Expanded Missions - Expanded Training

The future role of simulated training and mission enhancing tools for SOF—that will support their roles as an offensive instrument in conventional operations and as a force in humanitarian missions—must keep pace with the best available technology.

By Ken Kaizer

Special operations forces are being called upon to respond to various types of missions beyond traditional conflict. The increase in operational tempo associated with the global war on terror, as well as missions spanning the full spectrum of conflict, points toward new requirements for training SOF. These mission areas must be addressed, while at the same time maintaining and enhancing the training requirements for these forces as warfighters in a changing world. The future role of simulated training and mission enhancing tools for SOF—that will support their roles as an offensive instrument in conventional operations and as a force in humanitarian missions—must keep pace with the best available technology.

How SOF will use simulations and participate in exercises not only will be determined by the types of missions they will be called on to perform, but also by the allocation of available funds. The constant presence of budgetary constraints and the necessary prioritization of budget areas create a challenge to the planning and implementation of simulation support to training and exercises.

As always, the justification of resources to support simulation development and life cycle costs for maintenance and upgrades are challenged as schedule, cost and performance requirements compete against multiple priorities, operational requirements and the rising costs of actual mission participation, equipment, development and procurement. Combine this with the fact that all too often, current simulations and exercises take an SOF task force up to and through the deployment phase with little consideration given to their actions after this and puts them in danger of having training deficiencies for the full range of missions they must perform.

Thus, future systems should not only be extremely cost-effective but also allow for multiple layers of interaction so SOF units can continue to train at the appropriate level of fidelity while they pass relevant data and results to larger-scale simulations.

New Simulation Technologies Unite Teams

To be able to train for the variety of future missions with a constant eye on affordability, SOF need to prepare globally while training locally. By creating and networking simulation facilities at localized SOF home stations or in the field, the units at group or team levels will be able to participate at combined and joint-level exercises anywhere in the world. A new set of simulation technology initiatives and capabilities fully covering future SOF missions will enable the SOF to participate in a distributed manner, allowing units at different locations to train and learn together.

The key to creating a cost-effective and robust environment to plan, prepare, train and evaluate SOF—indeed any operational force—is less a technical issue as one of acceptance. Once you realize and accept the fact that the technology for robust multi-entity simulations is already available, the road ahead becomes much clearer. It is estimated that 45 million homes in the U.S. alone have video-game consoles, and it is these consoles that have pushed the edge of immersive environments, open architectures, and reliable interaction and communications. Today's gaming consoles are basically very focused computers. They allow for fast computing, robust graphics, internet connectivity, and real-time communications. The biggest benefit is that they provide a stable and consistent platform to develop applications that can be shared and used from anywhere in the world that provides a networked capability. It is a proven model on which to build the next generation of flexible SOF planning and training tools.

The Anatomy of the System

So what would this type of system look like, and what kind of capabilities should it have? The best place to start is with the system architecture. As we have been discussing, in order to create a flexible simulation environment that can be used to rapidly create and modify training and planning simulations for SOF, the approach must be simple yet, robust and comprehensive.

The basic design should be simple and take advantage of our understanding and acceptance of open architectures, since we already use integrated applications every day of our working lives (think Office products) based on a common operating environment (Windows). It should also be a robust and comprehensive approach, since legacy simulation systems may not automatically integrate with any proposed common operating environment and some organizational resistance is bound to arise when dealing with legacy systems.

The only way to avoid incompatibility is to strictly designate an operating system to which all developers must design their programs. This is not as onerous as it seems since most applications we use every day are already designed to these types of standards. To this end, it is realistic and cost-effective to designate a commercially available gaming console as the common operating system. Assuming this to be the case, the "To be" architecture's foundation is solid and well-known. As you would move forward, it would be no different than current developers creating cross-platform games for PCs and gaming systems like Xbox and PlayStation. There is no need to make the operating environment more complicated than it has to be.

The system itself should provide realistic planning and training, based on sound doctrine, tactics, techniques and procedures. A fully integrated system will include all levels of visibility, from the individual soldier in a fully interactive 3-D environment, to large-scale strategic operations displayed on national maps. Not only should the system allow for viewing an operation in first or third person, but it should also allow for the seamless interaction of the different datasets associated with different scales (i.e. when you move an opposing force brigade-sized icon in the third-person map view, a corresponding

number of first person entities would be moved and visible to the members of a Special Forces operational detachment-alpha team in the fully 3-D environment). This type of multi-resolution modeling would also allow for the representation of information taken from live training and field data from ranges for performing course-of-action analysis and review.

A few key features of the system would be on the front and back ends of the simulation. On the front end, the system would need a unit-configuration-tool that would allow for the spontaneous development of new technical systems (e.g. weapons, communications, logistics, etc.) and operational units to be created and inserted into the simulation without having to reboot the entire system in order to compile the new information. This type of dynamic unit-configuration tool will give users the ability to try new ideas on the fly.

On the back end, you would need an after-action-review tool that would allow users to review simulated operations immediately after it is run. A useful feature would be to understand how after-action reviews would be used in the 3-D environment. By capturing all of the data deposited by first person entities as they moved and interacted in the 3-D environment, during the after-action review you would be immersed into a fully interactive world where you can play, rewind and pause the simulation as you move freely through the landscape from any perspective. This would allow operators, planners and analysts the ability to uncover the turning points of your operations and find the keys to victory or pinpoint the moment when things went horribly wrong.

Another key feature of the system should pay special attention to the representation of individual entities and technologies they use to enhance system fidelity. This will not only include detailed representations of the forces, but a much more robust artificial intelligence (AI) for both computer-controlled enemy and friendly forces. Rather than using the relatively simplistic AI common in most military and commercial games and simulations, the system should incorporate advanced neural network artificial intelligence. Implementing neural networks would allow the system to provide artificial combatants that are trained by real soldiers to act and react in an incredibly realistic manner.

Trained networks of this type provide us with two key advantages over standard AI; adaptability of AI decisions; and, randomness of AI decisions. Neural networks trained in a specific scenario have the capability to adapt to new scenarios without additional training. Additional training in a new scenario, however, will provide increased accuracy in neural network AI. Since neural networks are modeled after the functioning of an organic brain and trained by a real person, they also have the capability to introduce some amount of randomness by making an occasional spontaneous decision (even mistakes), just as a human may.

It is important that we encourage the simulation community to also make AI development an important focus of future systems. We should not fall short when we have the ability to build simulations that would bring unique differentiators and solutions to the challenges that SOF face in real-world operations.

A New Paradigm for Success

It is important to recognize that the acceptance of commercial game technologies and processes as a model for defense simulations is not an easy paradigm to accept. Many companies currently supporting defense training and simulation systems have built a substantial portion of their business on proprietary applications. Because of this, a large portion of defense simulation systems are tied to these applications.

Even though some commercial games are being created and modified for use by SOF, they often still remain proprietary systems tied to system integrators who can often be hostile to new innovations and entrants that can be seen as encroaching on their business. Basically, it is time for a change in how defense contractors act towards the government and in how the government looks at gaming technology. Given the great advances in the technology and processes that have been developed to support an extremely competitive commercial environment, it is time for the government to embrace these processes and technologies but under more amenable and economical conditions.

Is a system of distributed and open simulations based on commercial gaming technology the silver bullet to all of our defense training needs? Probably not. But, as new and varied challenges arise, our SOF must be ready and able to meet them. Given the increase in mission responsibility and budgetary constraints, a new way of responding to these challenges must be developed and implemented. In keeping with this goal, this type of system, a new way of thinking about training and mission preparedness, must be developed in order to meet the challenges of future missions. Whether it is for traditional conflict, fighting the GWOT, or humanitarian missions, this type of system allows our SOF to prepare globally while training locally—maximizing effectiveness inside the box.

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