



VR-Vantage IG

First Experience

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1. VR-Vantage IG First Experience

Thank you for deciding to try out VR-Vantage IG. VR-Vantage IG is a configurable desktop image generator that provides realistic 3D scenes of your virtual simulation environment. It lets you control multiple distributed display engine windows and channels from a centralized location.

This first experience with VR-Vantage IG will be a quick guided tour of some of its most important features. To get the full experience you will need:

- ♦ VR-Vantage IG installed on two computers on the same network. (The second computer is required to try the remote display engine tutorial.)
- ♦ MAK Data Logger.

Before you begin, install and license the software. Please see [“Installation and Licensing,”](#) on page 2-1 for instructions.

When you are ready, this guide will help you:

- ♦ *[Explore the Terrain](#)*
- ♦ *[View a Simulation](#)*
- ♦ *[Attach the Observer to Entities](#)*
- ♦ *[Explore Sensors](#)*
- ♦ *[Explore Dynamic Ocean](#)*
- ♦ *[Save and Load Display Engine Configurations](#)*
- ♦ *[Continue to Explore VR-Vantage IG.](#)*

VR-Vantage IG is part of MAK’s VR-Vantage product line. VR-Vantage IG is built using the VR-Vantage Toolkit. Using the toolkit, developers can extend the capabilities of our applications and can create entirely new applications. For more information, please read developer documentation, which is in `./doc/classdoc/index.html`.

1.1. Start VR-Vantage IG

- On Windows 7, on the Start menu, choose **Programs** → **MAK Technologies** → **VR-Vantage 2.3** → **VR-Vantage IG**. VR-Vantage IG starts up. (The first time you run VR-Vantage IG, you will have to specify the license server.)
- On Windows 10, on the Start menu, choose **MAK Technologies** → **VR-Vantage IG**. VR-Vantage IG starts up. (The first time you run VR-Vantage IG, you will have to specify the license server.)



Windows 10 has a different Start menu structure than previous versions of Windows. It does not supported nested folders. For the remainder of this guide, we will use the Windows 7 path when referring to the Start menu.

1.1.1. Specify the License Server

If you have not previously run any MAK applications on this computer, the License Setup dialog box opens ([Figure 1-1](#)). It prompts you to enter the host-name of the license server and optionally, a port number.

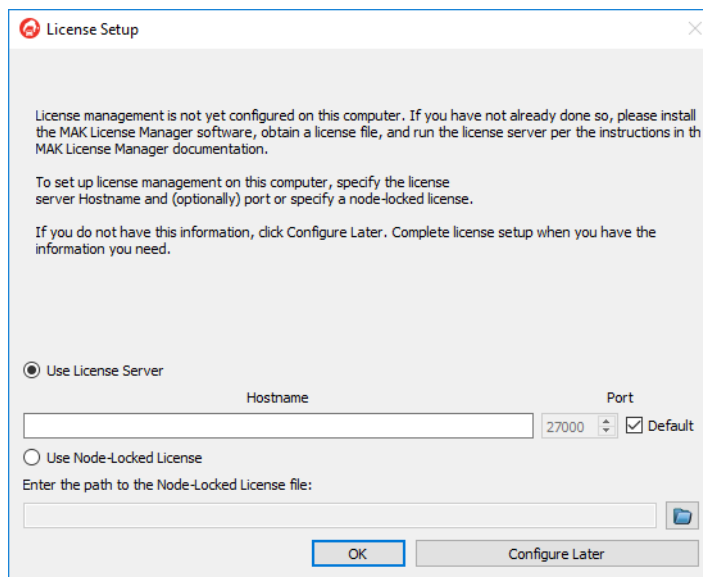


Figure 1-1. License Setup dialog box

1. Type the hostname in the Hostname box. This is the name you gave your salesperson when you requested the license file. (For details, please see (Section 2.2.1, [“Identify the Host ID and License Server Name”](#).)
2. Click Add License Server. VR-Vantage IG starts. The Load Terrain window opens on top of the main window ([Figure 1-2](#)).

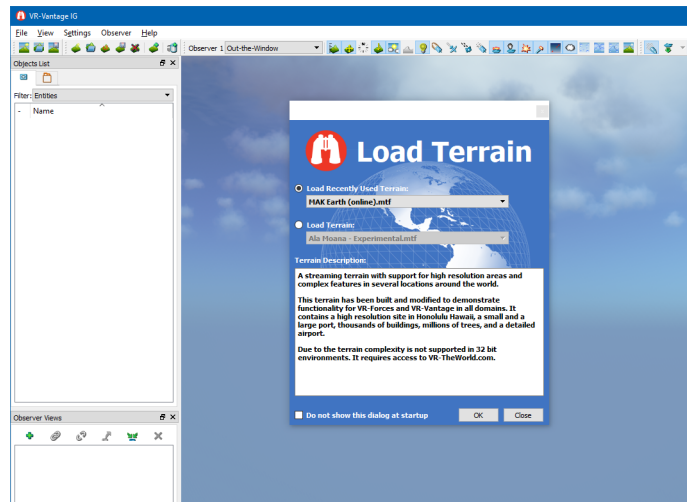


Figure 1-2. Load Terrain window



When you start VR-Vantage IG, if you receive the following message, it means that you did not install the data package:

Data package not found in specified data directory: 'c:\MAK\vrvan-
tage2.3\data'.

Please make sure the data package is installed.

VR-Vantage IG has an application installer and a data installer. You must install both of them.

3. Select the Load Terrain option.
4. In the list, select *VR-Village.mtf*.
5. Click OK. The VR-Village terrain loads. If the view does not look like [Figure 1-3](#), press the **Spacebar**.



Figure 1-3. VR-Village default view

1.2. Explore the Terrain

The observer is your viewpoint into the terrain. You can navigate through the terrain using the keyboard and mouse. This section introduces the basic keyboard and mouse actions. For a complete list, please see online help or the Quick Reference Card in *VR-Vantage Users Guide*.

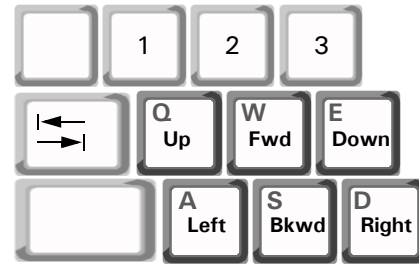
1. Hold down the **q** key. This raises the observer. Press **e** to drop back down.
2. Hold down the **s** key to back through the village towards the entrance road. If the observer stops moving, it may be blocked by a building or terrain. Press **q** to raise the observer a bit.
3. Experiment with keyboard and mouse control of the observer as described in the next few sections.

Notice that as you move backward and forward in the terrain, objects get added to the terrain or removed. To help improve performance, distant objects are hidden or displayed at lower levels of detail (LODs).

1.2.1. Use the Game-like Keyboard Navigation

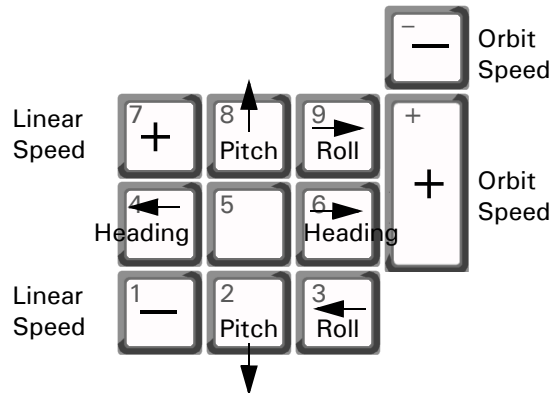
Press **w** and **s** to move forward and backward. Press **q** and **e** to move up and down. Press **a** and **d** to move left and right.

Press multiple keys to combine movement modes. Notice that you cannot go through walls or through the ground — unless you want to. Press and hold **x** while moving the observer and you can go through walls and terrain.



Press the **Spacebar** to move the observer to the default starting point.

The keypad lets you control position and orientation.



1.2.2. Use the Mouse to Move the Observer

Moving the observer with the keyboard often works best for fine movement in small areas when the observer is close to the terrain. Moving with the mouse is better for larger distances when the observer is away from the terrain.

Drag the Terrain

Dragging the terrain moves the observer forward, backward, left, and right.

1. Click a point on the terrain and hold down the left mouse button.
2. Drag the mouse left, right, forward, and backward.

Drag the View

Dragging the view moves the observer up, down, left, and right.

- Hold down the middle mouse button (or wheel) and drag the mouse.

Change the Observer's Orientation

- Hold down the right mouse button and drag the mouse.

Teleport the Observer

- **Shift**+click someplace on the terrain to jump to the location.

1.2.3. Change the Environment

VR-Vantage lets you manipulate the environment. You can apply preconfigured environment conditions and can change the specific environment conditions. This just affects how the scene looks. It does not affect the simulation you are viewing.

Apply an Environment Condition

1. Choose **Settings** → **Scene**. The Scene Settings dialog box opens.
2. Select the Environment Conditions Settings page ([Figure 1-4](#)).

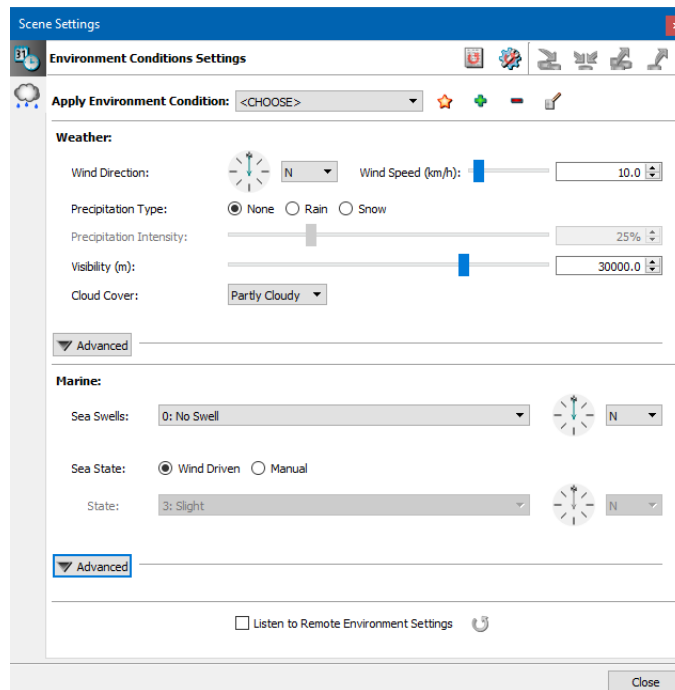


Figure 1-4. Scene Settings dialog box, Environment Conditions Settings page

3. In the Apply Environment Condition list, select a condition, such as Mostly Cloudy. The cloud cover changes ([Figure 1-5](#)).

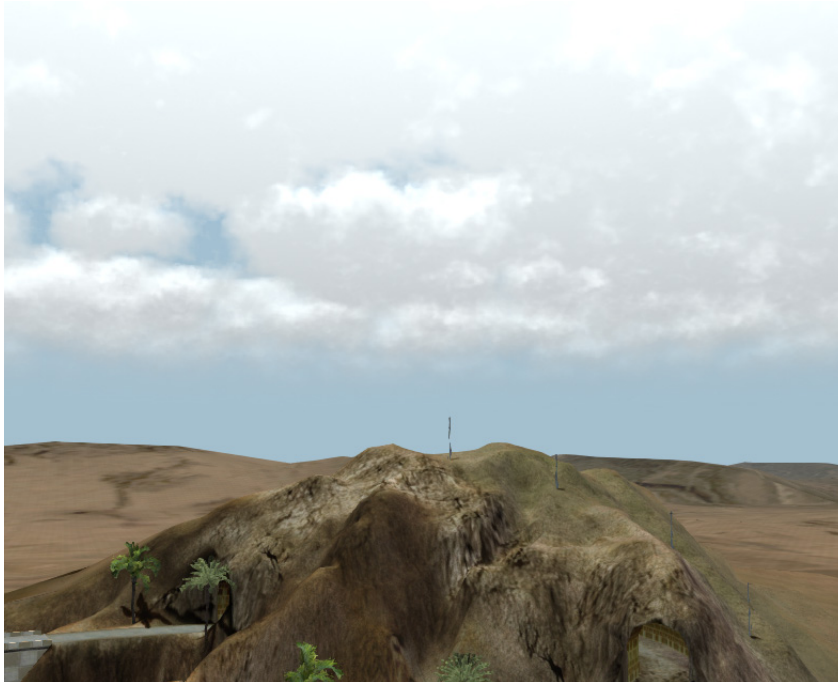


Figure 1-5. Cloud cover

Make it Rain and Snow

1. For Precipitation Type, select Rain. It starts to rain.
2. Drag the Precipitation Intensity slider to the right to make it rain harder.
3. Choose **Settings** → **Display**. The Display Settings dialog box opens.
4. Select the Observer Settings page ([Figure 1-6](#)).

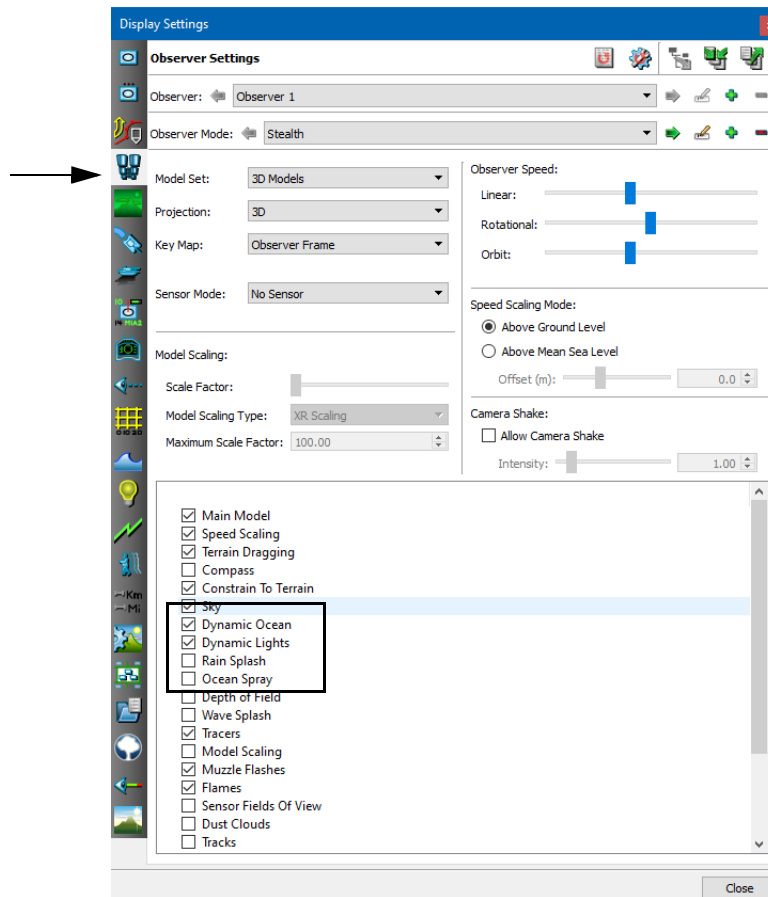


Figure 1-6. Observer Settings page

5. In the list of attributes, select the Rain Splash check box. Rain drops start to gather on the observer's camera lens (Figure 1-7). If this does not seem to work, increase the precipitation intensity in the Scene Settings dialog box.



Figure 1-7. Rain splash

6. Clear the Rain Splash check box and close the Display Settings dialog box.
7. On the Scene Settings dialog box, change the Precipitation Type to Snow (Figure 1-8).



Figure 1-8. Snow

8. Adjust the Precipitation Intensity slider.
9. Change the wind direction and wind speed and see how it affects precipitation.

10. Set the Precipitation Type to None.

Change the Time of Day

1. In the Scene Settings dialog box, select the Date and Time page.
2. Slide the Hour slider back and forth. See how the lighting changes as you change the time ([Figure 1-9](#)).



5:15 A.M., June 1



11:15 A.M., June 1

Figure 1-9. Time of Day affects lighting

3. Click Close.

1.3. View a Simulation

To view a simulation, you must load an appropriate terrain and connect to the simulation network. In this guide we assume that you have the MAK Data Logger and the recorded simulations that it includes. However, if you want to view your own simulation data, feel free to use it instead of the suggested files.

1.3.1. Connect to a Simulation Network

1. Choose **Settings** → **Connection**. The Simulation Connections dialog box opens.
2. Select the DIS Connections page ([Figure 1-10](#)).

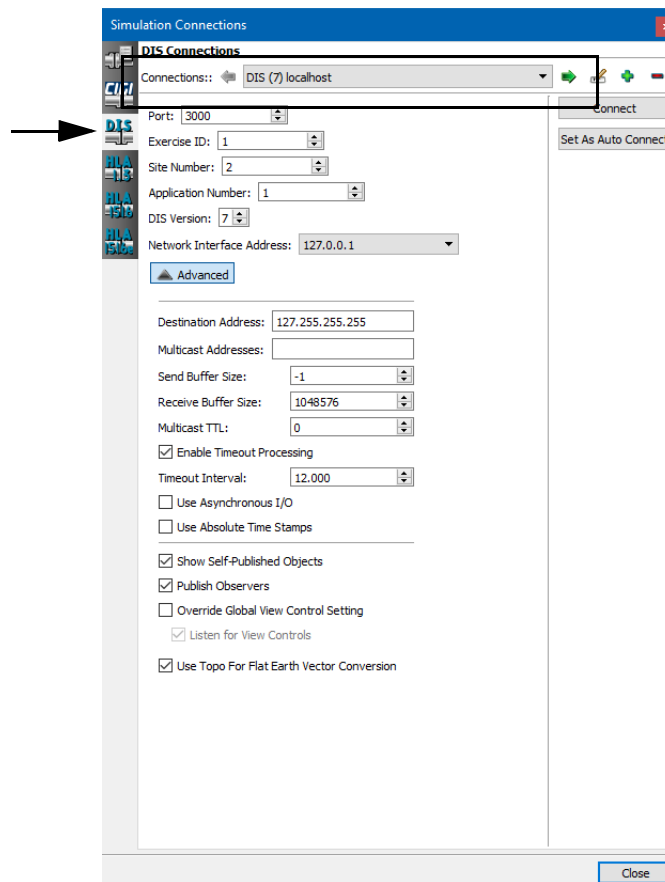


Figure 1-10. DIS Connection

3. In the Connections drop-down list, select DIS (7).
4. Click Connect.
5. Click Close.

1.3.2. Load the Terrain

The simulation you are going to view takes place on a small high-resolution terrain set in Honolulu, Hawaii, USA.

1. Choose **File** → **Open Terrain**. The Open Terrain dialog box opens.
2. Select *Ala Moana.mtf*.
3. Click Open. In a few seconds, the terrain is displayed. It is a view of the globe.

1.3.3. Start the Logger and Play a Simulation

1. On the Start Menu, choose **Programs** → **MAK Technologies** → **Logger X.X** → **Logger DIS**. The Logger starts.
2. Choose **File** → **Open**. The Open File dialog box opens.
3. Select *Raid2013-viewControl-DIS.lgr*.
4. Click Open.
5. Choose **Play** → **Toggle Loop at End**. This will cause the recording to continuously loop back to the beginning when it reaches the end.
6. Choose **Play** → **Play/Pause**, or click the Play button.

1.3.4. View the Simulation

VR-Vantage IG will take a few seconds to load model files. Then it will start to display the action in this simulation. The Logger file sends view control messages to VR-Vantage IG to control the observer. If the view does not start to change every few seconds, enable view controls as described in the next section. Then, watch the simulation for a while. When you are ready to explore the simulation on your own, disable view controls. Use the navigation controls you learned earlier to navigate through the terrain and watch the simulation from the viewpoints that interest you.

Enable or Disable View Controls

- Choose **Settings** → **View Controls**.

1.4. Attach the Observer to Entities

So far, you have moved the observer through the scene to observe entities. You can attach the observer to an entity and it will move through the scene with that entity.

1. In the Objects List Panel, right-click UtilRW 2. A popup menu is displayed.
2. Choose **Attach Follow**.
3. Press **Spacebar**. This puts the observer in the default position relative to the entity. It is now attached to the helicopter and is located to its rear. As the helicopter moves, the observer moves with it. You can change the position and orientation of the observer with the keyboard and mouse controls you learned earlier, but it will maintain its relationship with the helicopter and move through the scene as the helicopter moves.



The helicopter does not start moving until about 30 seconds into the recording. If it is not moving, click some place in the Logger timeline after the 0:30 mark.

4. Press **.** (period). The attachment moves to the next object in the Objects List Panel.
5. Continuing attaching to additional entities.
6. Press **z** to detach the observer.

1.4.1. Attach to an Entity that has a Cockpit Display

VR-Vantage is based on OpenSceneGraph (OSG), so developers can integrate third-party modules that are built on OSG. GL Studio, from DiSTI, is an application for building cockpit displays (also called heads-up displays, or HUDs). VR-Vantage includes a set of these displays for different vehicle types.

1. In the Objects List Panel, right-click UtilRW 2. A popup menu is displayed. Choose **Attach Mimic**. The observer attaches to the helicopter and its cockpit is displayed ([Figure 1-11](#)).



Figure 1-11. Cockpit display

2. Press **z** to detach the observer.
3. Stop the Logger.

1.5. Explore Sensors

VR-Vantage IG can simulate the way that the 3D scene would look if an observer were using visual sensor devices such as night vision goggles or viewing the infrared spectrum. This is an observer-specific setting. You can adjust the contrast, blur, and noise of the view.

VR-Vantage IG includes one sensor module – CameraFX, which uses the SenSim libraries from JRM Technologies. The sensors do not take into account the materials of the objects that you are viewing. They simply filter the view to produce the desired effect. If you want physics-based sensor effects, you may want to try the SensorFX Plug-in to VR-Vantage IG, developed by JRM. For details, please contact your MAK salesperson.

1. In VR-Vantage IG load *Ala Moana.mtf*.
2. In the Logger, open *Raid2013-viewControl-DIS.lgr* and run it as described previously.
3. Navigate to the area around the warehouse. The scene looks similar to [Figure 1-12](#):



Figure 1-12. No sensor

4. Choose **Settings** → **Display**. The Display Settings dialog box opens.
5. Select the Observer Settings page. Notice that the Sensor Mode is No Sensor ([Figure 1-13](#)).

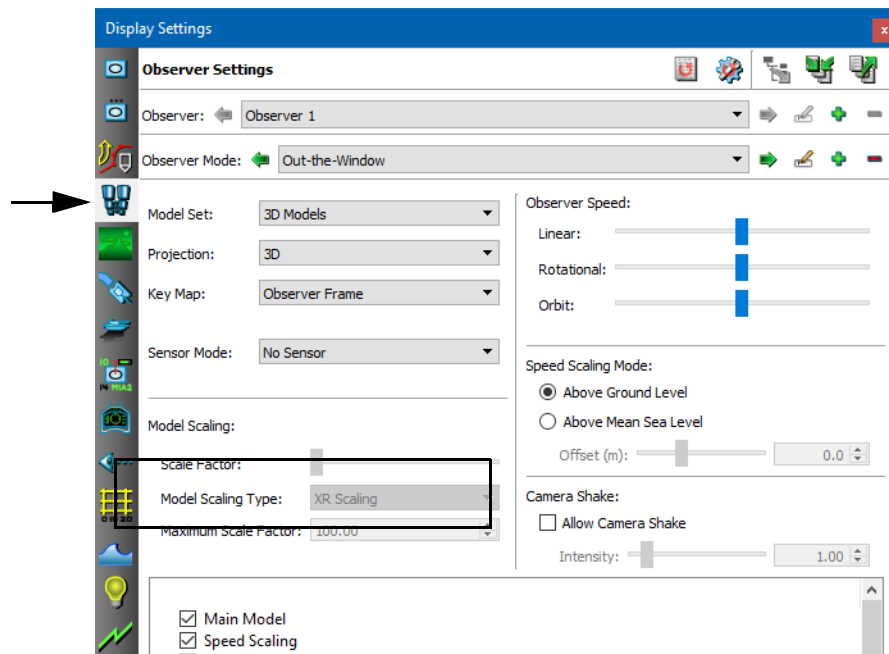


Figure 1-13. Sensor mode

6. Change the Sensor Mode to IR. See how the view of the scene changes.

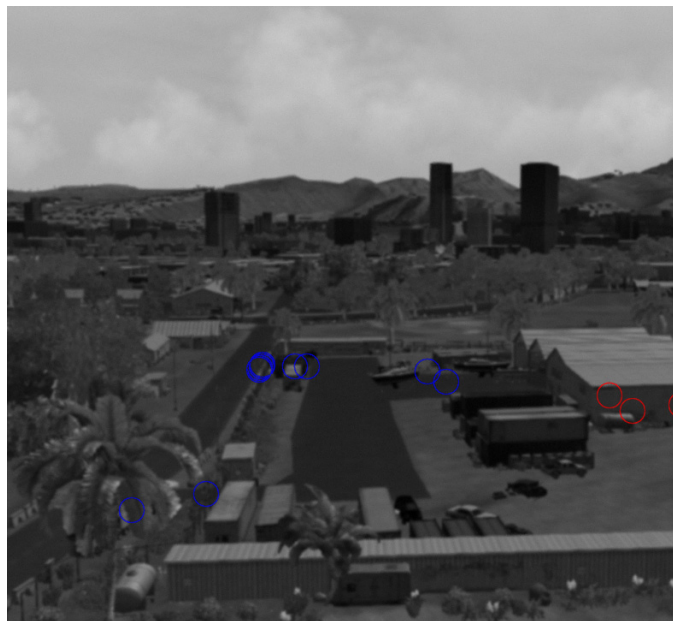


Figure 1-14. IR sensor

7. Choose **Settings** → **Scene**. The Scene Settings dialog box opens.
8. Select the Date and Time page.

9. Change the time to 9 PM.
10. In the Observer Settings page, change the sensor to NVG. See how the scene changes. For comparison, change the sensor to No Sensor and see what the scene looks like to the naked eye.
11. In the Display Settings dialog box, select the Sensor Settings page (Figure 1-15).

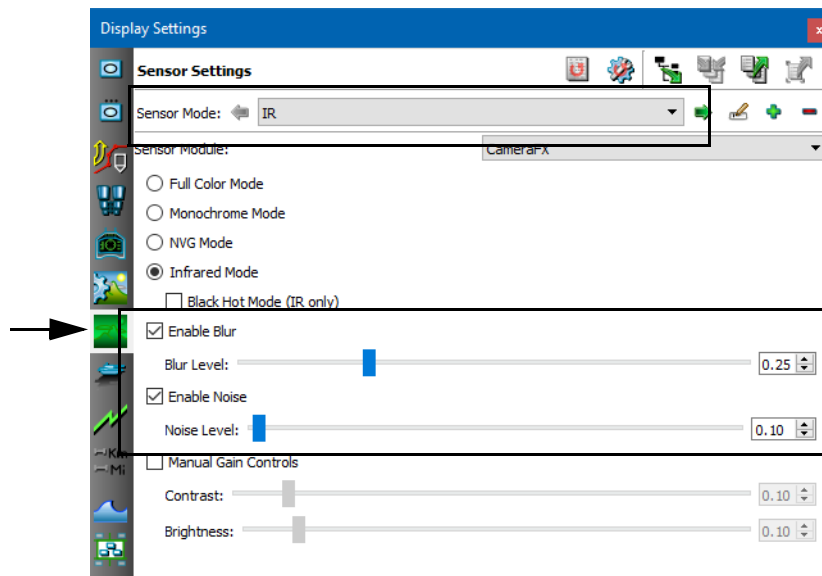


Figure 1-15. Sensor Settings

12. In the Sensors list, select the current sensor (NVG).
13. Experiment with changing the settings for blur and noise.

1.6. Explore Dynamic Ocean

VR-Vantage IG can simulate ocean waves and swell states and has additional lighting effects that show reflections on the water.

1. In VR-Vantage IG load *MAK Earth (online).mtf*. (This terrain requires internet access. If you do not have internet access, load *Ala Moana.mtf*.)
2. In the Logger, open *Raid2013-viewControl-DIS.lgr* and run it as described previously.
3. Attach the observer to the entity Carrier 1 and rotate so the view is similar to Figure 1-16.

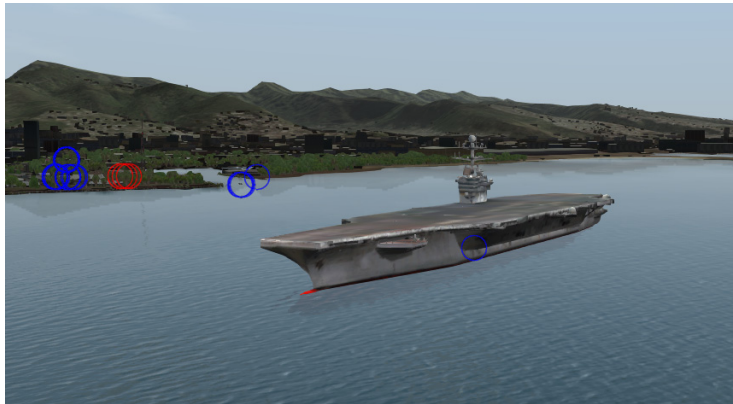


Figure 1-16. Dynamic ocean - clear weather condition

4. Choose **Settings** → **Scene**. The Scene Settings dialog box opens.
5. Select the Environment Conditions Settings page.
6. Select some of the different environment conditions, such as Rainy and Thunderstorm, and see how the ocean changes.



Figure 1-17. Dynamic ocean - stormy weather condition

7. Apply the Clear environment condition.
8. In the Marine section of the Environment Conditions Settings page, set the Sea State to Manual.
9. Select different options from the State list and see how the sea state changes.

1.7. Explore Paged and Streaming Terrain

VR-Vantage IG can display databases for which all of the data is loaded into memory, called static databases, and databases for which data is loaded as it is needed, called paged terrains. Paged terrain is used when the amount of data available is too great to load into memory. Paged databases can have their data stored locally on a computer or can be streamed over a network or the internet. In the previous sections of this guide, you have used both kinds of terrains. VR-Village is a local, static terrain. MAK Earth (online) is streamed over the internet. This section spends some more time with streamed terrain.

1.7.1. Connect to a Terrain Server

1. Choose **File** → **New Terrain**. The loaded terrain is cleared.
2. Choose **Settings** → **Terrain**. The Terrain Settings dialog box opens.
3. Select the Terrain Contents page ([Figure 1-18](#)).

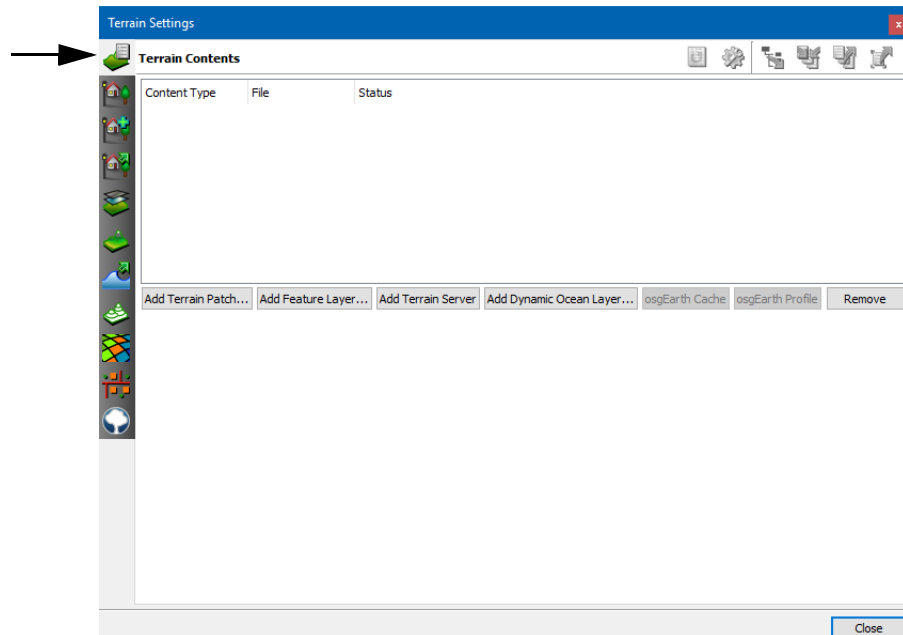


Figure 1-18. Terrain Contents

Click Add Terrain Server. The Add Terrain Server dialog box opens ([Figure 1-19](#)). The dialog box contains information about the selected terrain server. It is not editable.

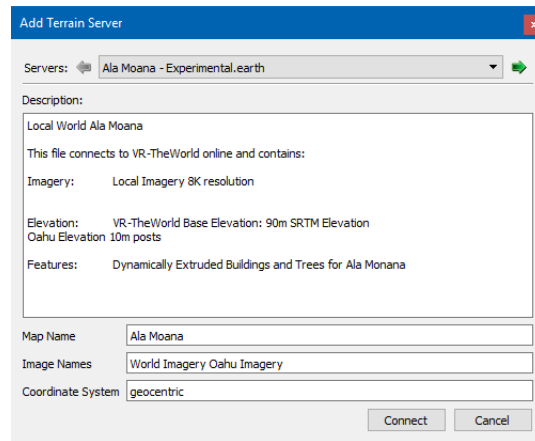


Figure 1-19. Add Terrain Server

4. Select *Ala Moana.earth* from the Servers drop-down list.
5. Click Connect. The whole earth is displayed (Figure 1-20).

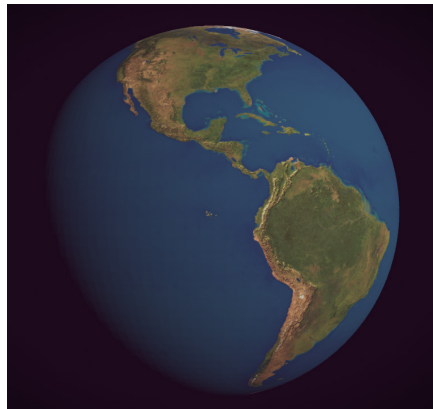


Figure 1-20. MAK Earth (online)

6. Close the Terrain Settings dialog box.

What is the Difference Between an Earth File and an MTF File?

In a previous section of this guide, you loaded *Ala Moana.mtf*. In this section, you loaded *Ala Moana.earth*. What is the difference between these files? An earth file tells VR-Vantage to load terrain data, which can be local or remote, using the osgEarth libraries. Every time you load terrain this way, VR-Vantage starts from scratch loading the data. This can be time consuming. If, after loading a terrain server, you save the terrain as an MTF file, VR-Vantage caches data in a format it can load quickly. Additionally, after loading an earth file, you could load additional types of terrain data that are not referenced in the earth file. When you save to MTF, that additional data is also saved as part of the terrain.

In summary, create an earth file to configure all the terrain data you want to load. Save loaded data to an MTF file for future use. If you examine the VR-Vantage file structure, you will see that *./userData/servers* has a set of earth files that match the MTF files in *./userData/terrains*.

Navigate the Earth

Use the keyboard and mouse to navigate the display. Zoom in and out. As you zoom in, more detailed terrain is displayed.

1.8. Save and Load Display Engine Configurations

This tutorial demonstrates how to:

- ♦ Connect VR-Vantage IG to a VR-Vantage Display Engine.
- ♦ Change a display engine configuration.
- ♦ Save display engine configurations.
- ♦ Load display engine configurations in the Display Engine Configuration Editor.
- ♦ Load multiple display engine configurations from the command line.

1.8.1. Connect to a VR-Vantage Display Engine



This tutorial assumes that you have two computers, one for VR-Vantage IG, and one for the remote display engine.

To create the display engine configurations:

1. On computer 1, start VR-Vantage IG.
2. Load *Ala Moana.mtf*.
3. Choose **View** → **Display Engine Configuration Editor Panel**. The Display Engine Configuration Editor opens (Figure 1-21). It shows one window and one channel for the VR-Vantage IG window on the local computer.

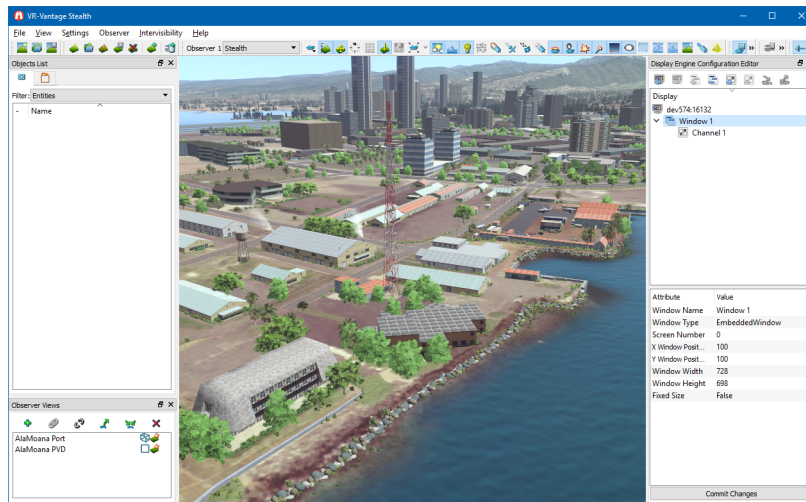


Figure 1-21. Display Engine Configuration Editor

4. On computer 2, choose **Start** → **Programs** → **MAK Technologies** → **VR-Vantage 2.3** → **VR-Vantage Display Engine**. A VR-Vantage display engine opens. It does not show a default window.
5. On computer 1, in the Display Engine Configuration Editor, click the Connect a Display Engine icon (). The Connect to Display Engine dialog box opens (Figure 1-22).

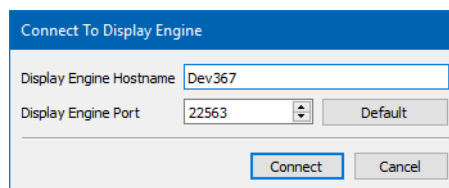


Figure 1-22. Connect To Display Engine dialog box

6. In the Display Engine Hostname box, replace “localhost” with the name of computer 2.
7. Click Connect. An entry for the display engine is added to the Display Engine Configuration Editor window ([Figure 1-23](#)). The remote display engine now displays the Ala Moana terrain with the same view as VR-Vantage IG.

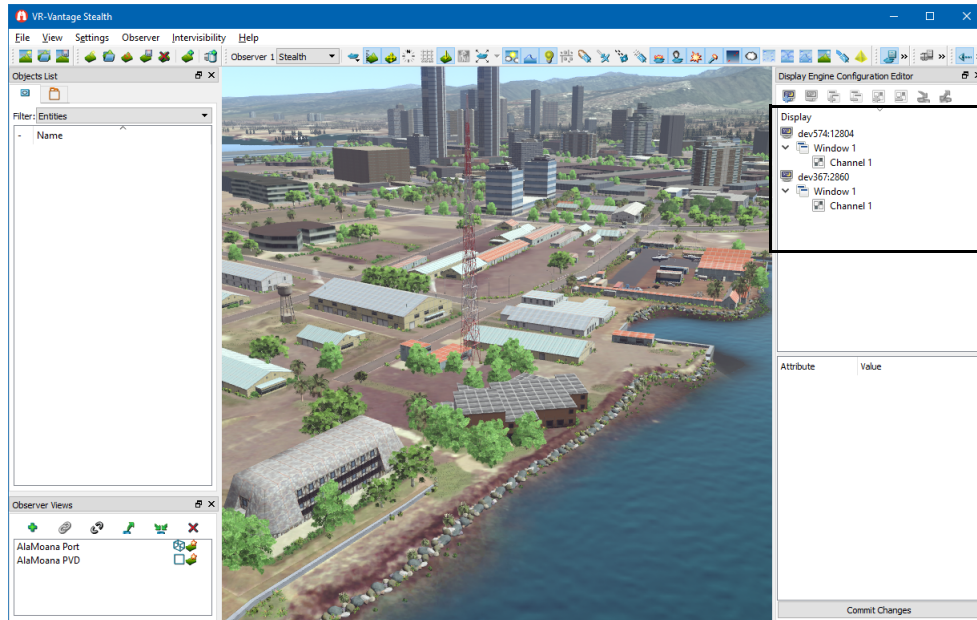
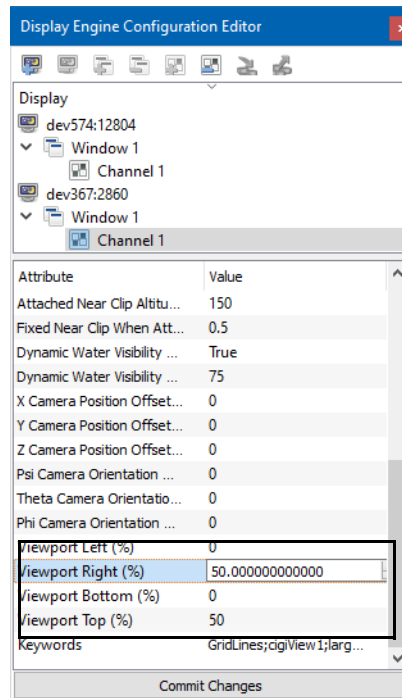


Figure 1-23. Remote display engine in editor

1.8.2. Create and Save Display Engine Configurations

By default, the views in the VR-Vantage IG window and the remote display engine window look exactly the same. So we will change the view in one of them so that when we load the display engine configurations later on, we can tell that each is different.

1. Select Channel 1 of the remote display engine. Its attributes are displayed.
2. Change the value for the Viewport Right and Viewport Top attributes to 50.



3. Click Commit Changes. The view of the terrain is now in the lower left quadrant of the display engine. (The full screen view of the terrain may also be visible until such time as the display engine refreshes. Resize the window to refresh it.)



4. Select the display engine on VR-Vantage IG (in this example, dev574).
5. Click the Save Display Engine Configuration icon (📁). A save dialog box opens.

6. Call this configuration *mainwindow.dcx*.
7. Click Save.
8. Select the display engine on the remote display engine (in this example, Dev367).
9. Click the Save Display Configuration icon. A save dialog box opens.
10. Call this configuration *remotedisplay.dcx*.
11. Click Save.

1.8.3. Load Display Engine Configurations in the GUI

We now have two visually distinct display engine configurations. In this part of the tutorial, we simply load them into the two display engines to see that loading a display engine configuration changes the view in the window. This part of the tutorial also demonstrates that display engine configurations are not unique to a particular display engine and are not tied to one either. Any particular configuration can be loaded into any display engine.

1. Select the display engine on VR-Vantage IG.
2. Click the Load Display Engine Configuration icon (). The Load Display Configuration dialog box opens.
3. Select *remotedisplay.dcx*.
4. Click Open. The window on the VR-Vantage IG application now shows the terrain in the lower left quadrant. (You may need to press **Spacebar** to reset the observer.)
5. Reload the *mainwindow.dcx* configuration in the main window.
6. Try loading the two different configurations in the remote display engine.

1.8.4. Load Display Engine Configurations from the Command Line

As you have seen in the previous part of this tutorial, you can load display engine configurations for individual display engines through the GUI. However, you cannot load more than one at a time. If you have a complex set of display engines that you need to configure, loading them one at a time can be tedious. To load multiple display engine configurations, you must start VR-Vantage IG from the command line.

You load multiple display engine configurations from the command line with the

--dispSetting command line argument and the -W or
--withDisplayEngine command-line argument. The syntax is:

```
vrvApplication.exe --dispSetting masterdisplayConfigFile  
-W port@netAddress;remotedisplayConfigFile1 ....  
port@netAddress;remotedisplayConfigFileN
```

In this tutorial, we use the default port – 22563. The netaddress for the remote display engine is the computer name – Dev367. The display engine configuration files are *mainwindow.dcx* and *remotedisplay.dcx*.

So the command line to load the two display engine configurations that we created would be:

```
vrvIG.exe --dispSetting ../appData/settings/vantageIG/mainwindow.dcx  
-W 22563@Dev367;../appData/settings/vantageIG/remotedisplay.dcx
```

To load the tutorial configurations from the command line:

1. If VR-Vantage IG is running, shut it down.
2. Open a command window.
3. Change directory to *./bin64*.
4. Enter the command:

```
vrvIG.exe --dispSetting ../appData/settings/vantageIG/mainwindow.dcx  
-W 22563@WERSANV420;../appData/settings/vantageIG/remotedisplay.dcx
```

VR-Vantage IG starts. The display engine configurations are visible in the main window and the remote display engine window.

5. Choose **View → Display Engine Configuration Editor**. In the Display Engine Configuration Editor, confirm that VR-Vantage IG is connected to the remote display engine.

1.9. Continue to Explore VR-Vantage IG

Continue to explore VR-Vantage IG. Look at the various settings options on the Settings menu. For more information, please read *VR-Vantage Users Guide* or online help. They provide detailed descriptions of all VR-Vantage IG features.

- To open *VR-Vantage Users Guide*, on the Start menu, choose **MAK Technologies** → **VR-Vantage 2.3** → **Documentation** → **VR-Vantage Users Guide**.
- To open online help, in the VR-Vantage window, choose **Help** → **Help**.

Please contact sales@mak.com for additional assistance or to provide feedback.



2. Installation and Licensing

Your MAK salesperson has given you a link to the VR-Vantage IG installer as well as links to other MAK applications and data to support your first user experience. Download the files. Before you install the applications, note the following possible issues:

- ♦ When you install VR-Vantage IG on Windows, there may be a delay of up to several minutes from the time you try to run the setup program to the time that an installation dialog box is displayed. If you experience this problem, turning off User Access Control can reduce or eliminate this delay.
- ♦ These instructions assume you are familiar with installing Windows applications that use a wizard-style installer. They also assume that you have an unzipping application and know how to use it.

2.1. Install VR-Vantage IG and Supporting Applications and Data

VR-Vantage has an applications installer and a data package, which consists of five compressed zip files.

To install VR-Vantage IG:

1. Put the application installer and the data files in the same directory.
2. Run the application installer. On the VR-Vantage Installation Code page (Figure 2-1), click Skip Toolkit Installation. (The installation code allows you to install the VR-Vantage Toolkit. If you have an installation code, you can enter it, but it is not necessary to for this first experience.)

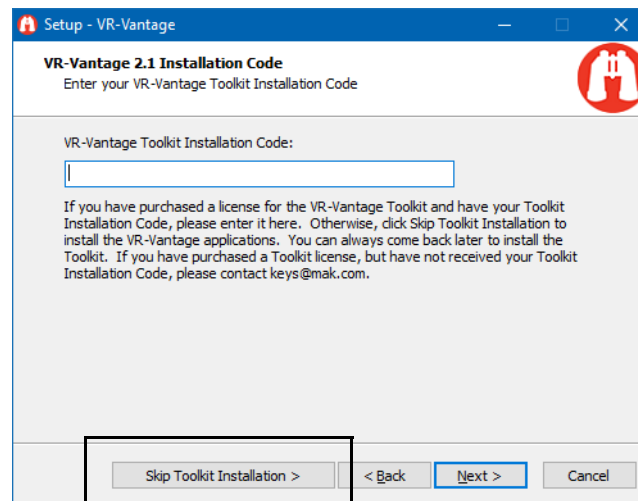


Figure 2-1. Installation wizard

3. When you are prompted to choose an option for installing the data package (Figure 2-2), select the default - “Install the recommended data package automatically”.

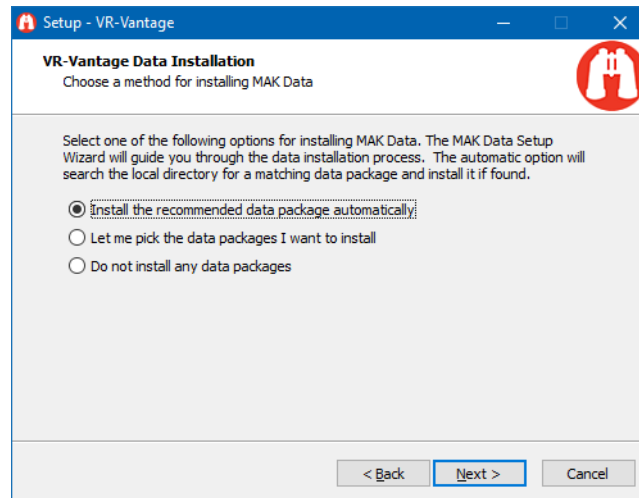


Figure 2-2. Data installer selection page

4. Continue with the installation wizard. When the application installer finishes, the MAK Data Setup Wizard (Figure 2-3) opens automatically and installs the data.

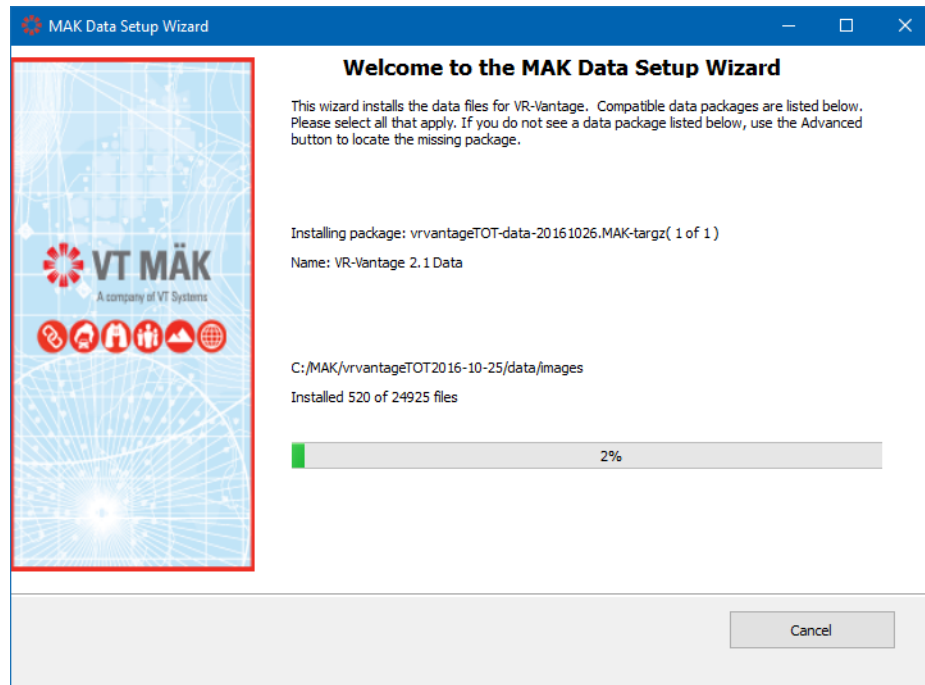


Figure 2-3. MAK Data Setup Wizard



You must install the data package. It is not optional. VR-Vantage IG will not run properly without it.

If you do not already have the MAK Data Logger installed, install it as follows:

- Run the MAK Data Logger installer. Accept all of the default settings.

2.2. Setting Up the License Manager

To use a MAK product, you must install the MAK License Manager and get a license for your product. Before you can use a MAK product, you must obtain a valid license file and specify the license server.

- To install the MAK License Manager, run the installer.

The general procedure for configuring license management is as follows:

1. Identify the name and ID of the license server and request a license file.
2. Put the license file in the *MAK/MAKLicenseManager* directory on the license server.
3. Run the license server.
4. Specify the license server location.

2.2.1. Identify the Host ID and License Server Name

For simplicity, use the computer on which you installed VR-Vantage IG as the license server. To find out the host ID and license server name:

1. On the Start menu, choose **Programs → MAK Technologies → MAK License Manager → MAK License Manager**. The MAK License Manager utility opens (Figure 2-4).

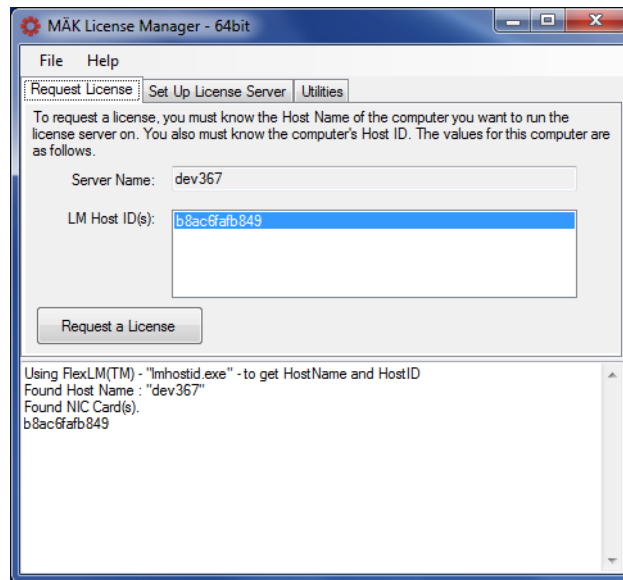


Figure 2-4. License Manager

2. Select the Request License tab. It displays the server name and the IDs for your network cards.
3. If you have more than one network card, select the one that you want to use as Host ID.
4. Send the host ID and hostname to your MAK salesperson. MAK will e-mail you a license file.

2.2.2. Put the License File in the *MAKLicenseManager* Directory

When you receive your license file, put it in the *MAKLicenseManager* directory on the license server. The file should have the extension *.lic*. If it does not, please contact keys@mak.com to clarify why it did not follow this convention.

2.2.3. Run the License Server

- To start the license server daemon, on the server machine only, execute `runLm` from the *MAKLicenseManager* directory.

Shutting Down the License Server

- To force all applications to check in their licenses and shut down the license server daemon, run `lmdown`.

2.2.4. Specify the License Server

The first time you run a MAK application on a computer, the License Setup dialog box opens (Figure 2-5). It prompts you to enter the hostname of the license server and optionally, a port number.

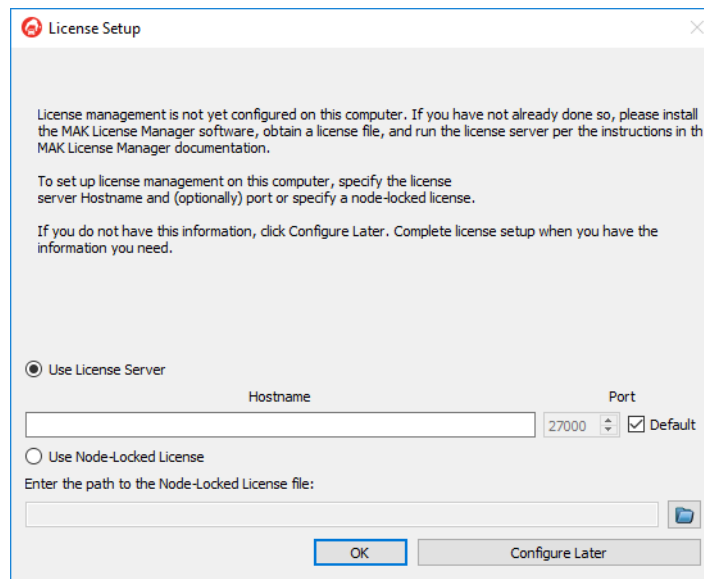


Figure 2-5. License Setup dialog box

1. Type the hostname in the Hostname box.
2. Click Add License Server. The application will start.