

DISTRIBUTED SIMULATION – A CONNECTION VECTOR AMONG ROMANIAN JOINT NATIONAL TRAINING CENTER AND SIMULATION TRAINING CENTERS DURING LARGE-SCALE TRAINING EXERCISES

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To face the modern battlefield challenges, Armed Forces need to be effectively trained and military leaders have to visualize the area of operation and understand its complexity, the purpose of missions, and the operational end state. In other words, for achieving the commander’s intent and operation’s end state, units must understand the contemporary complex operational environment. Using simulators and simulation systems, during large-scale simulation training exercises, military simulation can provide the best training opportunities for all armed forces in order to accomplish training objectives thru live-virtual-constructive integrating architecture (LVC-IA) and synthetic environment. The advance of science and technology related to military simulation and simulation systems supports the planners for tailoring appropriate training scenarios and sometimes it could be a significant challenge and also an opportunity for the staff to establish the technical simulation framework and integrated training environment. Nowadays, in order to support and provide the best training opportunities for setting up the appropriate simulated operational environment to all military forces which are located in different areas, the distributed simulation is the key of military training success and it also could be considered as a connection vector throughout all training simulation centers.

Key words: *distributed simulation, Military training, Simulation systems, integrated training environment.*

1. AN OVERVIEW OF ARMED FORCES TRAINING PROCESS

In an increasingly complex geopolitical situation opened to the unpredictable global evolutions of

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As part of the modernization process of the Romanian Armed Forces, in an increasingly complex geopolitical context opened to unpredictable global evolutions of nowadays' security environment, enhancing training quality level becomes mandatory.

A number of reasons favor large-scale training exercises by using distributed simulation, as following: they provide the best approximations to the actual realism of military operations, they efficiently use all the resources, and they reflect national capability and commitment. For training purposes, the Romanian Armed Forces strives to replicate the actual operational environment as closely as possible and, as a consequence, the training exercises accomplished at the "Getica" Joint National Training Center (JNTC), Cincu, Romania are the most successful in this regard by involving all unit types, no matter the size, and unit branches. The large-scale multi-echelon training exercises offer the best approximation of military operations for a sizable force, such as a division or greater.

Based on the unpredictable international security environment, along with maintaining the international agreements and commitments, the Romanian Armed Forces has been starting the transition from the training related to counterinsurgency operations towards a training focused on decisive actions, which implies adaptable Armed Forces, capable of fulfilling

tasks across the full spectrum of operations and achieving the national defense goals. The Romanian Armed Forces must be aligned with the Alliance's training efforts and, furthermore, they must start the training process transition towards Joint Operations in order to have adaptable, operational, and capable military forces facing all kinds of missions, anytime and anywhere.

Along with other military activities, the Armed Forces training represents a fundamental activity which requires an important amount of time and lots of resources, in order to achieve stated training objectives.

The modernization process of the military training through large-scale exercises requires also the existence and development of the simulation training component. The increasing role of Modeling and Simulation (M&S) in the training process represents a viable solution in support of the military training exercises implying cost reduction and reaching the training goals by using military modern equipment, simulators and other kind of simulation systems used in an integrated environment.

2. TRAINING CAPABILITIES THROUGH THE INTERCONNECTION OF SIMULATION SYSTEMS

The possibility to conduct training activities for each branch/specialty, in a joint, combined and multi-echelon manner by Headquarters

and maneuvering forces displaced in different locations, as well as the use of simulation capabilities in all-type training exercises brings up the interconnection issue in an integrated training infrastructure, concluding to what we are used to name – distributed simulation for training purposes.

The “*Change Engine*” in the military training field and exercises for all Headquarters and armed forces at the Romanian Army level, JNTC (located in Cincu, Braşov) makes use of the integrated real-constructive-virtual simulation for training environment’s replication and, in addition, the existent infrastructure, training capabilities, and all type facilities, as well as the well-trained teams (SMEs – Subject Matter Experts) belonging to JNTC lead to a real increase in training quality and evaluation of the training for all the units involved in a training event or in a large-scale exercise.

Table 1. Military simulation systems used during headquarters and forces training [1]

MILITARY SIMULATION SYSTEMS		
Simulation	People	Systems
REAL	Real	Real
VIRTUAL	Real	Simulated
CONSTRUCTIVE	Simulated	Simulated

The simulation systems offer the possibility of interconnection in order to have at the same time, in the same exercise, military structures (units) using different types of systems and simulations: LVC - Live, Virtual,

Constructive. With this capability, the training audience has the common operating picture (COP), no matter the systems and the type of simulation used by the subunits, often deployed in different locations, but using the same scenario. Moreover, by integrating multiple simulations we can create a common operational environment (ITE – Integrated Training Environment) – the base for the integrated architecture (LVC-IA Live, Virtual, Constructive – Integrating Architecture).

At the Munich Security Conference plenary session on “Building Euro-Atlantic Security”, February 4, 2012, NATO Secretary General, Anders Fogh Rasmussen, issued the “*Connected Forces Initiative*” (CFI) concept. The main idea was that the forces trained, exercised and operated alongside each other around the world, e.g. Libya, Kosovo, and Afghanistan, have to maintain their interoperable capacity, ability to work together – and, when necessary, to fight together. The main areas where this Initiative could enhance the unique capacity to work together are: expanded education and training increased exercises, and better use of technology [2].

An important role in achieving the objectives of the CFI concept is set by the simulation systems, their integration in a common training environment and their capacity/capability to be used in a distributed

simulation exercise: trained forces – different locations (different cities, countries or even continents).

To emphasize the previous statements, the series of the Command Post Multinational Exercises *Saber Guardian* which comprises more than three thousands military from different countries is an example in this respect. Some of the forces attending the exercises are deployed in one of the Combat Training Centers (e.g. Novo Selo – Bulgaria, L'viv – Ukraine) and the rest of them are stationed at Cincu JNTC. The participating forces are part of the distributed simulation exercise, having Response Cells at different levels according to the integrated exercise architecture and using a common scenario.

The situation is assessed as flexible due to the training audience's locations and based on the planned exercise design. The distance between the JNTC and CTCs does not represent an obstacle in conducting such exercises: the distribution capability is improved by integrating other countries' forces owning constructive simulation equipments. Moreover, it is important to mention the connection of live simulation with constructive one. In the same exercise, staff is working in constructive, troops – boots-on-the-ground instrumented with the Real Simulation equipments and all

together can be deployed in different locations and countries.

Concerning the *Saber Guardian 16* Multinational Exercise as an example, it is worth noting that the troops deployed at Cincu JNTC are using constructive and live simulations, and other subordinated forces are stationed in Bulgaria and Ukraine, achieving their training objectives in the same realistic and challenging scenario.

In this context, the statement of COL John G. Norris, U.S. Army Europe Joint Multinational Readiness Center, Hohenfels, Germany, delivered during the *Saber Guardian 14* exercise is important. He restated the “*Connected Training Initiative*” (CTI) approach during an interview for IHS Jane's Defense Weekly: “*This exercise, due to the last decade sustainment, is connected digitally with Romania, one of our sister Combat Training Centers, Cincu CTC located in Romania, which we have helped build and establish over the years. They have a battalion training there in CPX, and the rest of the higher headquarter training in Bulgaria, in a contingency Command Post. That is powerful, that is tremendous. The future is to connect the Live/Virtual to the CPX in a digital world, and we can do that. We are capable of doing that right now*”[3].

The JMTC “*Connected Training Initiative* (CTI) is illustrated below:



Fig.no. 1. Joint Multinational Training Command *Connected Training Initiative (CTI [3]*

The Romanian Armed Forces ROU NAT SIMNET (Romanian National Simulation Network) is an ongoing project and involves constructive simulation for staff training, live and virtual for troops training. The ROU NAT SIMNET functionality is established by Cincu JNTC guidance and coordination, since the beginning of the last year, based on the knowledge, experience and lessons learned gathered by the JNTC specialists during the distributed simulation multinational exercises. The ROU NAT SIMNET utility was proven during a distributed constructive exercise when the *Land Forces Combat Training Center - Cincu*, *Evaluation and Simulation Training Center – Constanța* and *Simulation Training Center - Bucharest* were fully connected.

Step by step, ROU NAT SIMNET will expand towards Romanian Armed Forces Units and other training structures, like Air Forces Simulation

Center, Secondary Training Centers, Military Academies and so on.

3. FINAL REMARKS

From the simulation training perspective, 2016 represented a milestone in Cincu CTC's experience: DACIA 16, the first major joint distributed exercise validated the ROU NAT SIMNET (Romanian NATIONAL SIMulation NETwork). Starting with the distributed constructive simulation as a first step for this project, there are also clear goals to integrate live and virtual simulations, developing Cincu JNTC Live, Virtual, Constructive – Integrating Architecture expertise at the national level.

In order to have a more efficient simulation training, where all the combat and combat support branches are represented, we need interoperable simulations [4].

Nowadays, using more and more the simulation equipments, simulators and other systems in support of the Romanian Armed Forces training in a modern Joint operational environment, national and multinational depends on the projected training objectives, the planners, scenarios experts, specialists knowledge, background and expertise. The Land Forces simulation training using Cincu JNTC capabilities reached the perfect framework heading to the right direction. The M&S development perspectives in order to support staff and troops training are very promising at this point.

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