

MBT-2000 (VT-1A) tank dynamic crew simulator



CHARACTERISTICS

- ◆ The adequacy of interior of compartments
- ◆ The functional adequacy
- ◆ High quality of the visualization
- ◆ 3D models of a tank driving range, a shooting range, and a tactical field
- ◆ 6DOF motion platforms
- ◆ Full package of Driving Course exercises
- ◆ Full package of Gunnery Course exercises
- ◆ The exercises at the tactical field
- ◆ Wide spectrum of scenarios for exercises and training events
- ◆ Unbiased evaluation of trainee's actions
- ◆ Training results documenting

The simulator's technical characteristics

No seq.	Characteristics	Unit of measurement	Parameter's value
1	Quantity of simultaneously trained learners	---	3 (driver-mechanic, gunner, commander)
2	Minimum area of training class	m ²	40
3	Premises type	---	Classroom
4	Actuation time	min	up to 5
5	Duration of continuous work,	hours	at least 12
6	Electric power supply voltage	V	220±10%
	Frequency	Hz	50±1
7	Maximum consumed power	kW	12
8	The range of operating temperatures	degrees C	from +5 till +40
9	Diagnostic system	---	In-build semiautomatic
10	dimensions of 3D terrain models	km	8x8
11	The types of terrain, quantity	---	3 (flat, desert, mountainous)
12	Evaluation of trainee's actions	---	Automated, following criteria and values of the Driving and Gunnery Courses
13	The capacity to generate tactical scenarios	---	With the use inbuilt editor
14	Training scenarios (terms and conditions)	---	Day, night, winter, summer, dust storm, fog, various optical visibility range, temperature range from - 20° C up to +50° C
15	The capability to simulate equipment malfunctions and failures	---	Is implemented, input, and removal from the Instructor's workstation
16	Error-free running time	hours	at least 1000
17	Specified lifetime	years	at least 10
18	Warranty period	years	2

The simulator structure

The driving compartment mock-up

The fighting compartment mock-up



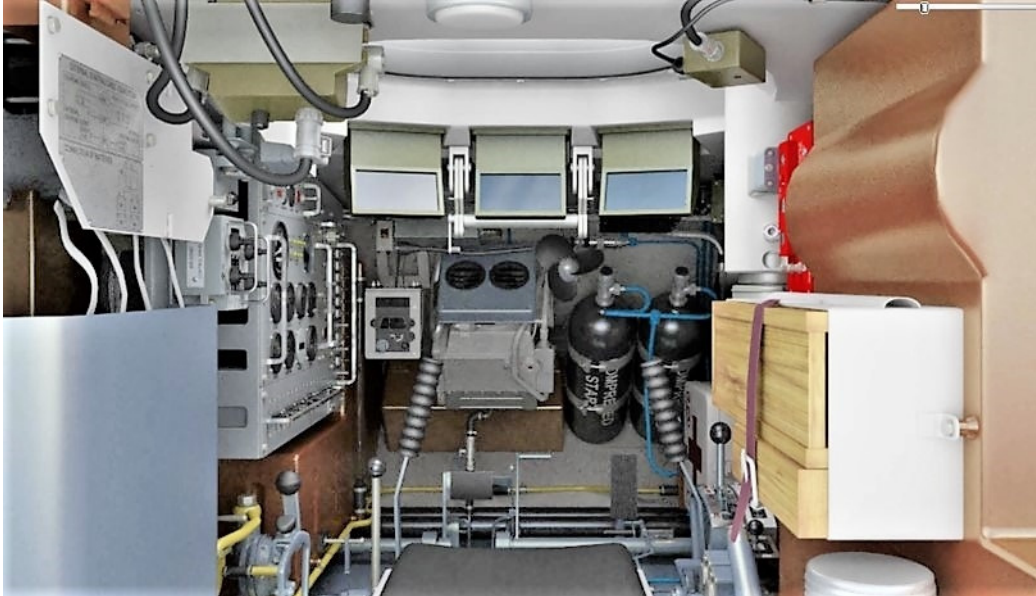
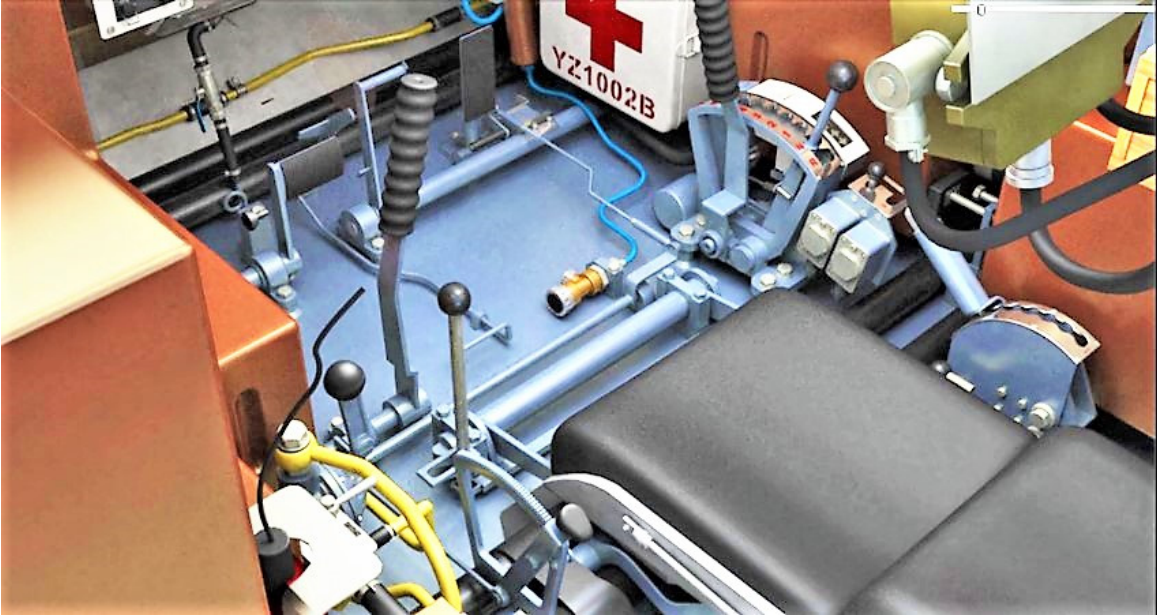
The instructor's workstation



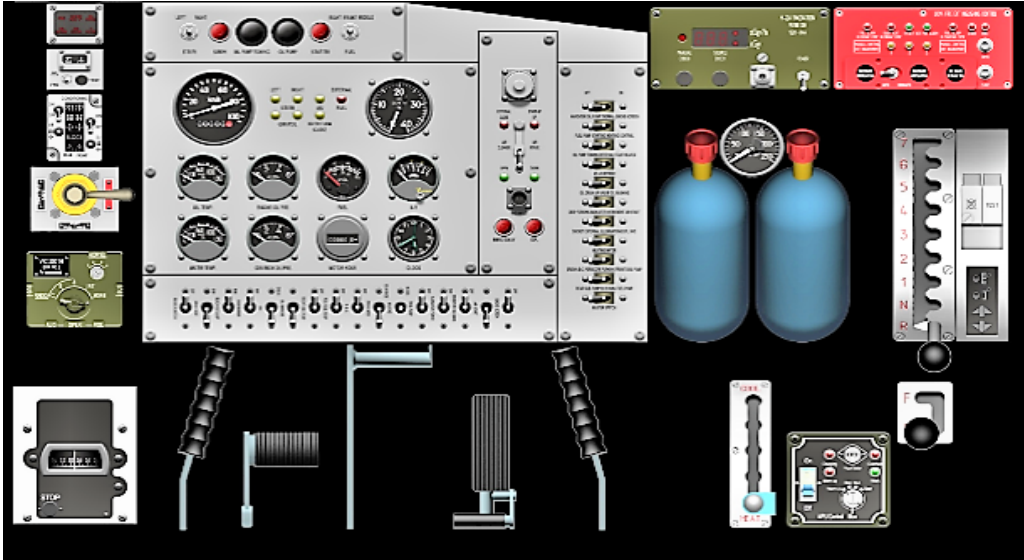
Functional controls' and instruments' mock-ups in the driving compartment

No	Designation	Quantity, pcs.	No	Designation	Quantity, pcs.
1	prismatic observation device	3	19	gear-selector and reverse lever	1
2	night vision device	1	20	toggle switch for disabling gear shifting	1
3	driver's dashboard	1	21	brake pedal locking drive	1
4	navigator (GPK)	1	22	the button for turning on the hydro-pneumatic cleaning of observation devices	1
5	air cylinder with valve	2	23	air conditioner heat exchanger	1
6	air conditioner control console	1	24	inlet shutters slot and gas bypass actuator arm	1
7	VIC-2001H intercommunication console, box №2	1	25	fuel tank selector valve	1
8	breastplate switch's rosette of a headset	1	26	starter's and generator's control console	1
9	hand fuel priming pump	1	27	air system gauge	1
10	fuel supply pedal	1	27	fire suppression system's control console	1
11	clutch pedal	1	28	A11 panel for switching coolant temperature sensor	1
12	brake pedal	1	29	gear-shift lock indicator	1
13	steering lever	2	30	NBC system control console	1
14	hand throttle's drive	1	31	T81A indicator for detection of chemical agents and radioactive substances	1
15	centrifugal pump				
16	A5 panel for displaying a maximum coolant temperature and immersion in water				
17	A6 signaling board				
18	white light illumination switch				

Functional driving compartment



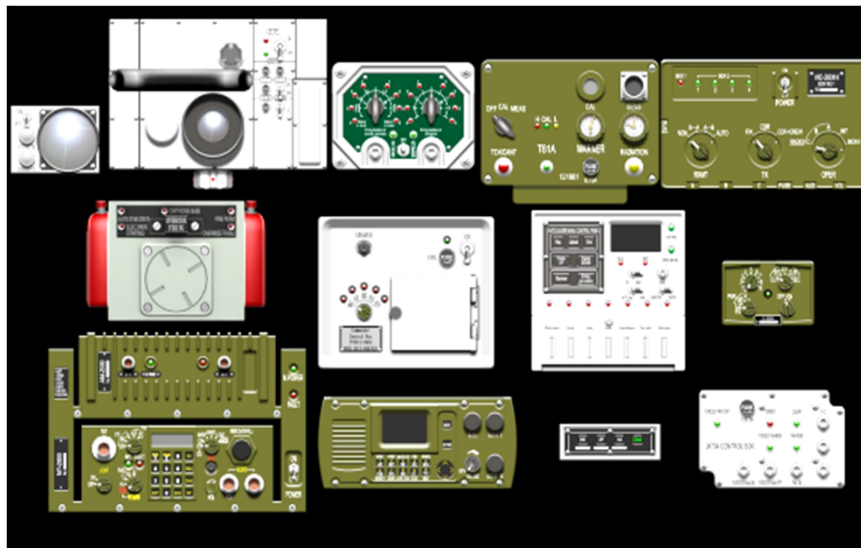
MBT-2000 Tank Driver controls on the left bottom instructor display



Functional controls' and instruments' mock-ups of the fighting compartment

№	Designation, title	Quantity, pcs.	№	Designation, title	Quantity, pcs.
1	YV0010-0401 panoramic commander sight	1	1	MBT2000 radio-station	1
2	video inspection device	1	15	JK704 NBC system control console	1
3	prismatic observation device	5	16	OSC-2 telephone headset socket	1
4	T81A indicator for detection of chemical agents and radioactive substances	1	17	a coaxial machine gun receiver's mock-up	1
5	commander's distribution box	1	18	rotary conveyor manual drive lever	1
6	commander's control console (ballistic computer and autoloader)	1	19	rotary conveyor release mechanism drive lever	1
7	commander's control console	1	20	the gun bolt striker's blocking manual release mechanism	1
8	commander's cupola lock	1	21	recoil length measurer	1
9	white light illumination switch	1	22	drive for opening a bypass valve of the NBC system	1
10	loading and backup console of an autoloader	1	23	a turret air intake valve control handle	1
11	the smokescreen and shrapnel mortar control panel	1	24	built-in zeroing system console	2
12	VIC-2001H intercommunication console, box №1	1			
13	VIC-2001H intercommunication console, box №2	1			

Commander's controls at the instructor's monitor



Functional controls' and instruments' mock-ups of the fighting compartment

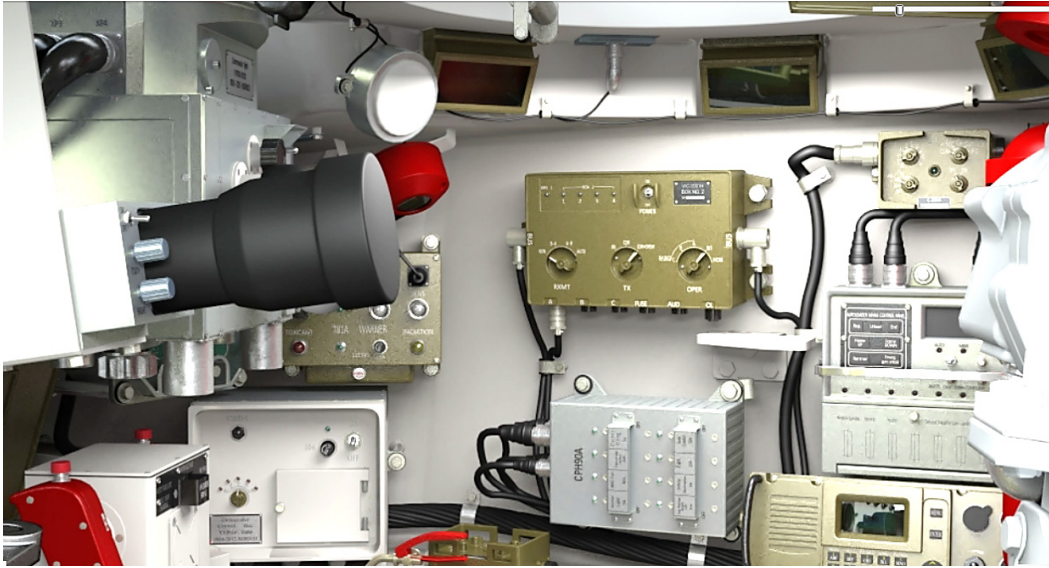
№	Designation, title	Quantity, pcs.	№	Designation, title	Quantity, pcs.
1	YV0010-0101 multichannel gunners' sight	1	12	a main gun breech assembly mock-up with a breech block wedge handle	1
2	video inspection device	1	13	fire-pin re-cocking handle	
3	gunner's control console		14	manual fire pin release pedal	1
4	the feed switch of a fire control system	1	15	hand-wheel of a gun lifting mechanism with a worm gear pair unlocking mechanism	1
5	gunner's distribution box	1	16	hand wheel of turret traversing mechanism	1
6	VIC-2001H intercommunication console, box №2	1	17	turret traversing mechanism flywheel release lever	1
7	gunner's fire suppression system console	1	18	turret stopper	1
8	weapon stabilizer control console	1	19	azimuth indicator	1
9	tank ballistic computer	1	20	gunner's guard plate	1
10	range-finding counter	1	21	gun side level illumination lamp with switch	1
11	an autoloader visual indicator	1			

Gunner's controls at the instructor's monitor



Functional fighting compartment

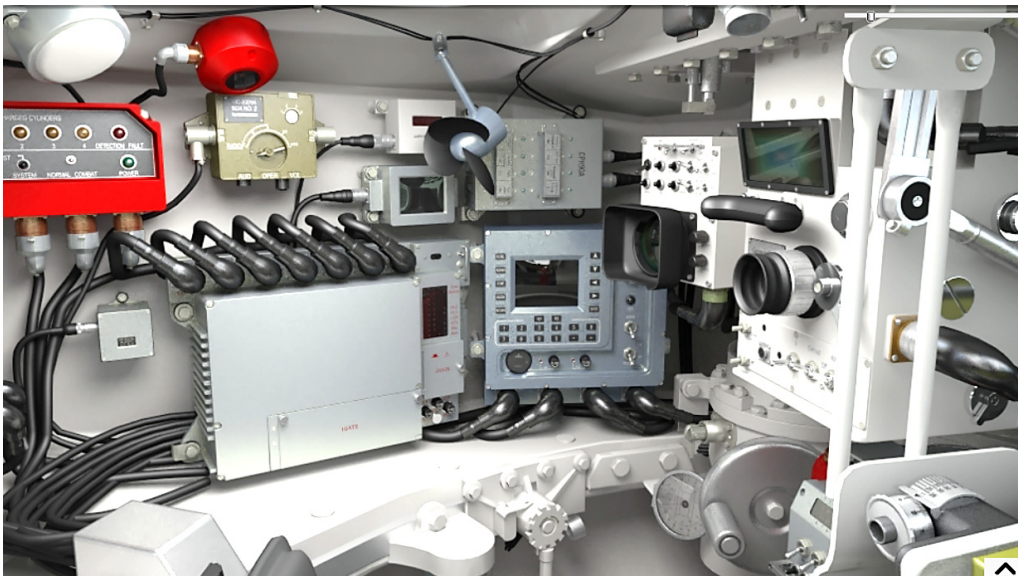
The workplace of the tank commander in the simulator



Tank commander sight simulator



The workplace of the tank gunner in the simulator



Tank gunner sights simulators

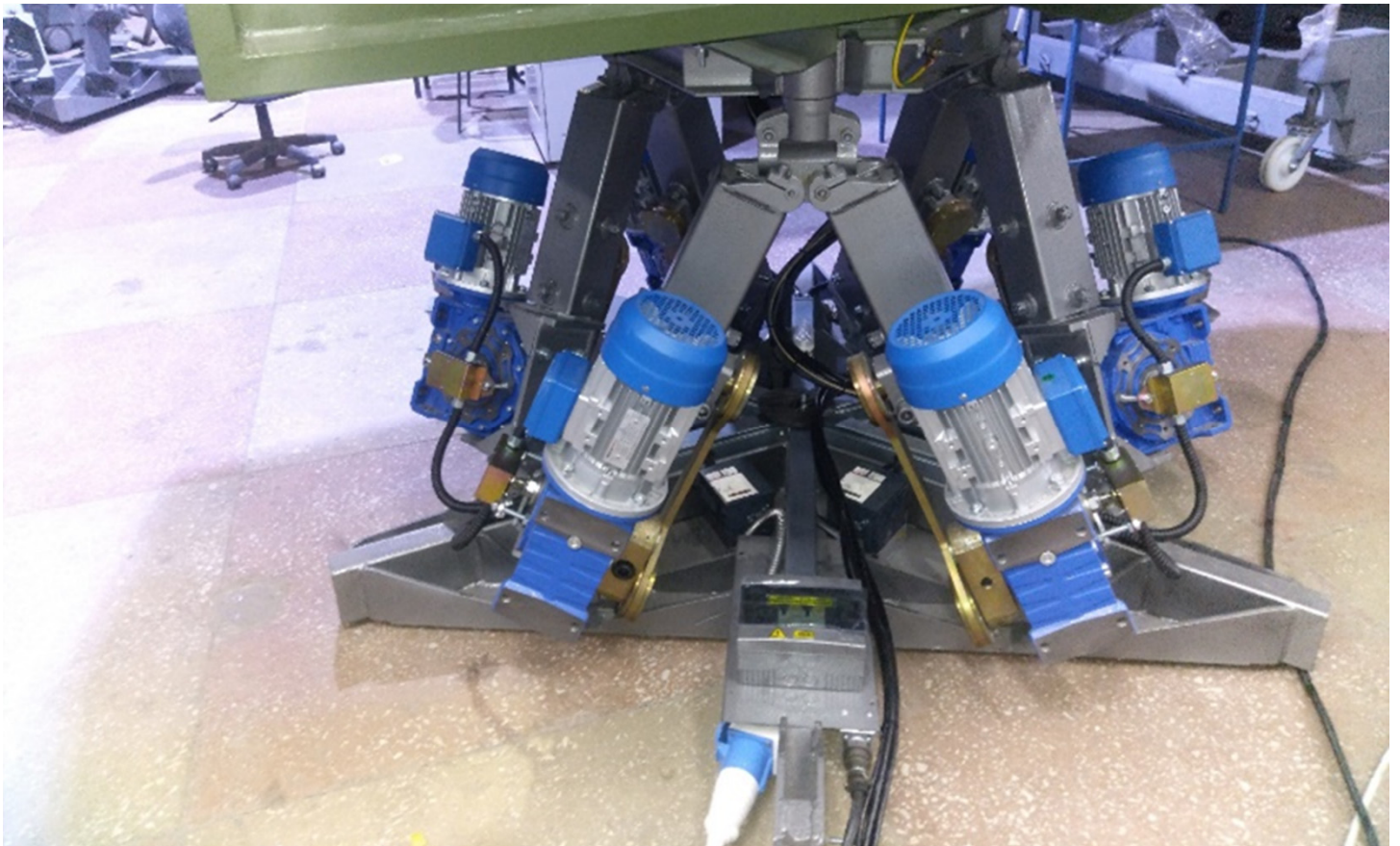


The motion platform

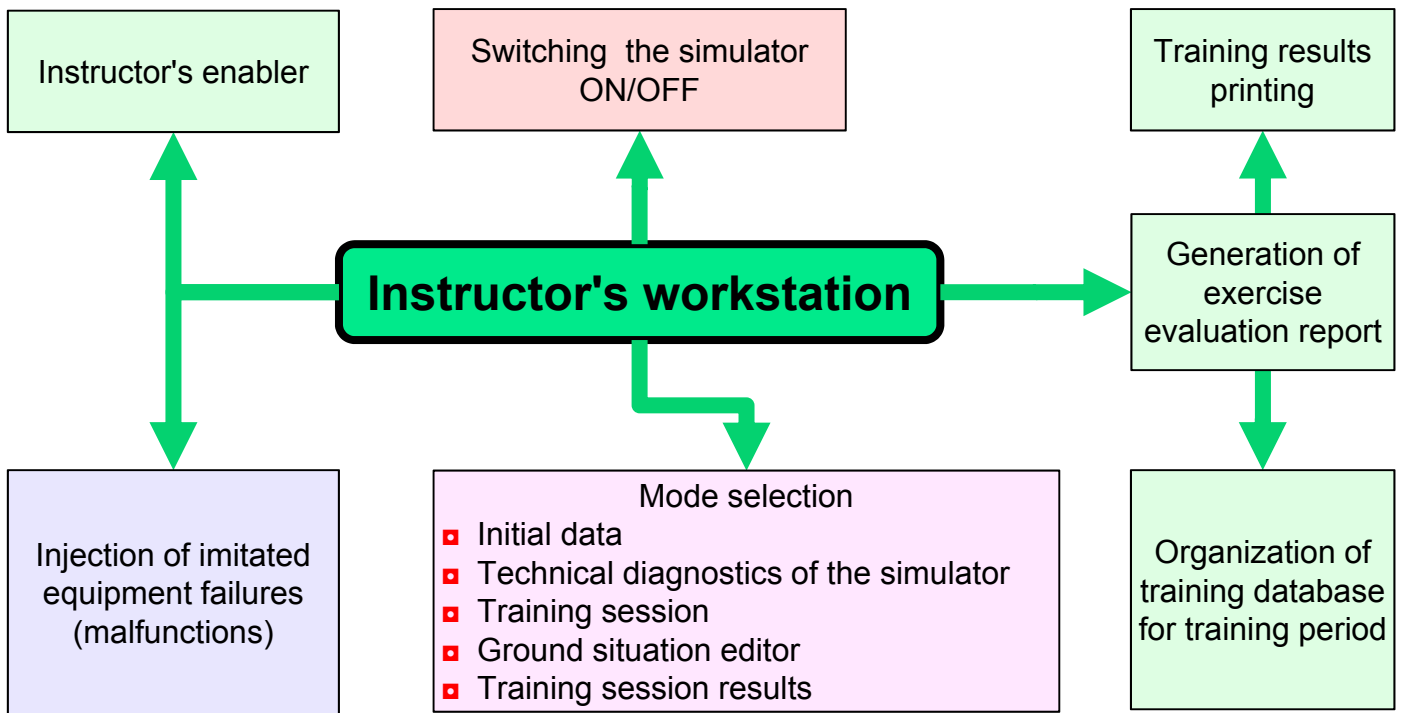
6DOF motion platform ensures the adequacy of cabins' tilts and acceleration loads on a crew when pulling away, accelerating, decelerating/breaking, turns, and crossing of water obstacles, as per a type of landscape and road pavement state.

The main characteristics of the motion platform

Designation	Value
The the type of drives of motors	Asynchronous with short-circuited rotor
Gearbox Type	Worm type
Driving motor Controls	Frequency mode, after speed and exit axle going out of reduction gear
Pitch angle	+/- 20 degree
Angle of heel	+/- 20 degree
Heave	+/- 100 mm from the middle position
Angle of rotation around vertical axis	+/- 30 degree from 'zero' position
Surge	+/- 100 mm from the middle position
Sway	+/- 100 mm from the middle position
Angular speed of movement along the axes	0-20 degree/sec
Accuracy of control signals processing	< 0,2 degree angularly
	<10 mm positionally
Power consumption (average)	4.5 kW



The instructor's workstation



Field of view of simulators of optical aiming devices in the simulator

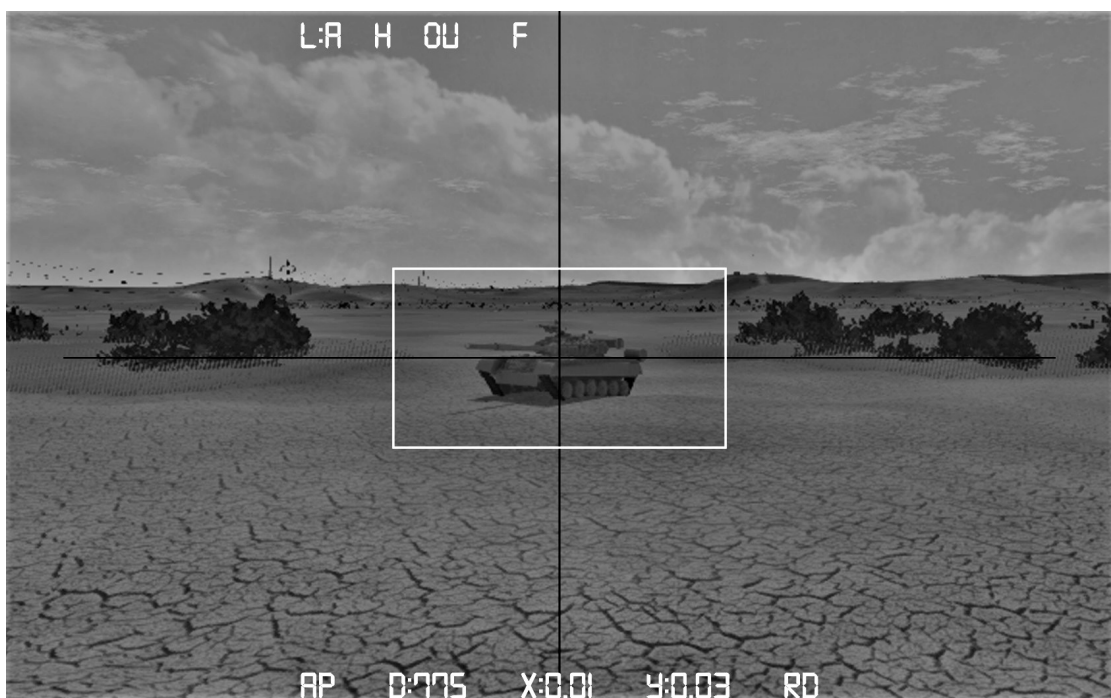
Main sight in automatic mode



Reserve channel of the main sight



Night sight



The visualization of terrain and objects in the field of view of the simulator's optical devices, examples

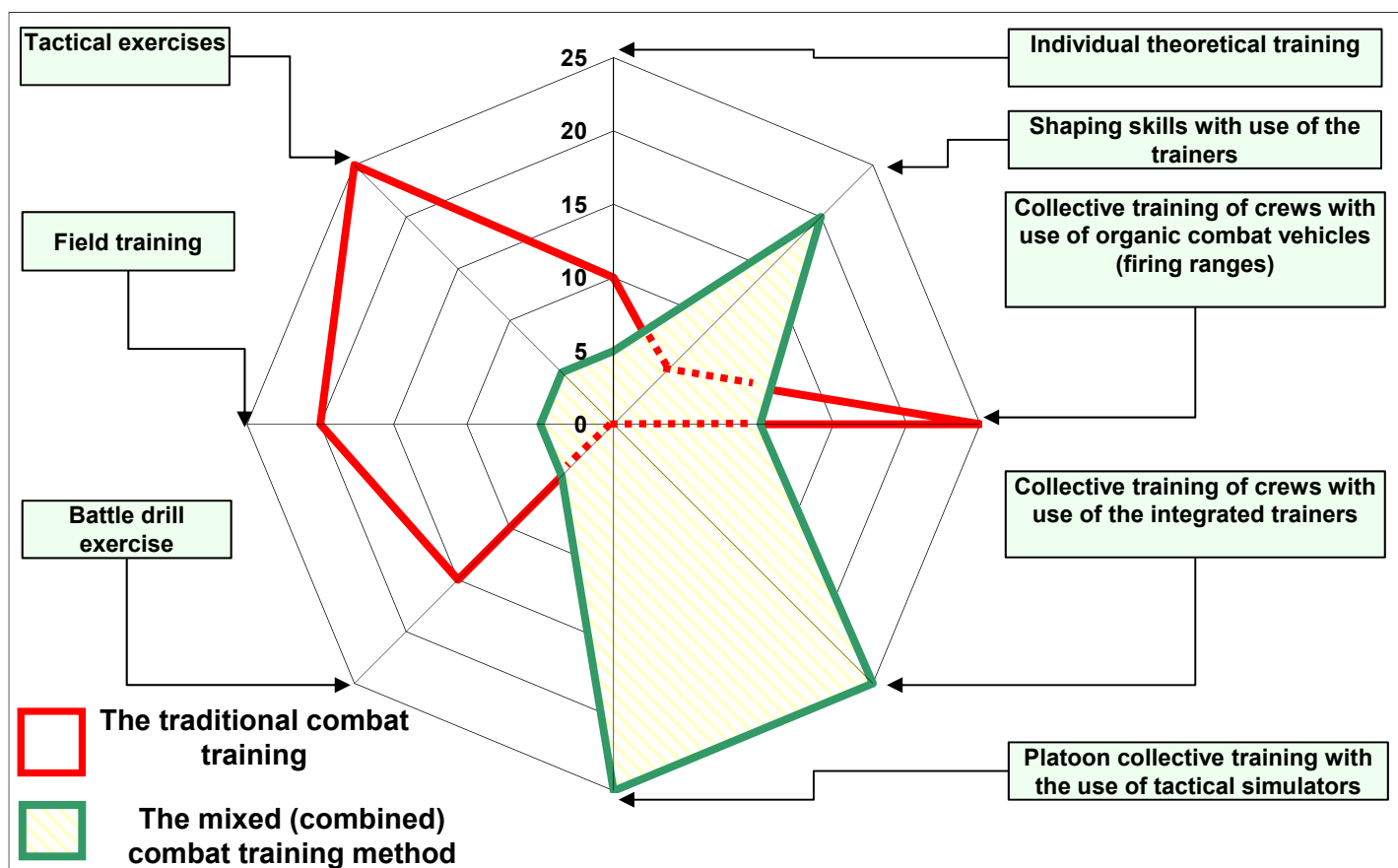
The view of a tank from an external controlled camera



Outcome of an introduction of tank dynamic simulators into training process

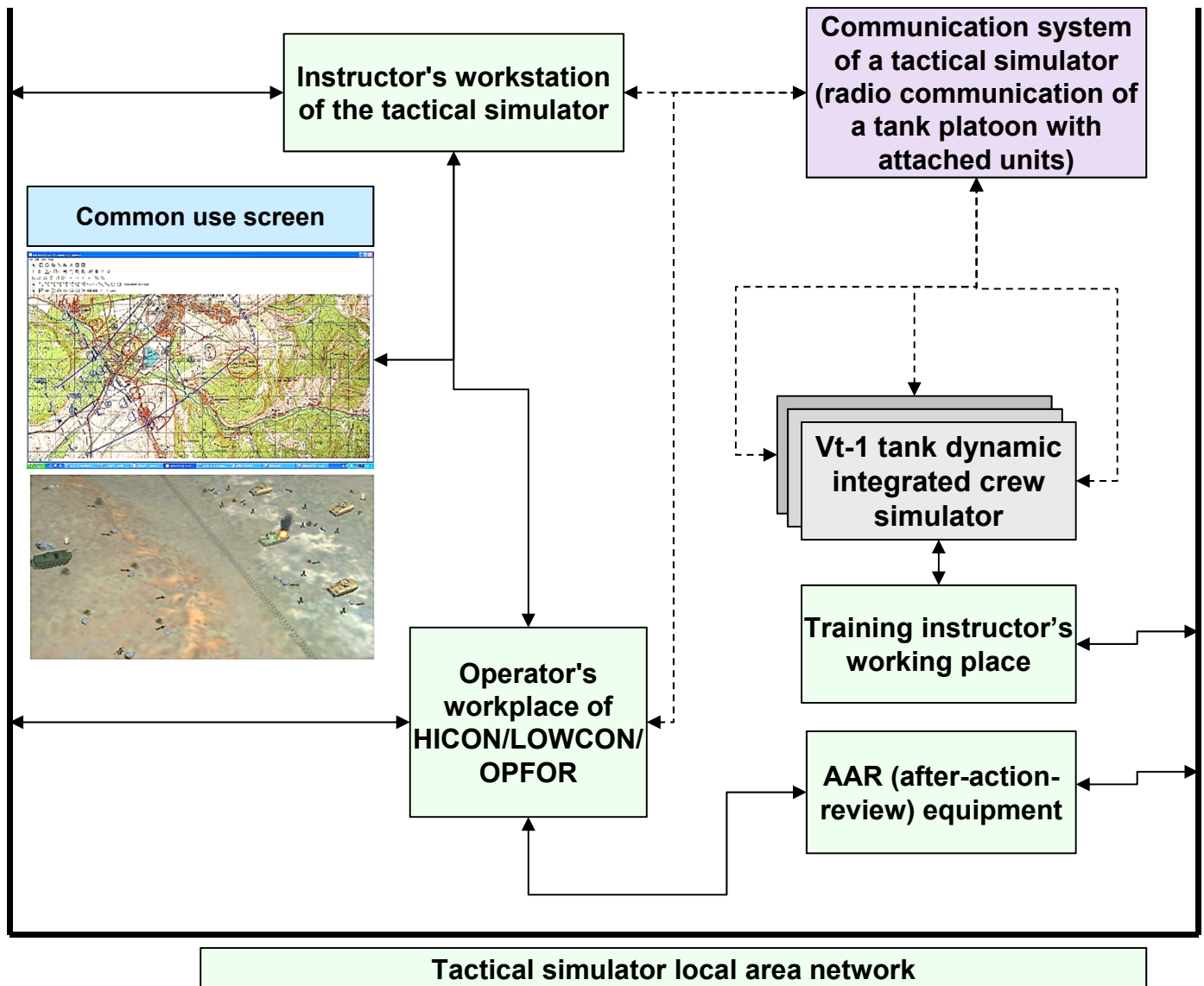
The use of simulators significantly changes the allocation of time for different forms of combat training:

- 75-80% of time is allocated for shaping and maintaining weapon operating skills at required level and units with use of simulation systems
- 20-25% of time is given for testing of individual skills and collective proficiency during firing exercises, as well as units collective training during tactical exercises



1. Effective solution of 80% of the combat training objectives
2. Practicing the training tasks of fire and tactical training under various conditions (mid-rugged, mountainous, swampy and desert terrain in day and night conditions, winter and summer, various weather conditions).
3. Ensuring the stages of combat training - individual, collective, and combat coordination (cohesion) within a platoon
4. Support of 'crawl-walk-run' training methodology, individual approach to trainees, continuity of training process.
5. Arrangement and methodical interrelation of training events and exercises with use of simulators and field training exercises.
6. Unbiased evaluation of the training level of each crew member apart and units as a whole, determination of progress ratio in skills level and unit cohesion
7. Manageability of the education and training process, modification of the intensiveness of training process .
8. Reduction of degree of pro forma of training, approximation of training conditions to combat ones

The Vt-1 tank platoon simulator



EDUCATIONAL AND METHODOLOGICAL CAPABILITIES OF THE PLATOON SIMULATOR

- ★ Performing training in shooting and fire control, force-on-force tactical exercises of platoons using integrated simulators in various conditions
- ★ Modeling the actions of attached and interacting forces
- ★ Modeling enemy units activity
- ★ Achievement of various tactical training objectives - from a platoon approach march up to simulated force-on-force fight (offense, defense, meeting engagement, reconnaissance in force, combat security)
- ★ Ensuring realistic platoon command-and-control radio-net operating during tactical events and exercise
- ★ Control of crew actions and fire during the battle
- ★ Portraying of close fight dynamics on an e-map
- ★ Supervision of leaders' and crews' actions
- ★ Integration of company and battalion level units into simulation systems



**Developer and manufacturer:
LCC ' Research and Production Company 'Energy 2000'
Povitrophlotsky, 94-A, Kiev, Ukraine
www.simulator.ua**

Developer and manufacturer provides:

- ☐ manufacturing the simulator
- ☐ assembly, adjusting, commissioning and acceptance testing at the site of intended use
- ☐ training of customer's technicians
- ☐ warranty service for 2 years
- ☐ Post-warranted maintenance (subject to separate contract)