What's Up MÄK

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VR-Vantage IG: A New Vision for Modeling & Simulation

Get ahead of the game.

VR-Vantage IG delivers game-like visual quality in a high-performance image generator — designed with the flexibility, scalability, and deliverability required for simulation and training.

With VR-Vantage IG, immerse your trainees in stunning virtual environments. Experience 60 Hz frame rates for smooth motion, engaging action to stimulate trainees, and beautiful effects for immersive realism; all this, inside world-wide geo-specific databases.

We use the latest shader-based rendering techniques — just like the triple A games do — to take full advantage of today's powerful GPUs. In your scenes, you'll see dynamic light sources that cast light on scene geometry, full-scene dynamic shadows, ambient occlusion, reflections, and bump maps, depth of field, zoom, and other camera effects – and a whole lot more.

VR-Vantage excels in all training domains: air, land, sea, even under the sea. For the high fliers, we have long viewing distances within unending terrains, curved horizons, haze, lens effects, and volumetric clouds. Closer to the ground we render highly detailed built-up environments with dense vegetation and DI-Guy human characters. On the water, we model physically accurate waves and sea state, realistic wakes and rotor wash, buoys with navigation lights, realistic shoreline effects, and subsurface visibility.

Designed for integrators, VR-Vantage IG has built-in support for industry standard protocols: CIGI for host connections, and DIS and HLA for distributed simulation. Its C++ API allows you to extend its capabilities or embed the IG directly into your simulation application.

VR-Vantage is deployable anywhere: in your multi-channel full-mission trainers, in your desktop player stations, in your R&D or experimentation labs, or in a streaming video server for web or mobile applications.

We've taken a Terrain Agile approach, to support all the ways of getting terrain into your scene. Whether it's through traditional visual database formats (including large-area paging terrains), by direct import from GIS source data, by streaming terrain from a remote server, or by procedurally generating terrain in the IG, VR-Vantage has you covered.

With VR-Vantage IG, the art of rendering beautiful visual out-the-window scenes is matched with the science of physics-based sensor simulation – to model night vision goggles, electro-optical cameras and infrared thermal imagers.

VR-Vantage 2.0 is out!

Learn more about its new capabilities so you can get ahead of the game.

INSIDE THIS ISSUE

@VTMAK

Tips and Techniques by Dan Brockway

Tuning your Graphics Processing Unit (GPU) for VR-Vantage

Many Image Generators (IG) are targeted to one environment; IGs designed specifically to provide the correct cues to high-flying-fast-jets don't do so well in first-person-shootouts. Truck driving simulators don't generally render the water well enough for maritime operations. Part of this is due to the choices in the content and part is the tuning of the IG and the graphics processing unit (GPU).

We've designed VR-Vantage IG to render beautiful scenes in any domain – air, land, and sea – and to fit into your simulation architectures. Version 2.0 has concentrated on both beauty and performance so you can get the most out of the graphics card.

Graphics cards these days are awesome. They take a steady stream of data and turn it into beautiful pictures rendered at upwards of 60 times each second (60Hz). To pull it off, the GPU computes color values for each pixel on your display. A 1920x1200 desktop monitor has over 2 million pixels and at 60Hz, thats 120 million color values. A lot of processing goes into each pixel so that collectively they form a beautiful picture. AAA game development houses do the work to configure the graphics card for all their target platforms; as a system integrator, you can do the same thing for your training customer.

This article points out ways you can setup VR-Vantage to maximize your customer's experience and discusses particular uses cases that benefit from particular GPU 3D settings.

On the water

A long time ago a sailor told me "water is the color of the sky." So true – water is a naturally reflective surface. The sky, light from the sun/moon, and light from objects near the water all add to the color you perceive. Water is also a dynamic moving surface that is affected by wind, gravity, ships, and helicopter rotors.

VR-Vantage has settings that make water really shine. First load a terrain that has water, like MÄK's Hawaii terrain. (Read the blog for clues on how to do this.) Here are a few of the settings you can control in VR-Vantage:

- Settings > Scene Settings > **Environmental Conditions** has a whole section of parameters to control the sea state of the water surface based on wind and current.
- Settings > Display Settings > **Render Settings** dialog has settings to modify the way things render.
- Settings > Display > **Observer Settings** dialog has a list to choose from, including:
  - Dynamic Ocean – This is the main on/off switch for the dynamic water.
  - Ocean Spray, Wave Splash, Rain Splash – These are all screen effects that occur when your observer is close to or penetrating the water surface.
  - Enable Ocean Planar Reflections – This one is relatively expensive, so use it when you need it.
  - Ocean Planar Reflections LOD Scale – Turn this up to remove the reflections of distant land forms from the water while keeping the ship's reflections.
- Settings > **Experimental Ocean Utilities** has some cutting edge parameters to really increase the fidelity of the water rendering. Try setting *Ocean Qualities* to *Best* when you are really close to a ship – notice the increased detail in the water?

Close up views of ships make aliasing very apparent. Make sure that you have tuned your graphics cards anti aliasing settings. If you notice crawling on the horizontal edges of the ship, you should try raising the **GeForce Antialiasing – Setting**. If the thin lines like railings and wires shimmer, try raising the **GeForce Antialiasing – Texture** setting. Keep reading this article on our blog...

Finish reading this article on our blog – learn how to set up your GPU for scenarios on the ground, in the air, or anywhere you need.

MÄK Product Releases

It's been a big month here at MÄK. Here's what we've been building for you.

VR-Forces 4.3

VR-Forces 4.3, the newly released version of MÄK's Computer Generated Forces (CGF) platform, introduces a major step forward in simulation capability. Version 4.3 enhances visual quality and improves usability, while strengthening its integration with the MÄK's suite of interoperable products. It also adds an entirely new aggregate level of modeling to help users build wargaming scenarios and CST training exercises.

VR-Forces 4.3 uses VR-Vantage 2.0 technology to provide cutting-edge and beautiful 3D scenes and content. As they develop and run simulation exercises, our users experience rich and immersive visual scenes, comparable to leading game engines, filled with more high-quality models and DI-Guy characters.

Version 4.3 provides a better user experience across the board. Usability improvements include the expansion of the Lua API, allowing for even more rapid development of new behaviors, as well as front-end observer controls, enabling users to control VR-Vantage-based applications from inside scenarios. VR-Forces also makes it easier to manage custom edits to a Simulation Model Set (SMS), allowing users to add and tweak entity modules in their system.

Our VR-Forces 4.3 release notes go into depth on its new and improved simulation capabilities.

In next month's issue of *What's Up MÄK?*, we'll explore VR-Forces' brand new aggregate-level simulation capability, which uses high-level parameters associated with units such as companies, battalions, and brigades to simulate mobility, engagement, attrition, combat engineering, logistics, NBC (Nuclear, Chemical, and Biological), reporting, and more.

SensorFX 2.0

The role of simulation in training exercises is to place the warfighter in an immersive environment. By "tricking" the senses into suspending disbelief, the warfighter is able to practice, learn, and understand the tactics, techniques and procedures required for the mission, as well as to visualize the outcomes of different strategies. The scope of what defines an immersive virtual environment has widened to include sensor views that match the myriad sensorized devices and vehicles used in the field.

Because sensors are now more central to the training experience, quality is important – we're taking that seriously.

Alongside the release of VR-Vantage 2.0 comes SensorFX 2.0, making the beauty of VR-Vantage visuals physically accurate in your sensor views. Tremendous effort by both MÄK and JRM Technologies has gone into integrating the visual shaders that render the terrain database, atmosphere, ocean, trees – everything – with the physics of sensor simulation. JRM's advanced signature synthesis and atmospheric propagation produce radiometrically-correct sensor displays over the 0.2 - 25.0 μm spectrum (UV, visible, near-IR, thermal-IR). Once an image with the correct irradiance is computed, JRM's advanced sensor modeling simulates any optical sensor in the EO or IR passband. It provides engineering-level modeling of the optics, detector, electronics and display components, simulating appropriate Modulation Transfer Functions (MTFs), detector sampling, noise, non-uniformity, dead-detectors, fill-factor, 1/f and white noise, pre-and post-amplifiers, and displays. The result is beautiful, physically accurate, sensor scenes that are correlated in all out-the-window and sensor channels.

At MÄK, we take simulation and training seriously. With VR-Vantage and SensorFX, the art of rendering beautiful visual out-the-window scenes is matched with the science of physics-based sensor simulation – to model night vision goggles, electro-optical cameras, and infrared thermal imagers.

RadarFX 2.0

MÄK is expanding our sensor offering. Again working with sensor experts JRM Technologies, we are proud to introduce RadarFX SAR Server — a server that delivers Synthetic Aperture Radar (SAR) images as requested by host applications.

Unlike point-of-view imaging sensors, like forward looking infrared or night vision goggles, SAR images are created using the motion of a radar antenna over a target region to create fine resolution images at great distances. These images take time to develop as the aircraft or satellite flies by. To match this operational difference, RadarFX is designed as a server that listens for image requests and generates SAR images on demand.

RadarFX SAR Server is built with MÄK's VR-Vantage IG and uses JRM Technologies' proven physics-based sensor simulation technology. RadarFX utilizes the same process as our SensorFX product for materially classifying terrain databases and 3D models. This allows it to work seamlessly with existing materially classified databases and provides operational correlation between the SAR images, the out-the-window scenes generated by VR-Vantage IG, and the EO/IR/NVG scenes generated by SensorFX. The RadarFX SAR Server natively supports all versions of the DIS and HLA standards making it easy to integrate into your simulation architecture.

Training programs are requiring more and more ways to integrate sensors into their training curriculum. MÄK is proud to provide a correlated world in every domain.

Curious about a release?
Want a personalized demo?

Let's make it happen.

Product Releases Continued...

MÄK High-Performance RTI 4.4

High Performance is our middle name. While MÄK has always focused on performance with our RTI, over the last year we doubled our efforts. Our release of MÄK RTI 4.4 offers the highest performance on the market and is twice as fast as our previous version. Let us prove it to you: tune in to our ongoing blog series outlining the testing and results of MÄK RTI performance. If you're interested in testing it yourself, request the RTI benchmark test suite and we'll give you the source code.

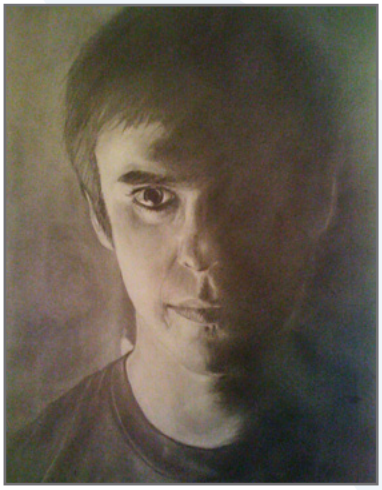
We didn't stop with performance. The MÄK RTI makes it quick and easy to start a lightweight federation on your LAN — without the configuration needed for more complex federations. Those lightweight federations can now include HLA Evolved FOM modules.

Let us know if you'd like more information on the newest release of MÄK RTI!

Intrigued by our releases? Interested in a personalized demo from the comfort of your own office? We're game. Let's set up a free web demo.

MÄKer Spotlight: Ryan Fournier

3D Artist



MÄK gets it; when our stuff looks good, your stuff looks good. Meet Ryan Fournier, one of our 3D artists who is always working to make sure that what you see in our software looks awesome. Ryan's speciality at MÄK is creating 3D models and props for our virtual environments. He builds the models with 3D software, then applies the appropriate texture for detail. From there, he adds other textures, like specular maps and normal maps, to make the models even more realistic. (Specular maps to bring out detail in how light reacts to the surface of an object and normal maps show small details of the object, like cracks, dents, and bolts.)

Ryan got his Bachelor of Science in Computer Sciences and Media Arts from The New England Institute of Art.

Before getting into 3D art as a career, Ryan was a jack of all trades. He mastered everything from running cafes and coffee houses to exploring carpentry and masonry. Ryan also managed a couple UPS Stores around the Boston area while attending school. He's put his artistic talent to use in various freelancing projects, much of it in the underground music industry creating T-shirts and album artwork.

Fun fact, if Ryan didn't get into 3D art as a career, he might be pursuing his dream of becoming a stuntman. He enjoys skateboarding in his free time, as well as playing/writing music in bands, drawing, cycling, snowboarding, obsessing over new tech and gadgets, and playing video games.

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!