UKRAINIAN SIMULATION INDUSTRY:

problems and possible solutions

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The design, development and production of military simulation training systems are all highly topical issues to Ukraine, and painful as well. The Ukrainian simulation industry seems to be going strong with its five major players, but all are complaining about problems, the number-one being the lack of interest on the Government's part.

Five companies in Ukraine are involved in the design/development and manufacture of trainer simulators for the military. These are the A.A.Morozov KhKBM Machine Design Bureau of Kharkiv, the Microtech company allied with Metekol of Nizhyn, the Interregional Agro Technical Service in Lviv (otherwise known as MATS Concern), the Research/Manufacturing Association NPO Aviaservice in Kremenchuh, and the Research/Manufacturing Association NPO Energia 2000, with research support being provided by a specialist research organization, the Ukrainian National Academy of Sciences' Institute of Computer-Aid Systems. The latter's Chief Executive Officer Vasyl Vashchenko, speaking to a round-table meeting, emphasized the necessity for all of the national designers and manufacturers of simulator systems to be integrated under the umbrella of a single national corporate group. Vashchenko noted at the same time that "The Ministry of Defense is too passive in exploiting the huge potential of Ukrainian simulator system designers who stand ready even today, in absence of funding from the Ministry of Defense, to make simulator training equipment available for the national Armed Forces, on some occasions even at no cost". The President of the MATS Concern, Ihor Krol says that businesses of most of the simulation industry players in Ukraine are targeted at export markets: "They have to do it because they need to earn money for investing in new simulator trainer designs which the companies have to produce at own expense".

On one and the same piece of terrain

"Most of the military forces operating Soviet-supplied weapons systems are keen to obtain associated trainer simulators. You see, nobody can tell you who will take the win in a tank duel between the American ABRAMS and the T-72B should they meet face to face, as was the case in Iraq, for example. Everything depends on the competency of the vehicle crew and the level of inter/intra-unit coordination. Still, "ours" will not be able to win, anyway. You see, here in Ukraine the focus has been lost on the need to provide the military with highly effective simulator training systems in sufficient numbers to support combat training programs. In the USA, for example, they have an integral training concept that requires every soldier to undergo a training course on simulators before he can get access to real weapons. Furthermore, American designers have for many years now produced complex training systems which they integrate into larger Brigade-level training networks consisting of up to 100 trainers. It is this kind of tactical trainers that the USA has deployed in Germany and Great Britain. This kind of approach is a far cry from ours," says PhD in Defense Studies Oleksandr Matvievsky, deputy Director General and Scientific Director at NPO Energia 2000, the company responsible for the design and development of a national networked training system.

The two key guiding principles for design engineers at NPO Entergia 2000 are "systemacity" and "tactics". Trainers are being designed and developed using common approaches and standards, enabling training systems of various kinds - tank crew trainers, simulators for antitank/antiaircraft gunnery and artillery systems and, objectively, simulators for helicopters - to be integrated into a single tactical network. What distinguishes products by NPO Energia 2000 from competing designs is that they are not developed as individual training systems but, rather, as tactical trainers intended to support requirements for exercising command and control of Platoon and Company team sizes. The networked simulator training system currently being developed by Energia 2000 is distinguishable by the maximum realism in simulating the realities of fighting along one another, and it can simulate war-like settings that are impossible to attain in tactical battlefield exercises, for example a tank combat involving same-formation vehicle crews making war on one another on one and the same piece of terrain.

Systemacity making up for system drawbacks

Matvievsky goes on to say: "This know-how is not ours. This kind of things have long been common in foreign militaries. Trainer simulator systems of this type are typically based on modern network centric technologies, enabling tactical lessons and combined-arms exercises to be held with participation of geographically dispersed formations. Unfortunately, as things stand now, we cannot attain such a capability thus far. Our immediate target is a simulator training system for a Platoon-size unit. Next will be a Company-level networked system integrating anti-tank gunnery trainers, simulators for air defense training, artillery simulator trainers and, objectively, simulators for Army aircraft, which will bring us closer to a full-fledged simulation of the modern comprehensive battlefield".

The networked training system currently under development, to be known as Tactical Training System (TTS), will be comprised of a few mission commanders' computer workstations, several command and control posts and two mechanized infantry Brigade-level command and control centers - all together 60 computer workstations integrated into a local area communications Brigade-level network.

DUAL-USE TECHNOLOGIES

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The key components of the Tactical Trainer System (TTS) are as follows:

1. Mission commander's workstation;
2. Local area computer network;
3. Tank (mechanized infantry) Platoon trainers;
4. Artillery Crew Trainer;
5. Air Defense Crew Trainer;
6. Helicopter Gunship Simulator.

The TTS local area computer network (TTS LACN) integrates a range of hardware and software assets supporting data transmission, storage and handling. This brings together 36 to 40 personal computers in a Microsoft Windows XP network -- a homogeneous multi-level network, with one or several computers (servers) dedicated for massive data storage.

As a matter of fact, modern simulator training systems are subdivided into two subgroups: semirealistic simulators and laser-based tactical engagement systems. Simulator training systems of the two subgroups have non-overlapping capabilities and advantages, their disadvantages being compensated for by the ability of system like application in combat training of individual soldiers, vehicle/gun crews and formations of the Brigade-level and lower.

Cost–effective training opportunities

Large-scale introduction of simulation training technologies into the combat exercise and training practices will make it possible to raise the overall combat training efficiency, provide more realistic training environments and to ensure sustainable, intensive and highly efficient combat and tactical training at all levels of command. The aim of the simulator training is to teach AFV crews and combat teams how to exploit various war fighting techniques while acting at the intra-squad level, and to exploit weapons systems to best effect in complex battlefield environments. Also, it is intended to support command and staff personnel training requirements with emphasis placed on ensuring sustainable coordination of unit operations and providing accurate fire controls on the battlefield; and on training individual units in highly efficient and

well-coordinated war fighting in modern battlefield environments. Experts estimate that the use of simulating technologies allows it to reduce the cost overall of combat training by 70 to 80 per cent. But the trouble is that the Ukrainian Government cannot comprehend the importance of simulator technology development or the economic effect such technologies can bring to military training, says Ihor Krol. He believes that simulation training assets are very needful for the Ukrainian Armed Forces, in that such assets not only could improve significantly the quality of combat training but could also generate a substantial cost saving for the country's scanty defense budget. The Ukrainian Ministry of Defense would be well advised to take advantage of the national simulation industry community's readiness to do the R&D and produce prototypes on credit. The Ministry of Defense should work together with national simulation technology manufacturers in search of ways to ensure sustainable development of this sector and to tap new sources of funding into R&D programs for new simulation trainer designs.

In the Russian Federation, for instance, a powerful corporate group named OJSC "Trenazherniye Sistemy" ("Training Systems") was set up in 2006 by the merger of eight major players - with all the latter's know how, expertise and manufacturing capabilities. Given the OJSC "Training Systems" potential, Ukraine may find itself uncompetitive on the export market right in a couple of years from now. The Training Systems corporate group has been given the clear task of providing all emerging weapon systems designs with complementing simulation assets. In Ukraine, there is no common or coordinated policy seen in the simulation technology design area, with designers working independently of one another - at own cost and at their own risk. Nobody is going to develop a relevant national program, either. "Surprisingly", Matvievsky goes on to note, "they declare an intention to rapidly build up a professional and combat-effective armed force. They are going to attain this goal by budgeting the required sum of money for acquiring new weapon types. But this will not produce a combat-worthy army. Without highly effective combat training, they are going to end up with nothing. Where to trial the new weapons? How to train and exercise new tactical techniques? How to effect coordination and unity of effort? Nobody even tries to find the answers or make analysis. Wouldn't it be better, instead of acquiring new weapons, to upgrade the already available weapons types to more capable configurations and to train soldiers in operating them? But this will require the provision of modern standard trainer simulators, because warfare is not conducted by weapons but, rather, by humans who need to be trained to operate the weapons to best effect".

Matvievsky goes on to note, "It's a hard job to teach units how to make war. This was well demonstrated during the most recent war conflict in Georgia, where the great

amount of state-of-the-art weapons systems available to the Georgian army units (who fought weapons designs of the same generation as the opponent in war) proved to be of as much use as a pile of scrap metal once they confronted well-trained enemy formations.

Tactical training, which accounts for 70 percent of the time budget for overall combat training, will be left out of the loop of combat training processes as long as the provision of advanced simulator trainer assets remains nobody's responsibility. We are currently working on a R&D project for a Brigade-level staff personnel trainer to be integrated into a network with subordinate staff personnel trainers. We believe this system-like approach to be sine qua non of tactical training of staff personnel and soldiers," the expert said in conclusion.

Domestic and export markets

Initially, Energia 2000 was placing a premium on simulator designs for air defense weapons. Later, as market research revealed a substantial requirement for AFV simu-
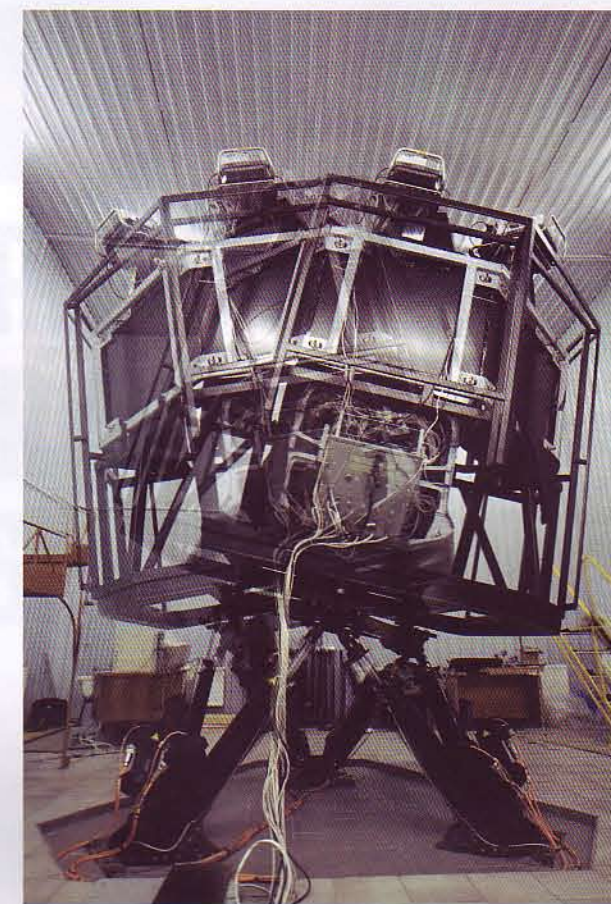
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lators, the designer refocused part of its R&D effort onto this market niche.

Energia 2000 has been on the market for nine years now, and it boasts a share of 5 to 10 percent of the European market. The company considers among its major rivals the Training Systems OSJC and the Logos firm of the Russian Federation, Facility #145 of Belarus, the VRM and Metapol companies of Slovakia, and Artifex of Hungary. Competition on the domestic market is substantial, as well. One of the major and most experienced rivals is of course the Morozov KhKBM Machine Design Bureau in Kharkiv, with all its development outputs and extensive experience gathered with earlier simulator designs. KhKBM simulator trainers are well selling on the domestic and export markets alike, but these are simulators for AFVs alone, in line with the company's major business activity. The Ukrainian company Microtech and its industrial partner Metekol of Nizhyn specialize in the design and development of simulator trainers for AFV and automobile drivers. Another Ukrainian company, the Interregional Agro Technical Service (otherwise known as MATS Concern of Lviv) had long focused on the design and development of battle tank simulators but eventually shifted over to trainer simulators for tactical fighter aircraft.

Energia 2000 has designed and built prototypes of a range of training simulator designs, including AFV crew trainers supporting training requirements for the T-55/72/90 main battle tanks as well as some infantry fighting vehicles and armored personnel carriers; motion simulators for training AFV drivers; integrated motion simulator systems; tactical trainers for Platoon/Company-size mechanized infantry and tank units. The company's product portfolio additionally includes IGLA man-portable air

defense system (MANPAD) simulators; integrated simulators for training the crews of STRELA-10, OSA and KUB-type surface-to-air missile systems; and KONKURS-type antitank guided missile simulators.

The Energia 2000's simulator designs are distinguishable by high novelty levels, confirmed in appropriate patents and copyright certificates. The company has supplied simulator systems to customers in some South-East Asian countries among others. A few years ago, for example, Energia 2000 was providing supplies of trainer simulators under a contract from the government of Myanmar. The company is currently bidding for a potential contract from the Indian Government to supply AFV crew trainers and anti aircraft gunnery simulators, and it is engaged in deliveries of trainer simulators of various design types and applications under contracts with customers from some of the CIS and African nations. The trainer simulators see an extensive use in combat training programs, being all too often loaded during ten to twelve hours every day.

Beyond the delivery of simulator training systems, the contracts include on-site start-up and adjustment assistance, warranty servicing, designer supervision and in-service support for the trainer equipment delivered.

As far as the Ukrainian Armed Forces' requirement is concerned, O.Matvievsky, for instance, believes it feasible "for the Ukrainian Armed Forces to set up a network of simulation training centers to ensure much better quality of military training. It would suffice to have two or three such centers equipped with state-of-the-art simulator training facilities. One such center would cost dozens of millions of US dollars to build and equip, but it could provide a quantum leap in the quality of tactical and firing training standards of formations from platoon/company level through brigade combat team size.

Regarding the suggestion by V.Vashchenko as to the proposed merger of all the national simulation industry players under the umbrella of a single entity such as a corporate group, for example, this idea enjoys broad support among the simulation industry community, at least among its major players. Vasyl Smoliakov, head of the Specialist System Division of Morozov KhKBM says: "KhKBM as Ukraine's number-one designer of simulation systems for AFV crew training is pursuing an open-door policy aimed at mutually beneficial cooperation with the designers of both simulation trainer systems and individual parts and component assemblies. We believe it necessary to urgently develop jointly with responsible Ministry of Defense departments and release a national year-by-year program for the design, development and production of simulation training systems to meet the requirement of the Ukrainian Armed Forces. In absence of such a program, the Ukrainian armed services and military education establishments cannot hope for a speedy provision of state-of-the-art simulation training facilities." **DE**