

March
2019

What's Up MAK

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Sensor Operator Training

By Ofer Tamir

Sensor operators and aircraft pilots provide critical intelligence and support during complex, sometimes dangerous missions. To qualify, they must have in-depth control of the ground control station sensor system along with the tactical prowess required to work as a team during missions with unpredictable complications.

To train, VT MAK offers flexible and powerful simulation products designed to address the range of Sensor-Operator and Pilot training requirements. Here are a few examples:



Use Case #1, Add ISR sensors to an existing training system:

Whether you want to add an airborne sensor asset to an existing exercise or to host a classroom full of beginner sensor-operators, VR-Engage Sensor Operator offers a quick and easy way to integrate with simulation systems right out of the box as shown in Figure 1. Experienced participants can use it to provide intel from their payload vantage point and beginners can gain baseline training.

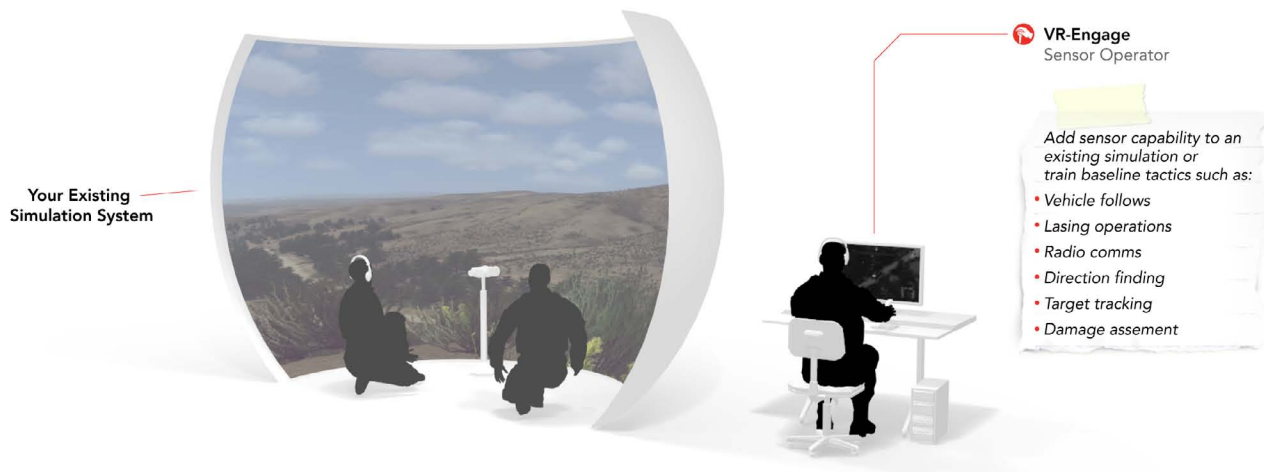


Figure 1: A Sensor Operator adds another view point to a JTAC system

All of MAK products are terrain- and protocol-agile, allowing you to leverage your existing capabilities while attaching a gimbaled sensor to any DIS or HLA entity in your existing simulation system.

Use Case #2, Train in-depth system operation:

Before operating a sensor system in the real world, operators need training for in-depth sensor system operation.

This training is done with the combination of VR-Forces as the simulation engine and VR-Engage as the Sensor Operator role player station. VR-Forces is used to design scenarios that require the learning of essential skills in controlling the sensor gimbal. It provides a way to assign real-world Patterns Of Life and add specific behavioral patterns to human characters or crowds. Fill the world with intelligent, tactically significant characters (bad guys, civilians, and military personnel) to search for or track. Create targets, threats, triggers, and events. VR-Forces is also the computer-assisted flight control for the sensor operator's aircraft.

VR-Engage can be configured to use custom controllers and menu structures to mimic buttonology and emulate the physical gimbal controls. Adding SensorFX to VR-Engage will further enhance fidelity — emulating the physics-based visuals so that they provide the same effects, enhancements, and optimizations as the actual sensor. In short, students can train on a replica of their system configuration.



Figure 2: Training to operate a particular sensor device

Use Case #3, Train the full airborne mission team:

Before integrating with a larger mission, the Sensor and platform operators must learn to operate tactically as a Remote Piloted Aircraft unit.

These skills can be acquired while training side-by-side on a full-mission trainer. The stations in Figure 3 use combinations of VR-Forces and VR-Engage to fulfill the roles of the Instructor, the Pilot of the aircraft, and the Sensor Operator.

Pilot:

In the Pilot station, VR-Forces provides the computer-assisted flight control of the UAV.

Through the VR-Forces GUI's 2D map interface, a user can task a UAV to fly to a specific waypoint or location, follow a route, fly at a desired altitude or heading, orbit a point, and even point the sensor at a particular target or location (sometimes the Pilot, rather than the Sensor Operator, will want to temporarily control the sensor). A user can also create waypoints, routes, and other control objects during flight. In addition, the VR-Forces GUI can show the footprint and frustum of the sensor to enhance situational awareness (in 2-D and 3-D).

VR-Engage provides manual control of the aircraft, including realistic aircraft dynamics and response to the environmental conditions. In this role, the Pilot can choose to see what the sensor sees, and even share control with the Sensor Operator.

Sensor Operator:

VR-Engage provides the role of the Sensor Operator, letting the user manually control the gimbaled sensor on the platform. In this role, the Sensor Operator gains the required set of advanced skills and tactical training to become an integral part of the mission. They learn to acquire and track targets and prioritize mission-related warnings, updates, and radio communications.

Instructor Station:

This is where the scenario design gets creative; the instructor can use VR-Forces to inject complexities into the scenario by using its advanced AI to create tactically significant behaviors in human characters or crowds. Instructors can tweak the clouds and fog, produce rain to change visibility, increase wind and change its direction, and even jam communications during runtime.

As students advance through full-mission training, they learn to support their crewmen in complex missions. They share salient information, operate radios, and communicate with ground teams, rear-area commanders, and other entities covering the target area.



Figure 3: Apply knowledge of systems, weapons and tactics to complete missions together

MAK products are well suited to Sensor Operator training. VR-Engage's Sensor Operator role is ready to use and connect to existing training simulations, it can be configured and customized to emulate specific sensor controllers, and it can interoperate with the full capabilities of VR-Forces to form full mission trainers.

MAK products can be used for live, virtual and constructive training.

[Get in touch](#) and let us help you Get Ahead of the Game.

Boeing Phantom Works chooses MAK's VR-Vantage image generator for reconfigurable cockpit simulator By Rob Hamilton

Boeing has purchased a MAK One Enterprise license that allows them to use VR-Vantage IG in a reconfigurable cockpit simulator in five Phantom Works sites worldwide.

Phantom Works, the advanced research and development unit for Boeing, has purchased a MAK One Enterprise license for VR-Vantage IG. MAK One licensing can be configured to suit an organization's size, shape, and preferred licensing model. Phantom Works is taking advantage of MAK One to license VR-Vantage IG for use inside reconfigurable cockpit simulators in five separate sites worldwide.

Phantom Works is the latest in a surge of customers who are taking advantage of the new improvements in VR-Vantage IG to meet their visualization needs at a lower cost than a typical high-end image generator.

VR-Vantage IG provides Phantom Works with a unique set of image generation capabilities.

MAK's VR-Vantage IG software is used to render out-the-window scenes for first-person simulators. Its open-architecture was designed from the ground up to offer the most flexible, high-performance visualization tools on the market.

VR-Vantage IG can procedurally generate terrain directly from source data including elevation, imagery, land use classification, and features. It also allows for procedural generation of textures from land use data, which provides higher effective resolution and eliminates artifacts such as baked-in shadows, cars, and trees. Textures for each land-use classification can change based on season and location. VR-Vantage IG can auto-material classify global terrains based on land-use data and feature data to enable accurate infrared sensor views.

VR-Vantage IG is capable of procedural generation of airports from X-Plane/Digital Aeronautical Flight Information File airport descriptions, including geo-specific runways, markings, taxiways, signs, and lights. It also generates millions of trees and other vegetation directly on the GPU, based on land use rasters or aerial features.

Customers can use VR-Vantage IG to create and render high-performance buildings, roads, etc. based on OpenStreetMap data for the whole world, including cut-in roads. They can also procedurally add detail and quality to the world by adding procedural geometric noise to the elevation data, and by adding convincing bump-maps based on slope and elevation of mountains.

Built-in support for DiSTI's GL Studio allows customers to build and prototype various cockpit instrument and tactical systems, critical for deploying reconfigurable flight simulators.

VR-Vantage IG continues to expand its capabilities, and in turn, its market share. It is built to be deployed on a variety of COTS hardware configurations from simple desktops to multi-channel displays for virtual cockpits, monitor-based training systems and AR/VR components. VR-Vantage IG APIs make it possible to accommodate any training, simulation or mission rehearsal requirements. This approach also supports compatibility with current, existing applications.

Want to learn more about the integral pieces of a simulation and their levels of fidelity? See [The Tech-Savvy Guide to Virtual Simulation](#). Interested in a [demonstration](#)?

Adding a Remote Camera to a VR-Forces Scenario for use with VR-Engage

By Fred Wersan

One of the major new features in VR-Engage 1.3 is the Sensor Operator role, which lets you control gimballed sensors on vehicles such as UAVs. It also lets you control security cameras, as demonstrated in the Security Checkpoint scenario that ships with VR-Engage. VR-Engage automatically adds gimballed sensors to aircraft, but suppose that you want to add security cameras to a scenario? We will demonstrate how to do this using the VR-Engage First Experience scenario.

You will need VR-Forces 4.6.1, with the VR-Engage Add-ons for VR-Forces installed.

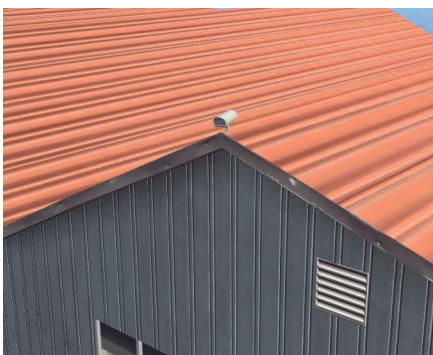
1- Start VR-Forces and load the VR-Engage First Experience scenario. (By default this scenario uses two simulation engines. VR-Forces will prompt you to remap the entities to one back-end. Click OK to do this.)

2- Change the Observer Mode to Stealth (3D).

3- In the Simulation Objects Palette, select Remote Camera. (There is also a Security Camera object. Do not use it.)

4- Place the remote camera on the peak of the warehouse, as in Figure 1. Set the heading to 270 degrees.

Figure 1:



5- Save the scenario. (You will be asked if you want to preserve the original object mapping configuration. Click Yes if you want to be able to run the scenario with two back-ends.)

6- To test the camera, run the scenario, select the camera, and choose Objects > Create Sensor View > Gimbaled Sensor. A sensor view opens and you can see the warehouse area (Figure 2).

Figure 2:



7- Copy the files for the First Experience Scenario from VR-Forces (vrforces4.6.1/userData/scenarios/ VR-Engage_First_Experience) to VR-Engage (vrenge1.3/userData/scenarios/ VR-Engage_First_Experience).

8- Start VR-Engage and host the First Experience Scenario.

9- In the Choose Role list, select the Remote Camera.

10- Click Engage. VR-Engage starts up showing the remote camera view of the warehouse (Figure 3).

Figure 3:



MAK continues to lead in interoperability standards

By Matt Figueroa

Here at VT MAK, we have always considered interoperability the linchpin for the development of successful simulation and training systems. Much of this relies on the standards written and maintained by the simulation industry. Therefore, the SISO Simulation Innovation Workshop (SIW) is important for us so that we may collaborate with other experts to improve on the current standards for the simulation challenges facing our industry today.

This year we had a team of engineers attend SIW to work on many of these standards, including HLA 4, DIS 8, RPR FOM 3.0, C2SIM, and WeblVC. As implementers of these standards and with our role as toolkit providers, we are exposed to many facets of simulation. From aggregate-level command staff trainers, to entity-level person in the loop systems, as well as utility applications including gateways and loggers, we need to find the best solutions to support all of our customers' endeavors. The best way to accomplish this is to take an active role in standards activity.

Looking to the future, there will be impactful changes to the standards we support. HLA 4, the successor to HLA Evolved, is adding FOM merging of attributes, which will allow extensions to existing objects and increase flexibility to HLA. DIS 8 is adopting a new PDU format in order to make all DIS PDUs extensible. This will break backwards compatibility with older DIS versions, but will allow more flexibility and reduce bandwidth. RPR 3.0 continues to work towards supporting all of the new capabilities added in DIS 7. WeblVC is entering final balloting for its official 1.0 version and C2SIM, a protocol for communicating between simulations, and Command and Control systems is making progress to become an official standard.

As always, our products will support these new standards as they are finalized. We are committed to providing our customers with the means to adopt these new standards, or interface with them through the use of gateways and translation.

There are more changes and updates that are too numerous to go over in one post. We will be writing more in-depth pieces on the various changes to each of the standards over the coming months. Stay tuned!

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Upcoming training classes:

Topic: [VR-Forces Training \(On-site\)](#)

Date: JUN 3 - JUN 7

Week-long class designed to guide students through VR-Forces. Please contact your sales rep to sign up.

Upcoming events:

We've just announced our event schedule for the first half of 2019! Come see when when MAK will be in your area on our [events page](#)! In March, we'll be at AUSA Global Force Symposium and the Cyber-Augmented Operations Division Spring Conference.

Recent Releases:

VR-Engage 1.3 - MAK's VR-Engage multi-role virtual simulator lets you *Get in the Game* by controlling a first-person human character; or acting as the driver, gunner or commander of a ground vehicle; the pilot of an airplane or helicopter; or a sensor operator.

VR-Exchange 2.6 - VR-Exchange 2.6 is a major feature release that continues to make it faster and easier to use. In addition, this release adds support for RTI Systems DDS implementation.

Jobs @ MAK:

We're hiring! Check out our [MAK careers page](#) and see the requirements for Software Quality Assurance Engineer and Software Engineer.