

February
2019

What's Up MAK

New Space-based
Capabilities in
VR-Forces

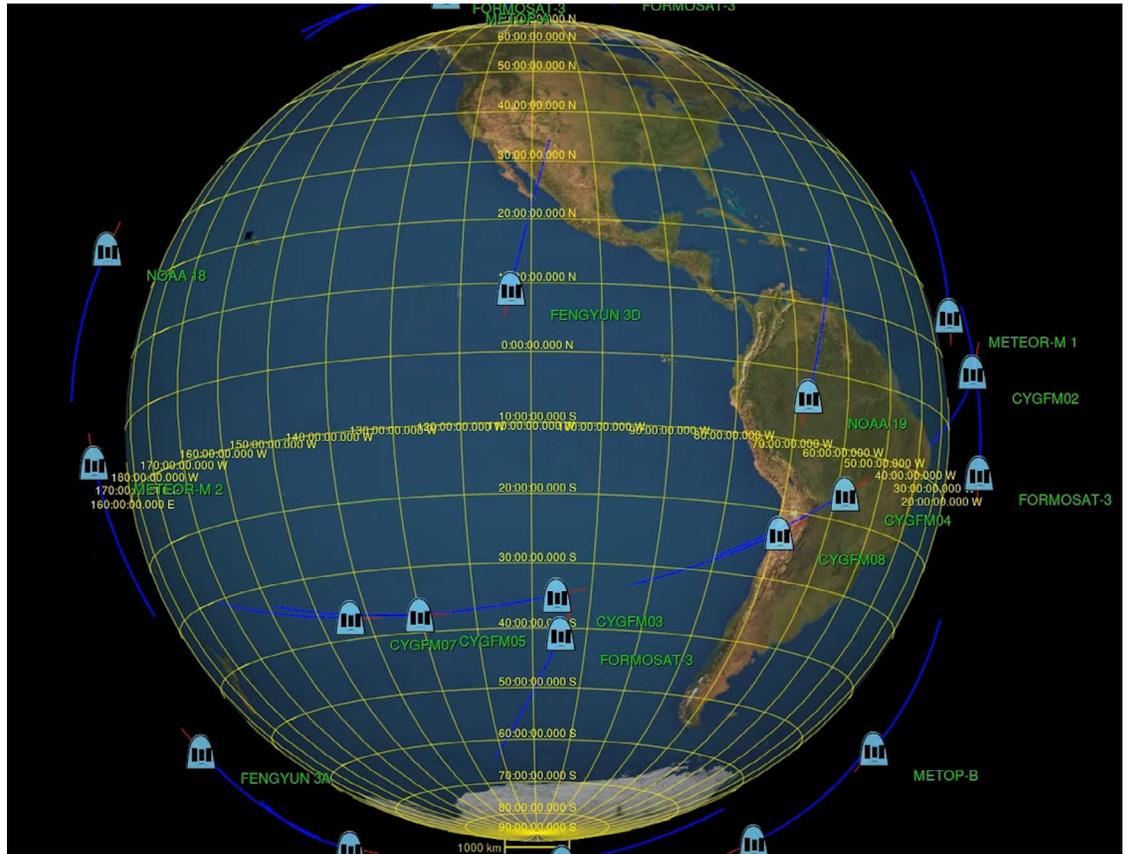
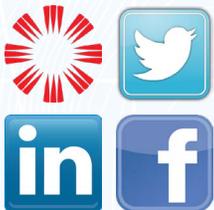
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New Space-based Capabilities in VR-Forces

Now customers can add satellites to support global and large theater simulations.

MAK customers have, for many years, used VR-Forces to simulate all kinds of scenarios on, or near, the Earth's surface. Some have been rudimentary to provide a context for training or experimentation — others very elaborate to support war games involving complex plans that depend on remote sensors and communication networks.

To support these customers, we've added the ability to model Earth-orbiting satellites to the long list of entity types and behaviors within VR-Forces.

Satellites

The orbit of satellites can be defined as a Kepler orbit or a geostationary orbit. Kepler orbits are specified by two-line element sets (TLE). Astonishing volumes of TLE sets are available on public websites such as <http://celestrak.com> and <https://www.space-track.org>. You can simply cut-and-paste the TLE's into VR-Forces to fill your scenario with current weather, communication, navigation and other types of satellites. Even space debris orbits are available to the public.

Sensor Platforms

VR-Forces Satellites can be used as sensor platforms that can detect all or specific types of entities within a configured field of view. For example, satellites can generate spot reports when they sense entities or detect missile launches.

Communication Nodes

Satellites can be used as communication platforms, relaying messages between entities on Earth or in orbit around Earth. Communication lines can be rendered in fixed altitude for easy visualization or using line-of-sight to show possible occlusion.

Observer Modes

Since entities in orbit are considerably farther away from one another and all the entities on or near the ground, a new Space Follow mode has been created to assist situational awareness.

You can watch these capabilities in action in this [video on MAKtv](#).



Terrain – you can't simulate without it. By Dan Brockway

The terrain is a persistent challenge within simulation projects. Our simulations and simulators need the terrain to provide the physical space wherein our simulations take place. The challenge, of course, is to achieve a representation of the world that is realistic enough to meet the user's needs while not being too costly or cumbersome.

Wouldn't it be nice for the terrain to 'just exist' and not be a problem that simulationists have to manage? It sure would. Here's the thing about terrain: the world is big and complex, and as much as we think we need an exact replica to achieve realism, in most cases we don't. What we do need is a convincing world where our simulations function correctly.

The exact details depend on the purpose and architecture of our simulation. See pages 25 to 47 of [The Tech-Savvy Guide to Virtual Simulation](#) for specific examples.

At MAK, we strive to help our customers manage their terrain decisions. We do this in several ways:



We have a Whole Earth solution we call MAK Earth

MAK applications all include the [MAK Earth terrain engine](#) which procedurally generates the terrain used by VR-Engage, VR-Forces, and VR-Vantage. MAK Earth generates only the portions of the Whole Earth model needed to achieve a correlated "fair-fight" simulation. VR-TheWorld Server provides terabytes of geographic data plus tiling and streaming services so users can add data specific to their terrain needs. You can see examples and learn more about MAK Earth on our website.

We build Terrain Agility into all our products

MAK products are capable of generating MAK Earth terrain as well as loading many common terrain formats produced by terrain tools (OpenFlight, MetaFlight, CDB, and more) – so you can use the terrain you have or take advantage of innovative streaming and procedural terrain techniques.

We provide out-of-the-box terrains

To support the diversity of our customers' goals, MAK applications come with a data package that includes terrain databases for use right out-of-the-box. Each database is designed to be useful in its own right, but also to provide an example of a specific terrain technique or use of geographic data.

Several MAK Earth configurations – these rely on data from VR-TheWorld Server to provide whole earth coverage for high fliers and ground-level detail for areas such as Twentynine Palms, CA, Edwards AFB, Ala Moana, Hawaii, Seattle, Washington, Boston, Washington DC, and more.

Ala Moana – an example of a MAK Earth terrain that uses a subset of the Hawaii data on the local disk drive, no server required.

Arrivals Hall – a stunning example of how a single model can be all the world you need for a security checkpoint simulation.

VR-Village – an Openflight site model, material classified for physics-based sensors with SensorFX.

Bakersfield – an example of a terrain made purely from topo maps to support wargaming.

Brooklyn – an Openflight site model that can be used alone or cut into MAK Earth.

Massachusetts S-57 – vector based bathymetry and navigation aids for VR-Forces ship route planning.



The point is, MAK can help you discover the terrain solution that fits your simulation, regardless of how large or small.



MAK at the movies

Recommended viewing on MAKtv



Missile Defense

An engaging video that walks the audience through the timeline of a missile defense scenario. Brilliantly highlights all aspects of the engagement - multiple launches from the opposing forces, followed by detection, and multi-domain response from the defending forces. Full of drama as the defenders attempt to save the country from an all-out nuclear barrage that would impress Dr. Evil. No sharks with lasers, however.



The Guide to Virtualization

Don't let the dark, shadowy, Godfather-esque lighting fool you: this is a light, upbeat presentation of the MAK Suite Guide to Virtual Simulation, by Dan Brockway, the author. Filmed at the Innovation Showcase at I/ITSEC, the presentation covers the fundamentals of virtualization and cloud computing. Shot in one take with minimal editing, the result is a fun, raw 20-minute video that is worth the time with some popcorn - you'll come out smarter for watching it.



Optimized Air Defense Systems

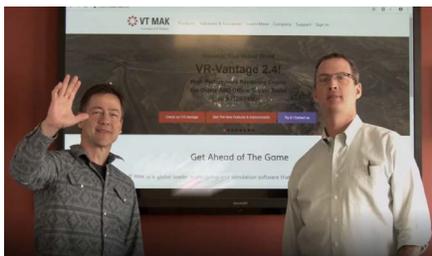
In this classic action movie, the VR-Forces user is the hero. Through judicious use of scripting, our hero was able to prototype concepts of operation. Just when you think he's reached the limits of his ability, he comes back with target priorities, shot patterns, and ammunition types to form the basis of a state-of-the-art air defense system. With informative graphics and text intros that would make The Terminator proud, this is a can't-miss.



The MAK Suite @ I/ITSEC

If there was a MakTV video made by Michael Bay, this would be it. I/ITSEC 2018 wrapped up in non-stop, rapid-fire action. A great overview of both live action at the booth as well as the action inside the simulation. Terrorists ride around in trucks, tanks smash into things, soldiers fast-rope out of a helicopter, and someone has a Javelin. Come for the action-packed sequences, stay for the fun, live-mic behind the scenes sequences.

February's MAKradio podcast



Terrain Talk with Dan and Danny

Dan Brockway and Danny Williams meet up to talk about terrain and specifically MAK's agile terrain approach. Together they discuss MAK's tools and declutter some of the common confusions that exist regarding terrain in the simulation industry. They visit the new MAK Earth webpage and break down different potential solutions, including the amount of data different customers need and how they can get that data into the virtual world.

Watch or listen on the following formats:



Using Qt Designer to Create Dialog Boxes for Lua Scripts

By Fred Wersan

One of the features of VR-Forces Lua scripting that makes it so easy to create useful tasks and sets, is automatic generation of dialog boxes. This feature makes it so easy to create dialog boxes that our developers often use it to create the dialog boxes for new C++ tasks, instead of using the Qt API. (VT MAK uses Qt, a cross-platform API to create the graphical user interfaces (GUIs) for its products.)

Unfortunately, other than providing some support for indenting, the automatically generated dialog boxes are very generic in their layout. Prior to VR-Forces 4.6, if you wanted a dialog box that supported the user with a UI design that was more than utilitarian, you were out of luck. However, in VR-Forces 4.6 we added the ability to use Qt Designer to create custom dialog boxes for Lua scripted tasks and sets.

Here is an example of how you could use Qt Designer to improve the layout of a dialog box. Suppose that you have created a new task that has some option buttons, a couple of checkboxes and some data input fields. We also put a separator between the option buttons and the checkboxes. The default dialog box that gets created looks like Figure 1.

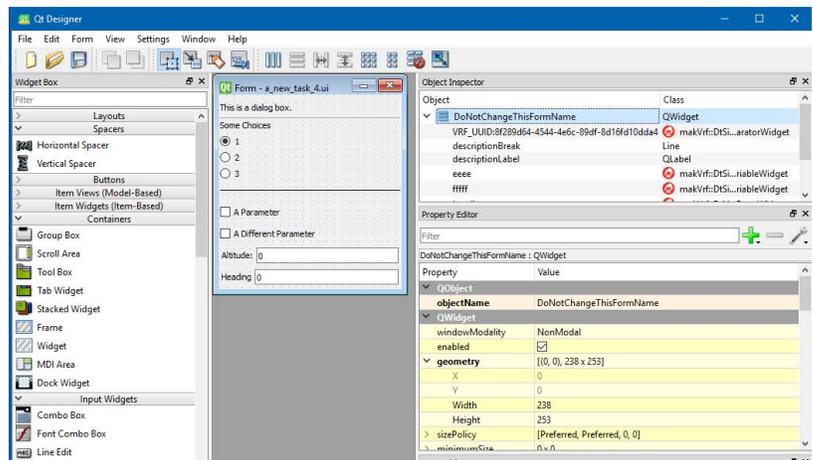
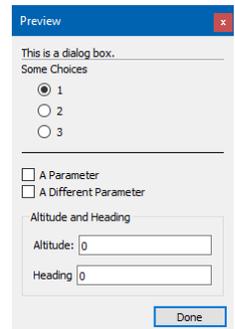
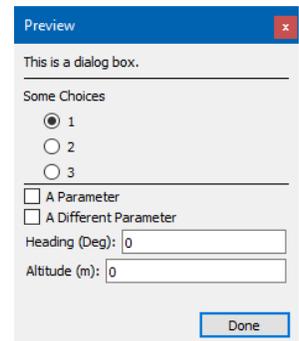
This is a perfectly functional dialog box, but is not aesthetically pleasing. We would like some more space above and below the separator line and we want the heading and altitude fields to be in a group box, as in Figure 2.

We can do this if we edit the layout using Qt Designer, as follows:

- In the New Script dialog box, select the Use Qt Designer check box.
Click the Qt button. Qt Designer opens with the parameters laid out in a dialog box form (Figure 3). Qt widgets are listed in panels on the left side of the window. Other panels are to the right.
- From the Spacers panel, drag a Vertical Spacer widget above the separator line.
In the Property panel on the right side of the window, change sizeType to Fixed and set the Height to 10.
Drag another Vertical Spacer widget below the separator line and set its properties.
- From the Containers panel drag a Group Box widget onto the form.
Drag the Altitude and Heading fields into the group box. They will probably look like they are on top of each other.
- In the Object Inspector panel on the right side of the window, select groupBox.
In the toolbar at the top of the window, click the button with three horizontal bars. This lays out the field vertically in the group box. Now the fields should look good.
- Save the form.
- Close Qt Designer.

Preview the dialog box. It now looks like Figure 2.

This is just a trivial example, but you now have the full power of Qt Designer to lay out dialog boxes for your new scripted tasks and sets. For complete information about using Qt Designer, please see the Qt documentation.



NewsMAKers

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.

Topic: VR-Forces 104 - Simulating Humans Characters & Activity in VR-Forces (Webinar)

Date: FEB 26, 1:00 PM -2:00 PM EST

Webinar will focus on how VR-Forces can be used to simulate individual human characters and their associated behaviors and actions. The webinar will also cover how these individuals can be aggregated into a group and associated group behaviors.

Topic: VR-Vantage 102 - Introduction to Configuring Terrain Files for VR-Vantage & VR-Forces (Webinar)

Date: FEB 27, 9:00 AM -10:00 AM EST

Webinar will focus on how VR-Forces can be used to simulate individual human characters and their associated behaviors and actions. The webinar will also cover how these individuals can be aggregated into a group and associated group behaviors.

Missed a class? No worries. Online courses are available to watch and download at your leisure [here](#).

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 February, we'll be at Marine West in Pendleton, CA, the SIW Workshop in Orlando, FL, and IDEX in Abu Dhabi, UAE.

Jobs @ MAK:

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