What's Up MÄK

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Faster, Better, Cheaper.

Military Technology magazine's Dennis Merklinghaus asked our CEO, Dan Schimmel, his thoughts on the general theme of ***Simulation Saves Money*** *– here's what Dan had to say.*

It's no secret that simulation saves money - it always has and always will. "Faster, better, cheaper" is one of the oldest mantras for military procurement and it has never been more relevant to military training and simulation than right now. Additionally, state-of-the-art simulation offerings must not make significant compromises when it comes to high-fidelity realism, extensibility, and adaptability. The bar is high and the challenge is great.

The very nature of new battle preparation requirements suggests that a well-architected networked simulation is not only the most cost-effective, but often is the only realistic solution to this challenge. Standalone and part-task trainers for individuals in singular domains are mature technologies. These are proven time- and money-savers compared to the high cost of live training.

However, the environment in which these solutions must deliver is now much more complex. Threats in emerging theatres of battle are ever more sophisticated, requiring an integrated and coordinated plan of attack across units, domains, roles, and national borders. At the same time, global budgets and timeframes for training results are shrinking. There are fewer personnel in all branches of the military, meaning all forces must be more cross-trained and multifaceted in preparation for more rotation and joint operations.

Much of this burden has traditionally fallen on simulation staff at standalone mission training complexes. The number of resident technicians and support personnel at these training centers is shrinking, sometimes dramatically.

A well-designed, compelling network simulation is a great answer to these challenges. A more open, plug-and-play interoperability model offers the lowest-cost, highest-productivity approach to doing more with less. The advantages are numerous: each individual trainee or small unit retains the convenience and efficiency of training at their home station, regardless of their role or domain. The architecture scales beautifully across regions and national boundaries. It allows all participants to become quick learners and efficient instructors or role players. It requires a leaner hardware, software, and staffing footprint. And it is especially suited to more complex joint operations with all the required synchronization and coordination.

There is more upfront system-of-simulation-systems planning required for these complex training scenarios. But with current open standards for how applications connect and decreasing costs for underlying technology and networking, it is an achievable reality; the total simulation costs will be far lower with much more bang for the buck in the end training product.

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Do More with Less

MÄK's Top 5 Ways to Empower Your Simulation Scenario

The size, complexity, and richness of your simulation scenario is typically a function of how much work it takes to set up and the computing power it takes to run at the desired fidelity. Here are MÄK's top 5 ways to empower your scenario with VR-Forces.

1. Give your entities brains - Scripting is great when you want to precisely define what individual entities are doing. (Read this article about differences between scripting and AI.) But in general, the more intelligence you can give an entity, the less scripting you have to do to define its role in the scenario. Use Lua scripting in VR-Forces to assign behaviors to entities and give them an additional layer of intelligence; this intelligence will provide behaviors that they'll use when they need to react to situations in the scenario.

2. Let one entity do the thinking for many - A simple example of this is embarkation. Imagine human character entities "embarking" in a vehicle; once inside the car, the humans can stop thinking about how to get around in the simulated world because the vehicle will do that for them. When the vehicle arrives at some destination, the human characters disembark and re-engage their brains to react to the circumstances at their destination.

3. Give your entities the ability to deploy other entities - Your simulation scenario may require a ship that is capable of deploying a helicopter. With VR-Forces, simply embed the helicopter in the ship; the ships' plan can include deploying these helicopters when needed. The helicopter won't exist in the simulation until the ship deploys it. Once deployed, the helicopter becomes a first class entity in the simulation with a plan of its own, to drop sonobuoys or launch missiles, etc. When the helicopter finishes its mission and returns to the ship, it becomes embedded again and no longer consumes simulation resources.

4. Simplify your planning by giving orders to aggregates - Another way to get a lot of work done with only a little bit of instruction is to aggregate entities. Give instructions to the aggregates and the instructions will be carried out by all the entities associated, allowing you to create large numbers of entities in a simulation quickly. With the placement of a few aggregates, each with a specific task, you'll have created dozens of individual entities that will carry out the tasks of those aggregates.

5. Use aggregate-level simulation - Numbers 1-4 are entity-level simulation tips; if you work more at the command staff level, use aggregate-level simulation. But that's a story for another day. (Unless you're curious now, in which case get in touch with us at info@mak.com.)

Do more with less by taking advantage of VR-Forces' productivity-enhancing capabilities.

5 tips not enough? Want to know all the ways VR-Forces can help you? Read the capability doc, online now!

ECOSim Takes MCTOG Training to the Next Level

The Marine Corps Tactics and Operations Group (MCTOG) provides advanced and standardized training in Marine Air-Ground Task Force (MAGTF) operations, combined arms training, and unit readiness planning at the battalion and regiment levels. MÄK's Enhanced Company Operations Simulation (ECOSim) is a vital component used by MCTOG for pre-deployment training and was recently awarded Phase IV funding for continued development and enhancement.

The centerpiece of the ECOSim system is the Small Unit Leader Interface (SULI) workstation, which visualizes the battlefield terrain, vehicles, civilians and combatants. Marine units are being trained with realistic training situations that are based on their upcoming combat. Each virtual marine within a battalion-sized element acts autonomously while navigating the terrain, following orders, joining formations, and responding intelligently to asynchronous events, like firefights. DI-Guy AI provides the critical "pattern of life" activity to simulate the real world challenges faced in combating insurgencies embedded within the general populace. The entire operation is viewed and broadcasted from a simple-to-use and versatile Unmanned Aircraft Systems (UAS) to platoon, battalion, and regiment levels.

Phase IV of ECOSim development includes integrating HLA federations with standard Marine Corps semi-autonomous forces (SAF) systems. This will enable ECOSim to interact with the entities in larger battlespace. GUI improvements allow the users to easily select and control squads, vehicles and other simulation assets, as well as to create and control crowds, we are updating and improving ECOSim's user interface. The camera controls will also become much more gamelike. To use the USMC hardware recently purchased for exercises, we will be creating a 64-bit version of ECOSim. On top of all that, Phase IV will incorporate many more new human, vehicle, and building models from active military area of operations. These new features and advancements for ECOSim will be built on top of DI-Guy 13's performance improvements, featuring instancing and new character appearances.

Want to learn more? See all you can get with DI-Guy 13.

Tips & Techniques:

Get Bumpier, Shinier, and Shadier Graphics in VR-Vantage

What's the difference between a dull, old model and a bright shiny, new model?

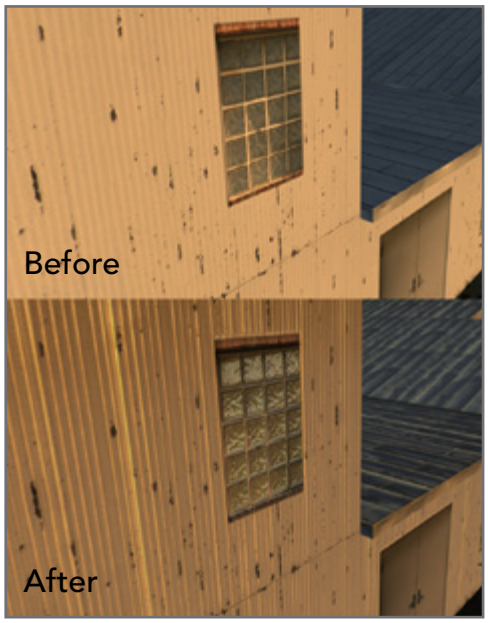
Turns out, it's just texture maps. Oh yeah, and the VR-Vantage rendering engine. With VR-Vantage 1.6 all you have to do to get bumpy, shiny, and shady effects in your models is add normal, specular, and occlusion maps. That might sound pretty complicated. But really these are all textures that you can create with tools like Crazybump, Blender, and Photoshop.

Crazybump will take your texture map and guess what shape it is and then use that shape to generate (bake) specular, normal, and occlusion maps. But it's just guessing. If you have a high-polygon count 3D model, then you can use tools like Blender to bake specular, normal, and occlusion maps from that model. And in Photoshop, you can paint specular maps by highlighting the shiny spots of your original texture.

All you have to do to tell VR-Vantage which textures specify which part of the lighting equation is add a few specific characters to their file names. For example, if your original texture was "rock.png" then your normal map texture will be named "rock_NML.png." Your specular map will be named "rock_SPC.png." And your ambient occlusion map will be named "rock_AO.png."

Just put these textures in the same folder as your original texture, run your VR-Vantage application, and see the difference. (Bonus tip: In VR-Vantage, change the time of day to move the sun and see the lighting effects you've created.)

To learn more about this technique or if you have other questions, email us at info@mak.com.



Benefits of Highly Accurate and Immersive Training Environments

VT MÄK's First-Person Driving Simulation Uses Simthetiq's SUROBI Virtual Terrain Environment

At I/ITSEC 2014, we demonstrated our new VR-Vantage IG image generation capabilities by building five first-person player stations – each representing a different type of player. One of these stations was a Light Armoured Vehicle (LAV) player where we collaborated with Simthetiq for the terrain database, CM Labs for the vehicle physics, and with MÄK's own DI-Guy human Character simulation to populate the environment.

Typically when building a competitive simulation solution, the biggest proportion of investment is on the hardware and software at the detriment of the visual database. Everyone agrees that the IG features and hardware performance are vital for any virtual training exercise – but all that action happens in the context of the virtual terrain. A poor visual database will make any investment much less effective. Simthetiq specializes in building cost-effective, immersive training environments that reach the new level of realism wanted by today`s demanding customers.

So what does that mean for us? We were finishing up improvements to VR-Vantage 2.0 and wanted to show off its high performance rendering so we needed a terrain database that would look great from ground level, render at 60Hz, and provide navigation and collision data to the DI-Guy and Vortex physics engines. Simthetiq offered a COTS terrain combined with their specialist integration services, which allowed us to minimize risk and effort on our side while ensuring an impressive visual for our simulation solution.

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MÄKer Spotlight: Brad Dillman

Principal Systems Engineer

Meet Brad Dillman, a Principal Systems Engineer at MÄK. His chief responsibilities include the design, development, and testing of distributed systems for interactive simulation. He also helps create international standards for simulation interconnectivity and spends time assisting customers to ensure a great user experience.

Before coming to MÄK, he spent time at many different tech companies and organizations. Brad worked on the Java Virtual Machine at IBM; he's also worked on virtual simulators and international distributed simulations at the Canadian Department of National Defence. He has experience with real-time sensor networks through Milltronics (now Siemens) and fiber optic amplifiers through Corning Incorporated.

Brad's alma mater is the Technical University of Nova Scotia, where he earned his Bachelors of Engineering with a specialization in computer engineering.

When Brad isn't thinking about simulations and coding, he enjoys spending time with his three kids, as well as binging on superhero movies. He's passionate about sailing and tries to spend as much time on the water in the summer as he can. Brad works remotely from his home in Canada, so when he visits our Boston-based office, we all get a kick out of hearing his awesome Canadian accent.

We hope this piques your interest in our community here at VT MÄK. Stay tuned to the MÄK blog and Twitter for more updates from us!