VIII. Tactical Graphics

Tactical graphics are objects that represent points, lines, areas, and information overlaid on the terrain. This section describes overlays and particular details about tactical graphics.

- For generic information about creating tactical graphics, see "Creating and Placing Objects".
- For information about creating and using spawn points, sink points, and air traffic areas (all of which are tactical graphics), see "Generating Traffic (Pattern of Life)".
- For information about combat engineering objects, which are displayed similarly to tactical graphics, see "Combat Engineering Objects".

2. Introduction to Tactical Graphics

This chapter is a brief introduction to tactical graphics.

2.1. Overview

You can add tactical graphics to scenarios. Tactical graphics are objects that represent points, lines, areas, and information overlaid on the terrain. They are automatically assigned to overlays. (You can change the overlay at or after creation.) Simulation objects have knowledge of some types of tactical graphics, which allows tasks and plans to take them into account. VR-Forces supports these types of tactical graphics:

Table 1. Types of tactical graphics

Tactical Graphic	Description
Control objects	**Simulation objects are aware of control objects and can respond to them. They avoid obstacles, can move to waypoints, follow routes, and so on.**
Waypoint	A specific X, Y, Z coordinate.
Area	A polygonal area. Areas are considered to have volume, so that air and subsurface entities can interact with them.
Route	A sequence of points in three-dimensional space.
Phase Line	Infinitely long line defined by two points.
Obstacle	A polygonal area on the terrain that simulation objects try to avoid if obstacle avoidance is enabled.
Linear Obstacle	A line on the terrain that simulation objects try to avoid if obstacle avoidance is enabled. Linear obstacles are supported only for entity-level scenarios. They work only in navigation areas.
Pedestrian Path	When humans plan paths in navigation areas that have navigation data, if a pedestrian path is present that can take them to their destination, they will use it. You can think of a pedestrian path as a route that a human will automatically choose to follow instead of being told to follow it. Pedestrian paths are supported only for entity-level scenarios.
Terrain Page-in Area	An area in which streaming or paged terrain is given priority for paging in.
Other tactical graphics	
Terrain Profile Line	A line that lets you examine the profile of the terrain along the line.
Intervisibility Line	A line that shows line-of-sight between two points.
Lines	Generic lines and lines with particular graphics, such as main axis and fortified line.
Bullseye	A graphic for measuring distances between a simulation object or the mouse cursor and the bullseye.
Points	Various military symbology, such as point of contact and decision point. Simulation objects treat most points as waypoints.

Table 1. Types of tactical graphics (continued)

Tactical Graphic	Description
Areas	Minefields and other areal objects. These are not treated like area control objects.
Weather	A variety of weather conditions that display in the 3D view. For information about weather tactical graphics, see "Using Weather Tactical Graphics".
Text	Any arbitrary informational text on the screen.
Symbols	Symbols that do not represent simulated objects. They are just graphics on the screen and do not affect the simulation.
Circles, ellipses, boxes, and spider webs	These are only graphics and do not affect the simulation.
Volumetric objects	Volumetric areas, circles, boxes, ellipses, and corridors allow you to test for a simulation object's presence in a 3D volume rather than just a 2D area. They are useful for defining air corridors and airspace.
Combat engineering objects	Combat engineering objects are lines and areas that can impede the progress of simulation objects and cause damage to them. Combat engineering objects are supported only in aggregate-level scenarios. For information about how they work, see "Combat Engineering Objects".

ⓘ In aggregate-level scenarios, linear obstacles and pedestrian paths are not supported.

Tactical graphics have names. New objects are assigned default names in the format **Point 1**, **Point 2**, **Route 1**, **Route 2**, and so on. You can specify an alternative name when you create the object. A graphical object's name can be up to 255 characters long.

Tactical graphics can have labels and extended labels. They do not have to be unique and do not have a length restriction.

Tactical graphics are assigned to a force. Waypoints and bullseyes are displayed using their force color. To determine the force of other tactical graphics, examine the Force attribute in the State Data page of the graphic's Information dialog box. For more information, see "Displaying Information About an Object".

The following sections provide more information about the basic control objects. For information about the other tactical graphics types mentioned in this section, see:

- "Intervisibility and Range".
- "Terrain Profiles".
- "Manually Paging-In Terrain in VR-Forces" in the *Adding Content to MAK ONE Applications Reference Manual*.

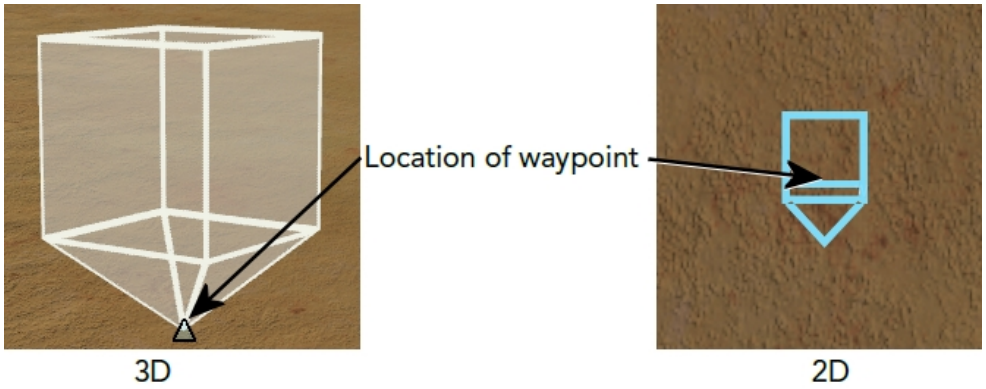
- "Creating and Placing Objects".
- "Chapter 3. Overlays" on page 13.

2.2. Points

A point identifies an X, Y, Z coordinate in the terrain. You can command a simulation object to travel to a point and to travel back and forth between points. Figure 1 illustrates waypoints in the 3D and 2D views. In 3D, the bottom of the symbol points to the location of the waypoint. In 2D, it is centered. You can place several different kinds of points on overlays.

A point can have an altitude value. This allows you to send aircraft to waypoints or have them patrol between points.

Figure 1. Waypoint symbol



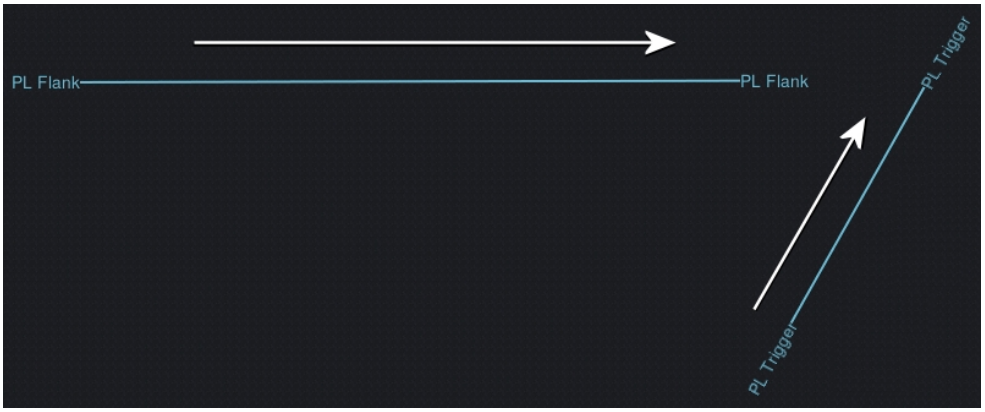
Waypoints clamp to the actual surface of the entity. To place a waypoint on a simulation object in the ocean, you may need to disable buoyancy before placing the waypoint (or other point tactical graphic); see "Enabling Buoyancy for Surface Entities".

2.3. Phase Lines

A phase line is defined by two points, but is considered to extend indefinitely in either direction and have infinite height. A phase line is used to test the location of a simulation object, for example: Is simulation object A to the left of phase line B? The left side of the line is determined relative to the direction in which the line is drawn. A phase line's label is placed at the beginning and end of the line. Figure 2 illustrates two phase lines. The arrows are placed to the left of the line and indicate the direction of the line.

Simulation objects cannot move along phase lines. Do not use a phase line if you want a two-point route.

Figure 2. Phase line direction and left side



2.4. Routes

A route is a sequence of points in three-dimensional space. Like phase lines, routes have a direction. A line's name is displayed at its beginning.

Simulation objects can move along routes from one end to the other, and can patrol back and forth along them.

> Do not create a two-point route if you want a phase line. VR-Forces cannot determine whether a simulation object is to the left or right of a route.

2.5. Areas

An area defines a polygonal area on the terrain. (This is not a terrain polygon; it is only a graphic.)

Areal tactical graphics represent a distinct place or an area with a specific purpose. Areas can also be used to test the location of a simulation object, for example: Is simulation object A in area B?

2.6. Obstacles

Obstacles represent lines and areas of the terrain that would cause a simulation object problems, such as a ditch or minefield. In entity-level scenarios, if obstacle avoidance is enabled, if a ground entity encounters an obstacle in its path, it tries to drive around the obstacle.

In addition to obstacles, aggregate-level scenarios support combat engineering objects and contamination areas. These objects can defend, damage, or impede simulation objects.

The many combat engineering objects available in aggregate-level scenarios make simple obstacles comparatively less useful. Linear obstacles are not supported in aggregate-level scenarios. They only work in navigation areas.

2.7. Displaying Tactical Graphics

You can configure the display of tactical graphics:

- Enable and disable the display of tactical graphics.
- Show or hide vertex indicators for point, linear, and areal objects. (By default, vertex indicators are displayed only when a tactical graphic is selected, except for intervisibility and range lines.)
- Show or hide height-above-terrain lines.
- Display height-above-terrain lines only for selected graphics.

Figure 3. Tactical graphics with height-above-terrain lines (3D)

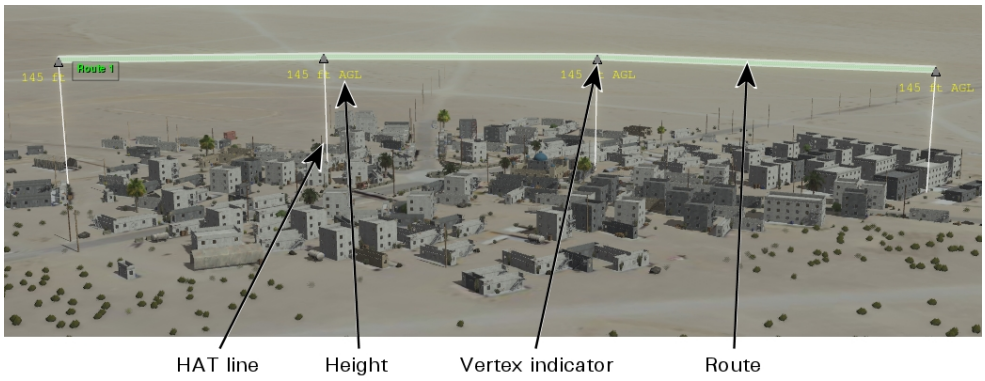


Figure 4. Tactical graphic (2D)

2.7.1 Showing and Hiding Tactical Graphics

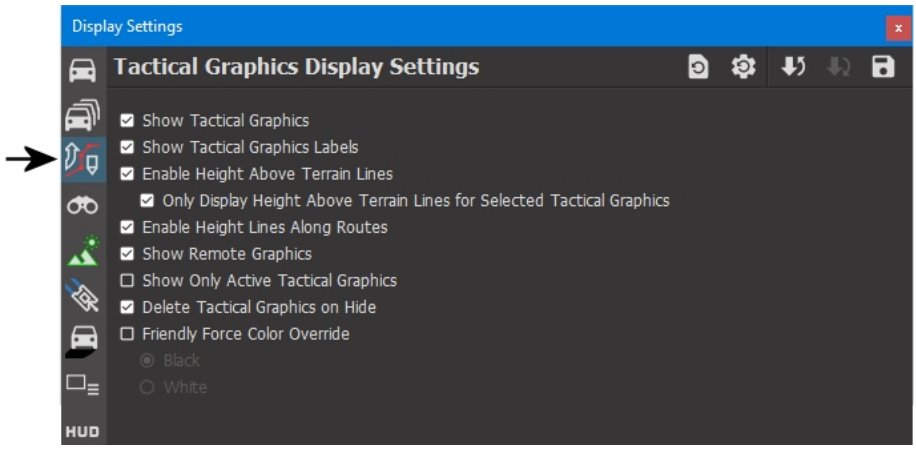
You can control the display of tactical graphics from the Display Settings dialog box, Tactical Graphics Display Settings page, from menu and toolbar options, and from the Overlays tab.

> ⓘ By default, tactical graphics are destroyed when you hide them and recreated when you show them again. This can cause performance issues when showing and hiding tactical graphics. See "Configuring How Tactical Graphics Are Hidden" on the facing page.

➤ **To show or hide tactical graphics:**

1. Choose **Settings > Display**. The Display Settings dialog box opens.
2. Select the Tactical Graphics Display Settings page (Figure 5).

Figure 5. Tactical Graphics Display Settings page



3. Select or clear the Show Tactical Graphics check box.
4. To show only active tactical graphics, select Show Only Active Tactical Graphics. For more information about active tactical graphics, see "4.11. Active and Inactive Tactical Graphics" on page 44.

- You can also enable and disable tactical graphics by clicking the Show/Hide Tactical Graphics button ( ) on the Display Settings Toolbar.
- You can choose whether to display tactical graphics only when they are active by clicking the Show Only Active Tactical Graphics button ( ).

Showing and Hiding Tactical Graphics on the Overlays Tab

On the Overlays tab, you can show and hide tactical graphics individually and by overlay.

➤ **To control the display of tactical graphics from the Overlays tab:**

1. On the Objects List Panel, select the Overlays tab (Figure 7 on page 15).
2. To hide all graphics on a particular overlay, clear the check box for that overlay.
3. To hide a specific tactical graphic, clear its check box.
4. To redisplay a hidden tactical graphic or overlay, select its check box.

Configuring How Tactical Graphics Are Hidden

You can make tactical graphics invisible instead of destroying them when you choose to hide tactical graphics. In scenarios with a number of tactical graphics that you want to hide and display again, this can improve performance.

To make tactical graphics invisible when hidden:

1. Choose **Settings > Display**. The Display Settings dialog box opens.
2. Select the Tactical Graphics Display Settings page (Figure 5 on the previous page).
3. Select or clear the Delete Tactical Graphics on Hide check box.

2.7.2 Showing and Hiding Tactical Graphics Labels

In addition to displaying the outlines of tactical graphics, you can display labels for these objects. For example, labels are enabled in Figure 3 on page 8 and Figure 4 on page 8. VR-Forces can display a tactical graphic's label and height above terrain (Figure 5 on the previous page).

ⓘ Displaying vertex labels can affect performance.

➤ **To show or hide vertex labels:**

1. Choose **Settings > Display**. The Display Settings dialog box opens.
2. Select the Tactical Graphics Display Settings page (Figure 5 on the previous page).
3. Select or clear the Show Tactical Graphics Labels check box.

ⓘ
- You can also enable and disable tactical graphics labels by choosing **Settings > Tactical Graphics Labels** or clicking the Tactical Graphics Labels button () on the Display Settings Toolbar.
- Text on tactical graphics is hidden when the observer is at an altitude such that the text is longer than the adjacent line segment or shape. Because of this, the text on larger tactical graphics is visible at higher altitudes than the text on smaller ones.

2.7.3 Displaying HAT Lines for Vertices

In 3D observer modes, you can display height-above-terrain (HAT) lines for the vertices of tactical graphics (Figure 3 on page 8). These vertical lines between an object's vertices and the ground help you understand the relationship of the object to the terrain. The height for each vertex is displayed (using whatever units are configured on the Display Units Settings page).

HAT lines at vertex points are shown only for tactical graphics that could be above or below the ground, such as routes and waypoints. You can show and hide these lines and you can specify that they be shown for all objects or only for the selected objects.

⚠ Use of height above terrain lines can reduce the frame rate.

➤ **To show or hide height-above-terrain lines:**

1. Choose **Settings > Display**. The Display Settings dialog box opens.
2. Select the Tactical Graphics Display Settings page (Figure 5 on the previous page).
3. To display HAT lines, select the Enable Height Above Terrain Lines check box.

4. To only display lines for selected objects, select the Only Display Height Above Terrain Lines For Selected Tactical Graphics check box.

2.7.4 Displaying HAT Lines for Routes (3D Only)

You can choose whether to display HAT lines for route tactical graphics in the scenario. These thin, light-colored lines display in regular intervals, pointing towards the terrain to help you visualize the height. There is no terrain intersection; if the route is above water, the HAT lines can go below sea level.

> To configure the appearance of the HAT lines, edit the Environmental Line visual definition for the route tactical graphic's element definition and specify the values for **enableheightlines**, **heightlinescolor**, and **heightlinesspacing**. See the *Element Definitions* chapter in the *Adding Content to MAK ONE Applications Reference Manual* to learn more.

➤ **To enable or disable HAT lines for track histories:**

1. Choose **Settings > Display**. The Display Settings dialog box opens.
2. Select the Tactical Graphics Display Settings page (Figure 5 on page 9).
3. Select or clear the Enable Height Lines Along Routes check box.

2.7.5 Displaying Tactical Graphics as Black or White

By default, most tactical graphics display as the color of the selected force. You can also change the color of tactical graphics using the create/edit dialog box. In the display settings, you can override these colors for friendly force tactical graphics to display them as either black or white.

➤ **To override the colors of friendly force tactical graphics:**

1. Choose **Display > Settings**. The Display Settings dialog box opens.
2. Select the Tactical Graphics Display Settings page (Figure 5 on page 9).
3. Select the Friendly Force Color Override check box.
4. Select either the Black or White option.

3. Overlays

This chapter explains how to create and edit overlays.

3.1. Creating and Editing Overlays

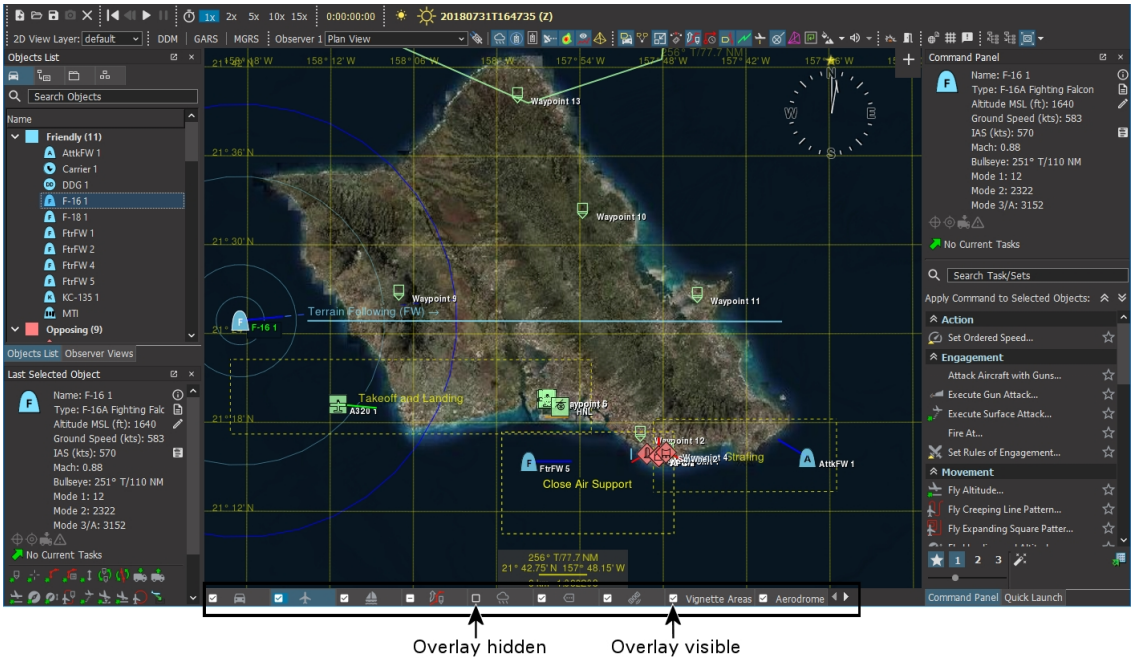
Overlays provide a convenient way to organize and manage the tactical graphics and simulation objects in a simulation. They are the equivalent of adding clear plastic overlays to a physical map and drawing on them. You can add any number of overlays. You can enable or disable editing of the objects they contain.

When you create an object, if you do not explicitly assign it to an overlay, it is placed on a default overlay. By default, simulation objects are placed on an overlay that corresponds to its high level filter – ground, air, human, and so on. All tactical graphics are placed on the tactical graphics overlay.

You can add overlays in the Simulation Object Editor and specify that they be used as the default overlay for specific object types. They are identified by text. You cannot specify an icon.

Overlays and their contents are displayed in the Overlays View of the Objects List Panel. The default overlays are identified by icons on the Overlay toolbar and by icons and text on the Overlays View of the Objects List Panel. You can show and hide objects by overlay and individually (Figure 6).

Figure 6. Overlays View and Overlay Bar

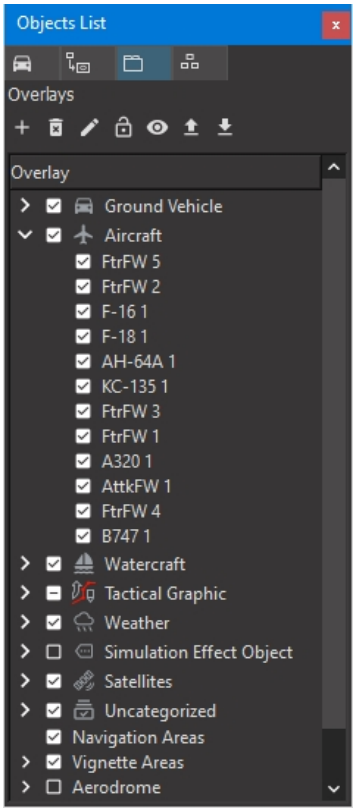


3.1.1 Creating an Overlay

➤ **To create an overlay:**

1. On the Objects List Panel, select the Overlays View (Figure 7).

Figure 7. Overlays View



2. Click the Add button (+). An overlay is added to the list with a default name.
3. Optionally, change the name as described in "3.1.6 Changing an Overlay's Name" on page 17.

3.1.2 Selecting Overlays

➤ To select an overlay, click its name on the Overlays View.

3.1.3 Locking an Overlay

When an overlay is locked, you cannot edit the objects on it. You can still add and delete objects.

When you save a scenario, VR-Forces saves the locked/unlocked state of each overlay. (If you lock or unlock an overlay while you are running a scenario, but do not save the scenario, the state of the overlay is not saved.

➤ **To lock or unlock an overlay:**

1. On the Objects List Panel, select the Overlays View.
2. Select the overlay you want to lock or unlock.
3. Click the Lock/Unlock Overlay button (or).

3.1.4 Hiding the Objects on an Overlay

You can hide the objects on an overlay. This may be convenient if you want to focus on a particular set of simulation objects or tactical graphics while you are editing or observing a scenario. You can hide all of the objects on an overlay or individual objects. You can also quickly:

- Hide all overlays except the selected one.
- Hide all overlays.
- Show all overlay.

ⓘ When you save a scenario, the show/hide state of default overlays and objects on them is not saved. The state of user-created overlays is saved.

➤ To hide all of the objects on an overlay, on the Overlay Bar or on the Object Lists Panel, Overlays View, clear the check box for the overlay whose objects you want to hide.

➤ To hide individual objects on an overlay, on the Objects List Panel, Overlays View, clear the check box for the object.

➤ **To hide all overlays except the selected one:**

1. Right-click the overlay that you want to be visible. A menu opens.
2. Choose Hide All but This.

➤ **To show all overlays:**

1. Right-click any overlay. A menu opens.
2. Choose Show All Overlays.

➤ **To hide all overlays:**

1. Right-click any overlay. A menu opens.
2. Choose Hide All Overlays.

3.1.5 Hiding Newly Created Objects

You can specify that newly created objects be hidden. When you set this option on one of the default overlays, the setting is not saved. When you set this option on a user-created overlay, it saves with the scenario.

➤ **To specify that newly created objects be automatically hidden:**

1. On the Overlay Views panel, select the overlay whose objects you want hidden.
2. Click the Auto-hide button (). A crossed out eye () is added to the overlay name to show that objects created on this overlay are hidden.

3.1.6 Changing an Overlay's Name

You can customize the name of a default overlay, such as Ground Vehicle or Tactical Graphics. However, the next time you create an object that is assigned to a default overlay, unless you assign it to the renamed overlay, a new overlay with the default name is created.

➤ **To change an overlay's name:**

1. On the Objects List Panel, select the Overlays View.
2. Select the overlay that you want to rename and click the Rename button, or slowly double-click the overlay whose name you want to change. The name becomes editable.
3. Type a new name.
4. Press **Enter**.

3.1.7 Removing an Object from a User-Created Overlay

You can remove objects from a user-created overlay. You might do this if you want to delete the overlay but do not want to remove the simulation object.

➤ To remove an object from a user-created overlay, in the Overlays View, right-click the object that you want to remove from the overlay and then choose **Remove From Overlay**.

3.1.8 Deleting an Overlay

➤ **To delete an overlay:**

1. On the Objects List Panel, select the Overlays View.
2. Select the overlay you want to delete.

> ⚠ When you delete an overlay, all of the simulation objects and tactical graphics on it are also deleted.

3. Click the Delete button ().

3.2. Saving and Loading Tactical Graphics and Overlays

If you publish a tactical graphic, it is automatically saved to the scenario objects file (*.oob*). If you do not publish a tactical graphic, it is automatically saved to the overlay file (*.ovl*). There may be cases where you want to create a set of overlays for use in multiple scenarios. You can save them to an overlay file independently of the scenario, or even save the overlays and not save the scenario at all.

> When you save overlay objects, only unpublished tactical graphics are saved.

To save overlays and tactical graphics:

1. Choose **File > Overlay > Save Overlay**. The Save Overlay dialog box opens.
2. Type a name for the overlay file.
3. Click Save.

3.2.1 Loading Tactical Graphics and Overlays

You can load overlays that you have saved from a previous session.

➤ **To load overlays:**

1. Choose **File > Overlay > Load Overlay**. The Load Overlay dialog box opens.
2. Select the overlay file you want to load.
3. Click Open.

> When you load overlay objects, you must use the same terrain database you created them on, or a terrain database that includes the area they were created in.

3.3. Exporting Tactical Graphics as Shapefiles

You can export point, line, and area tactical graphics to shapefiles. VR-Forces exports all of the graphics on a selected overlay. This may be useful if you need feature data for a terrain, such as a road network, but there is no feature data available from external sources. You can edit the shapefile created by VR-Forces in an appropriate third-party application to add the attributes needed to fully specify the features. For example, suppose you need a road network. You would create routes in the proper locations in VR-Forces and export the overlay to a shapefile. Then you would edit the shapefile to connect the road segments, specify road width, number of lanes, and so on. You could then load the shapefile in VR-Forces or any other application that supports shapefiles.

When VR-Forces creates shapefiles from tactical graphics, it creates separate files for points, lines, and areas. It appends *P.shp*, *L.shp*, or *A.shp* to the filename you provide based on the tactical graphics types being exported. For example, if an overlay has points and lines and you export them to myFeatures, VR-Forces creates files called *myFeaturesP.shp* and *myFeaturesL.shp*.

➤ **To export tactical graphics as shapefiles:**

1. On the Objects List Panel select the Overlays View.
2. Select the Overlay whose tactical graphics you want to export.
3. Choose **File > Overlay > Save Overlay as Shape Files** or click the Save Overlay as Shapefile button () on the Overlays View. The Save Overlay as Shape Files dialog box opens. (You can also right-click an Overlay on the Overlay Bar and open the context-sensitive menu.)

4. Type a name for the shapefile.
5. Click Save.

3.3.1 Importing Shapefiles into Overlays

You can import feature data into overlays. Features are placed as points, lines, or areas. This is a quick way to create tactical graphics for features such as roads, buildings, and so on. For example, if you were to load the *MAK Earth (online).mtf* terrain and import *BuildingsP.shp*, which is used in the Little Pond terrain, it places a group of waypoints at the locations of the buildings.

> Importing shapefiles into an overlay is not the same thing as adding a feature layer to the terrain. For example, importing a file such as *RoadsL.shp* to an overlay creates routes that can be referenced in movement tasks. Adding it as a feature layer creates a road network that could be used for path planning.

➤ **To import feature data into an overlay:**

1. Select an overlay.
2. Choose **File > Overlay > Import Shape File Onto Overlay** or click the Import Shapefile Onto Overlay button () on the Overlays View. The Import Shapefile Onto Overlay dialog box opens.
3. Select the shapefile you want to import.
4. Click Open.

4. Creating and Editing Tactical Graphics and Control Objects

This chapter explains how to create and edit tactical graphics.

4.1. Creating Tactical Graphics

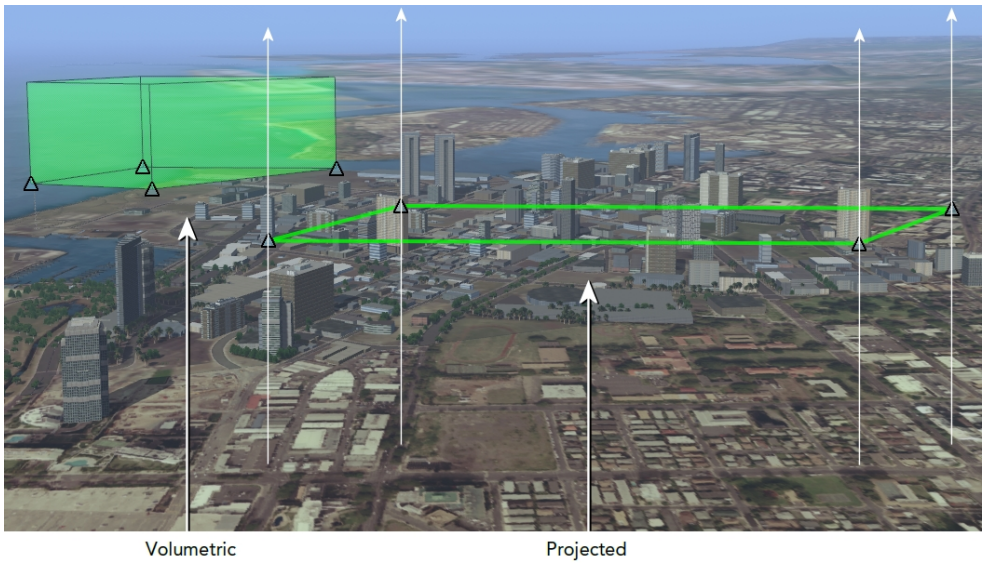
The generic procedures for creating tactical graphics are described in "Creating and Placing Objects". This section provides additional details about tactical graphic creation and placement.

4.1.1 How Areas Are Drawn

VR-Forces supports two types of areas, projected and volumetric (Figure 8). The points in a projected area do not have an altitude. They define an area that projects from ground level to an infinite height. Volumetric areas have a floor and a ceiling.

When you create a projected area, the points are drawn using the altitude of the first point in the area. This may result in some or all of the boundary of the area being drawn in the air. This is simply a matter of how it is drawn. The area still is projected from ground level upwards.

Figure 8. Volumetric and projected areas



4.1.2 Creating Freehand Lines

A freehand line is essentially many short line segments. After you create a freehand line, you can change the sampling rate used to determine how many segments it has. The fewer the segments, the less fluid the line is.

Unlike other lines, the individual vertices of a freehand line do not have vertex markers. You cannot select them individually on the map. However, you can edit them in the Edit Freehand Line dialog box.

The Freehand Line With Arrow tactical graphic automatically puts an arrow at the end of the line. However, you can also add an arrow to a freehand line that is created without one.

> If you reduce the sampling rate, resulting in fewer segments and a less fluid line, once you save the line you cannot automatically increase the number of segments to increase the fluidity of the line. You would have to add vertices by hand.

➤ **To create a freehand line:**

1. Open the Create Object Palette.
2. Optionally, click the Tactical Graphics filter ( ).
3. Select Freehand line.
4. Click where you want the line to start and, while holding down the left mouse button, draw a line on the screen.
5. Release the mouse button. The Create Freehand dialog box opens.
6. Edit the properties as desired.

4.1.3 Drawing Circles and Ellipses

Simulation objects do not interact with circles and ellipses. They are strictly for use as graphics.

> If you have cleared the Attach Object to Mouse check box in the Create Circle or Create Ellipse dialog box, you must still define the center point and other dimensions before the Create button is enabled. Since the object is not attached to the mouse, you will not see dynamic resizing of the object as you specify the points.

➤ **To draw a circle:**

1. Open the Create Object Palette.
2. Optionally, click the Tactical Graphics filter ( ).
3. Select Circle. The cursor changes to draw mode and shows a vertex icon.
4. Click to place the center of the circle. A center point is placed on the terrain and a circle is drawn. There is now a vertex icon on the circumference of the circle.
5. Drag the mouse to set the radius of the circle.
6. Click to complete the circle.

➤ **To draw an ellipse:**

1. Open the Create Object Palette.
2. Optionally, click the Tactical Graphics filter ( ).
3. Select Ellipse. The cursor changes to draw mode and shows a vertex icon.

4. Click to set the center of the ellipse. A center point is set and a small circle is displayed with a vertex indicator at the bottom of the circle.
5. Drag the mouse up or down and click to set the height of the ellipse. A vertex indicator is added to the left side of the circle.
6. Drag the mouse left and right and click to set the width of the ellipse.

4.1.4 Drawing Arcs

Simulation objects do not interact with arcs. They are strictly for use as graphics.

➤ **To draw an arc:**

1. Open the Create Object Palette.
2. Optionally, click the Tactical Graphics filter ().
3. Select Arc. The cursor changes to draw mode and shows a vertex icon.
4. Click to place one end of the arc.
5. Click to place the other end of the arc.
6. Drag the mouse to set the radius of the arc.
7. Click to complete the arc.

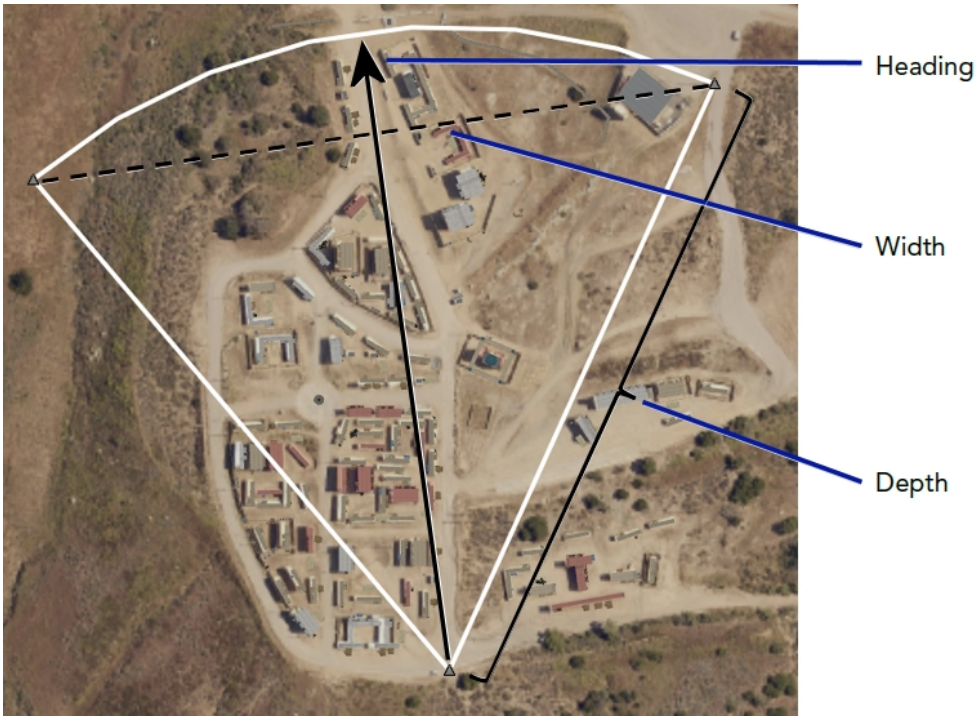
4.1.5 Drawing Sector Areas

Sector areas are defined by two legs with a common origin whose endpoints are connected by an arc (Figure 9). Drawn clockwise, the sector can be up to 360 degrees (a full circle).

In addition to the attributes typical to tactical graphics, you can manually specify these attributes in the Edit Sector dialog box:

- Width. The length of a line drawn between the end points of the two legs of the sector.
- Depth. The length of a line from the origin to the center of a line drawn between the end points of the two legs of the sector.
- Heading. The heading of a line drawn from the origin to the center of the arc of the sector.

Figure 9. Sector area



➤ **To draw a sector area:**

1. Open the Create Object Palette.
2. Optionally, click the Tactical Graphics filter ( ).
3. Select Sector. The cursor changes to draw mode and shows a vertex icon.
4. Click to place the common vertex of the sector.
5. Move the mouse and click to locate the end of one leg of the sector. (Do not hold down the mouse button while you move it.)
6. Move the mouse and click to locate the end of the other leg of the sector.

4.1.6 Drawing Spider Webs

Spider webs display sectors and ranges. Its heading is oriented to either true or magnetic north, based on the Display Units Settings. Each spoke displays its heading. In addition to the attributes typical to tactical graphics, you can manually specify these attributes in the Create Spider Web dialog box:

- Number of Rings. The number of rings to include in the spider web.
- Distance Between Rings (NM). The distance between each ring in the spider web in nautical miles.

  The spider web sizes itself based on the number of rings and the distance between them that you specify.
- Number of Spokes. The number of spokes in the spider web.

➤ **To draw a spider web:**

1. Open the Create Object Palette.
2. Optionally, click the Tactical Graphics filter ().
3. Select Spider Web. The cursor changes to draw mode and shows a vertex icon.
4. Open the Create Spider Web dialog box and then edit the parameters as desired.
5. Click where you want to place the center of the spider web. It is created using the parameters you specified.

4.1.7 Drawing Boxes

Boxes are constrained to be parallelograms. Simulation objects do not interact with boxes. (In other words, they are not areas.)

➤ **To draw a box:**

1. Open the Create Object Palette.
2. Optionally, click the Tactical Graphics filter ().
3. Select Box. A box is attached to the cursor
4. Click to place the box in the approximate location that you want.
5. Double-click any vertex. The vertex changes to show it is editable.
6. Drag the vertex to reshape the box.

4.1.8 Creating Volumetric (Extruded) Tactical Graphics

You can create volumetric tactical graphics. Volumetric tactical graphics are useful for defining air corridors, airspace, and similar 3D areas. Some volumetric graphics you can create are:

- Area (extruded).
- Box (extruded).
- Circle (extruded).
- Corridor (a linear object).
- Ellipse (extruded)
- Joint Engagement Zone (Altitude Limited)
- Missile Engagement Zone (Altitude Limited).

Volumetric areal objects have a floor and a ceiling above the terrain. Corridors have a width and height, which are centered on the vertices. Simulation objects can move along a corridor. (They move along the center line and ignore the height and width.)

The Entity in Area condition checks whether an entity is within the volume of an extruded area.

➤ **To create a volumetric tactical graphic:**

1. Open the Create Object Palette.
2. Optionally, click the Tactical Graphics filter ( ).
3. Select the volumetric tactical graphic you want to create.
4. Specify the vertices of the tactical graphic just like you would for a 2D tactical graphic. When you right-click to set the final vertex, the Edit dialog box should open.
5. If the Edit dialog box does not open, click its tab to open it.
6. If you are creating a route, specify the height and width. If you are creating any other extruded tactical graphic, specify the floor and ceiling (above mean sea level).
7. Click Create.

4.1.9 Adding Text to an Overlay

You can add text to an overlay. The maximum width of the text object is fixed.

➤ **To add text to an overlay:**

1. Open the Create Object Palette.
2. Optionally, click the Tactical Graphics filter ( ).
3. Select Text. The text "Text" is attached to the cursor.
4. Click to set the bottom center of the text. The Create Text dialog box opens.
5. Type the text you want in the Text box.
6. Edit any other properties as desired.
7. Click Create.

4.1.10 Assigning Tactical Graphics to an Overlay

By default, when you create a tactical graphic, it is assigned to the Tactical Graphics overlay. If no overlay exists, the overlay is created and the graphic is assigned to it. You can assign a tactical graphic to a different overlay when you create it or edit it. To assign a tactical graphic to an overlay when you create it, set this property as described in Specifying an Object's Properties Before You Create It (Click to Locate). To move a tactical graphic to a different overlay, follow the procedure in "Moving a Tactical Graphic to a Different Overlay" below.

Moving a Tactical Graphic to a Different Overlay

➤ **To move a tactical graphic to a different overlay:**

1. Select the tactical graphic you want to move.
2. Choose **Objects > Edit**. The Edit Object dialog box opens.
3. If Attach Object to Mouse is selected, clear the check box.
4. In the Overlay list, select the overlay that you want the tactical graphic to move to.
5. Click Update.

> ⓘ You can also move a tactical graphic to a different overlay by dragging it to the new overlay on the Overlays View of the Objects List Panel.

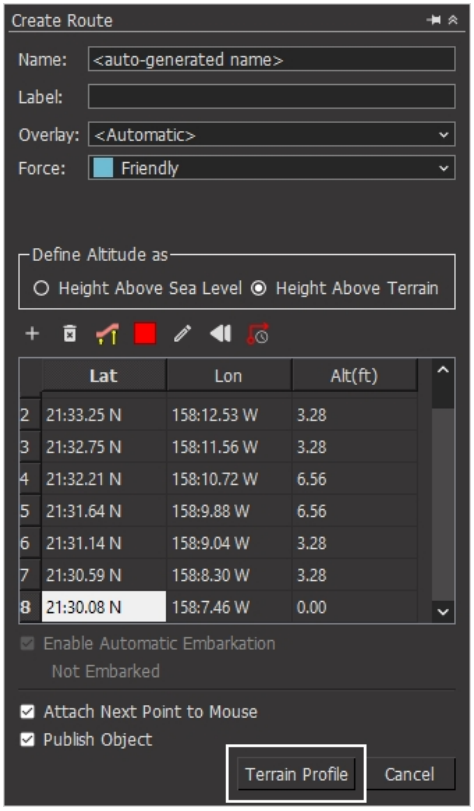
4.1.11 Displaying a Terrain Profile When You Create a Line

You can display a terrain profile window while you create a line. You can configure VR-Forces to automatically display a terrain profile when a line is created ("Configuring Terrain Profiles"), or you can display the window manually.

➤ **To open a terrain profile window while you are creating a line:**

1. Select the tactical graphic that you want to create as described in "Selecting the Object to Create". A Create *object* tab is added to the window below the palettes).
2. Click the Create *object* tab. A Create *object* dialog box that is appropriate for the object opens (Figure 10).

Figure 10. Terrain Profile button



3. Click to place the first vertex. The Terrain Profile button is activated.
4. Click Terrain Profile. A terrain profile window opens.
5. Complete the line. The terrain profile window stays open until you complete the line.

4.1.12 Publishing Tactical Graphics

By default, all tactical graphics are published. That is, they are sent out over the network and are visible to other participants in an exercise. You can choose to not publish a tactical graphic. In that case, it is visible only in the GUI on which it was created.

Published tactical graphics save to the scenario objects file. Unpublished tactical graphics save to the overlays file that is created as part of the scenario. You can also manually save tactical graphics to an overlay file separate from the one stored with the scenario.

➤ **To publish or unpublish a tactical graphic:**

1. Select the graphic you want to edit.
2. Choose **Objects > Edit**. The Edit Object dialog box opens.
3. To publish the object, select the Publish Object check box. To unpublish it, clear the check box.

4.2. Creating a Computed Route

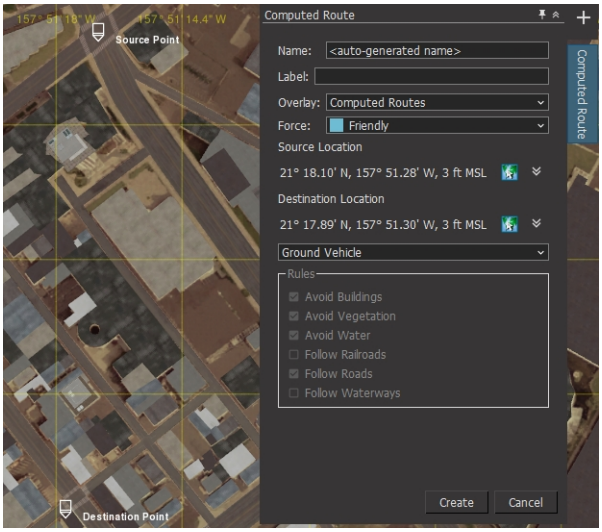
VR-Forces can create routes between two points and take into account criteria such as using roads and avoiding buildings and water. Unlike the temporary routes that VR-Forces creates for movement tasks, a computed route is a tactical graphic you save with the scenario and any simulation object can use.

When you create a computed route, you specify rules that VR-Forces should use when creating the route. VR-Forces includes preconfigured rule sets for ships and ground vehicles. You can add additional preconfigured rule sets. You can also add additional rules. The rules and rule sets are configured in *./data/simulationModelSets/<sms>/gui/computedRouteRulesTypes.xml*.

➤ **To create a computed route:**

1. Choose **Create > Computed Route**. The Create Computed Route dialog box opens (Figure 11).

Figure 11. Creating a computed route



2. Optionally, specify a name, label, and overlay.
3. Select the force for the route.
4. Click to place the starting point of the route, or expand the location group box by clicking the arrow next to enter a value for the Source Location.
5. Click to place the end point of the route, or enter a value for the Destination Location.
6. Select the type of vehicle from the list. Ground vehicles and ships have a preconfigured set of rules. Select Custom to choose a different set of rules.
7. If you select Custom, select the rules that you want to enforce for the route. Clear those you do not want to use.
8. Click Create.

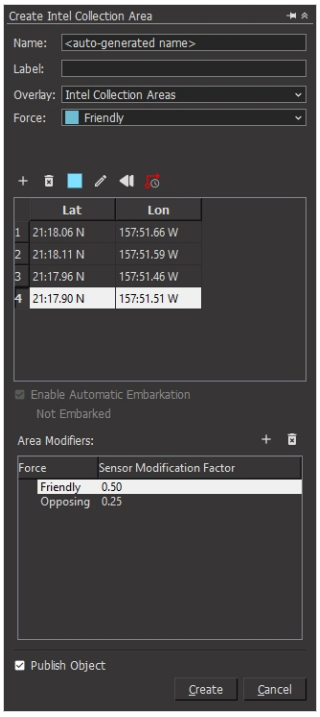
4.3. Creating an Intel Collection Area

Intel collection areas modify the sensor signatures of simulation objects within their boundaries. This affects the ability of other simulation objects to detect them. Intel Collection Areas are created just like other areas. The difference is specification of area modifiers. Area modifiers are set per force. A modifier greater than 1.0 increases the sensor signature for members of that force, making them easier to detect. A modifier less than 1.0 reduces their signature, making them harder to detect.

➤ **To create an intel collection area:**

1. Open the Create Object Palette.
2. Optionally, click the Tactical Graphics filter ( ).
3. Select Intel Collection Area.
4. Draw an area on the map as you would for any other tactical graphic area.
5. In the Create Intel Collection Area dialog box (Figure 12), click the Add button ( ) next to the Area Modifiers label. The Choose Force dialog box opens.

Figure 12. Create Intel Collection Area dialog box



6. Select the force for which you want to add a modifier.
7. Click OK. The force is listed in the Area Modifiers window.
8. Double-click the Modifier column to make it editable.
9. Type the modifier value you want to apply to this force.
10. Optionally, add additional force entries to the list.
11. Click Create.

4.4. Creating and Editing a Minefield Area

There are two types of tactical graphics for minefield areas: tactical graphics that simply represent areas where minefields could be in the scenario but have no affect, and simulation effect objects that create minefields with the parameters that you specify. The latter can damage entities that move through the area.

The tactical graphic minefield areas are:

- Minefield Antipersonnel. Represents a minefield designed for infantry.
- Minefield Antitank, Minefield Antitank Antihandling, Minefield Antitank Wide Area. Represent minefields designed for tanks.
- Minefield Decoy, Minefield Decoy Fenced. Represent decoy minefields.
- Minefield Graphic, Minefield Unspecified. Represent minefields of no specific type.
- Planned Minefield. Represents where a minefield could be placed in the future.
- Unexploded Explosive Ordinance. Represents ordinance that has not yet exploded.

The simulation effect object minefield areas are:

- Minefield Conventional. A minefield that can include conventional antitank and antipersonnel mines, which you define after drawing the minefield area. Conventional mines cannot self-destruct.
- Minefield RAAM-ADAM. A scatterable minefield that includes two types of mines, which self-destruct after 48 hours pass in the simulation. You can edit the minefield after you draw it and make changes to the mines.
- Minefield Scatterable. A minefield that can include remote anti-armor and area denial anti-personnel mines, which you define after drawing the minefield area. Scatterable mines can self-destruct.

➤ **To create a minefield:**

1. Open the Create Objects Palette.
2. Optionally, select the filter for Tactical Graphic () or Simulation Effect Object ().
3. In the objects list, select the minefield you want to create.
4. Draw an area on the map as you would for any other tactical graphic or control object area.
5. If you are creating a minefield tactical graphic or a RAAM-ADAM minefield object, the area displays on the map. Tactical graphics require no more work.

   If you are creating a conventional or scatterable object, the Create Minefield panel opens. If you are creating a RAAM-ADAM minefield object, you can edit the minefield using that panel. Specify the type of mines for the minefield:

   a. To add a mine type, click the Add button () in the lower area. The Configure Mine dialog box opens.
   b. From the Munition Type list, select the type of mine to add to the minefield.
   c. From the Fuse Type list, select the type of fuse for the mine.
   d. If you specified a trip wire fuse, specify the length for the trip wire.
   e. Click OK.
   f. In the Create Minefield panel, specify the areal density for the mine type, which is the number of mines per unit of measurement.
   g. If you are creating a scatterable minefield, you can specify the number of hours before the mine self destructs.
   h. Add more mine types to the minefield as needed.
   i. Click Create. The minefield displays on the map.

4.5. Creating Ditches, Berms, and Tank Scrapes

Ditches, berms, and tank scrapes are dynamic terrain objects that you can place to change the ground in parts of osgEarth terrains defined by `heightfield` elements.

- These dynamic terrain objects do not work in most high fidelity inset areas.
- The dynamic terrain objects are configured in the *./data/simulationModelSets/base/vrfSim/systems/other/dynamic-terrain.sysdef* file by the `linear-deformation` parameters in the `linear-deformation-list` block. Tank scrapes are directional, providing a place for tanks to take hull-down positions. The elevation deformation of tank scrapes is in *./SharedData/##/latest/ModelData/Environment/Land/TankScrape*.

➤ **To create a dynamic terrain object:**

1. Open the Create Objects Palette.
2. Optionally, select the filter for Terrain ().
3. In the objects list, select the dynamic terrain object you want to create.
4. Draw a line as you would for any other linear object.
   - Ditches and berms can have two or more points.
   - Tank scrapes are a two-point directional line.

   After you finish drawing the line, the terrain deforms to conform to the line you drew.

➤ To restore the terrain, simply delete the object.

4.6. Creating Nav Edges

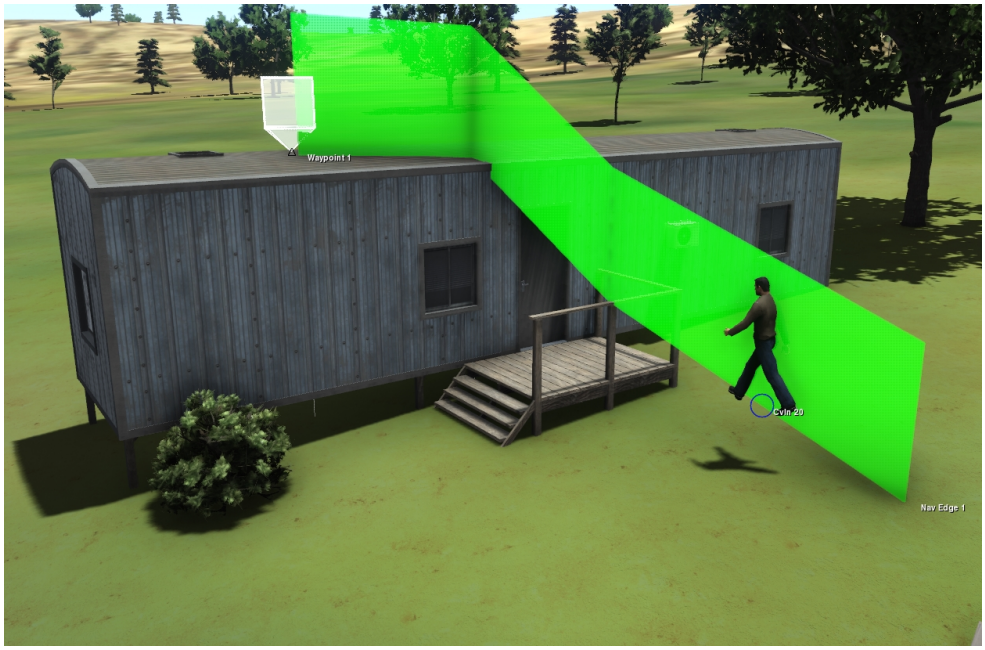
Navigation edges are tactical graphics—specifically terrain simulation effect objects—that affect the navigation mesh in a navigation area. They permit VR-Forces to calculate paths to locations that an entity would otherwise not be able to move to.

For example, suppose that you want an entity to walk from the ground to a waypoint on top of a building that does not have any interior geometry. Normally, the task would fail with a message, "No path to destination" as in Figure 13

Figure 13. Pedestrian cannot move to waypoint

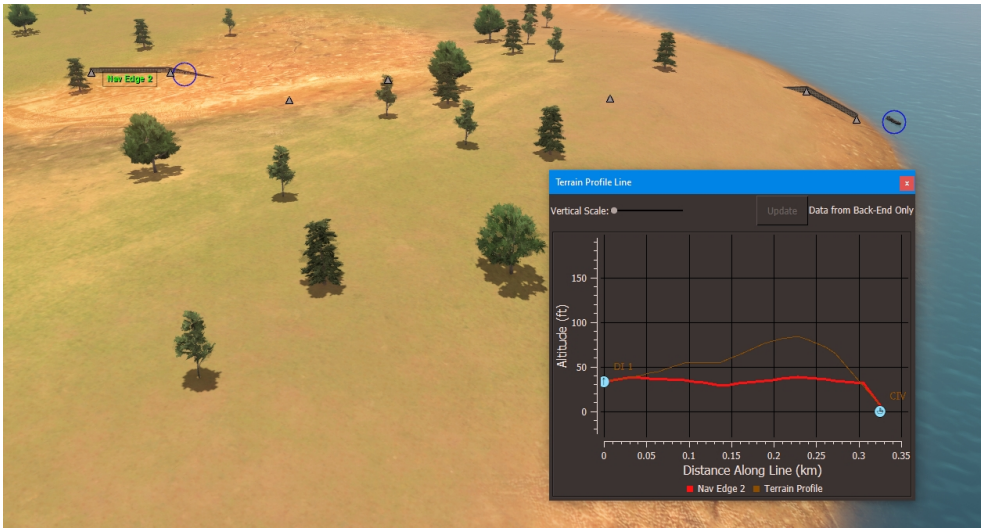
By adding a Direct Movement Nav Edge simulation effect object, the entity can plan a path to the waypoint (Figure 14). Use of nav edges in this way may compromise the realism of entity movement, but may be acceptable to achieve the overall goals of a simulation if the terrain is not as detailed as you would like it to be.

Figure 14. Navigation edge allows path planning



Another use for nav edges is to draw them with vertices that are underground, effectively creating tunnels that do not exist in the created terrain (Figure 15).

Figure 15. Entity follows nav edge underground



Finally, you might use a nav edge in cases where navigation data exists, but it is too restrictive. For example, the bounding volume of an entity might be slightly too large to permit it to go through a door. Adding a nav edge would allow it to go through the door.

VR-Forces has these types of nav edge simulation effect objects:

- Direct Movement Nav Edge. A generic nav edge.
- Pedestrian Nav Edge. A nav edge that acts like a pedestrian path. Pedestrians will prefer to use it over generic paths.
- Crawl Nav Edge. When a human that has a crawl animation moves along this route, it crawls.

> ⓘ You can also add nav edges in a navigation profile. For details, see "Navigation Profiles".

➤ **To create a nav edge:**

1. In the Create Object Palette, select a nav edge. (Selecting the Terrain simulation effect filter ( ) and entering "nav" in the search box quickly lists the available types of navigation simulation effect objects.)
2. Draw the nav edge as you would a linear tactical graphic.

4.7. Creating and Using Bullseyes

You can place a bullseye in the scenario and then use that to check the bearing and range between the bullseye and a simulation object or the mouse cursor. You create bullseyes in the same manner as other tactical graphics, as described in "Creating and Placing Objects".

By default, bullseyes are added to the bullseye overlay. You can assign them to another one; see "4.1.10 Assigning Tactical Graphics to an Overlay" on page 27.

➤ **To create a bullseye:**

1. Open the Create Object Palette.
2. Optionally, click the Tactical Graphics filter ( ).
3. Select Bullseye.
4. Place the bullseye on the terrain.

➤ To open the Bullseye Selection Toolbar, choose **View > Toolbars > Bullseye Selection Toolbar**.

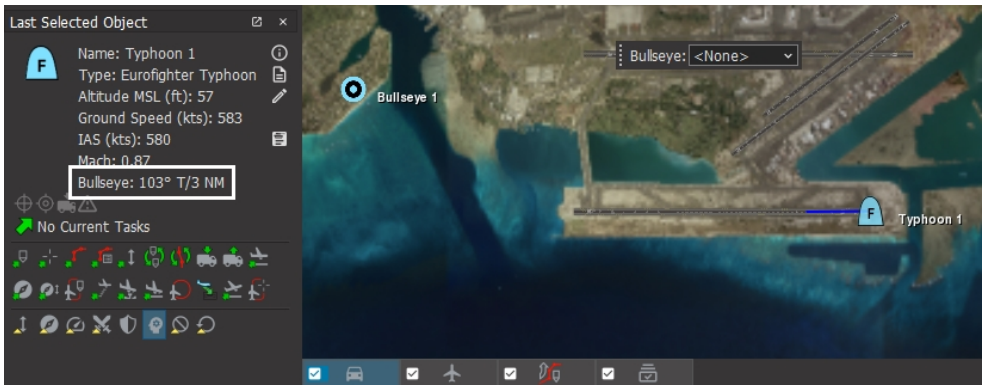
4.7.1 Measuring Bearing and Range

You can check the bearing and range between the bullseye and a simulation object or the cursor. Using the cursor, you can only check the bearing and range in the Plan View. The Last Selected Object panel simulation objects always displays the bearing and range from a bullseye, regardless of the view.

➤ **To check the bearing and range from a bullseye to a simulation object:**

1. By default, the first (or only) bullseye in the scenario is selected. If you want to measure the distance to another bullseye, select the bullseye from the list in the Bullseye Selection Toolbar.
2. Select the simulation object. The bearing and range from the selected bullseye displays in the Last Selected Object panel.

Figure 16. Bearing and range from bullseye to object



➤ **To display the bearing and range from a bullseye to the cursor at the bottom:**

1. In the Bullseye Selection Toolbar, select the bullseye you want from the list.
2. Choose **Observer > Mouse Bullseye Position**. The From Bullseye information displays at the bottom of the window.
3. Move the cursor around the terrain. The bearing and range from the bullseye update based on the location of the cursor.

Figure 17. Bearing and range from bullseye to cursor (bottom)

➤ **To display the bearing and range from a bullseye beside the cursor:**

1. In the Bullseye Selection Toolbar, select the bullseye you want from the list.
2. Choose **Observer > Map Cursor Position From Bullseye On Cursor**. The bearing and range display next to the cursor.
3. Move the cursor around the terrain. The bearing and range from the bullseye update based on the location of the cursor.

Figure 18. Bearing and range from bullseye to cursor (beside cursor)

ⓘ You can change the font and color of the information attached to the cursor by editing the DefaultMapMouseCursorFromBullseyeOnMouseOverlay model definition. To learn about editing model definitions, see "Creating and Editing Model Definitions" in the *Adding Content to MAK ONE Applications Reference Manual*.

4.7.2 Attaching a Spider Web to a Bullseye

You can set a spider web on a bullseye. Spider webs display sectors and ranges. The spider webs you can attach to a bullseye come in three sizes, measured in nautical miles (NM).

➤ **To attach a spider web to a bullseye:**

1. Select the bullseye.
2. Choose **Set** and then the size of spider web you want to use:
   - **Display 70 NM Range Rings**
   - **Display 100 NM Range Rings**
   - **Display 200 NM Range Rings**

➤ To remove the spider web from a bullseye, select the bullseye and then choose **Set > Clear Range Rings**.

4.8. Attaching Tactical Graphics to a Simulation Object

You can attach tactical graphics to a simulation object so that they move with it. For example, if you draw a route on an aircraft carrier deck, you want the route to stay attached to the deck as the carrier moves. Another example is to attach a Terrain Page-in Area to an aircraft so that it pages in terrain as the aircraft flies.

You can attach a tactical graphic to an object manually or automatically (3D observer modes only).

➤ **To attach a tactical graphic to a simulation object manually:**

1. Create a tactical graphic as you normally would.
2. Select the tactical graphic.
3. Choose **Objects > Attach Object To**. The Attach Object To dialog box opens.
4. Select the simulation object to which you want to attach the tactical graphic.
5. Click OK.

> ⓘ You can attach tactical graphics to entities using the Attach set data request, as described in "Attached".

4.8.1  Attaching a Tactical Graphic Automatically

You can attach a tactical graphic to a 3D model as you create it. (This procedure uses the automatic embarkation capability. For information about embarkation, see "Embarked and Embedded Entities".)

➤ **To attach a tactical graphic to a 3D model when you create it:**

1. Select a 3D observer mode, such as Stealth mode.
2. Move the observer to view the simulation object on which you want to attach a tactical graphic.
3. On the Create Object Palette, select the tactical graphic that you want to create.
4. Move the cursor over the 3D model you want to attach to until you see a green box around the model.

5. Click to place the first vertex (or point for point tactical graphics) on the 3D model.
6. Continue to create the tactical graphic as you normally would. The first point remains anchored to the model.

4.9. Deleting Tactical Graphics

➤ **To delete a graphical object:**

1. Select the tactical graphic you want to delete.
2. Choose **Objects > Delete**, or press the **Delete** key.

4.10. Editing Tactical Graphics

You can edit a tactical graphic's properties. The properties that you can edit vary depending on the type of graphic and can include some or all of the following:

- Add, delete, and edit vertices ("6.1. Displaying Remote Graphics" on page 54).
- Change its name.
- Change the altitude reference ("Setting Altitude in the Create Object or Edit Object Dialog Box", "Specifying the Altitude for All of the Vertices in a Route").
- Change the direction of a line ("4.10.4 Changing the Direction of a Line" on page 42).
- Edit linear and areal styles:
  - Change the pen style and width.
  - Change the line style.
  - Add or remove arrows.
  - Change the fill of an area.

  ("4.10.6 Changing Linear and Areal Style Properties" on page 42.)
- Move it to a different location ("Dragging an Object to a New Location").
- Move it to a different overlay ("Moving a Tactical Graphic to a Different Overlay" on page 27).
- Change the color ("4.10.5 Changing the Color of a Tactical Graphic" on page 42).
- Resize boxes and text objects ("4.10.2 Resizing Boxes and Text Objects" on page 41).
- Rotate an ellipse ("4.10.3 Rotating an Ellipse" on page 42).

ⓘ To edit a tactical graphic, its overlay must be unlocked.

4.10.1 Editing Vertices

You can edit the vertices of routes and areas. You can edit them dynamically or in the Edit Object dialog box.

Adding a Vertex

You can add vertices to a route or area directly on the terrain or in the Edit Object dialog box.

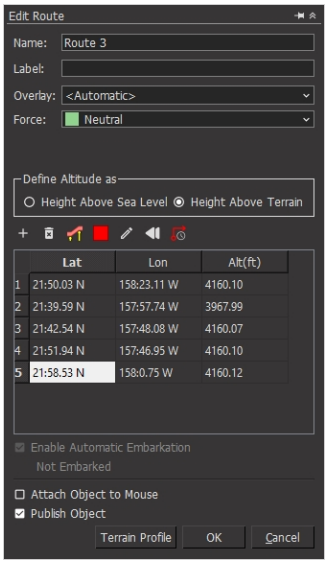
➤ **To add a vertex to a tactical graphic dynamically:**

1. Right-click the vertex next to which you want to add a new vertex. A menu displays.
2. Choose **Add Point After** or **Add Point Before**. A point is added midway between the selected vertex and the next or previous vertex, based on the command you chose.
3. Optionally, edit the new point as described in "Editing a Vertex" below.

➤ **To add a vertex in the Edit Object dialog box:**

1. Select the tactical graphic you want to edit.
2. Choose **Objects > Edit**. The Edit Object dialog box opens (Figure 19).

Figure 19. Edit Route dialog box



3. If Attach Object to Mouse is selected, clear the check box.
4. In the list of vertices, select the vertex after which you want to add the new vertex.
5. Click the Add button (+). A vertex is added midway between the selected vertex and the next vertex. If you selected the last vertex, a new vertex is added to the end of the route.
6. Optionally, edit the new point as described in "Editing a Vertex" below.
7. Click Update.

Editing a Vertex

You can edit a vertex dynamically or in the Edit Object dialog box.

➤ **To edit a vertex dynamically:**

1. Double-click the vertex.
2. Move the mouse to change the vertex's location.
3. Use **Alt**+mouse wheel or **Alt**+left mouse button+drag to change the altitude.
4. Click to place the vertex.

➤ **To edit a vertex in the Edit Object dialog box:**

1. Select the tactical graphic you want to edit.
2. Choose **Objects > Edit**. The Edit Object dialog box opens.
3. If Attach Object to Mouse is selected, clear the check box.
4. If you are editing a waypoint, click on the terrain to specify a new location or edit the coordinates and altitude in the Edit Waypoint dialog box.

   If you are editing a phase line, route, or area, you can:

   a. Double-click the coordinate value you want to change to make it editable.
   b. Type a new value and press **Enter** or click someplace outside of the value.

   Alternatively, you can click on the map to change the coordinates of the selected vertex. To set the altitude, you must edit the value by hand.
5. Click Update.

Deleting a Vertex

You can delete vertices directly or in the Edit Object dialog box.

➤ **To delete a vertex directly:**

1. Right-click the vertex you want to delete. A menu displays.
2. Choose **Delete Point**. The point is deleted. (There is no confirmation prompt.)

➤ **To delete a vertex in the Edit Object dialog box:**

1. Select the tactical graphic you want to edit.
2. Choose **Objects > Edit**. The Edit Object dialog box opens.
3. If Attach Object to Mouse is selected, clear the check box.
4. In the list of vertices, select the vertex you want to delete.
5. Click the Remove Point button ( ).
6. Click Update.

4.10.2 Resizing Boxes and Text Objects

You cannot edit the individual vertices of a box or a text object, you can only resize them.

➤ To resize a box or text object, double-click one of its vertices to make it editable and drag it to create the new object size.

4.10.3 Rotating an Ellipse

In addition to changing the width and height of an ellipse, you can rotate it around its center point. You can undo and redo ellipse rotation.

➤ **To rotate an ellipse:**

1. Select the ellipse.
2. Choose **Objects > Edit**. The Edit Object dialog box opens.
3. Select the Free Rotate check box.
4. Click OK.
5. Double-click one of the points on the ellipse to make it editable and drag it in a circular direction.

4.10.4 Changing the Direction of a Line

All lines have a direction. The direction affects how a simulation object moves along it and the direction that arrows face, if present. If you draw a line and then decide you want to reverse its direction, you can do so.

➤ **To change the direction of a line:**

1. Select the line.
2. Choose **Objects > Edit**. The Edit Object dialog box opens.
3. Click the Reverse Direction button ().
4. Click OK.

4.10.5 Changing the Color of a Tactical Graphic

By default, most tactical graphics are colored for the specified force. You can change the color of a tactical graphic.

➤ **To change the color of an tactical graphic:**

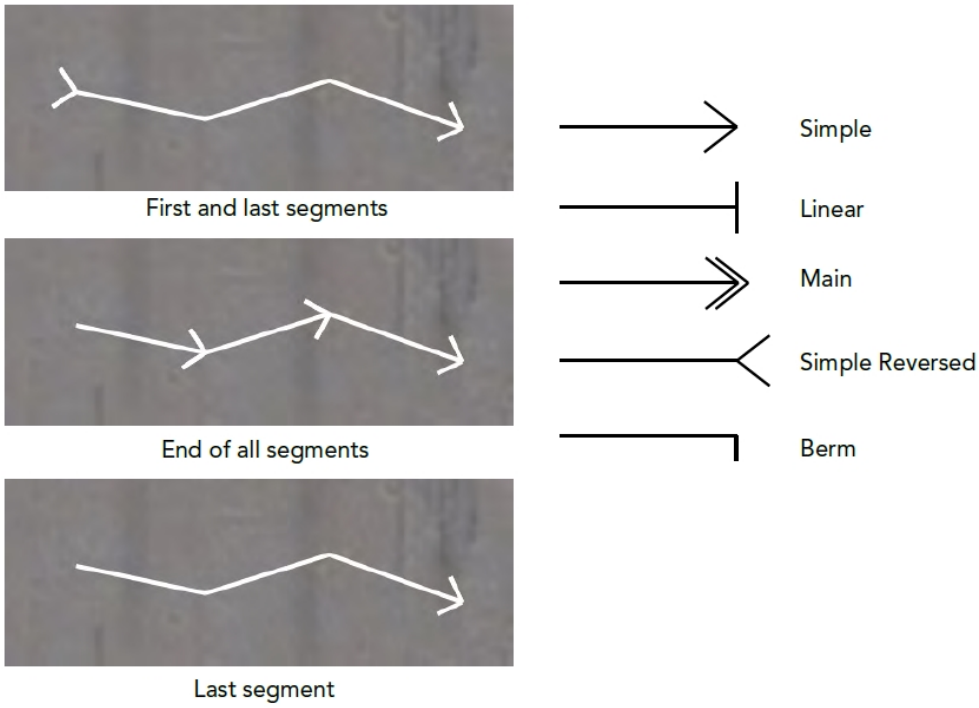
1. Select the graphic whose color you want to change.
2. Choose **Objects > Edit**. The Edit Object dialog box opens.
3. Click the Color button (). A color picker dialog box opens.
4. Click a color button or click the Custom Color button to choose a new color from the Color Picker.
5. In the Color Picker, click OK.
6. In the Edit Object dialog box, click OK.

4.10.6 Changing Linear and Areal Style Properties

Lines and areas have a variety of properties that you can set in the Edit Style dialog box. The procedure is essentially the same for all of these properties. The properties you might be able to change are:

- Line width. The width of the lines that make up a tactical graphic, either the actual line or the boundary of an area.
- Pen style. How the line or outline is drawn – solid line, no line, or as dashed and dotted lines. This property does not apply to lines that use a texture, such as Line of Contact.
- Fill style. The fill style for areal objects. Fill styles include degrees of solid fill and various types of line and grid fills.
- Line style. The different types of special lines, such as Main Axis.
- Arrow. You can add arrows to the end of a line, at the end and beginning segment, or at the end of each segment of the line. Figure 20 illustrates the arrow styles.

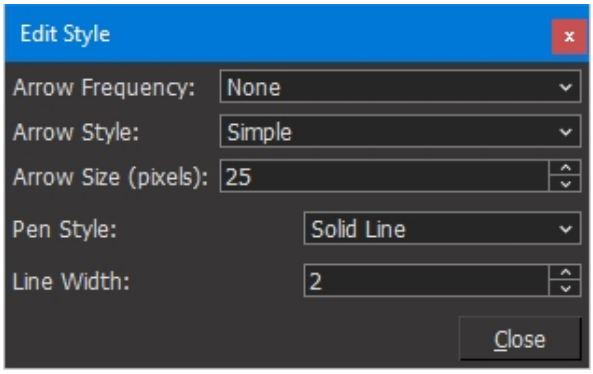
Figure 20. Arrow styles



➤ **To change a style property:**

1. Select the graphic you want to edit.
2. Choose **Objects > Edit**. The Edit object dialog box opens.
3. Click the Edit Style button (). The Edit Style dialog box opens (Figure 21). It lists the style options that you can edit for this tactical graphic.

Figure 21. Edit Style dialog box



4. Change the properties by selecting options from the appropriate list or typing new values.
5. Click OK.

4.11. Active and Inactive Tactical Graphics

You can activate (display) and deactivate (hide) all published tactical graphics. You can set a tactical graphic's state when you create it or edit it, and using a set data request. You can test for a tactical graphic's state with the Tactical Graphic Active condition. You can set a tactical graphic's state based on simulation time or time of day.

> For inactive tactical graphics to be hidden, you must select Show Only Active Environmentals on the Display Settings dialog box, Tactical Graphics Settings page or click the Show Only Active Tactical Graphics button ( )on the Display Settings Toolbar.

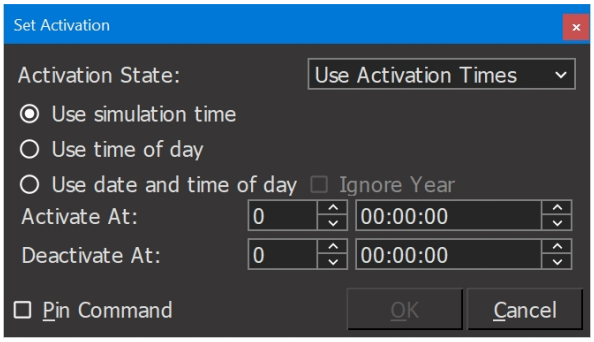
In most cases, deactivating a tactical graphic is a GUI effect. The graphic continues to be simulated and published over the network. Simulation objects continue to interact with it. However, if you set an indirect fire event area to be inactive, and you specify that the detonation start time is Wait for Activation, the indirect fire event does not begin until the area is activated.

For details about the Activation set data request, see "5.2. Activation" on page 48 and "Tactical Graphic Active". For details about indirect fire events, see "Introduction to Indirect Fire".

➤ **To set the activation state of a tactical graphic:**

1. Select the tactical graphic you want to edit. (If you are creating a new tactical graphic, open the Create object dialog box and skip to step 3.)
2. Choose **Objects > Edit**. The Edit object dialog box opens.
3. Click the Set Activation button ( ). The Set Activation dialog box opens (Figure 22).

Figure 22. Set Activation



4. Select one of these options from the Activation State list:
   - Active. The tactical graphic is visible.
   - Inactive. The tactical graphic is not visible if Show Only Active Environmentals is selected on the Display Settings dialog box, Tactical Graphics Display Settings page.
   - Use Activation Times. The tactical graphic is active during the times specified in the dialog box.
5. If you selected Active or Inactive, click OK. If you selected Use Activation Times:
   a. Select Use Simulation Time or Use Time of Day.
   b. In the Activate At boxes, specify the time you want the tactical graphic to be visible.
   c. In the Deactivate At boxes, specify the time you want the tactical graphic to be hidden.
6. Click OK.

5. Setting the State of Tactical Graphics

You can use set data requests to change the state of a tactical graphic.

5.1. Set Data Requests for Tactical Graphics

Set data requests for tactical graphics provide an alternative to using Edit dialog boxes to change the state of a graphic. The advantage of using set data requests is that you can make changes to tactical graphics from plans and in scripted tasks or scripted sets. You can also quickly make changes from the Set menu without needing to open an Edit dialog box.

> ⓘ Aerodrome and runway set data requests are covered in "Aerodrome and Runway Set Data Requests".

5.2. Activation

Use the Activation set data request to activate or deactivate tactical graphics. In most cases, this is strictly a visual effect; activated tactical graphics are visible; inactive tactical graphics are not visible. However, in the following cases, setting a tactical graphic to be inactive affects how it functions:

- If you set an indirect fire event area to be inactive, the indirect fire event does not start until the area is activated.
- If you set a spawn point to be inactive, it does not spawn entities.

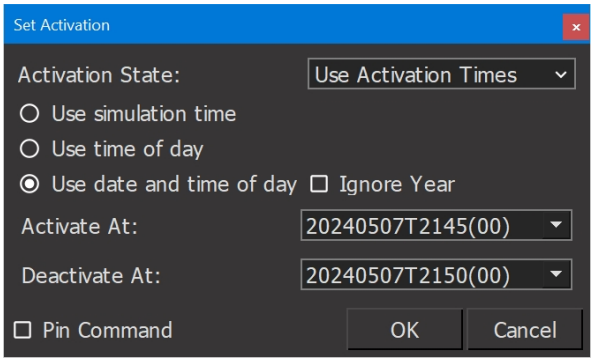
Inactive tactical graphics continue to be published and simulation objects interact with them normally. You can use the Tactical Graphic Active condition to test the state of a tactical graphic.

For more information, see "4.11. Active and Inactive Tactical Graphics" on page 44 and "Tactical Graphic Active".

➤ **To activate or deactivate a tactical graphic:**

1. Select the tactical graphic.
2. Choose **Set > Disposition > Activation**. The Activation dialog box opens (Figure 23).

Figure 23. Activation



3. Select one of these options from the Activation State list:
   - Active. The tactical graphic is visible.
   - Inactive. The tactical graphic is not visible if Show Only Active Environmentals is selected on the Display Settings dialog box, Tactical Graphics Display Settings page.
   - Use Activation Times. The tactical graphic is active during the times specified in the dialog box.
4. If you selected Active or Inactive, click OK. If you selected Use Activation Times:
   a. Select Use Simulation Time, Use Time of Day, or Use Date and Time of Day.
   b. In the Activate At boxes, specify the time you want the tactical graphic to be visible.
   c. In the Deactivate At boxes, specify the time you want the tactical graphic to be hidden.
   d. Optionally, if you selected Use Date and Time of Day, you can select the Ignore Year check box to use only the month, date, and time of day. (The activation happens annually, at the same time each year.)
5. Click OK.

   If this is an areal graphic that will be active during specific times, it displays the activation and deactivation information in Zulu time.

5.3.  Allow Crossing

The Allow Crossing set data request allows human entities to walk across a crosswalk. When human characters plan a path that includes a crosswalk, when they arrive at the crosswalk, if crossing is allowed, they can cross the street. If it is not allowed, they stop and wait.

➤ **To set a crosswalk to be enabled or disabled:**

1. Select a crosswalk tactical graphic.
2. Choose **Set > Allow Crossing**. The Allow Crossing dialog box opens.
3. Select or clear the Allow Crossing check box.
4. Click OK.

5.4. Arrowhead Style

The Arrowhead Style set data request lets you set the type of arrowhead, location, and width for linear tactical graphics. For a description of arrowhead styles, see "4.10.6 Changing Linear and Areal Style Properties" on page 42.

➤ **To set the arrowhead style:**

1. Select a linear tactical graphic.
2. Choose **Set > Appearance > Arrowhead Style**. The Arrowhead Style dialog box opens.

3. Select an option from the Arrow Style list.
4. Select an option from the Arrow Placement list.
5. Specify the width, in pixels, of the arrow.
6. Click OK.

5.5. Color

The Color set data request lets you change the color of linear and areal tactical graphics.

➤ **To set the color of a linear or areal tactical graphic:**

1. Select a tactical graphic.
2. Choose **Set > Appearance > Color**. The Color dialog box opens.
3. Select the color you want to use for this tactical graphic.
4. Click OK.

5.6. Fill Style

The Fill Style set data request lets you specify the fill for most areal tactical graphics. The fill can be horizontal, vertical, or diagonal lines, or various degrees of opacity.

➤ **To set the fill style of an areal tactical graphic:**

1. Select a tactical graphic.
2. Choose **Set > Appearance > Fill Style**. The Fill Style dialog box opens.
3. Select an option from the Fill Style list.
4. Click OK.

5.7. Force

You can change the force of a tactical graphic. For details, see "Force".

5.8. Line Width

The Line Width set data request lets you set the width of linear and areal tactical graphics.

➤ **To set the color of a linear or areal tactical graphic:**

1. Select a tactical graphic.
2. Choose **Set > Appearance > Line Width**. The Line Width dialog box opens.
3. Type a value, in pixels, in the Line Width box.
4. Click OK.

5.9. Notify Level

You can set the notification level for console messages without opening the Information dialog box. For details, see "Notify Level".

5.10. Pen Style

The Pen Style set data request lets you specify the type of line used to draw linear and areal tactical graphics. This includes solid lines and varies combinations of dashes and dots.

➤ **To set the pen style of a linear or areal tactical graphics:**

1. Select a tactical graphic.
2. Choose **Set > Appearance > Pen Style**. The Pen Style dialog box opens.
3. Select an option from the Pen Style list.
4. Click OK.

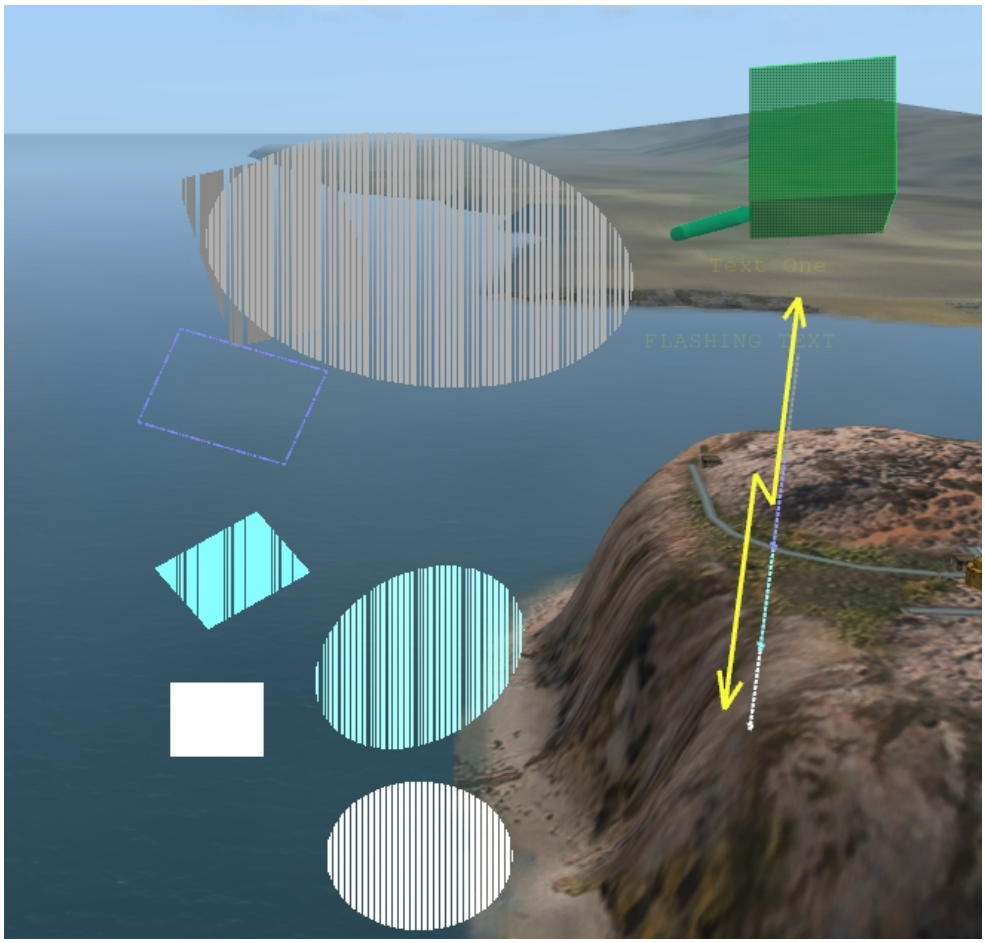
6. Remote Graphics

Remote graphics are graphics that are drawn onto the scene by remote programs that use the VR-Vantage Remote Draw API. This chapter explains how to display them in VR-Forces.

6.1. Displaying Remote Graphics

VR-Forces can display graphics sent from other applications using the VR-Vantage Remote Draw API (Figure 24).

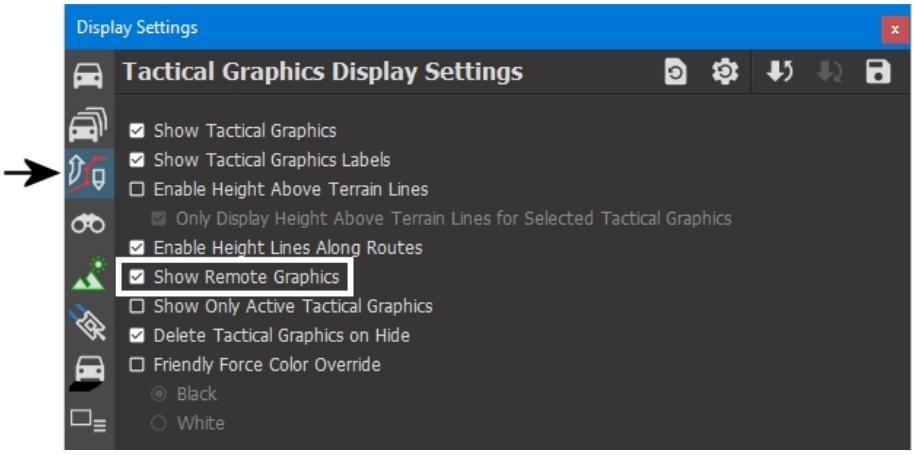
Figure 24. Remote graphics



➤ **To enable or disable the display of remote graphics:**

1. Choose **Settings > Display**. The Display Settings dialog box opens.
2. Select the Tactical Graphics Display Settings page (Figure 25).

Figure 25. Tactical Graphics Display Settings page



3. Select or clear the Show Remote Graphics check box.

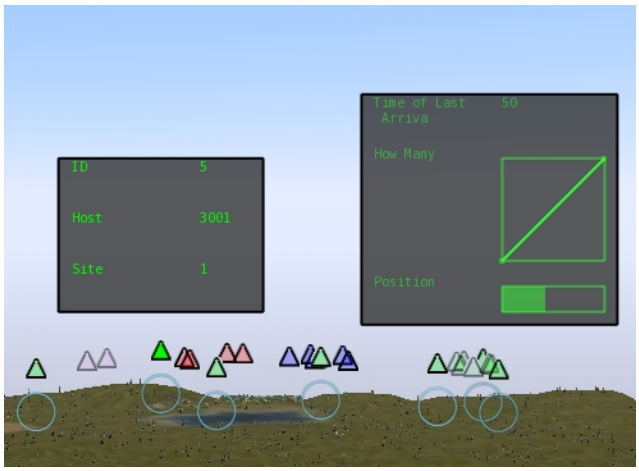
> You can also enable and disable remote graphics by choosing **Settings > Remote Graphics**.

6.1.1 Viewing a List of Remote Graphics

Remote graphics can be organized into sets. There is no fixed organization. Labeling of sets is entirely at the discretion of the programmer who develops the application that generates the graphics. The Remote Graphics Panel displays remote graphics in a hierarchy by set.

The VR-Vantage Remote Draw API lets developers send data about objects as attribute:value pairs, for example Speed:30 KM. The attributes are organized by type using attribute group templates. You can enable and disable the display of attribute information by group and by individual attribute. Figure 26 illustrates the attributes for the Entity and Packet attribute group templates displayed in Figure 27.

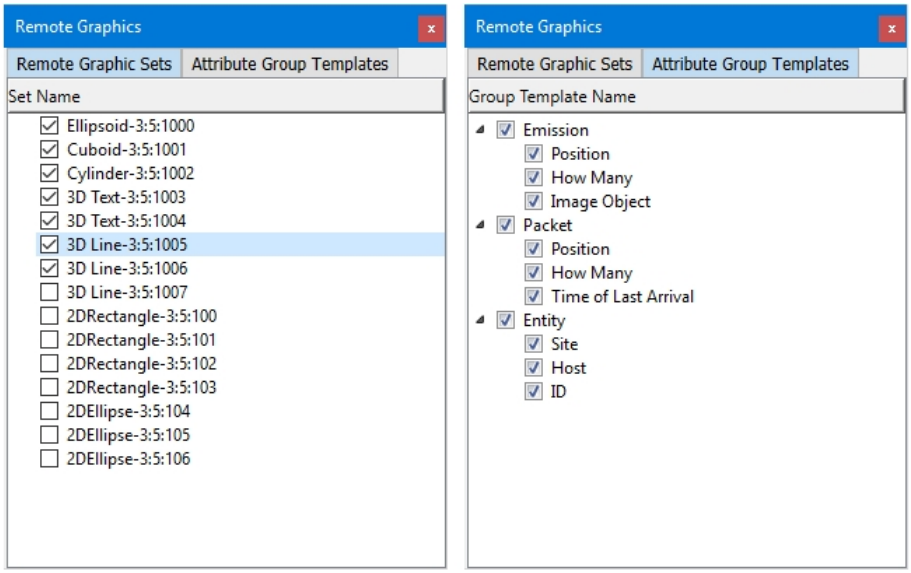
Figure 26. Remote graphics attribute group display



➤ **To view a list of remote graphics:**

1. Choose **View > Remote Graphics Panel**. The Remote Graphics Panel is displayed (Figure 27). The Remote Graphics Sets tab lists remote graphics by set.

Figure 27. Remote Graphics Panel



2. To hide or display a remote graphic set or individual graphic, check or clear its check box in the Remote Graphics Sets list.
3. To view Attribute Group Templates, select the Attribute Group Templates tab. To see the attribute display, mouse over an object for which display data is available.