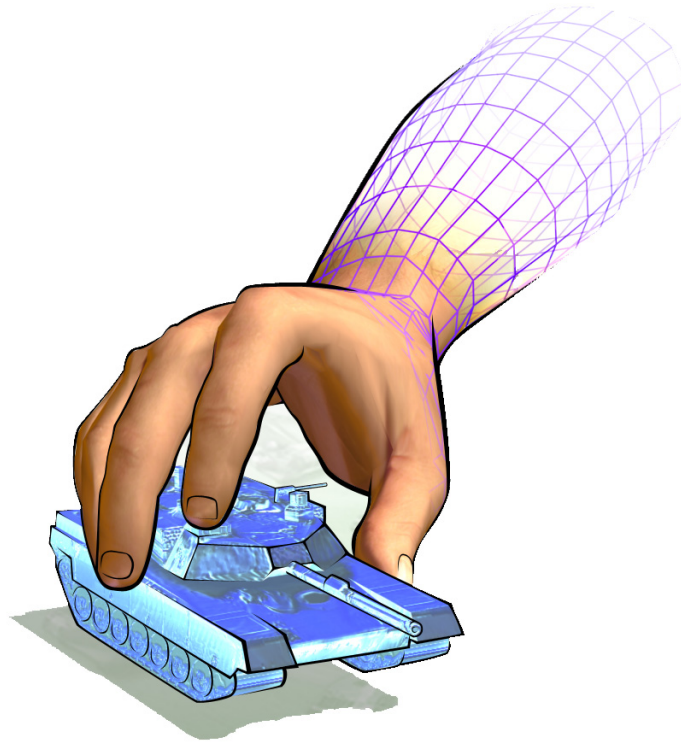




VR-Forces



First Experience

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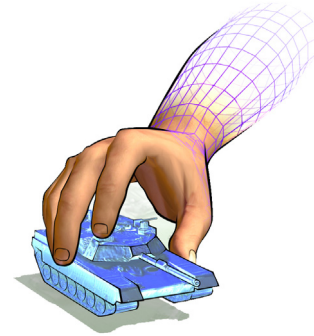
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VT MÄK
68 Moulton St.
Cambridge, MA 02138 USA

Voice: 617-876-8085
Fax: 617-876-9208

info@mak.com
www.mak.com

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VR-Forces First Experience

Thank you for deciding to try out VR-Forces. VR-Forces is MÄK's computer generated forces application and toolkit. This first experience with VR-Forces will be a quick guided tour of some of its most important features. To get the full experience you will need the VR-Forces runtime application. (You do not need to install the SDK)

Before you begin, install and license the software. Please see Section A, “[Install VR-Forces](#)” for instructions.

When you are ready, this guide will help you:

- ♦ [Start VR-Forces](#)
- ♦ [Run a Scenario](#)
- ♦ [Create a Scenario](#)
- ♦ [Assign Tasks](#)
- ♦ [Write a Plan](#)
- ♦ [Experience the 3D View](#)
- ♦ [Run the Scenario in the 3D View](#)
- ♦ [Create a Scenario in the 3D View](#)
- ♦ [Learn More.](#)

VR-Forces is a full-featured application built using the VR-Forces SDK. The graphical user interface (GUI), also called the front-end is based on the VR-Vantage Toolkit. Developers can extend the capabilities of VR-Forces and can create their own applications from scratch using these toolkits. For more information, please read *VR-Forces Developers Guide* and *VR-Forces Front-End Developers Guide*, which are in the `./doc` directory.

1. Start VR-Forces

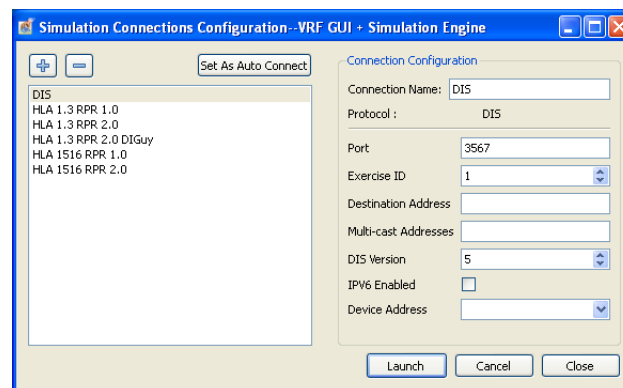
To use VR-Forces, you start two executables: a front-end (the graphical user interface, or GUI) and a back-end (the simulation engine). You can start them separately (independent mode) or with one command or menu option (combined mode). In this guide, we use combined mode.

VR-Forces can display terrain, entities, and other simulated object in 2D or 3D. The default startup mode is 2D. The first part of this guide introduces you to the 2D features. Then it introduces the 3D view.



Before you start VR-Forces, make sure the license server is running. For details, please see Section B.3, [“Run the License Server”](#).

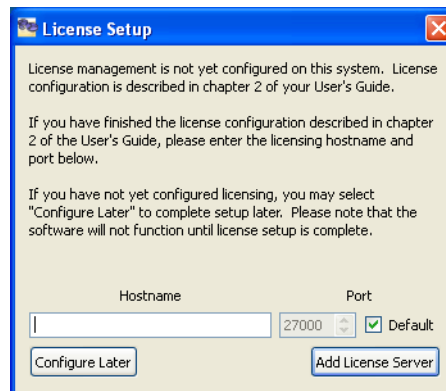
1. On the Start menu, choose **Programs → MAK Technologies → VR-Forces 4.0.2 → VR-Forces GUI + Simulation Engine**. The Simulation Connections Configuration dialog box opens.



2. In the Simulation Connections Configuration dialog box, select the DIS connection configuration. (If you want to use HLA, you also need to install and configure an HLA Runtime Infrastructure (RTI), so let's just stick with DIS for this first experience.)
3. Click Launch. If this is the first time that you have run a MAK application on this computer, you must specify the license server. If you have already configured the license server, the Scenario Startup dialog box opens ([Figure 1](#) in [“Run a Scenario,”](#) on page 1-4).

1.1. Specify the License Server

The first time you run a MÄK application on a computer, the License Setup dialog box opens. (If you already have other MÄK products installed, this dialog box might not open. If so, skip this section.) It prompts you to enter the hostname of the license server and optionally, a port number.



1. Type the hostname in the Hostname box. This is the name you gave your salesperson when you requested the license file.
2. Click Add License Server. VR-Forces starts. The Scenario Startup dialog box opens (Figure 1 in “Run a Scenario,” on page 1-4).

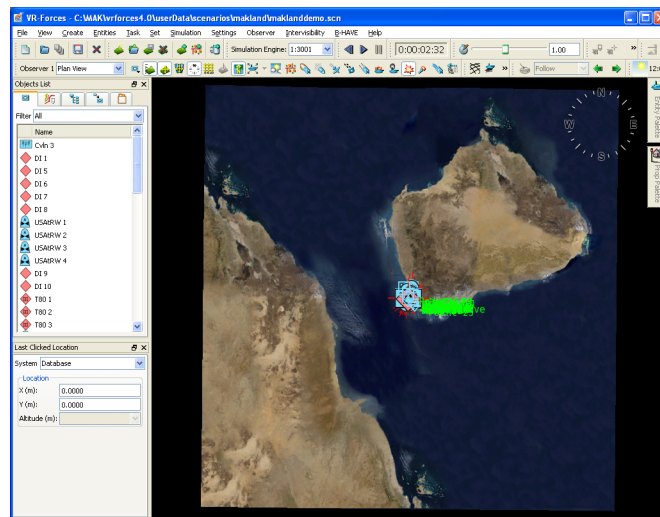
2. Run a Scenario

In VR-Forces, all simulation is done in the context of a scenario. A scenario specifies a terrain, entities, and objects. The entities may have plans or tasks assigned. When you start VR-Forces, the Scenario Startup dialog box lets you quickly load a scenario or create a new one without needing to use the VR-Forces menu system.

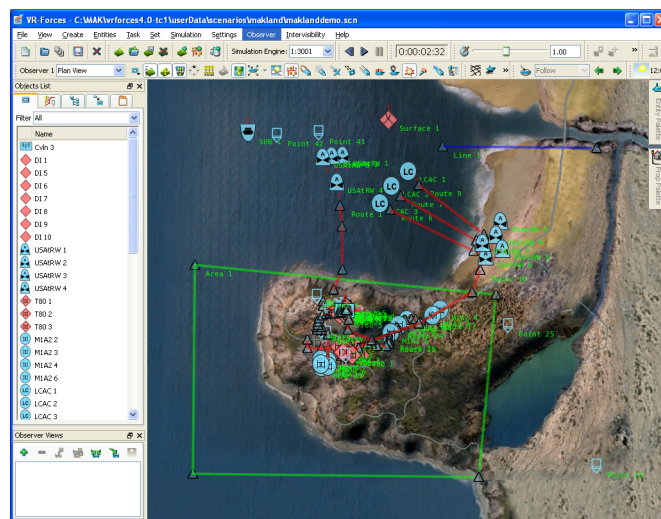


Figure 1. Scenario Startup dialog box

1. In the Scenario Startup dialog box, select the Load A Scenario option.
2. Click OK. The Load Scenario dialog box opens.
3. Select the *makland* directory.
4. Select *maklanddemo.scn*.
5. Click Open. A terrain and entity icons are displayed in the VR-Forces window.



6. Press and hold **e** to zoom in until you can comfortably see the entities in the scenario.



2.1. Run the Scenario

- To run a scenario, choose **Simulation** → **Run Scenario**.

The entity icons begin moving. You will see transient icons that represent missiles, lines representing munition fire and detonation, and other graphics.

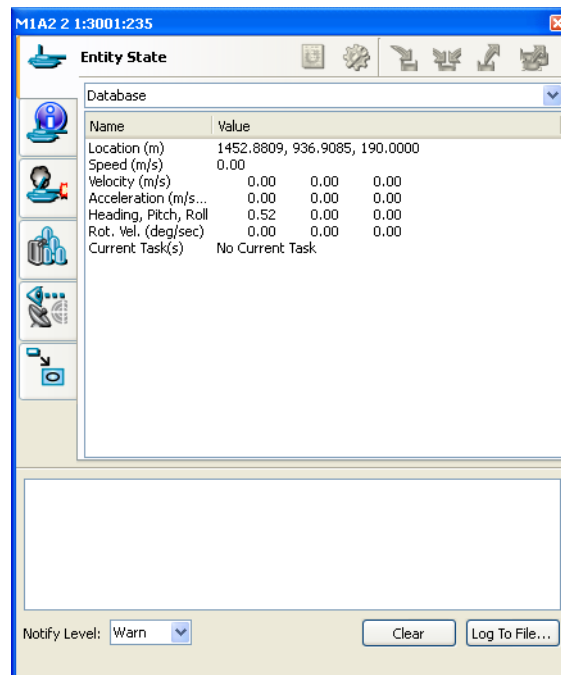
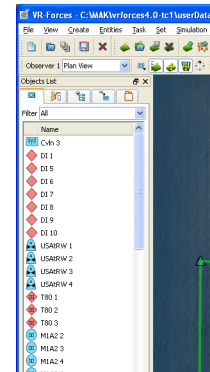
2.2. Understand the Scenario

In addition to displaying entities, objects, and animated graphics, VR-Forces provides a lot of information about what is going on as a scenario unfolds.

Getting Information about Individual Entities

On the left side of the VR-Forces window is a set of information and control panels.

1. The Objects List panel has tabs that show different views of the objects in a scenario.
2. Select the leftmost tab. It lists all entities.
3. Select (click) the entity named M1A2 4.
4. Press **i**. A dialog box opens. It has tabs that describe the entity's state and what it is doing. The M1A2 is an individual entity. If it were an aggregate entity, the dialog box would list its subordinates. At the bottom of the dialog box is a console window. It displays messages about the entity.

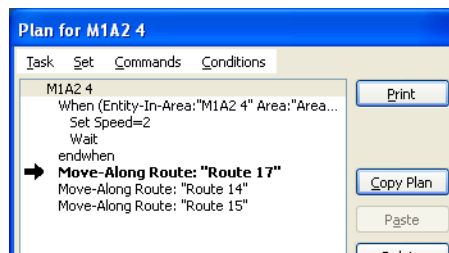


You can display information dialog boxes like this for most objects.

View Plans

A plan is a list of tasks and set data requests that an entity executes in sequence. A plan can also contain tasks that are executed only under certain conditions.

1. Select M1A2 4.
2. Choose **Entities** → **Plan**. The Plan window opens.

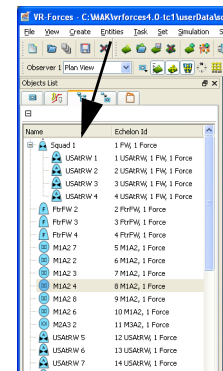


This plan is fairly simple. It tells the entity to move along three routes in succession. It also includes a condition block. The condition is that when the entity enters Area 2, it should change its speed and stop (Wait task).

View Force Hierarchies and Relationships

All entities exist within the context of a force, usually just called Friendly and Opposing. Some entities may be Neutral. (You can create up to 255 different forces.) The forces emulate military hierarchies.

On the Objects List panel, select the Echelon View tab. This tab shows the hierarchical arrangement of the entities by force.



Scenario Objects

In addition to entities, a scenario can contain tactical graphics (also called control objects). Tactical graphics are points, lines, and areal objects that entities can interact with. For example, an entity can move to a point, or follow a route. You can assign tactical graphics to overlays, which mimic clear plastic overlays that you might place over a real map.

2.3. Navigating the Terrain

You can change your view of the 2D terrain by panning and zooming in and out. You can do this from the keyboard or mouse. You can also drag the terrain.

To pan or zoom the terrain from the keyboard, use the keys shown in [Figure 2](#). To zoom in and out with the mouse, move the mouse wheel forward or backward.



Figure 2. Primary movement keys, observer coordinates (2D)

Dragging the Terrain

Dragging the terrain combines the move forward, backward, left, and right functions.

To drag the terrain:

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

3. Create a Scenario

In the next few sections, you will create a scenario. A completed version of this scenario is included with VR-Forces. It is called the *firstexperience* scenario.

To create a scenario, you must:

1. Choose a terrain.
2. Create entities.
3. Optionally, create control objects and overlay objects.
4. Tell the entities what to do.
5. Save the scenario.

3.1. Choose a Terrain

1. Choose **File** → **New Scenario**, or click the New Scenario icon (📁) on the File toolbar. The Choose Simulation Terrain dialog box opens.
2. In the file list, select *VR-Village.mtf*. (A MÄK terrain format (MTF) file packages together information about a terrain and related imagery for convenient loading in VR-Forces.)
3. Click Open. The New Scenario dialog box opens.
4. Give the scenario a name.
5. Accept all the default scenario parameters. Click OK. The map displays the VR-Village terrain.

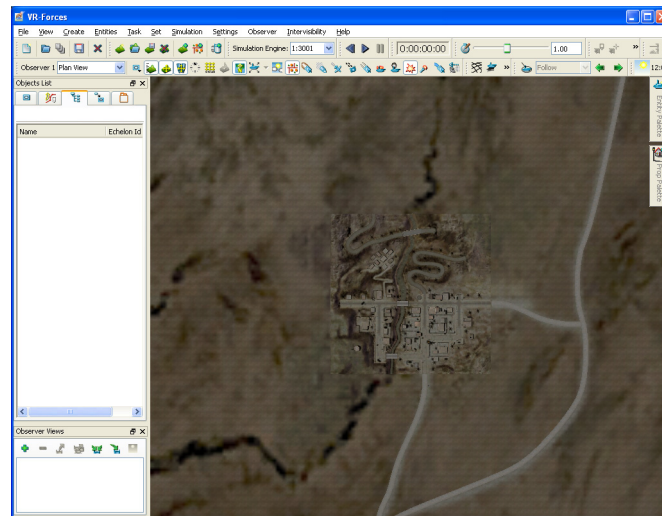
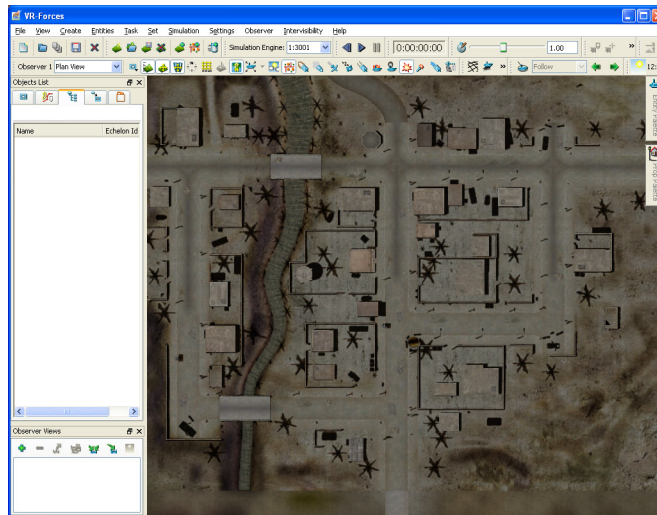


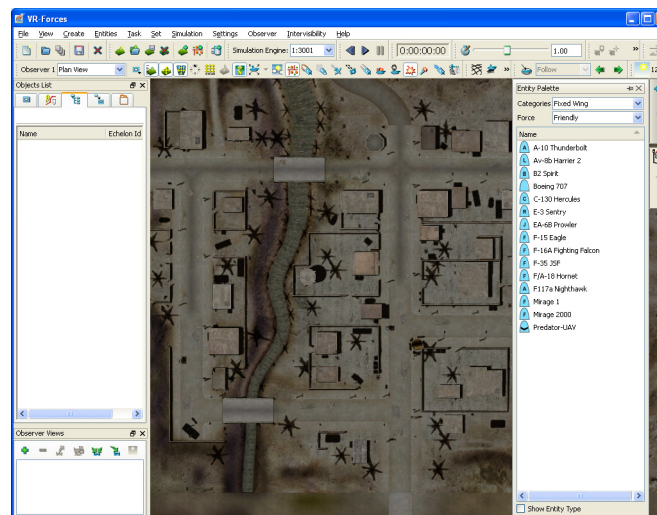
Figure 3. VR-Village

3.2. Create Some Entities

1. In the VR-Village terrain, the highly detailed portion of the terrain is the village in the very center. Press **e** to zoom in and drag the terrain so it looks like this:

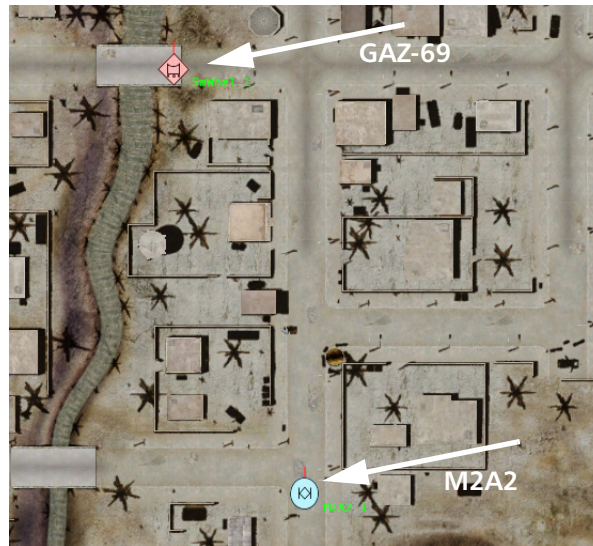


2. On the right side of the VR-Forces window, click the Entity Palette tab. The Entity Palette opens.



3. In the Categories list, select Ground.
4. In the Force list, select Friendly.
5. In the list of entities, select M2A2 Bradley IFV. The cursor changes to show the icon for an M2A2 Bradley.

6. Click on the map where the road enters the village from the south (as shown in the figure). An icon is placed at that location.



7. Right-click to exit create entity mode.
8. On the Objects tab, change the Force to Opposing.
9. In the list of entities, select GAZ-69 Utility Vehicle.
10. Click on the map across town from the M2A2, as shown in the figure.
11. Right-click to exit create entity mode.
12. Click the GAZ-69. The outline changes to white to show that it is selected. The heading indicator is pointing North, the default heading.
13. Choose **Set** → **Heading**. The Heading dialog box opens.
14. Type 90 and click OK. The heading changes to 90 degrees.



3.3. Create a Control Object

Control objects are points, lines, and areas that identify locations on the terrain. An entity can interact with these objects in various ways. One common use for control objects is to have an entity move to a point or along a route.

1. Choose **Create** → **Route**. The cursor changes to create object mode (it shows a little triangle at the end of the cursor arrow).
2. Click on the map in front of the Bradley (callout 1 in the figure). A vertex is placed.



3. Move the cursor toward callout 2. A line extends from the first vertex to show where you are drawing the route.
4. Add additional route vertices by clicking the locations of callouts 2, 3, and 4 in the figure.
5. For the end point, right-click at location 5.
6. The route is created with the default name Route 1.

3.4. Save the Scenario

1. Choose **File** → **Save Scenario** or click the Save icon on the Scenario toolbar. The Save Scenario dialog box opens.
2. Optionally, create a directory in which to save the scenario.
3. Select the directory in which you want to save the scenario.
4. Give the scenario a name.
5. Click Save.

4. Assign Tasks

You can give an entity a task by including it in a plan or by assigning it to the entity from the Task menu. We call tasks that are assigned from the Task menu “independent tasks”.

4.1. Independent Tasks

You can give an entity an independent task at any time. When you give an entity an independent task:

- ♦ It stops whatever it is doing and immediately begins to execute the new task.
- ♦ If the entity is executing a plan, the plan is abandoned and the entity executes the independent task. When it is finished with the task, it does not return to the plan.

Assign an Independent Task

In our example scenario, the M2A2 Bradley vehicle is sitting at the edge of town doing nothing. Now we will tell it to move along the route using an independent task.

1. Select the Bradley.
2. Choose **Task** → **Move Along Route**. The Move Along Route dialog box opens.
3. Select Route 1.
4. Select the Treat Route as Road check box. This option will improve how the entity follows the route compared to the default behavior.
5. Click OK.
6. Choose **File** → **Save**.

At this point nothing is happening, because the scenario is not running.

4.2. Run the Simulation

- Choose **Simulation** → **Run Scenario**.

The Bradley moves along the route. At some point between vertex 4 and vertex 5, it identifies the GAZ-69 vehicle and fires on it. Detecting and firing on opposing force entities is an automatic behavior. Notice that firing does not interfere with the entity's task. It continues to the end of the route.

You might wonder why the GAZ-69 does not fire at the M2A2. In order to fire, an entity needs a weapon system. It will then fire at any entity that it considers hostile and for which its weapon system is appropriate. The GAZ-69 does not have a weapon system. We picked this entity because we want the M2A2 to complete its tasks without risking the possibility that it might get destroyed. As you experiment with VR-Forces, feel free to use armed Opposing Force entities such as the BMP-2 or T-80.

4.3. Stop the Simulation and Rewind It

1. After the Bradley vehicle finishes moving along the route, choose **Simulation** → **Pause Scenario**.
2. Choose **Simulation** → **Rewind Scenario**. The simulation returns to its saved state.

5. Write a Plan

If a scenario has very few entities, or if you are responsible for controlling just one entity in a larger scenario, using independent tasks may meet all of your needs. However, if you want to control multiple entities in varying circumstances, you will want to give them plans.

Previously, we assigned the Bradley vehicle a Move Along Route independent task. Now we will do the same thing using a plan. And to highlight the difference between independent tasks and plans, we will give it a second task to execute when the first one is complete.

1. Select M2A2 1.
2. Choose **Entities** → **Plan**. The Plan dialog box opens.
3. In the plan window, choose **Task** → **Move Along Route**. The Move Along Route dialog box opens.
4. In the window, select Route 1.
5. Select the Treat Route as Road check box.
6. Click OK. The task is added to the plan.
7. Choose **Set** → **Heading**. The Set Heading dialog box opens.
8. In the Heading text box, type 180.
9. Click OK. The set data request is added to the plan.
10. Click **Task** → **Move to Location**. The Move To Location dialog box opens.
11. Click along the road somewhere between vertex 2 and vertex 5 (as numbered in the illustration for creating a route). The coordinates are entered in the Move To Location dialog box.
12. Click OK. The task is added to the plan.
13. In the Plan window, click OK.
14. Save the scenario.

Run the scenario. The Bradley follows the route. Then it changes its heading to face south and drives to the location you specified.



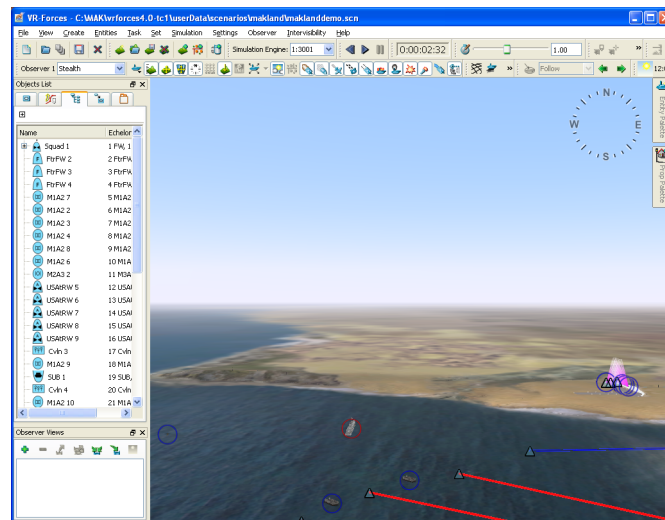
To try out a more complex version of this scenario, please see *VR-Forces Getting Started Guide*.

6. Experience the 3D View

In this section, you will run the same scenario that you ran in the 2D view and explore the similarities and differences with the 3D view.

6.1. Load a Scenario

1. Choose **Observer** → **Set Observer Mode** → **Stealth**.
2. Choose **File** → **Load Scenario**. The Load Scenario dialog box opens.
3. Select the *makland* directory.
4. Select *maklanddemo.scn*.
5. Click Open. A terrain and entity models are displayed in the VR-Forces window.



6.2. Run the Scenario in the 3D View

In the top-down view of the 2D view, you can see all entities and objects at the same time. This is because the size of the icons is exaggerated relative to the terrain. By default, the 3D view shows realistically sized models. If you were to zoom out and up to get the same overall view as the 2D view, you probably would not be able to see any of the entities. In the 3D view, you will probably look at only part of the scenario at any given time and will move the observer (the eyepoint) through the 3D view to observe entity activity. So, let's attach the observer to an entity before we run it.

1. In the Objects List panel, select USAtRW 1.
2. Right-click and choose Attach Follow.
3. Press the **Spacebar**. (This places the observer in the default location relative to the entity.)
4. Choose **Simulation** → **Run Scenario**.
5. In addition to all of the entities. You also see many tactical graphics. To simplify the view a bit, choose **Settings** → **Tactical Graphics**.

6.3. Navigate the 3D View

You can navigate through the 3D view 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-Forces Users Guide*.

Use the controls described in the next sections to navigate through the terrain as the scenario runs.

Use the Game-like Keyboard Navigation

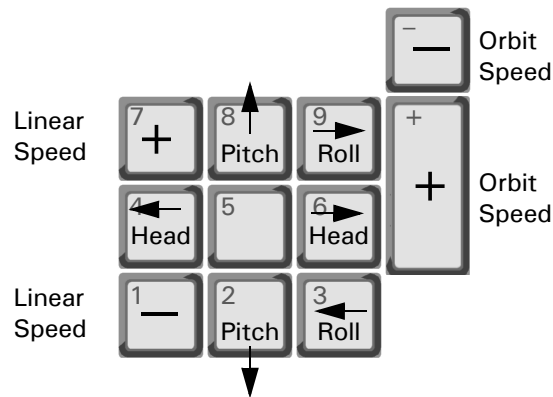
Press **w** and **s** to move forward and backward.
Press **e** and **q** to move up and down. Press **a** and **d** to move left and right.

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.



Use the Mouse to move the Observer

The mouse has navigation options that are not available on the keyboard.

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.

6.4. Create a Scenario in the 3D View

The main difference between creating a scenario in the 2D view and the 3D view is how you approach creating entities and control objects. Assigning tasks and writing plans is exactly the same. In this section we create the same scenario as we did earlier in this guide, but this time we do it in the 3D view.

The 3D view is very good for placing entities precisely on the terrain in a small area. It is not as good for placing many entities over a large area because in order to see a large area, you have to zoom out to a point where the 3D models are not easily visible. Similarly, the 3D view is very good for placing the vertices of tactical graphics precisely where you want them. However, it is much less convenient for drawing large areas or routes where you need to see a lot of the terrain at one time.

1. Choose **File** → **New Scenario**, or click the New Scenario button on the File toolbar. The Choose Simulation Terrain dialog box opens.
2. In the file list, select *VR-Village.mtf*.
3. Click Open. The New Scenario dialog box opens.
4. Give the scenario a name.
5. Accept all the default scenario parameters. Click OK. The window displays the VR-Village terrain database.
6. Choose **Observer** → **Set Observer Mode** → **Stealth**. This is one of the 3D observer modes.
7. Press the **Spacebar**.

Create an Entity

1. Hold down the **e** key. This drops the observer down into the village.
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. Continue using the various navigation keys or the mouse to get to the location shown in the illustration (it is the southern entrance to the village, the place where you created the M2A2 in the 2D view):



3. Click the Entity Palette tab. It expands to show the Entity Palette.
4. In the Categories list, select Ground.
5. In the Force list, select Friendly.
6. In the list of entities, select M2A2 Bradley IFV. Move the mouse over the terrain. The cursor changes to show the model for an M2A2 Bradley.
7. Click on the street where the road enters the village. A model is placed at that location.



8. Right-click to exit create entity mode.
9. Move the observer so that you see the road where you created the GAZ-69 in the 2D version of the scenario.



Step 9



Step 14

10. On the Entity Palette, change the force to Opposing.
11. Select the GAZ-69 vehicle. The cursor changes to show the correct model.
12. Move the cursor so that the model is over the bridge. (The model might go under the bridge, but when you place it, it will be on top.)
13. Hold down the shift key and the left mouse button and move the mouse to rotate the vehicle model until it is aligned with the street, facing into the town.
14. Click to place the entity.

Create a Control Object

1. Use the navigation keys to zoom out and rotate for a top down view of the village.
2. Choose **Create** → **Route**. The cursor changes to create object mode.
3. Click on the map in front of the Bradley.

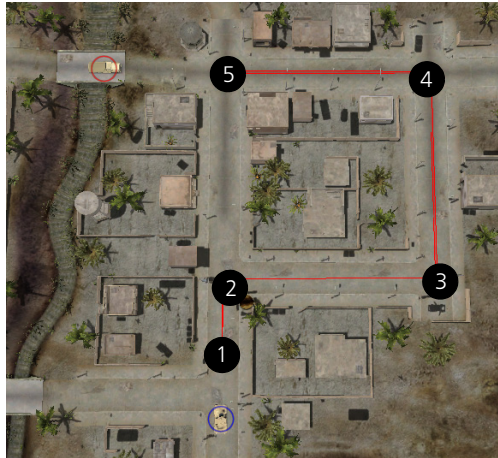


Figure 4. Vertex locations

4. Add additional route vertices by clicking the locations of 2, 3, and 4 in the figure.
5. For the end point, right-click at location 5. The route is created.

If you want to, you can give the Bradley vehicle a plan, as you did in the 2D version of this scenario. Alternatively, close this scenario and load the scenario you created in the 2D front-end. Run the scenario and observe the entity behavior.

6.5. Try Out XR Mode

As we mentioned earlier, one of the drawbacks of the 3D view (Stealth observer mode) is that if you zoom out from the terrain, you probably will not be able to see any but the largest entities. VR-Forces has a special observer mode to deal with this problem. In eXaggerated Reality (XR) mode, entities are represented by oversize, stylized models. Let's take a look at the makland scenario in XR mode.

1. If you are not in Stealth observer mode, select it on the Observer Settings toolbar.



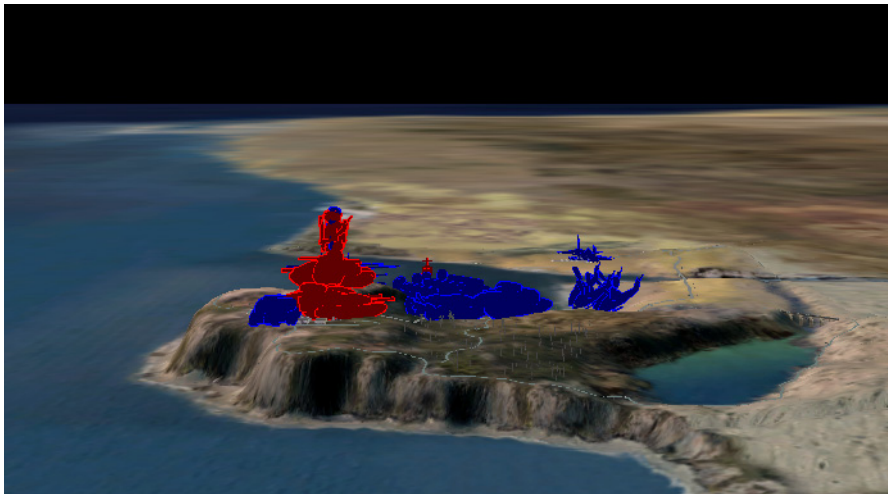
2. Choose **File** → **Load Scenario**. The Load Scenario dialog box opens.
3. Select the *makland* directory.
4. Select *maklanddemo.scn*.
5. Click Open.
6. Select the Stealth observer mode.
7. Press **Spacebar** to reset the observer.
8. Choose **Settings** → **Entity Labels**.
9. Press **s** and **q** to move the observer farther away. Can you see any entity models?





In step 9, why did we tell you to move the observer farther away, rather than asking you to zoom out? After all, that is what it looks like you are doing. In the 3D view, there is a difference between zooming (or magnifying) the view and moving the observer. Zooming happens relative to the observer's location. You can zoom in and you can zoom back out to the observer. But you cannot zoom out past where the observer is. So if you want to see more of the terrain, you have to move the observer farther away.

10. On the Observer Settings toolbar, select XR observer mode. Notice how the entities are now visible.



Another feature of the 3D view for helping you to see entities when the observer is far from the terrain is model scaling. When you go into XR mode, it is automatically enabled. If it is disabled, you can enable it on the Observer menu.

11. Choose **View** → **Observer Control Panel**.
12. On the Observer Control panel, slide the Model Scaling slider and see how the entity models change size.

7. Learn More

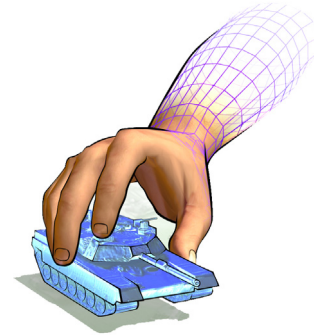
For a more detailed version of the information in this guide, please see *VR-Forces Getting Started Guide*. For complete details about using VR-Forces, see the appropriate manual, as listed in [Table 1](#). The VR-Forces documentation set is provided to all customers in PDF format. PDF versions of the manuals are in the *.doc* directory and, in Windows, are accessible from the VR-Forces shortcuts on the Start menu.

Table 1: Documentation roadmap

If you want to know:	Read this:
How to navigate the 2D and 3D views, attach the observer to entities, change GUI settings and so on. Everything about the GUI except how to create and run scenarios.	<i>VR-Forces Users Guide</i> , online help
How to create scenarios, assign tasks and sets, and write plans.	<i>VR-Forces Scenario Management Guide</i> , online help, and video tutorials at www.mak.com/products/vrforces_tutorials.php
How to use the SDK (APIs).	<i>VR-Forces Developers Guide</i> , <i>VR-Forces Front-End Developers Guide</i> , class documentation, header files
How to add, change, delete, or configure entity and object models and behaviors without writing code.	<i>VR-Forces Configuration Guide</i>
How to optimize performance.	<i>VR-Forces Configuration Guide</i>
How to use the Entity Editor, OPD Editor, or Scenario Merge utilities.	<i>VR-Forces Configuration Guide</i> , online help in each utility
How to compose terrains using elevation data, imagery, and feature data and save the terrains to the MTF format.	<i>VR-Forces Configuration Guide</i> and online help.
How to create GDB terrains from other formats, associate image data with terrains, and create MTD files.	<i>MAK Terrain Database Tool Users Guide</i> , TDB Tool online help
Add feature data to a GDB file.	<i>MAK Terrain Database Tool Users Guide</i> , TDB Tool online help
How to upgrade from older versions of VR-Forces.	<i>VR-Forces Migration Guide</i> , <i>VR-Forces Release Notes</i>
High level information about component models.	Class documentation
What the API examples do and how to build them.	Class documentation

Table 1: Documentation roadmap

If you want to know:	Read this:
Answers to frequently asked questions.	www.mak.com/support/faq.php
Which manual to look in to find specific information.	<i>VR-Forces Documentation Center</i>



Installation and Licensing

Your MÄK salesperson has given you links to the VR-Forces installers, and may have given you links to other applications, such as B-HAVE. Download the files. Before you install the applications, note the following possible issues:

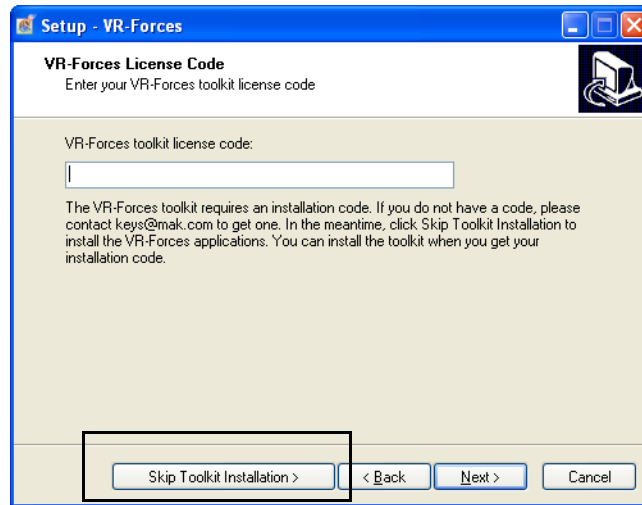
- ♦ You must have administrator privileges to install VR-Forces on Windows Vista.
- ♦ When you install VR-Forces on Vista, there may be a delay of up to several minutes from the time you try to run the setup program to the time that an installation dialog box is displayed. If you experience this problem, 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.

A. Install VR-Forces

VR-Forces has two installers. The first installs the application and, optionally, the SDK. The second installs application data. You must install the application data or the application will not run.

To install VR-Forces:

1. Run the application installer. On the VR-Forces License Code page, click Skip Toolkit Installation.



2. Run the data installer. When the installation wizard asks if it is OK to install in the existing VR-Forces directory, click Yes.

Install any other applications your salesperson has provided from their installers.

B. Setting Up the License Manager

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

- To install the 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/LicenseManager* directory on the license server.
3. Run the license server.
4. Specify the license server location.

B.1. Identify the Host ID and License Server Name

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

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

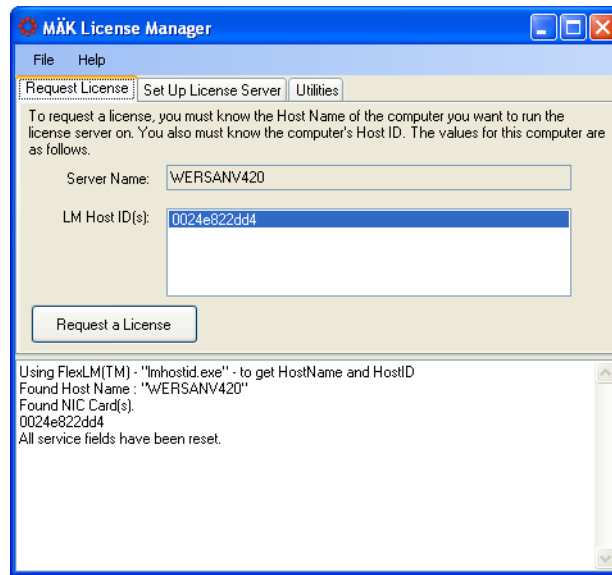


Figure 1. License Manager

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.

B.2. Put the License File in the *LicenseManager* Directory

When you receive your license file, put it in the *LicenseManager* 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.

B.3. Run the License Server

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

Shutting Down the License Server

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

B.4. Specify the License Server

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

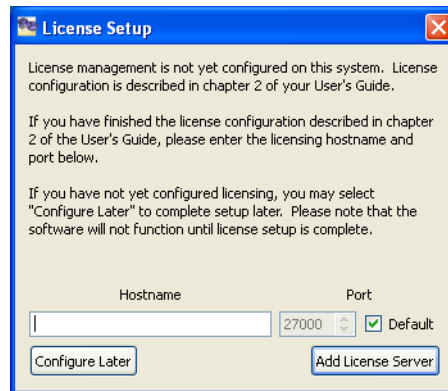


Figure 2. License Setup dialog box

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