BVI 0.9.4
USER INSTRUCTIONS

CM ID: 23360803-176

24 MARCH 2023

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1. INTRODUCTION

Battlespace Visualization and Interaction (BVI) is a research project investigating different methods for visualizing and interacting with complex battlespace information. It is being developed as an effective low-cost distributed training platform that integrates a traditional sand table with commercially available off-the-shelf (COTS) technologies in image projection, virtual reality (VR), augmented reality (AR), and machine vision. These technologies improve the interactive nature of the sand table by projecting information onto the sand/floor and providing the ability to interact with the display using tracked controllers, mobile devices, AR/VR devices and sand movement. With BVI, multiple users can coordinate virtually over a network using a range of supported devices from tablets to AR headsets. The BVI platform incorporates the best aspects of the traditional sand table and enables new possibilities in scaling, collaboration, and simulation.

1.1 BVI TOOL SUITE

The BVI tool suite was developed with a Service Oriented Architecture (SOA) approach to increase flexibility. Some of these key areas and capabilities are listed below:

- **Platform independence** – ability to run on a wide variety of host systems
- **Location transparency** – ability to be flexible relative to node and network topologies
- **Service oriented decomposition** – an approach for the separation of concerns that focuses on the definition of independent and reusable services
- **Flexibility in adapting to new service topologies** – an approach based on a message bus structure that supports location transparency and expansion
- **Open** – an approach to promote a widely adopted interface and architecture to support third party addition
- **Sensor independence** – isolation of sensor specializations and drivers to allow for easy substation of sensor technologies
- **Supports easy future extension** – an approach that allows for modifications or combinations of capabilities that were not originally designed such as sensor fusion

2. BVI OVERVIEW

The following sections will provide a detailed overview of how to use the following BVI modalities:

- BVI Floor Projection
- BVI Sand Table
- BVI Mobile Tactical Planner
- BVI Web Tactical Planner
- BVI Augmented Reality
- BVI Virtual Reality

2.1 BVI SAND TABLE

Sand Tables are used to conduct Sand Table Exercises (STEX), mission briefs, and After-Action Reviews (AARs). By adding a few low-cost, commercial technologies (e.g., projector, depth sensor, and computer) to existing sand tables, end users can create a BVI system that expands the range of tasks they can do while also decreasing the amount of time that is needed to shape the sand and overlay the tactical elements (see Figure 1).

Figure 1 BVI Sand Table

2.1.1 SAND TABLE SYSTEM STARTUP

To start up the BVI sand table system:

1. Power on projector and flat panel display(s).
2. Power on the BVI computer.
3. Log in using the provided BVI username and password.
   Note: If these credentials are unknown, contact bvi-team@dignitastech.com.
4. Double-click the **Start BVI <version>** shortcut on the desktop (see Figure 2):

   Note: BVI software may take several seconds to launch.

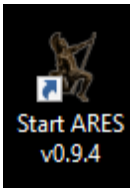


Figure 2 BVI Desktop Shortcut

5. Once the BVI software has started, open a Chrome browser and navigate to **http://localhost:9080** to load the BVI Table Manager (see Figure 3).

After BVI has started, the contour lines will automatically project onto the sand.

Note: The projected contour lines will depend on the BVI display settings during the last use, so no contours will be seen if they were turned off when the software was last closed. If the Chrome BVI Table Manager window does not automatically open, refer to Section 3 Troubleshooting.

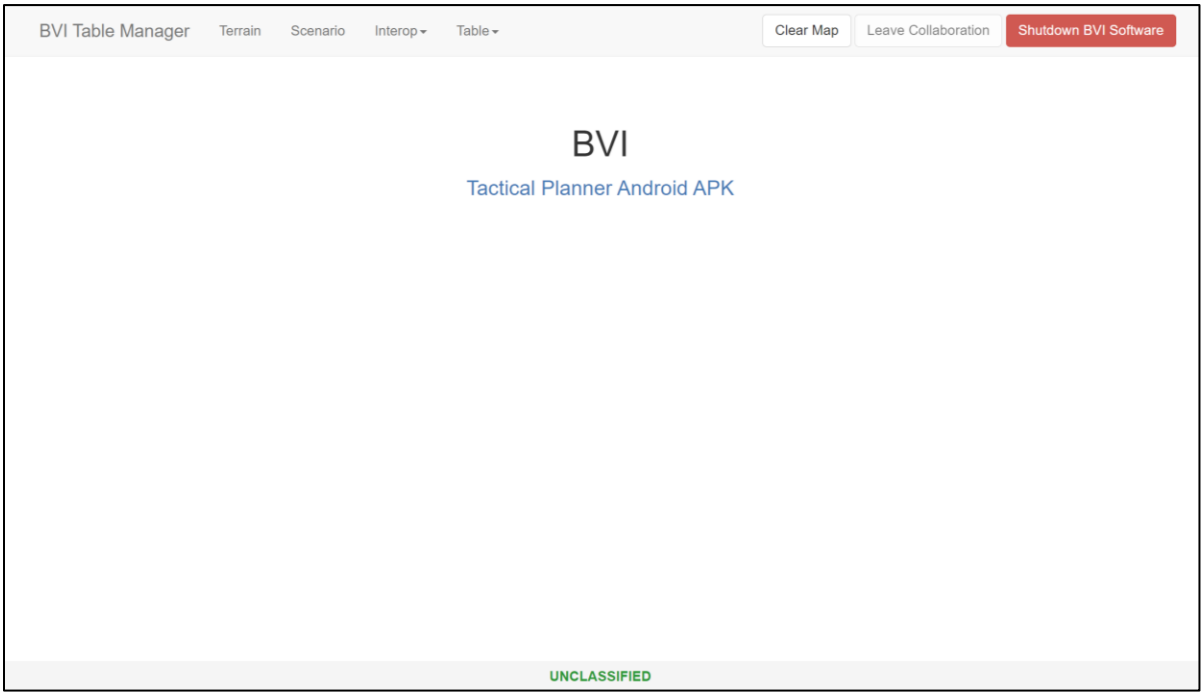


Figure 3 BVI Table Manager

2.1.2 TABLE SETTINGS

The **Table Settings** allow the user to adjust the BVI viewer properties. These settings include:

- Turn ON/OFF contour or grid lines.
- Adjust the contour interval.
- Adjust or disable the hypsometric color scheme on the sand table.
- Change or disable virtual lighting effects.

To adjust the BVI viewer properties:

1. Access the settings menu from the BVI Table Manager.
    a. Click the **Table** drop-down menu located on the top navigation bar.
    b. Select **Settings**.
2. The tabs that allow adjustments to be made to the current setup are detailed below:
    a. Contour Lines (Sand Table):
        - **Use Contours**: Turns on/off displayed contour lines.
        - **Use Height Labels**: Turns on/ off the height labels that mark the highest and lowest points on the table.
        - **Contours Color**: Changes the display color of the contour lines.
        - **Line Thickness**: Changes the thickness of the contour lines.
        - **Elevation Spacing**: Adjusts the contour interval.
    b. Grid Lines (Sand Table & Floor Projection):
        - **Use Grid Lines**: Turns grid lines on/off.
        - **Grid Line Type**: Determines the grid reference system to use for labeling grid lines.
            - **UTM**: Grid reference labels (similar to MGRS).
            - **Point Designation**: Fictional grid reference for use when no real-world coordinates exist (i.e., when creating fictional terrains).
        - **Margin Size**: Adjusts margin used for grid labels.
        - **Label Margin Size**: Adjusts location of the grid labels within the margin.
        - **Line Color**: Changes the display color of the grid lines.
        - **Text Size**: Changes the size of the grid label text.
    c. Hypsometric (Sand Table):
        - **Use Hypsometric**: Turns on/ off the hypsometric coloring of the table.
        - **Min Height**: Displays the minimum height on the sand table.
        - **Max Height**: Displays the maximum height on the sand table.

          Note: The values displayed for Min and Max Height are arbitrary and do not infer real-world values.

        - **Colors**: Adjusts each color in the hypsometric scheme.
            1. Use the 'Color Presets' drop-down menu to save various color configurations:
                a. **Edit**: rename an existing preset.
                b. **Add**: saves a new preset.
                c. **Delete**: delete an existing preset.

2. Pick the desired colors and use the + button to create a new preset for it. Type in the name and press ✔ to save the preset. Any presets may be selected from the dropdown menu.

d. Lighting (Sand Table):
   - **Use Lighting**: Turns virtual lighting effects on and off.
   - **Ambient Lighting**: Controls hill shading effects on the sand.
   - **Diffuse Lighting**: Alters brightness of sand facing static, virtual light source.
   - **Specular Lighting**: Highlight of sand brightness.

e. Terrain (Sand Table & Floor Projection):
   - **Show Features**: Displays LTF structures which interact with tactical graphics.
   - **Show Bounds**: Shows boundary around areas where LTF data is located.

3. Once the desired scheme is being displayed on the sand/floor, **Table Settings** can be closed.

To return to default settings, select the **Reset Settings** button on the bottom left side of the window.

Note: When the BVI software is shut down, the current settings will be saved and reloaded when the software is restarted. This means that if the contour lines and the hypsometric views are both turned off, nothing will be displayed when the software is restarted.

2.1.3 TERRAINS (SAND TABLE)

The **Terrain** tab in the Table Manager interface provides all current map images upon which scenarios can be built. The **Create New Terrain Template** interface allows the user to specify their own map of an Area of Operation (AO) based on available data from Google Maps, OpenStreetMaps, OpenTopoMap, USGS, or from a user-uploaded map image.

To access the terrain templates, click on **Terrain** in the top navigational bar in the **Table Manager**. Once open, a list of previously saved terrain templates will be displayed (see Figure 4).

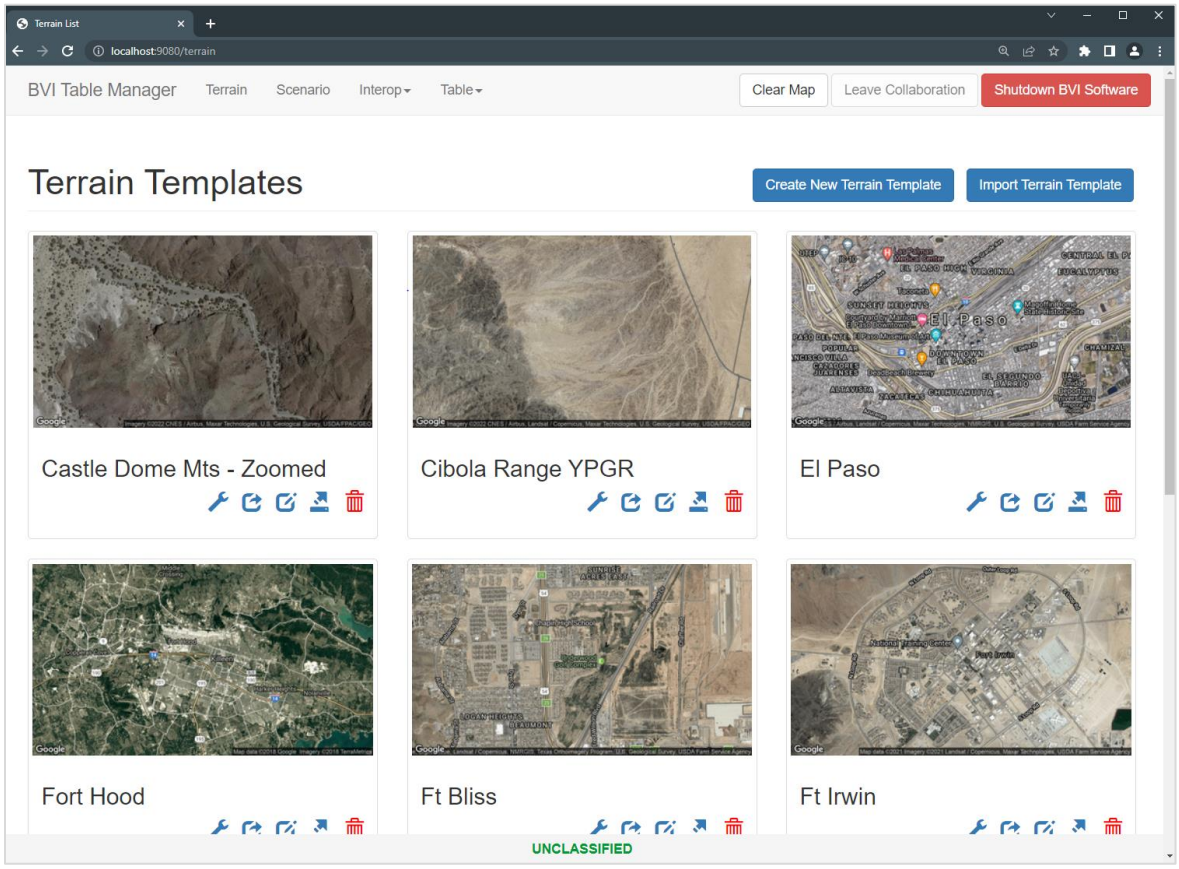


Figure 4 Terrain Templates

For each saved terrain template, the following options are available:

-  **Terrain Guided Build (Sand Table)**: Enters the Terrain Guided Build Mode which allows for the sand to be correlated to a previously saved topography.
-  **Show Terrain on Table**: Displays the corresponding terrain template on the BVI Table/BVI Floor Space.
-  **Edit Terrain Template**: Change the title or description of the terrain template.
-  **Export Terrain Template**: Exports the associated terrain template along with its saved sand configuration, if any, as a savable file.

-  **Delete Terrain Template**: Delete the associated terrain template. Once confirmed, the terrain template cannot be recovered.

2.1.3.1 CREATE NEW TERRAIN TEMPLATE

Creating a new terrain template from the Table Manager allows the user to specify their own map of an Area of Operation (AO) based on available data from Google Maps, OpenStreetMaps, OpenTopoMap, USGS, or from a user-defined map image. This map is then projected onto the sand for use with BVI.

BVI provides several methods to acquire maps. In the sections below, these methods are fully outlined, and categorized by whether an internet connection is required for the outlined feature.

When an internet connection is ***not*** available to the BVI computer, the user can create maps from offline sources. This includes user-defined map images from external sources and previously processed TMS Overlays (e.g., GeoPDF).

When an internet connection is available to the BVI computer, the user can create and download maps from Google Maps, OpenStreetMaps, OpenTopoMap, or USGS directly through the BVI web interface.

Note: A Google Maps API Key is needed to create and download maps from Google Maps. To obtain and configure a Google Maps API key, please refer to the Google Maps API Key Configuration Guide.

2.1.3.1.1 CREATING TERRAIN TEMPLATES WITHOUT AN INTERNET CONNECTION

This section outlines an option to create new terrain templates when ***no*** internet connection is available to the BVI computer.

2.1.3.1.1.1 OPTION 1: CREATE TERRAIN TEMPLATE FROM UPLOADED IMAGE

This option allows the user to upload an image file to utilize as a new terrain template. BVI has a 16:9 aspect ratio and a 1920x1080 resolution. Choosing an image with a different aspect ratio or resolution as a terrain template may not display optimally on the sand table/floor. Acceptable formats include JPG, PNG, or GIF.

Prerequisites include:

- Map Image
- Southwest (SW) corner latitude/longitude or MGRS
- Northeast (NE) corner latitude/longitude or MGRS

To create terrain template by uploading an image file:

1. Click the **Create New Terrain Template** button located on the Terrain Templates header.
2. In the **Select Terrain Template Type** window, select **Uploaded Image** and click **Create** (see Figure 5):

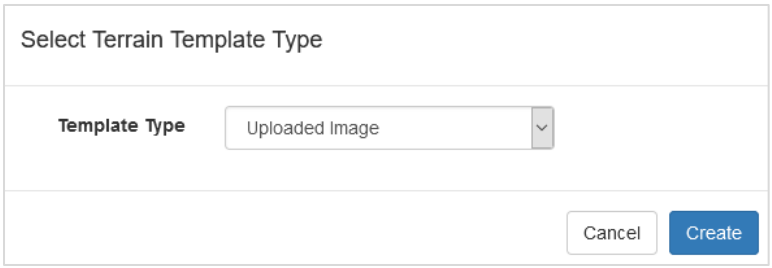


Figure 5 Terrain Type Dialog Box - Uploaded Image

3. Enter a name (required) and description (optional).
4. Click the **Browse** button located next to **Map Image File** to select an image that is stored on the local computer to be used as a terrain file (see Figure 6).

Note: The file type must be JPG, PNG, or GIF.

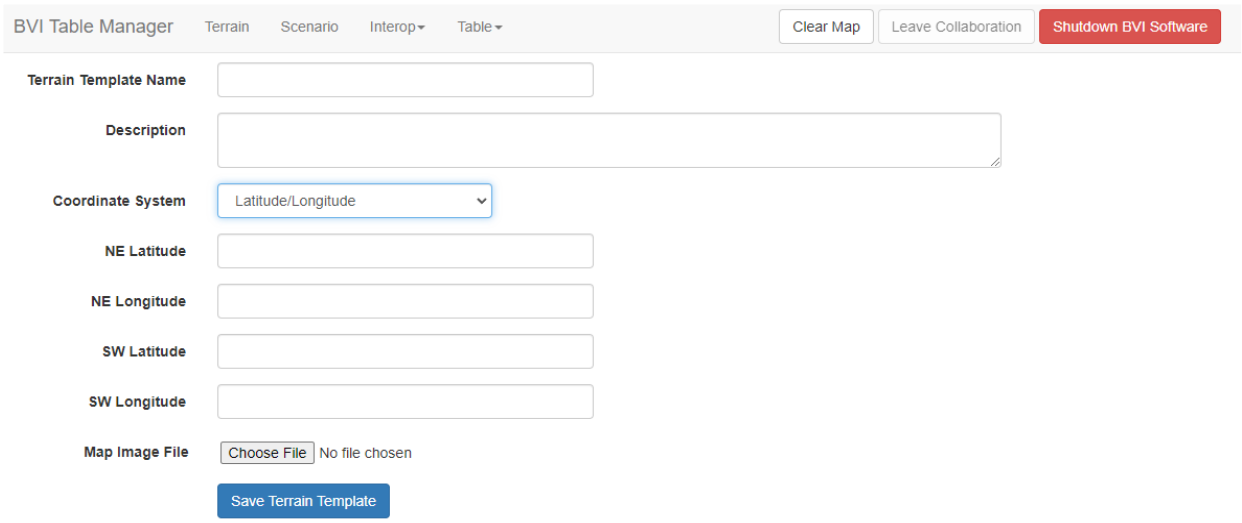


Figure 6 Creating Terrain Template from Uploaded Image (Latitude/Longitude)

5. Add boundaries to create the proper scale for the image by entering the latitude/longitude coordinates of the Northeast (NE) and Southwest (SW) corners.

   Note: If preferred, use the MGRS coordinate system rather than Latitude/Longitude.

6. Click **Save Terrain Template** to add the image as a new terrain template.

2.1.3.1.2 CREATING TERRAIN TEMPLATES WITH AN INTERNET CONNECTION

This section outlines two options for creating terrain templates when an internet connection is available to the BVI computer.

2.1.3.1.2.1 OPTION 1: CREATE TERRAIN TEMPLATE FROM GOOGLE MAPS

This option allows the user to browse Google Maps and select any available map data to utilize as a new terrain template.

To create a terrain template by selecting map data provided by Google:

1. Click the **Create New Terrain Template** button located on the Terrain Templates header (See Figure 7):

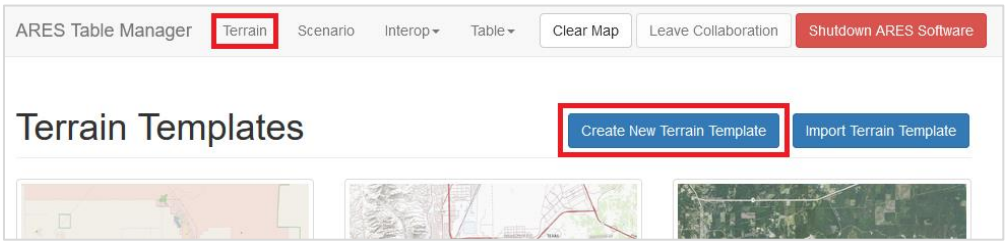


Figure 7 Create New Terrain Template Button

2. In the **Select Terrain Template Type** window, choose **Google Maps** and click **Create** (see Figure 8):

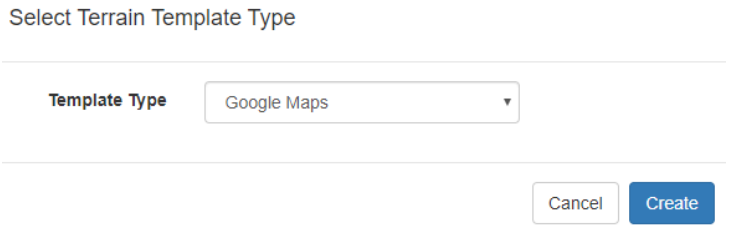


Figure 8 Terrain Type Dialog Box - Google Maps

3. Navigate Google Maps to find an area of interest (see Figure 9):
    a. Enter a name (required) and description (optional) for the terrain template
    b. Use the integrated pan, zoom, and search functions to navigate to the area of interest. The area shown in the preview window will be saved to create the terrain template.

    Note: The standard Google Maps views are available to select street, terrain, or imagery options.

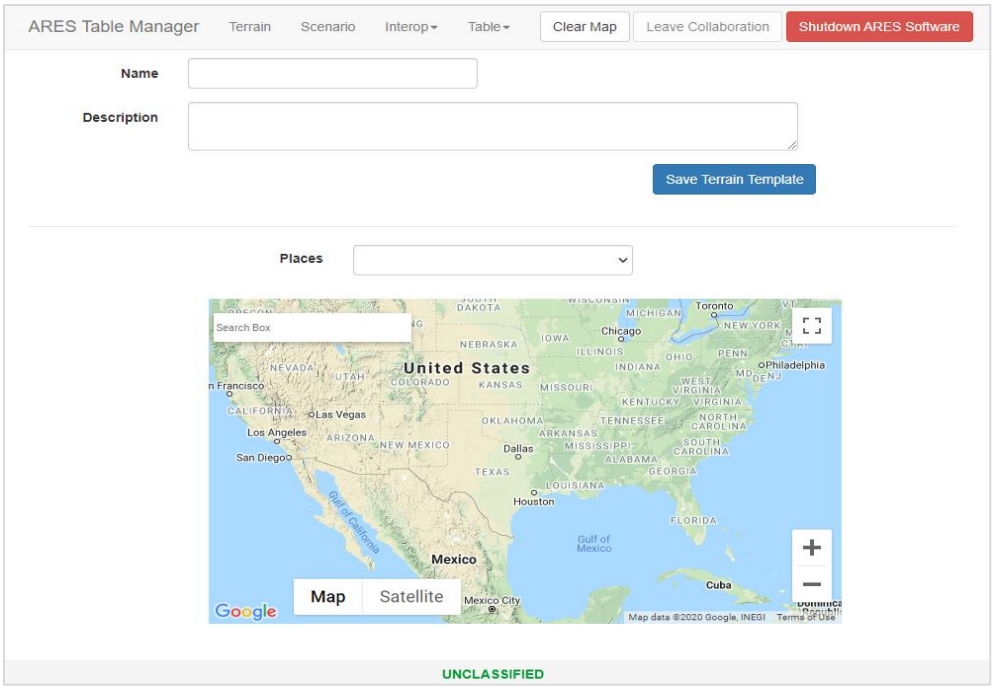


Figure 9 Google Maps Preview Screen

c. Click **Save Terrain Template** to save the new terrain template.

*Note: If the Google Maps preview screen displays the message "For Development Purposes Only" (see Figure 10), then a Google Maps API Key will need to be acquired. See the **Google/Bing Maps API Key Configuration Guide** or send an email to bvi-team@dignitastech.com.*

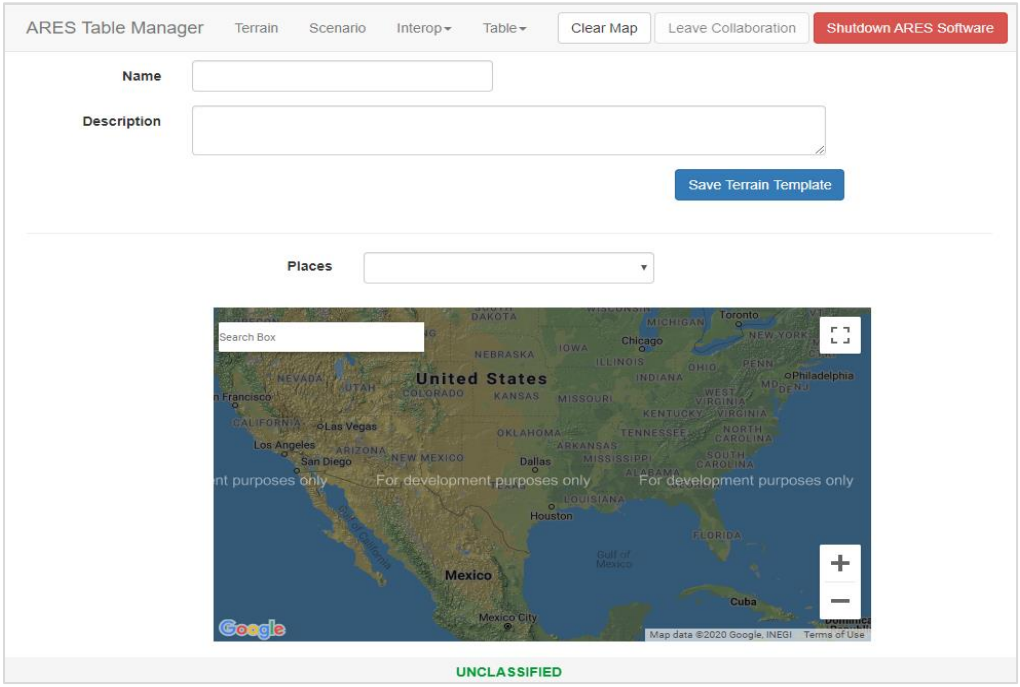


Figure 10 Google Maps Preview Screen Message "For Development Purposes Only"

2.1.3.1.2.2 OPTION 2: CREATE MAP FROM OSM, OPENTOPOMAP, AND USGS MAP SOURCES

This option generates a terrain template using one of the available map sources listed in the terrain template type dropdown menu. These map sources can be used in a similar way as the Google Maps option. The following three terrain template map sources are available:

- **OpenStreetMap (OSM)** – Open-source project that provides high-contrast street maps.
- **OpenTopoMap (OTM)** – Detailed, high-contrast maps with feature data and topographical overlay.
- **USGS Map** – Government resource that provides topographical maps utilizing either imagery or high-contrast images.

To create a terrain template using any one of these terrain template map sources:

1. Click the **Create New Terrain Template** button located on the Terrain Templates header (see Figure 7).
2. In the **Select Terrain Template Type** window, choose any map source and click **Create** (see Figure 11):

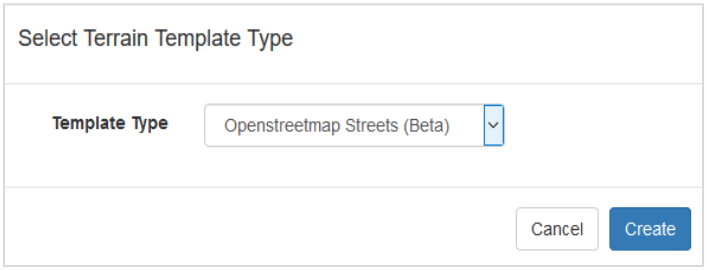


Figure 11 Terrain Type Dialog Box – OpenStreetMap Streets

3. **Name** the new terrain template.

   Note: Terrain Template names cannot contain the same name as an existing terrain template and must start with an alphanumeric character. Names can only include alphanumeric, dash, underscore, or space characters.

4. In the map below, navigate to an area of interest. The window contains many of the same fields and features of creating a new terrain template using the Google Maps option with a few added features detailed below (see Figure 12):

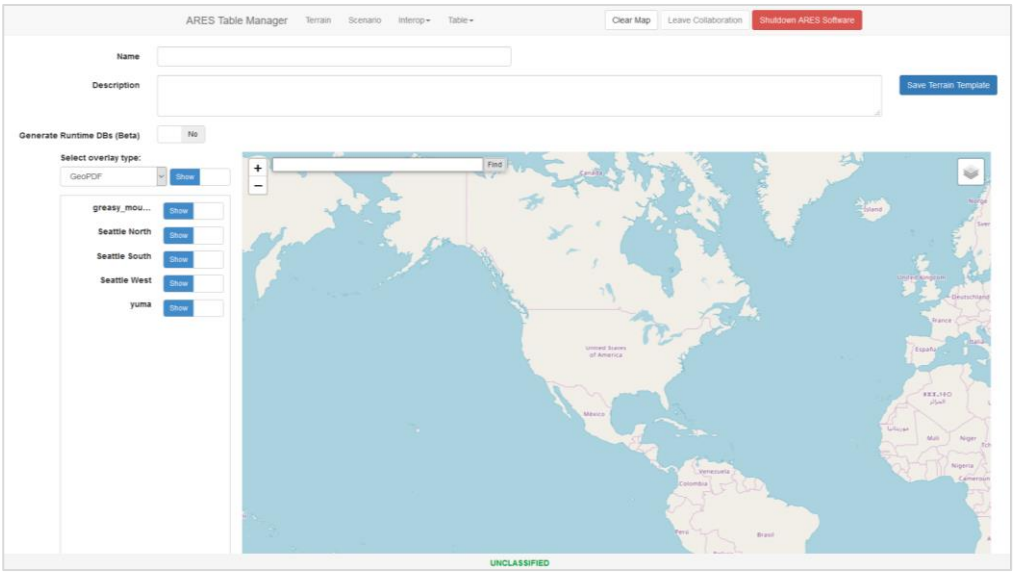


Figure 12 Creating Terrain Template from Map Source

a. Hover over the map layers icon () in the top-right corner of the map area to view the list of all available map sources. Once a map source is selected, the map view will display the map data from that source.
b. Use the integrated pan, zoom, and search functions to navigate to an area of interest. The area shown in the preview window will be saved to create the terrain template.
c. (*Optional*) Select an overlay:
    i. Select an overlay type from the drop-down menu under **Select overlay type**. The left section of the window displays available overlays that can be layered onto the map (e.g., GeoPDF), which are pulled from those listed in the **map overlays** directory of the BVI **Program Data** folder.
    ii. Toggle the available overlays to show or hide individual overlays
    iii. For each enabled overlay, navigate and zoom to the exact geolocation of that overlay to view it as a layer over the map surface (see Figure 13):

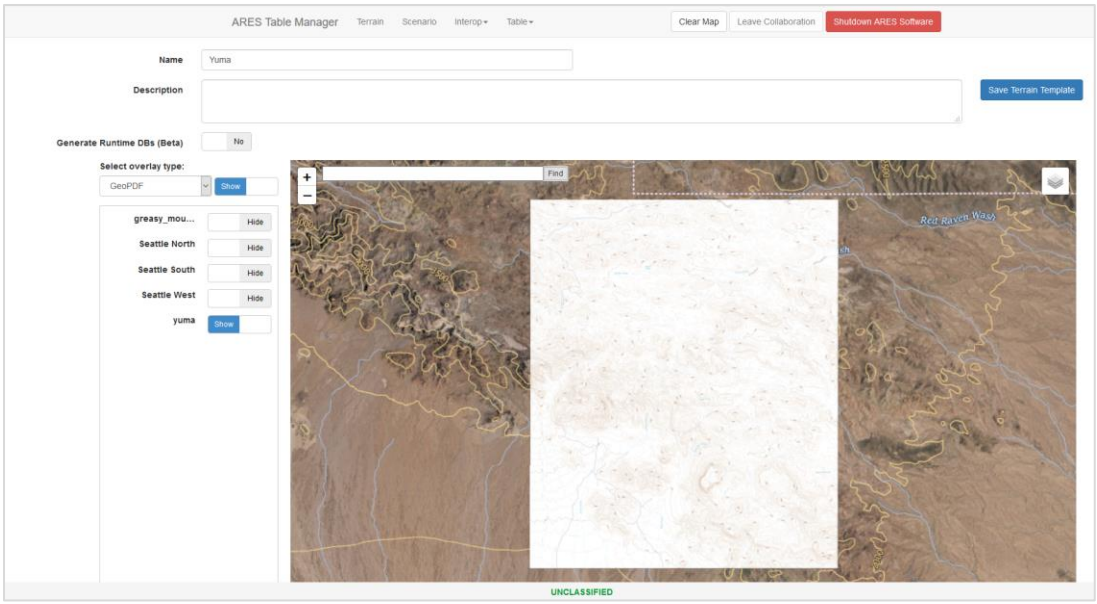


Figure 13 Example of Map Zoomed to Location of Yuma Overlay

2.1.3.2 TERRAIN GUIDED BUILD

The **Terrain Guided Build** functionality allows the user to save the current sand topology or correlate the sand to a previously saved topology. The tool works by highlighting the areas of the sand that need to be modified to match the saved data.

From the **Terrain** tab of the BVI Table Manager, select the **Terrain Guided Build** button () that corresponds to the desired terrain.

1. If a **Guided Build Alert** appears (see Figure 14), please proceed with the following steps. If no alert occurs, then proceed to step 2:
    a. If a previous sand configuration has not been saved for the selected terrain, a **Guided Build Alert** will state that no height data has been found (see Figure 14).

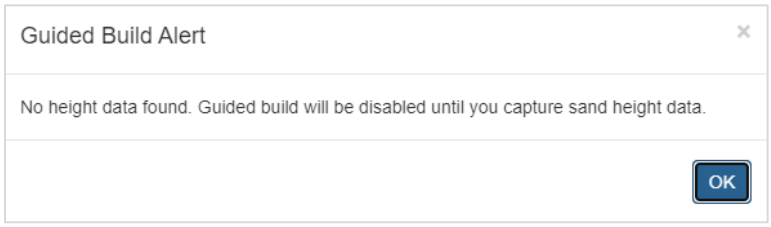


Figure 14 Guided Build Alert - No Height Data Found

    b. Click **OK** to save the height data for use with the **Guided Build** tool.
    c. Shape the sand to represent the terrain file that was selected and is being projected on to the BVI table.
    d. Once the sand is shaped, click the **Capture Sand Heights** button in the upper-right of the tool (see Figure 15).

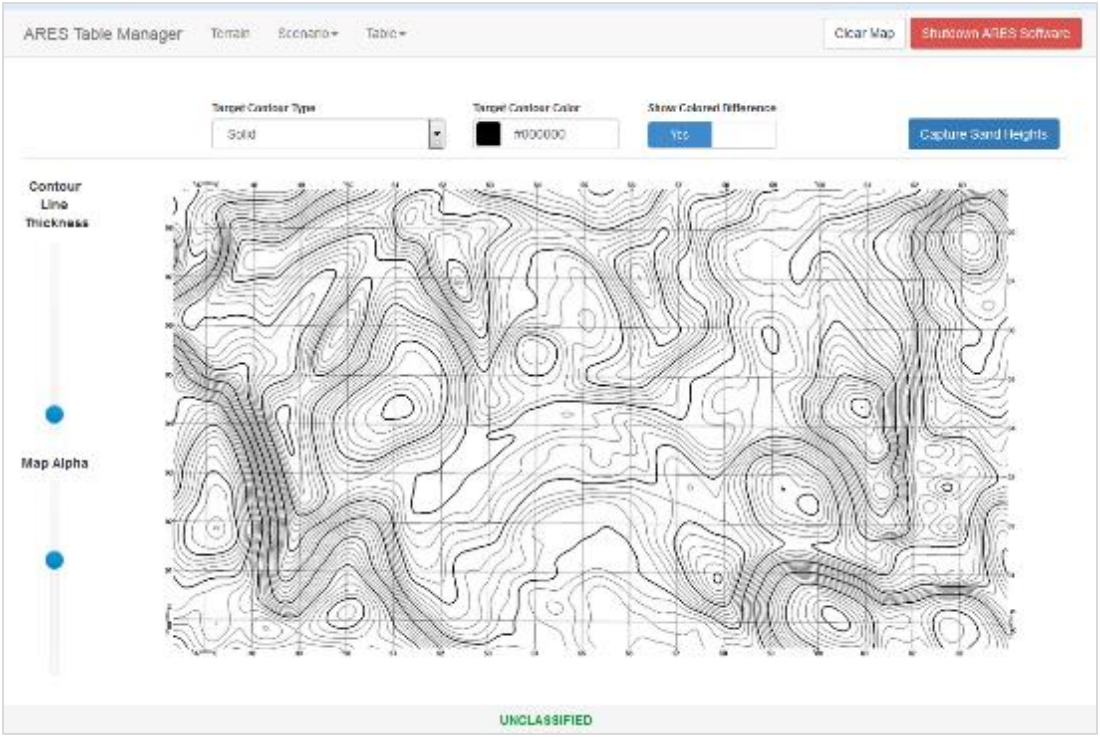


Figure 15 Guided Build Tool

2. Select the type of guidance preferred to aid in shaping the sand to match the saved data. The following settings can be adjusted individually to meet the user's preference:
    a. **Target Contour Type:** Changes the contour lines of the saved data.
        i. *Solid* – Solid contour lines.
        ii. *Dash* – Dashed contour lines.
    b. **Target Contour Color:** Changes the color of the saved data's contour lines.
    c. **Show Colored Difference:** Displays colored areas of the sand that need to be changed to match the target data. The brightness of the color indicates the degree to which the current topology differs from what is desired according to the saved data.
        i. **Red** indicates areas that are too high.
        ii. **Blue** indicates areas that are too low.
    d. **Contour Line Thickness:** Adjusts the thickness of the saved data's contour lines.
    e. **Map Alpha:** Controls the transparency of the terrain template that's displayed on the sand.
3. At any point, the new height data can be saved for the terrain file by clicking the **Capture Sand Heights** button. This will overwrite any previously saved data for the terrain file.

2.1.4 SCENARIOS (SAND TABLE)

Scenarios are terrain templates that have been modified and saved with symbology or graphics using the Tactical Planner application.

2.1.4.1 LOAD A SCENARIO (SAND TABLE)

From the BVI Table Manager, the user can view, export, import, or delete available scenarios, as well as display them on the sand table or floor projection system.

Note: The Tactical Planner application is required to interact with or edit features.

To load a scenario onto the BVI sand table:

1. Select the **Scenarios** tab on the Table Manager. A thumbnail view of all available scenarios will be shown (see Figure 16).

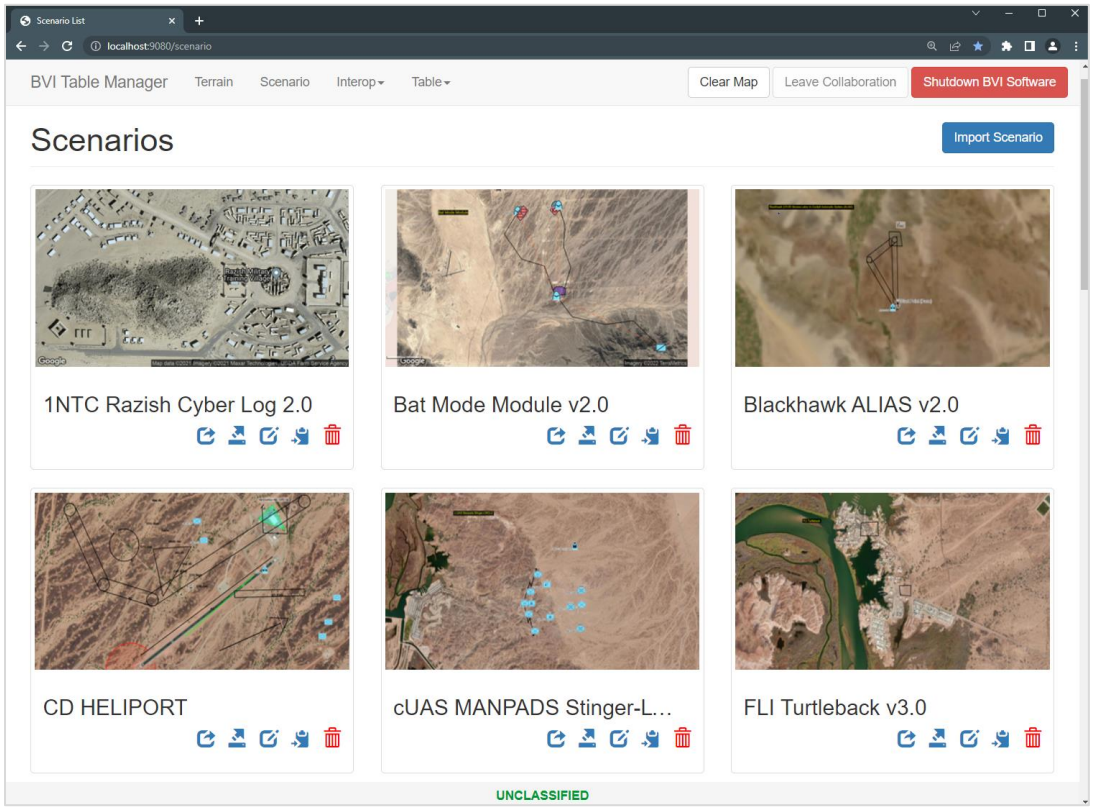


Figure 16 Scenario List as shown in Table Manager

There are several buttons associated with each saved scenario file:

-  **Show Scenario on Table:** Displays the corresponding scenario on the sand table/floor. Existing icons can be selected and moved only using a connected Xbox controller.
-  **Export Scenario:** Exports the full scenario, including all icons, as a savable file.

- **Rename Scenario:** Change the title of the scenario.
- **Clone Scenario:** Create a duplicate of the scenario.
- **Delete Scenario:** Delete the associated scenario and all its content. Once confirmed, the scenario cannot be recovered.

2.1.4.1.1 IMPORTING/EXPORTING SCENARIOS

Scenarios can be exported from a BVI computer and imported to another BVI computer.

2.1.4.1.1.1 IMPORTING A SCENARIO

To import a scenario:

1. In the BVI Table Manager, select **Scenario**.
2. In the upper-right corner, select **Import Scenario** (see Figure 17).

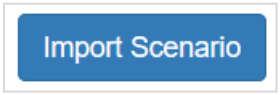


Figure 17 Import Scenario Button

3. Select **Browse** and choose the desired scenario zip file (see Figure 18).

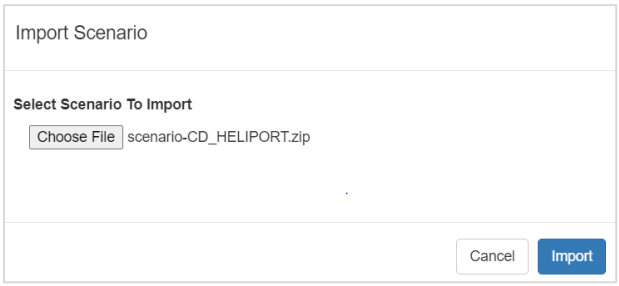


Figure 18 Import – Selected Scenario Zip File

4. Click **Import**. The scenario will be imported and can be found in the list of scenarios.

2.1.4.1.1.2 EXPORTING A SCENARIO

To export a terrain template:

1. In the BVI Table Manager, select **Scenario**.
2. Select **Export Scenario** ( ) on the desired scenario.
3. Select the desired format to export the scenario (see Figure 19):

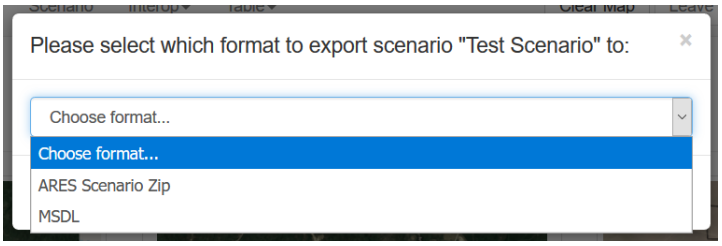


Figure 19 Export Scenario - Format Type

4. Press **OK** to confirm the export selection. The export begins and progress bar will show 100% (see Figure 20):

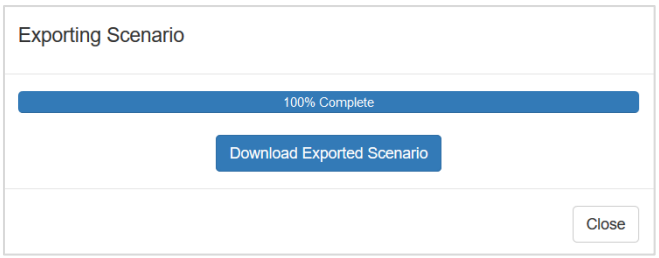


Figure 20 Export Scenario - Progress Bar

5. Click **Download Exported Scenario**.
6. Save the scenario zip file to a desired location. The scenario will be exported as a zip file and can be imported on a different BVI computer.

2.1.4.1.1.3 CREATE SCENARIO SUB FOLDER

To create scenario folders:

1. In the BVI Table Manager, select **Scenario.**
2. Select **New Folder** (see Figure 21).

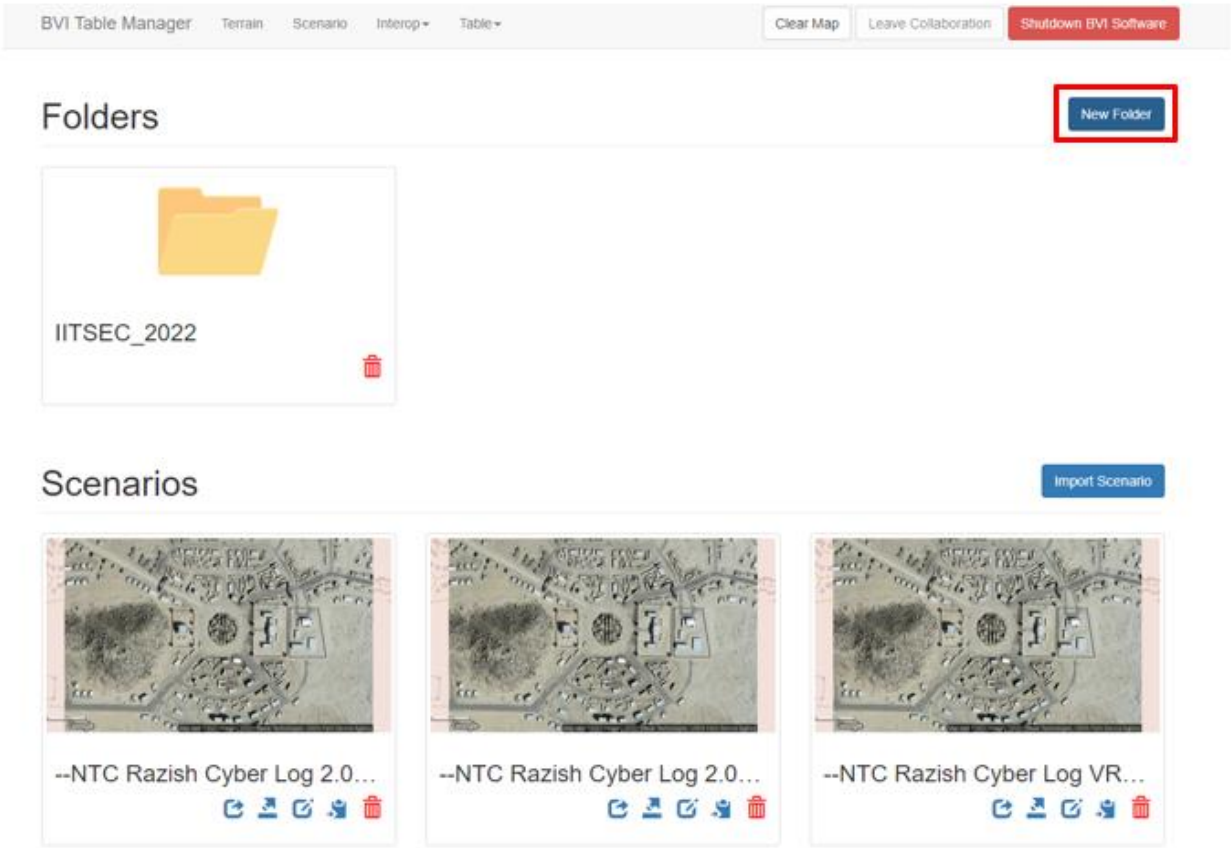


Figure 21 Creating Sub-Scenario Folder

3. Name the folder, select Ok.
4. Import desired scenarios into folder.

2.1.4.2 IMPORTING KML/JSON/MSDL/XTSP FILES

BVI provides the ability to import and view KML, KMZ, GeoJSON, MSDL, and xTSP files. These file formats are used to display geographic data.

To import a KML, KMZ, GeoJSON, MSDL, or xTSP file:

1. Load a scenario that encompasses the area of the file.
2. Select **Table** from the BVI Table Manager.
3. Select **Import Content.** The **Import Scenario Content** panel appears (see Figure 22):

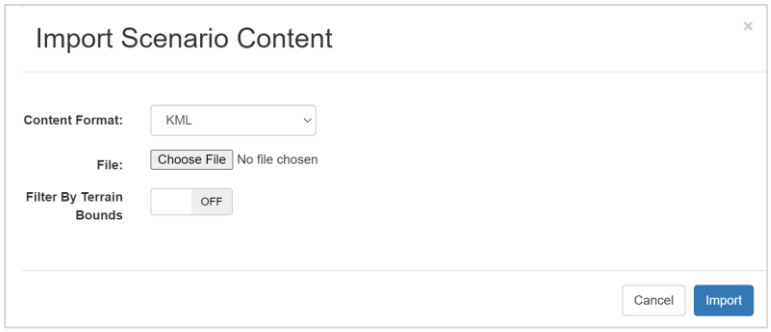


Figure 22 Import Scenario Content

4. From the **Content Format** drop-down menu, select the desired file type (e.g., KML, KMZ, GeoJSON, MSDL, or xTSP).
5. Select **Choose File** and navigate to the file to import.
6. Determine if the import should be filtered by the terrain bounds.
    a. **Filter By Terrain Bounds**: the imported file's contents will be filtered to the specified terrain template bounds. For example, if there are tactical units or geometries that imported outside the terrain bounds, then they will not be visible within the scenario if this option was toggled ON.
7. Click **Import**.

The imported KML, KMZ, GeoJSON, MSDL, or xTSP file is now displayed on the sand table and other modalities.

2.1.5 TERRAIN/SCENARIO FOLDERS

The BVI Table Manager allows the user to sort terrain templates and scenarios into grouped folders. These folders can be renamed, edited, and imported/exported to any machine running BVI.

The following sections will provide an overview of how to use the Table Manager terrain/scenario folders:

- Sorting Terrains/Scenarios

To sort terrains/scenarios:

1. Select the **Terrain** or **Scenario** tab in the Table Manager.
2. Click on the **New Folder** button (see Figure 23) and enter a name for the folder.

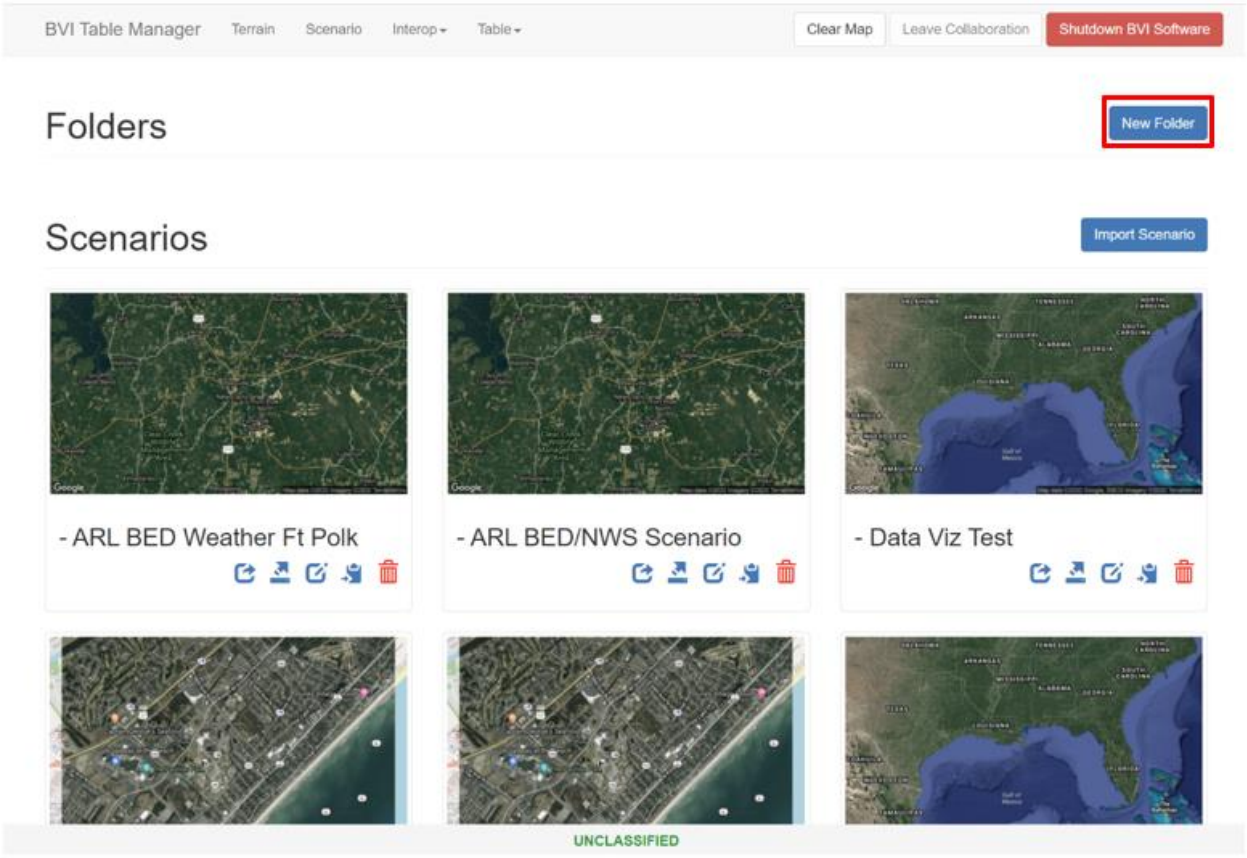


Figure 23 New Folder Button

3. Select the newly created folder.

   Note: The current folder path is displayed above (i.e., /terrains/<folder_name>). See Figure 24.

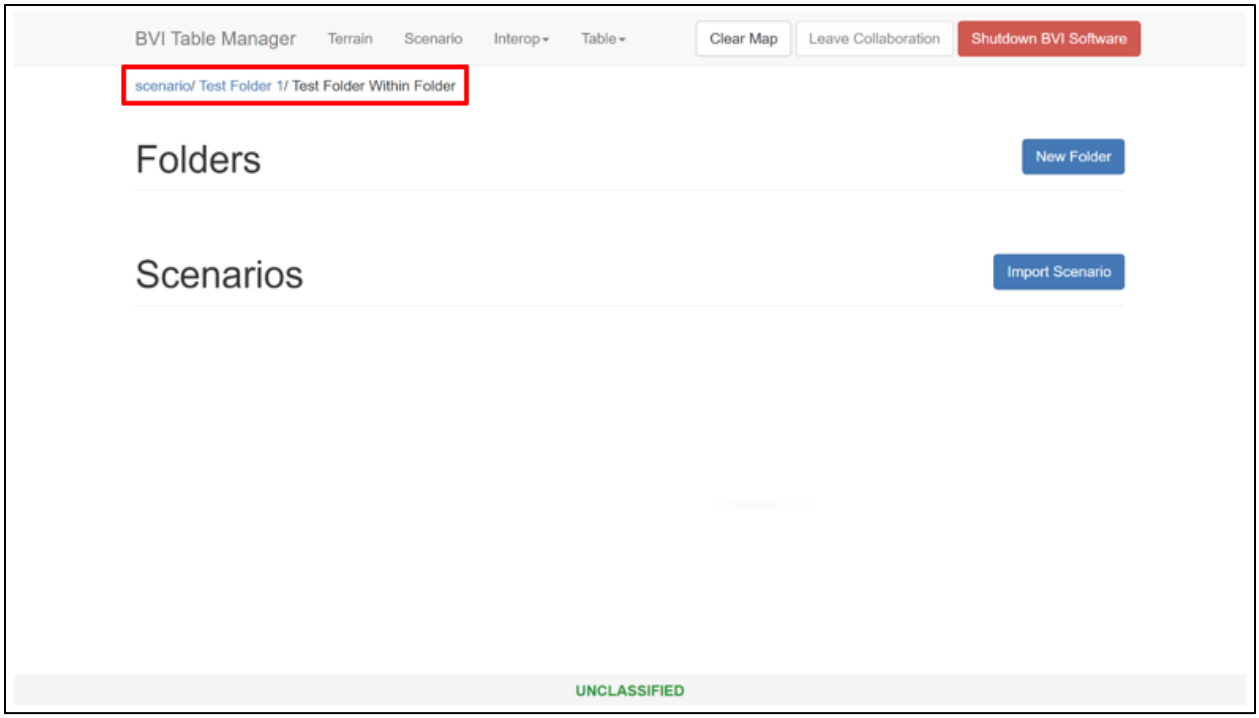


Figure 24 Folder Path

4. Click on the **Import Terrain** or **Import Scenario** button.
5. Choose the desired terrain or scenario.

Terrains/Scenarios are now imported to a folder and sorted within the Table Manager.

2.1.5.1 RENAMING TERRAIN/SCENARIO FOLDERS

To rename the terrain/scenario folders:

1. Select the **Terrain** or **Scenario** tab in the Table Manager
2. Right-click on the desired folder.
3. Select **Rename** (see Figure 25).

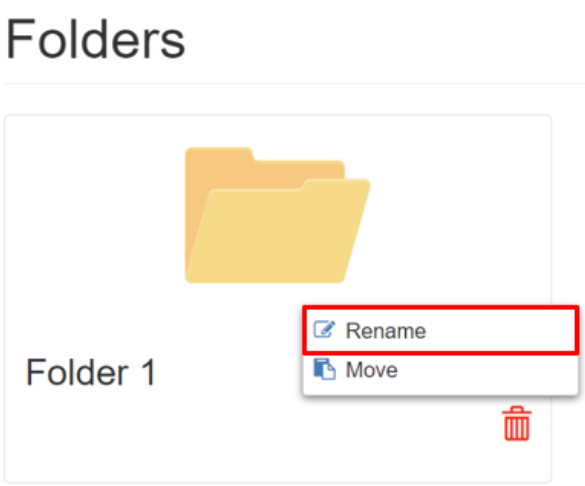


Figure 25 Rename Folder Button

4. Rename the folder.
5. Select **Ok**.

The terrain/scenario folder is now renamed.

2.1.5.2 MOVING TERRAIN/SCENARIO FOLDERS

To move terrain/scenario folders:

1. Select the **Terrain** or **Scenario** tab in the Table Manager.
2. Right-click on the desired folder to move.
3. Select **Move** (see Figure 26).

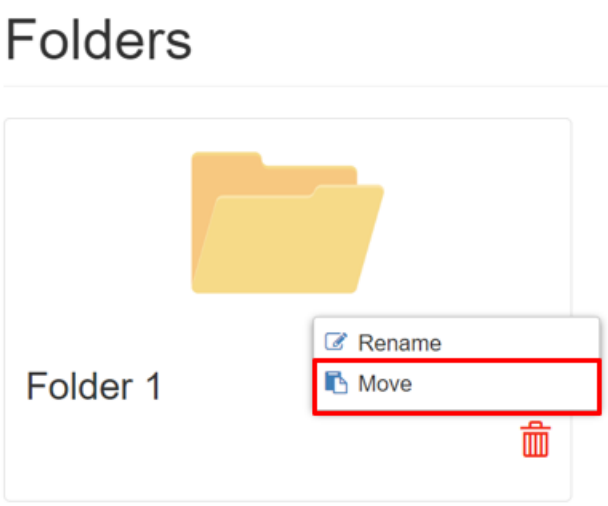


Figure 26 Move Folder Button

4. In the popup, select the folder to be the destination and select **Ok**.

The terrain/scenario folder is now moved to the desired location.

2.1.5.3 MOVING TERRAINS OR SCENARIOS

To move terrain templates or scenarios:

1. Select the **Terrain** or **Scenario** tab in the Table Manager.
2. Create a new folder (if not done so already).
3. Right-click on the desired terrain or scenario.
4. Select **Move**.
5. Move the terrain/scenario to the desired folder.

The terrain template or scenario is now moved to the desired folder.

2.1.5.4 COPYING TERRAINS/SCENARIOS

To copy a terrain/scenario into a folder:

1. Select the **Terrain** or **Scenario** tab in the Table Manager.
2. Right-click on the desired terrain/scenario.
3. Select **Copy**.
4. In the popup, select the folder to be the destination and select **Ok**.

The terrain/scenario is now copied to the designated file location.

2.1.6 LAYER MANAGEMENT

The BVI Table Manager can take layers that are assigned in a scenario and toggle between each layer and change the opacity of each layer. The Layer Management GUI (see Figure 27) displays a layer tree that shows the parent layers and child layers under each parent.

Note: To access Layer Management, a scenario with layers must be loaded first.

1. In the Table Manager, select **Table** and then **Layer Management**.
2. Under **Layer Hierarchy**, select the drop-down arrow next to the parent layer name to display the child layers assigned to that parent layer.

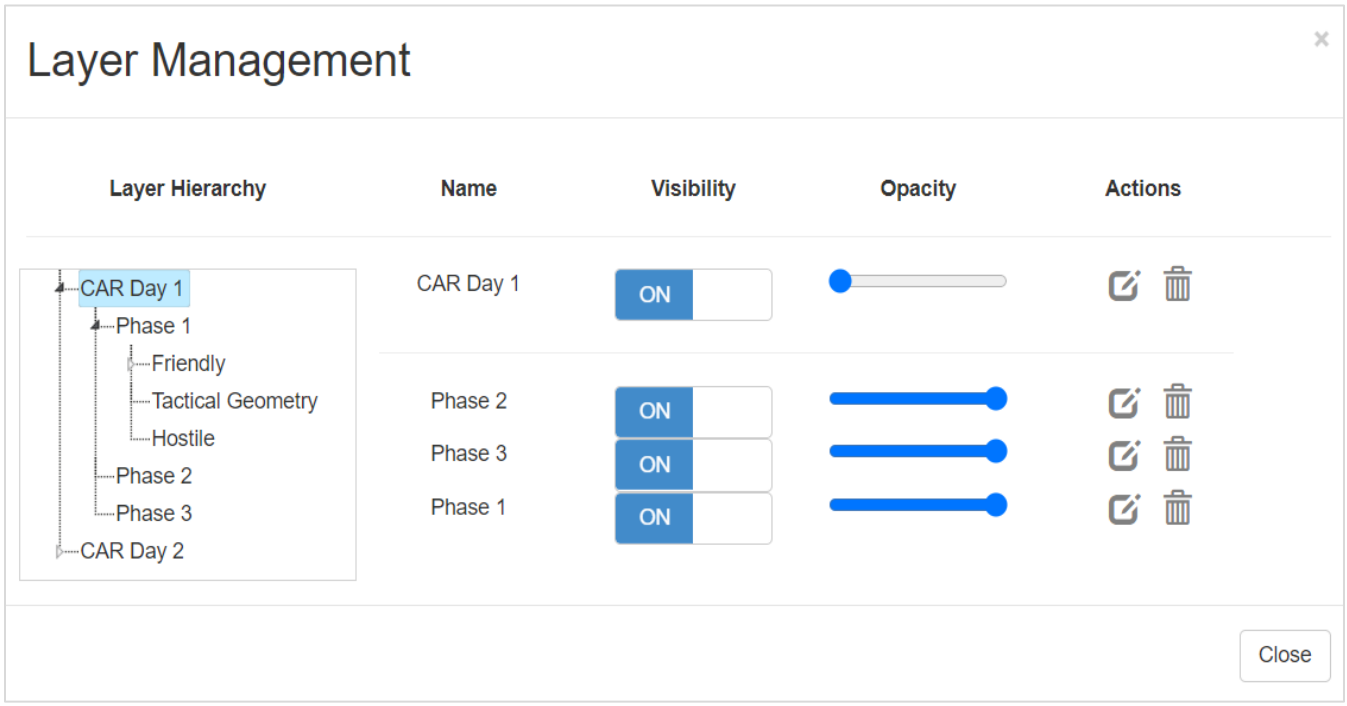


Figure 27 Layer Management Panel

2.1.6.1 TOGGLE LAYERS

To toggle layers, follow the steps below.

1. Select a parent layer or any child layer from the layer hierarchy.
2. Toggle **Visibility** to **OFF** to stop displaying the layer in any viewing modality.
3. Toggle **Visibility** back to **ON** to redisplay the layer.

Figure 28 shows an example of all layers displayed, whereas Figure 29 is an example where Phase 1 Layer is hidden.

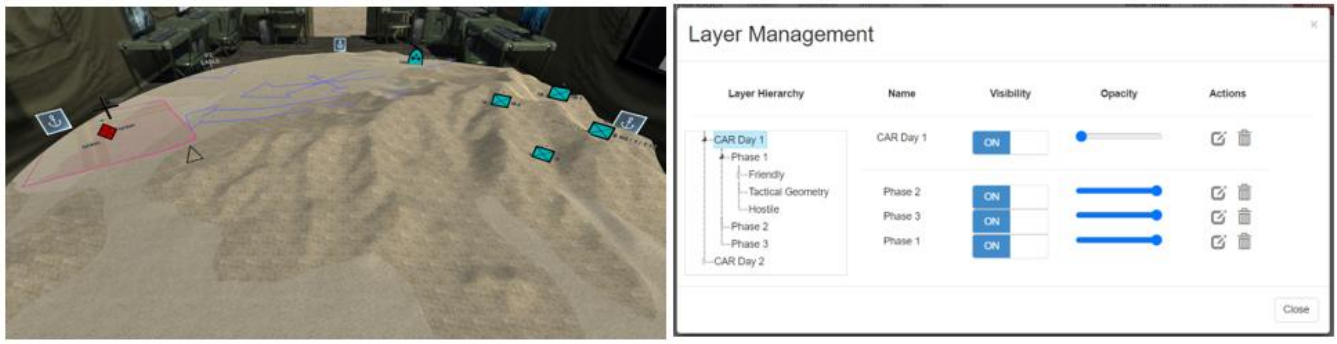


Figure 28 Layer Management Example - All Layers Showing

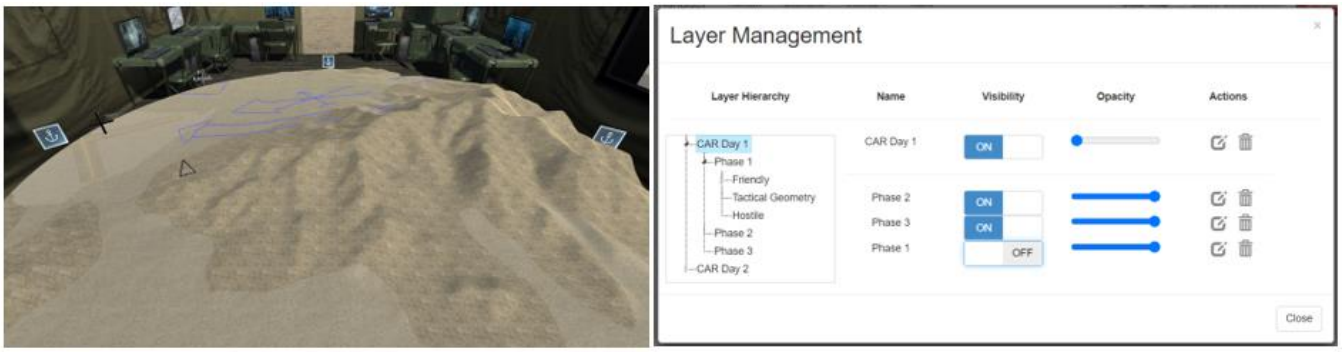


Figure 29 Layer Management Example - Phase 1 Layer Hidden

2.1.6.2 OPACITY

To adjust the opacity of a layer, follow the steps below:

1. Select a parent layer or any child layer from the layer hierarchy.
2. Adjust the **Opacity** slider to change the transparency of the layer.

   *Note: If a parent layer is selected, changing the **Visibility** and **Opacity** of the parent layer will persist across all the child layers assigned to that parent layer.*

2.1.7 FILTER MANAGEMENT

Filter Management in the BVI Table Manager toggles tactical symbols, graphics, and geometry, and separates the scenario objects by Affiliation, Object Type, Symbol, and Echelon.

1. In the **Table Manager**, select **Table.**
2. Select **Filter Management**.
3. To toggle each item, select its corresponding button (see Figure 30):

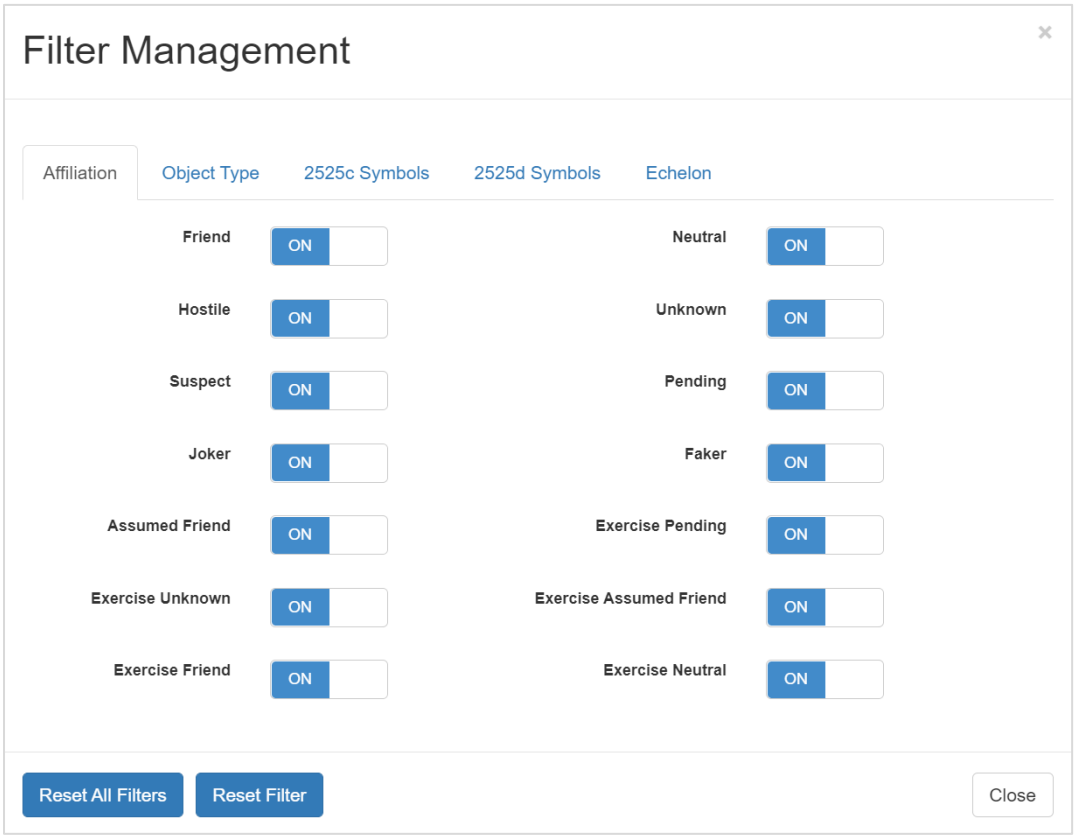


Figure 30 Filter Management

2.1.8 TANK GAME

The BVI Tank Game is an application that allows users to control a tank in a third-person view. Users can play against one another. A maximum of four players can join on one machine at a time.

2.1.8.1 LAUNCHING TANK GAME APPLICATION

To start the tank game application:

Note: the BVI software must be running on the sand table for this application to function properly.

1. Open a File Explorer and navigate to:
   C:\Program Files\ARES\ARES-<version>\ares.tank_game_unity\Win64
2. Double-click **BVI_Tanks_Win64.exe** to launch the application.

2.1.8.2 BEGIN A GAME

To begin a game in the application:

1. Join as a player:
   a. Select **Host + Client.**
   b. Enter the **IP address of the Host machine.**
   c. Set the **Sand Table Scale** in meters.
2. Press **Enter** to add a player. Player 1 will be added (see Figure 31):

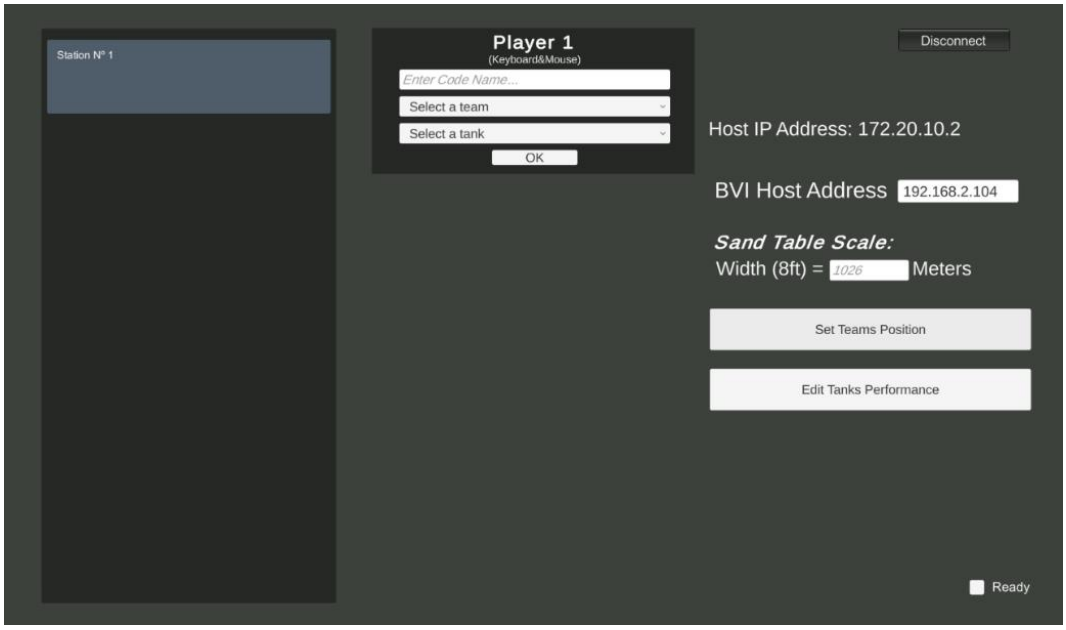


Figure 31 Tank Game Parameters

3. When playing with multiple teams, select **Set Teams Position.** This allows the user to set players at different starting positions (see Figure 32):

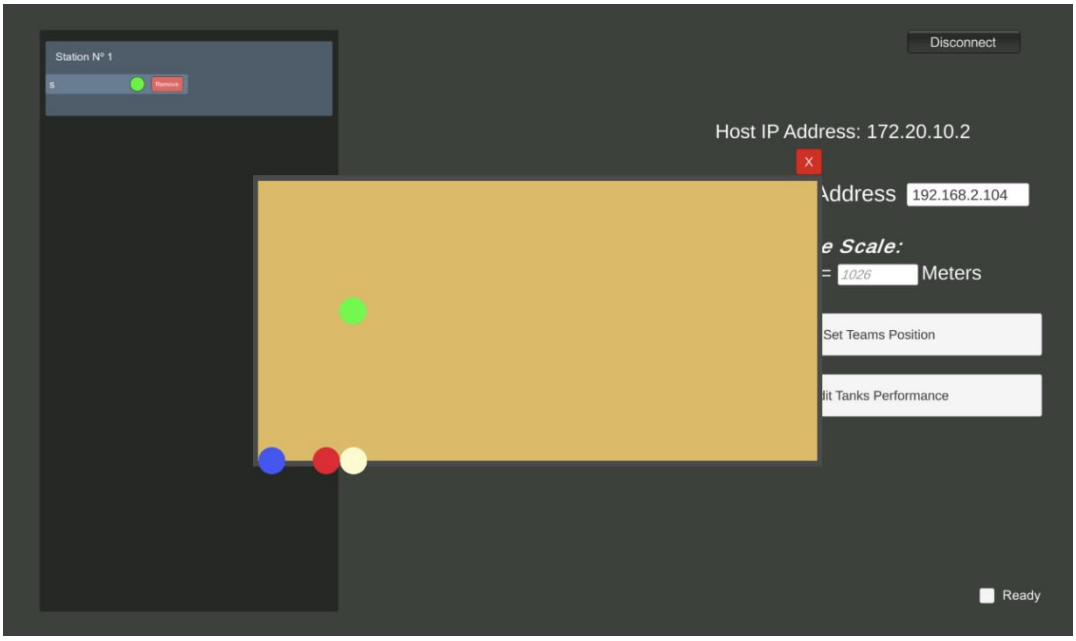


Figure 32 Set Teams Position

4. Edit tank performance(s):
    a. Select **Edit Tanks Performance**. A list of available tank models will appear (see Figure 33):

Figure 33 Available Tank Models

    b. Edit the desired tank model by clicking **Edit** for that model.
    c. Edit the tank models' variables to desired specifications (see Figure 34):

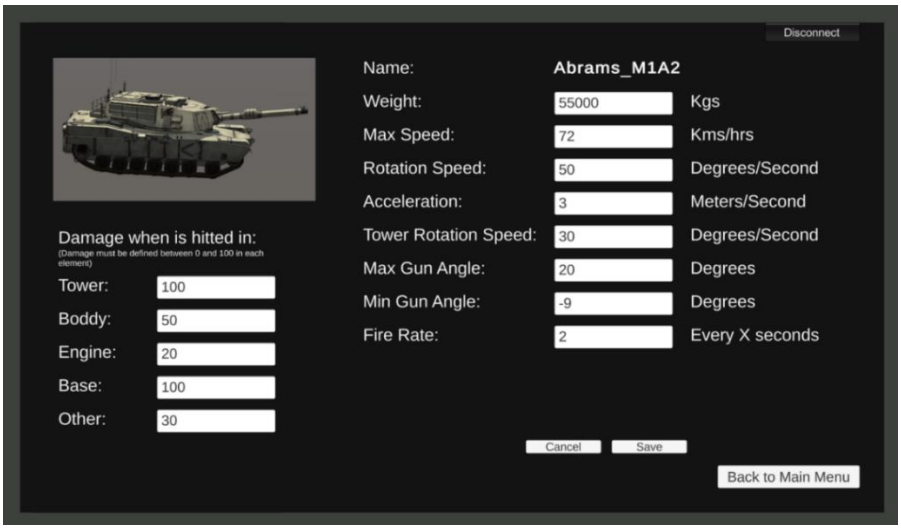


Figure 34 Tank Model Specifications

d. When all edits have been made, click **Save → Back to Main Menu**

5. For each player, enter a code name and select a team and tank model (see Figure 35). Press **OK** when finished.

Figure 35 Set Player Parameters

6. Check the **Ready** button when all players have been added.
7. Press **Start** to begin the tank game.

The tank game will launch, and a view of the player's tank will appear (see Figure 36).

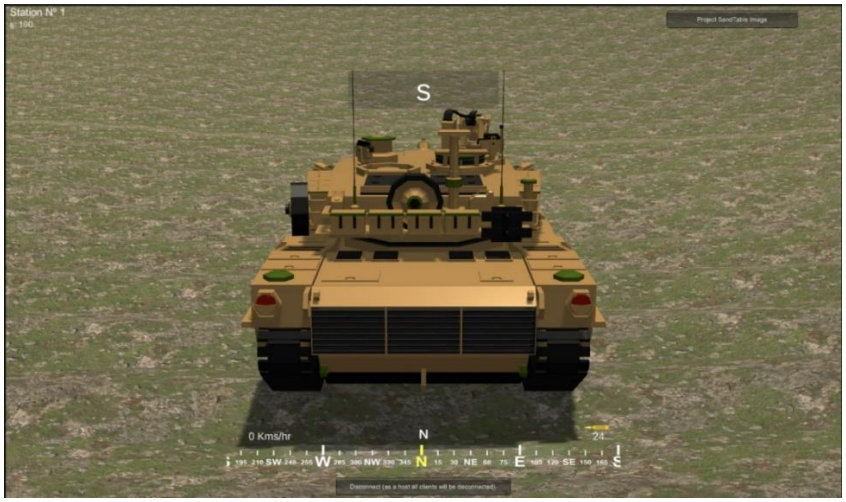


Figure 36 View of Player's Tank

2.1.8.3 TANK GAME CONTROLS

The player can use keyboard and mouse or an Xbox controller to interact with the player's tank.

2.1.8.3.1 USING KEYBOARD AND MOUSE (TANK GAME)

Use the Tank Game controls in Table 1 to manipulate and interact with the player's tank using keyboard and mouse.

Table 1 Tank Game Controls for Keyboard and Mouse

Control	Control Description
'W' or 'S'	Moves tank forward or backward
'A' or 'D'	Turns tank left or right
'I' or 'K'	Moves the canon on tower up or down
'L' or 'J'	Move tower base to the right or left
Right-click on mouse	Fires bullets
'C'	Changes camera angle
'C' + Arrow Keys	Moves camera angle
'Z' + Up or Down Arrow Key	Zooms in and out camera view
'X' + 'J'	Slows tower movement to the left for better accuracy
'X' + 'L'	Slows tower movement to the right for better accuracy
'X' + 'I'	Slow upward canon movement for better accuracy
'X' + 'K'	Slow downward canon movement for better accuracy
'2' + Arrow Keys	Moves sand table camera
'2' + 'Z'	Zoom in and out on sand table

2.1.8.3.2 USING XBOX CONTROLLER (TANK GAME)

Use the Tank Game controls in Table 2 to manipulate and interact with the player's tank using an Xbox controller.

Table 2 Tank Game Controls for Xbox Controller

Control	Control Description
Left Analog Stick	Controls tank movement forward, backward, left, and right
Right Analog Stick	Controls tower movement left and right; Moves canon up and down
RB+ Right Analog Stick	Slows turret movement
LT	Changes camera view
RT	Fire main gun
D-Pad / Arrow buttons	In panoramic view (centered around the tank), moves camera view up, down, left, and right In 3rd person view, zooms camera view in and out

2.2 BVI FLOOR PROJECTION

The Floor Projection modality is used to facilitate large group briefings. Floor projection displays maps and mission overlays directly onto the floor. The standard system uses two projectors to cover a 16' x 9' area (see Figure 37). Two projectors used to cover the same space enables for imagery to remain visible even when shadows are created by users walking over the projection surface. A larger floor projection system uses eight projectors to cover a 25'x14' area (see Figure 39), allowing larger audiences to participate in mission planning.

2.2.1 STANDARD 16'X9' FLOOR PROJECTION SYSTEM STARTUP

Figure 37 BVI 16'x9' Floor Projection

To start up the BVI floor projection system, follow the steps below:

1. Power on both projectors and flat panel display(s).
2. Power on the BVI computer.
3. Log in using the provided BVI username and password.

   Note: if these credentials are unknown, contact bvi-team@dignitastech.com.

4. Ensure Google Chrome is installed on the PC.
5. Double-click on the **Start BVI <version>** shortcut located on the desktop (see Figure 38).

   Note: BVI software may take several seconds to launch.

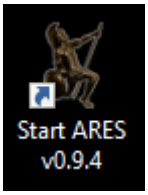


Figure 38 BVI Software Desktop Shortcut

6. Once the BVI software has started, the BVI viewer will project the BVI logo onto the floor and a Chrome browser window with the BVI Table Manager will open on the flat panel display (see Figure 40).
   Note: If the BVI Table Manager window does not automatically open, refer to section 3 Troubleshooting.

2.2.2 25X16 FLOOR PROJECTION SYSTEM STARTUP

Figure 39 BVI 25'x14' Floor Projection

To start up the 25'x14' floor projection system, follow the steps below:

1. Power on the eight projectors and flat panel display(s)
2. Power on the BVI computer.
3. Log in using the provided BVI username and password.
4. Turn on the two Fx4 Data Paths.
5. Ensure Google Chrome is installed on the PC.
6. Double-click on the **Start BVI <version>** shortcut located on the desktop (see Figure 38).

   Note: BVI software may take several seconds to launch.

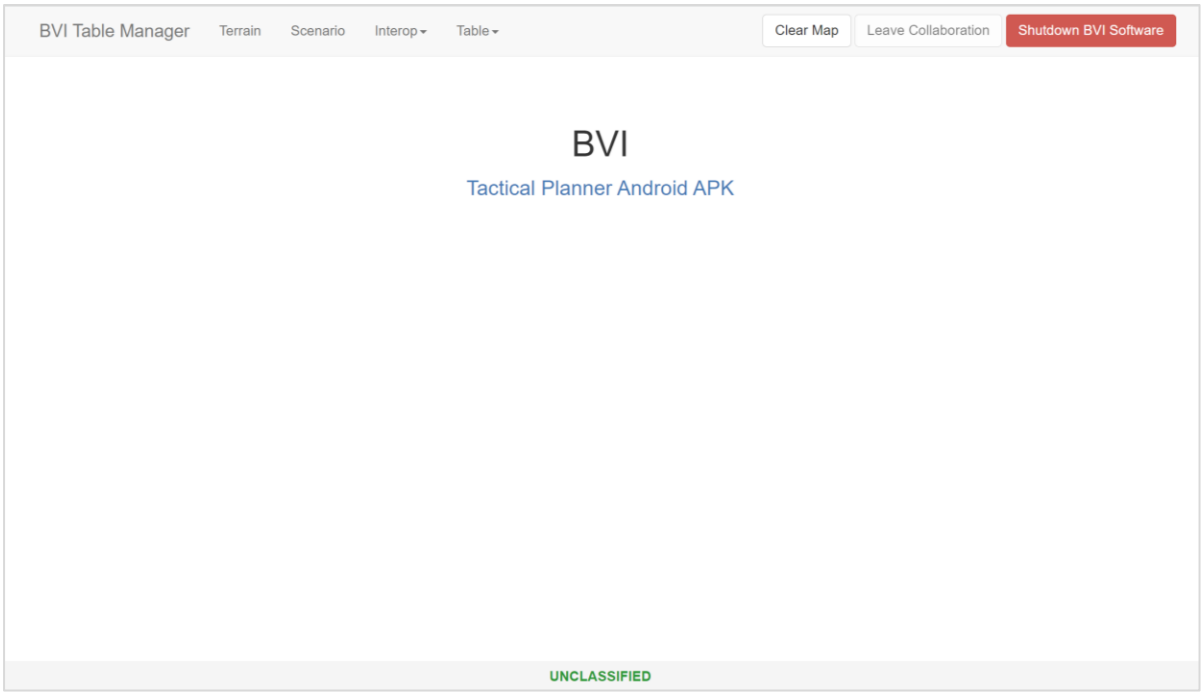


Figure 40 BVI Table Manager

BVI should now be running and ready to be used via the Table Manager or with a connected Android-based mobile device running the BVI mobile application. Instructions for obtaining the BVI mobile application are detailed in the BVI *Installation/Configuration Instructions*.

2.2.2.1 RECALIBRATING FLOOR PROJECTION

On startup, the floor projection image may appear blurry. If the image is unclear, then the projector blending needs to be recalibrated. Steps to maintain a clear picture on the BVI floor projection are provided below:

1. Set the lighting in the room to a dim or low level.

   Note that the less light, the higher the probability for successful recalibration.

2. Clear the BVI floor projection area of all objects (e.g., people, chairs, desks etc.).
3. Click the **Recalibrate** desktop shortcut to recalibrate the projector blending. This will take approximately two minutes to complete.

Upon successful recalibration, the BVI floor projection image will appear in focus with proper blending (no blurry images or text).

2.2.3 BVI SCENARIO POINTER

The BVI Scenario Pointer provides the capability to view the scenario in the BVI 3D viewer (webVeritas).

2.2.3.1 VERIFY BVI SCENARIO POINTER PROPERLY OPERATES

To verify the BVI Scenario Pointer is properly set up:

1. Ensure the Vive system is on.
2. Double-click the **BVI Scenario Pointer <version>** desktop shortcut on the BVI computer (see Figure 41):

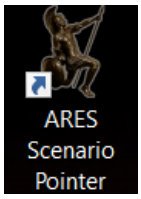


Figure 41 BVI Scenario Pointer Desktop Shortcut

3. Verify that the following hardware is lit green in the Steam VR popup window (see Figure 42). The window will open automatically when running BVI Scenario Pointer.
   - Vive headset
   - Vive controller(s)
   - Two base stations

   Note: If the Steam VR window does not open, open Steam and click the VR icon in the top right of the window.

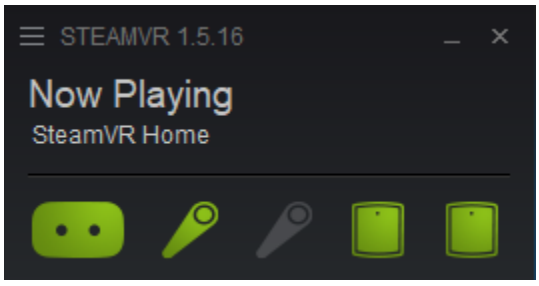


Figure 42 Steam VR Peripherals Connected

The **BVI Scenario Pointer** window should now be streaming the VR view of the Vive headset. The application will automatically detect the movement and location of the Vive controller if it is in view of the headset.

Note: Ensure the BVI Scenario Pointer window remains open in the background when running BVI to allow for proper functioning of webVeritas.

2.2.4 WEBVERITAS 3D SCENARIO VIEWER

One feature of BVI is the ability to use the HTC Vive virtual reality system as a mode for exploring BVI scenarios in virtual 3D space. The following sections detail how to explore a BVI scenario in 3D space using the Vive controller.

2.2.4.1 VIEWING SCENARIO WITH WEBVERITAS

To load a scenario onto the floor projection and view it in webVeritas 3D scenario pointer, follow the steps below:

1. In the BVI Table Manager, select the **Table** drop-down menu.
2. Select **Applications.** A list of system processes will appear.
3. Click **Start** for the 3D View. webVeritas will launch in a Chrome browser.
4. Load a scenario:
    a. Navigate to the **Scenario** tab via the BVI Mobile Tactical Planner application or BVI Table Manager on the BVI computer.
    b. Choose a scenario and select the **Show Scenario on Table** () icon. The scenario will load in the webVeritas browser with tactical graphics and units. The scenario will also load onto the floor projection.
5. To tether the camera to a unit's location in the scenario, double-click on an entity in the **Entity List** menu ().

2.2.4.2 VIVE CONTROLLER CONTROLS

Use the Vive controller controls in Table 3 to navigate and explore the scenario in 3D virtual space.

Table 3 Vive Controller Controls

Action	Description
Press up/down on circular pad on center of the controller	Increases/decreases elevation
Pull trigger on the controller	Displays a black crosshair on the map indicating the current viewpoint of the camera
Move Vive controller across sand table	Explores current scenario using webVeritas browser as a viewport for first-person camera point-of-view

Note: If the Vive controller becomes unresponsive (meaning the camera location in webVeritas stops tracking the Vive controller movements), restart the 'BVI Scenario Pointer' application and refresh the webVeritas browser.

2.2.4.3 KEYBOARD/MOUSE WEBVERITAS CONTROLS

Use the controls in Table 4 to maneuver the webVeritas camera in virtual 3D space.

Table 4 Keyboard/Mouse webVeritas Controls

Action	Description
'W' or Mouse Wheel Scroll Up	Moves camera in forward direction; Zooms into the surface of the Earth if camera is pointed at Earth
'S' or Mouse Wheel Scroll Down	Moves the camera backwards; Zooms out from the surface of the Earth if camera is pointed at Earth
'A'	Pan the camera view to the left
'D'	Pan the camera view to the right
Left-Mouse Click + Drag	Pivot the camera view on its axis
Right-Mouse Click + Drag	Rotate the Earth around the axis centered on the mouse cursor position
'Q'	Pans the camera view up
'Z'	Pans the camera view down

2.2.5 TERRAINS (FLOOR PROJECTION)

Using the BVI Table Manager, new terrain templates can be generated using Google Maps, by user upload or from the current display on the sand. The map sources in beta include OpenStreetMap, Open Topo Map and USGS. Users can modify or delete existing terrains or correlate the sand to a pre-saved topology.

Note: The BVI Table Manager for the sand table and the floor projection function the same.

To create a terrain template, reference the Section 2.1.3 Terrains.

2.2.6 LOAD A SCENARIO (FLOOR PROJECTION)

The BVI Table Manager can also be used to load a scenario. From the BVI Table Manager you can view, export, import, or delete available scenarios and display them on the sand table or floor projection system.

Note: The Tactical Planner application is required to interact with or edit features.

To load a scenario onto the BVI floor projection:

1. Select the **Scenarios** tab on the Table Manager. A thumbnail view of all available scenarios will be shown (see Figure 43).

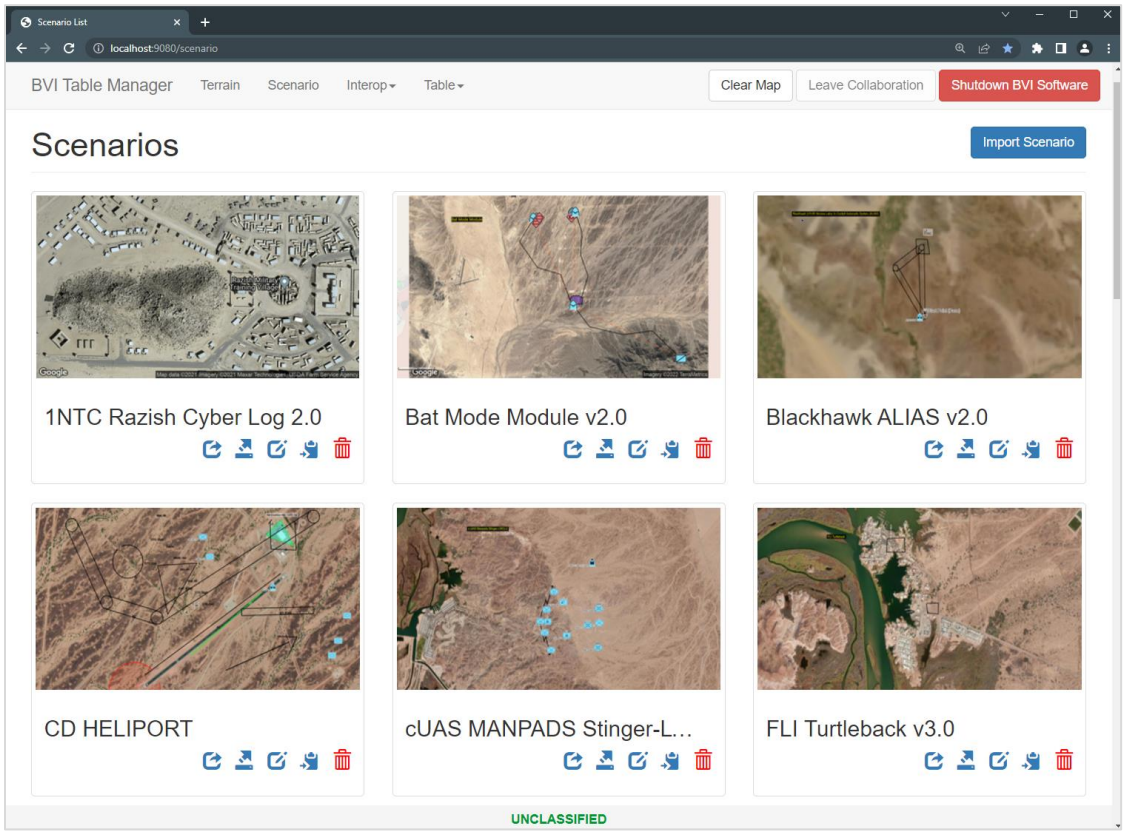


Figure 43 Scenario List as shown in Table Manager

There are several buttons associated with each saved scenario file:

- **Show Scenario on Table:** Displays the corresponding scenario on the sand table/floor. Existing icons can be selected and moved only using a connected Xbox controller.
- **Export Scenario:** Exports the full scenario, including all icons, as a savable file.
- **Delete Scenario:** Delete the associated scenario and all its content. Once confirmed, the scenario cannot be recovered.

2.2.6.1 IMPORTING/EXPORTING SCENARIOS

To import or export scenarios, reference *Section 2.1.4.1.1 Importing/Exporting Scenarios.*

2.2.7 IMPORTING KML/JSON FILES

To import KML, KMZ, or GeoJSON files, reference section *2.1.4.2 Importing KML/JSON/MSDL/xTSP Files*.

2.2.8 DATA VISUALIZATION

Data can be imported and visualized through the BVI Table Manager. The data can be displayed in both 2D and 3D as the following:

- Specified location mappings by different types of visualization types
- Specific categories and color mappings all in both 2D and 3D views

2.2.8.1 IMPORTING CUSTOM DATA VISUALIZATION

The BVI Table Manager can import *.csv files and display the information in either chart, circle, or region visualization.

Note: A scenario must be loaded first to import custom data.

1. In the BVI Table Manager, select **Table** and then select **Import Data Visualization.**
2. Select **Import New Data From File**.
3. Select **Choose File** and select the **.csv** file to be imported.
   Note: When import is completed, the Data Visualization Import GUI will appear.
4. Specify the **Location Mapping** by County or by Lat/Lon.
   This will depend on how the data locations are listed in the .csv file.
5. Select the desired **Visualization Type**.

2.2.8.1.1 CHART VISUALIZATION

To visualize data in a chart format:

1. From the **Visualization Type** options, select **Chart**.
2. Under **Categories**, name the desired column.
3. Select the appropriate column.
4. Select a desired column color.
5. In the **2D** section, set the radius for the data to be displayed.
6. In the **Common** section, set the desired **Min Radius** and **Max Radius** fields.

   *Note: The **Scale** and **Opacity** fields can be left as is. This **Common** section sets the minimum and maximum radius for both 2D and 3D Views.*

The steps below apply *only* if 3D viewer applications are available. The steps are not required if the data is only being displayed in the Viewer or Mobile Tactical Planner, which are 2D viewer applications.

1. Select **3D** under the **Visualization Config**.

2. Select the desired **3D Chart Type**.
3. Set the **Radius** and toggle the **Extrude** field to **On** if the data is desired to be extruded in 3D view.
4. Select **Apply**.

2.2.8.1.2 CIRCLE VISUALIZATION

To visualize data in a circle format, follow the steps below.

1. From the **Visualization Type** options, select **Circle**.
2. Choose the desired column name for the **Column to Visualize** field.
3. Choose the desired color mapping scheme for the **Color Map** field.
4. Set the scale and the height for the data in the **Scale** and **Height** fields.

   Note: The scale and height can be left as is and will not affect the data import.

5. Set the desired **Min Radius** and **Max Radius** fields.
6. Set the desired **Radius** field.
7. Toggle the **Extrude** field to **On** if the data is desired to be extruded in 3D view

   Note: Extrusion only affects the 3D viewer applications.

8. Select **Apply**.

2.2.8.1.3 REGION VISUALIZATION

To visualize data in a region format:

1. From the **Visualization Type** options, select **Region**.
2. Choose the desired column name for the **Column to Visualize** field.
3. Choose the desired color mapping scheme for the **Color Map** field.
4. Set the scale and the height for the data in the **Scale** and **Height** fields.

   Note: The scale, height, and opacity can be left as is and will not affect the data import.

5. Toggle the **Extrude** field to **On** if the data is desired to be extruded in 3D view.

   Note: Extrusion only affects the 3D viewer applications.

6. Select **Apply**.

2.2.8.2 IMPORT

The BVI Table Manager can import weather data from a file that contains data or download data from an online source. The weather data imports as layers and can be played as a stop-motion video in viewer applications. For importing weather data from an online source, note that the source is limited to NCEP data.

2.2.8.2.1 IMPORT WEATHER DATA FROM FILE

To import weather data from a file:

1. In the BVI Table Manager, select **Table** and then **Import Weather**.
2. Select **Import Weather Data from File**.
3. Select the appropriate file that contains the weather data.

   *Note: The files must be in ***.pb**, ***.zip**, or ***.grib2** format.*

4. Select **Import**.

2.2.8.2.2 IMPORT WEATHER DATA FROM ONLINE SOURCE

To import weather data from an online source:

1. In the BVI Table Manager, select **Table** and then **Import Weather**.
2. Select **Retrieve Weather Data**.
3. Choose an available date and time for the **Start Time** by selecting the calendar icon.

   Note: Weather can be imported up to nine days before the current date and up to sixteen days after the current date.

4. Choose an available date and time for the **End Time** by selecting the calendar icon.
5. If playback is desired, toggle the **Playback** field to **On.**

   Note: Playback can be toggled after the data imports in the Weather Settings. Reference section 2.2.8.3 on how to do so.

2.2.8.3 WEATHER SETTINGS

The BVI Table Manager can toggle between visibility settings, set the type of weather to be displayed, set the layer altitude and time, and toggle to display wind quivers. Once the Weather Settings are set, Viewer or other viewer applications can play the weather data as a stop-motion video.

Note that weather data must be imported first to access the Weather Settings.

1. In the BVI Table Manager, select **Table** and then select **Weather Settings**.
2. Toggle **Show Weather** to either display the weather data or not.
3. To adjust the opacity, slide the **Weather Opacity** scale.
4. Select **Air Temperature**, **Humidity**, **Precipitable Water**, or **Total Cloud Coverage** to be displayed.
5. Adjust the **Layer Altitude** to the desired layer height.
6. Adjust the **Forecast Time** to the desired time.

   Note: This slider will also set the start time for the Playback Service.

7. Toggle **Wind Quivers** on to display wind vectors.
8. Select **Play** to play the weather data in a stop-motion video in the viewing applications.

2.3 BVI MOBILE TACTICAL PLANNER

The Mobile Tactical Planner app is an Android-based application used in conjunction with all BVI modalities (e.g., sand table, floor projection). This application allows for the creation of tactical scenarios utilizing MIL STD 2525C symbols. Scenarios can be saved locally to BVI or exported as a file, which can also be imported onto another BVI computer.

2.3.1 CONNECT BVI APP TO TABLE

Before the Android tablet can interact with BVI, the tablet must be connected to the same wireless network as the BVI computer, and the BVI Mobile Tactical Planner application needs to be installed. Refer to section ***2.4 Connecting a Mobile Device*** in the *BVI Installation/Configuration Instructions*. This section will assume that the steps to connect the tablet to BVI have already been completed.

Note: The BVI Mobile Tactical Planner App must be installed on the tablet before continuing with this section.

1. Launch the BVI app on the Android tablet (see Figure 44):

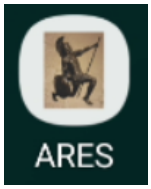


Figure 44 BVI Mobile Tactical Planner App

2. Tap **Allow** for any permissions the application requests (if a permission pop-up appears).
3. From the main drop-down menu (located on the left side of the top bar), tap on **Tables** (see Figure 45):

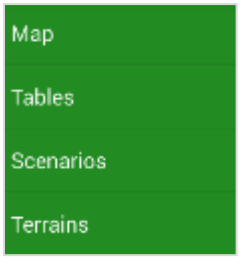


Figure 45 Main Drop-down Menu of BVI App

4. Press the **Start** button when a text box containing **Searching for BVI Tables disabled** appears on the bottom portion of the screen (see Figure 46). The tablet will begin to search for any BVI tables that are within the local network. It may take several seconds before any tables are located. Once one or more BVI tables are found, they will be displayed along with their name.

Figure 46 Searching for BVI Tables

5. Tap on the thumbnail image representing desired table to select it (the selection will highlight green).
6. Tap the **Connect** ( ) button on the upper right-side of the window to connect the tablet to the table (see Figure 47).

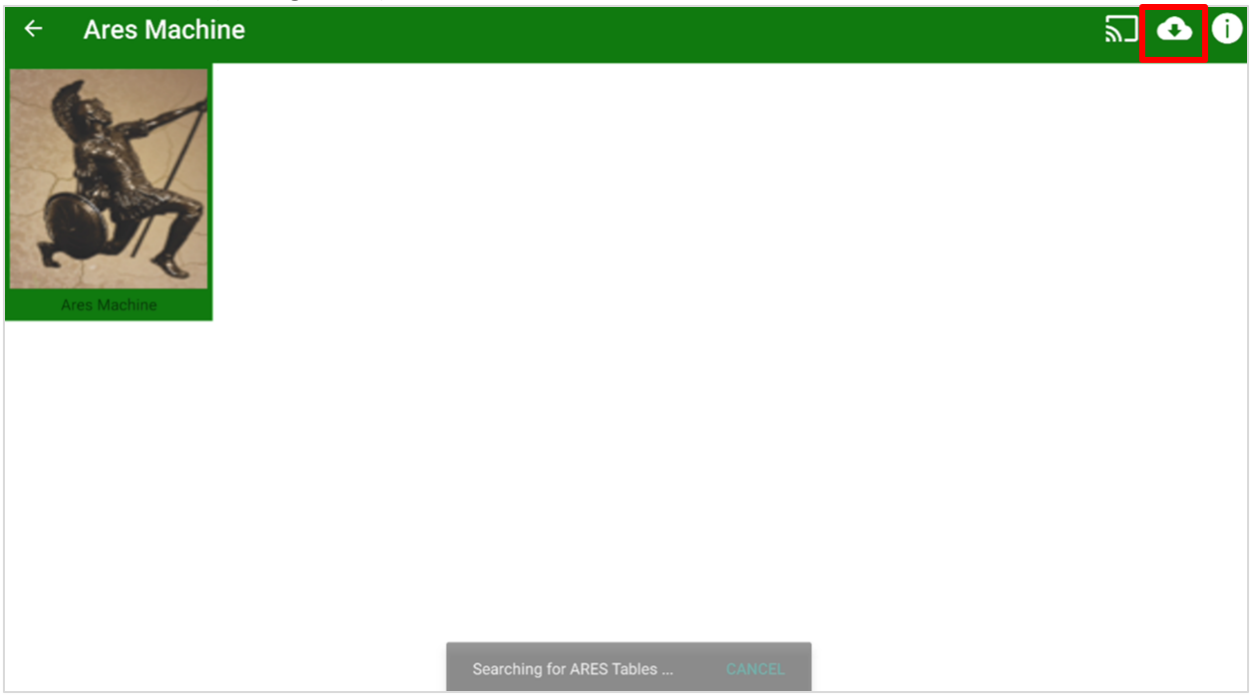


Figure 47 Connect to BVI Table

The BVI Mobile Tactical Planner is now connected.

2.3.2 LOAD A SCENARIO

Scenarios can be loaded from the Mobile Tactical Planner. This can be performed in two ways:

- **Method 1**: via the BVI mobile app running on the BVI tablet
- **Method 2**: from the BVI table manager

The sections below will provide detailed overviews for each process.

2.3.2.1 METHOD 1: LOAD FROM BVI MOBILE APP

The BVI mobile application is used to build tactical scenarios using MIL STD 2525C symbols. To use this tool, the mobile device with the BVI app must be connected to the BVI table that will be used.

1. Tap the **menu** icon ( ) in the top-left corner of the app to access the drop-down menu.
2. Select **Scenarios** from the menu. A list of available scenarios will appear (see Figure 48):

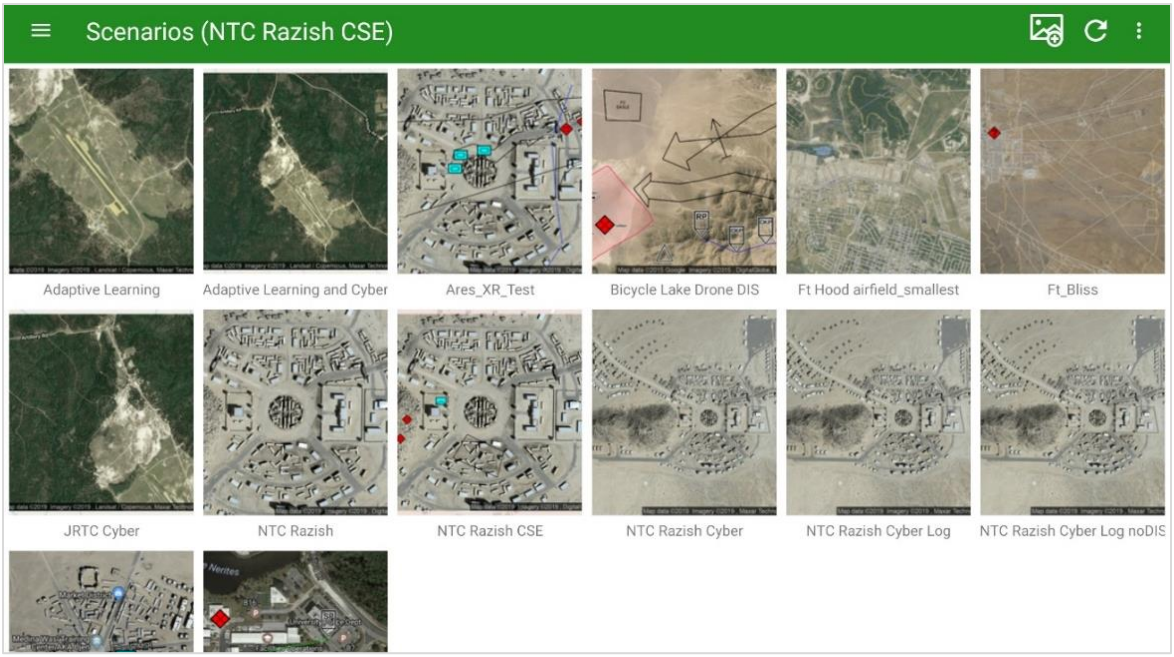


Figure 48 Scenario List as shown in BVI Mobile App

3. Select the desired scenario. New options appear in the top bar once a scenario is selected (see Figure 49).

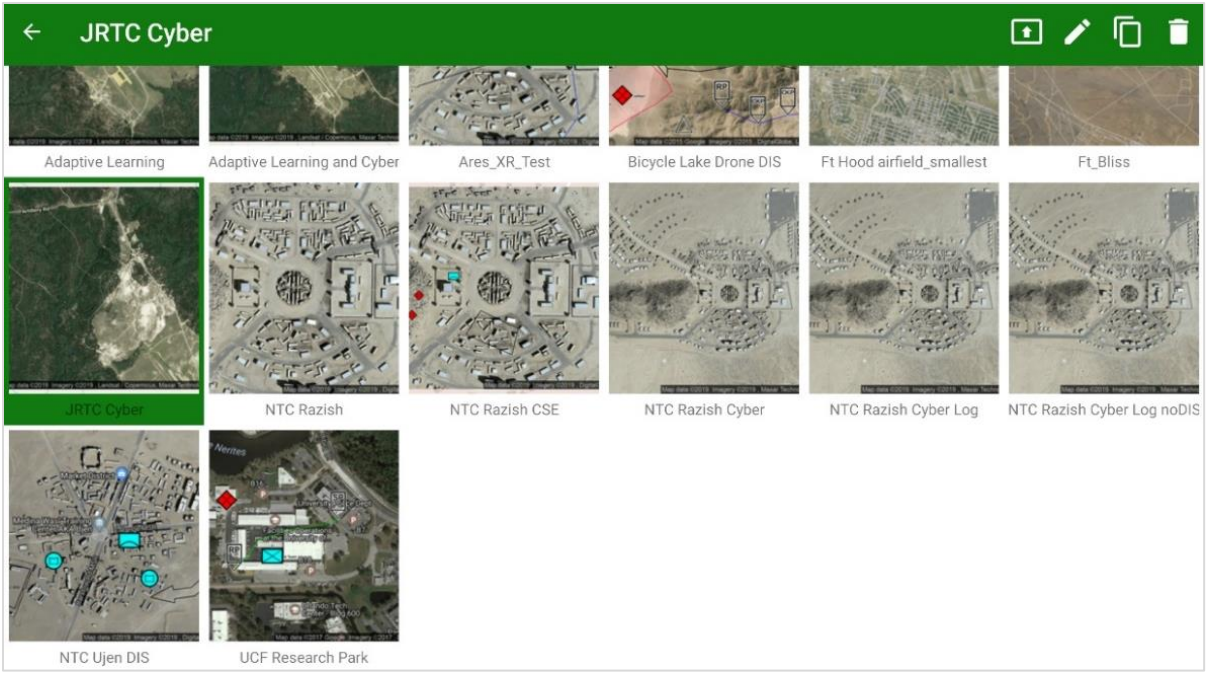


Figure 49 Selected Scenario in BVI Mobile App

For each scenario, the following options are available:

- **Load Scenario:** Displays the scenario on the sand table/floor and opens the file in the app for editing.
- **Edit Scenario Properties:** Allows the editing of scenario name and description.
- **Copy:** Copies scenario (includes all entities and graphics within scenario).
- **Delete:** Delete the associated scenario file. Once deleted, the scenario file cannot be recovered.

2.3.2.2 METHOD 2: LOAD FROM BVI TABLE MANAGER

The BVI Table Manager can also be used to load a scenario. From the BVI Table Manager, the user can view, export, import, or delete available scenarios, as well as display them on the sand table or floor projection system.

Note: The Tactical Planner application is required to interact with or edit features.

To load a scenario from the Table Manager:

1. Select the **Scenarios** tab on the Table Manager. A thumbnail view of all available scenarios will be shown (see Figure 50).

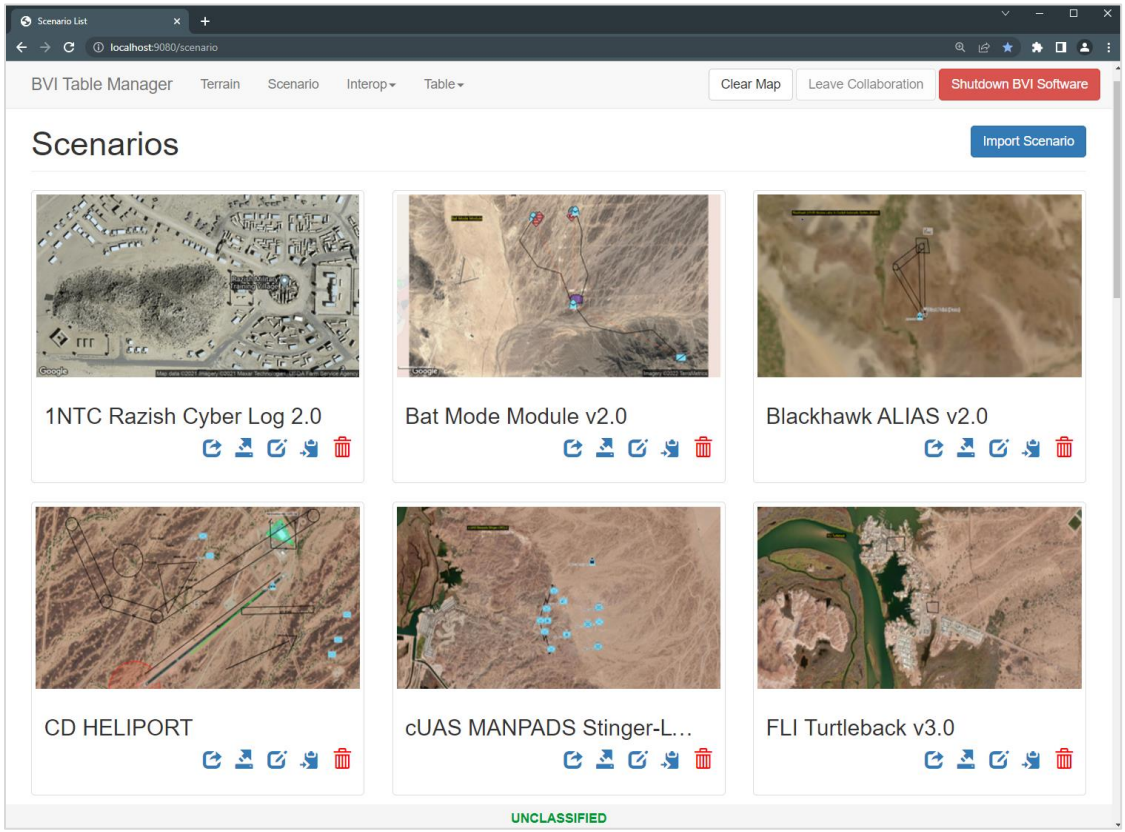


Figure 50 Scenario List as shown in Table Manager

For each saved scenario file, the following options are available:

- **Show Scenario on Table:** Displays the corresponding scenario on the sand table/floor. Existing icons can be selected and moved only using a connected Xbox controller.
- **Export Scenario:** Exports the full scenario, including all icons, as a savable file.
- **Delete Scenario:** Delete the associated scenario and all its content. Once confirmed, the scenario cannot be recovered.

2.3.3 BUILDING A SCENARIO (MOBILE TACTICAL PLANNER)

After loading a scenario from the Mobile Tactical Planner application or from the Table Manager, the display on the sand table/floor will mirror that on the mobile device. When a scenario is loaded, the top bar displays the name of the table along with the name of the current scenario (see Figure 51).

Figure 51 Mobile View of Opened Scenario

The toolbar menu options include:

- **Disconnect from Table:** Disconnects from the sand table
- **Open BVI Table Manager in Browser:** Opens the Table Manager in a browser window to allow for changing of BVI settings.
- **Share Preview:** Exports a screenshot of the scenario to an indicated location.
- **Share Scenario:** Exports a zip file of the scenario to an indicated location.
- **Line-of-Sight:** Enable Line-of-Sight feature (see section 2.3.7 *Line-of-Sight Feature* for more details)
- **Add:** Adds units, route points, lines, and polygons to the scenario.
- **Save:** Saves the current scenario with all entities and geometries.
- **Unload Scenario:** Unloads scenario. This option leaves the scenario without saving.
- **Settings:** Opens the scenario settings menu.

To begin building or editing the scenario, select the **Add** button. Once selected, the available actions are:

-  **Add Tactical Symbol:** Add units.
-  **Add Tactical Graphic:** Add a maneuver or entity.
-  **Add Radio Propogation:** Add visual representation of radio propagation.
-  **Add Route:** Add route points.
-  **Draw Text:** Write and position text.
-  **Draw a Line:** Draw freeform lines.
-  **Draw a Polygon:** Draw polygons.
-  **Draw a Circle**: Draw circles.

2.3.3.1 ADD TACTICAL SYMBOL (MTP)

To add a tactical symbol in the Mobile Tactical Planner:

1. Select the **Add** () button.
2. Select **Create Symbol** (See Figure 52).
3. Enter the desired name, affiliation, and echelon for the tactical symbol.
4. Choose a symbol set (e.g., MIL_STD_2525B, MIL_STD_2525C, MIL_STD_2525D, DHS_A).

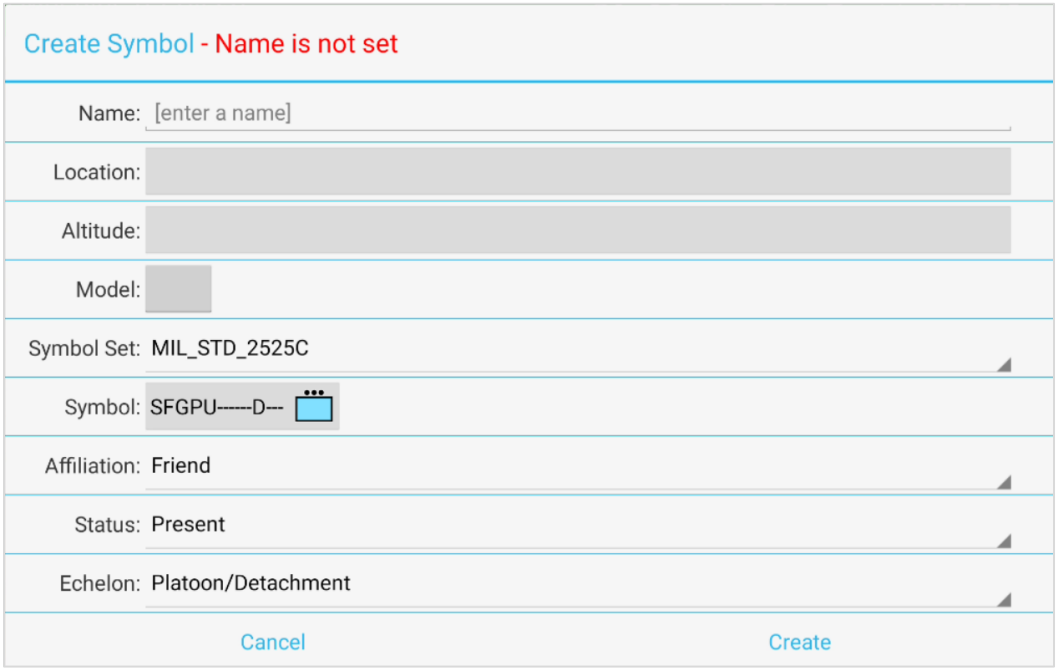


Figure 52 Add Tactical Symbol Menu (MTP)

5. To select the symbol:
    a. Tap the gray box to the right of **Symbol.** Observe the symbol selection panel appears (See Figure 53).

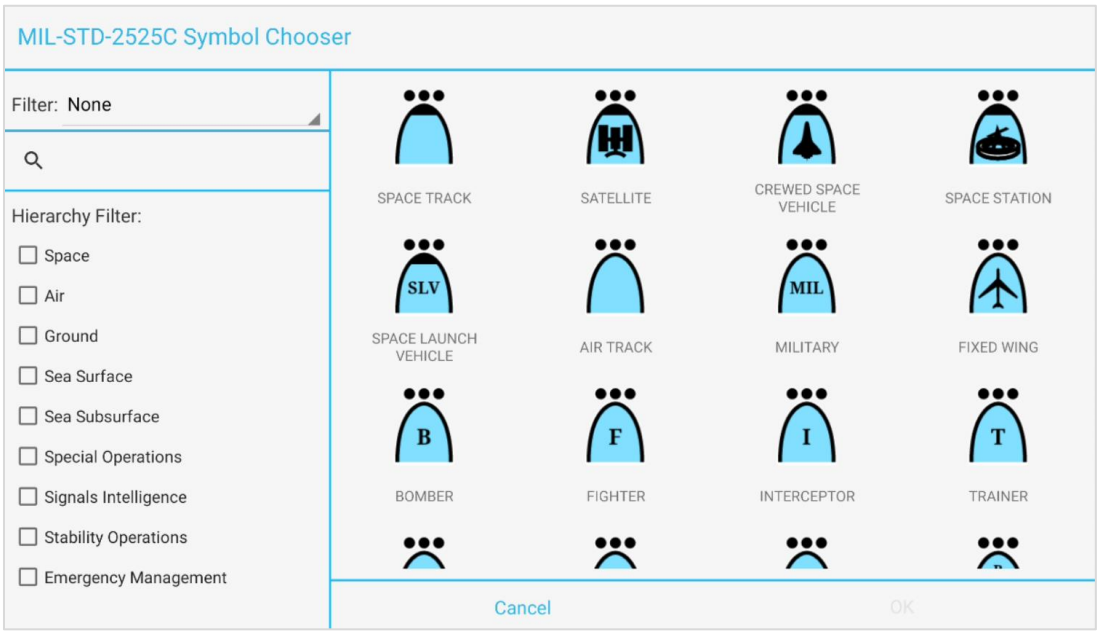


Figure 53 Tactical Symbol Selection

    b. Locate the desired symbol using one of the available tools:
        i. **Filter** (Top-left): Allows the user to view a list of recently used symbols, or clear the recent list
        ii. **Search** ( ): Search by keyword
        iii. **Hierarchy Filter**: Filter by symbol type
    c. Choose the icon. The icon will be highlighted green.
    d. Tap **OK** to select the symbol.
6. (*Optional*) To add modifiers to a symbol (see Figure 54):
    a. Tap the gear icon all the way to the right of **Symbol:**
        - Text modifiers:
            - **Header Text**
            - **Icon Text**
            - **Footer Text**
        - Badge modifiers: add numerical values to the fields
            - **Upper Left**
            - **Middle Left**
            - **Lower Left**
            - **Upper Right**
            - **Middle Right**
            - **Lower Right**
        - Badge Radius: size of the badges on the symbol
        - Badge Font Size: size of the text on the badges
        - Badge as Diamond: displays badges as diamonds instead of circles

Figure 54 Symbol Customizer Menu

7. (*Optional*) To add a model:
    a. Select the gray box to the right of **Model.** Observe that the **Model Chooser** window appears (see Figure 55).

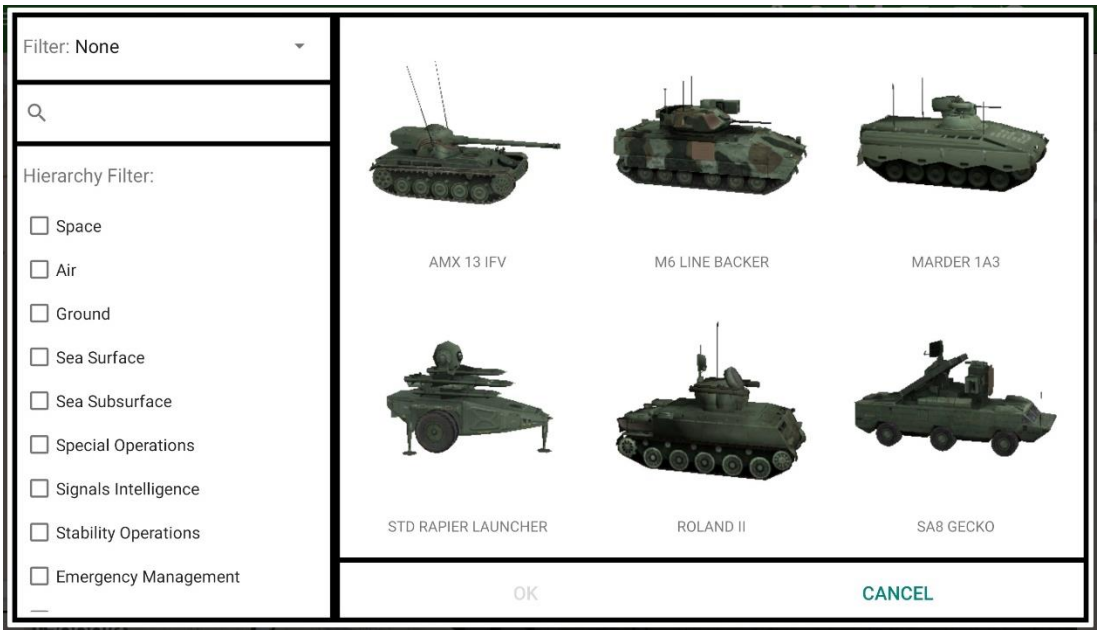


Figure 55 "Model Chooser" Panel (MTP)

    b. Locate the desired symbol using one of the available tools:
        i. **Filter** (Top-left): Allows the user to view a list of recently used models or clear the recent list.
        ii. **Search** ( ): Search by keyword
        iii. **Hierarchy Filter**: Filter by model type
    c. Choose the model. The model will be highlighted green.

d. Tap **OK**.

8. Tap **Add** once all information has been entered. The unit icon will be displayed on the terrain.
9. To move the unit:
    a. **Tap the symbol** once to select it. A yellow highlight will appear around the unit (see Figure 56).
    b. **Drag-and-drop the unit** anywhere on the terrain.
    c. **Tap the symbol again** to deselect the unit.

Figure 56 Selected Unit

When a unit is selected, the toolbar menu options include:

- **Toggle Snail Trail:** Enables trail for selected unit.
- **Line-of-Sight:** Gives ability to see line-of-sight (LOS) for selected unit. For additional details, reference section *2.3.7 Line-of-Sight Feature*.
- **Edit Unit Properties:** Edit unit name, affiliation, echelon, or function.
- **Copy:** Creates a copy of the selected unit.
- **Delete:** Deletes selected unit.

2.3.3.2 ADD TACTICAL GRAPHIC

To add a tactical graphic:

1. Select **Add** to open available actions.
2. Select **Add Tactical Graphic** to add a tactical graphic. A **Create Graphic** window will appear (see Figure 57).

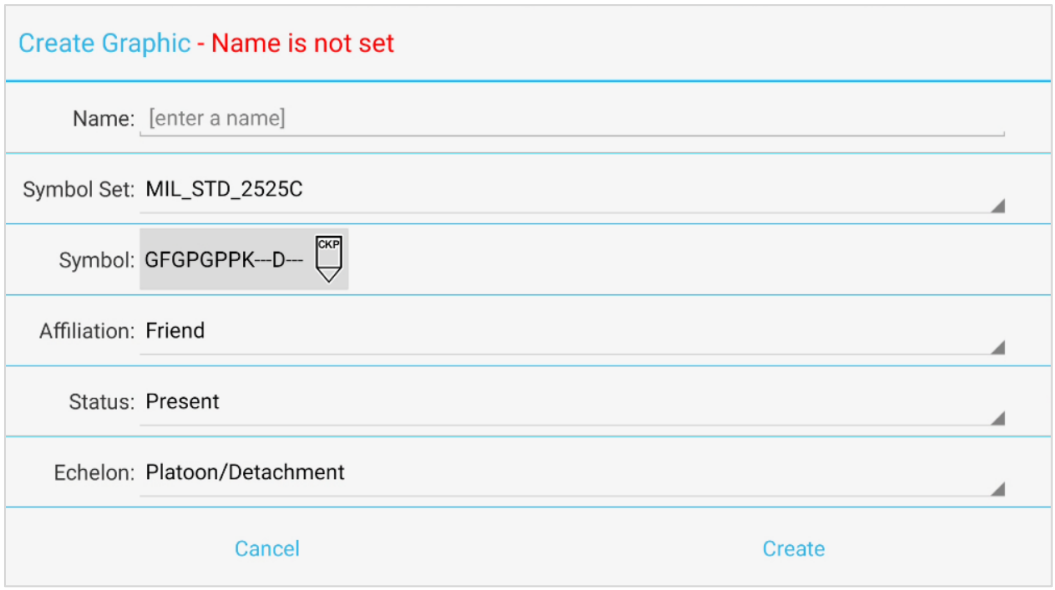


Figure 57 Add Tactical Graphic Panel (MTP)

3. Enter the desired name, affiliation (Friendly, Hostile, Neutral, etc.), and echelon.
4. Select a symbol set (e.g., MIL_STD_2525B, MIL_STD_2525C).
5. To select the tactical graphic:
    a. Tap the gray box to the right of **Symbol**. Observe that the **Tactical Graphic Chooser** panel appears (see Figure 58).

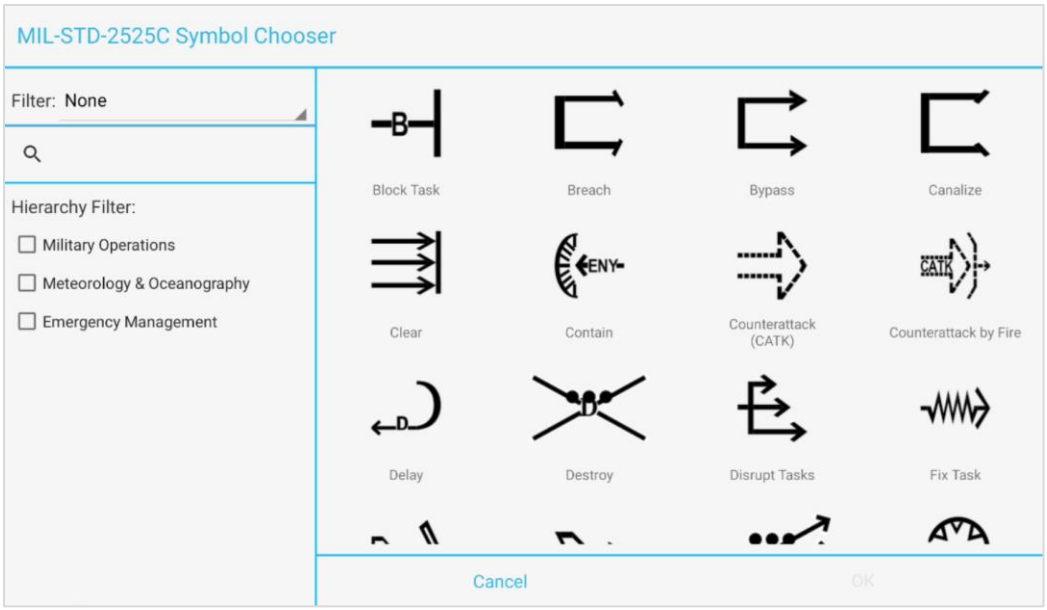


Figure 58 Tactical Graphic Chooser Panel (MTP)

b. Locate the desired symbol using one of the available tools:
    i. **Filter** (Top-left): Allows the user to view a list of recently used tactical graphics or clear the recent list
    ii. **Search** ( ): Search by keyword
    iii. **Hierarchy Filter**: Filter by tactical graphic type
c. Choose the graphic. The graphic will be highlighted green.
d. Press **OK**.

6. Tap **Add** to add the tactical graphic to the scenario.
7. Once the graphic has been added, the user may be prompted to select **control points**. These points will determine the size and direction of the graphic.

   *Note: The graphic may be modified by simply selecting it or the control points. However, the **Symbol** section may not be modified once the graphic is initially added.*

2.3.3.3 ADD RADIO PROPAGATION

To add radio propagation:

1. Select **Add** to open available actions.
2. Select **Add Radio Propagation**. An 'Add Radio Propagation' dialog box will appear.
3. Tap on **Radio Frequency (MHz)** to change the radio frequency.
4. Select **Add** and the radio symbol appears in the center of the terrain.
5. Select either the **Tx** or **Rx** radio symbol (a yellow circle will appear over the symbol when selected) and drag it to the desired location to measure the propagation.
6. Select and drag the other point to any other position on the terrain (see Figure 59).

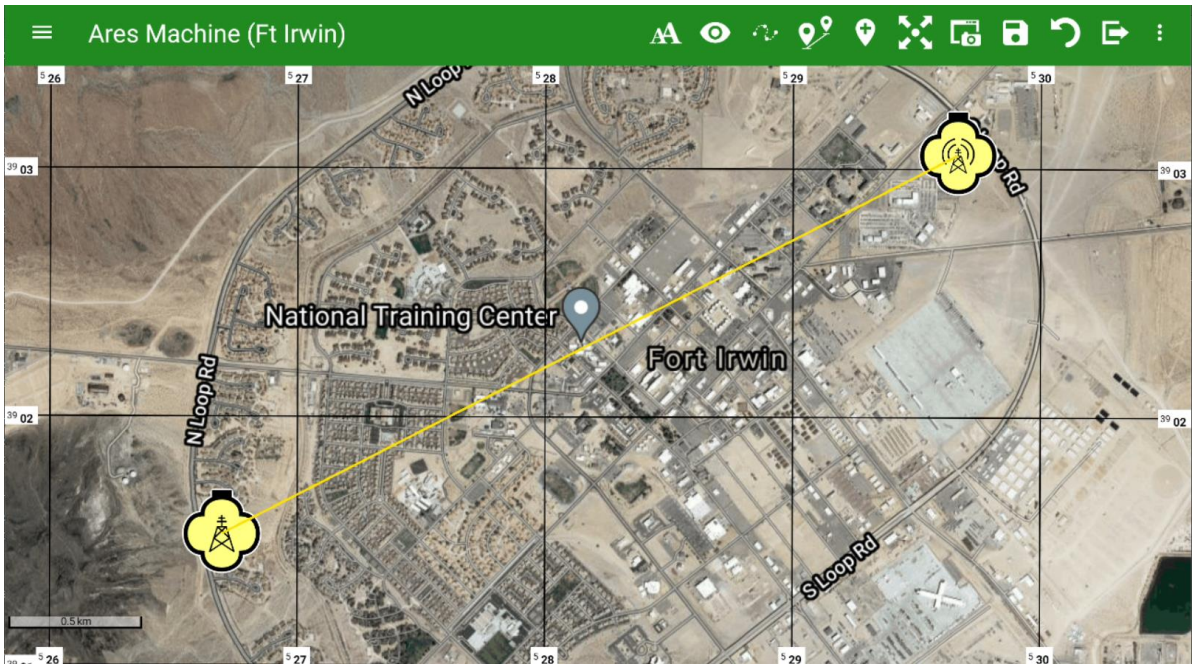


Figure 59 Radio Propagation

2.3.3.4 ADD ROUTE

To add a route:

1. Select **Add** to open available actions.
2. Select **Add Route.**
3. Tap on a chosen location to select a position on the terrain to start the route.
4. Continue adding additional points until the desired route has been set (see Figure 60).

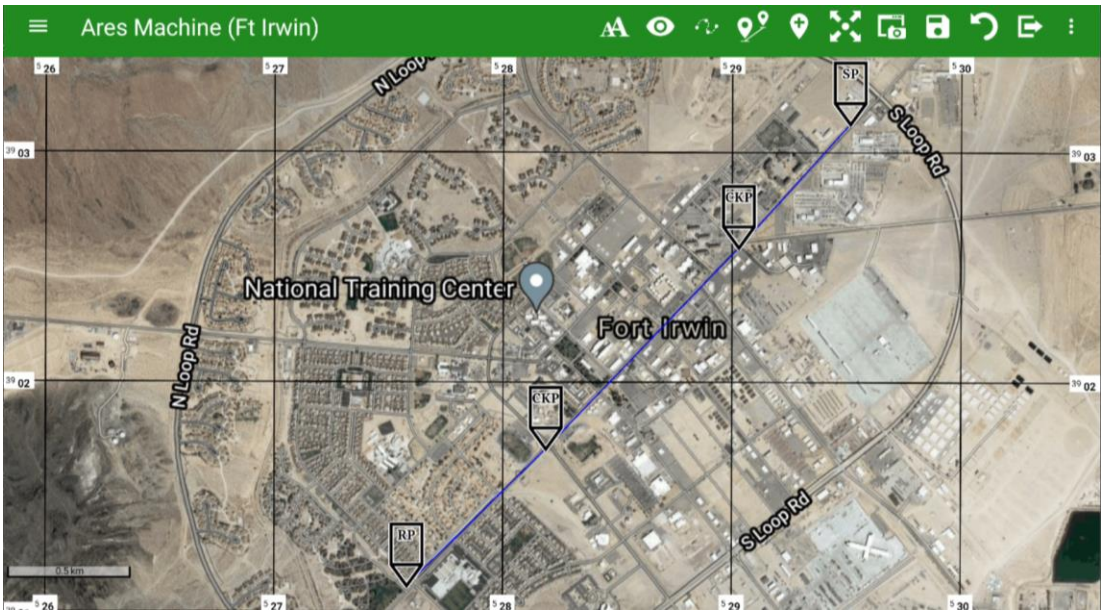


Figure 60 Adding Route

5. To change **Route Data**:
    a. Swipe left on the green bar titled **Route Data** located on the right side of the screen.
    b. Adjust properties of the route such as soldier weight, load weight (lb), terrain cost scale, etc. (see Figure 61).

Figure 61 Route Data Menu

c. Swipe right to save and close the properties.

6. Click **Save** button in the top right portion of the screen to confirm the route.

2.3.3.5 DRAW TEXT

To draw text:

1. Select **Add** to open available actions.
2. Select **Draw Text**. A text box will appear (see Figure 62).

Figure 62 Draw Text Window

3. Enter desired text.
4. Select **OK** to add the text. The text will appear in the center of the screen.
5. Drag the text to any location.
6. Drag the rotate point to change the text rotation (see Figure 63).
7. Drag the resize point to change the font size (see Figure 63).
8. Tap anywhere on the terrain to deselect the text box.

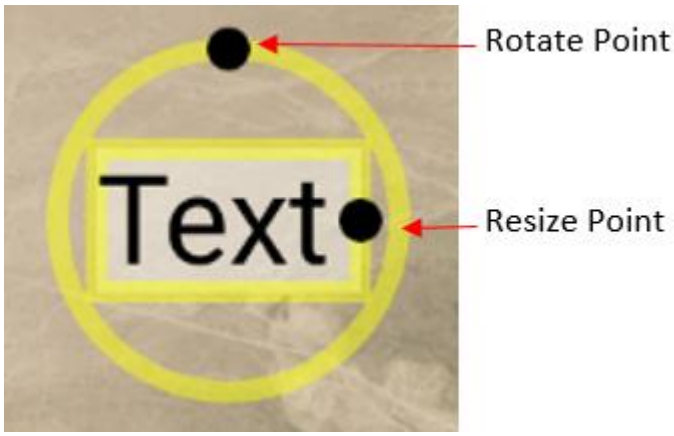


Figure 63 Text Rotation and Resize Points

2.3.3.6 DRAW A LINE

To draw a line:

1. Select **Add** to open available actions.
2. Select **Draw a Line**.
3. Draw the line by free-hand drawing on the screen or by tapping on endpoints to create straight lines.
4. To alter the settings of a line:

   a. Select the **Settings** menu ()

b. Several settings can be changed:
    i. **Point Color:** changes the color of the vertices
    ii. **Point Width**: adjusts the size of the points
    iii. **Display Vertices**: toggles on/off the display of vertices
    iv. **Line Color**: changes the color of the line
    v. **Line Width**: changes the width of the line
    vi. **Dashed**: Determines if the line is dashed or solid

5. To alter the altitude of a line:
    a. Select the **Height** menu ()
    b. Several settings can be changed:
        i. **Height Reference:** changes the reference point for altitude adjustments
        ii. **Altitude (m):** adjusts the height of the line
        iii. **Extrude:** stretches the line vertically to create a 3D object
        iv. **Flatten:** changes the line's elevation to the highest point along its route. For example, if a line intersects with a tree, then the highest point that the line intersects with is the top of the tree, meaning the entirety of the line will elevate to this point.
        v. **Drape:** conforms the line to the surface of the terrain

    Note: The extruded line is a 3D object that will only appear as a 2D line in MTP, but will appear as a 3D object in WTP and BVI XR.

6. Tap **Save** in the top-right corner of the screen to confirm the line.

2.3.3.7 ACQUIRE DISTANCE FROM LINES

To acquire the distance from points using a line:

1. Select the **Settings** icon in the top right.
2. Select **LOS Settings**.
3. Select the check box for **Allow Info Popup**.
4. Return to the BVI main interface and add a line
    a. The total distance in meters will display in a popup at the bottom of the page. Once the line is saved the popup will no longer be displayed.

2.3.3.8 ADD POLYGON

To add a polygon:

1. Select **Add** to open available actions.
2. Select **Draw a Polygon.**
3. Tap at a chosen location to begin drawing the polygon.
4. Continue selecting points until the desired polygon is drawn. The points will connect and color fill in between automatically.
5. To alter the settings of a polygon:
    a. Select the **Settings** menu ().
    b. Several settings can be changed:

i. **Point Color:** changes the color of the vertices
ii. **Point Width**: adjusts the size of the points
iii. **Display Vertices**: toggles on/off the display of vertices
iv. **Line Color**: changes the color of the line
v. **Line Width**: changes the width of the line
vi. **Dashed**: Determines if the line is dashed or solid

6. After selecting this option, the settings of the object can be changed by first selecting the settings menu ( ). In the settings, the outline width and color can be changed along with the fill color and transparency (see Figure 64). Note that the slider on the far right controls the transparency of the polygon.

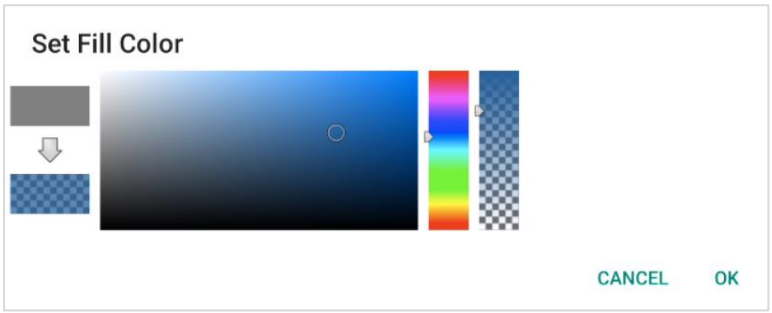


Figure 64 Polygon Fill Options

7. To alter the altitude of a polygon:
    a. Select the **Height** menu ( )
    b. Several settings can be changed:
        i. **Height Reference:** changes the reference point for altitude adjustments
        ii. **Altitude (m):** adjusts the height of the polygon
        iii. **Extrude:** stretches the polygon vertically to create a 3D object
        iv. **Flatten:** changes the polygon's elevation to the highest point within its area. For example, if a polygon covers a tree, then the highest point that the polygon covers is the top of the tree, meaning the entirety of the polygon will elevate to this point.
        v. **Drape:** conforms the polygon to the surface of the terrain

    Note: The extruded polygon is a 3D object that will only appear as a flat polygon in MTP but will appear as a 3D figure in WTP and BVI XR.

8. After making the desired changes to the settings, the polygon can be created by tapping the screen at the desired location of each vertex.
9. The polygon is confirmed by selecting the **Save** button at the top-right portion of the screen.

2.3.3.9 ADD A CIRCLE

To add a circle:

1. Select **Add** to open available actions.
2. Select **Draw a Circle**.

3. Tap at a chosen location to draw a circle.
4. Use two fingers to set the diameter of the circle, widening to increase the diameter.
5. To alter the settings of a circle:
    a. Select the **Settings** menu ().
    b. Several settings can be changed:
        i. **Point Color:** changes the color of the vertices
        ii. **Point Width**: adjusts the size of the points
        iii. **Display Vertices**: toggles on/off the display of vertices
        iv. **Line Color**: changes the color of the line
        v. **Line Width**: changes the width of the line
        vi. **Dashed**: Determines if the line is dashed or solid

6. To alter the altitude of a circle:
    a. Select the **Height** menu ().
    b. Several settings can be changed:
        i. **Height Reference:** changes the reference point for altitude adjustments
        ii. **Altitude (m):** adjusts the height of the circle
        iii. **Extrude:** stretches the circle vertically to create a 3D object
        iv. **Flatten:** changes the circle's elevation to the highest point within its area. For example, if a circle covers a tree, then the highest point that the circle covers is the top of the tree, meaning the entirety of the circle will elevate to this point.
        v. **Drape:** conforms the circle to the surface of the terrain
        vi. **Dome:** elevates the circle fill to create a dome

    Note: The extruded circle and dome are 3D objects that will only appear as a circle in MTP but will appear as a cylinder or dome in WTP and BVI XR.

7. To alter the transparency of the circle, refer to Figure 64.
8. Select the **Save** button.

2.3.3.10 ADD A CONE

To add a cone:

1. Select **Add** to open available actions.
2. Select **Draw a Cone**.
3. Tap at a chosen location to place the **vertex** of the cone.
4. Tap at a second location to place the **base** of the cone.

    Note: A dotted line will appear between the two points to show they are a single geometry and will appear as a cone in WTP and BVI XR.

5. To alter the settings of a cone:
    a. Select the **Settings** menu ().
    b. Several settings can be changed:

i. **Point Color:** changes the color of the vertices
ii. **Point Width**: adjusts the size of the points
iii. **Display Vertices**: toggles on/off the display of vertices
iv. **Line Color**: changes the color of the line
v. **Line Width**: changes the width of the line
vi. **Dashed**: Determines if the line is dashed or solid

6. To alter the altitude of a cone:
    a. Select the **Height** menu ().
    b. Select either **Base** or **Vertex**.
    c. Several settings can be changed:
        i. **Height Reference:** changes the reference point for altitude adjustments
        ii. **Altitude (m):** adjusts the height of the base or vertex
        iii. **Radius (m):** adjusts the size of the base or vertex
        Note: The base and vertex are the same radius upon creation.

7. To alter the transparency of the cone, refer to Figure 64.
8. Select the **Save** button.

2.3.4 RANGE RINGS

Air defense range rings can be toggled on/off for a specific unit.

To toggle on range rings:

1. Select an air defense unit in the scenario (e.g., air defense missile, air defense composite).
2. Select the **Toggle Range Rings** icon ( ) from the toolbar. Range rings will be toggled on for the unit (see Figure 65).

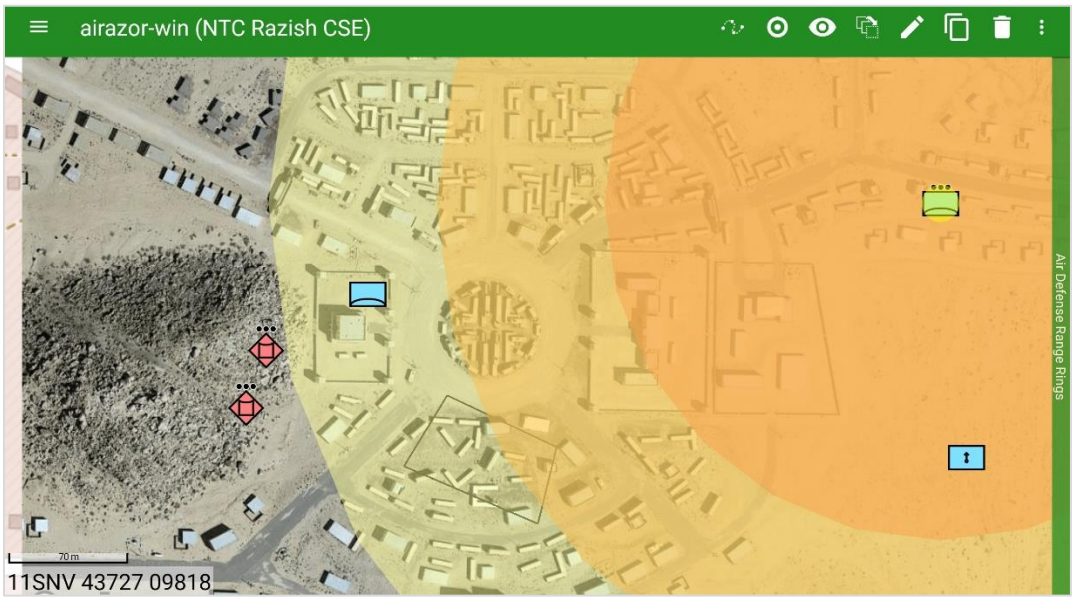


Figure 65 Range Rings for Air Defense Unit (MTP)

3. To change the air defense system:
   a. Swipe left on the **Air Defense Range Rings** bar located on the right-side of the tablet. The range rings menu will open (see Figure 66).

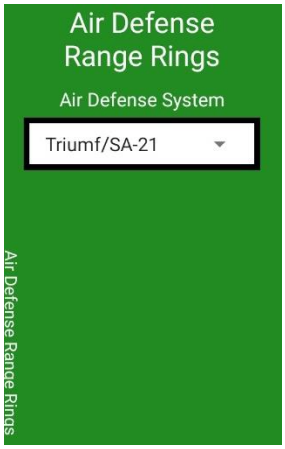


Figure 66 Air Defense Range Rings System (MTP)

   b. Select the drop-down arrow to change the range ring system.
   c. Swipe right on the **Air Defense Range Rings** bar to close the menu.

4. To create a custom range ring for all units:

    a. Open the **Settings** menu in the top right ( ).
    b. Select **Settings.**
    c. Select **LOS settings.**
    d. Select the check box for **Allow Range Rings for All Units.**
    e. Create any unit and select the **Toggle Range Rings** icon.
    f. Open the side bar and select **Custom** at the bottom of the list (see Figure 67).

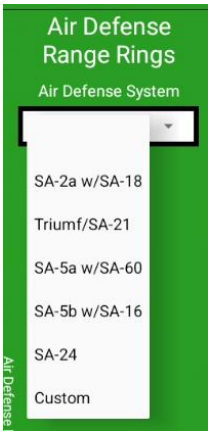


Figure 67 Custom Air Defense Range Rings (MTP)

    g. Select **Custom** and enter the values for **Detection Radius**, **Tracking Radius**, and **Engagement Radius.**

2.3.5 MORTAR REQUESTS

Mortar requests can be called in a scenario from the Mobile Tactical Planner.

To call a mortar request:

1. Select a mortar unit in the scenario (e.g., field artillery mortar, SP wheeled mortar).
2. To set and fire the mortar:
    a. Swipe left on the **AWE Simulation** bar located on the right-side of the tablet. The **AWE Simulation** menu will open (see Figure 68).

Figure 68 Mortar Request Menu (MTP)

    b. Set the azimuth (mils) and elevation (mils) using the **+** and **-** buttons.
    c. Choose the desired munition from the drop-down arrow.
    d. Once all settings have been chosen, press the **Fire** button ( ) to call the mortar request.

2.3.6 CLEAR SCENARIO

To clear the scenario of all content, excluding the terrain tiles:

1. Select the **Scenarios** icon ( ) drop-down.
2. Select **Clear Scenario.**

2.3.7 LINE-OF-SIGHT FEATURE

The Line-Of-Sight (LOS) feature provides additional capability for users to plan and assess situations within their scenarios. The LOS can either be displayed on the Sand Table, Floor Projection or Mobile Tactical Planner application, as a LOS fan that is based on an underlying terrain file or based on the dynamic topography of the sand.

2.3.7.1 BASED ON CURRENT TOPOLOGY OF THE SAND TABLE

This mode visualizes an entity's LOS based on the topography of the sand. Instead of showing a LOS fan such as those based on LTF data, this feature will show the LOS for a unit based on the sand heights from the table. For example, a LOS fan may not show that the entity could see a mountain top in the distance, but this mode will represent that it is visible.

Note: The scale of the sand is based on which scenario is loaded. If the loaded scenario covers a large area, the unit's sight will likely be limited.

1. Select a desired entity and choose the **Line-of-Sight** icon from the right side of the top bar ().
2. Choose **Area Intervisibility** from the LOS drop-down menu.
3. Move the entity around the terrain and the area of visibility will dynamically change according to the unit's LOS (see Figure 69).
4. To turn off the LOS, deselect the unit by tapping anywhere else on the screen.

Figure 69 Line-of-Sight Based on Sand

2.3.8 IMPORTING KML/JSON FILES

To import KML, KMZ, or GeoJSON files, reference *Section 2.1.4.2 Importing KML/JSON/MSDL/xTSP Files.*

2.3.9 SCENARIO PHASES MTP

Scenario phases allow the user to show multiple stages of a scenario at different time stamps without having to use additional BVI modalities or playback simulation tools (e.g., OneSAF). Each phase can be given a name and an ordering index, but the phases are sorted by ordering index first and then secondly by name. When "playing" a phase, any scenario object not included in a phase but still part of the scenario will maintain its state and position.

To use Scenario Phases:

1. Create, load, or edit any scenario.
2. In MTP, select the **Scenario** button to open the scenario menu.
3. Select the **Save as Phase** button.
4. In the dialog, select **Create New Phase**.
5. Add a **name** and an **ordering index**, then press **Save**.
6. (Optional) Adjust the scenario to display the next phase and repeat steps 3-5.
7. Select the **Menu** () icon.
8. Select **Phases**.
9. Select the first phase that was created and select the **Start** () button.

The scenario phase(s) are saved and are playable via MTP.

2.4 BVI WEB TACTICAL PLANNER

As an alternative to the Mobile Tactical Planner, BVI provides the ability to run a web-based version of the Tactical Planner. The Web Tactical Planner (WTP) can be run in a browser on a desktop or a laptop. To ensure ease of use, the web-based Tactical Planner has a similar layout to the Mobile Tactical Planner application, as well as having many shared capabilities. In addition to the 2D top-down view used for planning, the Web Tactical Planner also features a 3D viewer to provide an alternative perspective of the map. Please note that the planning portion is intended to be used via the 2D view. A tactical planning toolbar can be toggled via the webVeritas settings and/or configured at startup.

2.4.1 LAUNCH WEB TACTICAL PLANNER

The Web Tactical Planner can be launched in two ways:

- **Method 1**: from a browser
- **Method 2**: from the BVI Table Manager.

2.4.1.1 METHOD 1: LAUNCH FROM BROWSER (WTP)

To launch the Web Tactical Planner from a browser:

1. Open a Chrome browser and navigate to: ***http://localhost:9081/webveritas/?topDown3D=true&planning=true***
2. Click the **Star** icon to save the Web Tactical Planner as a bookmark for ease of access (see Figure 70).

Figure 70 Bookmark WTP

The Web Tactical Planner will load in the Chrome browser (see Figure 71).

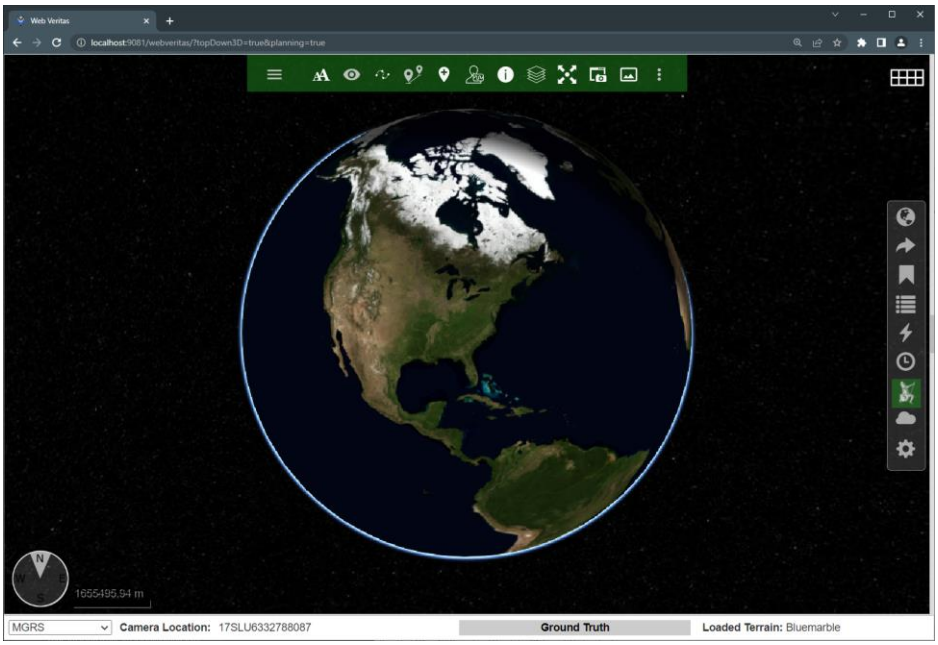


Figure 71 Web Tactical Planner Browser

2.4.1.2 LAUNCH FROM BVI TABLE MANAGER (WTP)

To launch the Web Tactical Planner from the BVI Table Manager:

1. In the **BVI Table Manager**, select the **Tables** drop-down menu and click **Applications**.
2. Select the **Start** button to the right of **Web Tactical Planner** (see Figure 72). The Web Tactical Planner will launch in a Chrome browser.

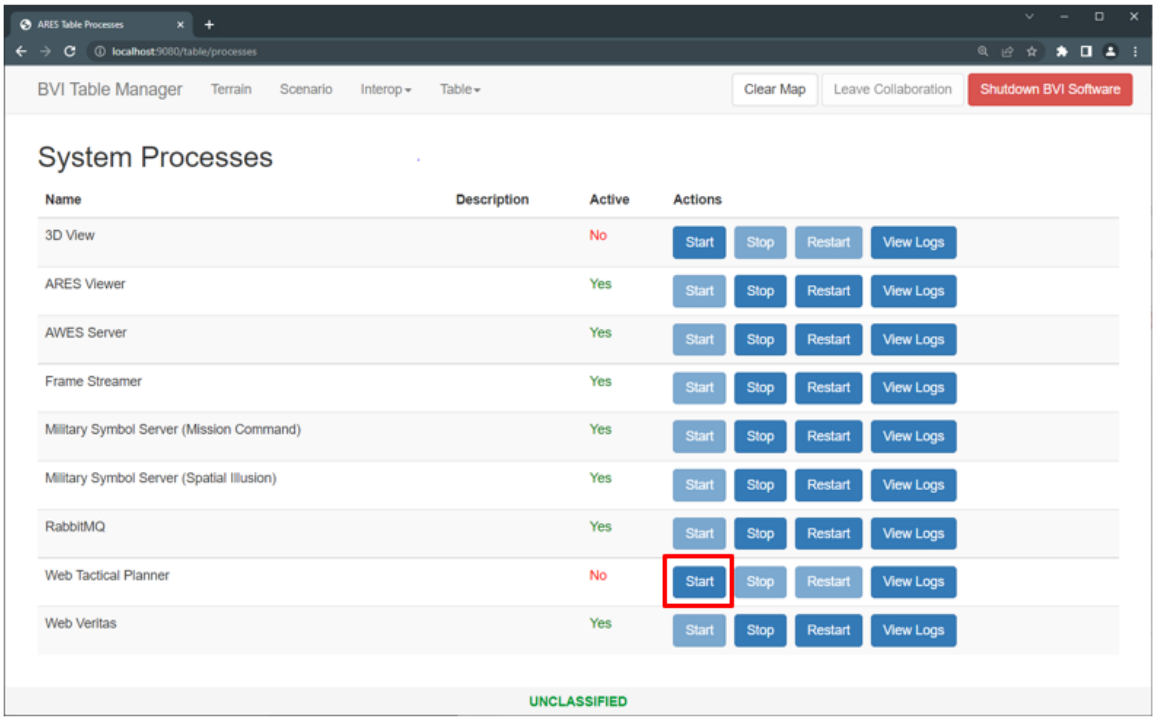


Figure 72 System Processes in BVI Table Manager (WTP)

2.4.2 SCENARIO CREATION IN THE WEB TACTICAL PLANNER

The BVI Web Tactical Planner can be used to build tactical scenarios using MIL STD 2525C symbols. The Tactical Planner offers scenario creation capabilities including creating, loading, and saving new and existing scenarios.

2.4.2.1 CREATE A NEW SCENARIO (WTP)

To create a new scenario in the Web Tactical Planner:

1. Select the **Scenario** () button from the Web Tactical Planner toolbar. A menu of scenario options appears (see Figure 73).

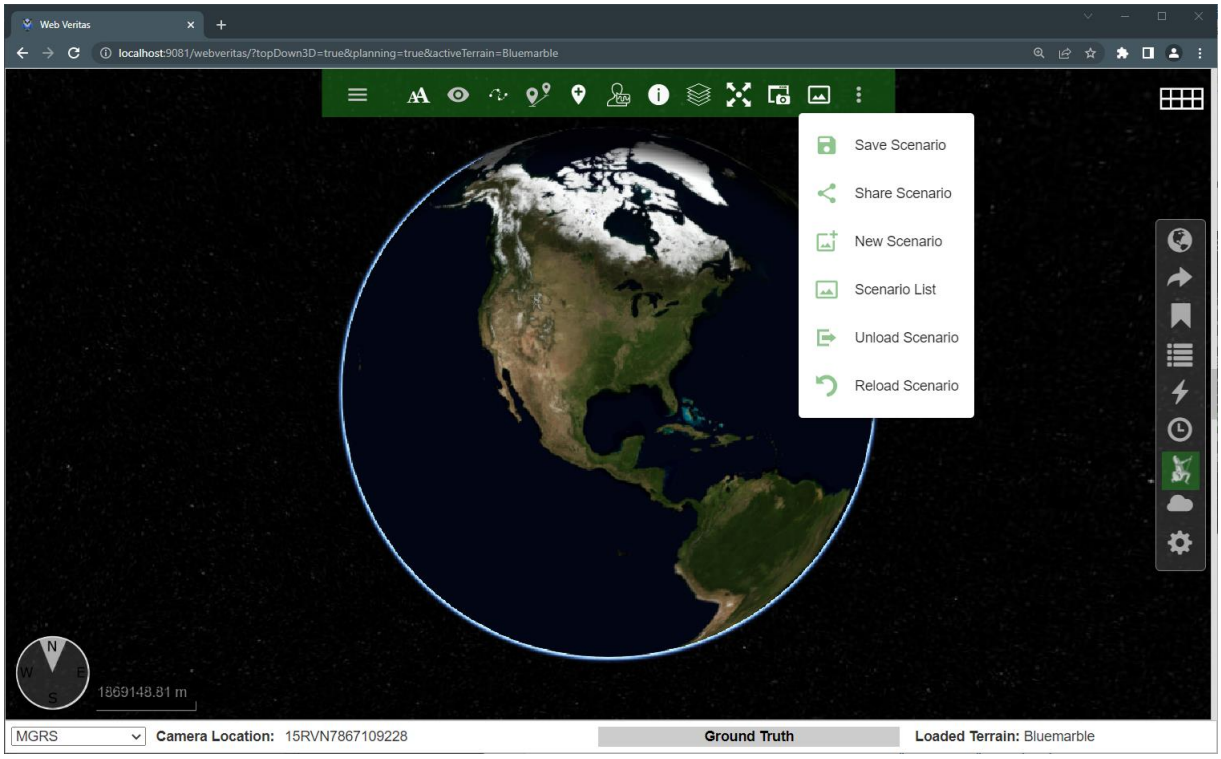


Figure 73 WTP Scenario Options

2. Select **New Scenario** from the options. A **Create Scenario** popup appears (see Figure 74).

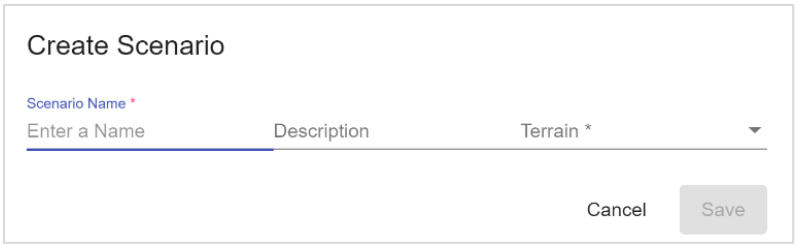


Figure 74 "New Scenario" Popup (WTP)

3. Enter the desired scenario name (required) and description (optional).
4. Select the desired terrain template (required).

5. Click **Save** to create the new scenario.
6. To load the scenario, reference *Section 2.4.2.2 Load a Scenario (WTP)*.

2.4.2.2 LOAD A SCENARIO (WTP)

To load a scenario in the Web Tactical Planner:

1. Select the **Scenario** ( ) button from the Web Tactical Planner toolbar. A menu of scenario options appears.
2. Select **Scenario List** from the options. A popup of all available scenarios appears (see Figure 75).

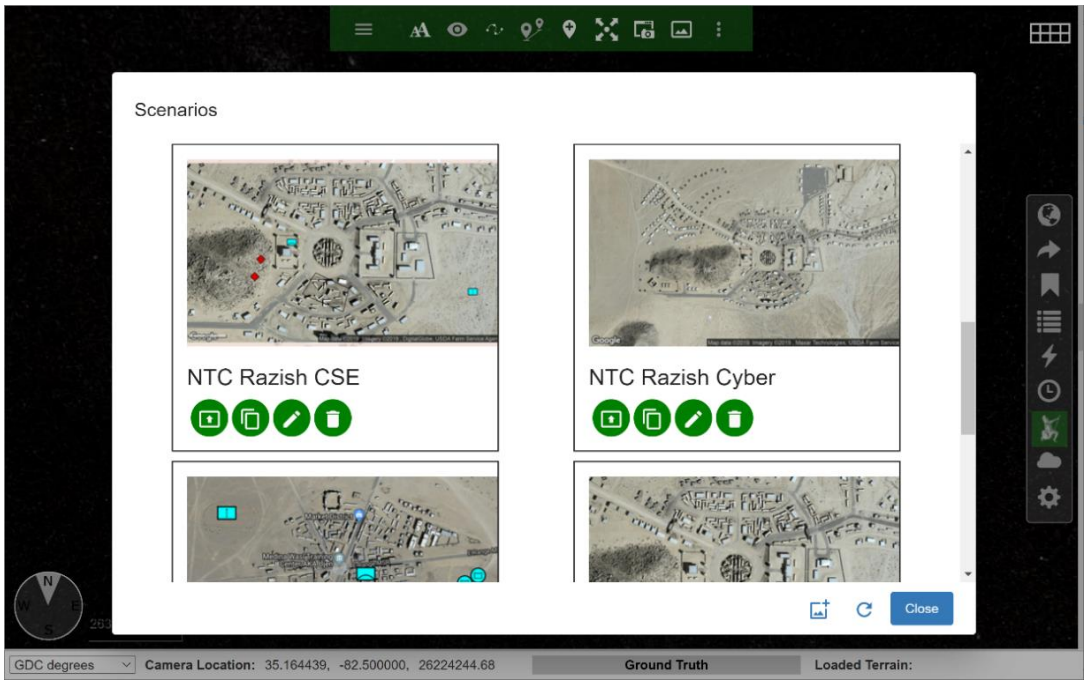


Figure 75 Scenario List (WTP)

For each scenario, the following options are available:

- **Load Scenario:** Displays the scenario in the Web Tactical Planner
- **Copy:** Copies scenario (includes all entities and graphics within scenario).
- **Edit Scenario Properties:** Allows the editing of scenario name and description.
- **Delete:** Delete the associated scenario file. Once deleted, the scenario file cannot be recovered.

3. Select the desired scenario and tap the **Load Scenario** ( ) icon. The Web Tactical Planner 2D view will jump to the scenario location.

Note: If a 3D terrain database is unavailable and WTP displays a blank scenario, see Section 2.4.3

2.4.3 USING BING MAPS IN WTP

Web Tactical Planner can leverage Bing Map data to display terrains (see Figure 76). A Bing Maps key must be obtained and configured within an installed terrain to be displayed (reference the *Google/Bing Maps API Key Configuration Guide* file for obtaining and configuring the Bing Maps key).

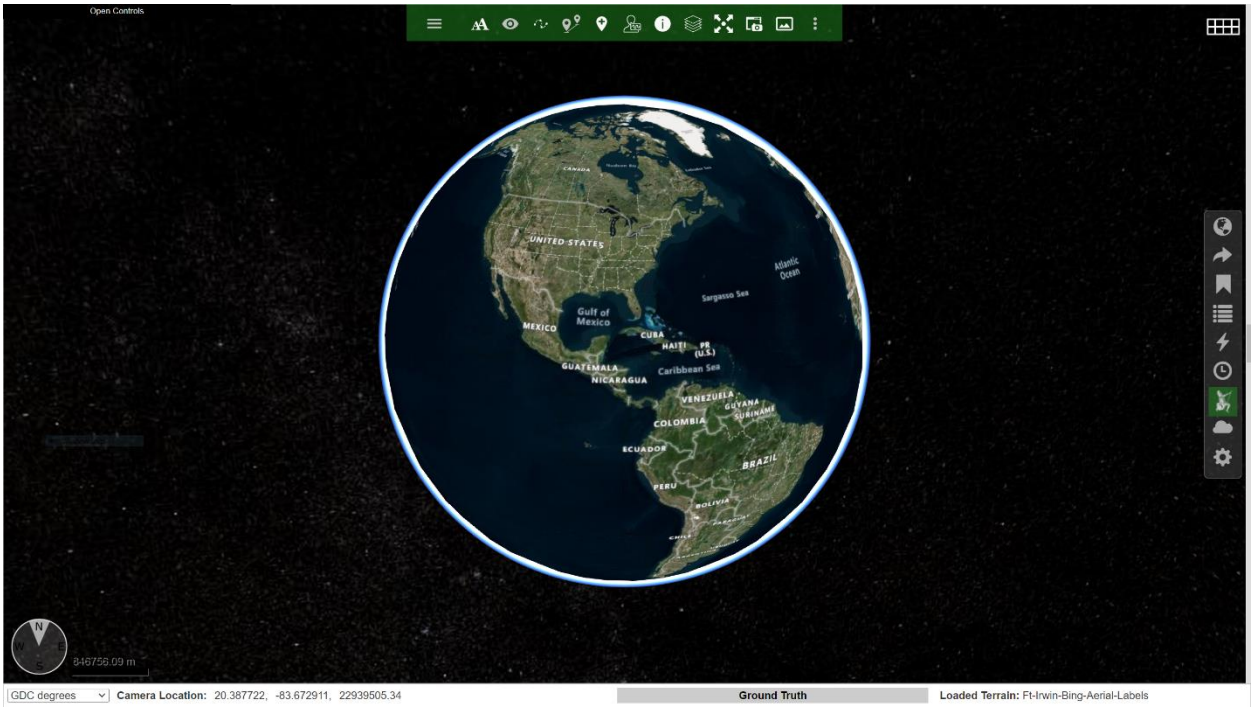


Figure 76 Bing Map Imagery

To display Bing Map data in WTP:

1. Start WTP (if not running already).
2. In the **Table Manager**, load/create a terrain template or scenario **within the bounds** of an installed terrain with the Bing Maps configuration.
3. In **WTP**, select the **Terrain Selection** button () in the webVeritas menu.
4. Select **Bing-Aerial**.

Bing Maps is now displayed in Web Tactical Planner.

2.4.4 VIEWING THE 2D MAP TERRAIN OVERLAY

If a terrain database is unavailable, the 2D map imagery can be used a terrain overlay in the Web Tactical Planner.

To overlay the 2D map imagery:

1. In the Web Tactical Planner address bar, append the following to the end of the URL (see Figure 77): **&showTerrainImage=true**

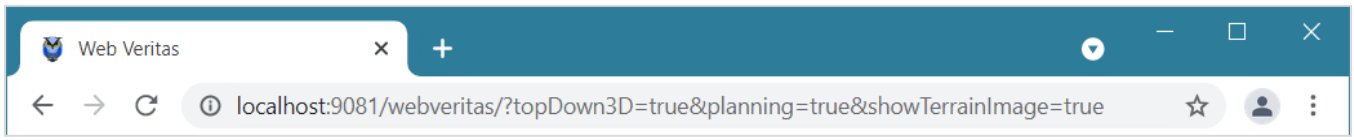


Figure 77 WTP Terrain Image Overlay URL

2. Click the **Star** () icon to save the Web Tactical Planner terrain image overlay as a bookmark for ease of access.

The Web Tactical Planner displaying the terrain image overlay will load in the Chrome browser (see Figure 78).

Note: While viewing the scenario using the 2D map terrain overlay, the 3D-view toggle is unavailable.

Figure 78 WTP with Terrain Image Overlay

2.4.5 BUILDING A SCENARIO (WTP)

After loading a scenario in the Web Tactical Planner, the 2D view will jump to the scenario location. When a scenario is loaded, the top bar displays the name of the current scenario (see Figure 79).

Figure 79 Scenario Toolbar (WTP)

The WTP toolbar provides the following options that allow the user to interact with the scenario:

- **Toggle Font Size:** Scales the font and symbol size
- **Toggle Snail Trails:** toggles on/off trails for entities
- **Add:** Adds units, route points, lines, and polygons to the scenario.
- **Zoom to Scenario Bounds:** re-centers scenario
- **Share Preview:** Exports a screenshot of the scenario to an indicated location.
- **Scenario:** opens scenario creation options

Note: Some options are currently unavailable.

To begin building or editing the scenario, press the **Add** button. Once clicked, the available actions are detailed below:

- **Add Tactical Symbol:** Add units.
- **Add Tactical Graphic:** Add a maneuver or entity.

- **Draw Text:** Write and position text.
- **Draw Line:** Draw freeform lines.
- **Draw Polygon:** Draw polygons.
- **Draw Circle:** Draw Circles.

Note: Some options are currently unavailable.

2.4.5.1 ADD TACTICAL SYMBOL (WTP)

To add a tactical symbol in the Web Tactical Planner:

1. Select the **Add** ( ) icon.
2. Select **Add Tactical Symbol**. A **Tactical Symbol Creation** popup appears (see Figure 80).
3. Enter the name, affiliation, echelon, and layer the symbol will be assigned to for the desired tactical symbol.
4. Select a symbol set (e.g., MIL-STD-2525C, MIL-STD-2525D, DHS_A).

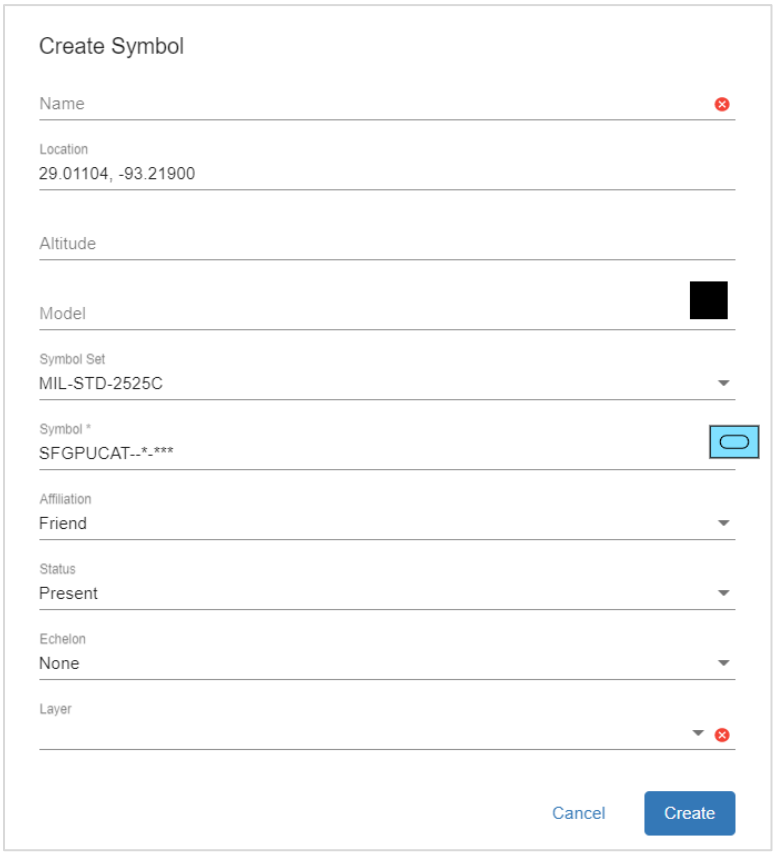


Figure 80 Add Tactical Symbol Menu (WTP)

5. To select a unit:

a. Click the icon to the right of **Symbol***. Observe the **Symbol Chooser** panel appears (See Figure 81).

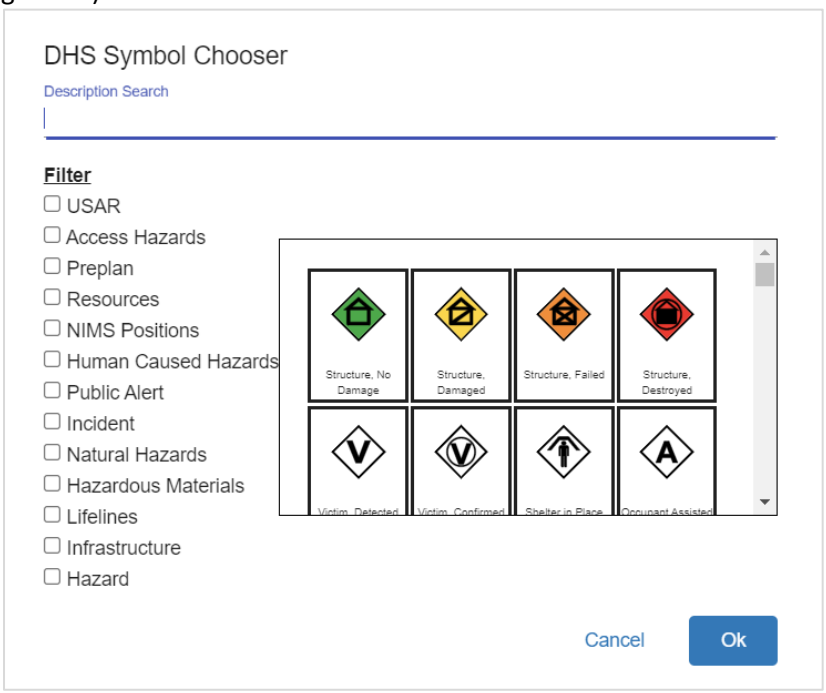


Figure 81 Tactical Symbol Selection (WTP)

b. Filter by unit type or type a description in the **Description Search** bar.
c. Select the desired unit (the box will highlight green).
d. Press **Ok** to choose the unit.

6. (*Optional*) To select a model:
   a. Click the black box to the right of **Model**. Observe that the **Model Chooser** appears (see Figure 82).

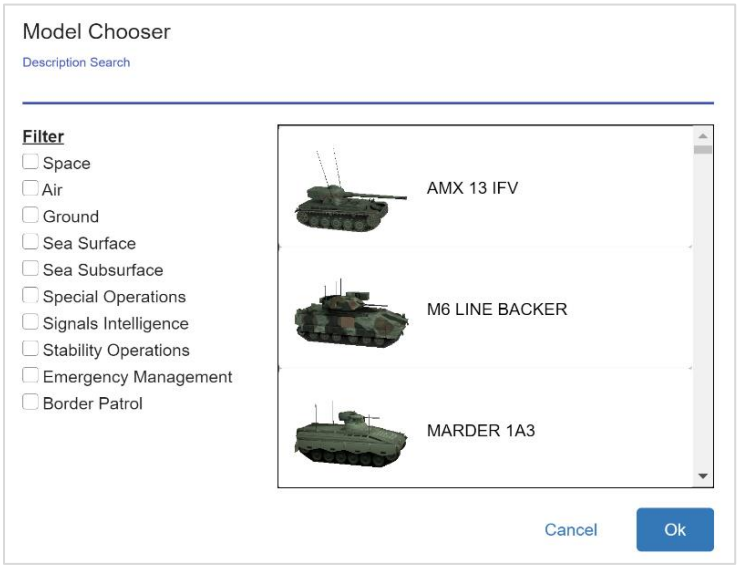


Figure 82 Model Chooser (WTP)

b. Filter by unit type or type a description into the **Description Search** bar.
c. Select the desired model (the box will highlight green).
d. Press **Ok** to choose the model.

7. Tap **Create** once all parameters have been set. The unit icon will be displayed on the terrain.
8. To move the unit:
    a. **Click the symbol** once to select it. A green reticle will appear around the unit (see Figure 83).
    b. **Drag the unit** anywhere on the terrain.
    c. **Tap anywhere** on the scenario to deselect the unit. The green reticle will disappear.

Figure 83 Selected Unit (WTP)

When a unit is selected, the following options become available on the top toolbar:

-  **Edit Trail:** toggles snail trail on for unit and enables manipulation of color and length of persistence
-  **Edit Unit Properties:** Edit unit name, affiliation, echelon, symbol, or model.
-  **Copy:** Creates a copy of the selected unit.
-  **Delete:** Deletes selected unit.

2.4.5.2 ADD TACTICAL GRAPHIC (WTP)

To add a tactical graphic in the Web Tactical Planner:

1. Select the **Add** () icon.
2. Select **Add Tactical Graphic**. A **Create Graphic** window appears (see Figure 84).

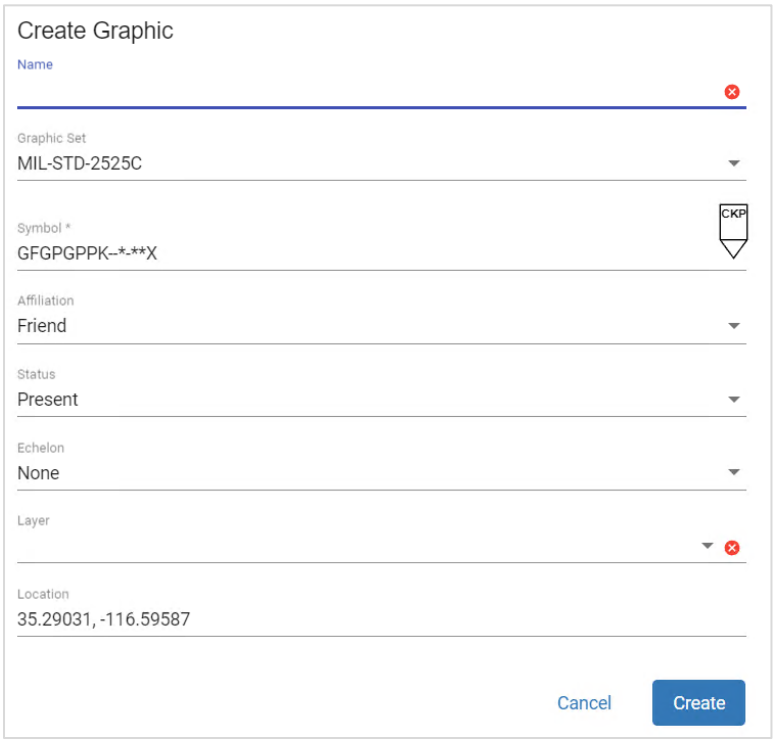


Figure 84 Tactical Graphic Creation Window (WTP)

3. Enter the desired name, affiliation (Friendly, Hostile, Neutral, etc.), the echelon, and the layer the graphic will be assigned to (For information on layers, reference *Section 2.4.6 Layers*).
4. Choose a symbol set (e.g., MIL-STD-2525C, MIL-STD-2525D).
5. To select the tactical graphic:
    a. Click the icon to the right of **Symbol*.** Observe the **Symbol Chooser** panel appears (See Figure 85).

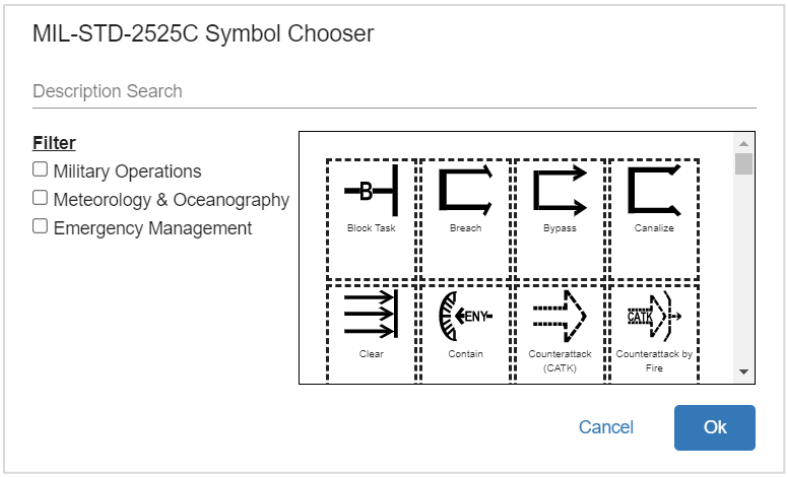


Figure 85 Tactical Graphic Symbol Chooser (WTP)

b. Filter by graphic type or type a description in the **Description Search** bar.
c. Select the desired graphic (the box will highlight green).

   Note: If a graphic is a single point, a solid border will surround it. If a graphic is a multi-point, a dashed-lined border will surround it.

d. Click **Ok**.
e. If the graphic is a multipoint graphic, a **Modify** setting will appear (see Figure 86). Determine if the multipoint graphic is to be draped to the terrain and select the **Modify** symbol then click specified number of control points on the terrain.

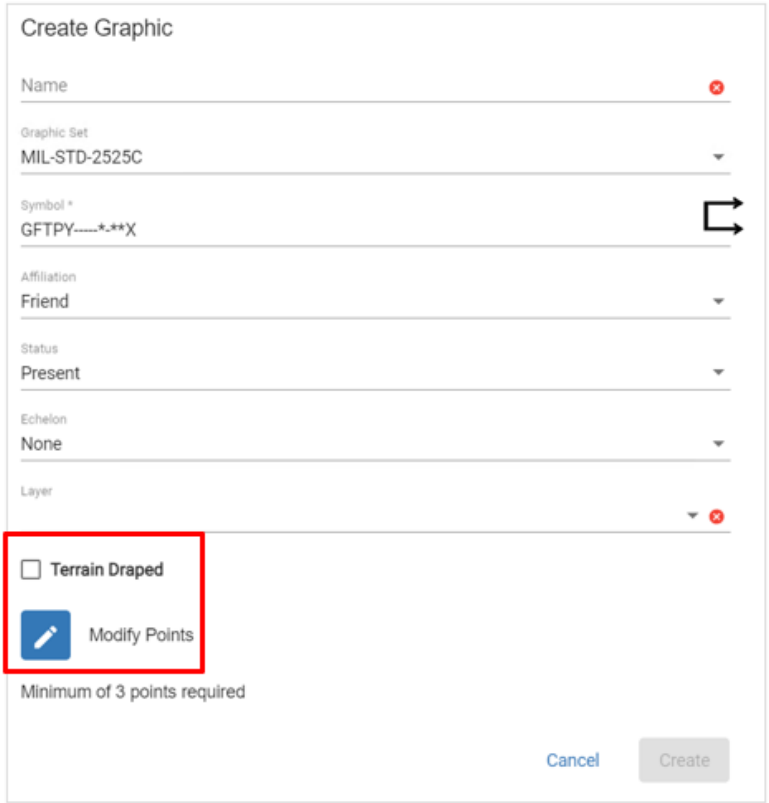


Figure 86 Modify Points and Terrain Drape for Multipoint Tactical Graphics (WTP)

f. Click the **Finish** (checkmark) icon to save the tactical graphic.

6. Tap **Create** once all parameters have been set.
7. The graphic may be modified by selecting it or the control points and clicking the **Edit** or **Undo** buttons.

   *Note: The **Symbol** section may not be modified once the graphic is initially added.*

2.4.5.3 DRAW TEXT

To draw text in the Web Tactical Planner:

1. Select the **Add** () icon.
2. Select **Draw Text**. A **Text Creation** window appears (see Figure 87).

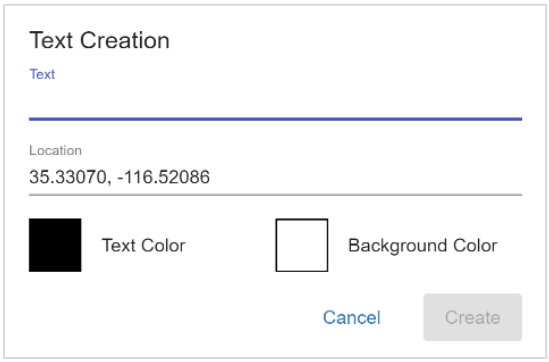


Figure 87 Text Creation Window (WTP)

3. Enter desired text.
4. (*Optional*) Change the text color and background color
5. Select **OK** to add the text. The text will appear in the center of the screen.
6. Drag the text to any location.
7. Tap anywhere on the terrain to deselect the text box.

2.4.5.4 DRAW LINE

To draw a line in the Web Tactical Planner:

1. Select the **Add** () icon.
2. Select **Draw a Line.** A **Line Creation** window appears (see Figure 88).

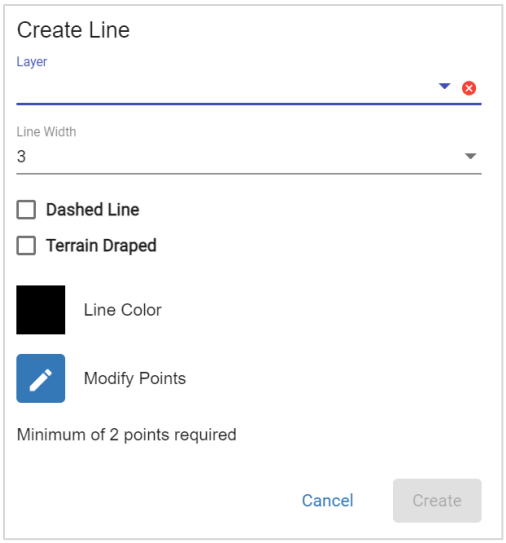


Figure 88 Line Creation Window (WTP)

3. (*Optional*) Change the line width, line color, assign the line to a layer, determine if the line will be dashed or solid, and determine if the line will be draped.
4. To draw the line:
    a. Tap the **Modify** ( ) icon.
    b. Select 2 or more points on the scenario to draw a line.
    c. Press the **Save** ( ) button when finished.
5. Tap **Create** once all parameters have been set.

2.4.5.5 ADD POLYGON

To add a polygon in the Web Tactical Planner:

1. Select the **Add** ( ) icon.
2. Select **Draw Polygon.** A **Polygon Creation** panel appears (see Figure 89).

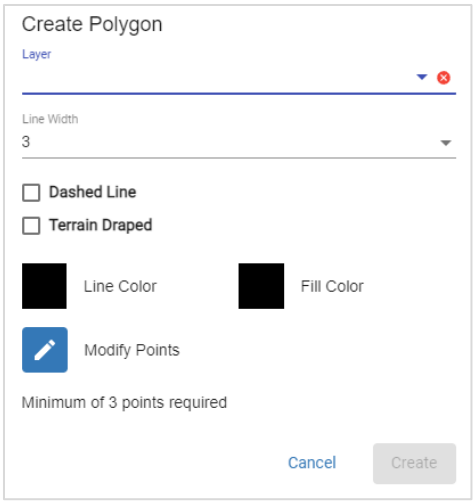


Figure 89 Polygon Creation Panel (WTP)

3. (*Optional*) Edit the line width, line color, fill color, assign the polygon to a layer, determine if border will be dashed or solid, and determine if the polygon will be draped.

   Note: The slider on the bottom controls the transparency of the polygon (see Figure 90).

Figure 90 Geometry Fill Options (WTP)

4. To draw a polygon:
   a. Tap the **Modify** () icon.
   b. Select 3 or more points on the scenario to draw a polygon

      Note: The polygon must be drawn in a clockwise motion.

   c. Press the **Save** () button when finished.
5. Tap **Create** once all parameters have been set.

2.4.5.6 ADD CIRCLE

To add a circle in the Web Tactical Planner:

1. Select the **Add** () icon.
2. Select **Draw Circle.** A **Circle Creation** panel appears (see Figure 91).

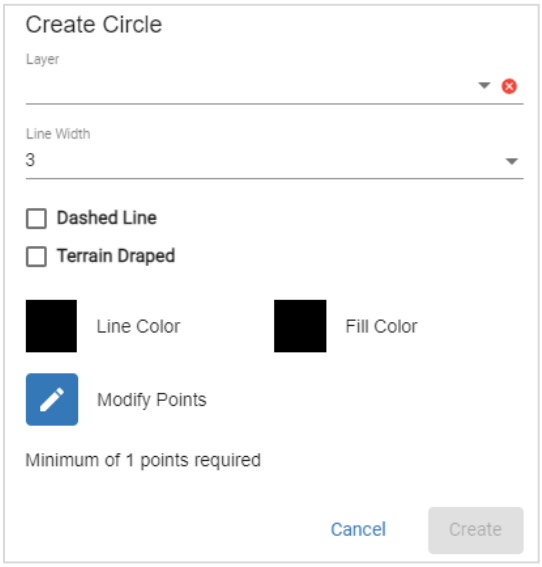


Figure 91 Circle Creation Panel (WTP)

3. (*Optional*) Edit the line width, line color, fill color, assign the circle to a layer, determine if border will be dashed or solid, and determine if the circle will be draped.

   Note: The slider on the bottom controls the transparency of the circle (see Figure 90).

4. To draw a circle:

   a. Tap the **Modify** () icon.
   b. Select 2 points on the scenario to draw a circle

      Note: The first point establishes the center and the second point establishes the radius.

   c. Press the **Save** () button when finished.
5. Tap **Create** once all parameters have been set.

2.4.6 LAYERS

Web Tactical Planner allows the user to create layers as well as assign scenario objects to any existing layer. Web Tactical Planner displays a layer hierarchy and allows the user to toggle layers. Note that layers can only be created and deleted using Web Tactical Planner.

2.4.6.1 CREATE PARENT LAYER

To create a layer in the Web Tactical Planner:

1. Select the **Open Layer Management** () icon.
2. Press the **Add Top Level Layer** icon.
3. Give the new layer a name.

   *Note: The **Description** field can be left blank.*

4. Select **Create**.

A parent layer is now created and is displayed in the WTP Layer Management GUI.

Note: Do not change the scenario or refresh the page before saving the scenario or the newly created layers will not save.

2.4.6.2 CREATE CHILD LAYER

To create child layers in the Web Tactical Planner:

Note: A parent layer must be created in order to create child layers.

1. Select the **Open Layer Management** () icon.
2. Press the **Add Top Level Layer** icon.
3. Give the new layer a name.

   *Note: The **Description** field can be left blank.*

4. Select the **Parent Layer** field.
5. Choose the desired layer to be the parent layer.
6. Select **Create.**

A child layer is now created under the parent layer and is displayed in the WTP Layer Management GUI.

Note: Do not change the scenario or refresh the page before saving the scenario or the newly created layers will not save.

2.4.6.3 ASSIGN OBJECT TO LAYER

To assign a scenario object to a layer:

Note: The Tactical Symbol, Tactical Graphic, or Tactical Geometry must be placed first to assign the object to a layer.

1. Select the desired scenario object.
    a. A green box will highlight **Tactical Symbols**.
    b. **Tactical Geometry** and most **Tactical Graphics** will highlight neon green.
2. Press the **Edit** () icon.
3. Select the **Layer** parameter.
4. Choose the desired layer to assign that object to that layer.

The scenario object is now assigned to a layer.

Note: Do not change the scenario or refresh the page before saving the scenario or the object will not be assigned to that layer after the page has reloaded.

2.4.6.4 TOGGLE LAYER IN WEB TACTICAL PLANNER

To toggle layers in the Web Tactical Planner:

1. Select the **Open Layer Management** () icon.
2. Press the drop-down arrow next to the parent layer to display child layers.

    Note: Only applicable if child layers are created.

3. Select the checkbox () icon next to the desired layer to toggle the layer off.
4. Press the blank checkbox () icon to toggle the layer back on.

2.4.6.5 EXPORT / IMPORT LAYERS

To export an existing layer and import into a scenario that does not already have that layer:

1. In BVI table manager select the Table drop down.
2. Select **Layer Management**.
3. Export the desired layer by selecting the export icon (see Figure 92 for an example).

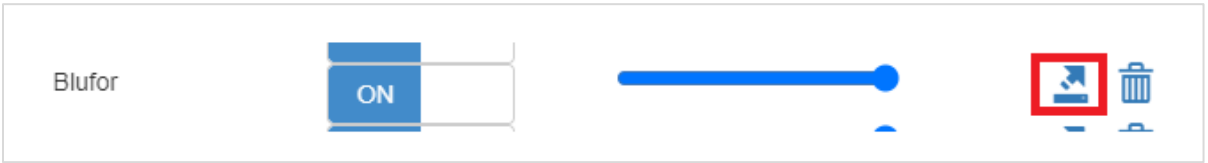


Figure 92 Export Layer

4. Load a terrain or scenario that does not currently have the exported layer.

5. In BVI table manager select the Table drop down.
6. Select **Import Layer**.
7. Select **Choose File** and select the exported layer from the download folder or drag the exported layer from the download folder.

2.4.7 IMPORTING KML/JSON FILES

To import KML, KMZ, or GeoJSON files, reference *Section 2.1.4.2 Importing KML/JSON/MSDL/xTSP Files*.

2.4.8 3D VIEW IN THE WEB TACTICAL PLANNER

The Web Tactical Planner allows the user to view the scenario from a 3D point-of-view. The user can fly around and see the scenario from a ground view.

Note: Editing the scenario is disabled in this mode, but units and tactical graphics can be moved. Use this mode to finetune the scenario.

To toggle 3D view in the Web Tactical Planner, select the **Toggle 3D View** () icon in the upper-right corner (see Figure 93).

Figure 93 Toggle 3D View (WTP)

2.4.8.1 3D VIEW KEYBOARD/MOUSE CONTROLS (WTP)

Use the controls in Table 5 to maneuver the webVeritas camera in virtual 3D space:

Table 5 Keyboard/Mouse 3D View Web Tactical Planner Controls

Action	Description
'W' or Mouse Wheel Scroll Up	Moves camera in forward direction; Zooms into the surface of the Earth if camera is pointed at Earth
'S' or Mouse Wheel Scroll Down	Moves the camera backwards; Zooms out from the surface of the Earth if camera is pointed at Earth
'A'	Pan the camera view to the left
'D'	Pan the camera view to the right
Left-Mouse Click + Drag	Pivot the camera view on its axis
Right-Mouse Click + Drag	Rotate the Earth around the axis centered on the mouse cursor position
'Q'	Pans the camera up
'Z'	Pans the camera down

2.4.9 SPEECH AND SKETCH INTERFACE (SSI)

The **Speech and Sketch Interface (SSI)** functionality allows the user to create tactical symbols and graphics using voice commands or freehand drawing (see Figure 94).

Note: Internet connectivity is required for this capability.

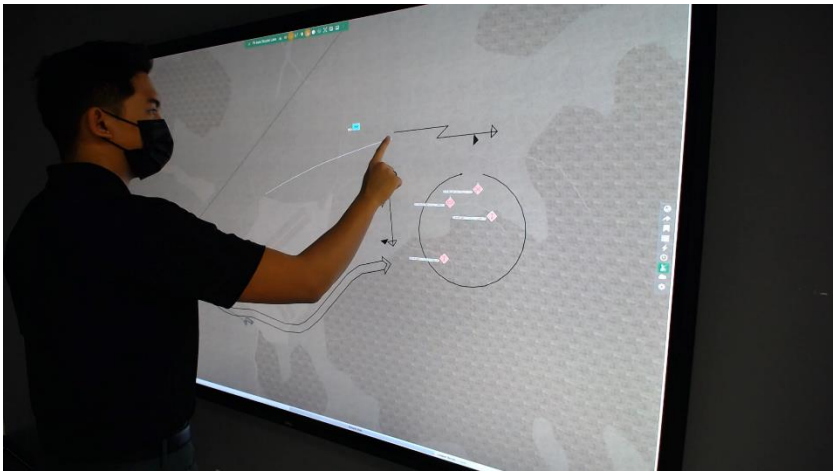


Figure 94 Speech and Sketch Interface User

2.4.9.1 CONFIGURE SPEECH AND SKETCH INTERFACE (SSI)

The Speech and Sketch Interface (SSI) functionality requires a microphone for the user to verbally communicate with WTP.

To configure the microphone:

1. Connect a microphone to the dedicated machine for speech and sketch.

   Note: Ensure the microphone is facing the user and is clearly visible.

2. Start Web Tactical Planner.
3. Open another browser and allow permissions for the site to use a mic:
   a. Select **Settings** in the top right.
   b. Under **Privacy and Security**, select **Site Settings**.
   c. Select **Microphone** and verify the mic is selected at the top.
   d. Under **Default Behavior**, select **Sites can ask to use your microphone**.
4. Return to WTP, verify the view is in 2D-View.
5. From the WTP toolbar, toggle on the **Speech and Sketch Interface** (see Figure 95):

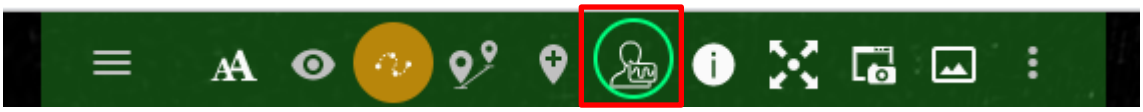


Figure 95 Speech and Sketch Interface (SSI) Toggle

6. Using a finger, draw a line on the screen. A prompt will appear to allow permissions for the mic.
7. Select **Allow** on the prompt to allow the site to use the mic.

The Speech and Sketch Interface is now configured and ready for use.

2.4.9.2 ADD TACTICAL SYMBOL USING SSI

Tactical Symbols are added by drawing a single point and voicing the icon name (e.g., air defense missile). See *Table 6* for examples of tactical symbols supported in BVI.

For a full list of tactical symbols, refer to the MTP or WTP symbol library.

1. Toggle on the **Speech and Sketch Interface**.
    a. The icon will highlight and a prompt saying **Start drawing and say symbol name** will appear.
2. Tap a single point in the scenario.
    a. A green point within a green box will appear at the location of the drawn point.
    b. The prompt will say **Listening…** at the bottom.
3. Say the **affiliation** of the unit followed by the **name** of the symbol (e.g., Hostile Field Artillery).

    Note: If no affiliation is specified, the symbol will default to a friendly affiliated unit.

Table 6 Tactical Symbol Examples

2525 Symbol	Speech (2525 Term)	Sketch
	AIR DEFENSE MISSILE	•
	DRONE	•
	AVIATION	•
	CARRIER	•

2.4.9.3 ADD TACTICAL GRAPHIC WITH SSI

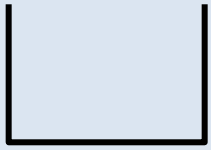
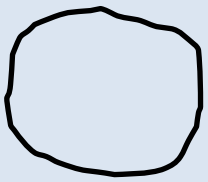
Tactical Graphics are added by drawing the general shape of the graphic and voicing the graphic name (e.g., axis of advance). See *Table 7* for examples of tactical graphics supported in BVI.

1. Toggle on the **Speech and Sketch Interface**.
    a. The icon will highlight and a prompt saying **Start drawing and say symbol name** will appear.
2. **Draw** the general shape of the desired Tactical Graphic.
    a. A white line will be drawn.
    b. The prompt will say **Listening…** at the bottom.
3. Say the **affiliation** of the graphic followed by the **name** of the graphic (e.g., neutral objective).

    Note: If no affiliation is specified, the graphic will default to a friendly affiliated graphic.

For a full list of tactical graphics, refer to the MTP or WTP symbol library.

Table 7 Tactical Graphic Examples

2525 Symbol	Speech (2525 Term)	Sketch
	BREACH	
	COUNTERATTACK	
	OBJECTIVE	
	PL	

2.4.10 DRAG AND DROP

The **Drag and Drop** feature allows the user to insert custom objects into a scenario and display the custom object in both 2D view and 3D view. Microsoft 3D Builder and Microsoft Blender is required to create custom objects and change the object transparency.

Note: Microsoft 3D Builder and Microsoft Blender can be downloaded for free from the Microsoft Store.

2.4.10.1 CREATING CUSTOM OBJECTS

To create custom objects:

1. Open **3D Builder** by selecting Start on the desktop and searching for **3D Builder**.
2. Select **New scene**.
3. Select **Insert** in the menu bar above.
4. Choose one of the available 3D shapes.
5. Select the **Scale** () button and enter the dimensions for the x, y, and z axis.

   Note: The dimension preference can be set by pressing menu ( *), selecting settings, and choosing the desired units.*
6. Once the dimensions are entered, the object may appear partially under the grid (any part of the object under the grid will not appear in WTP). To bring the object above the grid:
   a. Select the **Move** () button.
   b. Click and drag the object upwards until the object is flush with the grid.
7. Once the object is set, select the **Menu** () button.
8. Select **Save as**.
9. (*Optional)* Rename the file if desired.
10. Change the **Save as type** to **GLB format (*.glb)**
11. Press **Save** when finished.
    a. A notification saying **Some information might be lost…** may appear.
    b. Check the box next to **Do not show this message again**.
    c. Select **Continue**.

The custom object has been created and saved as a **.glb** file.

2.4.10.2 ADJUST CUSTOM OBJECT TRANSPARENCY

To adjust the transparency on a custom object:

1. Open **Blender**.
2. Select the transparent grey cube that already exists.
3. Press **x,** then select **Delete**.
4. In the menu bar, select **File**.
5. Select **Import,** then select **glTF 2.0 (.glb/.gltf)**.
6. Navigate to the file location where the custom object was saved.
7. Select the desired **.glb file** then click **Import glTF 2.0**.

8. Use the mouse wheel to zoom in or out to see the object.
9. In the upper menu bar, select **Shading**.
10. Click **Material Properties** (see Figure 96).

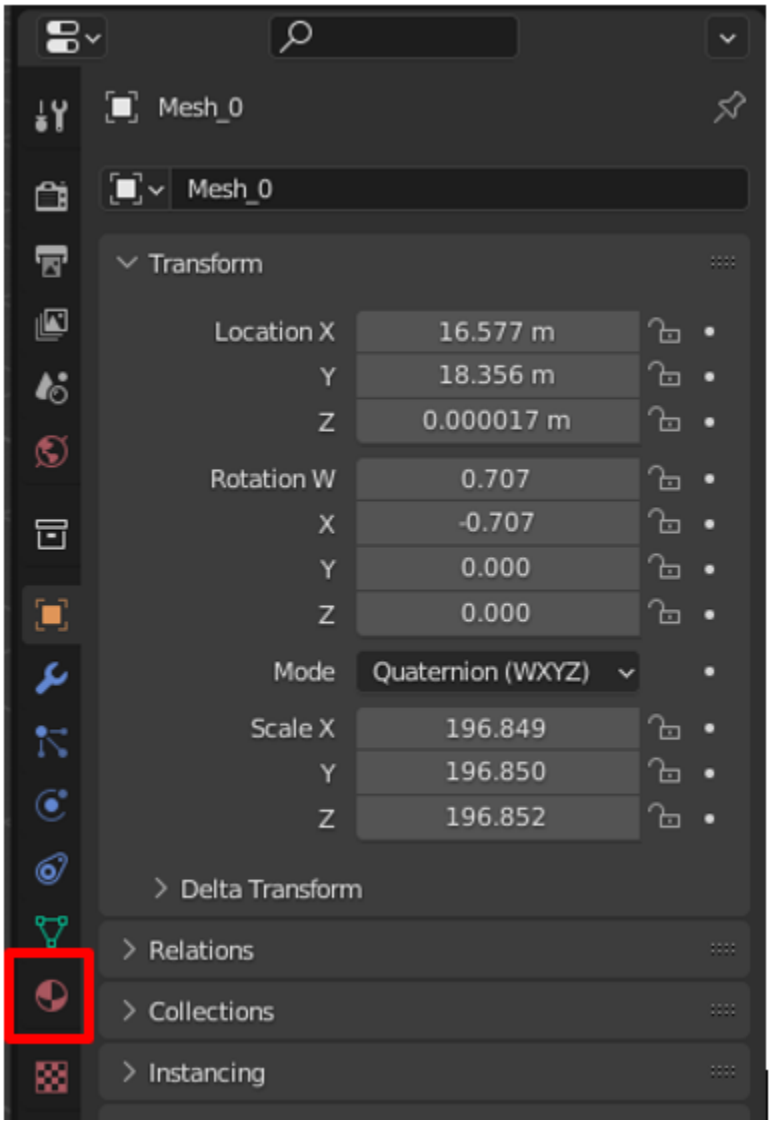


Figure 96 Material Properties Button

11. Select **New** on the right side of the window.
12. To change the color of the object:
    a. Select **Base Color**.
    b. Choose the desired color.
    c. Click outside of the color wheel window.
13. To change the transparency of the object:
    a. Scroll down to the **Settings** field.
    b. Select the **Blend Mode** drop down menu (see Figure 97).

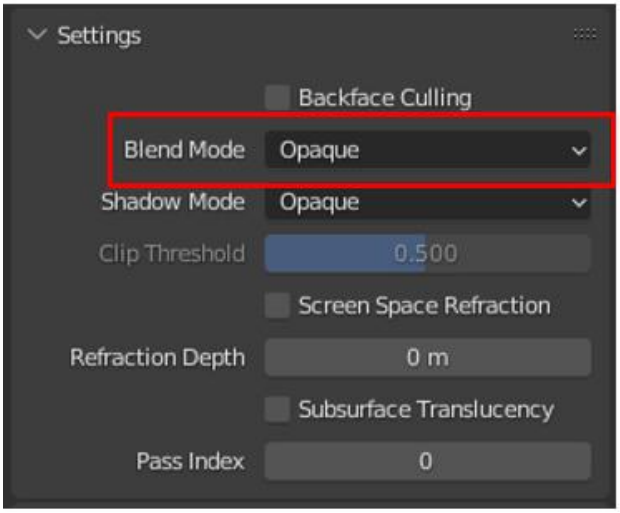


Figure 97 Blend Mode Drop Down Menu

c. Choose **Alpha Blend**.
d. Scroll back up to the **Surface** field.
e. Click and drag the **Alpha** slider (see Figure 98). The slider values are between 0 (completely transparent) and 1 (completely solid).

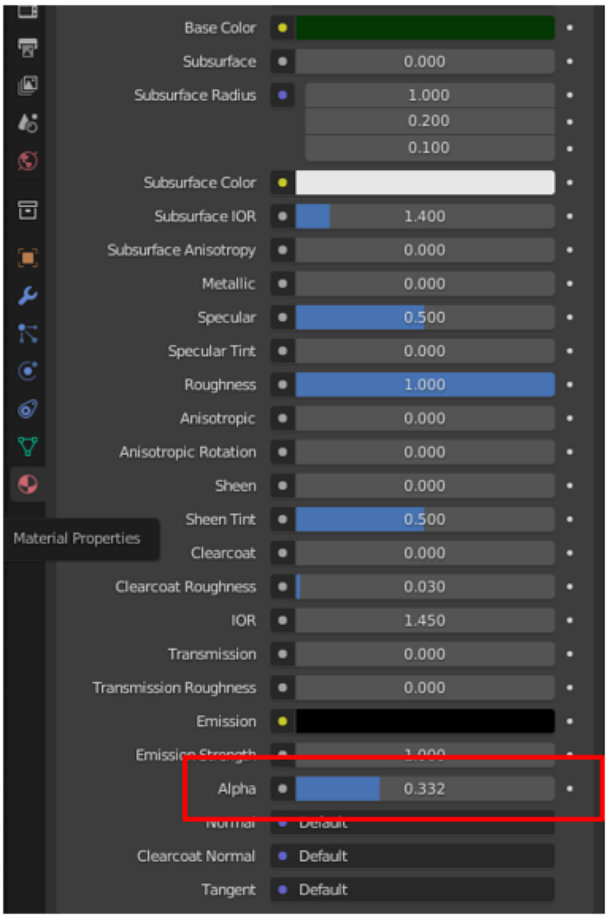


Figure 98 Alpha Blend Slider

14. In the upper menu, select **File**.
15. Select **Export** then choose **glTF 2.0**.
16. (*Optional*) Rename the file if desired.
17. Select **Export glTF 2.0**.

The custom object is ready to be dragged and dropped into the Web Tactical Planner.

2.4.10.3 IMPORTING CUSTOM OBJECT

To import a custom object into the Web Tactical Planner:

1. Launch BVI and start WTP if not already running.
2. Load the desired terrain/scenario.
3. Open a File Explorer and navigate to the location of the custom object **.glb** file.
4. Click and drag the **.glb** file over the WTP window.
5. Once released the model will appear with an **Edit** window, allowing the user to adjust the **Heading**, **Roll**, **Pitch**, and **Scale**.
6. Adjust the desired parameters in the **Edit** window and select **Create.**

Note: Set the height to 1 to observe the movement in XR modalities.

The custom object appears in the Web Tactical Planner directly underneath the camera position.

2.4.10.4 SCENARIO PHASES WTP

Scenario phases allow the user to show multiple stages of a scenario at different time stamps without having to use additional BVI modalities or playback simulation tools (e.g., OneSAF). Each phase can be given a name and an ordering index, but the phases are sorted by ordering index first and then secondly by name. When "playing" a phase, any scenario object not included in a phase but still part of the scenario will maintain its state and position.

1. Create or load any scenario.
2. In WTP, select the **Scenario** button to open the scenario menu.
3. Select the **Save as Phase** button.
4. In the dialog, select **Create New Phase**.
5. Add a **name** and an **ordering index**, then press **Save**.
6. (Optional) Adjust the scenario to display the next phase and repeat steps 3-5.
7. Select the **Menu** () icon.
8. Select **Phases**.
9. Select the first phase that was created and select the **Start** () button.

The scenario phase(s) are saved and are playable via WTP.

2.5 BVI AUGMENTED AND VIRTUAL REALITY (BVI XR)

Augmented and Virtual Reality (AR/VR) is useful when a physical sand table or floor projection is not an option. Known as BVI XR, this modality allows the user to view scenarios in 3D space with 3D models representing entities. With the AR capability, users can see a holographic projection of a sand table overlaid with a scenario (see Figure 99). With VR capabilities, users can view scenarios in a completely virtual setting while manipulating tactical symbols and taking advantage of a variety of visual effects unique to VR (see Figure 100).

Note: BVI v0.9.3 or later no longer supports the Hololens 1.

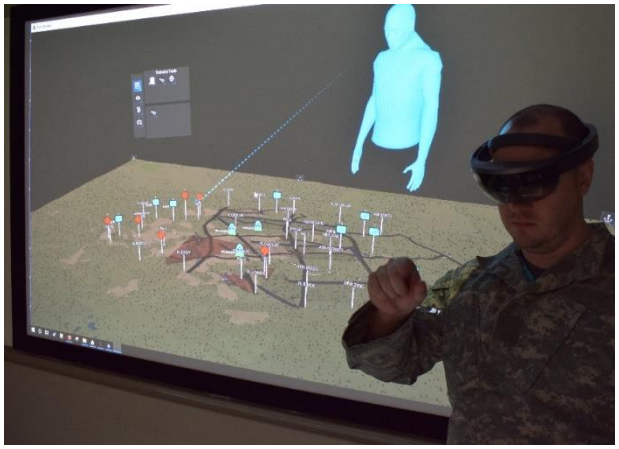


Figure 99 HoloLens User

Figure 100 HTC Vive User

2.5.1 AR AND VR SYSTEM STARTUP

BVI supports several different augmented and virtual reality devices. While the BVI XR functionality is similar per modality, the startup and controls for each device may differ. For a list of supported devices, see below:

- Microsoft HoloLens 2 – reference section *2.5.1.1 HoloLens 2 - Launching BVI XR App*
- Magic Leap – reference section *2.5.1.2 Magic Leap – Launching BVI XR App*
- Oculus Quest – reference section *2.5.1.3 Oculus Quest – Launching BVI XR App*
- HTC Vive – reference section *2.5.1.4 HTC Vive – Launching BVI XR App*

2.5.1.1 HOLOLENS 2 - LAUNCHING BVI XR APP

The Microsoft HoloLens 2 AR headset serves as a means for viewing BVI scenarios in 3D augmented reality space. This mode allows users to view terrain data and tactical units as a 3D terrain hologram projection onto real-world objects and spaces. For example, a HoloLens user can place the current configuration of the sand table/floor as a hologram on top of a conference table, walk around, and interact with units in the scenario.

To launch BVI XR in HoloLens 2:

1. Launch BVI, if it is not already running, on the BVI computer and load a scenario onto the table.
2. Power on the HoloLens 2 by pressing the power button on the back right-side of the headband (see Figure 101):

Figure 101 HoloLens Diagram

3. Put the HoloLens on and adjust the overhead strap if needed (see Figure 102).

Figure 102 HoloLens 2 – Adjust Overhead Strap

4. Tighten the headband using the fit-adjustment spinner located on the back of the headset.
5. Open the menu, using the **Open Start Menu** gesture. Hold out one hand with the palm facing up and look at your wrist. Using the index finger of your other hand, touch the holographic Windows logo that appears (see Figure 103).

Figure 103 HoloLens 2 Menu Using "Open Start Menu" Gesture

6. Select **All Apps** by poking it with your index finger (see Figure 104).

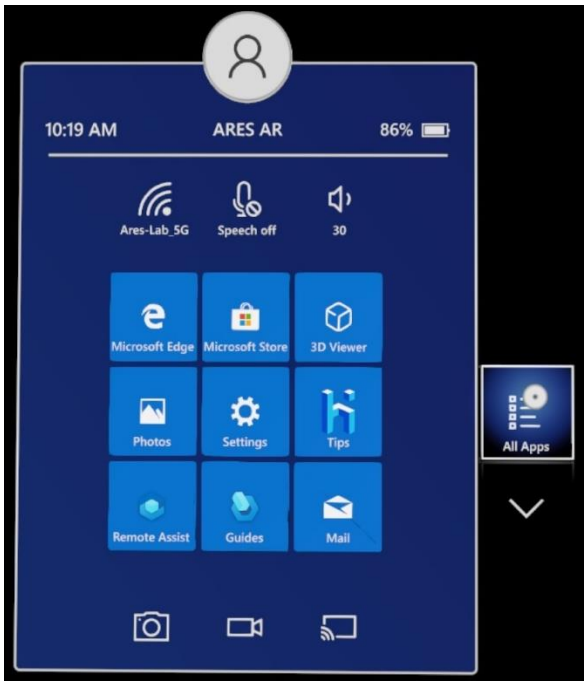


Figure 104 HoloLens 2 – "All Apps" Tile using "Poke" Gesture

7. Start the **BVI XR** app within the HoloLens 2 using **Poke** gesture (see Figure 105).

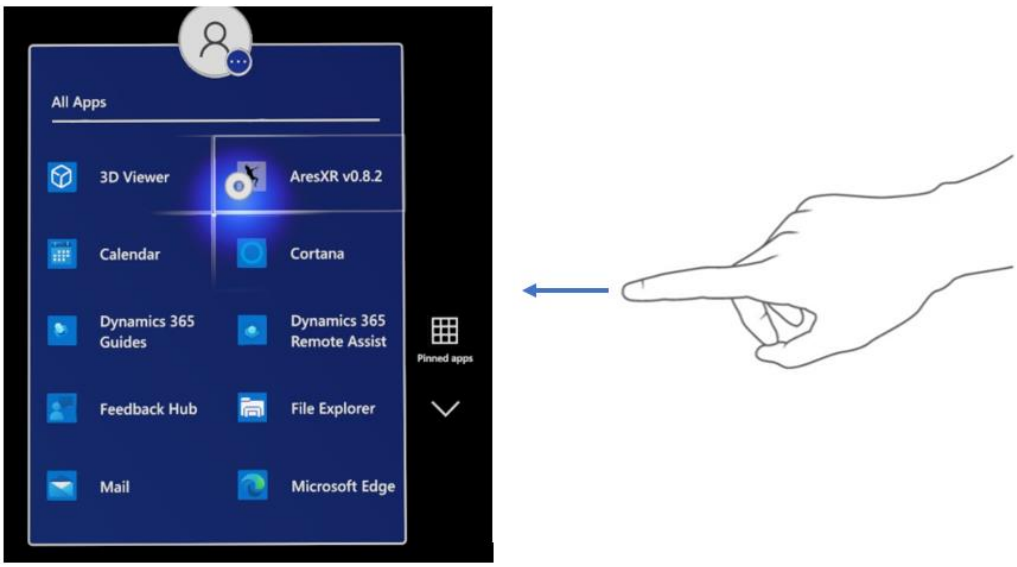


Figure 105 BVI XR App Selection in HoloLens 2

8. Place the app window in an open area to lay down the virtual terrain. The loaded scenario should now appear as a 3D floating hologram onto the surface in front of you (see Figure 106).

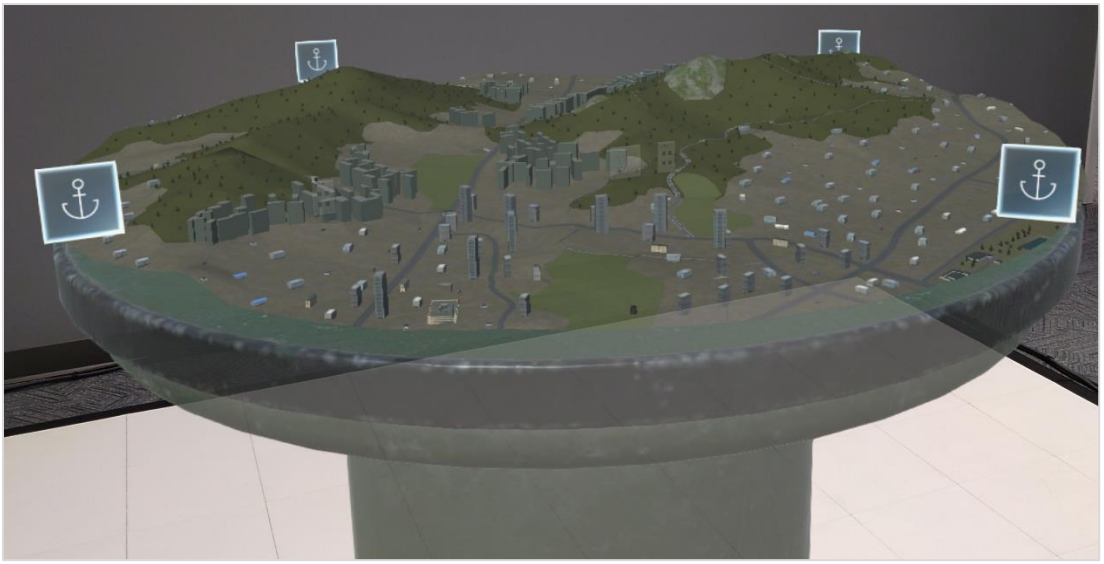


Figure 106 HoloLens 2 – Virtual Table

2.5.1.2 MAGIC LEAP – LAUNCHING BVI XR APP

The Magic Leap AR headset serves as a means for viewing BVI scenarios in 3D augmented reality space. This mode allows users to view terrain data and tactical units as a 3D terrain hologram projection onto real-world objects and spaces. For example, a Magic Leap user can place the current configuration of the sand table/floor as a hologram on top of a conference table, walk around, and interact with units in the scenario.

Note: The Magic Leap is not supported with BVI v0.9.4. Future releasees of BVI will integrate the Magic Leap 2.

To launch BVI XR in the Magic Leap:

1. Launch BVI, if it is not already running, on the BVI computer and load a scenario onto the table.
2. Power on the Magic Leap by pressing the button on the top of the **Magic Leap lightpack** (See Figure 107):

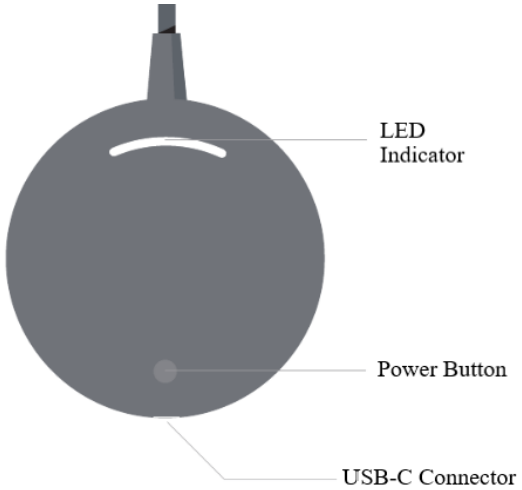


Figure 107 Magic Leap Lightpack Diagram

3. Power on the Magic Leap controller by pressing and holding the **Home Button**. The LED indicator surrounding the touch pad will light up (See Figure 108):

Figure 108 Magic Leap Controller Diagram

4. If the Magic Leap asks to **create a new spatial map,** select **Skip** by pointing the controller and pressing the trigger
5. Select **All Apps** by pointing the controller and pressing the trigger at the bottom of menu
6. Start the **BVI XR** app within the Magic Leap by pointing the controller and pressing the trigger

2.5.1.3 OCULUS QUEST – LAUNCHING BVI XR APP

To launch BVI XR in the Oculus Quest:

1. Launch BVI, if it is not already running, on the BVI computer and load a scenario onto the table.
2. Power on the Oculus Quest by pressing and holding down the button on the right of the **Oculus Quest** headset (See Figure 109):

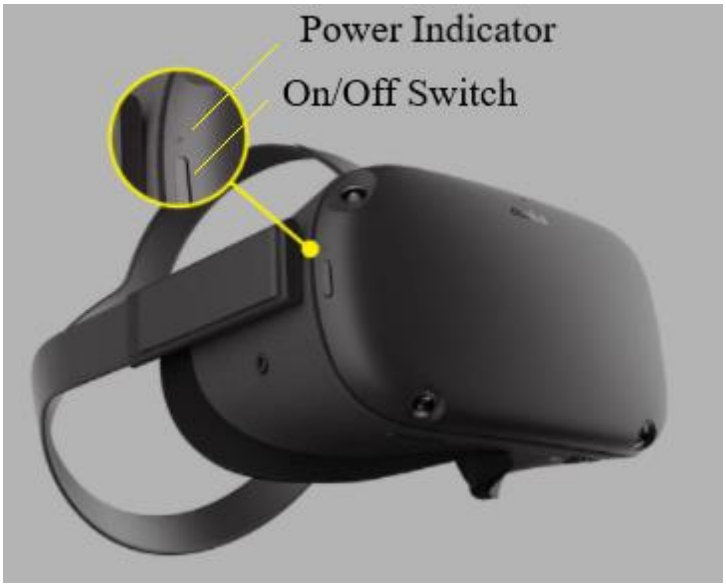


Figure 109 Oculus Quest Power Button

3. In the headset, select the **Apps** icon on the bottom right (See Figure 110). If this is not displayed, press the **Home** () button on the right controller.

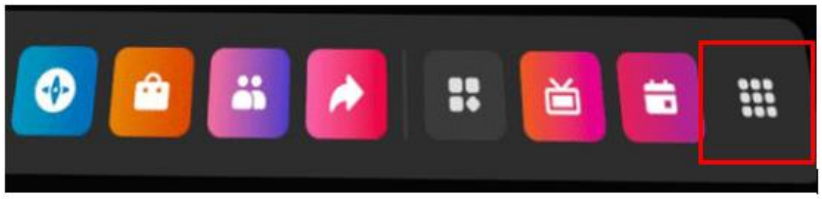


Figure 110 Oculus Quest Apps Menu

4. From the **Apps** menu, select the **All** drop-down arrow (See Figure 111).

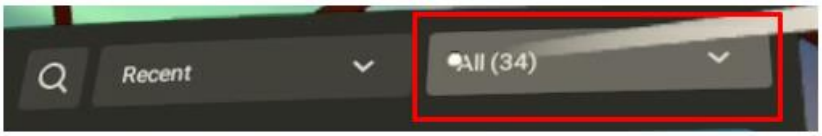


Figure 111 Oculus Quest Apps Drop Down

5. Locate and select **Unknown Sources** at the bottom (See Figure 112).

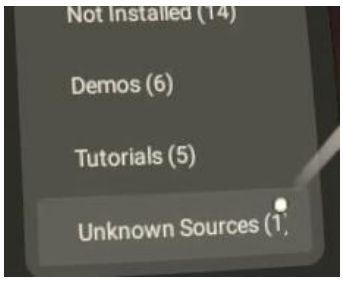


Figure 112 Oculus Quest Unknown Sources App

6. Launch BVI XR on the Oculus Quest by selecting the application (see Figure 113).

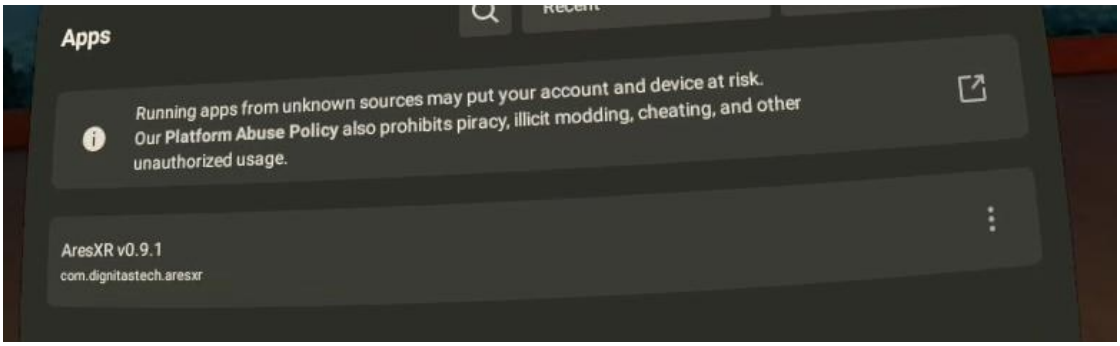


Figure 113 Oculus Quest BVI XR App

2.5.1.4 HTC VIVE – LAUNCHING BVI XR APP

To launch BVI XR in the HTC Vive:

Note: BVI Table Manager must be running; a BVI scenario can be chosen before or after BVI XR start-up.

1. Double-click the **BVI XR v0.9.4** shortcut on the desktop to start BVI XR (see Figure 114):

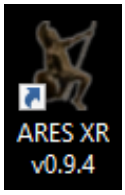


Figure 114 BVI XR Shortcut

2. Verify that the following items are connected and displaying in the Steam VR app (see Figure 115):
   - Vive Headset
   - Vive Controller
   - 2 base stations

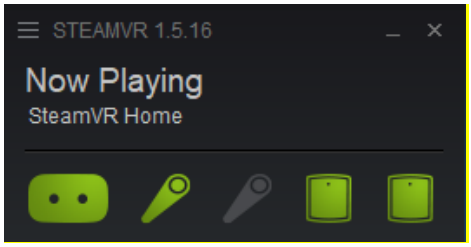


Figure 115 STEAMVR Peripherals Connected

3. Within the headset, observe that BVI XR app loads and any currently loaded BVI scenario terrain appears on the table in the center of the 3D virtual reality environment (see Figure 116).

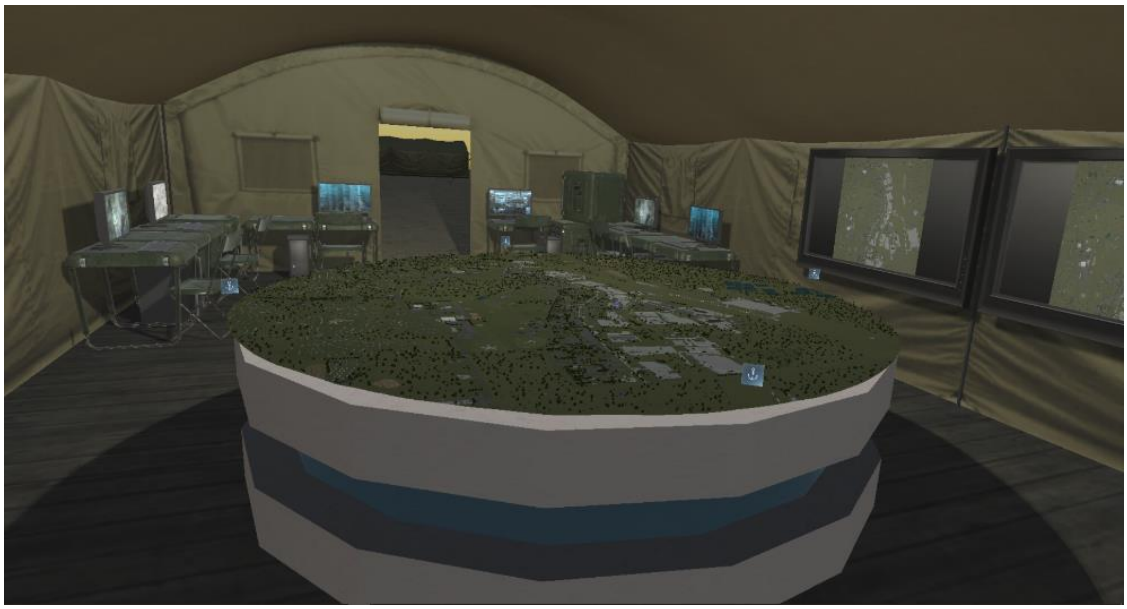


Figure 116 Vive - Scenario Terrain Loaded within BVI XR

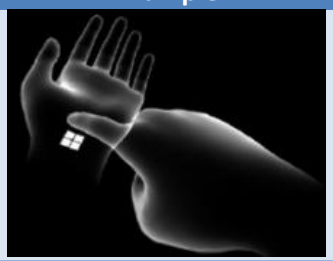
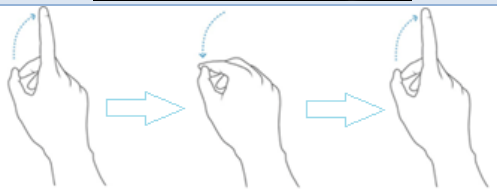
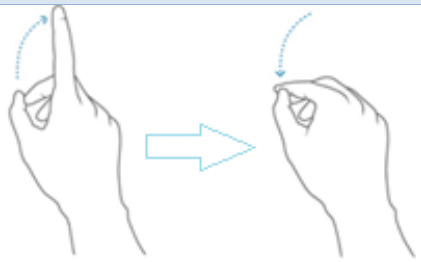
2.5.2 BVI XR DEVICE CONTROLS

The following sections detail the BVI XR controls for each supported device.

2.5.2.1 HOLOLENS 2 CONTROLS

Use the HoloLens 2 controls in Table 8 to navigate and move the table around 3D augmented reality space.

Table 8 HoloLens 2 Controls

Control	Control Description	Example
Open Start Menu Gesture: Hold out one hand with the palm facing up and look at your wrist. Use index finger of other hand to touch the holographic Windows logo that appears	Opens Start menu of HoloLens	
Air Tap Gesture: Start with fingertip up, then bring fingertip down	Click and select objects within the HoloLens	
Poke Gesture: Use index finger to "poke" buttons	Click and select objects within the HoloLens *Note that this gesture cannot be used in the BVI XR app.*	
Tap and Hold Gesture: Start with fingertip up, then bring fingertip down and hold down	Drags the entity around the scenario	

2.5.2.1.1 LIVE STREAM HOLOLENS AR FEED

To launch the HoloLens 2 live stream feed:

1. Navigate to the HoloLens UI browser window:
    a. Use the HoloLens 2 **poke** gesture to open the app tiles menu.
    b. Click on **Settings** -> **Network and Internet** using the **Air Tap** hand gesture.
    c. Scroll to the bottom of the **Wi-Fi** networks list by tapping, holding, and pulling upward.
    d. Tap on **Hardware Properties** at the bottom of the **Wi-Fi** networks list.
    e. Note the HoloLens **IPv4 address** on display.

f. Open a Chrome browser and enter the IP address of the HoloLens into the URL.
2. In the HoloLens UI browser window, navigate to **Mixed Reality Capture** in the left panel.
3. Click **Live Preview**.

2.5.2.2 MAGIC LEAP CONTROLS

Use the Magic Leap controls in Table 9 to navigate and move the table around 3D augmented reality space.

Table 9 Magic Leap Controls

Control	Control Description
Press the 'Home' button on the top of the Magic Leap controller	Opens the BVI XR menu within the Magic Leap
Press and hold the home button on the controller for 3 seconds	Opens the 'Start' menu of the Magic Leap
Point the controller at an object and press the trigger	Click and select objects within the Magic Leap
Point the controller at an entity, then press and hold the trigger	Drags the entity around the scenario

2.5.2.3 OCULUS QUEST/QUEST 2 CONTROLS

Use the Oculus Quest/Quest 2 controls in Table 10 to navigate and move the table around 3D augmented reality space.

Table 10 Oculus Quest/Quest 2 Controls

Control	Control Description
Press 'Menu' Button (Left Controller)	Brings up the BVI XR menu within the Oculus Quest
Press 'Menu' Button (Right Controller)	Opens Oculus Quest universal menu to return home or quit app
Point the controller at an object or item and press trigger	Selects desired object or item
Press and hold left or right trigger	Move the terrain left, right, pan in, or pan out
Press and hold left or right trigger in Immersive Mode	Pan the terrain left, right, pan in, or pan out
Press and hold left or right trigger, then point the controller at a symbol or graphic	Moves symbols and graphics to a desired location on the terrain

Push forward or backward on left analog stick in Immersive Mode	Traverse the terrain in the direction of the pointer. Forward will move towards the pointer and backwards on the analog will move in opposite direction

2.5.2.4 HTC VIVE CONTROLS

Use the HTC Vive controls in Table 11 to navigate and move the table around 3D augmented reality space.

Table 11 HTC Vive Controls

Control	Control Description
1. Hold down circular touch pad on the front of the Vive Wand with your thumb. (Keep touch pad pressed in, do *not* release) 2. Point wand at desired location on the VR room floor 3. While pointing at desired location, release your thumb from the touch pad	Move around the BVI VR room
1. Point Vive controller at the terrain on the table 2. Hold down the trigger on the back of the Vive Wand using index finger (Keep trigger pressed in, do *not* release) 3. Move pointer left and right to pan the terrain on the table to the left and right 4. Move pointer forwards and backwards to pan the terrain on the table forwards and backwards	Pan and zoom the terrain on table
1. Move the pointer toward the floor or ceiling by rotating wrist up and down to zoom the terrain in and out to the desired level	Zoom in and out of the terrain
1. Point the laser of the Vive wand at the virtual TV 2. Click on the TV screen using the trigger on the back of the Vive controller to cycle through available video content	Cycle through virtual TV screen content
1. Press the "Menu" () button on the Vive wand	Open and close BVI XR menu

2.5.3 BVI XR MENU

The BVI XR menu allows the user to control and toggle on/off several features of the 3D terrain including changing table positioning, selecting the table's view, and toggling settings when in collaboration with another augmented or virtual reality user.

To open the BVI XR menu, select any **Menu** button () located in each corner of the virtual sand table.

2.5.3.1.1 SCENARIO TOOLS

Scenario Tools allow the user to manipulate features of the scenario including the following listed below (see Figure 117):

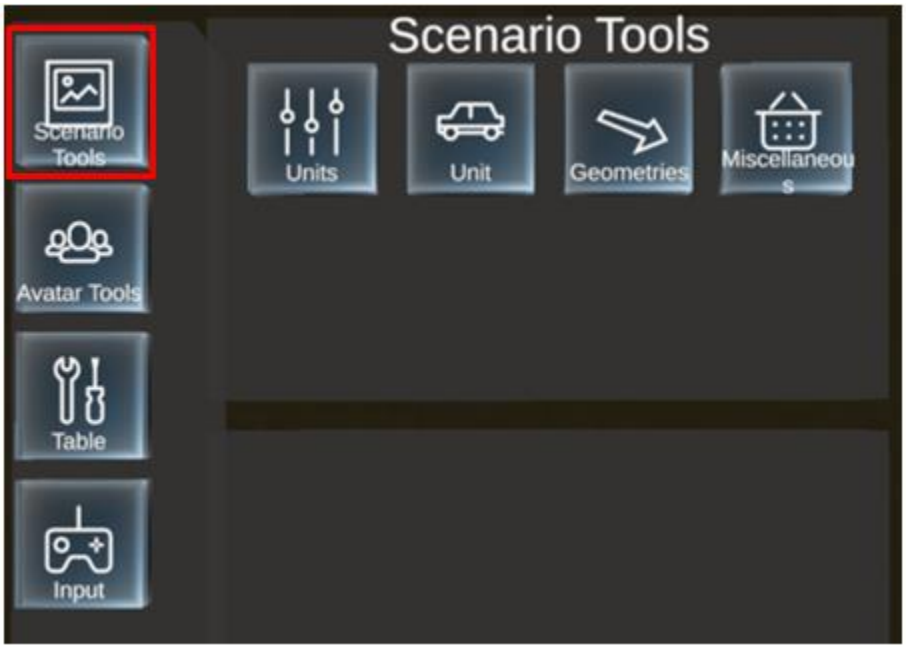


Figure 117 'Scenario Tools' Menu

- **Units:** manipulates features of all units.
- **Unit:** manipulates features of a single unit.
- **Geometries:** allows toggling of extrapolation of tactical graphics.
- **Miscellaneous:** calls detonations and toggles cyber view.

2.5.3.1.1.1 SCENARIO TOOLS – UNITS

The **Units** panel provides several features that can be toggled for all units (see Figure 118).

Figure 118 Scenario Tools - Units

- **DeadReckon:** smooths movement of models around scenario when updates for models' positions have long intervals.
- **Vehicle Models:** Toggles on and off vehicle models.
- **Scale:** Toggles model size between normal 1:1 scale, and larger sizes for model inspection.
- **Trails:** Toggles snail trails for all units.

2.5.3.1.1.2 SCENARIO TOOLS – UNIT

The **Unit** panel provides several features that can be toggled for a single unit (see Figure 119).

Figure 119 Scenario Tools - Unit

- **Tether:** Tethers the camera to an entity on the table by centering the entity on table then moving with the entity as the entity's location changes.
- **LOS:** When an entity is selected, displays the Line of Sight of the entity within the terrain.
- **Mortar Request:** When a mortar unit is selected, fires mortar request with parameters set from BVI Mobile Tactical Planner application on the tablet.
- **Set POV Camera:** When an entity is selected, sets the entity's point of view to the First-Person channel view of the TVs within the BVI XR environment.

  Note: this feature is unavailable in the BVI XR HoloLens or Magic Leap version.

- **Trails:** toggles snail trails for the selected unit.

2.5.3.1.1.3 SCENARIO TOOLS – GEOMETRIES

The **Geometries** panel allows extrapolation to be toggled for tactical graphics (see Figure 120). Geometries panel also provides the capability to create **Arcs** which can be viewed in XR applications along with the WTP.
To create arcs in BVI XR:

1. Select the Geometries icon.
2. Select **Create Arc** or **Arc /Symbols** (see Figure 121).
3. To adjust the arc length and height
   a. Select either end of the arc and move to desired location.
   b. To adjust the height, select middle point of arc and drag up or down to increase or decrease height.
4. Select **Delete Geometry** to delete the most recently created arc.

Figure 120 Scenario Tools- Geometries

Figure 121 Scenario Tools - Create Arc and Arc w/ Symbols

- **Extrapolation:** toggles extrapolation of tactical graphics.

2.5.3.1.1.4 SCENARIO TOOLS – MISCELLANEOUS

The **Miscellaneous** panel allows the user to call detonations and toggle cyber view (see Figure 122).

Figure 122 Scenario Tools - Miscellaneous

- **Detonation:** triggers a detonation in the center of the terrain.
- **CyberView:** toggles cyber view.

  Note: The CyberBOSS application is required to use this toggle functionality.

2.5.3.1.2 AVATAR TOOLS

Avatar Tools allow the user to toggle on/off features of the avatars (see Figure 123).

Figure 123 'Avatar Tools' Menu

- **My Avatar:** toggles on/off the user's avatar for other people collaborating within the same session.
- **My Pointer:** toggles on/off the user's pointer for other people collaborating within the same session.
- **My Gaze:** toggles on/off the user's gaze for other people collaborating within the same session.
- **Other Avatars:** toggles on/off whether the user sees other people's avatars, collaborating within the same session.
- **Other Pointers:** changes how the user sees other people's pointers, collaborating within the same session. Toggles between solid line, dashed line, or off.
- **Other Gaze:** changes how the user sees other people's gaze, collaborating within the same session. Toggles between solid line, dashed line, or off.

2.5.3.1.3 TABLE TOOLS

Table Tools allow the user to manipulate features of the virtual table (see Figure 124).

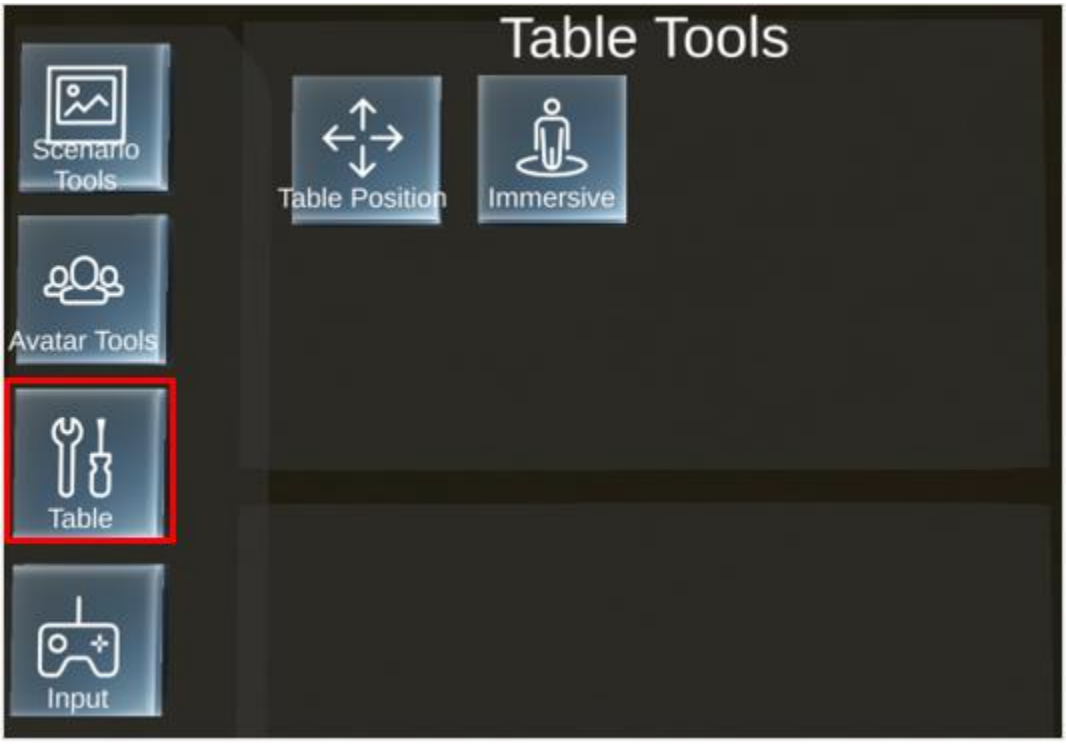


Figure 124 'Table Tools' Menu

- **Table Position:** while toggled on, the user can reposition the virtual table. To do this:
  - **HoloLens 2 -** use the **tap and hold** gesture on the virtual table, drag the table to the desired location and release the hold.
  - **Magic Leap** – point the controller at the table and **press and hold** the **trigger** on the virtual table, drag the table to the desired location and release the trigger.

  - **Oculus Quest** – point the controller at the table and press and hold on the pointer finger trigger to drag the table to the desired location and release the hold.
  - **HTC Vive** – hold down the trigger on the back of the Vive wand on the virtual table, drag the table to the desired location and release the hold

Note: Remember to toggle the Table Position option off once desired location is reached. This prevents accidently moving the table when trying to manipulate the terrain/scenario loaded onto the virtual table.

- **Immersive Mode:** When selected, the 3D virtual reality environment changes from the BVI XR virtual table to a first-person immersive terrain.
  - **Oculus Quest:**
    - To move, point the left controller in the direction of desired movement and use the analog stick to move forwards and backwards.
    - To move faster, press down on the grip trigger on the left controller while moving.
    - To move the terrain, press and hold the trigger while the controller is pointed down to the terrain.
    - To exit immersive mode, press the **menu** () button on the left controller to open the XR menu and then, deselect immersive mode.
  - **HTC Vive:**
    - To move, point wand in any desired direction and hold down on top of the touchpad
    - To move faster, hold down the trigger while moving
    - To exit immersive mode, open the table tools menu by pressing the **menu** () button on top of the Vive Wand and then, deselecting immersive mode.

Note: Immersive mode is not supported with HoloLens 2 or Magic Leap.

2.5.4 AUGMENTED FLOOR

The BVI Augmented Floor provides the capability to view the 2D floor projection image in a 3D augmented reality space. When the Augmented Floor is toggled, the scenario objects become 3-dimensional, and the user can move units and pan/zoom in or out of the scenario (see Figure 125).

Note: The Augmented Floor is only supported with HoloLens 2.

To setup the Augmented Floor, reference *BVI Installation/Configuration Instructions Section 3.1.1.5 Augmented Floor Setup.*

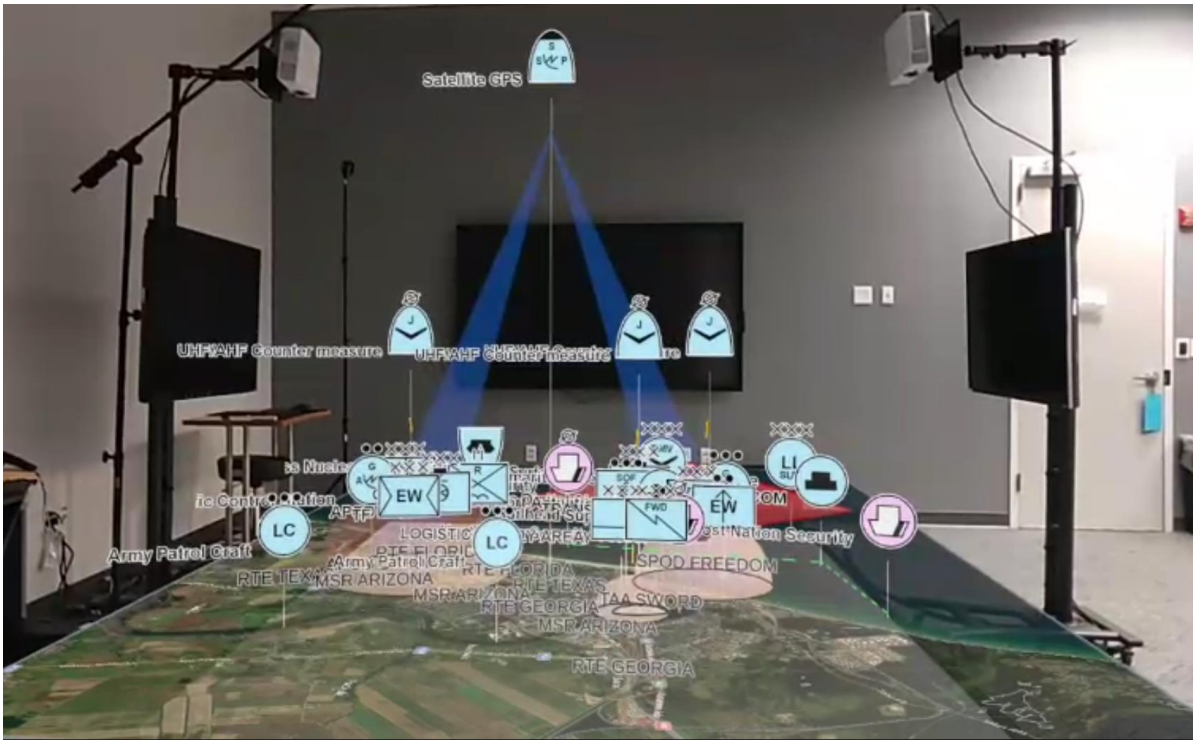


Figure 125 Augmented Floor

2.5.5 USING BING MAPS IN BVI XR

BVI XR allows the user to leverage Bing Map data to visualize a terrain. A Bing Maps key must be obtained and configured within an installed terrain in order to be displayed (reference the *Google/Bing Maps API Key Configuration Guide* for obtaining and configuring the Bing Maps key).

To display Bing Map data in BVI XR:

1. Start **BVI XR** (if not running already).
2. Open a web browser (e.g., Chrome).
3. Navigate to: **<IP address of the machine running BVI XR>:4321**
4. Expand the **BingMaps** preference (see Figure 126).

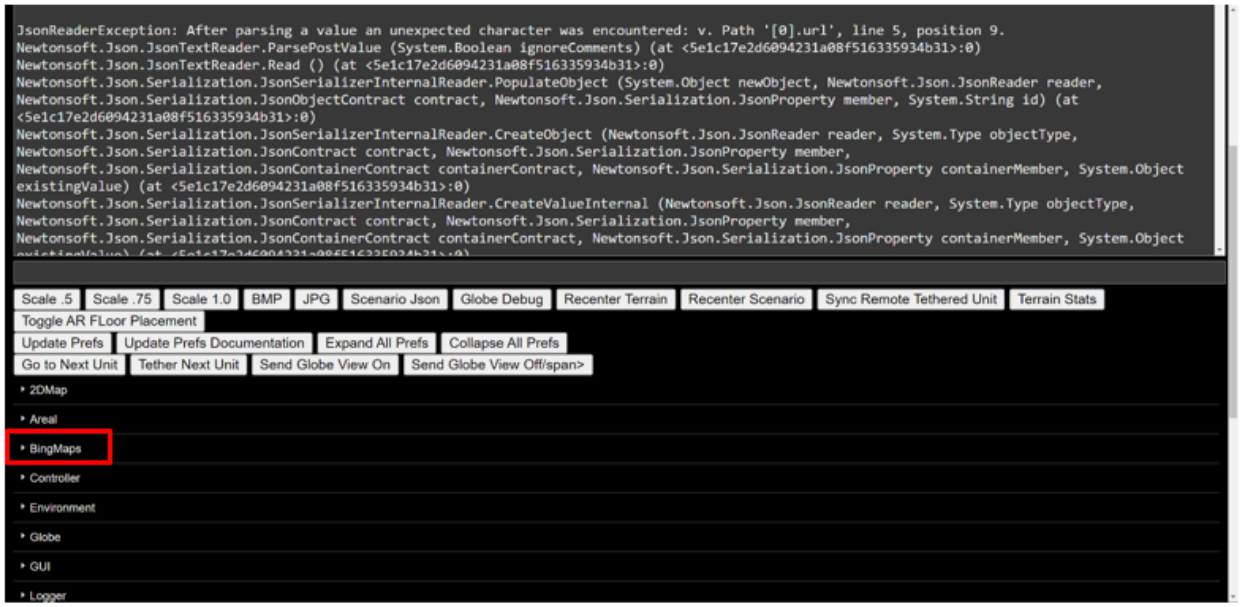


Figure 126 Bing Maps Preference Section

5. Select the check box next to **BingMaps.Enabled**.
6. Several settings can be enabled/disabled:
    a. **Contour Lines:** visualize the terrain topography
        i. **Major Color:** color of the major contour lines
        ii. **Major Interval Altitude:** amount of space between major contour lines
        iii. **Major Line Pixel Size:** major contour line thickness
        iv. **Minor Color:** color of the minor contour lines
        v. **Minor Line Pixel Size:** minor contour line thickness
        vi. **Minor Interval Sections:** number of minor contour lines between each major line
    b. **Detail Offset:** level of detail on the map
    c. **Labels:** display city and road names
    d. **Roads:** highlight highway roads
    e. **Satellite Imagery:** display terrain with satellite imagery

2.6 COLLABORATIVE ABILITIES

2.6.1 REMOTE COLLABORATION - MULTIPLE BVI USERS

To facilitate remote teamwork and planning, BVI can connect multiple users in different locations to the same table (internet connection or shared local network required).

To start a collaboration session:

1. Remote users will need to:
    a. Navigate to the folder in which their BVI installation is located
    b. Navigate to **<BVI Install Directory>** (e.g., **C:/Program Files/Ares)>/ares.manager/config**)
    c. Open **env.yml** and locate the section labeled **Ares Server Config**
    d. For each variable, replace **localhost** with the value of the main host's IP address (see Figure 127), which can be found in the address bar of the BVI Table Manager before the semicolon.

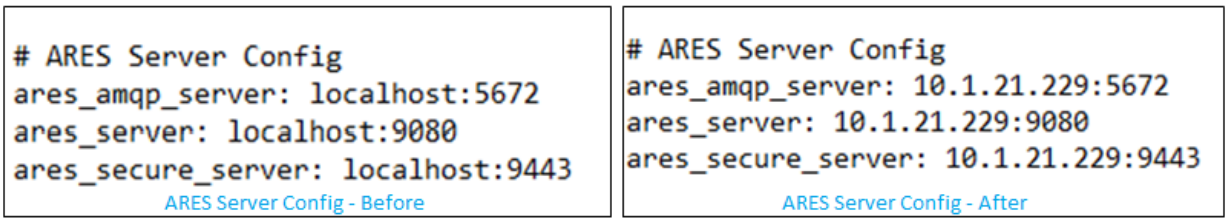


Figure 127 Ares Server Config Modified in env.yml File

2. Host user will need to:
    a. Click the **Table** drop-down menu from the BVI Table Manager and select **Collaborate**.
    b. From the **Collaboration Options** window:
        i. Enable VTC.
        ii. Select the remote users to add to the collaboration (see Figure 128)
        iii. Click the right-pointing arrow.
        iv. The added remote users should be located in the **Selected Tables** section

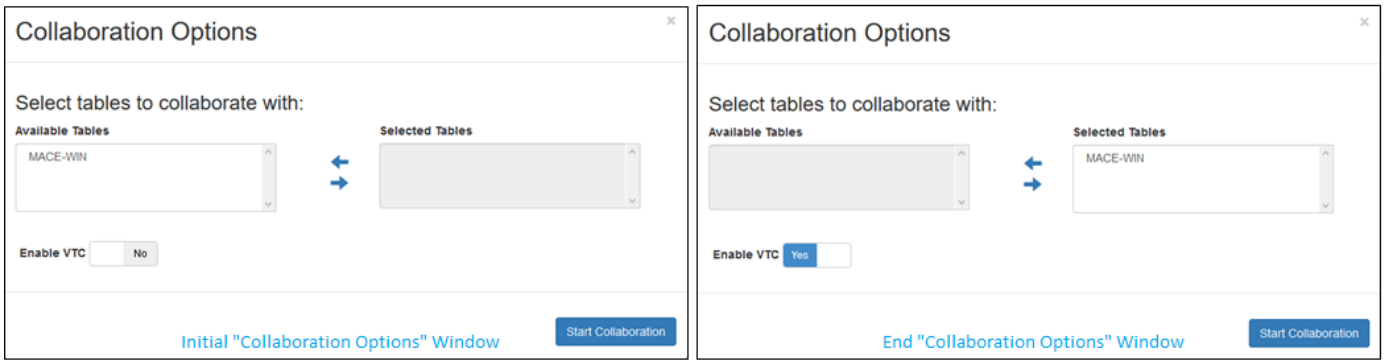


Figure 128 Collaboration Options Window

3. When remote users are prompted with a text box to join the main user, select **OK**.

Note: Pop-ups must be allowed for BVI Collaboration to work properly.

4. When prompted to allow use of camera and microphone, select **Allow**.
   Note: The BVI title screen is the view from the Kinect of the host table (see Figure 129*).*
5. To display the **Collaboration Chat Log**:
   a. Move the mouse over the table view.
   b. Select the **chat** ( ) button.

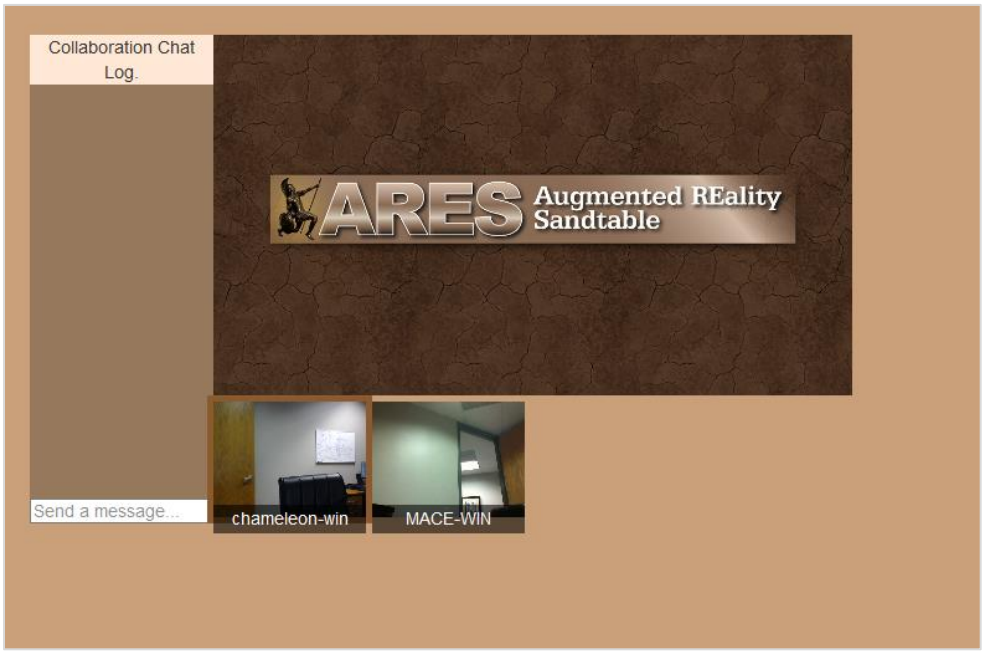


Figure 129 BVI Collaboration window

6. To leave the collaboration:
   a. Close the tab titled **VTC**
   b. Select **Leave Collaboration** from the top bar of BVI Table Manager, located next to **Shutdown BVI software**.

2.6.2 ATAK

BVI allows an ATAK user to be remotely connected. The ATAK user can create scenarios and show the ATAK current position in real time to BVI. For ATAK to communicate with BVI, the machine running the BVI Table Manager must be on the same network as the ATAK device.

2.6.2.1 SYSTEM SETUP

To setup ATAK:

1. On the ATAK device, install **ATAK-CIV** from the Android **Play Store**.
2. Open the newly installed application.

   *Note: When launching the application for the first time, a EULA Acceptance prompt will appear. Select **I agree** and select **Allow** for all permission prompts that appear.*

3. Go to **Settings**.
4. Go to **Network Connection Preferences**.
5. Select **Manage Inputs** and verify all fields are checked.
6. Select **Manage Outputs** and verify all fields are checked.
7. Launch BVI.
8. Select **Interop Settings** in Table Manager.
9. Select the **ATAK** tab.
10. Set the **Network Adapter Address** to the **IP address** of the machine running.
11. Toggle **ATAK** on.

    Note: Once ATAK is toggled on, the ATAK device will already be connected to BVI.

12. (Optional) Navigate to the scenario location in the ATAK device:
    a. Load any terrain/scenario through the BVI table manager.
    b. Start **WTP**.
    c. In **ATAK**, zoom into the location where the terrain/scenario is located.
        i. Optionally, create a symbol in **WTP**.
        ii. In **ATAK**, zoom closer to where the icon is located.

The ATAK device is now connected to BVI.

2.6.2.2 CREATING SCENARIOS FROM ATAK

ATAK allows the user to create scenarios using various methods. However, BVI requires a specific process to display scenario objects created in ATAK.

2.6.2.2.1 ADD UNITS (MARKERS)

To add units using ATAK:

1. Select the **Point Dropper** () button.
2. Choose a desired marker.

3. Tap the map at the desired location.
4. Deselect the icon by tapping the icon again.
    a. Optionally, select the Android back button ().
5. Tap the newly created icon.

    Note: An icon wheel menu will appear around the icon.

6. Choose the **Send Options** button ().
7. Select **Send** ().
8. Select **Broadcast**.

2.6.2.2.2 ADD GEOMETRIES

The following sections provide instructions on adding geometries.

2.6.2.2.2.1 CIRCLES

To add a circle using ATAK:

1. Open the **Tools** () menu in the top right.
2. Select **Drawing Tools**.
3. Select the **Draw Circle** () button:
    a. Tap anywhere on the map to establish the center point of the circle.
    b. Tap on the map a second time to establish the radius of the circle.
    c. Select the newly created circle by tapping the center.
4. A few options can be changed to customize the circle:
    a. **Line Color:**
        i. Select the **Edit** () button.
        ii. Tap on the box next to **Color**.
        iii. Select the **Stroke** menu.
        iv. Choose one of the preexisting colors or set a custom color.
        v. Tap **OK**.
    b. **Fill Color:**
        i. Select the **Edit** () button.
        ii. Tap on the box next to **Color**.
        iii. Select the **Fill** menu.
        iv. Choose one of the preexisting colors or set a custom color.
        v. Tap **OK**.

        *Note: The line and fill color can be set simultaneously under the **Both** menu.*

    c. **Fill Opacity:**
        i. Select the **Edit** () button.

ii. Drag the **Color** slider left or right to adjust the opacity.

d. **Line Thickness:**

i. Select the **Edit** () button.

ii. Drag the **Line Thickness** slider left or right to adjust the line thickness.

Once edits are complete, select **End Editing** and skip to step 6.

5. Choose the **Send Options** () button.
6. Select **Send** ().
7. Select **Broadcast**.

2.6.2.2.2.2 ELLIPSE

To add an ellipse using ATAK:

1. Open the **Tools** () menu in the top right.
2. Select **Drawing Tools**.
3. Select the **Draw Ellipse** () button:
   a. Tap anywhere on the map to establish the first corner of the ellipse.
   b. Tap on the map a second time to establish the edge of the ellipse.
   c. Tap on the map a third time to establish the depth of the ellipse.
4. Select the newly created ellipse by tapping the center.
5. A few options can be changed to customize the ellipse:
   a. **Line Color:**

      i. Select the **Edit** () button.

      ii. Tap on the box next to **Color**.

      iii. Select the **Stroke** menu.

      iv. Choose one of the preexisting colors or set a custom color.

      v. Tap **OK**.

   b. **Fill Color:**

      i. Select the **Edit** () button.

      ii. Tap on the box next to **Color**.

      iii. Select the **Fill** menu.

      iv. Choose one of the preexisting colors or set a custom color.

      v. Tap **OK**.

      *Note: The line and fill color can be set simultaneously under the **Both** menu.*

   c. **Fill Opacity:**

      i. Select the **Edit** () button.

      ii. Drag the **Color** slider left or right to adjust the opacity.

   d. **Line Thickness:**

i. Select the **Edit** () button.
ii. Drag the **Line Thickness** slider left or right.

Once edits are complete, select **End Editing** and skip to step 7.

6. Choose the **Send Options** () button.
7. Select **Send** ().
8. Select **Broadcast**.

2.6.2.2.2.3 RECTANGLE

To add a rectangle using ATAK:

1. Open the **Tools** () menu in the top right.
2. Select **Drawing Tools**.
3. Select the **Draw Rectangle** () button:
    a. Tap anywhere on the map to establish the first corner of the rectangle.
    b. Tap on the map a second time to establish the edge of the rectangle.
    c. Tap on the map a third time to establish the depth of the rectangle.
4. Select the newly created rectangle by tapping the center.
5. A few options can be changed to customize the rectangle:
    a. **Line Color:**
        i. Select the **Edit** () button.
        ii. Tap on the box next to **Color**.
        iii. Select the **Stroke** menu.
        iv. Choose one of the preexisting colors or set a custom color.
        v. Tap **OK**.
    b. **Fill Color:**
        i. Select the **Edit** () button.
        ii. Tap on the box next to **Color**.
        iii. Select the **Fill** menu.
        iv. Choose one of the preexisting colors or set a custom color.
        v. Tap **OK**.

        *Note: The line and fill color can be set simultaneously under the **Both** menu.*

    c. **Fill Opacity:**
        i. Select the **Edit** () button.
        ii. Drag the **Color** slider left or right to adjust the opacity.
    d. **Line Thickness:**
        i. Select the **Edit** () button.

ii. Drag the **Line Thickness** slider left or right.

Once edits are complete, select **End Editing** and skip to step 7.

6. Choose the **Send Options** () button.
7. Select **Send** ().
8. Select **Broadcast**.

2.6.2.2.2.4 SHAPE

To add a shape using ATAK:

1. Open the **Tools** () menu in the top right.
2. Select **Drawing Tools**.
3. Select the **Draw Shape** () button:
   a. Tap anywhere on the map to establish the vertices.
   b. Tap on the first point to end a closed shape.
4. Select the newly created shape by tapping the center.
5. A few options can be changed to customize the shape:
   a. **Line Color:**
      i. Select the **Edit** () button.
      ii. Tap on the box next to **Color**.
      iii. Select the **Stroke** menu.
      iv. Choose one of the preexisting colors or set a custom color.
      v. Tap **OK**.
   b. **Fill Color:**
      i. Select the **Edit** () button.
      ii. Tap on the box next to **Color**.
      iii. Select the **Fill** menu.
      iv. Choose one of the preexisting colors or set a custom color.
      v. Tap **OK**.

      *Note: The line and fill color can be set simultaneously under the **Both** menu.*
   c. **Fill Opacity:**
      i. Select the **Edit** () button.
      ii. Drag the **Color** slider left or right to adjust the opacity.
   d. **Line Thickness:**
      i. Select the **Edit** () button.
      ii. Drag the **Line Thickness** slider left or right.

Once edits are complete, select **End Editing** and skip to step 7.

6. Choose the **Send Options** () button.
7. Select **Send** ().
8. Select **Broadcast**.

2.6.2.2.2.5 LINE

To add a line in ATAK:

1. Open the **Tools** () menu in the top right.
2. Select **Drawing Tools**.
3. Select the **Draw Shape** () button:
    a. Tap anywhere on the map to establish the vertex.
    b. Tap anywhere on the map a second time to end the line.
    c. Select **End Shape**.
4. Select the newly created line.
5. A couple options can be changed to customize the line:
    a. **Line Color:**
        i. Select the **Edit** () button.
        ii. Tap on the box next to **Color**.
        iii. Choose one of the preexisting colors or set a custom color.
    b. **Line Thickness:**
        i. Select the **Edit** () button.
        ii. Drag the **Line Thickness** slider left or right.

Once edits are complete, select **End Editing** and skip to step 7.

6. Choose the **Send Options** () button.
7. Select **Send** ().
8. Select **Broadcast**.

2.6.2.2.2.6 FREEHAND

To add a freehand shape using ATAK:

1. Open the **Tools** () menu in the top right.
2. Select **Drawing Tools**.
3. Select the **Draw Telestration** () button:
4. Draw the desired shape on the map.

5. Select the newly created shape by tapping the line.
6. A couple options can be changed to customize the shape:
    a. **Line Color:**
        i. Select the **Edit** () button.
        ii. Tap on **Change Line Color**.
        iii. Choose one of the preexisting colors or set a custom color.
        iv. Select **Done Coloring**.
    b. **Line Thickness:**
        i. Select the **Edit** () button.
        ii. Drag the **Line Thickness** slider left or right.

    Once edits are complete, select **End Editing** and skip to step 8.

7. Choose the **Send Options** () button.
8. Select **Send** ().
9. Select **Broadcast**.

2.6.3 AIS

AIS is a ship tracking protocol service provided by the Dutch that translates VR Forces DIS/HLA messages into AIS messages. BVI can listen and translate the AIS messages into BVI for display.

To run AIS:

1. Select **Interop → AIS**.
2. Toggle AIS **off** (if not done already).
3. Ensure the **AIS Port** matches the port in the **ais_model_mappings.yml** file:
    a. Open a **File Explorer**.
    b. Navigate to the installed BVI build (i.e., C:\Program Files\ARES\<BVI_BUILD>).
    c. Select **ares.manager → config**.
    d. Open the **ais_model_mappings.yml** file in a text editor (i.e., Notepad++).
    e. Note the **port number** in line 2.
4. Insert the IP address of the machine running BVI into the **AIS Address**.
5. Toggle AIS **on**.

AIS is now connected to BVI.

2.7 BVI SYSTEM SHUTDOWN

To shut down the BVI system:

1. From the BVI Table Manager, click the red **Shutdown BVI software** button located in the top-right corner. This will shut down the BVI software and close all BVI windows.
2. Shutdown the BVI computer:
    a. Press the Windows key on the keyboard or press the **Windows** () logo in the bottom-left of the screen
    b. Select the **Power** () icon to open power options
    c. Select **Shut down** to power off the BVI computer
3. Turn off the flat panel display using their respective remotes.

3. TROUBLESHOOTING

- If the Chrome BVI Table Manager window does not automatically open:
    1. Launch the Chrome browser.
    2. Navigate to the following URL to access the BVI Table Manager: **localhost:9080**.

- BVI Mobile Tactical Planner is frozen on the loading screen:
    1. Tap on the home button
    2. Open the settings application
    3. Scroll down and tap on **Apps**
    4. Select **BVI**
    5. Scroll down and tap on **Storage**
    6. Tap **Clear data**
    7. Restart the BVI Mobile Tactical Planner application

- BVI XR is not displaying models:
    1. In a browser, navigate to: **<IP address of the machine running BVI XR>:4321**
    2. Set the **model server** IP address:
        - Expand the **Scenario** setting by selecting the drop-down arrow to its left (see Figure 130):

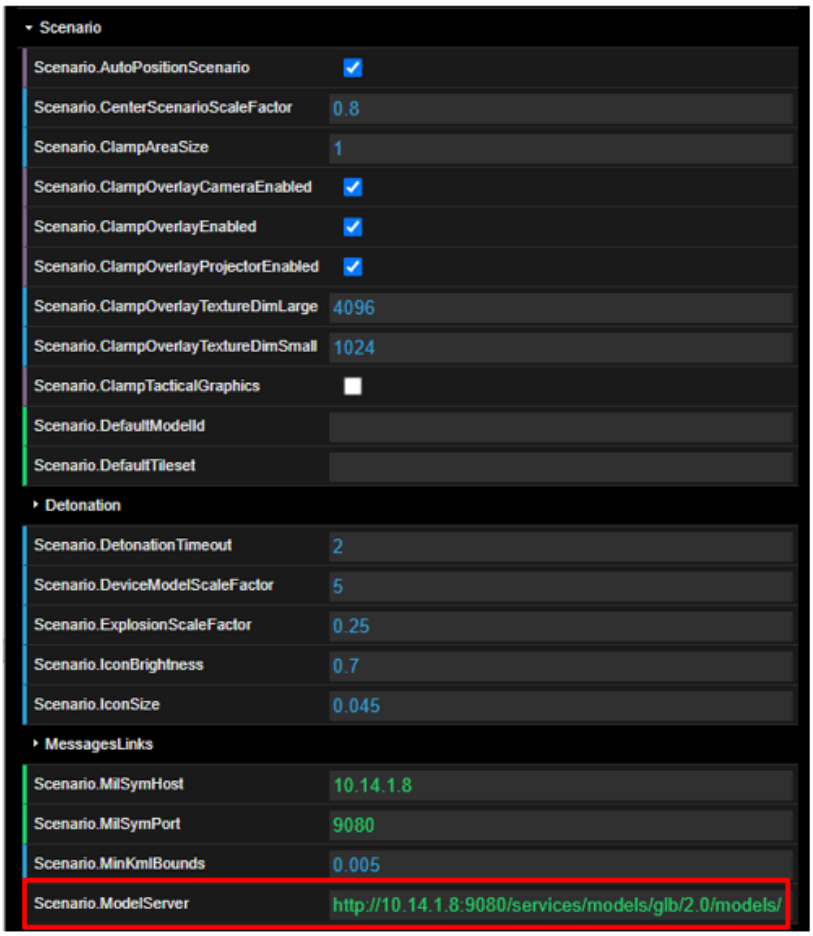


Figure 130 Model Server Scenario Settings in BVI XR Preferences

- Change the IP address of the **ModelServer** value to:

  http://<IP Address of machine running BVI>:9080/services/models/glb/2.0/models/

- Press "Enter."

- BVI XR is not displaying icons:
  1. In a browser, navigate to: **<IP address of the machine running BVI XR>:4321**
  2. Set the **model server** IP address:
     - Expand the **Scenario** setting by selecting the arrow to its left (see Figure 131):

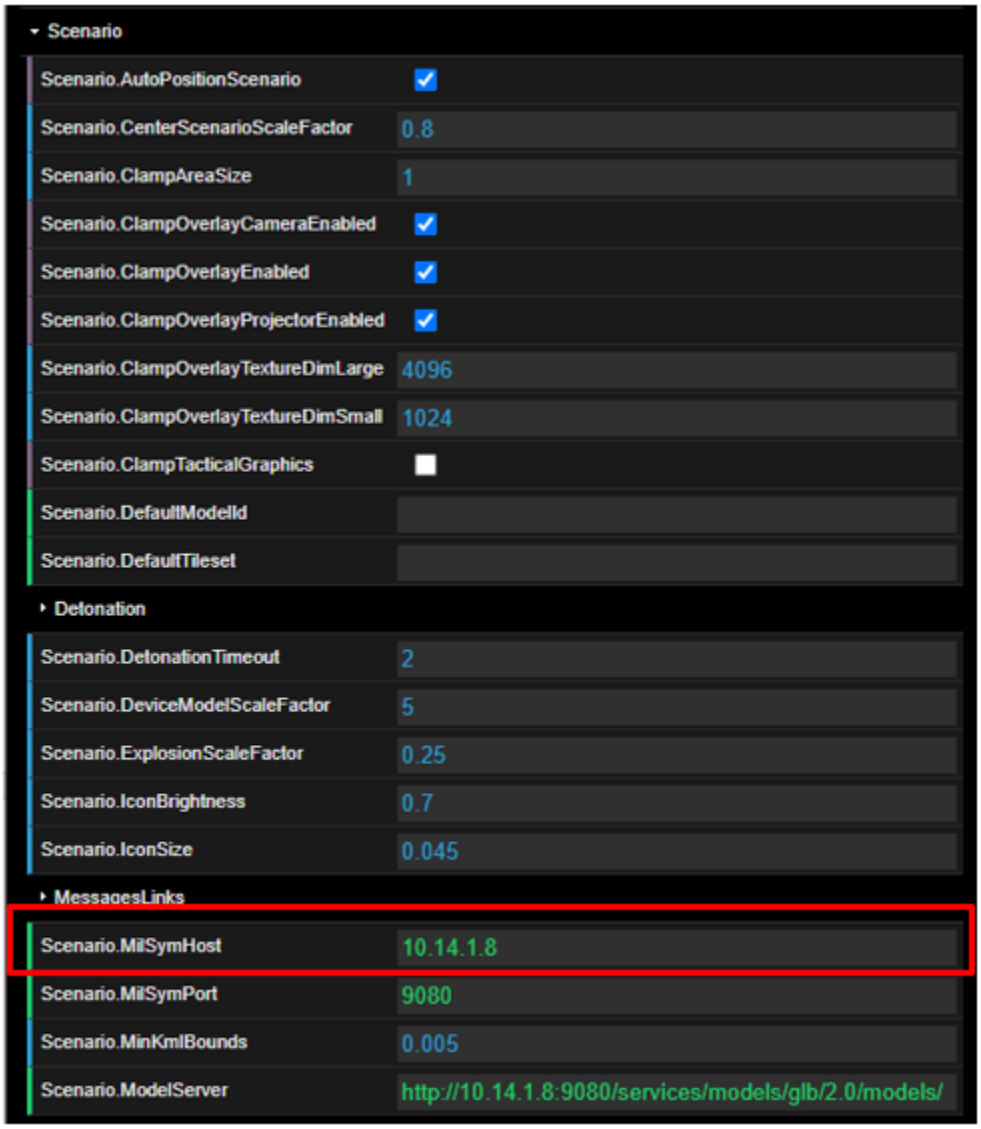


Figure 131 MilSymHost Scenario Settings in BVI XR Preferences

- Change the IP address of the **Scenario.MilSymHost** value to the **IP address of the machine running BVI XR**
- Press "Enter."

- BVI XR is not displaying scenarios:
  1. In a browser, navigate to: **<IP address of the machine running BVI XR>:4321**
  2. Set the **rabbitmq** IP address:
     - Expand the **RabbitMQ** section by selecting the arrow to the left (see Figure 132):

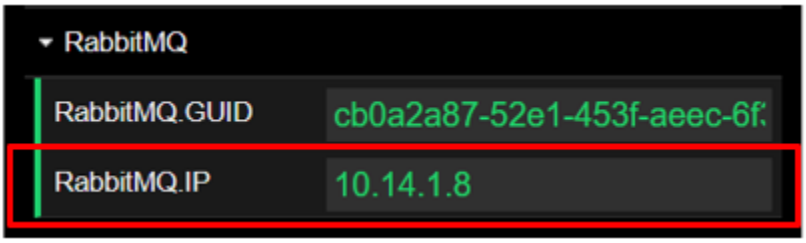


Figure 132 RabbitMQ Scenario Settings in BVI XR Preferences

     - Change the IP address of the **RabbitMQ.IP** value to the IP address of the machine running BVI XR
     - Press "Enter."

4. APPENDIX 1: TERMINOLOGY

Term	Explanation
BVI Table Manager	Browser-based user interface to control and modify different aspects of the BVI software
Flat Panel Display	Large monitor or TV used in the BVI setup
Mobile Device	Mobile Android tablet or phone that is running the BVI app to edit scenarios
Hypsometric	Color scheme based on the relative sand heights on the BVI sand table
Table Settings	User interface for controlling the display settings of BVI
BVI Table	Refers to the sand table portion of the BVI system
BVI Floor Space	Refers to floor space projection area of BVI floor projection setup
Terrain Template	Imagery, contour lines, or map that can be viewed on the BVI table/floor. Terrain templates are the background layer upon which users can add graphical layers, via the mobile app, to build scenarios
Scenarios	BVI files that contain both a terrain template as a background and graphical information (e.g. unit icons, polygons, lines, etc.) and are created using the BVI mobile app
Mobile App	Android based app that is used on the mobile device to add graphical information to scenarios
Guided Build	Mode which allows users to save sand configurations to corresponding terrain files and later shape the sand to match what was previously saved
Terrain Data / Terrain Databases	Digital representations of points with x-, y-, and associated z-values. It may include a series of points that define topographic features.
Web Tactical Planner (WTP)	Web-based version of the Tactical Planner that allows the user to create, edit, save, and delete scenarios using a browser.
3D View	A 3D point-of-view within the Web Tactical Planner that provides the user the ability to fly around and view the scenario from a ground view.

5. KNOWN ISSUES

The table below is a set of known issues and features for future releases. If you would like to provide feedback regarding this application, please email one of the Dignitas Technologies contacts.

- [XR] With Globe.AllowDisablingRenderersAndCollidersOutOfRange set to False, Text continues to be rendered when outside of the table area.
- [Viewer] Viewer does not visualize message links
- [XR] Message link disappears when source or target is not within the table.
- Inconsistent font styles across some modalities
- [Viewer] Does not render line vertices.
- [WTP] Unable to set height of text boxes
- [Table Manager] Using weather settings, user is unable to set layer altitudes
- [XR] Mortar detonations activated in XR do not go to the desired location.

5.1 KNOWN LIMITATIONS

- The user is unable to create entities/units or tactical graphics within an BVI scenario using the VR and AR modalities, this must be done from the BVI Mobile Tactical Planner or the Web Tactical Planner.
- BVI scenarios within the Table Manager are ordered alphabetically, therefore the easiest way to prepare a planning or briefing session that utilizes more than one scenario is to edit the name of each scenario to place numbers at the front of each scenario name.
- Note that when using the KML/JSON import feature, BVI XR is not optimized to visualize the KML/JSON file.
- KML, KMZ, or GeoJSON files may not always import successfully.
- Imported KML, KMZ, or GeoJSON files may not display correctly.

6. CONTACTS

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