BATTLESPACE VISUALIZATION AND INTERACTION (BVI)

Technical Document

Abstract

Step-by-Step Guide for Setting Up BVI to Interact with VBS4 via a DIS Bridge over a Network.

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Table of Contents

Section 3 is the start of the troubleshooting section

Launching is the start of the step by step start guide, will be moved to be above troubleshooting section

1. Prerequisites:

1.1 Software and Tools

- VBS4 installed. Verify that all VBS4 systems are on the same VBS4 version number
- BVI software package (including ARES). Should be pre-installed on the system
- Erlang/OTP. When installing BVI, click this option.
- Head Mounted Display (HMD) device supported by VBS4. The SMPTK provides multiple Oculus headsets.

1.2 Network Configuration

1.2.1 Network setup and configuration

Explain how to set up the enclosed network for BVI/VBS4

Static IP configuration is recommended when using multiple devices on the same network.

1.2.2 Static IP configuration

Explain what a Static IP configuration is.

1.3 System Configuration:

Ensure ports 5672, 4321, and 9080 are open.

Open this link http://localhost:9080

1.4 ARES Configuration

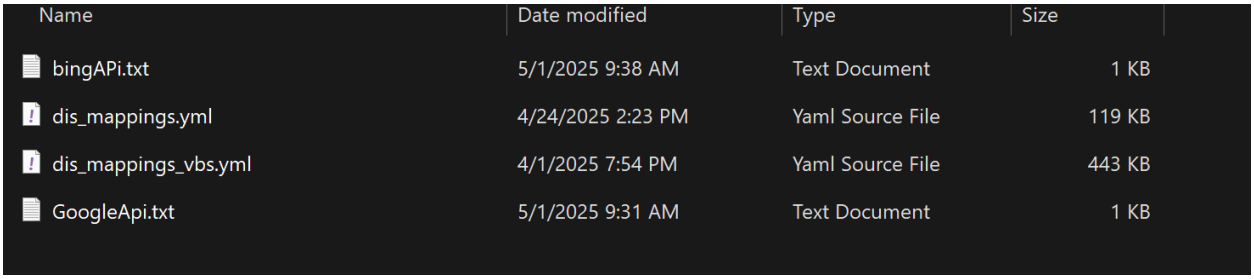
Run the Ares setup, make sure RabbitMQ is working and running

In the 'BVI_Files' folder, locate the 2 DIS MAPPINGS. yaml files

Along with the DIS mapping file, you will find the Bing and Google API files.

Ensure VBS4 entity mappings and BVI mappings files are placed in

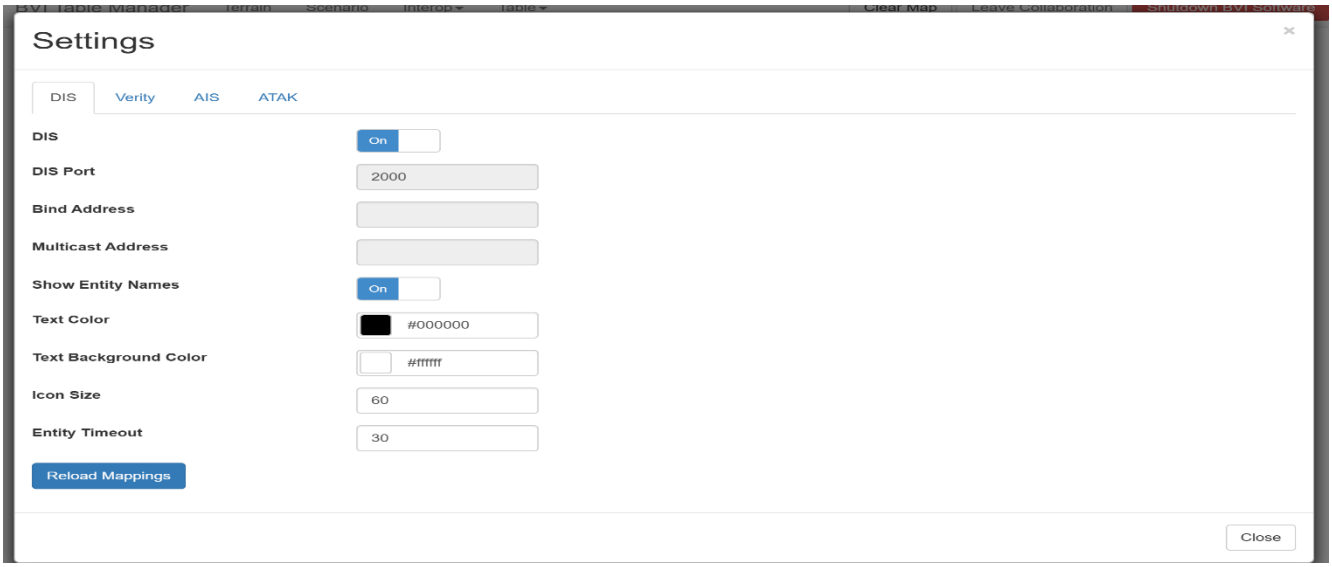
“C:\Program Files\ARES\ARES-dev-release-v0.9.4-c1d3950\ares.manager\config”



Name	Date modified	Type	Size
bingAPi.txt	5/1/2025 9:38 AM	Text Document	1 KB
dis_mappings.yml	4/24/2025 2:23 PM	Yaml Source File	119 KB
dis_mappings_vbs.yml	4/1/2025 7:54 PM	Yaml Source File	443 KB
GoogleApi.txt	5/1/2025 9:31 AM	Text Document	1 KB

Go to http://localhost:9080/ and configure these settings for DIS, ensuring the port is set to 2000 or matches the VBS4 gateway port.

1. Open the ‘Interop’ settings located at the top left corner
2. Change the port number



We need to add picture comments to explain each picture in the guide.

1.5 VBS4 Configuration

1.5.1 Configuring VBS4

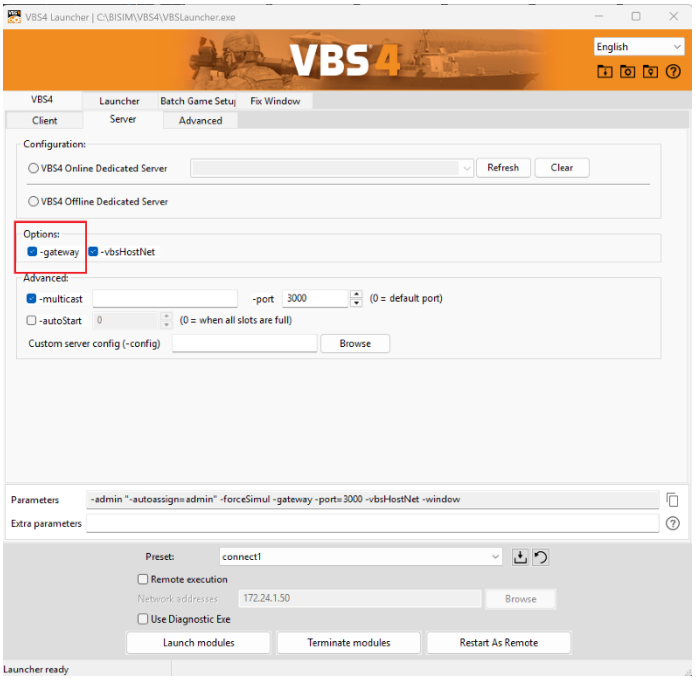
VBS4 uses DIS packets to send movement and entity data. The settings are configured in the following location:

C:\Bohemia Interactive Simulations\VBS4 24.1 YYMEA_General\Components\Gateway

Check and Update VBS4 Mappings (exported from Gateway)

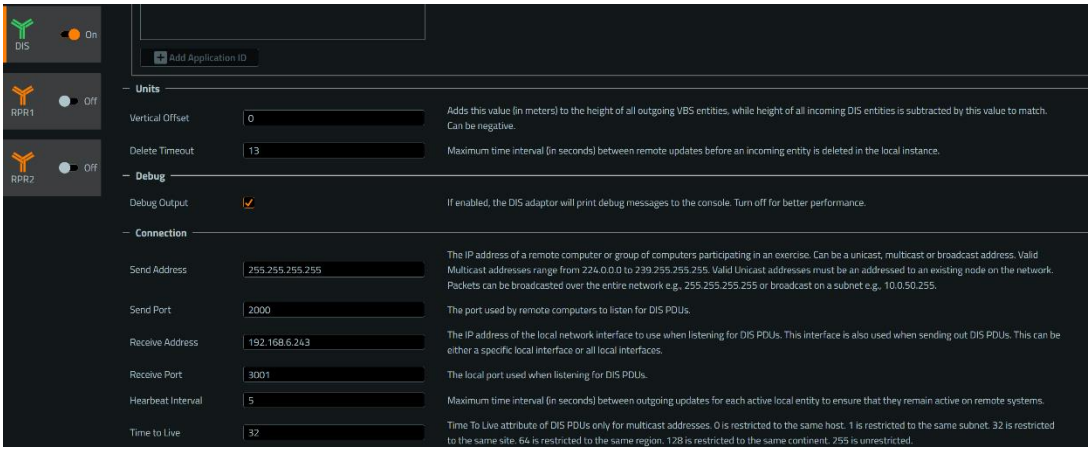
(see VBS4 Gateway UI doc for more information)

Before launching a scenario in VBS4, ensure that the '-gateway' option is enabled, and then run the scenario on the host to retrieve the gateway settings.



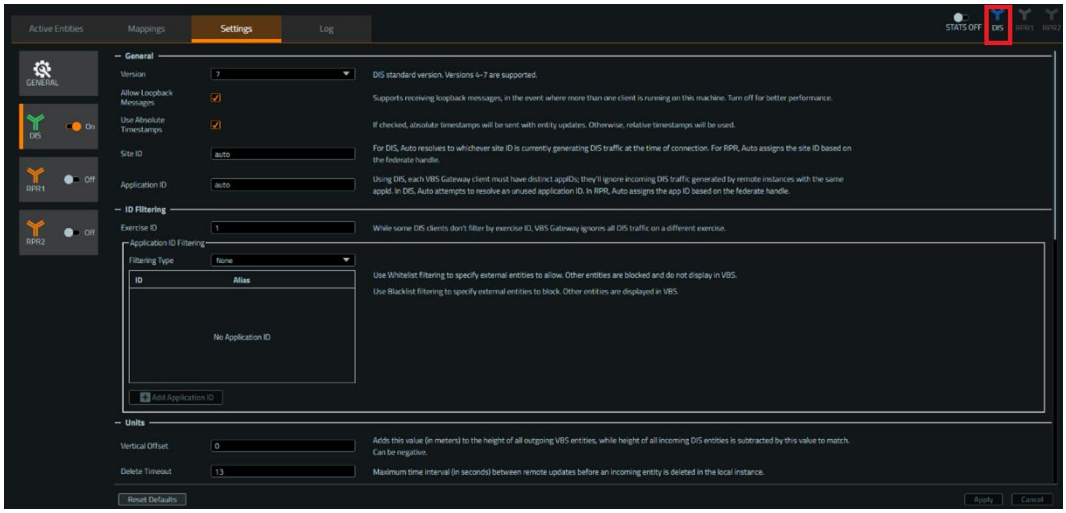
Locate VBS4 DIS Configuration (Editor → Tools → Show Gateway Gui

Make sure the port is set to 2000.

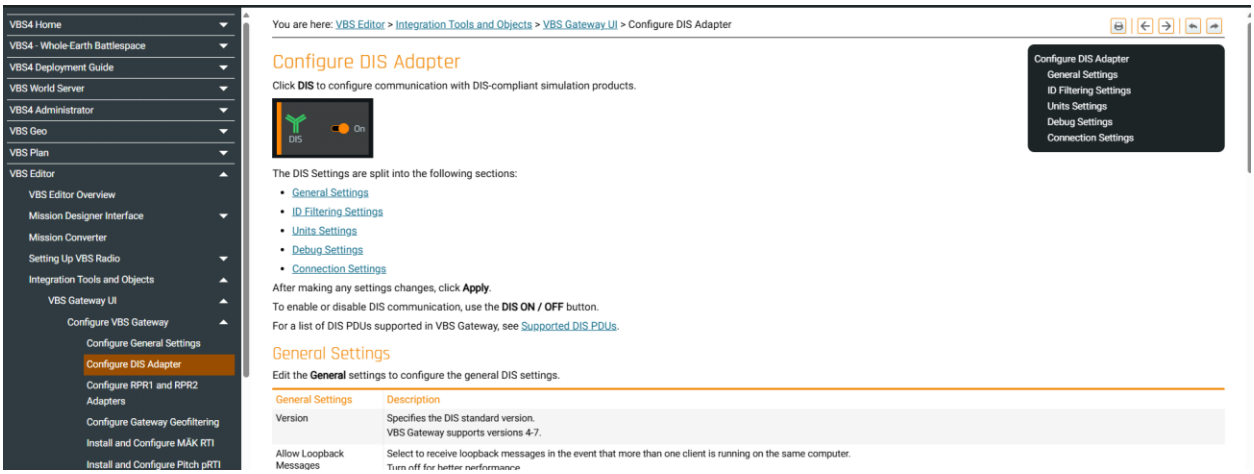


Success is indicated by visually seeing the DIS symbol illuminated in blue.

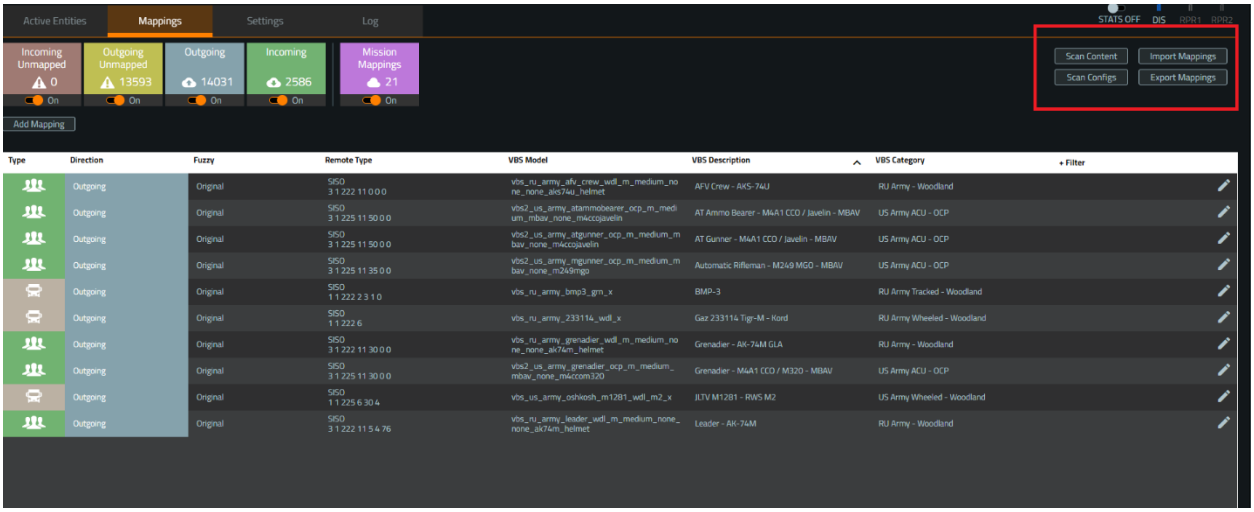
If this is what is being shown, you can skip to step 4.



1.5.2 Export Mappings from VBS4

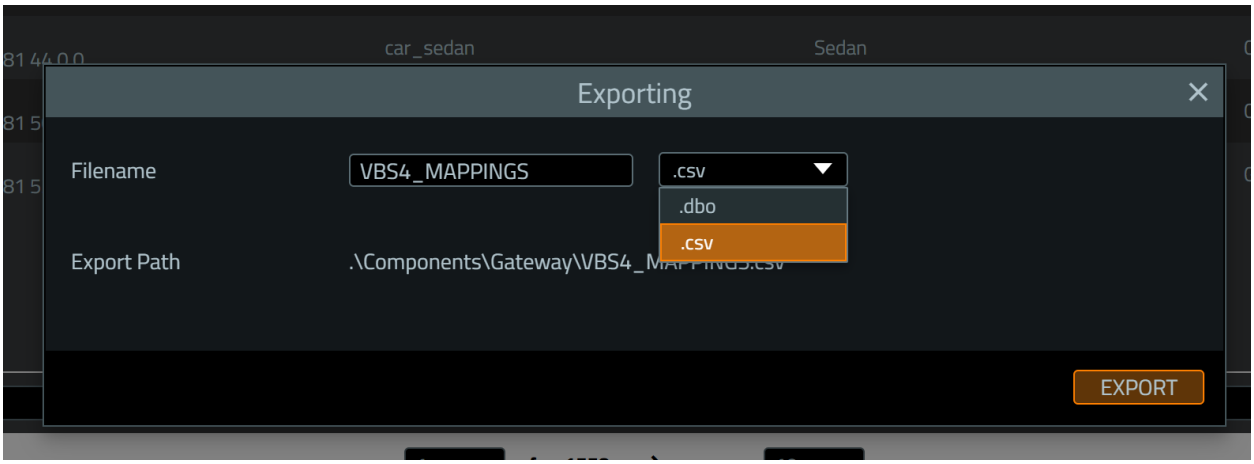


In the VBS4 Gateway Mappings tab section, you will find all the DIS Enums needed for mappings. In the top right corner, select ‘Export mappings’.



Ensure all required entities are mapped correctly.

When selecting exports, two options will be presented. Select export as CSV file (MS Excel file doc)



- **VBS4 Mapping File**: C:\Bohemia Interactive Simulations\VBS4 24.1 YYMEA_General\Components\Gateway\VBS4Mappings.csv
- **BVI Mapping File**: C:\Program Files\ARES\ARES-dev-release-v0.9.4-c1d3950\ares.manager\config\dis_mappings.yml
- **Python Script**: update_mappings.py (script exe should be provided in the folder with the DIS mappings)

2. **Run the Python Script.** Open Command Prompt (as Administrator), run the script:

update_mappings.py

3. **Verify Mapping Updates**

- Check ‘dis_mappings.yml’ to confirm updated mappings.
- Ensure VBS4Mappings.csv and ‘dis_mappings.yml’ match.
- Open Wireshark and filter for DIS packets.
- Check for correct entity types in network logs.

Ensure that the ‘DIS_Enumeration’ numbers match between VBS4 and ARES XR.

Modify as needed to match the expected mappings.

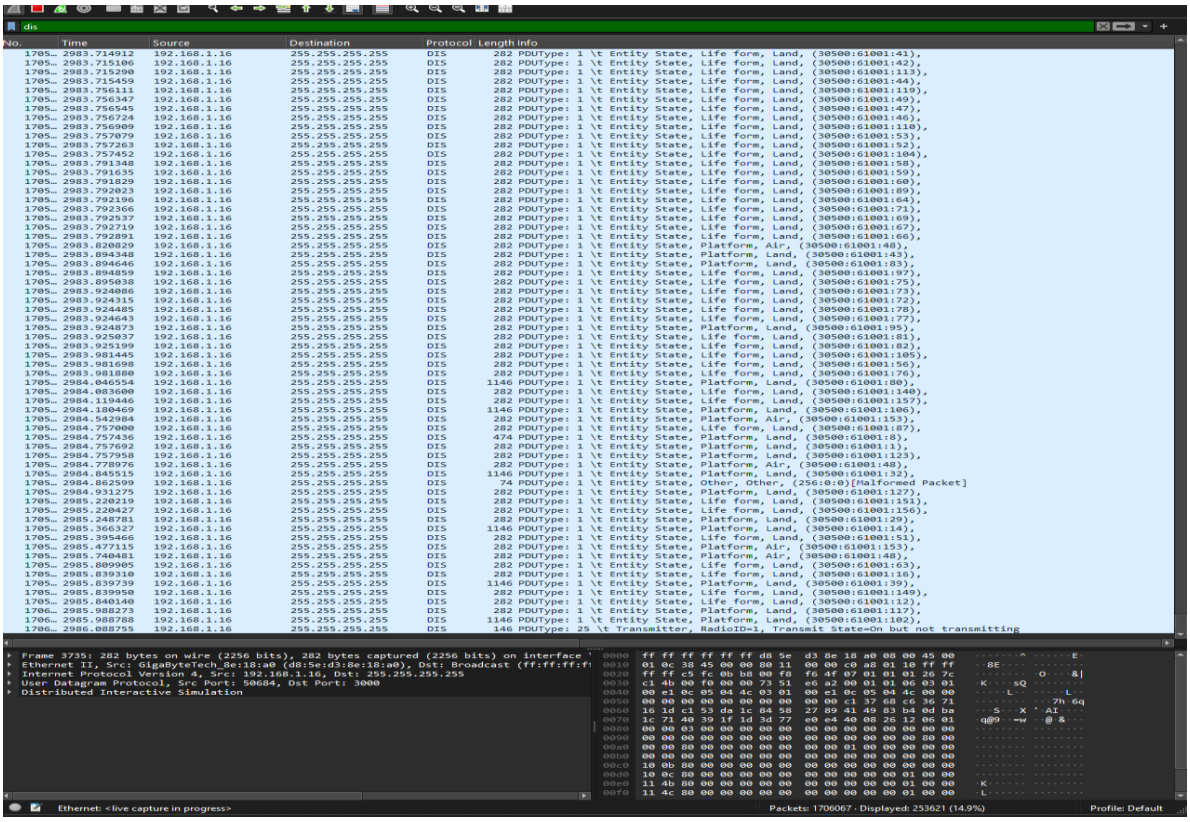
2. Physical VBS4 to BVI Setup

3. Wireshark

3.1 Verify DIS Traffic

1. **Open Wireshark.**

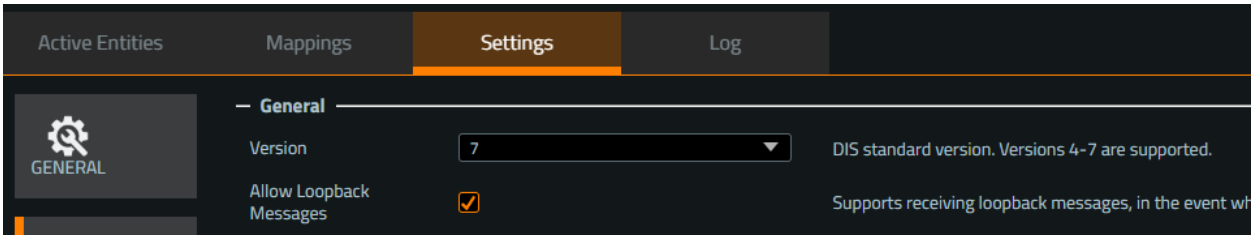
2. **Use the filter: DIS**



Ensure you see packets with a source address of 192.168.1.0 (or the machine's IP address) and a destination address of 255.255.255.255.

If packets are malformed:

Ensure DIS version is set to 7 in both VBS4 and BVI



Verify that the correct 'send_port' and 'receive_port' are set to '2000' in VBS4 and ARES.

3.2 Check Network Configuration

Run the following in CMD: netstat -ano | findstr :2000

Ensure ARES XR is listening on port **2000**.

I included a Python script in this folder that I ran to make sure the mappings were correct.

(where it's located on my system)

"C:\Program Files\ARES\ARES-dev-release-v0.9.4-c1d3950\ares.manager\config\python update_mappings.py"

4. Google and Bing API Setup

In the provided folder, you will find the necessary keys for this section. Keys may change due to who is providing them.

NOTE: If you are not part of STE-CFT, you will need to source your own keys.

4.1 Bing key setup

Once a Bing Maps key is obtained, it must be configured with the BVI software to be used for the following modalities:

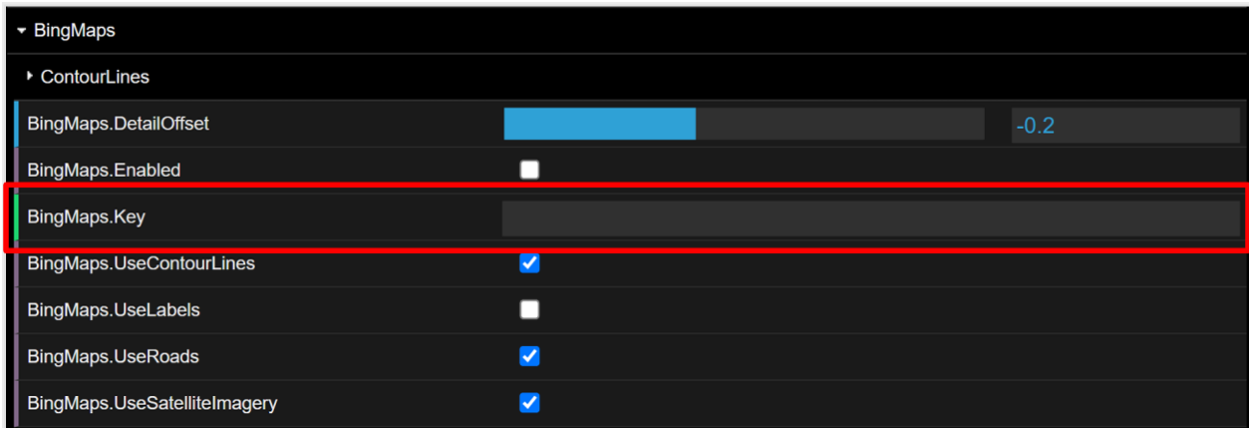
- BVI XR
- Web Tactical Planner (WTP)
- Mobile Tactical Planner (MTP)

To configure the Bing Maps key for BVI XR, follow the steps below:

1. Start BVI XR.

2. In a browser, navigate to (IP of HMD):4321

3. In the XR Preferences, expand the Bing Maps preference



4. Enter the Bing Maps key in the Bing Maps key preference and press Enter to accept changes (photo above)

4.2 Configure Bing Maps key for WTP

Note that, at a minimum, one terrain must be installed on the BVI machine to leverage Bing Maps in WTP.

To configure the Bing Maps key for Web Tactical Planner, follow the steps below:

1. Ensure the BVI software is not running.

2. Open a File Explorer and navigate to: C:\ProgramData\ARES\terrain_databases\shared\\webveritas

3. Right-click on the 'terrainConfig.json' file and open it in a text editor, such as Notepad++.

4. Under the imagery section, copy and paste the following Bing-Aerial information – replace with the Bing Maps key obtained in section 4, Obtaining Bing Maps API Key:

'"Bing-Aerial": { "url": "https://dev.virtualearth.net", "implementation": "BingMaps", "key":"", "mapStyle": "Aerial" }' Note: the 'terrainConfig.json' entry must follow the same format as the rest of the syntax. If any syntax is missing (i.e., commas or quotes are missing), then the terrain will fail to load in WTP.

```
3   "imagery": {
4     "Bing-Aerial": {
5       "url": "https://dev.virtualearth.net",
6       "implementation": "BingMaps",
7       "key":"<Bing_Maps_Key>",
8       "mapStyle": "Aerial"
9     },
```

Under the terrains section, copy and paste the following Bing-Aerial information: '"Bing-Aerial": { "imagery": ["Bing-Aerial"] },'

Note: The 'terrainConfig.json' must be formatted correctly

Save the ‘terrainConfig.json’ file. Web Tactical Planner is now able to leverage Bing Maps data.

```
40  "terrains": {
41    "Bing-Aerial": {
42      "imagery": [
43        "Bing-Aerial"
44      ]
45    },
```

4.3 Configuring Bing Maps key for MTP

To configure the Bing Maps key for BVI MTP, follow the steps below:

1. Start BVI MTP.

2. Connect to the table running BVI.

3. Select the Ellipsis icon on the top right of the green menu bar.

4. Select Settings

5. Select Map Tile Settings

6. Select the Big Maps Key option.

7. Type or paste the Bing Maps Key obtained in section

4. Obtain a Bing Maps API Key and select OK

8. Select Map Tile Source

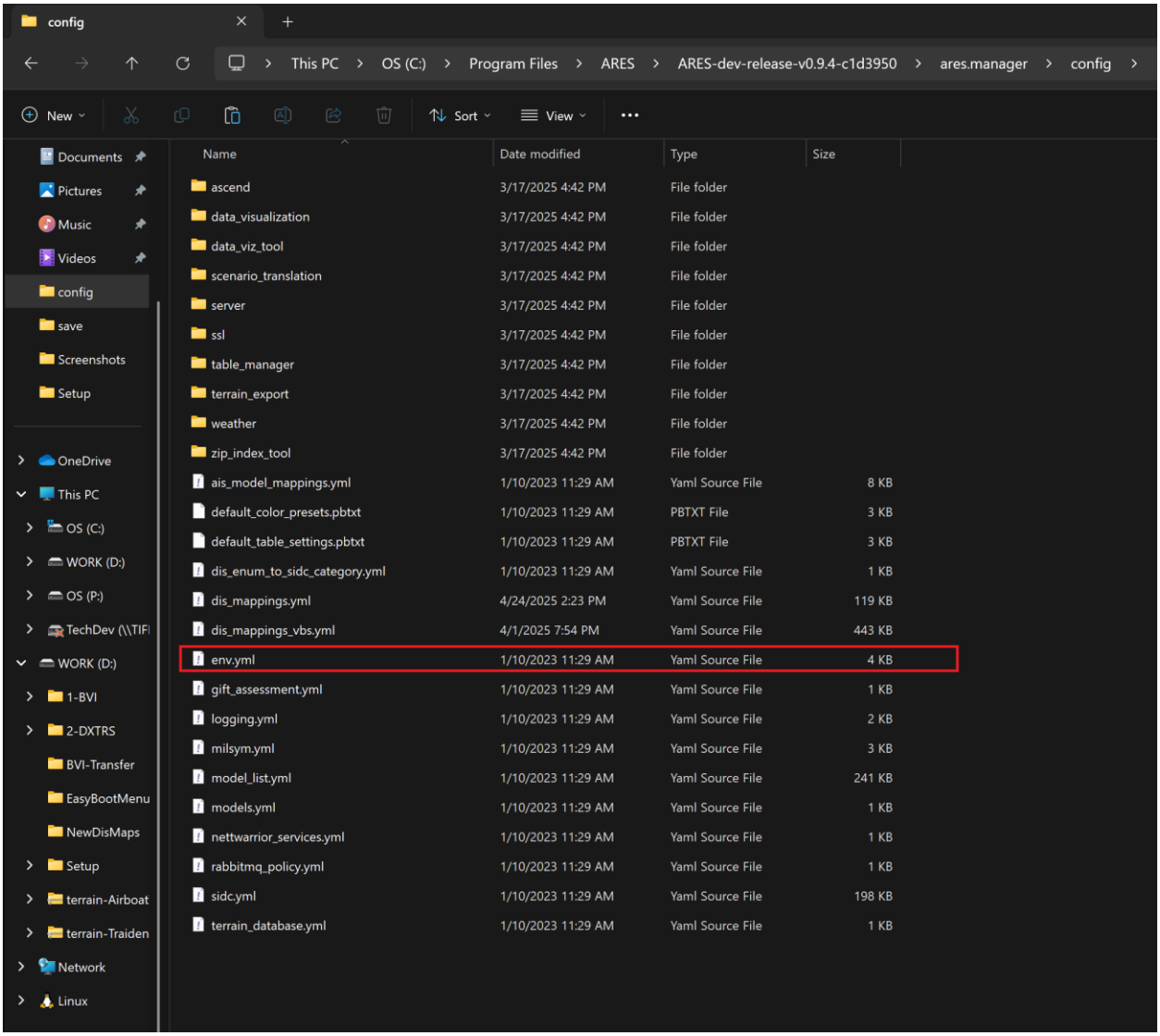
9. The Bing Map Aerial Mobile Tactical Planner can now leverage Bing Map data.

4.4 Configuring Google Maps Api key for Windows

Once a Google Maps API key is obtained, it must be configured for the BVI software. To configure the Google Maps API key for Windows, follow the steps below:

1. Open a file explorer and navigate to ‘C:\Program Files\ARES\ares.manager\config’

2. Right-click and open the ‘env.yml’ file using a text editor (e.g., Notepad, Notepad++).



3. Scroll to the end of the file and paste the API key between the single quotes following “google_maps_api_key: ‘’”

```
99
100  # Google Maps API Key (Replace dev key below with valid API key)
101  google_maps_api_key: ''
102
103  # OneSAF
104  onesaf_amqp_port: '5672'
105  onesaf_terrain_name: 'Algorithmic_terrain_database'
106  onesaf_terrain_location: '{{ares_terrain_database_root_dir}}/otf/59v2'
107
108  # CyberBOSS
109  cyberboss_server: 'localhost:61616'
110  cyberboss_bridge_location: ''
111
112  # Scenario AMQP routing keys
113  scenario_routing_key: 'scenario-updates'
114  scenario_raw_routing_key: 'scenario-updates-raw'
115
116  # AMQP
117  amqp_user: ares
```

Example figure

```
# Google Maps API Key (Replace dev key below with valid API key)
google_maps_api_key: 'AIzaSyCpaYJPi7obLbrXTkzRgtpb4hnt0KrWuM0'
```

5. Once finished editing, click File → Save.

6. Launch the BVI software. Terrain templates can now be created using the Google Maps functionality.

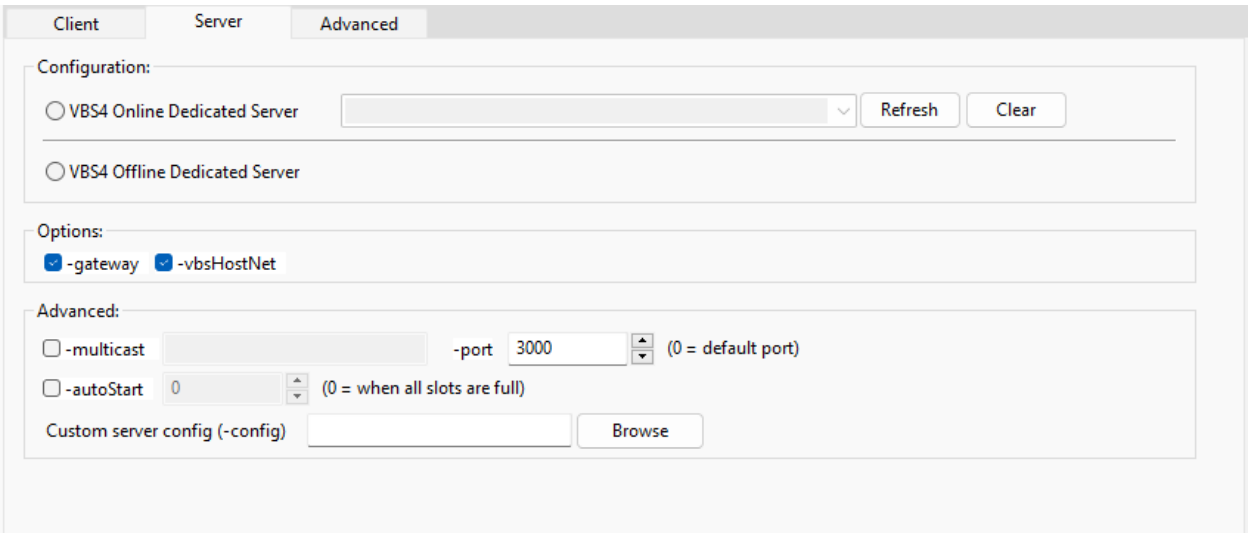
5. Checklist config setting

5.1 VBS4 Launcher.

1. Launch VBS4 via the launcher.
2. Configure **Client Settings:**
    - Set the configuration to VBS4 Offline or VBS4 Online based on your setup.
    - Enable the following options:
        - -forceSimul
        - -hmd=OpenVR
        - -window

In extra parameters, you need to set these -DIS-port=3000 -host=192.168.1.14.

On the server side



- Set port to 2000.

- Enable ‘-gateway’ and ‘-vbsHostNet’.

VBS4 config file "C:\Bohemia Interactive Simulations\VBS4 24.1 YYMEA_General\systems\dataSystem\plugins\OWSPlugin\config.cfg"

In the config file, I modified the setting to set up a local host.

port=2000

host=192.168.1.13 # IP of Ares XR machine

Cache-Control=max-age=2630000, immutable

[DIS]

DIS_Enable=1

DIS_Exercise_ID=1

DIS_IP_Address=192.168.1.14 # Set this to Ares XR's IP (192.168.1.14)

DIS_Port=2000

DIS_Enable_Broadcast=1

DIS_Broadcast_Interval=0.05

DIS_Receive_Entities=1

DIS_Send_Entities=1

Preset is Connect1

6. Launching

6.1 Initial Launch

Launch Ares

Launch VBS4 (with Connect1 presets integrated to HAMMERKIT)

6.2 Final Checklist

VBS4 and ARES XR both use DIS Version 7
VBS4Mappings.csv and dis_mappings.yml are synced using update_mappings.py
Wireshark confirms valid DIS packets
netstat -ano | findstr :2000 confirms port binding
Python script executed without errors
VBS4 objects appear in ARES and ARES XR live simulation
