



## Virtually the real thing

*Simulation comes of age outside the battlefield*

by CHRISTOPHER ROGERS

Quick thinking and accurate knowledge can be the difference between life and death in some industries. Traditional training can never fully prepare individuals for what it's really like on the job. In industries such as oil and gas, improper training can result in danger or even death; quick thinking paramedics can save. Clearly, the more realistic the training, the more lives will be saved.

Simulation and virtual training are usually associated with the defence industry. Helping soldiers better grasp the feel of real-life battle or helping train mechanics to repair helicopters are just some of the uses. Virtual training simulations are not especially new technologies, yet companies are continually seeking new ways to apply the technology that drives them: artificial intelligence,

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software rendering and accessibility are some of the key drivers.

Now, civilian groups are discovering the benefits of simulations – not only for training the next generation of employees, but to improve decision making abilities and emergency preparedness.

In a field that's evolving at such a quick pace, sometimes the best improvements are the simplest. Nick Giannias, vice-president of research and technology at Ottawa-based Presagis, believes that one of the biggest recent improvements in simulation technology is ease of use. Accessibility was a much needed advancement which had been sorely lacking in the field. In the early days of simulation and modelling, those who wanted to use a simulation based solution needed an expert to even consider its implementation.

Giannias also said people have truly realized the benefits of 3D and its power as a tool. "I think where it started in the non-defence military application was in visualization," said Giannias. "If you were going to build a shopping mall and you could visualize this in 3D, it would be better."

Presagis has a suite of tools to model, simulate and visualize 3D worlds. It's a field usually associated with complex military training, and it can be difficult to realize the benefits that 3D simulations and training bring to other fields, but Presagis has some compelling examples.

"Now [customers] are realizing they can add another layer to it," said Giannias. "They've got that same shopping mall, but now they need to see if they've got enough exits in case of an emergency. How long would it take 10,000 shoppers to get out of the mall in case of an emergency?"

Presagis also recently implemented a project with Ottawa-area paramedics seeking a better way to deploy their ambulances. Traditionally, said Giannias, the paramedics relied on the knowledge and skill of a dispatcher to deploy the right ambulance in case of an emergency and then redeploy the other ambulances to better cover the city.

The Presagis solution uses their simulation engine to highlight the current position of all the ambulances and provide recommendations to the dispatcher based on the emergency calls they receive. "In the end, it is always the dispatcher's call," Giannias said.

The solution not only provides valuable suggestions to the dispatcher but also helps bring new dispatchers up to speed much more quickly. Presagis worked with a professional organization that added their knowledge of the area and used the Presagis tools to build the application for the paramedics. Giannias said that

tapping into the specialized knowledge of particular groups is essential because of the importance of accuracy.

He also points out that accuracy is one of the key distinctions between simulation and gaming. Gaming is for entertainment; simulations mirror reality. That commitment to accuracy has helped propel perhaps one of the most successful products of the technology – assisted decision making.

"[Simulations] are such an effective way of doing training that otherwise would be very difficult to do or very expensive to do in real life," Giannias said. "But as people started using them, they saw other uses for it. You can run the same simulation different times in different ways so that it can help you make a decision... we call that decision support because that helps you decide what action to take based on the simulations that you run."

The example of the Ottawa-area paramedics shows exactly how beneficial decision support can be and how useful the technology can be away from the traditional realm of training. Combine that decision support with another Presagis technology – AI Implant – and the possibilities expand exponentially.

What began as a technology used in the gaming and film industries, to model thousands of extras at a fraction of the cost of live actors, is now being implemented on the modelling and simulation side, such as the shopping mall example.

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Taking a different approach to simulations but also using dynamic models is NGRain solutions. The company began in 2000 with a number of prototype 3D solutions which were shown to executives in different industries. The solution which garnered the most attention was a 3D model of a V8 engine which could be dismantled down to the spark-plugs.

Paul Lindahl, co-founder and CEO of NGRain, said there is a looming problem with the shortage of skilled workers. NGRain's solution was to gather up knowledge and deliver it to the masses. Lindahl believes that 3D is an intuitive way of communicating complex information – particularly complex procedural information.

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"We created an environment that captures knowledge that is locked in the minds of these subject matter experts," said Lindahl. "We embed it in 3D and we communicate it into the operations."

NGRAIN removed two significant barriers in order to bring their training solutions to a mass audience. The first, according to Lindahl, is that the NGRAIN environment in which the graphics are manipulated can be used by a person with a skill level equivalent to understanding Microsoft Word. The second barrier NGRAIN's solutions have conquered is running without the aid of graphics processors; allowing the solutions to be implemented in the field where large desktop computers are unavailable. NGRAIN also uses large compression algorithms which allow significant 3D files to be compressed down to a small footprint.

If procedures change, it is not difficult to change the virtual training procedures. Using a tool called NGRain Producer, the knowledge expert has only to change the properties and procedures of the specific knowledge object in question. NGRAIN's solutions are easy to manipulate and understand and they are also getting results.

Lindahl said that one of the most important metrics in training is "first time right" performance, that is, doing the task right on the first real field attempt. Having to redo a task in maintenance wastes resources and increases the equipment's down time. According to Lindahl, for a task that would normally get 75-80 per cent first-time-right performance, NGRAIN increases performance to 96 per cent.

"It's trackable so you can test [trainees] on what they're doing, whereas if you're doing it in the field or

doing it with a human assessor, there is always bias introduced in the assessment," said Reilly Montgomery, the general manager of training and development services at AMEC Americas, referring to NGRAIN's solution.

Montgomery said that using tools such as NGRAIN not only increases retention, but also speeds up the training process. "For us it's part of the next-generation of learning solutions, it's really where things are headed and it's not too far out there for clients. They're looking for solutions like this now," he said.

As a creator of site or asset specific operations and maintenance training programs, AMEC Training and Development Services works with clients and equipment vendors to create customized training solutions.

Traditionally, training was done in a classroom and on the job, but this process underwent a significant transition when web-based training became popular. Montgomery said that with web training came better consistency and higher quality of deliverable training that improved testing and retention. Unfortunately, according to Montgomery, maintenance training has been lacking since web based training became popular.

"One of the things they were looking for was a tool that allowed people to view equipment using 3D exploded views and be able to put it back [together] in a virtual environment," he said. "For us it is a really exciting opportunity to fill that void when it comes to maintenance training." **W**