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**MACE R2 2016**

**What's New?**

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## MACE R2 2016 – What’s New

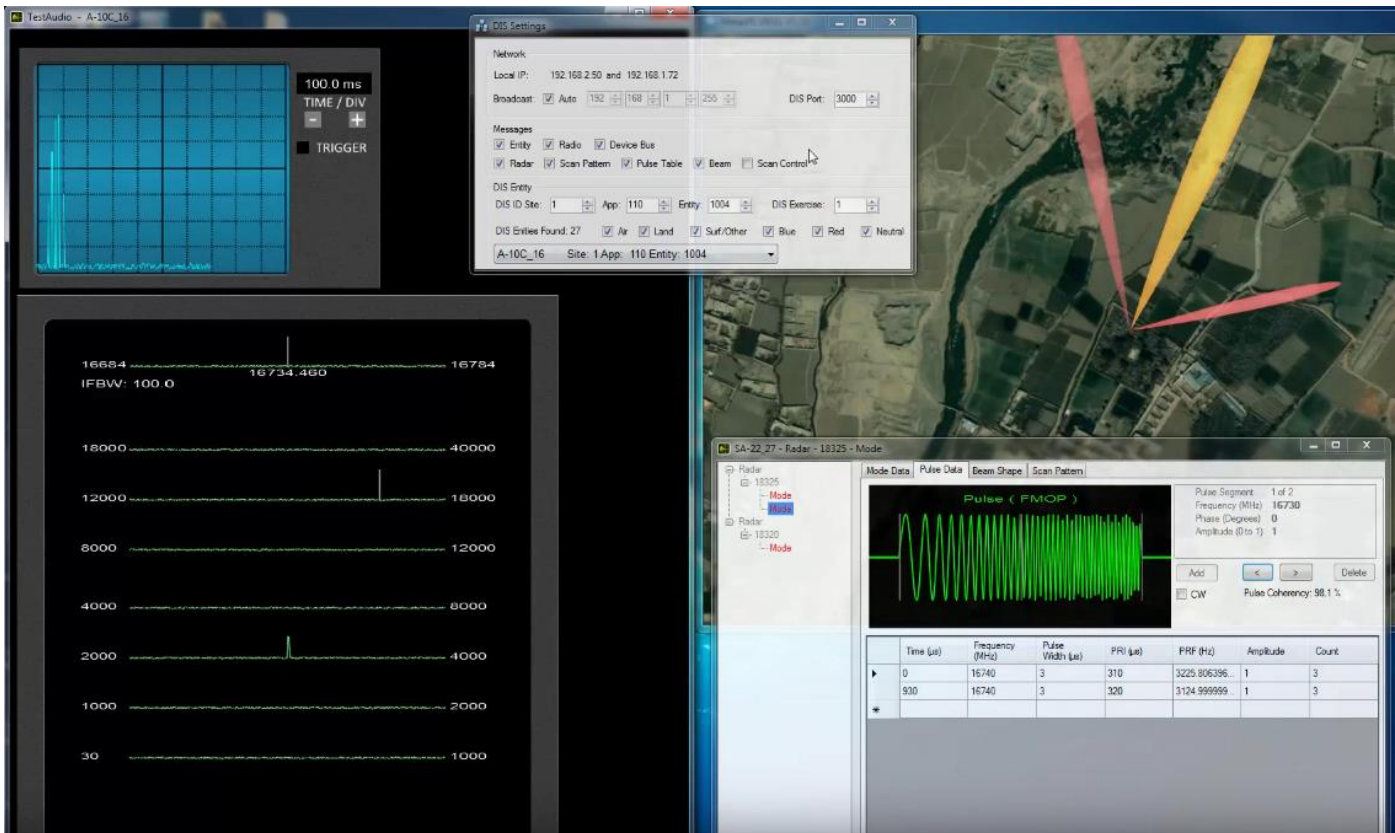
Hello everyone! Today we are happy to announce that MACE 2016R2 is now available for download as an official release. And yes, we know it is now 2017 – but we released our first Betas back in December so we decided to stick with the name. No matter what we call it, this release has some ‘big league’ improvements; this is just a summary of the highlights.

Before we get into our summary of the new features, I would once again like to extend a sincere “thank you” to everyone who helps us continuously improve MACE. It is extremely fulfilling for us to see people using our software. 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! Many of the best ideas for MACE improvements come from you, our existing customers.

### Simulation Improvements

#### New Signal Generation Engine (SGE)

One of the most significant improvements in 2016R2 is a complete upgrade of our entire electronic warfare subsystem. The Signal Generation Environment (SGE) is capable of simulating advanced, 5<sup>th</sup> generation radar systems such as Active or Passive Electronically Scanned Arrays (A/PESA). This will enable much higher fidelity simulation of advanced air defense systems and the simulation of 5<sup>th</sup> generation air-to-air combat, as well as improved simulation of self-protect jamming systems.



**Figure 1: New Signal Generation Engine and new Beam Viewer for VRSG**

Here are some videos showing this new capability in action:

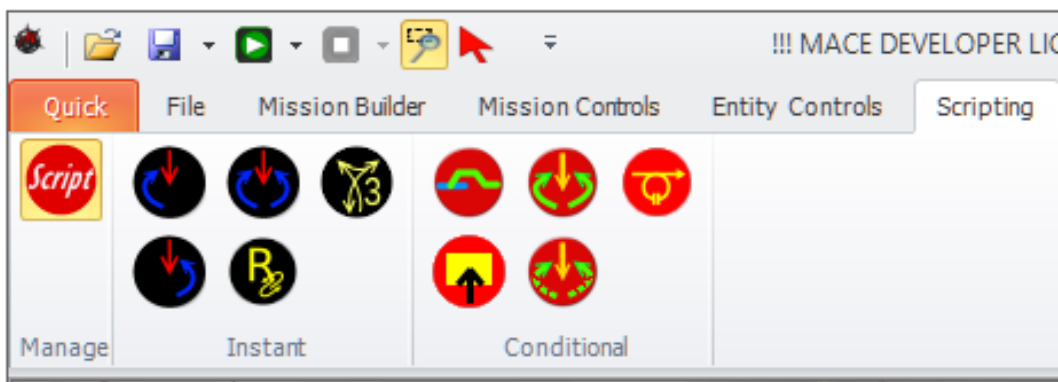
<https://www.youtube.com/watch?v=18spUQY67AA>

<https://www.youtube.com/watch?v=wz3T3sCIM3w>

<https://www.youtube.com/watch?v=TXRIYjEXnHQ>

## New 'Buttonized' Scripts

Our script editor takes a YUGE leap forward in 2016R2 with the ability to 'Buttonize' your scripts. In the past, your MACE scripts were mission specific, with script 'actors' identified by their in-mission callsign. Now, we've added additional 'abstract' platform references (for example, the 'script platform', 'script platform's assigned target', etc) which means your scripts themselves need no longer be mission-specific. You can now 'Buttonize' them, adding them to the MACE user interface as either instant (triggerless) or conditional (with triggers) behaviors:



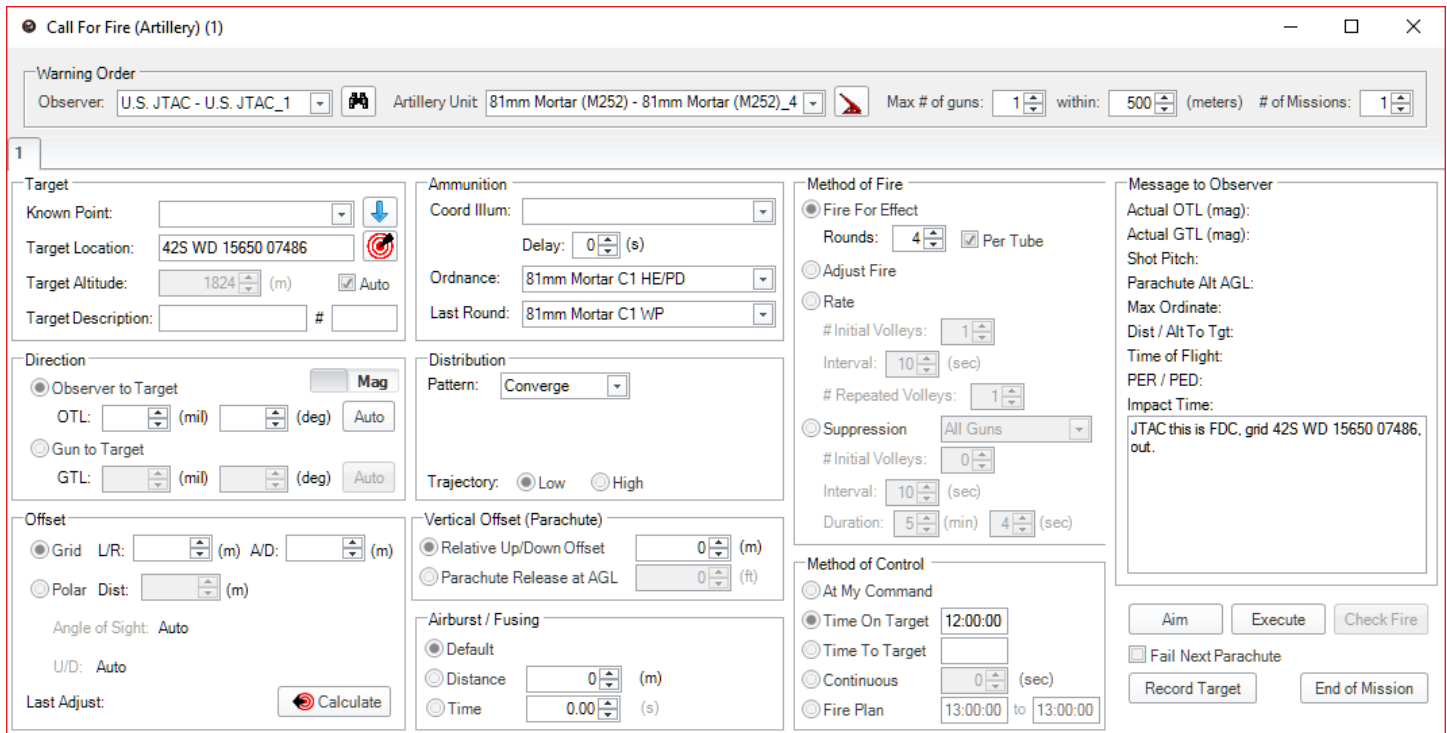
**Figure 2: New Scripting Tab on MACE UI for Buttonized Scripts**

You can use these buttons just like the buttons that come with MACE; select an entity or entities, then click the Button you've added to the MACE UI (which kicks off your buttonized script).

This is an easy way to quickly create tactics/behaviors for multiple use cases (pattern of life, air-to-air, etc) without anyone having to write a single line of code. It is designed so that the non-programmer end user can create advanced behaviors. Example 'Buttonized' scripts that are included in this new MACE include a button to command the selected ground vehicle to execute a 3-point turn, or to command a 2-ship of fighters to execute a pincer maneuver against the nearest enemy air platform.

## Call for Fire Improvements

The Call for Fire form has been significantly enhanced, and is now capable of supporting up/down adjustments, fusing settings and multiple mission per form (which can be scheduled via the also enhanced Fire Plan interface).



**Call For Fire (Artillery) (1)**

Warning Order  
 Observer: U.S. JTAC - U.S. JTAC\_1 Artillery Unit: 81mm Mortar (M252) - 81mm Mortar (M252)\_4 Max # of guns: 1 within: 500 (meters) # of Missions: 1

**Target**  
 Known Point: [Dropdown] [Arrow]  
 Target Location: 42S WD 15650 07486 [Target Icon]  
 Target Altitude: 1824 (m) [Auto]  
 Target Description: [Text] # [Text]

**Ammunition**  
 Coord Illum: [Dropdown]  
 Delay: 0 (s)  
 Ordnance: 81mm Mortar C1 HE/PD  
 Last Round: 81mm Mortar C1 WP

**Method of Fire**  
 Fire For Effect  
 Rounds: 4 [Per Tube]  
 Adjust Fire  
 Rate  
 # Initial Volleys: 1  
 Interval: 10 (sec)  
 # Repeated Volleys: 1  
 Suppression  
 All Guns [Dropdown]  
 # Initial Volleys: 0  
 Interval: 10 (sec)  
 Duration: 5 (min) 4 (sec)

**Message to Observer**  
 Actual OTL (mag):  
 Actual GTL (mag):  
 Shot Pitch:  
 Parachute Alt AGL:  
 Max Ordinate:  
 Dist / Alt To Tgt:  
 Time of Flight:  
 PER / PED:  
 Impact Time:  
 JTAC this is FDC, grid 42S WD 15650 07486, out.

**Direction**  
 Observer to Target [Mag]  
 OTL: [Text] (mil) [Text] (deg) [Auto]  
 Gun to Target  
 GTL: [Text] (mil) [Text] (deg) [Auto]

**Distribution**  
 Pattern: Converge  
 Trajectory:  Low  High

**Offset**  
 Grid L/R: [Text] (m) A/D: [Text] (m)  
 Polar Dist: [Text] (m)  
 Angle of Sight: Auto  
 U/D: Auto  
 Last Adjust: [Calculate]

**Vertical Offset (Parachute)**  
 Relative Up/Down Offset [Text] (m)  
 Parachute Release at AGL [Text] (ft)

**Airburst / Fusing**  
 Default  
 Distance [Text] (m)  
 Time [Text] (s)

**Method of Control**  
 At My Command  
 Time On Target 12:00:00  
 Time To Target [Text]  
 Continuous [Text] (sec)  
 Fire Plan 13:00:00 to 13:00:00

[Aim] [Execute] [Check Fire]  
 Fail Next Parachute  
 [Record Target] [End of Mission]

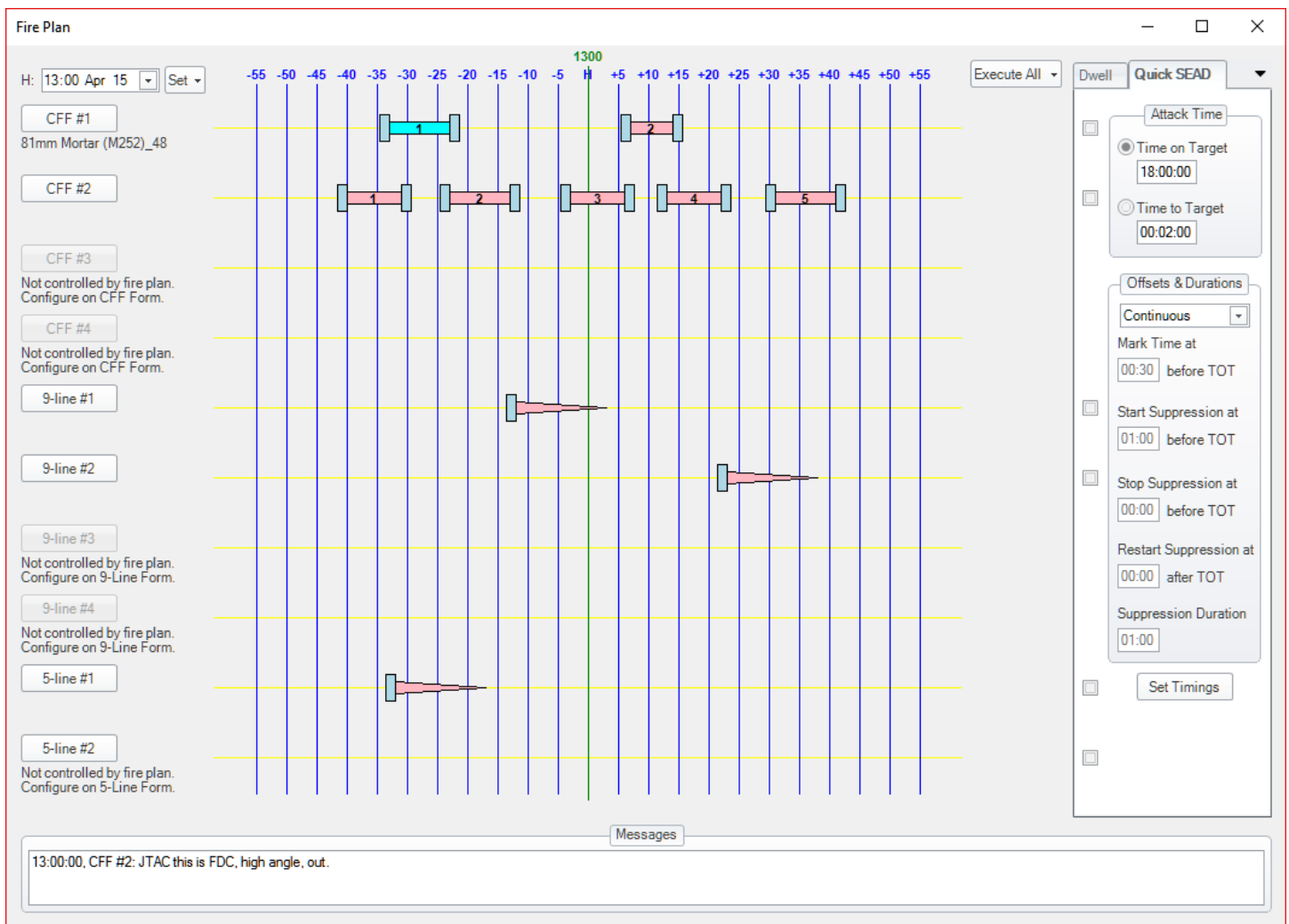
**Figure 3: Enhanced Call for Fire Interface**

### Fire Plan Improvements

MACE's Fire Planning interface has also been significantly improved. Users can now task the same artillery units multiple times on the Fire Plan, separated by time, with different targets and ordnance each time. Up to eight different taskings can be assigned to each artillery unit/battery on each Call for Fire form. For those of you with 4 Calls for Fire, this means 32 different CFF taskings can be scheduled using the Fire Plan.

Additional Fire Plan improvements include support for Dwell/Rejoin as well as rapid configurations for Continuous, Interrupted and non-standard attack coordination with aviation assets.

All available 9-Line and 5-Line attacks can also be scheduled using the Fire Plan. These improvements were made using inputs from experienced Fires experts from around the world, including the US, UK, Australia and New Zealand.



**Figure 4: Improved Fire Plan Interface**

### Aggregates of Aggregates

You can now create 'aggregates of aggregates' in MACE. Aggregates are a way to group entities using 2525D symbology and is a great way to add, move and command many entities at once. The picture below illustrates this; a platoon is shown, comprised of 2 sections, each comprised of 2 squads.



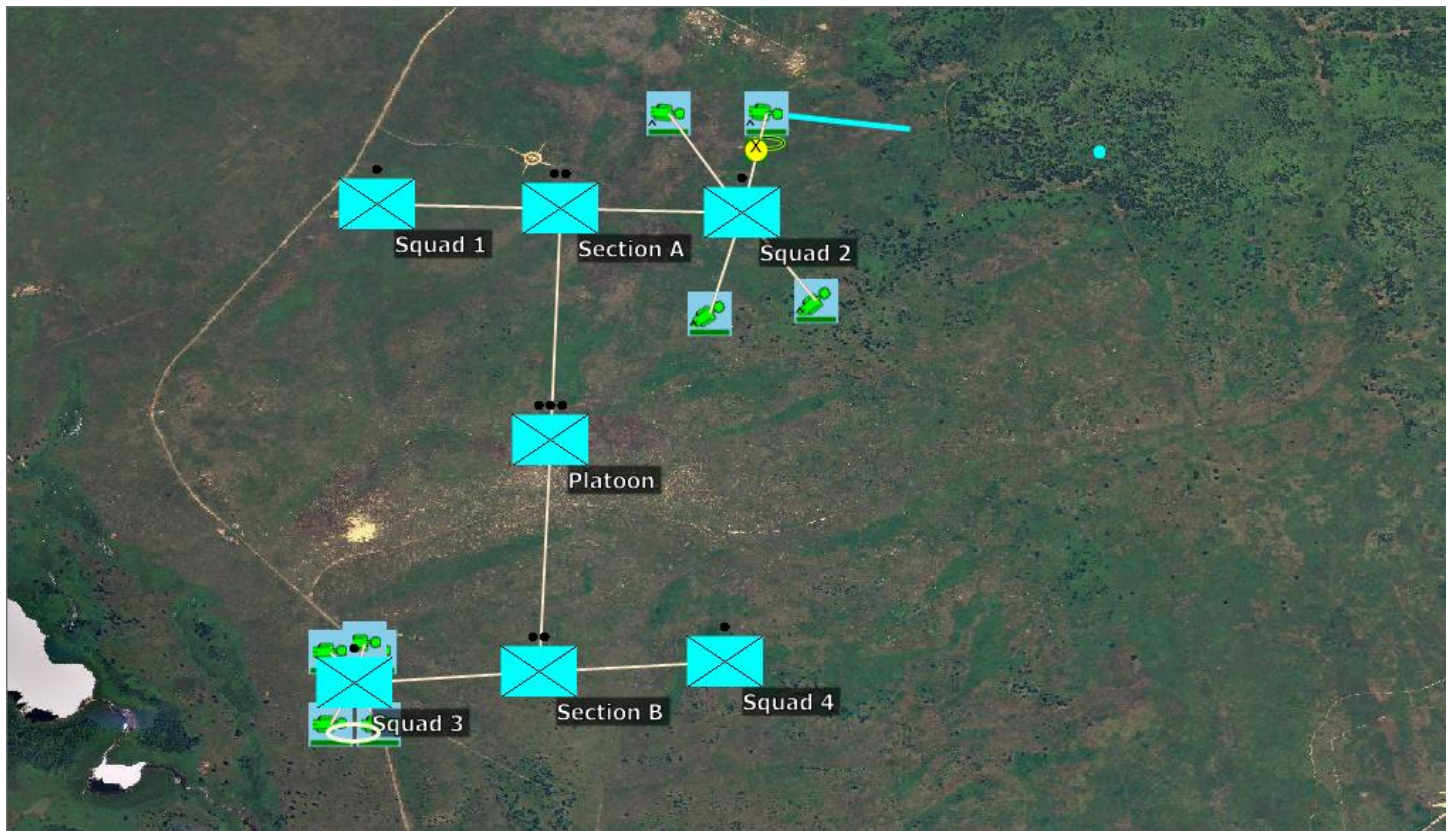
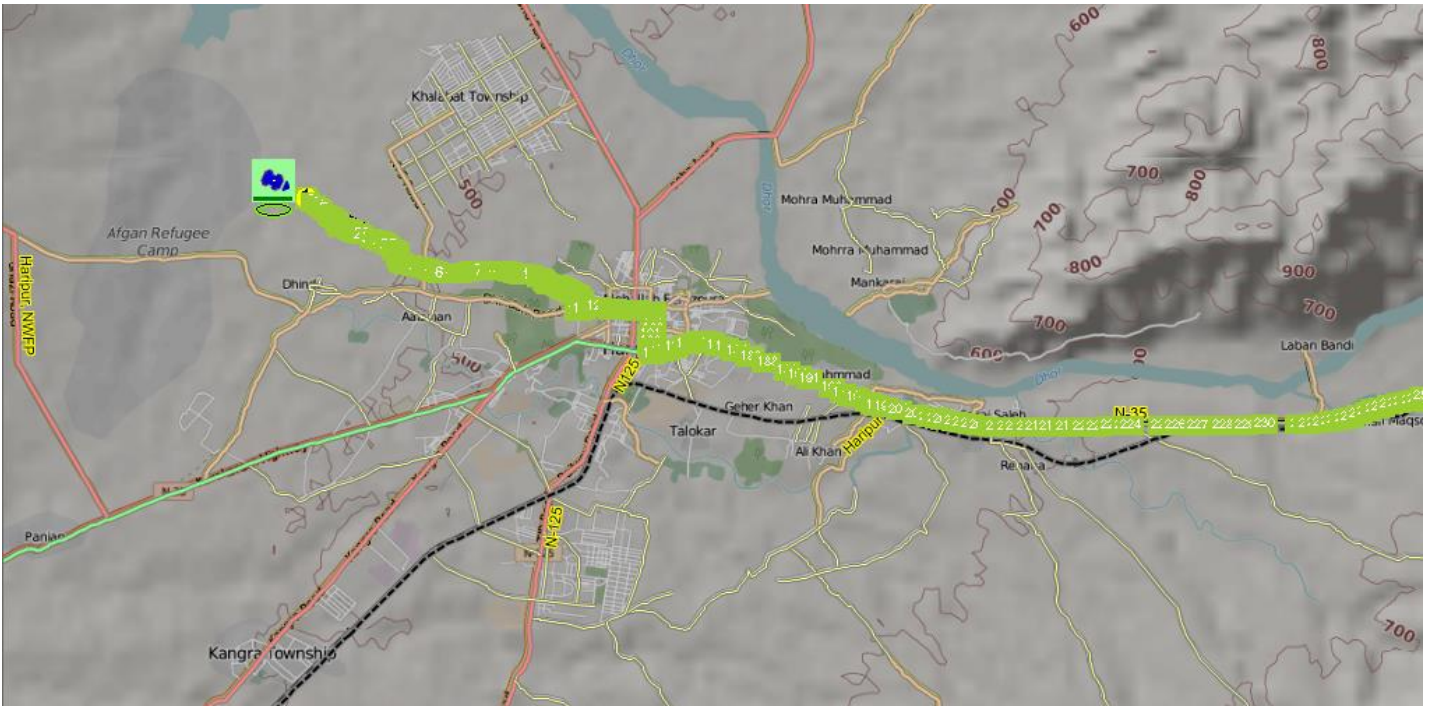
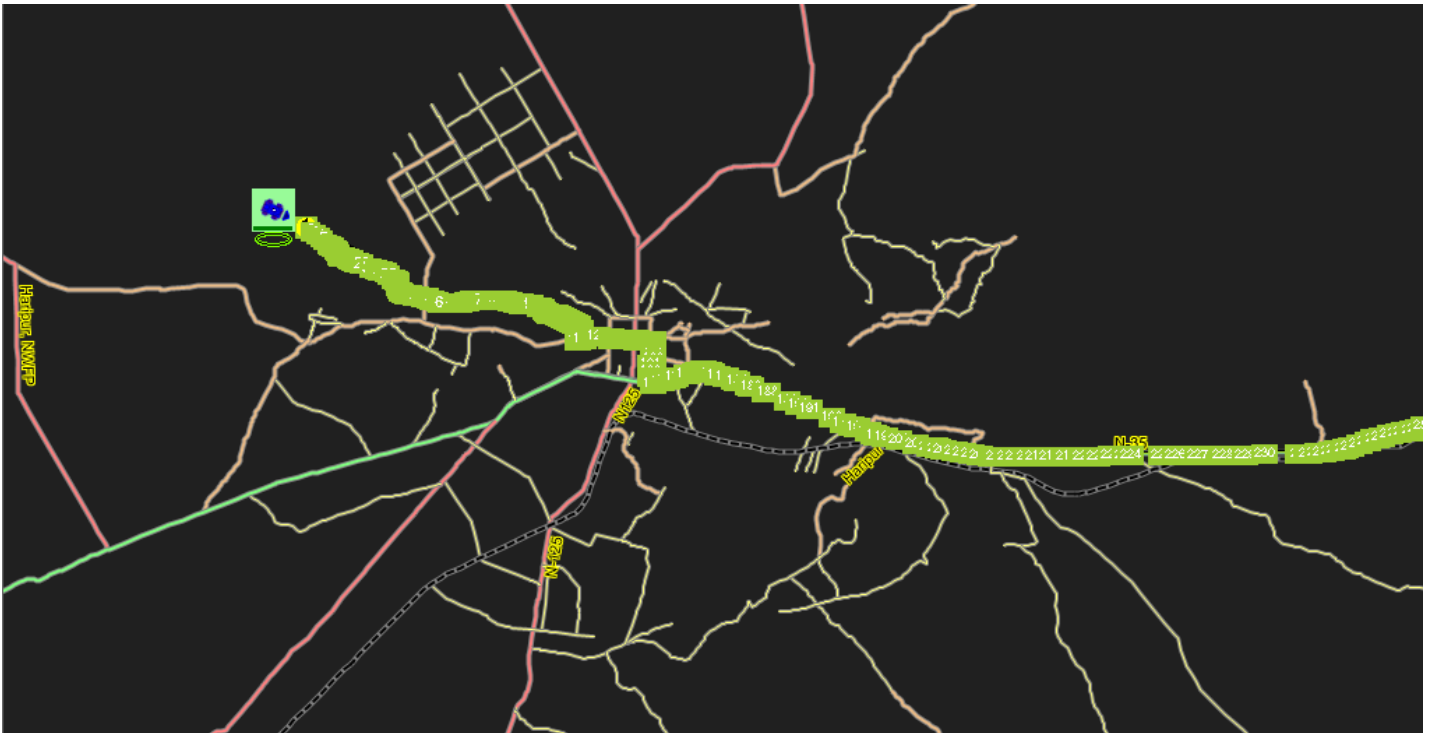


Figure 5: Aggregates of Aggregates

## GIS (Data) Improvements

### Worldwide OpenStreetMap (OSM) Data – New Version

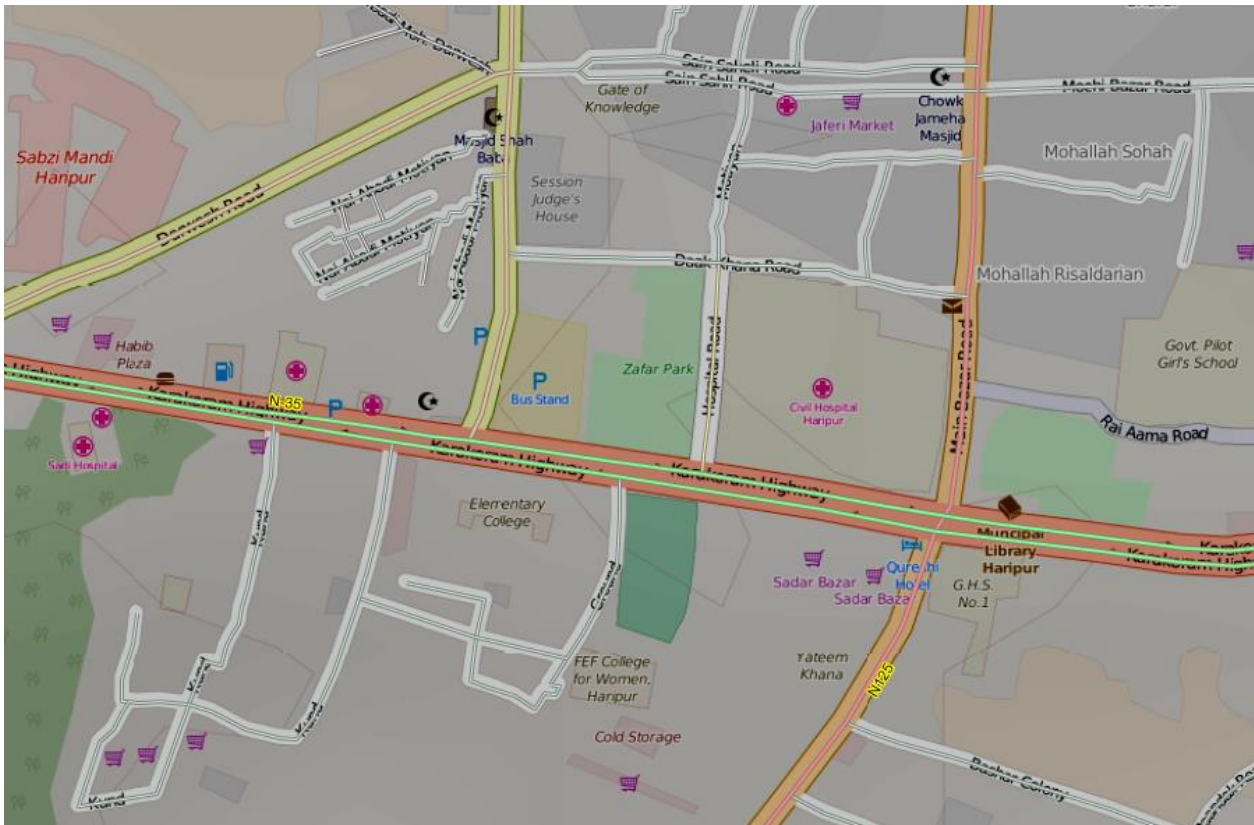
We've updated our OSM database for MACE to include hill shading with elevation contour lines marked in meters. Also, the tile (raster) and vector data are now available on a single instance of Red Hat Enterprise Linux (RHEL), which runs inside a Virtual Machine using either Oracle's VirtualBox or under VMWare. The result is high-quality worldwide GIS data similar to 'Google Maps' but available offline (no internet connection required). And because you can attach vehicles in MACE to the road vectors, you can now easily build missions with vehicles following roads, or build traffic patterns for use in multiple scenarios.



**Figure 6: Worldwide OSM Data (road vectors, top) and Raster (bottom, shown with road vectors on top)**

This is a vast amount of high-quality GIS data; the database even includes building footprints. In fact, in 2017 we expect to add the ability to extract these building footprints as a vector layer (much like you can do now with roads) so that you will be able to set your lifeforms in MACE to pathfind around these buildings. There's even OSM coverage in some areas we didn't expect, like North Korea.





**Figure 7: Tagged Buildings with Footprints in Haripur, Pakistan (from BSI's OSM database for MACE)**

Please contact us if you are interested in the OSM data for your MACE installation.

## User Interface Improvements

### Scripts get their own Tab

The Scripts button has been moved off of the Entity Control tab onto its own tab, where the 'Instant' and 'Conditional' Buttonized Scripts will appear as they are created.

### New Emitter Editor

The SGE comes with an enhanced user interface for creating beam/scan/pulse patterns. You can use this to define advanced, 5<sup>th</sup> generation waveforms (electronic scans and advanced pulse patterns).

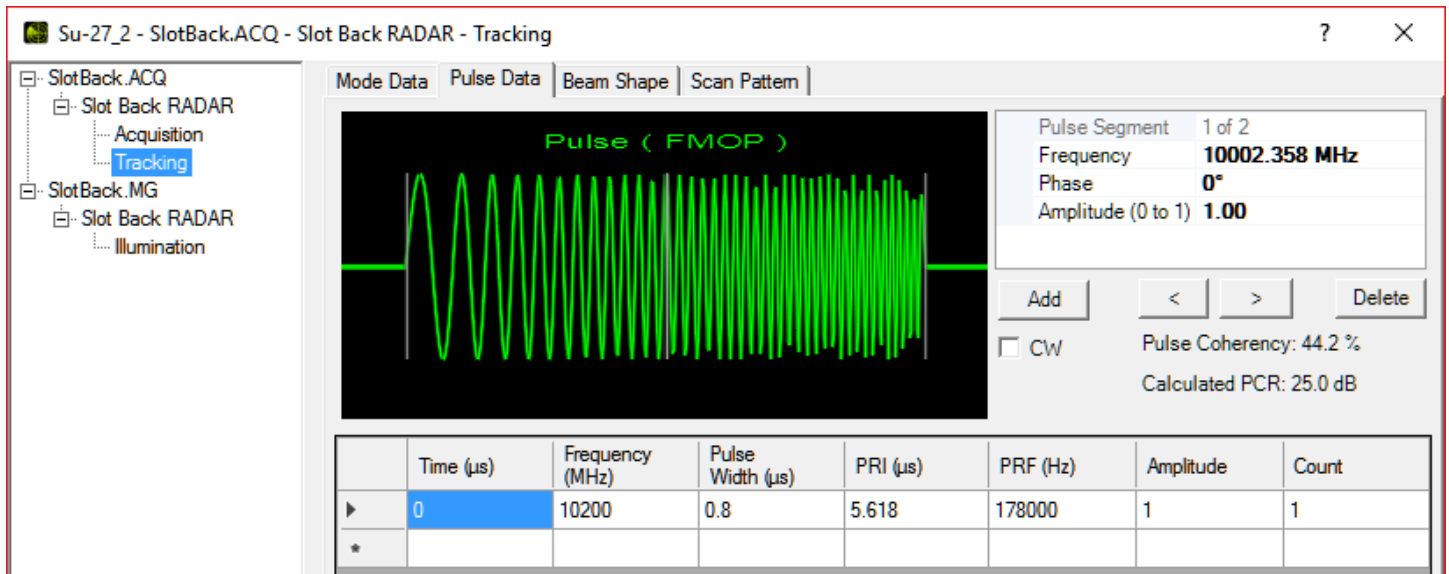
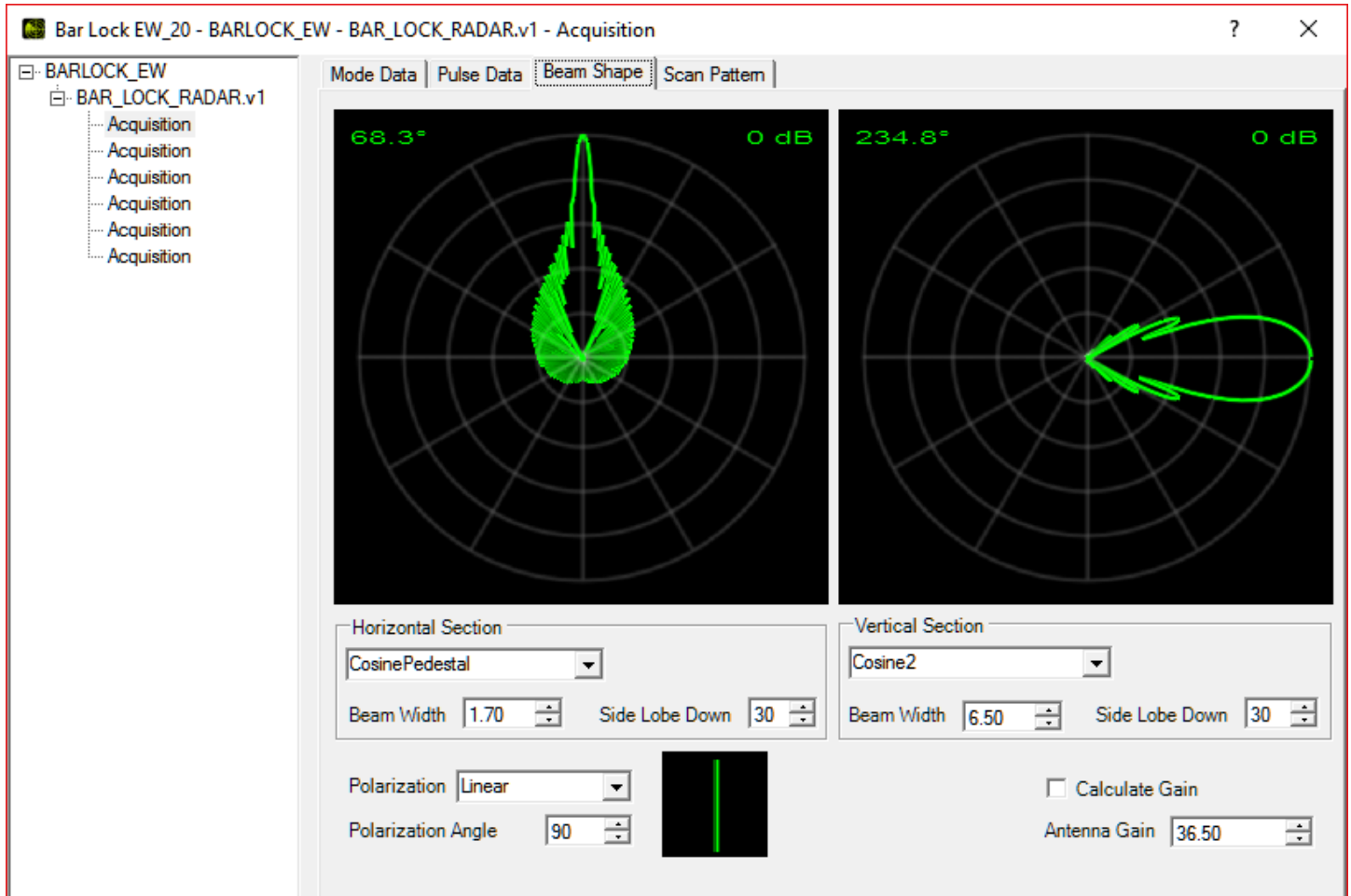


Figure 8: Emitter Editor for creating/modifying radar & jamming systems in MACE



## **New Plug-In Architecture**

We've also introduced a plug-in architecture for MACE with this release. You can write your own code (using Visual Studio 2013) to extend the MACE User Interface or add your own logic into MACE. In fact several features that are included in MACE 2016R2 were written by the BSI team as plug-ins, including the Radar Analysis Tool and 3D Beam Viewer (the latter of which is enabled only in MACE-EW).

If you are interested in writing MACE plug-ins, please contact us for a copy of the MACE Plug-In Template for Visual Studio 2013.

Please contact us at [sales@bssim.com](mailto:sales@bssim.com) for information on how to obtain a fully-functional evaluation copy of MACE.