October
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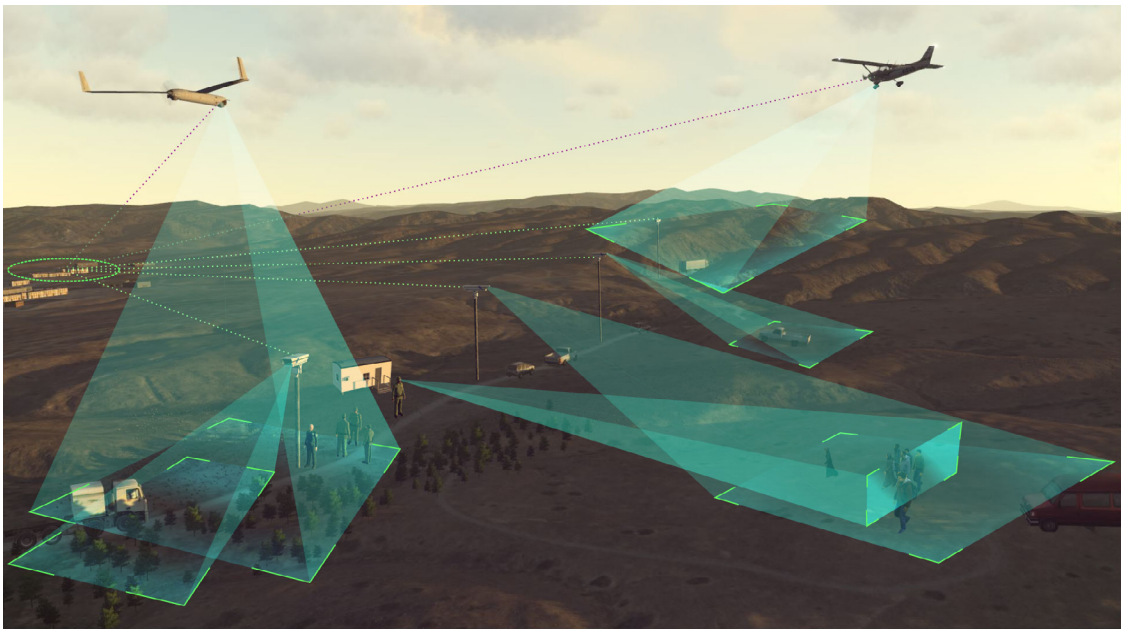
What's Up MAK



Click on the above image to check out how MAK products fit in a border security training system.

The eyes in the sky

MAK's surveillance tools provide a boost to ISR customers.

By Rob Hamilton

A core element of ISR systems is the ability to use cameras and imaging sensors to survey areas for activity and to search for or track suspects and targets. MAK provides a robust suite of tools for simulating ISR systems in a virtual world and for stimulating real-world ISR systems with video feeds from a virtual world.

The essential components of a simulated ISR system include more than the simulation of the cameras or sensors. Tactically meaningful content is critical to the simulated sensor scenes. The terrain must be detailed, realistic and populated with people and vehicles behaving naturally. Time of day and weather must impact sensor and platform performance. Control systems need to be available to control the sensors, and the platforms they are attached to. Finally, there must be mechanisms to communicate with the other participants like pilots or intelligence consumers.

Thanks to longtime MAK values such as interoperability and flexibility, the MAK suite has the components needed to model all these aspects of an ISR system. MAK products are designed to work seamlessly with an existing system or serve as building blocks to create the foundation of a new, flexible, future-proof system.

Let's look at a few ISR simulation tasks and learn how MAK products fit into a simulation configuration that addresses each need.

Imagery/Video

First, generating the sensor image. VR-Vantage provides realistic image generation to simulate a video feed from the perspective of an electro-optical (EO) camera or an infrared (IR) or night vision (NV) sensor. VR-Vantage also models the effects that the camera or sensor applies as part of its internal image processing circuitry. When the most accurate thermal sensors are needed, the SensorFX module adds the ability to model the thermal effects of materials in the environment.

Subject Behavior
There are three approaches to filling the sensor scenes with tactically relevant entity behavior. First, VR-Forces, MAK's computer-generated forces platform, allows users to define simple or complex scenarios that model the behavior of targets, suspects, and friendly/opposing forces, as well as civilian patterns-of-life that challenge the sensor operators. VR-Forces incorporates MAK's DI-Guy technology to model realistic AI human characters. Second, VR-Engage allows instructors and role players to interactively participate in first-person simulators to inject real human behavior into the simulation. Third, MAK's interoperability products enable DIS/HLA compliant simulations from many commercial and government sources to interact and contribute to the simulation.

Terrain Environment
Scenarios occur in real-world or geo-typical locations. VR-TheWorld Server provides each MAK product with the real-world geographic data for a rich terrain context in which to play out the ISR simulation. For those with existing terrain databases, MAK products are terrain agile to load the terrain formats common within the simulation industry.

Sensor Platform
ISR simulations may have sensors modeled anywhere within the environment. A scenario may call for setting up surveillance cameras on a border fence, or inside a busy train station, or mounted to a ship tossing in the dynamic ocean, or on the belly of aircraft traveling through the virtual atmosphere. In any case, terrain objects and entities within VR-Forces and VR-Engage can be configured to host a sensor. Entities simulated elsewhere on the DIS/HLA network can also host sensors that can be controlled by MAK products.

Sensor Control
The way to control a sensor depends on the objectives. To learn to operate sensors in tactical environments, VR-Engage's newest role – Sensor Operator – gives a trainee the opportunity to take first-person control of any gimbaled sensor defined within the simulation. The Sensor Operator experiences the physical limitations of the sensor gimbal's motion (rotation, speed, and limits) while it is being carried through space by the entity hosting the sensor.

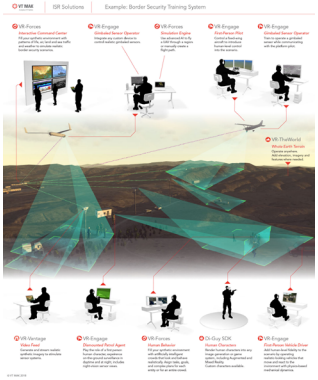
To learn the operation of specific manufacturer's sensor systems, MAK's product APIs enable manufacturers to develop applications that embed simulated sensor video into real sensor equipment.

To add sensor operations to higher-level simulations, VR-Forces includes the ability to pop up a GUI to control a gimbaled sensor. VR-Forces can also model sensor detections made by the CGF controlled entities and issue spot reports to stimulate an intelligence system.

Communications
In all of the examples above, operators can communicate using simulated tactical voice radios that transmit over the DIS/HLA simulation network. Simulated radios come with VR-Engage, VR-Forces, and separately for use by instructors or non-operator players.

Want to learn more about how to implement ISR simulations? Contact Us.

We've made an infographic that illustrates the multitude of ways that MAK software can contribute to an ISR simulation modeling border security scenarios. You can find it on the Solutions & Successes section of our website!



VR-Engage adds new role: Sensor Operator

By Len Granowetter & Rob Hamilton

When MAK launched VR-Engage in 2016, it came with a great set of roles for first-person play, including a helicopter pilot, driver, weapons operator, etc. Now, we're adding a new role - a Sensor Operator.

Using the new Sensor Operator capability, a VR-Engage user can perform common surveillance and reconnaissance tasks such as tracking fixed and moving targets - using a simulated E/O camera or IR sensor, with configurable informational overlays. Immediately control the gimbaled sensor using joysticks or gamepads; or configure VR-Engage to work with sensor-specific hand controller devices. VR-Engage has built-in support for HLA/DIS radios, allowing sensor operators to communicate with pilots, ground personnel, or other trainees or role players using standard headsets.

VR-Engage's new Sensor Operator capability can fit into your larger simulation environment in a number of different ways to help meet a variety of training and experimentation requirements:

- Attach a gimbaled sensor to any DIS or HLA entity, such as a UAV, ship, or manned aircraft - even if the entity itself is simulated by an existing 3rd party application.

- When VR-Engage is used in conjunction with VR-Forces CGF, a role player can take manual control of a camera or sensor that has been configured on a VR-Forces entity.

- For a full UAV Ground Control Station, use VR-Forces GUI to "pilot" the aircraft by assigning waypoints, routes, and missions while using VR-Engage's Sensor Operator capability to control and view the sensor on a second screen.

- Execute a multi-crew aircraft simulation using two copies of VR-Engage - one for the pilot to fly the aircraft using a standard HOTAS device or gamepad and a second for the Sensor Operator.

- Place fixed or user-controllable remote cameras directly onto the terrain, and stream the resulting simulated video into real security applications or command and control systems using open standards like H.264 or MPEG4.

VR-Engage comes with MAK's built-in CameraFX module, which allows you to control blur, noise, gain, color, and many other camera or sensor post-processing effects. The optional SensorFX add-on can be used to increase the fidelity of an IR scene. SensorFX models the physics of light and its response to various materials and the environment, as well as the dynamic thermal response of engines, wheels, smokestacks, and more.

Real sensors, virtual stimulus

By Dan Brockway

Operating a gimbaled sensor is simple in concept but becomes a bit more difficult when the sensor platform is being tossed about by the motion of an aircraft. Manufacturers of sophisticated sensor systems can provide virtual training embedded with their products so that operators can practice on virtual subjects without having to take the aircraft out of the hanger.

The goal is to use the manufacturer's user interfaces and control logic to manipulate the gimbal and to control the sensor modes. But since the sensor is not flying in the real world, the sensor must be stimulated with imagery from a virtual world. This is where MAK's simulation software fits in. VR-Vantage and SensorFX, like all MAK software, are designed so users can customize and extend as needed. In this case, VR-Vantage with SensorFX is used to render accurate, but virtual, scenes of scenarios. Because the sensor pod has its own onboard image processing, VR-Vantage's image generation process is stopped short of its usual final step and instead passed as raw imagery to the real sensor.

The rest of the MAK suite of simulation software provides the flight of the aircraft, virtually hosts the sensor pod, and the creates a beautiful virtual world filled with simulated activity to challenge the sensor operator.

Virtual simulation can be a part of a complete training system. The basic training goals of operating the gimbal may well be achieved without the motion of the aircraft. The next levels take advantage of the virtual simulation where VR-Forces or VR-Engage flies the vehicle through the virtual world. The third level might include dealing with the effects of weather and environment on the flight dynamics and the sensor image. The addition of pre-planned and interactive scenarios provided by VR-Forces can address tactical operations training, even introducing the operators to the stress of adversarial conditions. This use of virtual stimulation to achieve most of the training goals reduces cost by minimizing training time needed in real aircraft.

Tech Tip: Everything in its right place

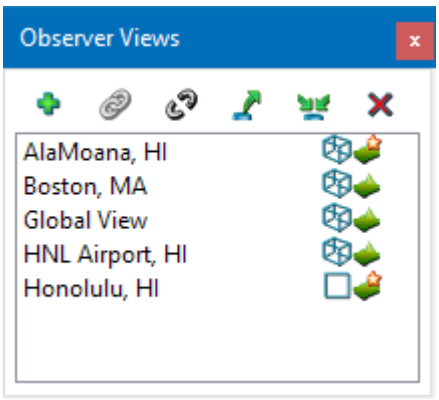
By Fred Wersan

One of the little convenience features that make applications more pleasant to work with is the ability to remember the window layout from one use to the next. If you don't have to restore an application to your preferred working environment every time you open it, your life gets that much easier. Recent releases of MAK products have added new features that address this convenience factor.

MAK Data Logger 5.5.1 (and later) saves the layout of the Logger window when you close it. The next time you start the Logger, it starts up with the window size and location that it had when you exited. If you want to save several possible startup configurations, you can create separate configuration files and specify the one to use on the command line or in the startup configuration file.

VR-Vantage 2.3.1 (and later) lets you specify the window location and size at startup with the --guiWindowRectangle command line argument. VR-Vantage 2.3 (and later) lets you specify a default observer view for a terrain so that it always opens to your preferred location and observer mode (Figure 1). If you want to specify the terrain to load at startup, you can do so on the command line.

Figure 1:



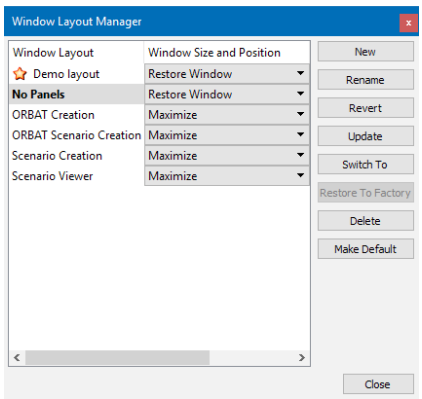
VR-Forces 4.5 (and later) has several layout features:

- VR-Forces remembers the window location and size when you close it and restores that layout the next time you start up.

- When you create a new scenario, if the terrain has a default observer view, it opens to that view (VR-Forces 4.6 and later). Thereafter, you can specify a default observer view for the scenario.

- You can create named window layouts that you can easily switch between at runtime. You can specify that a layout be the default layout used when VR-Forces starts up (Figure 2). In this case, the default layout overrides the behavior described in the first bullet.

Figure 2:



NewsMAKers

Check out The MAK Suite Guide to Virtualization! The guide walks you through the benefits of each type of IT architecture, the costs or obstacles that each presents, impacts on the User Interaction Feedback Loop, and how MAK products are specifically designed to fit at each level.

Three new VR-Forces webinar videos from our last classes are now available on our training page. Click here to check out our latest videos.

MAK and Antycip Simulation are presenting VT MAK: Simulation & Interoperability user conference, October 10, near Oxford, UK! Join others in the simulation community and experts from VT MAK, for the latest roadmap and overview of VT MAK's simulation and interoperability capabilities. Take the time to discuss your projects with Antycip Simulation and VT MAK experts plus other members of the VT MAK user community, to find best practice approaches and solutions. Discussion topics will include synthetic environments, network interoperability, situational awareness, and combined forces simulation. The conference will be held at The Hub, Antycip Simulation's UK office and demonstration center, near Oxford, on Wednesday, October 10, from 10am. To reserve your place at this free conference, please contact your Antycip Simulation account manager, email our UK office on info.uk@antycipsimulation.com, or contact your local Antycip Simulation office.

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