FREQUENTLY ASKED QUESTIONS (FAQ)

4 APRIL 2022

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1 GENERAL QUESTIONS

Q1. WHAT IS BVI? (PREVIOUSLY KNOWN AS ARES)

A: Battlespace Visualization Interaction (BVI) research is focused on human factors elements of information visualization, multimodal interaction, and human performance assessment. BVI is a distributed interactive visualization architecture enabling real-time collaborative mission planning, rehearsal, command and control, training, and after-action review.

Q2. WHAT ARE ALL THE BVI MODALITIES?

A: BVI is composed of multiple modalities using low-cost technologies. These modalities can run standalone or in a hybrid configuration to meet Warfighter needs. The modalities include:

- Physical sand table augmented with mixed reality (see Figure 1).

Figure 1 Sand Table

- Mobile devices (Mobile Tactical Planner (MTP)) (see Figure 2).

Figure 2 Mobile Tactical Planner

- Web-based desktop (Web-based Tactical Planner (WTP)) (see Figure 3).

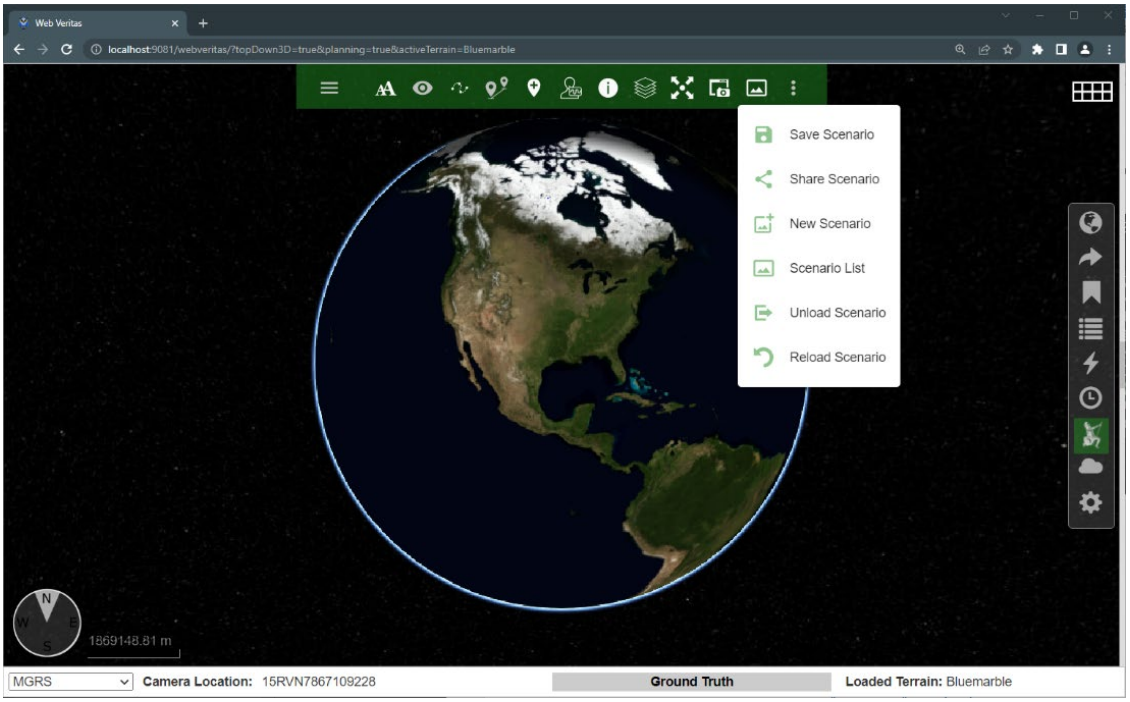

Figure 3 Web Tactical Planner

- Floor Projection with mixed reality for large groups (see Figure 4).

Figure 4 Floor Projection 16'x9'

- Augmented Reality (AR) and Virtual Reality (VR) head-mounted displays (HMDs) (see Figure 5 and Figure 6).

HoloLens 2 HMD

Figure 5 HoloLens 2 AR

Figure 6 HTC Vive VR

Q3. HOW ARE BVI TERRAIN TEMPLATES (2D MAPS) CREATED FOR BVI?

A: BVI terrain templates are acquired from two sources.

- Existing 2D maps from online sources
  - Google Maps
  - OpenStreetMap (OSM)
  - OpenToppMap
  - USGS
- Local images imported to BVI
  - JPEG
  - PNG
  - GeoTIFF
  - GeoPDF

Figure 7 below depicts the process for displaying 2D imagery.

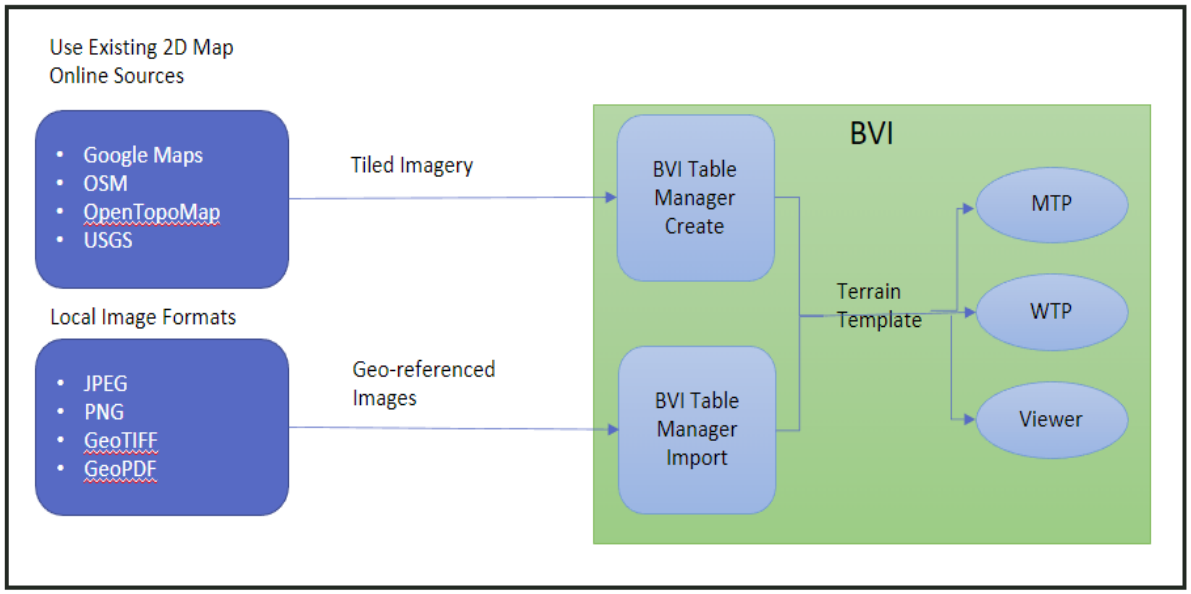

Figure 7 2D Map Formats

Q4. WHAT 3D TERRAIN FORMATS ARE SUPPORTED IN BVI?

A: The 3D Terrain Formats that are supported in BVI include:

- Open Geospatial Consortium (OGC) 3D tiles with terrain skin
- Existing US Army STE OWT program (WFF 3D tiles)
- Existing 3D terrain formats which require conversion to BVI 3D terrain runtime format
- Geospatial source data including DTED, imagery, shapefiles, etc. which would need to be generated into the 3D tile format.

Figure 8 below depicts the sources and processes to provide 3D terrain for BVI.

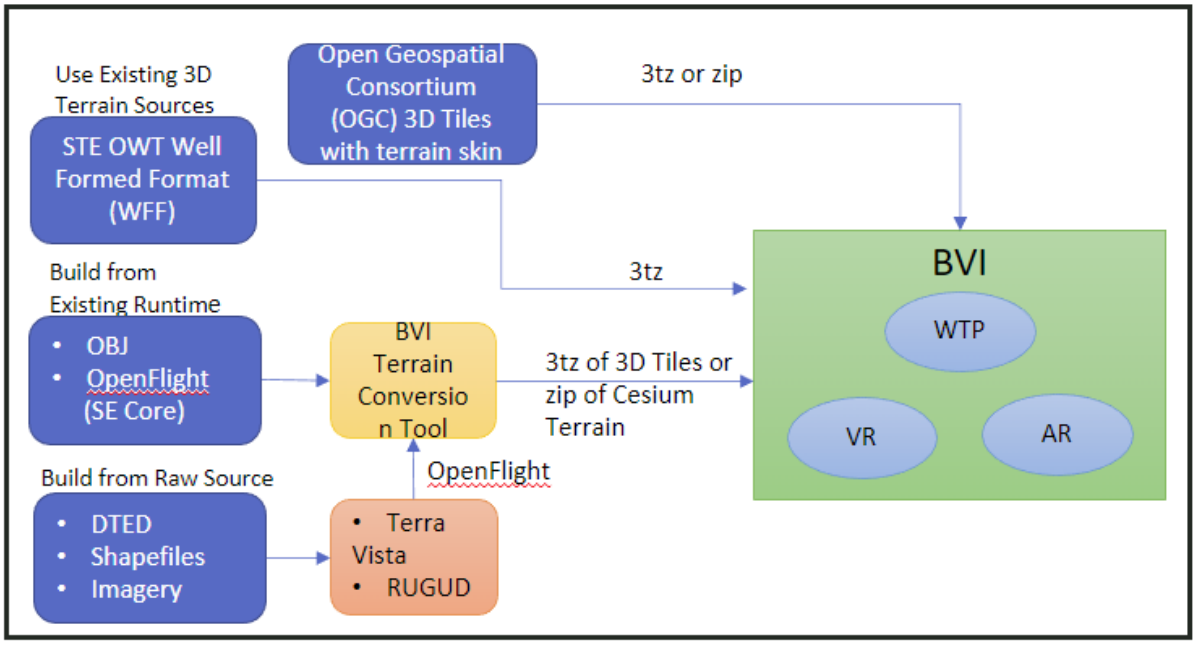

Figure 8 3D Map Formats

Q5. DOES BVI HAVE AN ATO?

A: BVI does not currently have an ATO.

Q6. WHAT OPERATIONAL AND SIMULATION SYSTEMS DOES BVI INTEROPERATE WITH?

A: BVI is integrated with:

- ATAK/Nett Warrior Platform to publish mission plans created by BVI to the Nett Warrior device, and to provide the warfighter the ability to use plans developed on BVI in the field.
- OneSAF
- VBS
- VR Forces
- DIS and AIS Message Protocols

Q7. WHAT DEVICES CAN I VISUALIZE AND INTERACT WITH BVI DATA?

A: BVI supports the following devices:

- Windows PCs with display devices including
  - Desktop monitors
  - Touchscreen TVs
  - Projectors
- Android tablets
- VR headsets (compatible with Windows) – HTC Vive, Oculus Pro, and Oculus Quest
- AR headsets (compatible with Windows) – HoloLens 2.

Q8. WHAT IS THE ARES XR APPLICATION?

A: Ares XR is an application that runs on VR/AR headsets. Users can view and manipulate a table displaying a terrain/scenario. Users can interact with the battlespace by panning and zooming in/out of the terrain, moving entities, adjusting models, and more.

For a full list of ARES XR capabilities, refer to the BVI_User_Instructions.pdf.

Q9. WHAT IS THE BVI VIEWER?

A: The BVI Viewer is a 2D application that is used with Floor Projection and Sand Table modalities. For the Floor Projection, the Viewer displays a top-down view of a terrain template or scenario. For the Sand Table, Viewer displays the top-down view of a terrain template or scenario as well as a hypsometric view to display terrain elevation levels from the sand heights.

Q10. CAN VIEWER BE LAUNCHED WITHOUT A FLOOR PROJECTION/SAND TABLE?

A: The viewer can be launched if the user has a second monitor connected to the BVI computer. The viewer will automatically start when detecting a second monitor. If the user has three monitors and prefers the viewer to be displayed on that monitor, follow the steps below.

1. Open File Explorer
2. Navigate to C:\ProgramData\ARES
3. Open Veritas.ProjMapping.ini with a text editor
4. Scroll down to the 'Table' section
5. Change the display number on Display_Number_For_Table_One_Based=2. Change to 3 to denote the third display monitor. Save when complete.

Q11. WHAT IS THE BVI SHUTDOWN PROCEDURE?

A: To shut down the BVI system, click the "Shutdown BVI Software" button located in the top-right corner of the Table Manager (see Figure 9).

Figure 9 Shutdown BVI Software

Q12. WHAT IS VTC?

A: VTC stands for "Video Teleconference" and allows the BVI user to collaborate with other BVI instances. This application displays a table for all users in collaboration alongside a live chat feed and video streams from webcams at each BVI instance.

Q13. DO ALL BVI COMPUTERS/ MODALITIES NEED TO BE ON THE SAME NETWORK?

A: For standard collaboration, BVI computers and modalities need to be on the same network. Using a coturn server, users can be on different networks and work in collaboration.

Q14. CAN BVI RUN WITHOUT INTERNET CONNECTION?

A: Standalone BVI computers can run without internet connection. However, if the computer is not connected to the internet, then certain functionalities, such as downloading terrain templates, displaying Bing imagery, USGS imagery, connecting to external services, and live NCEP weather layer data, will not be available.

Q15. WHAT IS THE DIFFERENCE BETWEEN A TERRAIN TEMPLATE (2D TERRAIN) AND 3D TERRAINS?

A: 2D terrains are georeferenced map images that depict the scenario as an overhead view. This is displayed on MTP, WTP planning mode, and the Floor Projection/Sand Table. 3D terrains allow the user to view the scenario in three-dimensional space via the AR, VR, and WTP modalities.

Q16. HOW DO I IMPORT WEATHER DATA?

A: In the BVI Table Manager browser window click Table > Import Weather > Retrieve Weather Data, select the weather service, start and end dates, layers, and playback. Once your selections have been made, click "Retrieve" for the data to be shown in the scenario.

You can control the weather layers by returning to Table Manager and clicking Table > Layer Management. Alternatively, you can display your weather data by clicking "Import Weather Data from File" instead of "Retrieve Weather Data.".

For instructions using the Weather Settings, review section 2.3.9.3 in the BVI User Instructions.

Q17. WHAT IS DATA VISUALIZATION AND HOW DO I ENABLE IT?

A: Data Visualization is an added software interface to import different types of data to be processed and visualized (e.g., CSV, xml, etc.). It is a capability to display data using different visualization types, which include color maps, circles, pie charts, stacked columns, regions, etc. The data used is translated from information such as spreadsheets, weather data, or topography. To enable Data Visualization, refer to the *BVI User Manual section 2.2.7*.

Q18. SHOULD I USE MOBILE TACTICAL PLANNER OR WEB TACTICAL PLANNER?

A: Each tactical planner modality has unique capabilities.

The Mobile Tactical Planner (MTP) capabilities include:

- Light of Sight (LOS)
- Range Bearing Tool
- Mortar request
- Creating routes
- Air defense rings
- Rotate model orientation
- Dome and cone creation

Some of the Web Tactical Planner (WTP) capabilities include:

- 3D viewer for an alternative perspective of the map
- 3D models
- View 3D geometries (Cones/Domes)
- Speech to sketch interface

Using both tactical planners will allow the user to have full access to scenario creation.

Q19. WHAT SIMULATION PROTOCOLS ARE SUPPORTED IN BVI?

A: BVI uses two simulation protocols. Distributed Interactive Simulation (DIS) and Automatic Identification System (AIS).
BVI supports the DIS 7 standard which is an open-DIS library. For more information of DIS go to http://open-dis.org/.
AIS uses the NMEA 0183 standard. AIS message types include 1,2,3,5,18 and 24(A/B). For more information on AIS go to https://gpsd.gitlab.io/gpsd/AIVDM.html#_introduction.

DIS communications the following information that will be displayed in BVI:

- Symbol and model assignment
- Name
- Position Location Information (POI)
- An ID
- State/Status data (ex. Damage status)
- Fire and detonation Protocol Data Units (PDUs)

AIS communications the following information that will be displayed in BVI:

- Symbol and model assignment
- Name

- Position Location Information (POI)
- An ID
- Call Sign

2 TABLE MANAGER

Q20. WHAT IS THE BVI TABLE MANAGER?

A: The BVI Table Manager is a desktop application that governs the core applications that compose the BVI system. It serves as the central hub for BVI communication and state, and it provides interfaces to start/stop other BVI services and locally hosted applications. The Table Manager includes a browser-based user interface used to control a variety of BVI functionality including:

- Importing, Exporting, Creating and Loading terrain templates
- Importing, Exporting, and Loading scenarios
- Importing, Exporting, and Controlling layers
- Clearing the scenario
- Adjusting interop settings
- Importing data visualization
- Initiating and controlling collaboration.

Q21. HOW DO I CREATE A NEW TERRAIN TEMPLATE?

A: Navigate to the terrains tab within the BVI Table Manager (localhost:9080) and click on **Create new terrain template**. Terrain templates can be created from several sources and methods, including Google Maps, USGS, or uploading an image.

Q22. HOW DO I CREATE A SCENARIO?

A: A scenario can be created using the Web Tactical Planner or Mobile Tactical Planner.

1. Load a terrain template
2. Add tactical symbols and graphics
3. Save the scenario. The saved scenario will now show up in the scenarios list.

For more detailed instructions on how to create a scenario, refer to the BVI_User_Instructions.pdf document.

Q23. WHAT ARE LAYERS AND HOW DO I CREATE THEM?

A: Layers are a hierarchal grouping of entities, geometries, and graphics in a scenario. Layer visibility and opacity can be toggled in both the Table Manager UI and Web Tactical Planner.

To create a layer, follow these steps:

1. In WTP or MTP select the layer management icon 
2. To create a new layer, press the plus button 
3. Name the layer ().

Note: *The first layer added will be assigned as the parent and additional layers can be assigned as child layers under the parent.*

4. Create a new unit, or select an existing unit that you would like to assign to a layer
5. At the bottom of the create symbol or edit symbol pages, assign the unit to the desired layer

Note: The Table Manger can toggle layer visibility, adjust opacity, and export/import layers.

Review section 2.4.6.2 of the BVI User Instructions for additional directions on child layers and assigning symbols, graphics, and tactical geometries.

Q24. CAN SCENARIOS AND TERRAINS BE EXPORTED?

A: The user can export a saved terrain or scenario. For both scenarios and terrains, the export button  is found in Table Manager. Terrains will always export as Zip files, however scenarios can be exported as Zip, MSDL, KML, KMZ, or GeoJSON files. Scenarios can also be downloaded in WTP and MTP by selecting the terrain map icon  , followed by the share scenario button. WTP and MTP will always download scenarios as a Zip file. Copy these files onto a flash drive so it may be downloaded onto the desired computer.

Q25. CAN SCENARIOS AND TERRAINS BE IMPORTED TO OTHER COMPUTERS RUNNING BVI?

A: The user can import an exported terrain or scenario to another computer running BVI. For both scenarios and terrains, there is an import feature located within Table Manager. Select the Import Terrain or Import Scenario buttons on either the terrain or scenario tabs and choose the desired file to import. The terrain/scenario can be seen within the list of other terrains/scenarios in Table Manager.

Q26. CAN LAYERS BE EXPORTED AND IMPORTED ONTO OTHER COMPUTERS RUNNING BVI?

A: Layers that have been exported can be imported on other computers.

To export and import a layer, follow these steps:

1. When a scenario is loaded that has layers, access the table manager <locahost:9080>
2. Select the Table dropdown.
3. Select Layer Management.
4. Export the desired layer by selecting the export icon 
5. Save the exported layer on the secondary computer.
6. Load a terrain/scenario that has the same bounds as step 1.
7. Within Table Manager, select the Table dropdown.
8. Select import Layer.
9. Select choose file and upload the layer that was saved in step 5.

Q27. WHAT IS BVI COLLABORATION?

A: Collaboration is a method by which two or more instances of Ares can connect with each other to view and edit the same scenario. When one of the computers makes changes to a scenario, or chooses a different scenario, those changes will be displayed in all collaborating instances of BVI.

Q28. HOW DO I ENTER COLLABORATION?

A: Collaboration can be initiated through the Table Manager. On the drop downs at the top row of Table Manager, click Table, Collaboration and select which devices will be invited. To select a table, highlight one of the available tables and press the right arrow. Once the selection is made, the invited device must accept the collaboration request by clicking the prompt that will appear on their Table Manager.

1. Start BVI on more than one computer connected to the same network
2. In the Table Manager click Table and select Collaborate
3. Under Available Tables select the desired device and click the right arrow putting the device into the Selected Tables section
4. Click Start Collaboration and accept the invite from the second device through that computers Table Manager

Q29. CAN A USER COLLABORATE ON SEPARATE NETWORKS?

A: For remote collaboration to work, a TURN server with a public facing IP needs to be available. A Traversal Using Relays around Network Address Translation (NAT) (TURN) server provides a service for relaying network traffic when direct socket connections are not possible between clients. BVI has tested with and can use the open-source project coturn (https://github.com/coturn/coturn). The server should be publicly accessible and run using port 3478. The public IP for the TURN server will need to be added to the table manager configuration (env.yml). It also may be necessary to create firewall rules to allow UDP and TCP ports 3478 as well as UDP port range 65435-65535 through.

Q30. HOW MANY BVI SYSTEMS CAN COLLABORATE AT ONCE?

A: The limit of collaborating BVI systems (e.g., Floor, Sand Table, VR/AR) is four. There is no limit to devices (e.g., tablets, HMDs) which can be connected to a single Table Manager in a BVI system.

3 MOBILE TACTICAL PLANNER (MTP)

Q31. WHAT IS MTP?

A: The Mobile Tactical Planner (MTP) is an Android-based application used in conjunction with all BVI modalities (e.g., sand table, floor projection, AR, and VR). See Figure 10 for an image of the MTP.

MTP capabilities overview:

- Terrain Template creation
- Scenario creation and control
- Display of 2D maps
- Pan/Zoom 2D maps
- Scenario Layer creation and control
- Scenario Phase creation and control
- Generate basic mortar fire and range rings
- Display Line of Sight (LOS) features
- Range/Bearing tool for local displayed only
- Used standalone or with other BVI modalities

MTP technical overview:

- Platform/OS: Android mobile devices
- No commercial licenses required
- Leverages open-source libraries (e.g., OpenStreetMap)

Figure 10 MTP

Q32. WHAT ARE THE TABLET SYSTEM REQUIREMENTS?

A: Any tablet running Android version 6.0 and up can run MTP.

Q33. WHAT SCENARIO FUNCTIONALITY IS INCLUDED WITH THE MTP?

A: MTP features include:

- Create, Delete, and Control Visualization Layers
- Create, Update, and Delete MIL-STD-2525(B, C, D) tactical symbols and graphics within a Scenario
- Create, Update, and Delete tactical geometry including circles, lines, polygons, dome, spheres and text within a Scenario
- Move Scenario objects
- Insert text and adjust the font color, size, rotation, and position
- Toggle LOS on and off
- Request mortar strikes
- Display range bearings and distance between points
- Creating cones, domes, and spheres
- Add air defense
- Create custom icons
- Create, manage, and display scenario phases

Q34. HOW DO I DOWNLOAD AND INSTALL THE MTP SOFTWARE?

A: On the Android tablet, access table manager by adding the BVI computer's IP Address into the address bar, followed by "**:9080**" (e.g., ***http://192.168.1.10:9080***). A download link will appear on the page labeled "Tactical Planner Android APK".

For more detailed instructions, please refer to Section 2.4.1 of the BVI_Installation_Configuration_Instructions.pdf document.

Q35. WHAT IS AN ENTITY?

A: An entity is an object that can be placed anywhere on the map. Entities can be displayed as symbols and can have an assigned name and 3D model. Entities added to a scenario can be selected through the 'Entity List' located on the right settings bar in WTP.

Q36. WHAT IS A SCENARIO OBJECT?

A: A scenario object is anything that has been added to a scenario including symbols, graphics, and geometries. The list of all scenario objects added to a scenario can be seen using the link: http://localhost:9080/services/table/scenario/objects

Q37. HOW DO I SAVE A SCENARIO?

A: A scenario can be saved by clicking the terrain map icon (), then clicking **Save Scenario**. Note that this will overwrite the loaded scenario.

Q38. WHAT IS LINE OF SIGHT (LOS) AND HOW DO I ENABLE IT?

A: Line of Sight (LOS) allows the user to visualize possible lines of sight from an entity using either height data from a file, or streamed sand height data from the BVI Sand Table.

Using the **Eye** icon () on the MTP toolbar, either select **Fan** to enable LOS based on a data file, or **Area Intervisibility** to enable LOS based on sand heights.

Q39. HOW DO I CREATE ENTITIES IN MTP?

A: In the MTP, on the green toolbar, click the 'Add' () icon and select **Create Symbol**. Enter parameters for the unit including model, affiliation, and symbol. Created units can be copied for quick duplication by selecting the unit, then tapping the copy symbol on the top green bar  .

Q40. HOW DO I ACCESS MORTAR REQUESTS IN MTP?

A: To access mortar request, follow these steps:

1. Create a mortar unit with the correct symbol and model
2. Select the unit once its saved and open the green bar on the right side of the screen labeled **AWE Simulation** by swiping open to the left
3. Input the desired **Azimuth**, **Elevation**, and **Munition**
4. Select the play button which will show a fire line and detonation of the munition

4 BVI SAND TABLE

Q41. WHAT IS THE SAND TABLE SYSTEM?

A: The Sand Table system is composed of a waist-heigh sandbox, filled with dustless sand, and augmenting electronics. By connecting low-cost, commercially available technologies such as a projector, a depth sensor, a TV, and a computer, users can project dynamic contour lines and planning scenarios directly onto the surface of the sand. The depth sensor is used detect sand heights. This height data is used both to generate and display dynamic contour lines, as well as to morph any map image on the sand.

Sand table capabilities overview:

- Traditional sand table augmented with low-cost commercial off-the-self (COTS) technology (e.g., projector, TV, depth sensor, computer)
- Supports planning, rehearsals, training, briefings.
- Enables terrain model construction.
- Display 2D map with units and tactical graphics.
- Used with Tactical Planning app to create and interact with units and tactical graphics.
- Display OWT terrains on 3D viewer improves situational awareness.
- Pan/Zoom large area terrains.
- Ingest and display air and ground entities on 2D map and 3D viewer.
- Can be used with MR device to
- Visualize 3D entities and objects on 2D map.
- Interact with units and tactical graphics.

Sand table technical overview:

- Table augmented with PC, large TV, projector, depth sensor, VTC camera.
- Platform/OS: Windows 10 desktop PC/Laptop.
- No commercial licenses required.

Q42. WHAT ARE THE COMPUTER REQUIREMENTS FOR THE SAND TABLE?

A: Please refer to section 1.2 of the BVI Installation and Configuration Instructions for the computer requirements.

Q43. WHAT IS HYPSOMETRIC VIEW?

A: Hypsometric view is a view of the Sand Table that uses colors to denote different sand elevation heights. The colors can be edited to suit the users' preference.

Q44. HOW DO I DISPLAY HYPSOMETRIC VIEW?

A: When a terrain template or scenario is loaded, it replaces the current hypsometric view in the Sand Table projection. To display the hypsometric view, reduce the map alpha by going in the table manager and navigating to **Table → Settings → Map**. Alternatively, clear the current scenario by clicking **Clear Map** in the Table Manager. Note that this option removes the scenario from view and reverts all adjustments before saving it.

Q45. HOW DO I CHANGE HYPSOMETRIC COLORS?

A: To change hypsometric colors,

1. Under **Table → Settings → Hypsometric**, the user can change colors according to their preference via pre-sets or adjusting each color individually.

Q46. WHAT ARE HEIGHT LABELS?

A: Height labels are indicators that point out the highest and lowest point in the Sand Table.

Q47. HOW DO I REPLENISH THE SAND TABLE SAND?

A: The Sand Table uses special dustless craft sand. Our recommendation can be found here:

https://sandartsupplies.com/white-colored-sand/

Q48. HOW DO I CALIBRATE THE SAND TABLE?

A: Please refer to the calibration instructions provided with the software for an in-depth, step-by-step guide on how to calibrate the Sand Table.

Q49. WHAT IS A GUIDED BUILD?

A: A guided build helps the user recreate a saved snapshot of sand heights from a previous state. When attempting to reshape the sand from a saved state, the Sand Table projection will use red and blue areas to indicate where to take sand from, and where to place it, respectively.

Q50. HOW DO I SAVE A GUIDED BUILD TEMPLATE?

A: When starting a guided build on a terrain, click **Capture Sand Heights** to take a snapshot of the current Sand Table configuration. This snapshot is saved as data to the terrain template, which can be used when performing future guided builds on the terrain.

5 FLOOR PROJECTION

Q51. WHAT IS THE BVI FLOOR PROJECTION SYSTEM?

A: The BVI Floor Projection modality (see Figure 11) displays maps and mission overlays directly onto the floor and is most used to facilitate large group briefings.

Floor Projection system capabilities:

- Uses MTP or WTP as the user interface
- Supports planning, rehearsals, training, briefings.
- Display 2D map with units and tactical graphics.
- Visualize 3D entities and objects on 3D terrain.
- Displays 3D topography using BVI Scenario Pointer

Figure 11 Floor Projection (16'x9')

Q52. WHAT ARE THE COMPUTER REQUIREMENTS FOR THE FLOOR PROJECTION PC?

A: Please refer to section 1.2 of the BVI Installation and Configuration Instructions for the computer requirements.

Q53. HOW LARGE CAN THE FLOOR PROJECTION BE?

A: The BVI software does not have a limit on the size of the display but requires a 16:9 aspect ratio. The largest tested BVI floor was 50’x28’ in Conmy Hall at Ft Myer, VA (see Figure 12). While the BVI software does not have a limit on the size of the display, there is a limit based on the display hardware (i.e., projectors). The standard floor projection uses two projectors to display an area of 16’x9’. Using eight projectors, the floor system can scale to 25’x’16’, by area the projected image is 2.8 times larger.

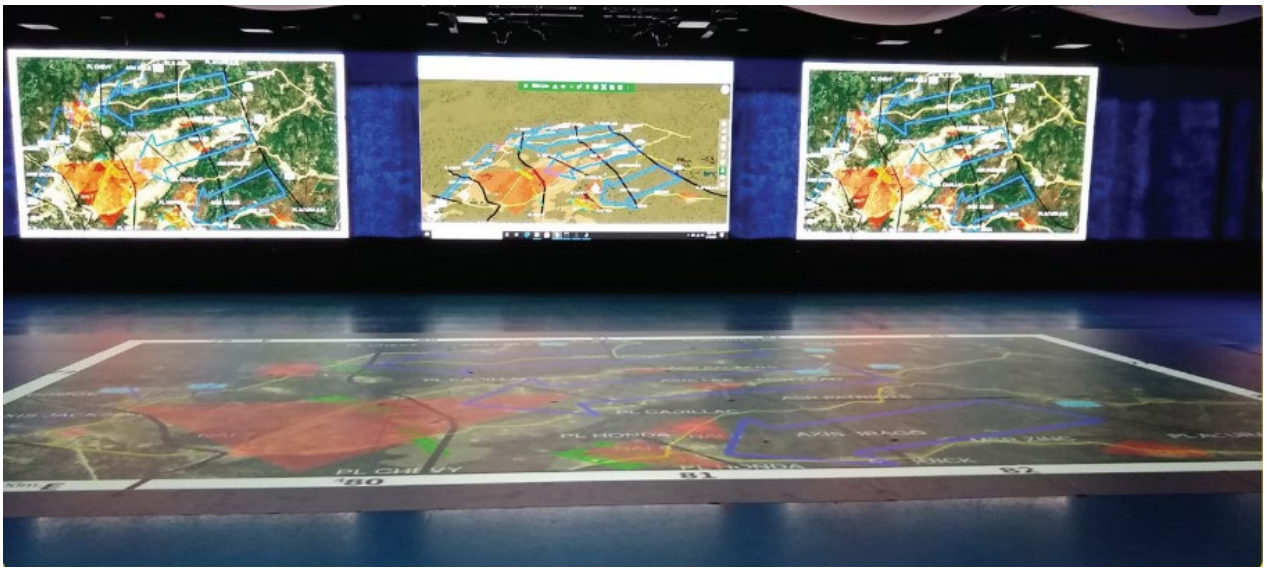

Figure 12 Conmy Hall Ft Myer, VA - 50'x28' Floor Projection

Q54. WHY DOES THE FLOOR PROJECTION USE MULTIPLE PROJECTORS?

A: The Floor Projection uses multiple projectors to prevent the user's shadow from obstructing the image on the floor. This is done by projecting two images of the battlespace on top of each other using display-blending software to ensure the projected images are synchronized.

Q55. THE TV STAND WAS BUMPED, IS THERE A QUICK CALIBRATION METHOD?

A: If the TV stand supporting the projector was bumped and the projected image is not clear there is a quick calibration solution. From the desktop select the ReCalibrate icon. 

Ensure the floor is clear of people/hardware during the ReCalibration process and the room is dim.

Q56. WHAT IS THE BVI SCENARIO POINTER?

A: The BVI Scenario Pointer is an application that uses the HTC Vive wand's controller position and angle relative to the Floor Projection's 2D map and displays the viewpoint on the television monitors, showcasing the 3D environment. This allows the user to explore the 2D scenario in a 3D space, with the Vive wand acting as a first-person camera that can move through the scenario.

Q57. WHEN SELECTING THE TRIGGER ON THE SCENARIO POINTER, THE CROSSHAIR DOES NOT GO TO THE DESIRED LOCATION; HOW DO I CALIBRATE MY WAND?

A: To calibrate the wand so the crosshair goes to the desired location,

1. Double click the **ARES Scenario Pointer <version>** shortcut on the PC's Desktop.
2. Select Enable Table Setup

3. Follow the on-screen steps for calibration by placing the HTC Vive wand at the top left, bottom left, bottom right, and center of the floor projection and pulling the Vive wand's trigger at each location.
4. Pull the trigger and validate the pointer goes to the desired location. If it does not, repeat steps 1-3, ensuring the wand is in view of the base stations.

6 WEB TACTICAL PLANNER (WTP)

Q58. WHAT IS WTP?

A: The Web Tactical Planner (WTP) is a web-based version of the MTP, which can be run in a web browser on a desktop or laptop (see Figure 13). The WTP has a similar layout to the Mobile Tactical Planner application, as well as having many of the same capabilities. In addition to the 2D top-down view used for planning, the WTP also features a 3D view to provide an alternative perspective of the scenario.

WTP capabilities overview:

- Web based tactical planning tool
- Author scenarios, add tactical symbols/graphics (MIL-STD-2525), and leverage models such as artillery, route planning, etc.
- Tactical Planner client app runs in a browser
- Provides 2D or 3D view of the battlespace
- 3D viewer displays OWT terrains
- Pan/Zoom large area maps and terrains
- Interact with units and tactical graphics
- Ingest and display symbology and 3D air and ground entities

WTP technical overview:

- Client Platform: Chrome
- Server Platform/OS: Windows 10, desktop PC/laptop
- Leverages GOTS visualization tool extended for Ares
- No commercial licenses required
- Plug-in architecture for extension of new tools and capabilities
- Leverages open-source libraries (e.g., OSG and QT)

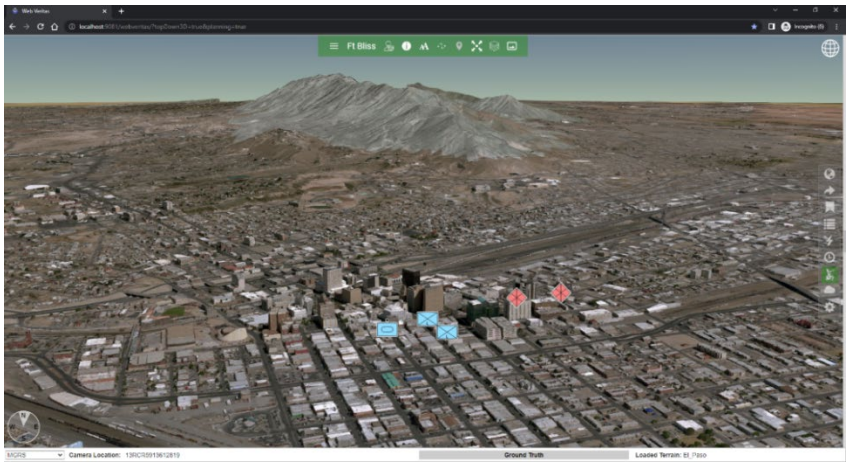

Figure 13 WTP

Q59. WHAT ARE THE COMPUTER REQUIREMENTS FOR WTP?

A: The WTP requires the latest version of Google Chrome. Microsoft Edge and Mozilla Firefox are currently not supported. The minimum hardware specifications are listed below.

	Hardware Specifications
Environment	64-bit processor and operating system
CPU	4-core @ 3.6GHz
RAM	8GB
GPU	Dedicated GPU with 2GB VRAM
SSD	M.2 1TB PCIe NVMe Class 40
OS	Windows 10 Pro

Q60. HOW DO I START WTP?

A: To Start WTP follow the steps below:

1. Ensure the Web Veritas server application is running.
    a. Access the Table Manager (localhost:9080)
    b. Click Table > Applications
    c. Next to Web Veritas ensure 'Start' is selected and Active status displays 'Yes'
2. Above Web Veritas there is Web Tactical Planner, select 'Start' to launch WTP in 2D planning mode
3. Alternatively, WTP can be accessed by opening a tab in chrome and entering http://localhost:9081/webveritas/?topDown3D=true&planning=true (It is recommended to bookmark Table Manager and WTP)

Q61. WHAT ARE THE CONTROLS TO NAVIGATE WTP?

A: WASD controls are implemented in the WTP.

- **A** and **D** to move left and right respectively
- **W** and **S** to move forward and backward respectively
- **Q** and **Z** are used to move vertically

These controls are used for both 2D and 3D however, the mouse can be used in conjunction to navigate the terrains.

Q62. HOW DO I SWITCH FROM 2D TO 3D MODE AND VICE VERSA?

A: On the upper-right corner of WTP, there is either a 2D grid icon  or a 3D globe icon  . Clicking the icons will toggle the view from the 2D mode to the 3D mode. When the icon is in the shape of a sphere, WTP is in 3D view. When the icon is in the shape of a rectangle, WTP is in 2D view.

Q63. HOW DO I CREATE A SCENARIO?

A: To create a scenario:

1. Have the desired template already created or create a template via Table Manager
2. In WTP, select the "Scenario" button from the green toolbar.
3. Select "New Scenario"
4. Enter the scenario name, description, and select the terrain template from step 1.
5. Click "Save" to create a new scenario.

Q64. HOW DO I CREATE ENTITIES IN WTP?

A: Click add, represented by the teardrop + icon on the top green bar, and select the desired parameters for the unit that needs to be created. WTP must be in the 2D mode to add units. Once the unit appears on the map, it can be selected and moved around the scenario freely.

1. Select add represented by the  icon located in the green ARES toolbar (must be in 2D mode)
2. Click 'Create Symbol' and input all desired parameters including Name, Model, and Symbol
3. Click Create and the model will be created in the middle of the screen
4. Move the created symbol to a location on the map

Q65. HOW DO I USE SPEECH AND SKETCH INTERFACE (SSI)?

A: SSI allows the user to add tactical symbols and graphics in WTP by using a combination of freehand drawings on a touchscreen or monitor along with voice commands. To use this feature, ensure a microphone is connected to the computer running WTP and has permissions allowed for the web page of WTP.

Once the permissions are allowed for the microphone, follow these steps to use the feature:

1. Toggle the "Toggle Sketch Thru Plan"  in the toolbar.
2. Sketch the desired symbol on the touchscreen or monitor using your finger, stylus, or computer mouse. Say the affiliation of the unit followed by the name of the symbol or graphic.

For example: to create a friendly counterattack sketch, you would draw a line followed by saying "friendly counterattack".

Note: Internet connectivity is required to use the SSI capability

To see a full list of available symbols, graphics, and accompanying sketches, visit *https://www.hyssos.com/plan-canvas.*

7 BVI VR/AR

Q66. WHAT IS BVI XR (EXTENDED REALITY)?

A: XR is a catch-all term for augmented reality (AR), virtual reality (VR), and mixed reality (MR). BVI XR is BVI's virtual and augmented reality (VR/AR) application. The name of the application is ARES XR. This application runs on VR and AR headsets and places the scenario onto a planning table in 3D space, allowing the user to view the scenario from all sides, pan and zoom the terrain, adjust scenario object positions, and more. With virtual reality (VR) devices such as the HTC Vive, Quest, and Quest Pro, 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 14 and Figure 15). Using the HoloLens 2, users can use Augmented Reality (AR) to display a 3D terrain hologram projection onto real-world objects and spaces (see Figure 16 and Figure 17). The HoloLens 2 can be used in conjunction with the BVI Floor Projection system to project 3D view of the scenario (including 3D buildings, terrains, models) on top of the physical floor projection. Users will have a better understanding of terrain topology with the augmented scenario above the 2D Floor Projection.

For a full list of ARES XR capabilities, refer to the BVI_User_Instructions.pdf document.

Figure 14 VR - HTC Vive

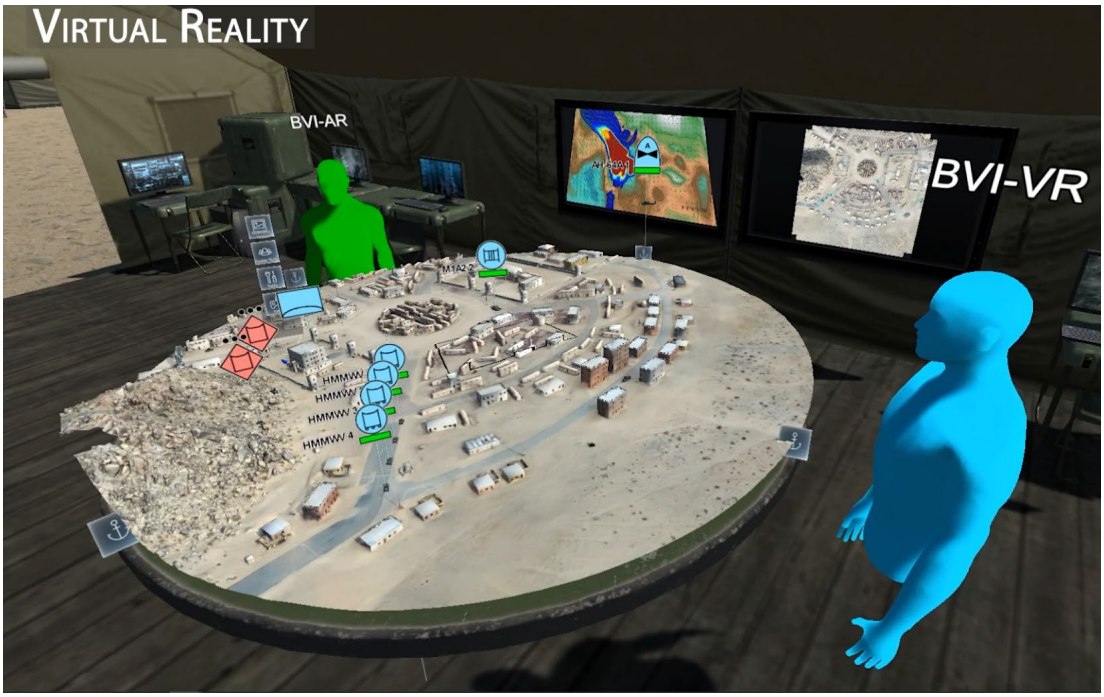

Figure 15 VR - Operator Point of View

Figure 16 AR - HoloLens 2

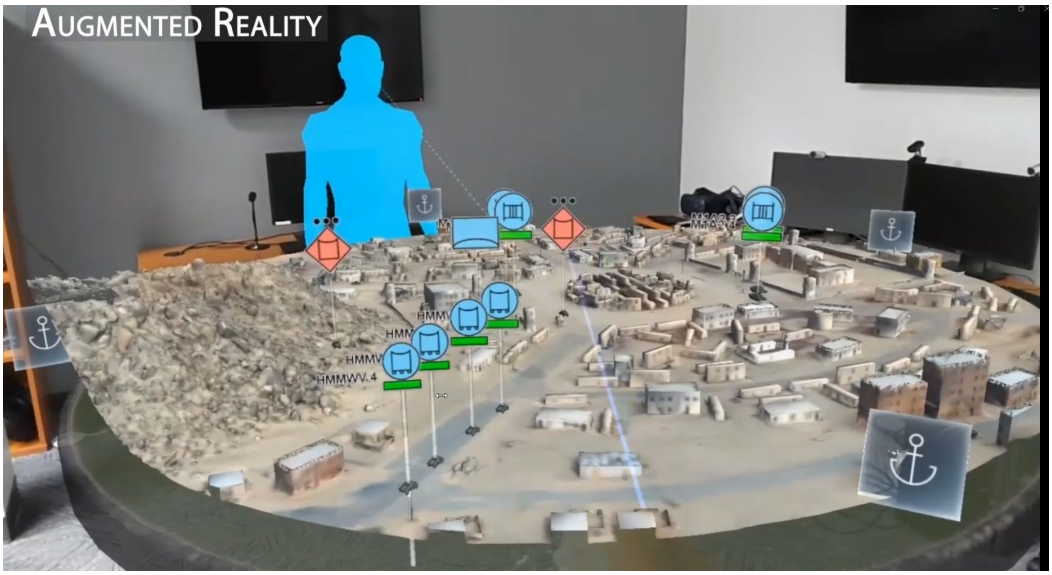

Figure 17 AR - Operator Point of View

Q67. HOW DO I LAUNCH THE ARES XR APPLICATION?

A: To launch ARES XR for the HTC VIVE,

1. Double-click the **ARES XR <version>** shortcut located on the PC Desktop.
2. Verify that SteamVR is paired to the headset, the controller, and the 2 base stations.
3. Using the HTC VIVE headset, locate and observe the table in the center of the environment.

Q68. HOW DO I CHANGE THE DIRECTION THE TABLE OPENS?

A: To change the location the virtual Sand Table opens:

1. Place the HTC Vive headset on the floor facing the desired direction the virtual Sand Table will open
2. Open the Steam VR application.
3. Select the menu in the top left.
4. Select Room Setup.
5. Select Standing Only and then Next.
6. Select Calibrate Center, press next once this is complete.
7. Select Calibrate Floor, and press next once complete.
8. Select Done
9. Start the XR application, the virtual Sand Table will start in the desired direction.

Q69. WHAT ARE THE CONTROLS FOR NAVIGATING IN THE 3D VIRTUAL SPACE IN TABLE VIEW?

A: The controls for navigating the 3D virtual space differ by modality.

Refer to the *BVI User Manual section 2.5.2.4* for the controls using the HTC Vive.

Q70. WHAT IS IMMERSIVE MODE?

A: Immersive mode is a setting in XR that allows the user to fly above the terrain in full view, rather than viewing the terrain on a table. The immersive mode can be enabled by clicking the anchor icon (see Figure 18) then selecting the **Table** menu and clicking **Immersive** (see Figure 19). You can disable immersive mode by repeating the same steps. The immersive mode can only be enabled in VR devices (HTC Vive, Quest, Quest Pro) and the Windows XR application.

Figure 18 Anchor on ARES XR

Figure 19 Immersive mode in Table Tools

Q71. CAN I RUN IMMERSIVE MODE IN BVI AR (HOLOLENS2)?

A: Immersive mode cannot be enabled in the BVI AR modality.

Q72. WHAT ARE THE CONTROLS FOR NAVIGATING VR IN IMMERSIVE MODE?

A: When using immersive mode in BVI VR, the user can press and hold the controller's touchpad in any direction to travel in that direction. Holding the trigger while traversing will increase the speed at which you travel, and the user travels faster when at higher altitudes. In addition, you can select the terrain with the trigger and pan and zoom the terrain as normal.

Q73. HOW DO I LOWER/RAISE THE VIRTUAL TABLE IN XR (AR/VR)?

A: In XR, select the **Anchor** icon → **Table** → **Table Position** (see Figure 20). While this setting is on, the user can grab the table by pressing and holding the rear trigger of the controller and raising/lower it or moving it to any desired position. When the table is in the desired position, the user can deselect the **Table Position**.

Figure 20 Adjust Table Position

Q74. HOW DO I CREATE ARC LINES?

A: Arc lines are created using an XR or AR modality. Created arced lines can be seen in WTP, XR, and AR modalities. To create arced lines:

1. Select the anchor icon.
2. Within Scenario Tools select the Geometries icon.
3. Select the Create Arc or Arc w/ Symbols icon (see Figure 21).

Figure 21 Create Arced Lines

Q75. HOW MANY PEOPLE CAN INTERACT IN AR/VR?

A: With the collaborative nature of BVI software, there is no software limit to the number of users or devices in a single session, though a degradation in performance and visualization may occur. For example, when 6 or more users are accessing the same table, FPS may go down and 3D representations of collaborators (avatars) may begin to clutter the scene. This can be mitigated by disabling other avatar visibility through the settings in Ares XR. Both AR and VR device can be used at the same time to interact and observe a scenario.

Q76. HOW CAN I REMOVE OTHER AVATARS IN XR?

A: Avatars can be removed from the **Avatar Tools** tab of the XR menu. Pointer and gaze can also be removed in this tab (see Figure 22).

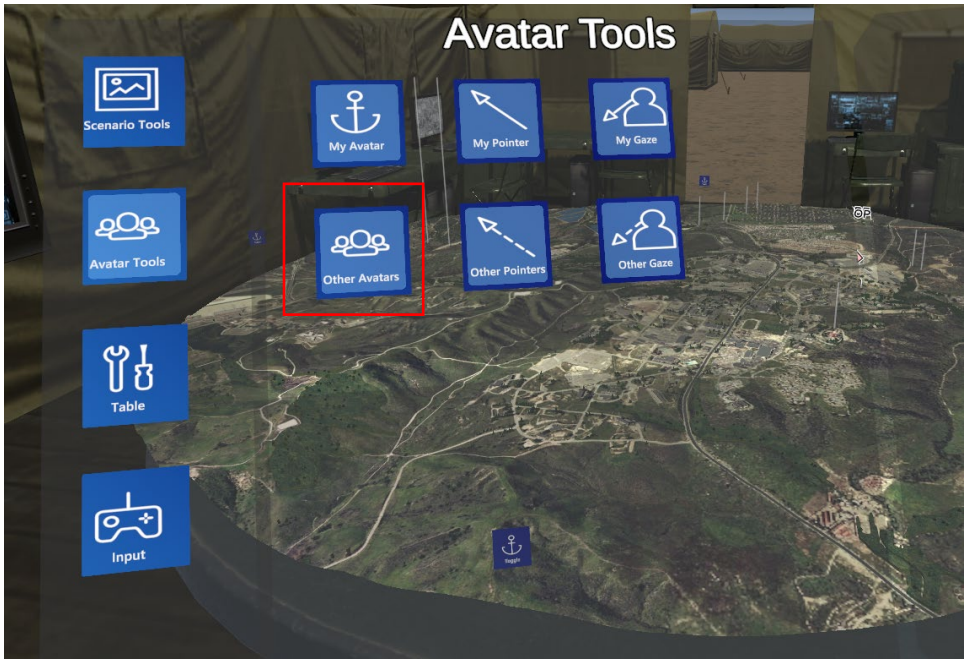

Figure 22 Avatar Tools Turn off Other Avatars

Q77. WHAT ARE THE COMPUTER REQUIREMENTS FOR ARES AR/VR?

A: Please refer to section 1.2 of the BVI Installation and Configuration Instructions for the computer requirements.

8 TROUBLESHOOTING

Q78. WHAT HAPPENS IF I JUST CLOSE THE BVI TERMINAL WINDOW/COMMAND PROMPT TO SHUT DOWN BVI?

A: There is an intermittent issue when directly closing the terminal window that results in BVI not being able to start again properly before restarting the computer. Using the "Shutdown BVI Software" button ensures a proper shutdown.

Q79. AFTER STARTING BVI, TERMINAL WINDOW DISPLAYS WAITING FOR RABBIT_MQ TO START AND WON'T PROGRESS?

A: If the BVI terminal window does not progress past rabbit_mq, restart your computer. After restarting the computer and starting the BVI build again.

Q80. WHAT SHOULD I DO IF TABLE MANAGER DOESN'T AUTOMATICALLY START WHEN RUNNING BVI?

A: Open the Chrome browser and type "localhost:9080" or <IP address of the computer:9080>. This will navigate you to the BVI Table Manager.

Q81. WHY DO I NOT SEE MY DIS ENTITIES FROM A CONNECTED SIMULATION ENGINE?

A: The simulation engine (e.g., VBS, VR Forces) and the BVI Computer need to be on the same subnet to ingest the DIS traffic. After confirming the two are on the same subnet, the Interop settings in the BVI Table Manager must be changed to ingest DIS from the simulation engine.

1. From the Table Manager interface, click **Interop** at the top, then click **Settings**.
2. Toggle DIS to 'Off' to enable editing.
3. Set the DIS Port to the port of the simulation engine.
4. Toggle DIS to 'On'.

Note: The DIS entities may have to be mapped to properly display in BVI, refer to section 2.7 Mapping DIS Traffic of the BVI Installation and Configuration Instructions for details.

Q82. WHY CAN'T MY TABLET FIND ANY TABLES?

A: Devices in collaboration need to be on the same network, otherwise the tablet will not detect the computer running BVI. Ensure that all devices are connected to the same network. Alternatively, use the manual process to find the table by navigating to the **Tables** tab, double-tapping the white background, and entering the IP address of the BVI computer. Another option is to reboot the tablet and the BVI PC to reset network configurations

Q83. MY SCENARIOS ARE NOT SHOWING UP IN MTP

A: If your scenarios are not displaying in MTP, attempt one of these methods:

Method 1:

1. Select the menu icon in the top left.
2. Click the **Tables** button followed by **Start.** This will display all the possible tables the MTP can connect to.
3. Select the desired table and press **Cast** in the top right of the tablet. The scenario being displayed from the computer running BVI will now display on the MTP.

Method 2:

1. Uninstall the BVI application from the device.
2. Open a Chrome browser and enter the IP address of the device running the BVI software followed by the port number (e.g., <1.2.3.4:9080>) in the search bar.
3. When the BVI Table Manager appears on the screen, select the **Tactical Planner Android APK** which will redownload the BVI application.
4. Open the application once it is downloaded.
5. Follow Method 1 above to display the desired scenario.

Q84. MY 3D TERRAINS ARE NOT SHOWING UP IN WTP OR ARES XR

A: If your 3D terrains are not showing up, ensure that they have been configured correctly. The default location for 3D terrains is "C:\ProgramData\ARES\terrain_databases\shared\".

Q85. WHY IS MY TERRAIN NOT SHOWING IN 3D?

A: A 3D terrain can only be visualized in WTP and ARES XR. Ensure those applications are running to view the 3D terrain. In WTP, the application defaults to 2D view, so be sure that the icon in the top-right of WTP is a globe, which denotes that the application is in 3D mode.

Q86. MY SCENARIOS ARE NOT SHOWING UP IN WTP

A: If your scenarios are not showing up in WTP, try restarting Web Veritas under Table ->Applications in Ares Table Manager, restart WTP, and reload the scenario. If this does not work, restart Ares and try again.

Q87. WHY DOES WEB TACTICAL PLANNER NOT START WHEN I PRESS IT FROM THE APPLICATIONS MENU?

A: The WTP loads in Chrome by default. If Chrome is not installed, Microsoft Edge can be used, and entering http://localhost:9081/webveritas/?topDown3D=true&planning=true as the URL

Q88. MY SCENARIOS ARE NOT SHOWING UP IN XR

A: If your scenarios are not showing up, verify that XR is connected to the correct IP in the BVI scenario configuration settings. If it is correctly configured, try reloading the scenario and restarting Ares XR.

Refer to section 2.5.2.1.3 of the BVI Installation and Configuration Instructions to ensure the XR device is connected correctly.

Q89. WHY DON'T MODELS APPEAR WHEN I TOGGLE MODEL ENTITIES IN XR?

A: This is most likely an issue regarding configuration. For model entities to show within Ares XR, models must first be configured on the BVI PC and in the BVI debug interface.

For more in-depth instructions on how to configure model entities, please refer to section 2.6.3 of the BVI Installation and Configuration Instructions.

Q90. WHY ARE MY VR HEADSET AND WAND NOT DETECTED BY THE SOFTWARE?

A: One of the main reasons why the wand stops operating abruptly is that it is not being recognized by the sensors. Ensure that no objects are interfering with the sensors' ability to see the wands. Make sure that the wands are properly paired with the Vive headset in Steam VR and that they are fully charged. Wands automatically pair to their respective Vive headset when powered on for the first time.

If, for any reason, the wands need to be repaired to the Vive headset, follow these instructions from the HTC support website Pairing the controllers with the headset (vive.com)

Q91. MY VIVE BASE STATION IS NOT REGISTERING MOVEMENT AND IS DISPLAYING A RED LED. WHAT SHOULD I DO?

A: If the base station is displaying a red LED light, HTC reports that the device has been physically damaged.

Q92. WHY IS ONLY ONE PROJECTOR DISPLAYING AN IMAGE ON THE FLOOR PROJECTION?

A: If only one projector is displaying an image disconnect and reconnect the HDMI cable in the computer. Also, ensure the HDMI source is correct. If this does not fix the issue open the display settings and ensure both projectors are being displayed. Repeat the steps if both projectors are not displayed in the display settings

Q93. WHY CAN I NOT VIEW THE WTP FROM ANOTHER DEVICE THAT'S NOT IN COLLABORATION?

A: To access the WTP from another device, the **clientConfig.json** must be edited to point to the desired device's IP address. The clientConfig is located in **C:\ProgramFiles\ARES\"Ares-build"\ webveritas\webapps\webveritas\WEB-INF\config**. Change every instance of "local host" to the IP

address of the computer running BVI.
Note: The two computers must be on the same network.

Q94. WHY DO THE SAND CONTOUR LINES NOT CHANGE WHEN THE SAND IS ADJUSTED?

A: The Xbox Kinect may need to be reset by unplugging and plugging in the power cable.

9 CONTACTS

Q95. WHO CAN I CONTACT FOR SUPPORT OR SUGGESTIONS?

A: For support inquires or suggestions please contact:

PROGRAM PM:
Charles R. Amburn charles.r.amburn.civ@army.mil

TECH SUPPORT:
Bryan Long bryan.a.long10.civ@army.mil