportation, follow defined waypoints and a time schedule. Pull over the vehicle can initiate the robbery. [2]

A. Reasons for pull over

In the list below the examples of the reasons to pull over the vehicle can be found.

Stop the car by a police officer

In VBS 2, there are applicable models of policeman and police vehicles, as can be seen in figure 1. In this part of the scenario the move command can be launched if the distance condition is met (e.g. Vehicle1 distance Police1 <30). This means that the move command is done if the object called Vehicle1 is 30 or less meters far from the object Police1.

Fig. 1 – Policeman and police car in VBS 2.

Collision with another vehicle

There are several ways how to make collision of two vehicles in VBS 2. There can be used some onActivation condition, e.g. the distance of two objects or moving object (vehicle) through waypoint. The collision can be programmed with the move command to the position of the Vehicle1. For destruction of the Vehicle1, the setVehicleArmor command can be used (e.g. Vehicle1 setVehicleArmor 0).

The crew witnessed the car accident

Basically, nothing is more important than life and health. If the crew is a witness of the car accident, driver should immediately stop the car and the chosen member of the crew should go to check the situation and start to do first aid if it is needed.

In VBS 2, the car accident, e.g. a person hit by car, can be made using similar method as in collision with another vehicle. In this case, there is no need to use setVehicleArmor command, because the moving vehicle itself causes death of a man. The onActivation condition should be chosen wisely, because the crew must see this accident. An appropriate condition could be slow vehicle moving or stopping.

An obstacle on the road

The obstacle on the road can easily force driver to slow or even stop the vehicle. The obstacle on the road can be made by other vehicle, person, animal or other objects. In VBS2, a great way how to use obstacle is using jaywalker, which suddenly starts to cross a narrow one way street. A suitable onActivation condition is the distance and a car speed which starts jaywalker crossing the street.

Fig. 2 - Obstacle on the road.

Breakdown

For a vehicle breakdown, the distance or getPos onActivation condition can be used ideally in the chaotic terrain such as the presence of a lot of cars or other objects near the vehicle. For the total destruction of the vehicle, the setHit command can be used (e.g. Vehicle1 setHit ["engine, 1"]). Another similar scenario is when a vehicle ran out of gas because of the hole in the gas tank. This can be made by setFuel command (e.g. Vehicle1 setFuel 0), which can cause a partial or total leak of a gas.

Fig. 2 – Blowout in VBS 2.

B. Steps to follow in conjunction with vehicle stopping

After vehicle stopping, the following steps should be performed.

Communication with dispatcher

In VBS 2, one of the participants can be chosen as a dispatcher, who gives orders to the crew. Whole communication in this simulator can be ensured by the microphone. This also means that the simulator is greatly useful for improving communication skills between the crew and dispatcher as well as in the crew itself.

Safe Stop

The driver should immediately stop in a safe place such as at the intersection to have a choice to leave the place as many by directions as possible. Car should be pulled over away from the suspicious cars avoiding falling into the trap. In VBS 2, this activity should be made by driver, which can choose the right place to pull over. [7]

The driver should idle the vehicle to have the opportunity to fast leave the place in case of need. However VBS 2 supports turning the engine on and off, there is no reason for the participant to do this. [7]

The driver remains in the vehicle

The driver should always remain in the vehicle to be able to immediately react for dangerous situation. Only one man of the crew should get out the vehicle and deal with the situation. The rest of the crew should observe the surrounding area and communicate all findings. Generally, the simulator is very helpful in this part of scenario, because the communication is crucial in this case. [7]

The one man should assess the situation, for example if there is the need to do the first aid, if he is able to repair the car, etc. These two actions can be simulated using appropriate triggers. The trigger should be set to the object – human or vehicle. Using repeating trigger, the health of injured person would be decreasing e.g. each 1 minute when there is nobody near. The officer should stay near the person until other help (an ambulance) arrives.

If the operator uses the setHit command, trigger can be set to the condition of presence the officer near the vehicle for e.g. 5 minutes. This can simulate vehicle repairing and after specified time, the vehicle can become repaired (e.g. Vehicle1 setHit 0).

Calling for backup

If needed, for example if the vehicle cannot be repaired, a leader of the crew calls for backup, which arrives with functional vehicle. While waiting for the backup, crew stays in the vehicle and observe the surrounding area unless the backup arrives.

This part of scenario can be modelled by using implemented radio and trigger function. Trigger can be set to move new vehicle into the position of the damaged one. The onActivation condition can be set to one of the existing commands, such as "Radio Foxtrot". By using this radio signal, condition VehicleSupport1 doMove (Vehicle1) is activated. [7]
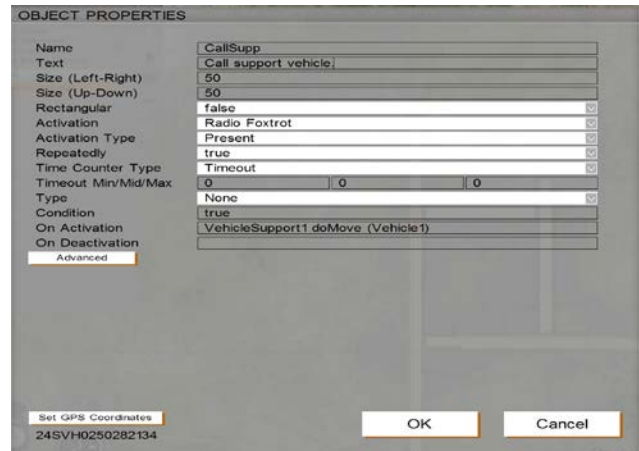

Fig. 3 - Trigger settings.

IV. ARMED ROBBERIES

The highest-risk situation for the vehicle crew is an armed robbery. There is a threat to life or health if the weapons are used. There is really great importance of punctuality of the training of this situation. [7]

A. Enemy group

The attack on vehicle can be done in VBS 2 scenario in several ways. In this example, the hostile group is located on the map, e.g. behind one house near the street. All members of this group are AI controlled and their behaviour is set to combat. The presence probability can be used to make more groups on the map to make sophisticated variable scenario. After seeing transport, this enemy group attacks him.
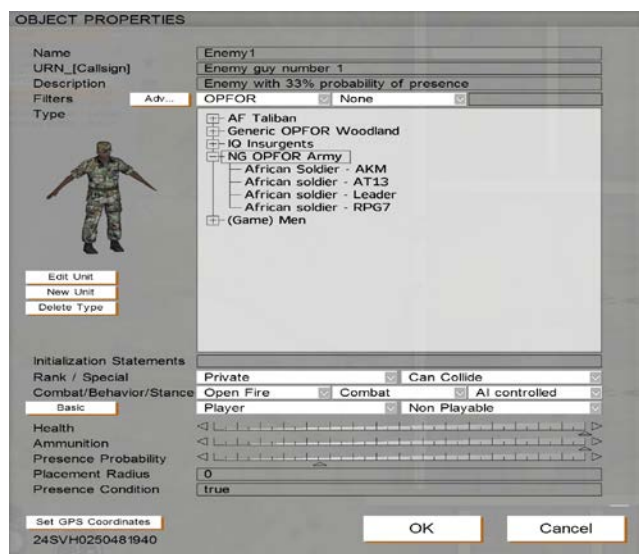

Fig. 4 – Settings of a robber.

B. Steps to follow

During an armed robbery especially if guns were used, there are some basic steps that should be followed by the crew. If it is possible, the crew should cooperate with robbers and comply with their reasonable demands.

Below evaluated and discussed possibilities of the simulation of these steps in VBS 2 can be found. These steps should be taken if robbers used their guns.

Communicate with dispatcher, police and inside the crew

As written above, dispatcher should be informed of all suspicious and dangerous situations, as well as continuously notified of a proper running of the transportation. In serious situations it is necessary to notify the police that should arrive in a few minutes to deal with this situation. The communication in VBS 2 is possible, as explained in 2.2.1 chapter, whereas the police arrive can be controlled by the similar trigger as in chapter 2.2.4 or by operator via real-time editor.

Move away from danger

This part of scenario depends primarily on the capabilities of the driver and the situation itself.

If there is one or more escape route, driver should try to get out of the danger, if it is not a direct threat to the life or health of the crew or civilians.

Take cover behind a vehicle

If there is no other way, the unit takes cover behind an armoured vehicle which serves as protection from bullets. Officers should take turns while returning fire and leave dangerous place as soon as possible.

In VBS 2, this situation can be well simulated, because the armoured cars have greater resistance against weapons of attackers. They provide good cover for the unit. Taking turns can be greatly synchronized by using communication described in the previous chapter of this paper. [7]

V. CONCLUSION

As can be seen in this paper, the simulator VBS 2 is a very useful tool to train private security officers and guards, even in the difficult situations like transporting money and valuables. Research has shown that the most of the scenarios mentioned in the article can be modelled in the simulator, what can help participants to improve their skills and preparedness for these situations. However the VBS 2 is a powerful training tool, there is a lack of models (buildings, vehicles, people and other objects) with common appearance. Although, the presence of real models would enhance fidelity of the simulation, the most important part – communication – can be taught greatly.

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