BATTLESPACE SIMULATIONS INC.

8305 Catamaran Circle
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MACE 2020 R1 *Beta*

What's New?

If you have questions or comments, please contact us at support@bssim.com.

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MACE 2020 R1 Beta – What's New

Hello everyone! Today we are happy to announce that the MACE 2020R1 Beta is now available for download. We expect to have a formal release within the next few weeks; we are about 70% done with our test cases and most of the documentation has been updated. ***Note that since we are still in Beta, this version is only recommended for testing outside of your production environments***. We wanted to give you a few weeks to test with the Beta before we release, so if you find any issues with this Beta please let us know!

Before we get into our summary of the new features, I would once again like to thank all of our MACE customers for your continued suggestions and feedback. We take these very seriously and there are several features in 2020R1 that came directly from a MACE user's suggestion. If you are a MACE user and find yourself saying "if only these guys would add such and such a feature, it would make my life so much easier/help meet additional training objectives" – then please tell us!

While this document contains a summary of improvements in MACE 2020R1, there are many smaller changes not mentioned here. So, if you encounter any changes to the MACE user interface not mentioned in this document, please reference the updated 2020R1 User's Manuals (which install with MACE and are accessible from the Help menu within MACE).

Resources

As a reminder, we have a series of MACE Tutorial Videos posted on our YouTube page. There are many other videos posted on our YouTube page as well, designed to demonstrate specific capabilities or new features.

Also, if you have any questions please e-mail us @ support@bssim.com and we will do our best to reply within one business day.

2021 MACE User's Group (MUG) Update

We've decided to postpone the 2021 MUG from April to September, as we anticipate that with a few more months of vaccine distribution behind us, a late September MUG will be safer and by then we hope more of you will be able to obtain permission to attend. We will send out an update once we firm up the dates.

Get your MACE!

Because this MACE is still in Beta, you will need to download it from the daily build repository, which is located here: http://downloads.bssim.com/dev/mace/builds/ (usr: JT@C pwd: @!rp0wer).

Once we have a formal 2020R1 Release (in a few weeks) the download will move to the Latest Release repository: http://downloads.bssim.com/MACE/Latest_Release/ (usr: JT@C pwd: @!rp0wer). We will send out another notice in a few weeks once we promote 2020R1 from Beta to Release.

Thanks again everyone, and please let us know if you have any suggestions or encounter any issues with this new MACE. We're hopeful we can have our MUG later this year where we can give you all some hands-on training! -- The BSI Team.

Plug-in Manager

A plug-in manager has been added to MACE's System Settings, allowing for the runtime management of MACE plugins. Plugins can be loaded and unloaded from the plug-in manager without the need to restart MACE. MACE plugins now also support summary information that can be displayed in the plugin manager -- giving useful information like version number, the location of the button within the MACE UI, a listing of runtime dependencies, and a description of what the purpose of the plugin is. A MACE user's plugin preferences are saved and restored when MACE starts, and plugins can be loaded at runtime by simply checking their checkbox in the plugin manager – no restart required!

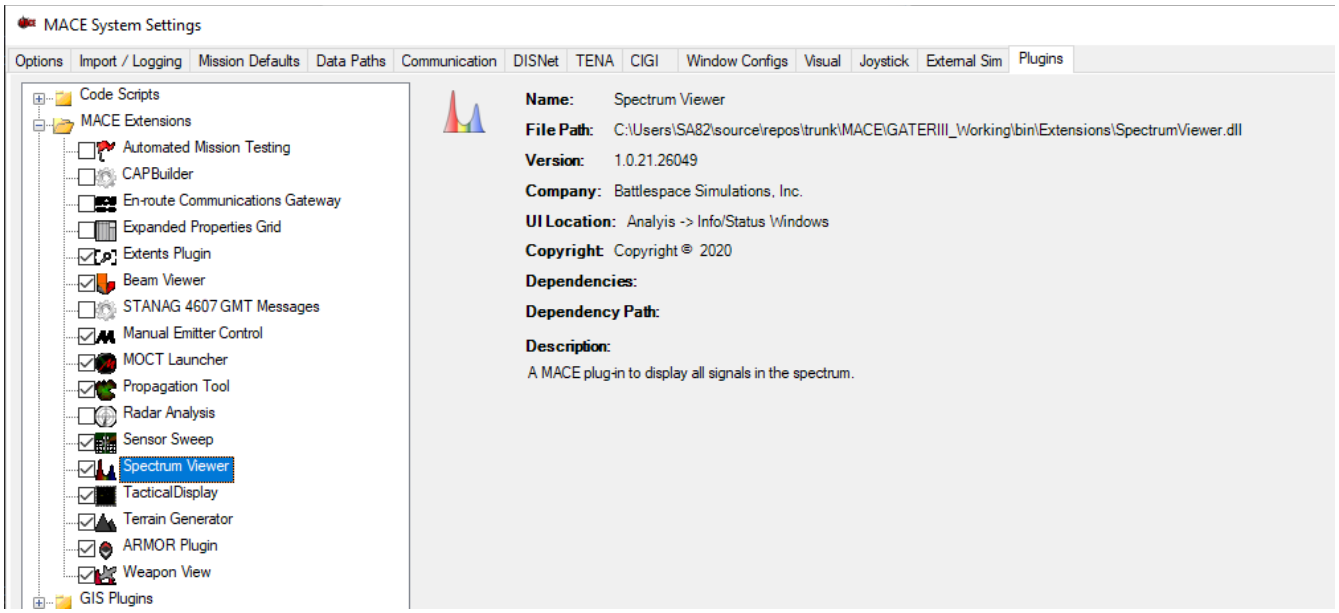


Figure 1. MACE Plugin Manager.

Embedded Codescript Editor/Compiler

A powerful new feature in 2020R1 is the ability to edit and compile codescripts from inside the MACE plugin manager. Codescripts are small C# snippets that can be executed alongside the MACE runtime, and BSI has developed a full featured application programming interface (API) that gives the codescript or plugin developer direct access to many of the powerful underlying capabilities of MACE. While codescripts are not a new feature, in 2020R1 MACE users can now easily create new codescripts directly inside of MACE. You can edit them with modern IDE features like syntax highlighting, code completion, split windows, bookmarks, themes, and full intellisense integration of the MACE API (Figure 2). You can then compile your codescripts to check for any errors and run your codescripts from directly from inside the MACE plugin manager. We even give direct access to the MACE API documentation from inside the codescript editor (Figure 3).

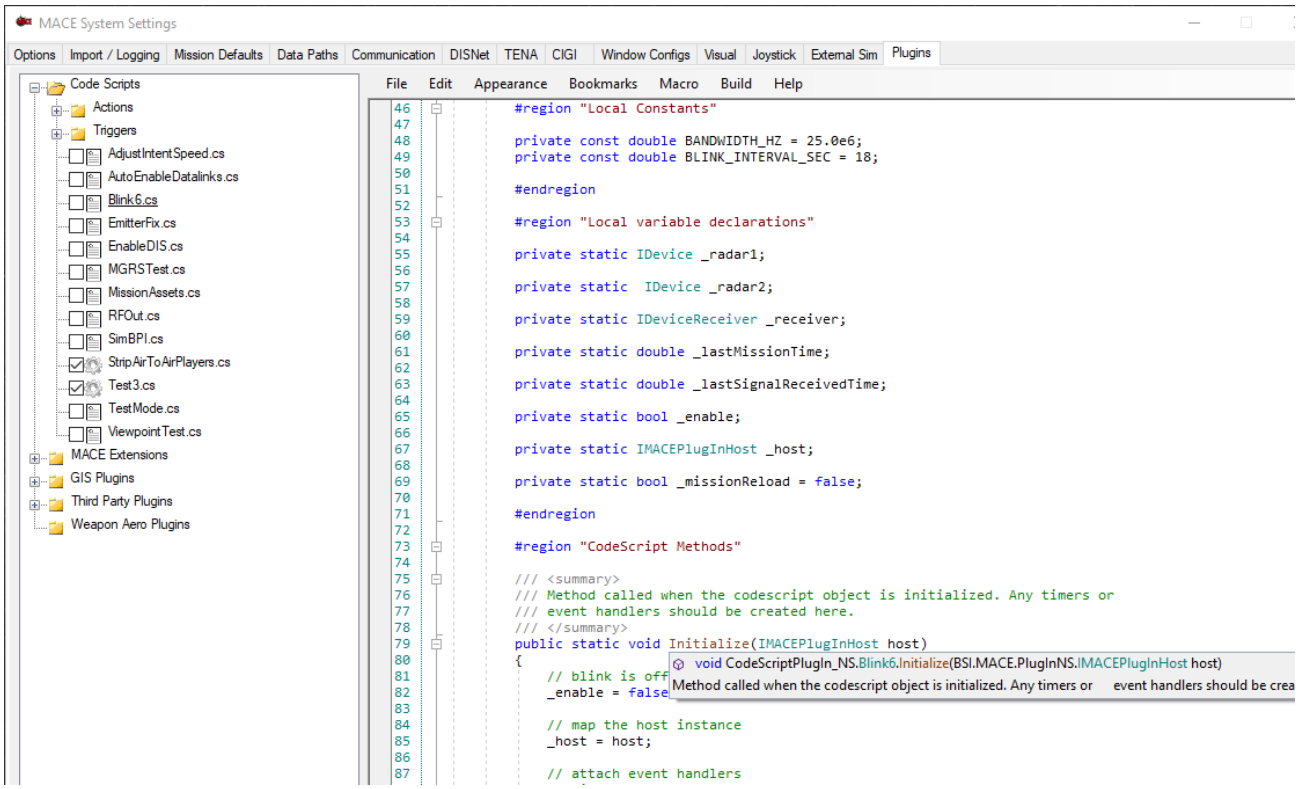


Figure 2. MACE Codescript Editor.

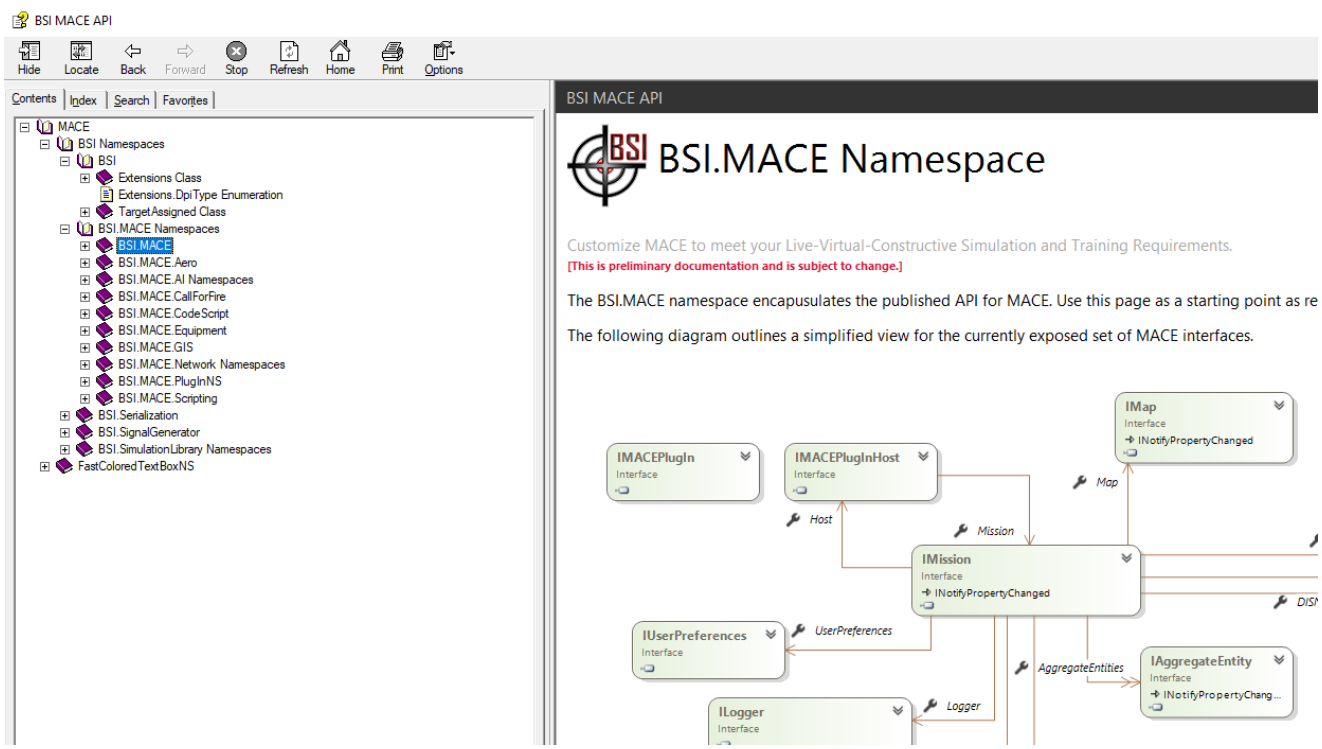
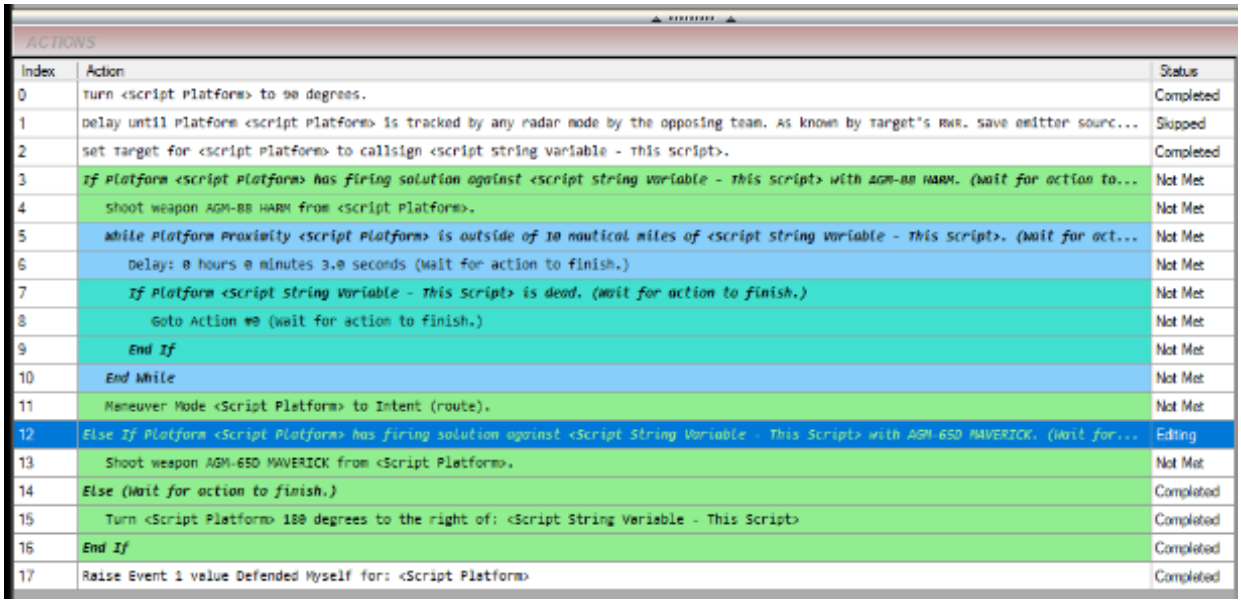


Figure 3. MACE API Documentation.

Scripting Improvements

BASIC Syntax in the Script Editor

With MACE 2020R1, the scripting tool gets some major improvements, including support for BASIC Operations such as If/Else If/Else/End If, While/End While, and Goto. This allows you to create complex decisions and actions in a single script.

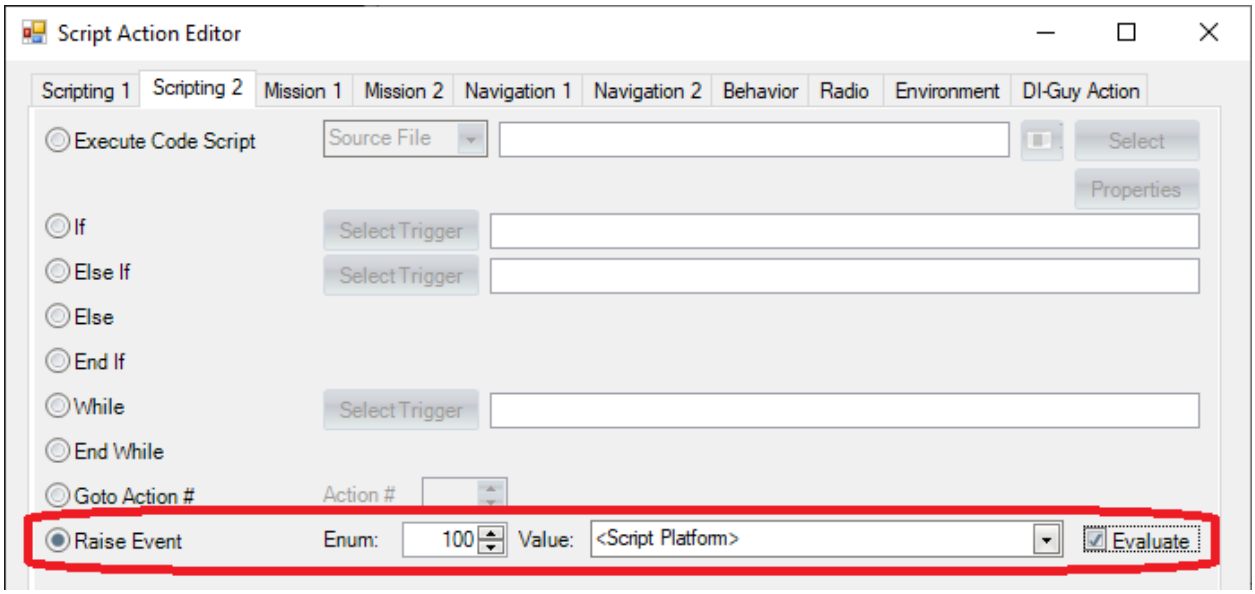


ACTIONS

Index	Action	Status
0	Turn <script Platform> to 90 degrees.	Completed
1	Delay until Platform <script Platform> is tracked by any radar mode by the opposing team. As known by target's RWR. Save emitter sourc...	Skipped
2	Set Target for <script Platform> to Callsign <script String Variable - This Script>.	Completed
3	If Platform <script Platform> has firing solution against <script String Variable - This Script> with AGM-88 HARM. (Wait for action to...	Not Met
4	Shoot Weapon AGM-88 HARM from <script Platform>.	Not Met
5	While Platform Proximity <script Platform> is outside of 10 nautical miles of <script String Variable - This Script>. (Wait for act...	Not Met
6	Delay: 0 hours 0 minutes 3.0 seconds (Wait for action to finish.)	Not Met
7	If Platform <script String Variable - This Script> is dead. (Wait for action to finish.)	Not Met
8	Goto Action #0 (Wait for action to finish.)	Not Met
9	End If	Not Met
10	End While	Not Met
11	Maneuver Mode <Script Platform> to Intent (route).	Not Met
12	Else If Platform <Script Platform> has firing solution against <Script String Variable - This Script> with AGM-65D MAVERICK. (Wait for...	Editing
13	Shoot Weapon AGM-65D MAVERICK from <Script Platform>.	Not Met
14	Else (Wait for action to finish.)	Completed
15	Turn <Script Platform> 180 degrees to the right of: <Script String Variable - This Script>	Completed
16	End If	Completed
17	Raise Event 1 value Defended Myself for: <Script Platform>	Completed

Figure 4: BASIC Syntax in the Script Editor

We also added a new Action called 'Raise Event' and a new Trigger called 'Event Raised' so that scripts can more easily communicate with one another.



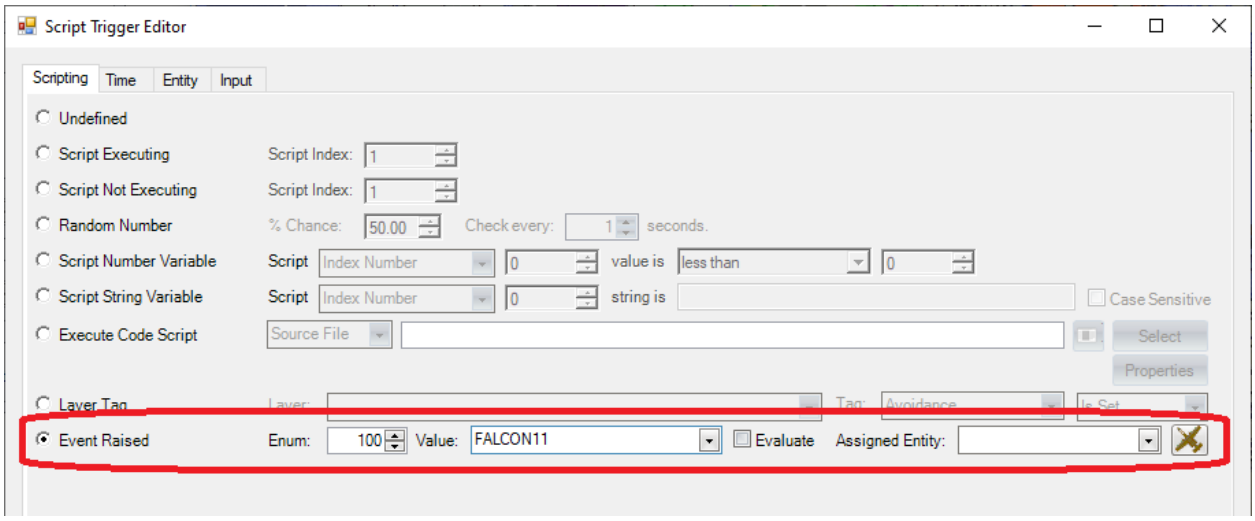


Figure 5: Raise Event Action and Event Raised Trigger

Action Template Improvements

Action Templates can now have individual scripts set to "Auto Assign" or "Quick Assign". Platforms with action templates with auto assigned scripts automatically get those scripts created and assigned to the platform when they're created. Quick Assign scripts can be assigned via a right click on the platform.

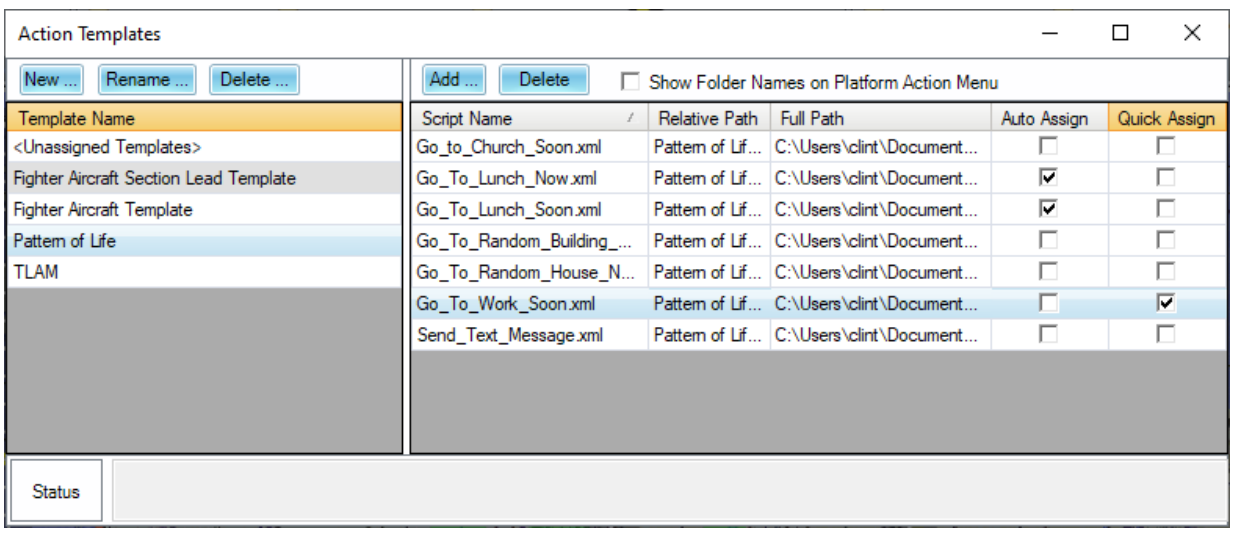


Figure 6: Auto-Assign Scripts via Action Templates

Analysis Tab Improvements

In prior versions of MACE, you were limited to one custom mask altitude. In 2020R1, there are seven separate mask layers that can be drawn, and you can specify the altitude for each one:

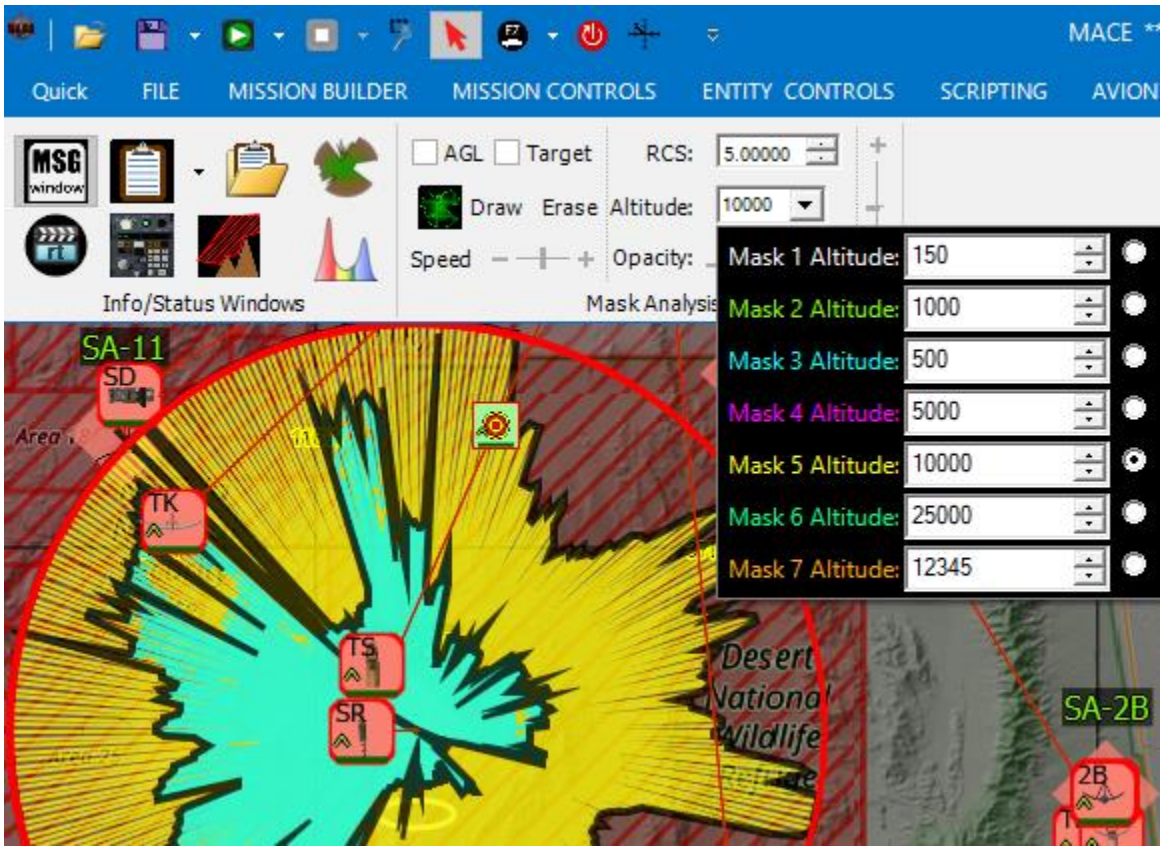


Figure 7: Radar Mask Improvements

Signal Generation Improvements

Bi-Static Radar Support

Reflections from a target 3D RCS are now calculated for dedicated receiver devices (such as SARH missile seekers) using the monostatic-bistatic equivalence theorem. In addition, a new weapon sensor processing module was added that allows any combination of multiple sensors per weapon. Visual and RF receiver beams are also now available in the Layer Manager.

Datalink Improvements

MACE 2020R1 adds support for toggling between datalink versions 6016D/F (for J-Series version), 47001C/47001D/47001D Ch 1 (for K-series headers) and 6017A/6017B (for K-series version):

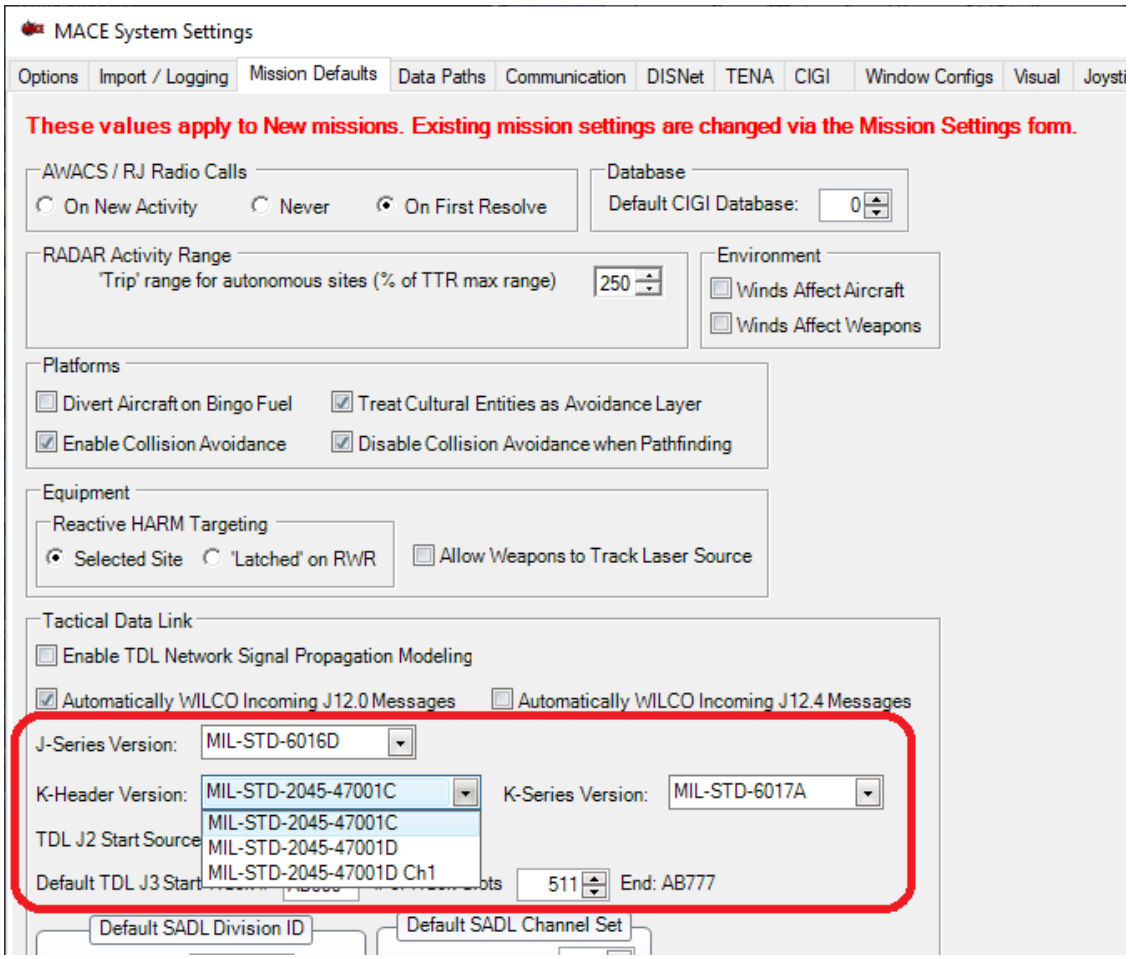


Figure 8: Datalink Version/Header Selection

We've also added the J2.0 (for Link-11), J7 Drop track, and J12.4 Controlling Unit messages

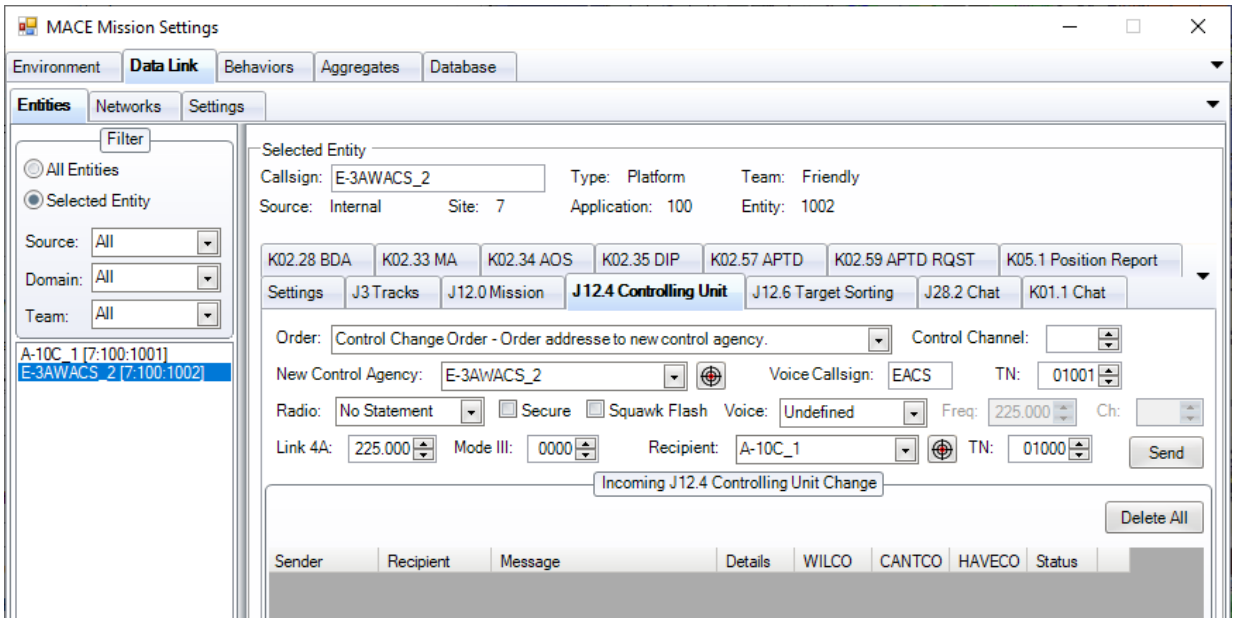


Figure 9: New Datalink Messages - J2 for Link 11, J7 and J12.4

And we've added additional options for relaying JREAP-C to DIS including from likely source entities and via SADL. Note that you can also use MACE to relay DIS to JREAP-C:

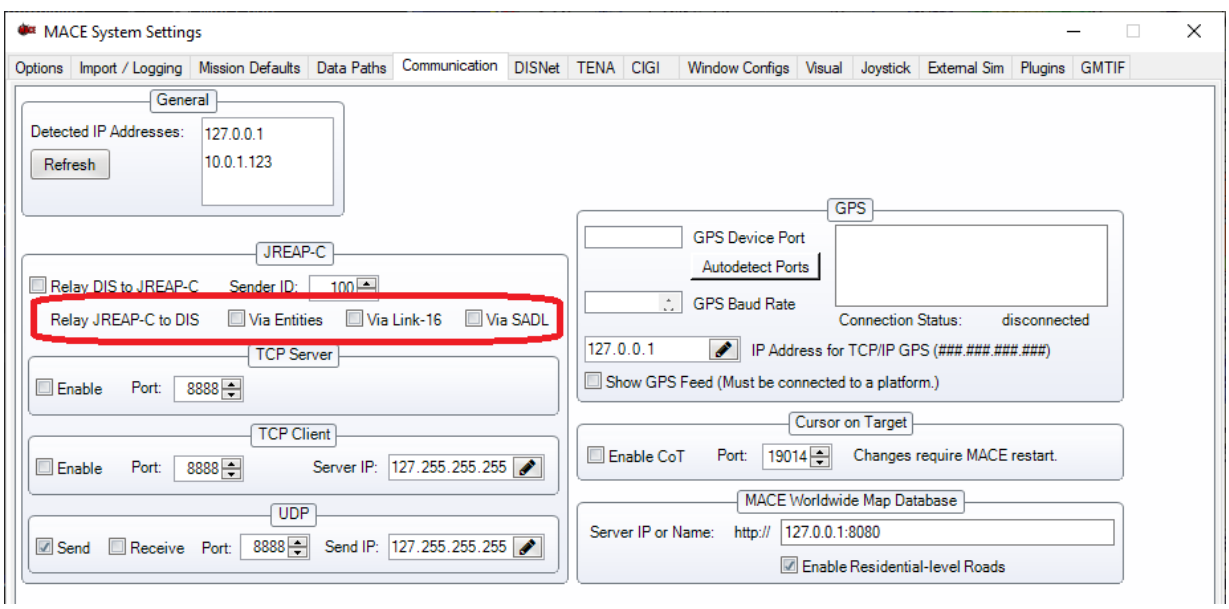


Figure 10: Relay JREAP-C to DIS

Improvements when using VRSG IG or Vital IG

Storm Systems

We've added support for Storm Systems in VRSG, including two volumetric cloud layers with precipitation / lightning effects within the more severe regions of the storm. Storm systems are defined as relative points in XML (user-creatable) and can be positioned and rotated anywhere on the map:

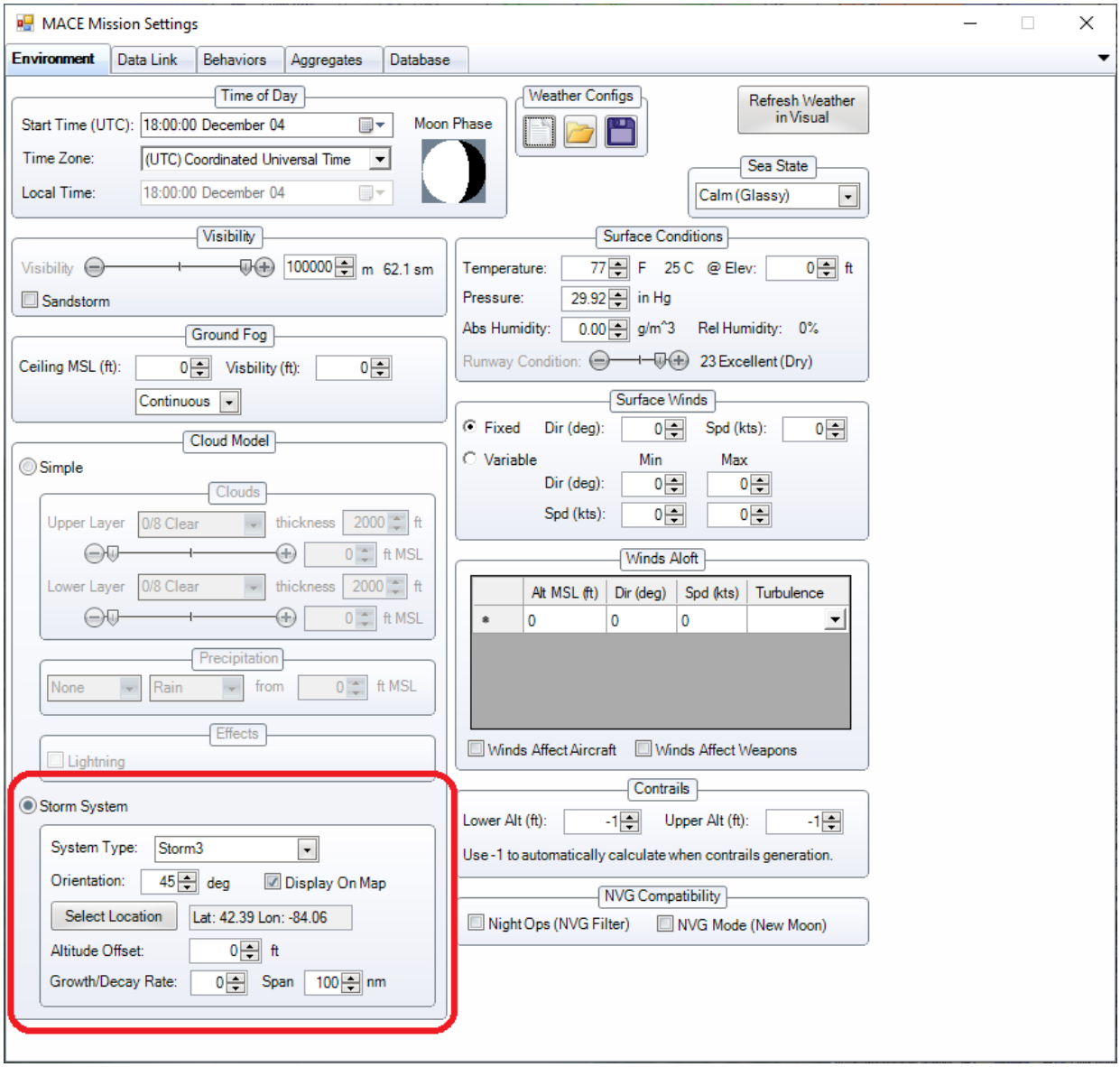
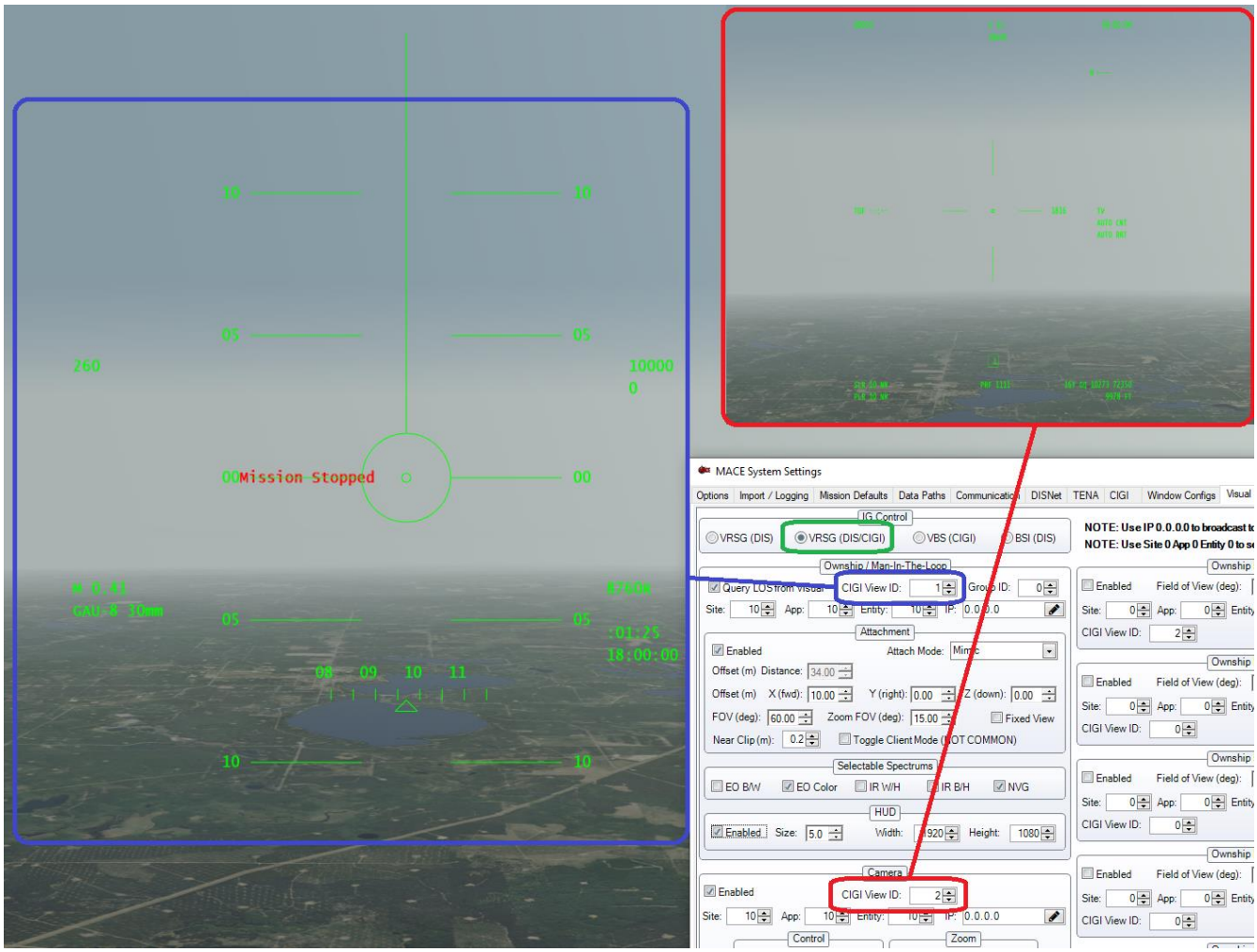


Figure 11: Create a Storm System; works with VRSG IG and Vital IG

Figure 12: Storm System as shown in VRSG and MACE

CIGI Control for VRSG

CIGI control for VRSG enables multiple viewports with a single VRSG channel. For example, picture-in-picture as shown below (one view is showing out-the-window and the other the camera view).



Tighter Integration with ARMOR

ARMOR (Augmented Reality Mission Rehearsal and Observation) is BSI's Unity-based 3D viewer for MACE. ARMOR has also undergone major improvements in 2020, including support for user-generated, streaming, tile-based terrain and a much larger 3D model library.

Please see these videos for examples of what is possible with MACE and ARMOR:

[Mission Rehearsal with BSI's MACE and ARMOR - Terrain Masking Briefover - YouTube]

[Malaysia Rescue Scenario: A Demonstration of MACE and ARMOR - YouTube]

For more information about MACE and ARMOR, please see the additional documents posted here: http://downloads.bssim.us/ (password: @!rp0wer)

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Other Improvements to MACE

'Swarm' Formation

By popular demand! Swarms will cluster around the formation Leader, generally mimicking the leader's movements. Swarms are 'self-healing' and will fill gaps where platforms have been killed (if the Formation Leader dies a new one will be assigned).

You can also create swarms with a 'kamikaze' behavior (this is done by assigning the platform the 'kamizkaze' role in the MOCT). The kamikaze behavior will cause the entity to move to its assigned target and all the weapons carried by the platform will detonate upon impact. There are two pre-built drone swarms included in MACE 2020R1 – one where the drones are carrying low-power RF jammers and one where the drones are carrying low-power explosives (and in the latter case, are also assigned the kamikaze behavior). Live for the swarm!

Countermeasures

Chaff / flares completely handled in hard points. Each platform can have its own unique flare pattern with scriptable release

Sonic Booms

Based on customer request – we've implemented a simplified physics-based sonic boom propagation model for aircraft and missiles. It is a new setting located under Mission Settings -> Behaviors

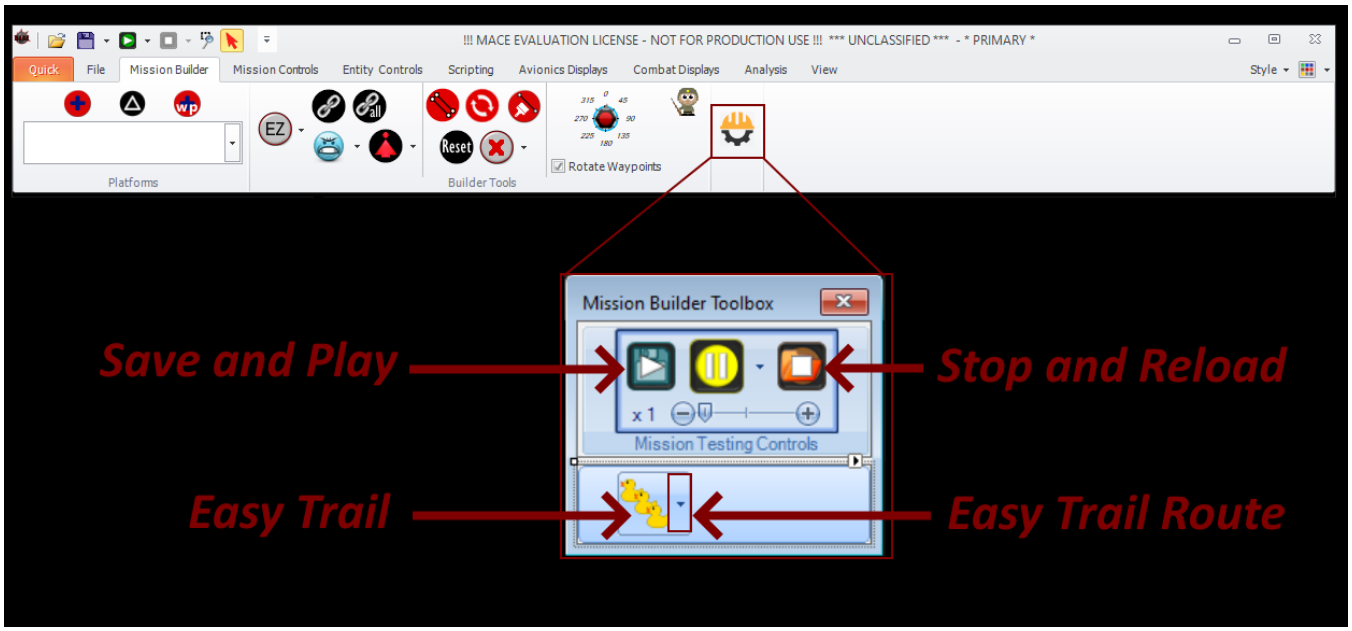
When the setting "Calculate and React to Sonic Booms" is enabled, any Platform with "is Squirter = true" will squirt when it intersects any sonic boom carpet.

Elevation

- Greatly improved speed and efficiency of GeoTIFF based elevation data (for example, CDB).
- Interpolate GeoTIFF based elevation data.
- Support GeoTIFF water terrain tiles to identify terrain material. (Ships identify water, ground vehicles avoid water, people swim in water, bullets create splash effects.)

Mission Builder Toolbox

There's a new mini-UI on the Mission Builder tab – the Mission Builder Toolbox. It contains some common workflow items wrapped as single-button 'macro' type commands. For example, a single button to save and play the mission, and a single button to stop and reload the mission.



MACE API

- Manage newly created entities immediately (creation on background thread).
- Control MACE joystick via plugin.
- Control MACE camera via plugin.
- Control MACE environment / weather via plugin.

Camera Footprint – MACE will now draw an outline of a given platform's camera footprint on the ground as the camera is moved and as zoom level changes. This is enabled with the existing 'camera line' option on the Layer Manager.

New Plug-Ins

NOTE: There is some content that we add to the main MACE application, and other content that we add to MACE using the plug-in API. This is to keep the user interface as clutter-free as possible while exposing capability to those customers that want/need it.

As a result, we have decided not to cover the plug-in capabilities in the main MACE User's Manual, but instead to create a separate document, the MACE Plug-in User's Manual, where all plug-in capabilities are covered. Both of these documents install with MACE.

Sensor Sweep Plug-In

This plug-in shows sensor beam swept area on terrain as well as targets. The visual persistence (fade speed) can be adjusted from 0 to infinite in order to depict where a sensor has looked over time. The calculations that generate the detected areas are based on the sensors parameters and can be updated at runtime in the SGE.

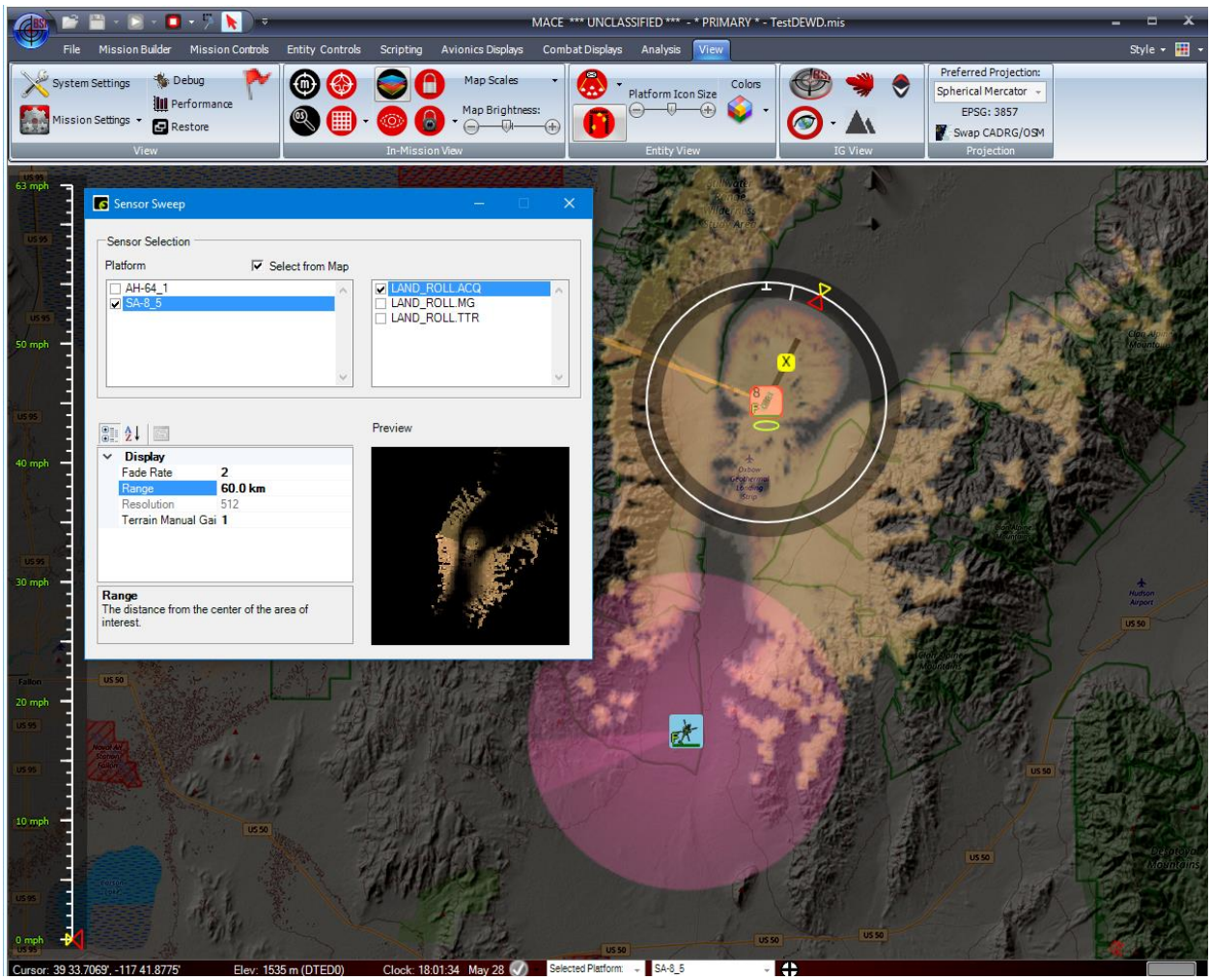
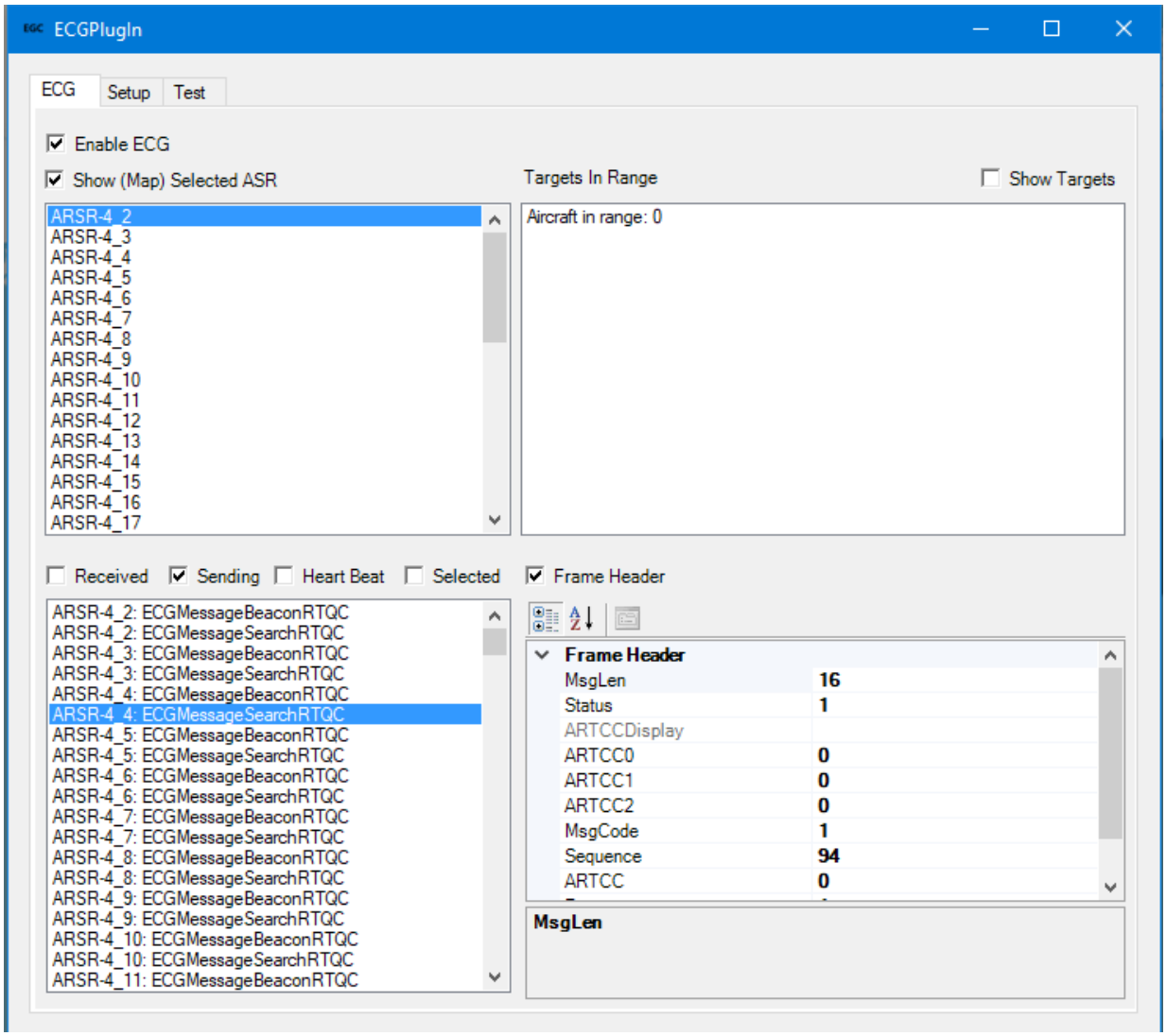


Figure 13: The Sensor Sweep Plug-In. Yeah we know... pretty cool :)

ECG Message Plug-In

This plug-in provides for the transmission of data formatted in the CD-2 format from EnRoute primary and beacon radar systems to ECG systems located at Air Route Traffic Control Center (ARTCC) facilities. Data is transmitted for EnRoute Communications Gateway Protocol (ECGP) in User Datagram Protocol (UDP) format.


ECGPlugIn
ECG
Setup
Test
Enable ECG
Show (Map) Selected ASR
Targets In Range
Show Targets
ARSR-4_2
ARSR-4_3
ARSR-4_4
ARSR-4_5
ARSR-4_6
ARSR-4_7
ARSR-4_8
ARSR-4_9
ARSR-4_10
ARSR-4_11
ARSR-4_12
ARSR-4_13
ARSR-4_14
ARSR-4_15
ARSR-4_16
ARSR-4_17
Aircraft in range: 0
Received
Sending
Heart Beat
Selected
Frame Header
ARSR-4_2: ECGMessageBeaconRTQC
ARSR-4_2: ECGMessageSearchRTQC
ARSR-4_3: ECGMessageBeaconRTQC
ARSR-4_3: ECGMessageSearchRTQC
ARSR-4_4: ECGMessageBeaconRTQC
ARSR-4_4: ECGMessageSearchRTQC
ARSR-4_5: ECGMessageBeaconRTQC
ARSR-4_5: ECGMessageSearchRTQC
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ARSR-4_10: ECGMessageBeaconRTQC
ARSR-4_10: ECGMessageSearchRTQC
ARSR-4_11: ECGMessageBeaconRTQC
Frame Header
MsgLen 16
Status 1
ARTCCDisplay
ARTCC0 0
ARTCC1 0
ARTCC2 0
MsgCode 1
Sequence 94
ARTCC 0
MsgLen

MOCT Improvements

Added the ability to highlight items in the MOCT that meet a search criteria. Supports two simultaneous search conditions (text color and background color indicate results).