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APPLICATION OF THE JCATS SYSTEM IN COMPUTER-AIDED TACTICAL LEVEL COMMAND POST EXERCISE

Abstract: The article discusses a modern tool for conducting training with the use of advanced information technologies. The article presents the capabilities of the JCATS (Joint Conflict and Tactical Simulation) battlefield simulation system with regard to new challenges and trends in the area of tactical level command and staff training. Selected training courses conducted in Poland with the use of JCATS are presented. The presented information introduces the reader into the problems of modern computer-aided training methods.

Keywords: tactical exercise, simulation system, simulators, JCATS.

1. INTRODUCTION

Changes in the national safety environment, emergence of new types of threats have assigned new missions for the Polish Armed Forces, which in effect changed the image of the army. To follow the trends of professionalism, quantity must be replaced with quality.

The condition to attain and maintain required operational capabilities to accomplish missions (tasks), including the preparation to act within its capacity and in accordance with NATO procedures, is the achievement of proper level of training determined by the requirements, criteria and standards of armed forces preparedness to accomplish missions in national, Allied and Coalition configuration.

Preparation of the Polish Armed Forces to accomplish new missions (tasks) commenced with the introduction of extensive structural and organisational changes to adapt the size, organisation and equipment of the armed forces to actual needs and capabilities of the State. This involves the need to introduce a number of new solutions, also in the system of training of the armed forces. The process of training armed forces should be improved continuously by introducing new solutions generated after acquiring experience in this field.

The essence of modern training consists in the combination of three areas: training, command and responsibility, that is accomplishing efficient training that will in future enable command with full responsibility.

Now then, how to **train** to be able to properly **command** and take on full **responsibility**?

It is known that the most efficient organisational form of practical training of commands and staff is **exercise**, wherein complex problems of planning, preparation and conducting operations are solved based on scenarios similar to real situations of the opposing parties.

The main purpose of exercise is perfecting the skills of staffing commands and individual soldier posts necessary to carry out the duties in the process of planning, organising and conducting operations (combat) and commanding the troops, including the harmonisation of combat systems.

It may be said that developed, budget-aware nations use simulation systems in all the exercises aimed at harmonising their commands and staff and on verifying functioning of their troops in the area of **rules and procedures of conducting operations**.

Nowadays the approach to computer aided exercises with the use of battlefield simulation systems is becoming increasingly serious. It is now a requirement warranting proper completion of a process/cycle of command and staff training at a given level of command. Simulation systems are applied across the world by the armed forces, industry, civilian circles and state administration, as a technology that enables education, developing adequate habits and establishing procedures and decision-making processes.

The Polish armed forces, backed by the Centre for Command Systems Support of the General Command of Branches of Armed Forces, also initiated computer aided exercises using the JCATS Joint Conflict and Tactical Simulation. It was an arduous process constipated by lengthy procedures associated with the acquiring and implementation of the equipment in armed forces.

Another parallel process is the modelling of the proper organisational structure related to employing and training of personnel.

Nevertheless, before the Section of Battlefield Simulation Systems is ready to participate in designing, planning and carrying out exercises, it must gain experience while attending conferences, training courses and participating in national and Allied exercises.

The first multinational command post exercise we have participated in was BAGRAM XIV, the aim of which was to prepare the command and staff of the 10th Armoured Cavalry Brigade to carry out operations as part of the Polish Military Contingent in Afghanistan.



Fig. 1. Process of gathering experience and attaining readiness to operate

The first national exercise conducted by one of the Departments of the Simulation Systems Section was the computer-aided command post exercise at the 17th Wielkopolska

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Mechanised Brigade under the covername "GRONOST@J-13". The topic of the exercise was "Planning, organising and conducting combat operations by a battalion tactical task force (bZT) in the first echelon of a brigade".

The process of planning and building a database of terrain structure, armament, individual equipment of soldiers and combat vehicles took six months to complete. It involved close collaboration between the Developers Team and the Brigade Command with representatives of the Simulation Department. When preparing the exercise we have participated in the following tasks;

- preparation of databases of:
 - terrain;
 - structures;
 - equipment.

The exercise scenario was adapted to the capabilities of the battlefield simulation system on the basis of data provided by the exercise organiser. As a result we have obtained the initial situation on the first day of the exercise and the arrangement of JCATS workstations in the structure of Exercise Control (Fig. 2).

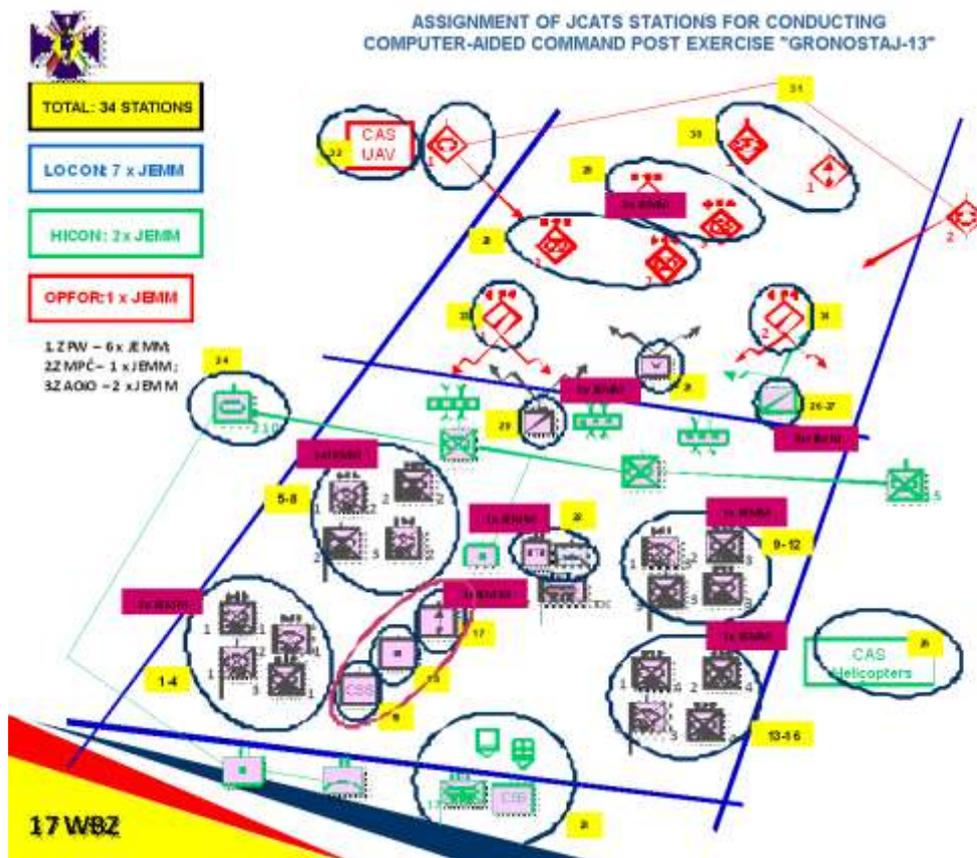


Fig. 2. Arrangement of JCATS stations for conducting the computer-aided command post exercise under the covername Gronostaj-13.

Source: Exercise Development Team

Prior to the main phase of the exercise, a number of training sessions for simulation system operators were prepared and held with appointed workstation operators.

During the main phase of the exercise the Simulations Section controlled the course of the exercise, supported the operators of workstations and administered the simulation system.



Fig. 3. Course of training sessions and exercises for simulation system operators

To illustrate the extent of involvement, an area related to the building of database is shown below. The volume of information and adapting it to the exercise scenario in a manner enabling the attainment of the goals of the exercise requires much more time than specified in current doctrines. The attainment of the goal of a computer-aided exercise is preceded by the preparation of many elements that are included in the database, such as:

- structure of the exercise participants and division thereof into combat groups to provide the commander with the freedom of forming such groups,
- details of soldiers' individual gear, from arms to items that support the execution of combat tasks (binoculars, night vision),
- detailed data on equipment and armament of the unit, among them:
 - device type, length, height, weight, maximum speed, road speed, off-road speed, floatability and rough terrain capabilities, traction and slope negotiation,
 - armament, fire control system, unit of fire, load carrying capacity,
 - number of passengers,
 - sensors, probes, radars,
 - day and night readiness time, travelling position to combat position switching time, range of operation,
 - repairability, logistic support.

2. WHAT IS JCATS?

JCATS – Joint Conflict and Tactical Simulation is a multi-service, multi-sided, interactive, multi-level simulator used by the military, civilian services, security services as a training tool for conducting command post exercises, analysis, harmonising commands and staff in preparation to future operations.

It is also **an excellent tool for supporting data collection and enabling analysis of training undertakings as Lessons Learned.**

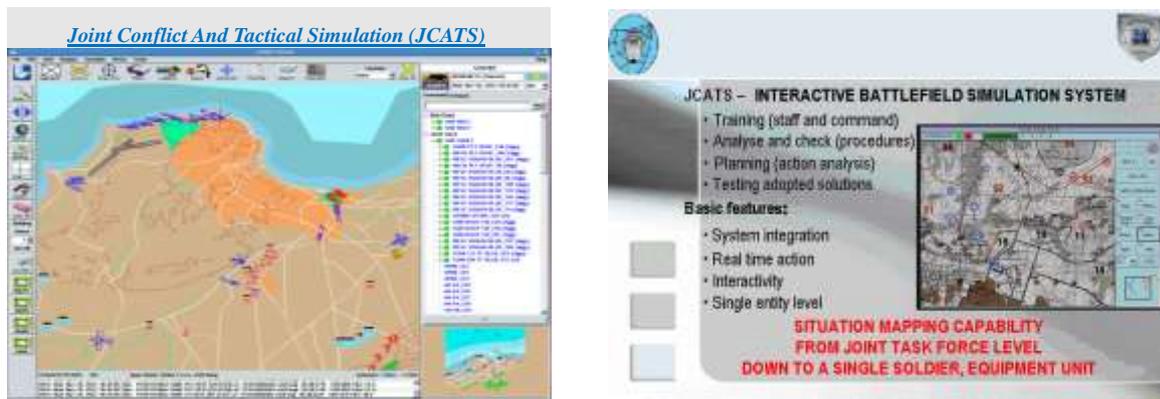


Fig. 4. JCATS functionalities

Depending on the adopted tactical background scenario and possessed database, the system supports simulating up to ten sides in an exercise. For demonstration during Bagram only three sides participate in the exercise.

The system enables reflecting the operations of troops down to the lowest level within the entire spectrum of combat (kinetic) and non-combat (non-kinetic) operations. An additional advantage of the system is the capability of simulating operations/combat in an urban area. It can represent such details as the location and characteristics of individual buildings (type of structure, number of storeys, arrangement of rooms, doors and windows).

The system is able to simulate the actions of up to 60 thousand entities (soldiers, vehicles, flying objects, ships).

It is possible to simulate operations over an area of 4000x4000 km, if maps are available. Digital maps are used as a background for conducting operations. These maps contain detailed information on terrain configuration and its characteristics, among them:

- main and side roads;
- weather and effect on land, air and sea visibility;
- tunnels;
- caves;
- obstacles (minefields, bags with sand, underwater obstacles, concertina wire);
- bridges, viaducts (load-bearing capacity);
- areas affecting traffic and mobility;
- rivers and their depths;
- towns;
 - buildings and details thereof;
 - multi- and single-storey;
 - staircases / lifts;
 - town blocks;

- windows, doors, internal and external walls;
- facade types.

JCATS supports simulation of operations from squad level to brigade level inclusive. The commander and the staff participating in the planning and command process take part in a typical "wargame", wherein all possible battlefield conditions are represented.

3. BASIC SYSTEM FUNCTIONS

The basic JCATS functions include the simulation of:

- joint operations (land forces, navy, air force);
- operations conducted in cooperation with non-military entities (police, fire brigades, non-government and international organisations, hostilities and terrorism);
- weather and time-of-day conditions (including artificial lighting) and the impact thereof on humans (including battle fatigue) and equipment;
- logistic issues and replacement of human resources;
- principles of the use of artillery;
- conducting direct and indirect fire;
- conducting aeromobile operations (without parachute landing);
- operations of engineering troops (barriers and terrain obstacles, minefields, manner of negotiating);
- use of weapons of mass destruction (WMD), defence against weapons of mass destruction and operations of chemical troops;
- use of air defence resources.

Additionally the system features:

- extensive scenario editors that enable convenient building of the simulation with account taken of terrain and weather conditions, unit and individual soldiers' equipment;
- wide possibilities of aggregation – specifying and assigning resources;
- function enabling the embarkation and disembarkation of troops and equipment;
- high-resolution simulation of objectives – down to a single soldier and his/her individual gear (weapons, individual protective measures against contaminants, etc.).

It should be noted that the Centre for Command Systems Support of the General Command of Branches of Armed Forces, and within that the Section of Battlefield Simulation Systems indicate the justified need for further development. National and international collaboration constitute an excellent means of interpretation and invaluable source of knowledge. We do know, however, what we are missing and what has to be gained in the process of development to reach all of the adopted standards.

Recommendations apply not only to the means (the technological sphere) – of great importance are also organisational (and structural) and procedural (doctrinal and instructional records) considerations.

Changes in mentality, habits and reasoning are an important element of the system. We must bear in mind that simulation systems are not computer games and are not designed to play shooting games – they are training tools. Tools that will indicate and divulge the areas of our tactical ignorance and will show erroneous and inaccurate analyses, incomplete order documents, which in the circumstances of the real world would result in casualties and material losses, and which in traditional exercises often remained unnoticed.

The indication of areas of shortcomings is not meant to offend or arouse criticism, it is a valuable material for use in Lessons Learned. The indicated errors, mistakes and deficiencies form an excellent and very important material to be discussed during exercises and training sessions.

If we build our consciousness on closely interrelated resources, organisation and processes, then in a relatively short time can we expect the following benefits resulting from the initial application of simulation systems followed by the integrated training environment:

- realism of operations conducted by the staff;
- reduced cost of exercise;
- setting up any environment for conducting operations;
- creating any scenario of exercise;
- improved quality and efficiency of command and staff training;
- reproduction of simulation for the purpose of discussing an exercise (After Action Review, Lessons Learned).

4. CONCLUSIONS

The main conclusion drawn from the pursue for establishing effective training procedures with the use of battlefield simulation systems should be the streamlining of all undertakings aimed at combining the available systems of command support, reconnaissance and battle assets management as well as simulation systems, simulators and sensors on a single ICT platform to create a single integrated training system environment.

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