

# ARMY STRATEGY

## Modeling and Simulation

The publication of *The Army Strategy – Advancing with Purpose (2002)* provides a catalyst for renewal at a time when there is broad acceptance of the requirement for Army transformation. Recognizing the continued scarcity of investment resources, the Strategy presents an implementation concept that will focus on areas where quantum improvements can be achieved, and suggests that quality will usually be preferred over quantity in order to produce consistency and mission success.

A Synthetic Environment (SE) links any combination of models, simulations, people, and equipment (real or simulated), into a common representation. The creation of SEs, through the clever application of Modeling and Simulation (M&S) technology, is a perfect example of one such area for investment. Consider this excerpt from the Commander's Vision:

*"Using progressive doctrine, realistic training and leading-edge technologies, the Army will be a knowledge-based and command-centric institution capable of continuous adaptation and task tailoring across the spectrum of conflict."*

Achieving this vision is based upon implementing a strategic framework of four strategic objectives: Connect with Canadians; Shape Army Culture; Manage Readiness; and Deliver a Combat-Capable Sustainable Force Structure. The *Army Synthetic Environment Strategy* describes how M&S will be developed and employed to meet these objectives.

Coupled with increasing investment on the part of industry, the Department of National Defence (DND), and our allies, recent technological advances in M&S are resulting in an impressive effort to capitalize on the potential of these emerging tools. SEs are providing the Army with a powerful and resource efficient medium for the exploration of doctrinal alternatives, realistic training, support to operations, and experimentation in support of concept and combat development. In order to harness existing capability and harmonize effort and investment into new capabilities, a comprehensive simula-

tion policy framework is currently under development. The aim of the resulting policies will be to provide the mechanisms necessary for the Army to meet the recently formulated Army SE Vision:

*The Army will exploit synthetic environments as the primary enabling technology necessary to effectively meet Army strategic objectives. SEs will merge the real and virtual worlds in ways that empower leaders to visualize the future, analyze decision alternatives and prepare for operations throughout the spectrum of conflict. In order to maximize effectiveness and optimize efficiency, Army SEs will be centrally controlled and coordinated to achieve appropriate levels of validation, standardization and modular development for potential use and reuse in a distributed environment.*

– The Army SE Strategy, Land Forces Doctrine and Training System, Kingston, March 2003.

### STRATEGIC OBJECTIVES

In order to achieve this vision, Army SE policy and development planning will be guided by the Army strategic objectives:

- **Connect with Canadians.** There is no better way to demonstrate what the Army is doing than by letting Canadians experience it first hand. Rather than promoting the Army through 'show and tell' type activities, SEs would allow everyday Canadians to experience simulated situations that are very realistic, thus gaining a better understanding of what we do. SE demonstrations can promote a deeper understanding and facilitate communications with national leaders and decision-makers who do not have the time to deploy on visits to actual operations. Furthermore, recruiting from the millennium generation (those born after 1984), a group that is increasingly computer-literate and fond of computer games, will be greatly facilitated with realistic simulations and simulators. Failure to relate to this group in new and meaningful ways could put the Army Strategy at serious risk.

- **Shape Army Culture.** This objective links to aspects of *Connect with Canadians* and aligns with two DND/CF Strategy 2020 Objectives: *Innovative Path*, and *Decisive Leaders*. In the uncertain and increasingly unpredictable battlefield of the future, creativity and innovation will be critical components of successful missions. However, innovative paths are difficult to find and even harder to travel in a culture that is rooted in tradition with substantial organizational inertia that has for so many years trained to fight a (relatively speaking) "predictable enemy," employing "known tactics," with "standard weaponry."

CFB Petawawa – Soldier in the Brigade Command Post on exercise: simulation meets reality.



We can no longer afford the luxury of assuming we know who the enemy is, let alone his tactics or the means by which he will choose to engage us. Leaders must be prepared to embrace this uncertainty as a matter of course and rely upon their problem solving skills to adapt to changing circumstances and find creative means to achieve their mission objectives.

Simulation offers a mechanism to not only create complex and uncertain circumstances for training, but will also enable future leaders to explore innovative techniques and, most importantly, get them used to finding solutions to problems that do not fit within traditional war fighting templates.

Even if the SE representations fail to capture the circumstances associated with an actual operation, the skills associated with the mental agility that this training will provide will serve these leaders well as they are increasingly relied upon to succeed in the face of new and unforeseen circumstances. Decisive leaders become so through experience; however, there are few real-world opportunities to gain this experience in an operational setting where decisiveness is most crucial. SEs will be employed to ensure that soldiers get the training they require in realistic scenarios that will provide them with the confidence they need when faced with difficult choices in real operations.

Through the development of decisive leaders who are encouraged to be creative and explore innovative paths, the Army will create an appealing, learning culture capable of understanding how things should be, while at the same time appreciating how things are in reality. The resulting dialogue will naturally serve to reinforce the Army ethos and culture by fostering understanding and strengthening the essential bonds of trust required for combat effectiveness.

• **Manage Readiness.** Readiness requires realistic training. The establishment of the Canadian Manoeuvre Training Centre (CMTC) as a state-of-the-art, live simulation capability in 2006 will greatly enhance our ability to train for operations. CMTC is the cornerstone of the Army Training and Operations Framework (ATOF) that will enable the Land Force to confirm the operational readiness of units that will be tasked for combat and non-combat operations overseas. Beyond the live collective training at CMTC, achieving high degrees of readiness in the post



*This 3D representation of the MMEV vehicle (which will not actually exist until after 2007) was modeled for Army Experiment 8A.*

digitization era will rely heavily upon using constructive simulation to stimulate the emerging suite of real command support systems that make up the Land Force Command and Control Information System (LFC2IS). Commanders and staff at all levels will be able to realistically exercise their headquarters in operational planning and execution without ever having to deploy actual troops. This capability was recently demonstrated during Exercise Complex Combatant held in the new Directorate of Land Synthetic Environment facility in Kingston. The Joint Conflict and Tactical Simulation (JCATS) constructive simulation was linked with LFC2IS version 1.0 to create an SE that allowed six syndicates of the Canadian Land Force Command and Staff College (CLFCSC) students to attack, occupy and defend the City of Kingston against a virtual enemy that had taken the Limestone City.

• **Deliver a Combat-Capable, Sustainable Force Structure.** The experimentation implications of this objective have resulted in a 5-year target to “enhance experimentation capability.” This capability will be critical in supporting the analysis required to determine which combat capabilities are required and how to sustain them. Without a realistic representation of the future battlefield, a decision regarding which technological advances to pursue and their corresponding impact on force structure will be problematic. As a complex system-of-systems, combat capability needs to be understood with a future focus, and in a holistic manner. The lens through which the Army will establish a future focus is SEs. Analysis of authoritative representations of future conflicts and technologies will enable decision-makers to build consensus over contentious force structure decisions.

Risk taking is inevitable; however, rather than relying on qualitative risk assessment, SEs offer the opportunity for visualization and quantitative risk analysis

that will provide a degree of analytical rigour to the decision-making process that has not been possible in the past.

The Army Experimentation Centre, has been renamed (DLSE 4) and embedded in the Directorate of Land Synthetic Environments. It is already well on its way to meeting these objectives. This small team has been working closely with operational research staff since 1999, having completed several experiments in support of concept and combat development.

The recently completed Army Experiment 8A, for example, was conducted to assist in the investigation of the effectiveness of potential upgrades to the planned Multi-Mission Effects Vehicle (MMEV), including the evaluation of employment concepts required to defeat existing and emerging ground and air threats. Results suggested that the precision indirect capability afforded by the MMEV upgrades is potentially transformational, leading to a recommendation that it be pursued through the MMEV project and through a coordinated approach to providing laser designation across the battlefield.

## CONCLUSION

As the Army Synthetic Environment Authority, implementing the SE vision to help enable the Army strategic objectives, as described above, is one of my top priorities. We have had many early successes as described above, but we have a long way to go in order to take full advantage of this enabling technology. Simulation however, is a means to an end and not an end unto itself. We will continue to ensure that investments are justified against Army priorities. The newly formed Directorate of Land Synthetic Environments (DLSE) is charged to ensure this is the case. In so doing, the Army will work closely with the rest of DND and our allies to make sure our decision-makers and war fighters receive maximum benefit from modeling and simulation technology. **FL**

*A graduate of the US Army's Command and General Staff College with a focus in simulation, BGen Ward is currently the Commander of the Land Force Doctrine and Training System and is responsible for Army Individual and Collective Training. As a previous Director Land Strategic Concepts, he was instrumental in the creation of the Army Experimentation Centre in 2000.*