



Introduction

Training technologies for military ground vehicle crews are reaping the benefits of intense industry competition and improving networking capabilities in simulators, said government and industry experts.

In an effort to save money, military officials are searching for ways to substitute technology for what they used to accomplish solely with troop manoeuvres and firing live ordnance.

While simulators are not intended to replace live training entirely, simulators often help troops acquire some degree of competence in the task of coordinating with other units in large-scale manoeuvres.

This is a new training solution able for CombatVehicle Simulator.

Combat Sim

The CombatVehicleSimulator is intended to train crews of battle tanks, infantry combat vehicles, and armoured personnel carriers in executing combat and training missions in various weather and

landscape conditions, in any time of the day and year, without spending the engine life and ammunition.

Provision is made for individual and team (in the composition of a sub-unit) training in executing common tactical and fire missions.

The simulator is based on up-to date computer systems intended to support high-level three-dimensional graphics and software models of simulated vehicle systems in the real-time operating mode.

The following simulators are offered for training combat vehicle crews:

- Ø Drivers simulator;
- Ø Commanders and gunners (gunner-operators) simulator;
- Ø Simulators complexes.

Structurally each simulator is provided with interface facilities to integrate the simulators into a united system for training and practicing teamwork skills when executing common missions.

When combining several integrated simulators it is possible to carry out team training in the composition of a subunit (platoon inclusive).

In terms of their design features the simulator workstation ensure:

- Ø Identity of the general view and layout of simulated

controls to that of real vehicle;

- Ø Simulation of vehicle motion peculiarities;
- Ø Imitation of sounds of combat, operating mechanisms, systems and tank interphone in the trainee headset.

The simulator enables the instructor to:

- Ø Select exercises from the set of exercises delivered with the simulator or develop new exercises;
- Ø Introduce various exercise parameters;
- Ø Observe the field of view displayed by the trainee's vision device;
- Ø Keep watch on movement of the trainees simulated vehicles via a virtual camera;
- Ø Monitor the state of controls and indicators of the trainee workstation from the instructor workplace;
- Ø Automatically fix the trainee errors and evaluate trainee performance after the exercise is over;
- Ø Maintain voice communication with trainees and promptly intervene in the training process
- Ø Record and playback the performance of an exercise as a whole or its separate fragments.

Drivers Sim

The Driver Simulator is intended to train drivers of battle tanks, infantry combat vehicles, and armoured personnel carriers.

The simulator allows the trainees to practice the following training missions:

- Ø Basic training (study of driving techniques)
- Ø Performing preparatory exercises (acquiring and mastering driving skills);
- Ø Performing record exercises (driving examination);
- Ø Performing combat missions (driving in the crew complement in virtual combat environment).



The simulator standard equipment includes a set of combat vehicle driving exercises to be practiced in various landscape and weather conditions, which may be adapted to terrain characteristics assigned by a customer.

In the individual training mode, the simulator allows a trainee driver to acquire skills to prepare the vehicle for movement, start the engine, drive the vehicle in various terrain conditions, face natural and artificial obstacles, handle instruments, and manipulate controls.

When used in the subunit-training mode, the trainee driver acquires the skills in preparation for movement, start of movement, and movement in a subunit formation in a column or extended order.

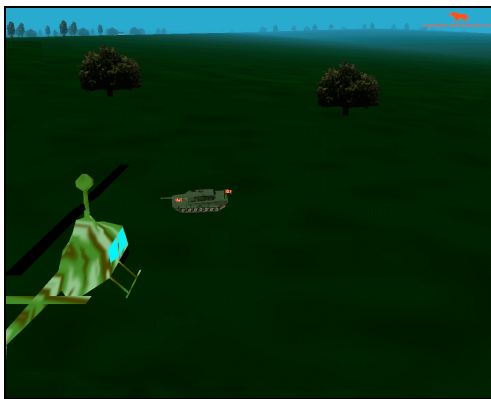
The up-to-date computer system and mathematical models make it possible to simulate motion of the battle tank with due regard for dynamic characteristics of the engine and suspension system, arrangement

of road wheels and track drive sprockets as well as terrain features and ground-track adhesion.

The visualisation system consistently displays the simulated terrain with moving and stationary objects making the generated imagery visible through the vision sights of the trainees.

The audio subsystem allows it to synthesize three-dimensional stereophonic noise effects of combat, including sounds of the running engine, weapon firing, projectiles burst, etc.

The synthesized environment includes three-dimensional highly realistic views of the specified terrain with objects located on it (roads, obstacles, engineering, structures, trees, buildings, etc.)



ComGun Sim

Commanders and gunners simulator is intended to train the commander and the gunner and perfect their skills in firing the weapons of battle tanks, infantry combat vehicles, and armoured personnel carriers, using all types of ammunition, including guided missiles.

With due regard for simulated operation of battle tank units and systems, movement of the tank proper, as well as target movements, the simulator makes it possible to carry out the following missions:

- Ø Preparation of weapons and the fire control system for firing

- Ø Target reconnaissance, detection and identification
- Ø Ranging via laser rangefinder
- Ø Target tracking by means of the stabilized weapon control console
- Ø Delivering direct fire, fire from the stationary position, short halts and on the move, as well as indirect fire from tank armament.



If the simulator incorporates an automatic loading gear stand, the following missions can be carried out:

- Ø Loading and unloading ammunition;
- Ø Automatic and semiautomatic loading of the gun;

The commander and the gunner are able to monitor firing results in the form of smoke obscuration, burst and detonations.

The instructor is provided with complete operational information about results of the trainee actions, hit locations, and the degree of target destruction.



Complexes

The simulators complex consists of two interacting functionally complete simulators:

- Ø The tank commanders and gunners simulator
- Ø The driver simulator

Both simulators operate in a unified working medium and ensure training of crews or subunits, provided they are combined with other crew training simulators.

The simulator complex is a basic component of the tactical training simulator.

The complex simulator ensures operation of the tank interphone system.

Interaction between simulator complexes is provided in compliance with DMSO - High Level Architecture (HLA) standard.



Trainee Station

A generic CombatVehicleSimulator Trainee Station encompasses:

- Ø Simulation workstation (desktop or laptop).
 - Only 1 simulation workstation if distributed rendering functionality is not used
 - Up to 3 (better ergonomic solution) simulation workstation for distributed rendering purpose.
- Ø Input Devices
 - 1 steering wheel and relevant pedals (clutch pedal included)
 - up to 4 joystick (depending on the complexity of the vehicle simulated)
 - onboard touch screens and push buttons simulation through workstation keyboard.

Trainer Station

The Trainer Station will encompass a desktop/laptop equipped with the CombatTrainerVisio software included in CombatVehicleSimulator supply.

Both Trainee and Trainer station are multifunction reconfigurable workstations. This means that if needed the Trainee Station can be used also as a Trainer station.

Tech Spec

TruckSim Feature Summary

- Ø HLA compliant
- Ø Distributed co-operative training
- Ø Support for remote tutoring
- Ø Modular realtime simulation environment
- Ø Realtime execution kernel
- Ø Multi-pipe/multi-channel support
- Ø System and database configuration files
- Ø Professional documentation
- Ø Distributed simulation for synchronized displays
- Ø Tactical support system
- Ø Damage assessment simulation
- Ø Simulation of operative procedures

Input Devices

- Ø Multiple simultaneous devices (wheels, joysticks, etc.)
- Ø Synchronous and asynchronous reads
- Ø Device scaling
- Ø Calibration and verification tools

Dynamics

- Ø Ballistic simulation real time
- Ø Multiple joint types: Ball and Socket, Hinge, Prismatic, Angular, Linear, Universal, Car Wheel.
- Ø Hard contact constraints with no interpenetration.
- Ø Real-time dynamic response capable of efficiently simulating very large numbers of objects.

- Ø For extended functionality, easy integration with third party
- Ø Contact forces and normal available for accurate force feedback.

Stable and accurate vehicle dynamics including suspension models, Car Wheel joint and wheel traction systems.

Recommended Configuration

- Ø Windows workstation, 1.0 GHz
- Ø 256 MB RAM
- Ø 4 GB hard disk space
- Ø CD ROM drive
- Ø OpenGL 1.2 compliant graphics card
- Ø Windows XP Professional or Windows 2000 Professional Service Pack 2

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