

2025



EURO-MAG



BATTLESPACE SIMULATIONS

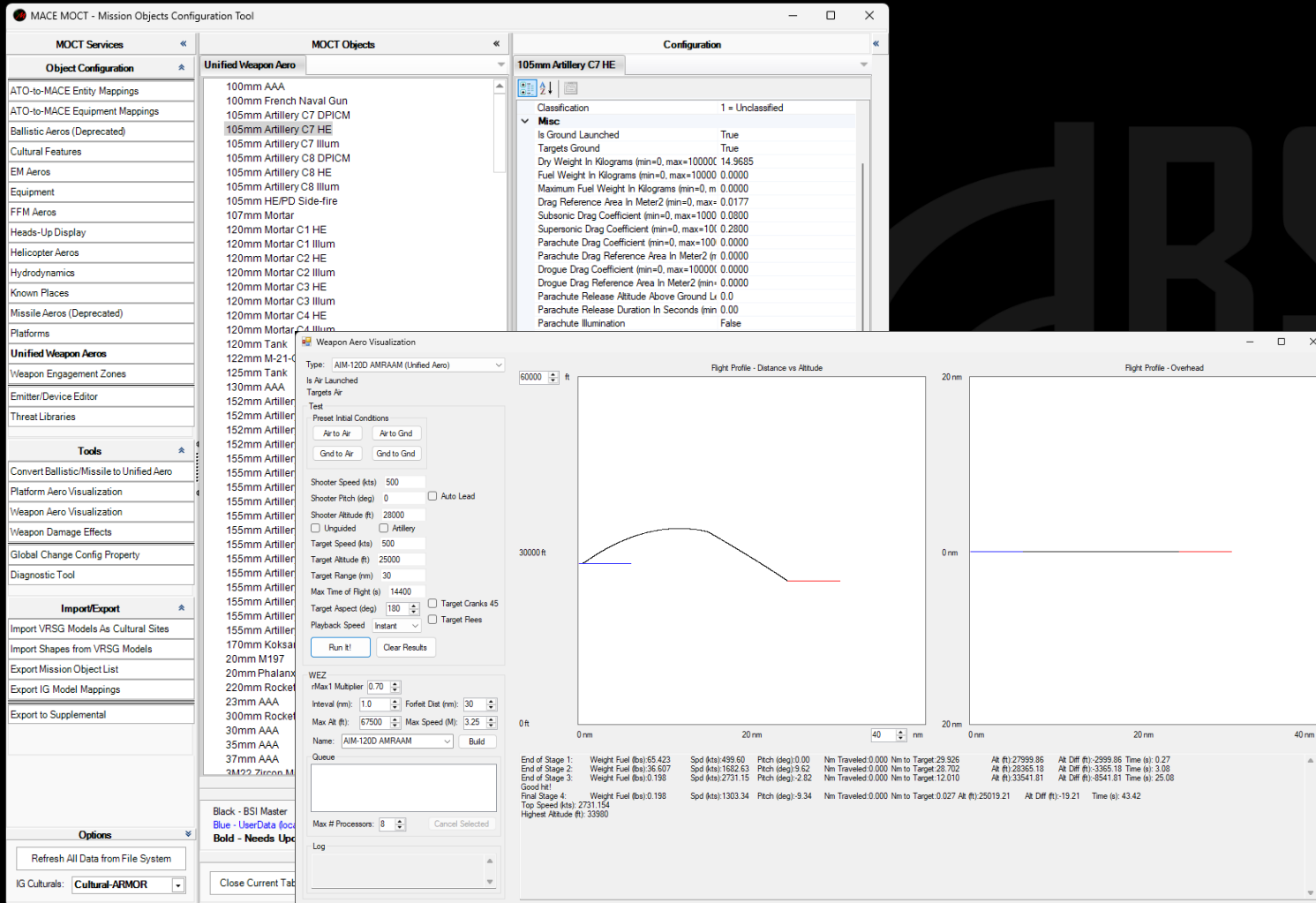
What's New in MACE 2025

Updated Platform Icons



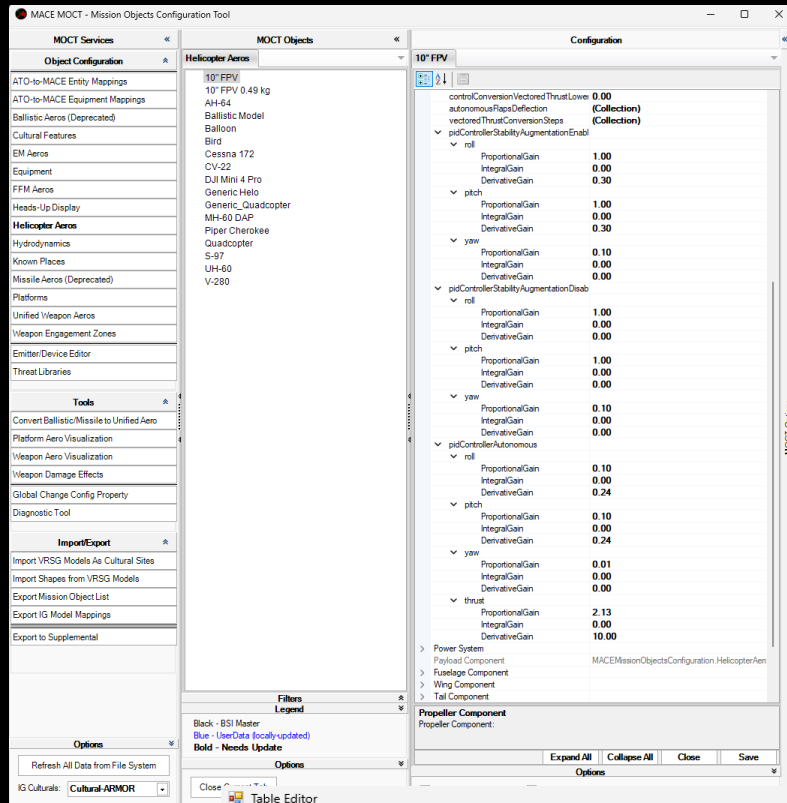
- Use ARMOR model as baseline image.
- Border is team color.
- Weapon stance around health bar.

Unified Weapon Aero

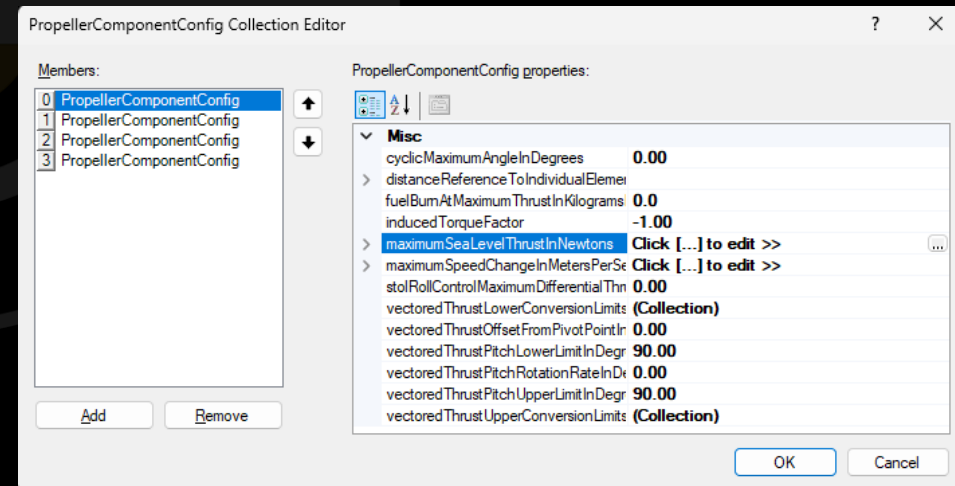


- Deprecated Ballistic & Missile Aeros, replaced by Unified Weapon Aero
- All Metric Units
- Code Consolidation
- Easier to Improve
- Your existing ballistic/missile aeros will continue to work!

Quadcopter Flight Model



- Quadcopter virtual and constructive flight behavior can be customized using PID gains
- Two available virtual flight modes, Stability Augmentation Enabled and Disabled
- Propeller specific thrust profiles



Maximum Sea Level Thrust vs Airspeed

# of Columns:	7	Column Increment:	1.0	Column Units:	Airspeed (m/s)	Apply		
# of Rows:	1	Row Increment:	1.00	Row Units:	Thrust (Newtons)	Revert		
		0 Airspeed (m/s)	1 Airspeed (m/s)	2 Airspeed (m/s)	3 Airspeed (m/s)	4 Airspeed (m/s)	5 Airspeed (m/s)	6 Airspeed (m/s)
▶ Thrust (Newtons)	30.00	29.00	27.00	24.00	20.00	15.00	13.00	
◀								

FPV Plugin

The screenshot displays the FPV Drone interface. The main view is a 3D map of a city with a drone icon and the text "1 3000' AGL 30 kts". The top right corner shows "4.40 GHz". A settings window titled "FPV Drone" is open, showing "Operators" and "Settings" tabs. The "Settings" tab is active, showing "Modelling" options: "Controller RF" (checked, Signal Strength: 100% (-43 dBm)), "Video downlink RF" (checked, Signal Strength: 100% (-48 dBm)), and "Battery drain" (unchecked). Below this, it says "Mapped Hand Controller: RM-TX16S Joystick" and "Active Operator: FPV GUY-01". A table titled "Operators in Mission" is also visible:

Name	PairedDroneName	Control Frequency	Video Frequency
FPV GUY-01	KK	2400 MHz	4400 MHz

At the bottom left, there are battery status indicators: "3.56 v" and "14.20 v". The bottom right corner shows "Quadcopter". A "Control System Properties -- KK" window is open, showing "Aero" and "Physical" tabs. The "Physical" tab is active, displaying various gain and rate settings:

- Pitch Rate (deg/s): 719.634990684314
- Roll Attributes
 - Roll Derivative Gain (K_d): 0
 - Roll Integral Gain (K_i): 0
 - Roll Proportional Gain (K_p): 0.25
- Roll Rate (deg/s): 719.634990684314
- Yaw Attributes
 - Yaw Integral Gain (K_i): 0
 - Yaw Proportional Gain (K_p): 0
 - Yaw Proportional Gain (K_d): 0.03125
- Yaw Rate (deg/s): 719.634990684314
- Thrust Attributes
 - Max Thrust (N): 80

Below the settings, there is a "Max Thrust (N)" section with a description: "The maximum thrust that the drone can generate, typically determined by the propeller and motor specifications. This value is applied across the propeller output thrust profile using the thrust curve defined below." A "Thrust Curve" graph is shown at the bottom, with a blue line representing the thrust profile.

- Capabilities to change PID flight gains and propeller thrust curves during mission runtime
- Different FPV Controller and On-Screen Display options
- Battery thrust modelling
- RF propagation modelling for controller and VDL

Mission Builder

- Platform Descriptions and Images
- Equipment Descriptions

Name	Auto / Enabled	Weapon
100mm AAA	☒	AGM-65 MAVERICK (Entity 1010)
100mm AAA Naval	☒	AGM-65 MAVERICK (Entity 1011)
100mm French		
100mm Tank		
105mm DPICM		
105mm HE		
105mm HE Ra		
105mm HE/PC		
105mm HE/PF		
105mm Illum		
105mm IR Illum		
105mm Tank		
105mm WP		
107mm Mortar		Flare (MJU-7)

Description: The 100mm naval anti-aircraft artillery system represented a crucial component of naval air defense during the mid to late 20th century. Most notably deployed on various destroyer and cruiser classes, these dual-purpose guns could engage both surface and aerial targets effectively. The naval variant typically achieved a rate of fire of 15-20 rounds per minute, with an effective ceiling of approximately 15,000 meters against aerial targets. The system incorporated advanced fire control radar and stabilization mechanisms to maintain accuracy despite ship movement. One of the most prominent examples was the Soviet AK-100 system, which saw widespread deployment across multiple vessel classes and continued service well into the modern era. These weapons proved particularly valuable in providing medium-range air defense coverage for naval task forces.

The screenshot displays the Mission Builder software interface. The top menu bar includes 'Quick', 'File', 'Mission Builder', 'Mission Controls', 'Entity Controls', 'Scripting', and 'Avionics Displays'. Below the menu, there are various tool icons and a 'Builder Tools' section. The main window shows a list of aircraft entities, including A109, A-10C, A400M, AC-130, and AC-130J. The A-10C is selected, and its configuration details are displayed on the right. The configuration includes a 'DIS Type' of 1.2,225,2.4,3.0, a 'Description' of the A-10 Thunderbolt II, and a list of 'Tags' and 'Role' (Attack). The 'Default SCL' section lists various weapons and equipment, such as 1174 x GAU-8 30mm, 2 x Mk-82, 1 x GBU-12 PAVEWAY, 20 x Air Illum Flare, 2 x GBU-38 JDAM, 1 x RADAR Warning Receiver, 1 x TACAN NavAid, 1 x Laser Designator, 1 x ARC-164 Radio, 1 x Visual Detection Airborne (A/L/S), 1 x EPLRS Radio, 60 x Flare (M-206), 60 x Chaff (RR-180), 1 x AGM-65E2/L MAVERICK, and 1 x IR Signature A-10.

Shape Tools and ACO Export

The screenshot displays the ShapeDrawingPlugin software interface. The main window shows a map with a red oval shape drawn on it. Overlaid on the map is the 'Edit Shape' dialog box, which contains the following sections:

- 3D Properties**
 - Lower Altitude (ft): 1000 ft
 - Lower Altitude Datum: MSL
 - Upper Altitude (ft): 15000 ft
 - Upper Altitude Datum: MSL
- ACO**
 - ACO Effectiveness: BRFL
 - ACO Shape: ORBIT
 - ACO Type: ROZ
 - ACO Usage: AAR
 - Control Authority: 123.0 MHz
 - Control Frequency: 4/21/2025 10:08 AM
 - From: 4/22/2025 10:08 AM
 - To: 4/22/2025 10:08 AM
 - Use in ACO: True
- Appearance**
 - FillColor: 127, 255, 0, 0
 - Opacity: 0.50
 - Stroke Color: Red
 - StrokeStyle: Solid
 - StrokeWidth: 2
- Dimensions**
 - Length (nm): 11.93 nm
 - Width (nm): 3.60 nm
- Location**
 - Offset: Center
 - Point 1: Latitude: 43° 37' 17.28" N Longitude: 43° 36' 35.40" N Longitude
 - Point 2: Latitude: 43° 36' 35.40" N Longitude
- Misc**
 - Name: Orbit

Below the dialog box, a table lists the vertices of the shape:

Name	Latitude	Longitude
	43.649629357341468	-116.39536404586821
	43.641588613785395	-116.20427457785635
	43.641596273874846	-116.2044677837945
	43.640871478491889	-116.19734496246694
	43.639262189493465	-116.19050458952793
	43.636817372714283	-116.18415476615176
	43.633611409130587	-116.17848860799349
	43.6297418231752	-116.17367835581088
	43.625326305874466	-116.16987013271141
	43.620499124907781	-116.16717950843659
	43.61540703235503	-116.16568800494156
	43.6102047959932	-116.16544064736159
	43.605050491090758	-116.16644463138576
	43.600100696434453	-116.16866914324189
	43.595505740661864	-116.17204633310186
	43.591405142861426	-116.17647340785965
	43.5879233849751	-116.18181577594802
	43.585166143055268	-116.18791114606817
	43.5832170902517	-116.19457445419987
	43.582135366996837	-116.20160346969742
	43.581953793748433	-116.20878491218366
	43.5818463468682	-116.20897508080858
	43.589887090424284	-116.40006517738843

ATO Export

The screenshot displays the MACE Evaluation License software interface. The main window shows a map with various aircraft icons and flight paths. The 'ATO Export' menu is open, listing options such as 'Common Route (.crd)', 'Cultural Shapes (.shp)', 'EOB 318 (.bt)', 'EOB PCI (.pci)', 'Group Template (.xml)', 'GPS Exchange File (.gpx)', 'MACE Route(s) (.xml)', 'Master Entity List (.csv)', 'Mission as MSOL (.msol)', 'Mission as XML (.xml)', 'Mission Roster (.bt)', 'Mission w/External Entities', 'Nav Point Entities (.xml)', 'Scripts (.xml)', and 'VRSG Cultural (.clt)'. The 'MACE Script Editor' window is also visible, showing a list of scripts and a detailed view of the 'Refuel FALCON11' script. The 'Descriptor Editor for FALCON11' window is open, showing the 'Command: GenericEngagement' and 'TASKUNIT: 51SQDN'.

- Create a route with loiters to setup missions.
- Script trigger time and set refueler to assign refueling.
- Use Descriptors to further refine

Expanded Aeronautical Database Support

- Added Xplane and OurAirports database support to MACE
 - Both supported in API via shared libraries
- Enables worldwide support for METAR import (environmentals)
- ICAO diverts
 - “Land EGDM Rwy05”

Expanded Datalink Message Support

- J13.3, 13.5
- K02.4 Call For Fire
- K02.6 Observer Mission Update
- K02.9 Target Data
- K02.12 Command To Fire
- K02.14 Message To Observer
- K02.16 End Of Mission

Additional MACE Improvements

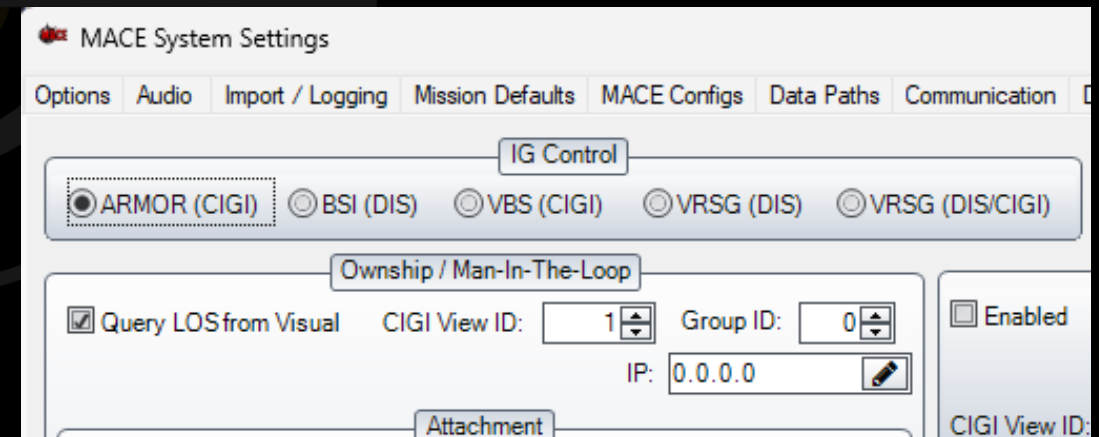
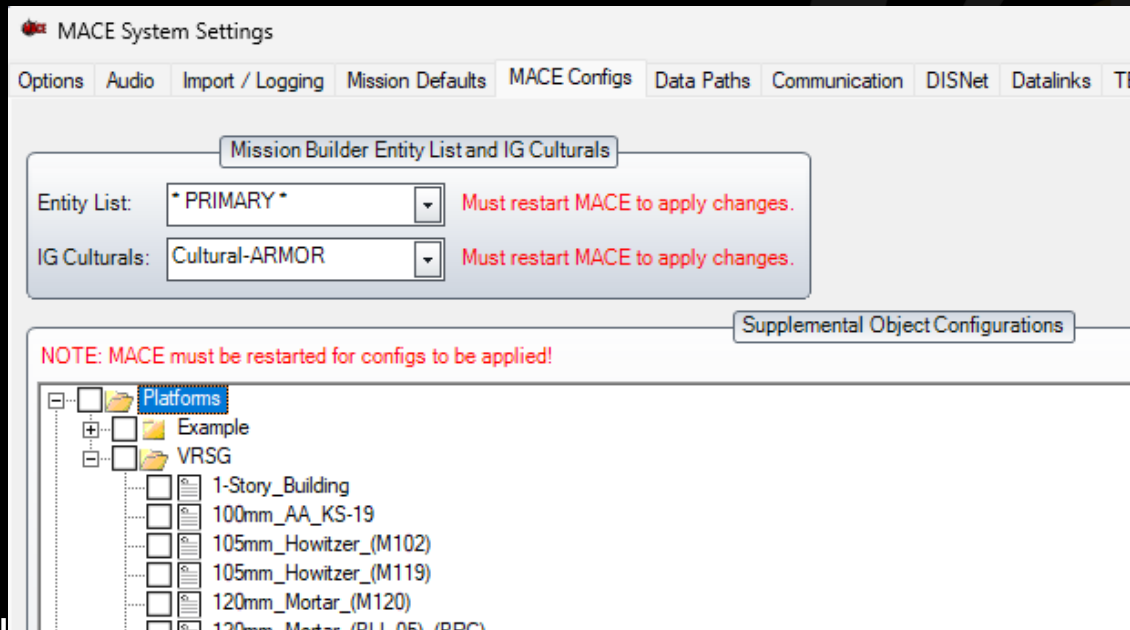
- Helicopter Formation Improvements
- Autonomous Dropped Munitions (from Quadcopters)
- Quickly manually create J3 tracks from the map.
- MARC for Surface Vessels
- RF Noise/Clutter from Sea States
- Satellite improvements
 - [YouTube Video](#)
- Many, many, more...

Additional Improvements (cont)

- IADS Builder Overhaul
- Improvements to TAC Display
- Recycle bin gone - Delete on context
- LZ - approach lane
- Formation on ground for aircraft
- Scale Bar on Map

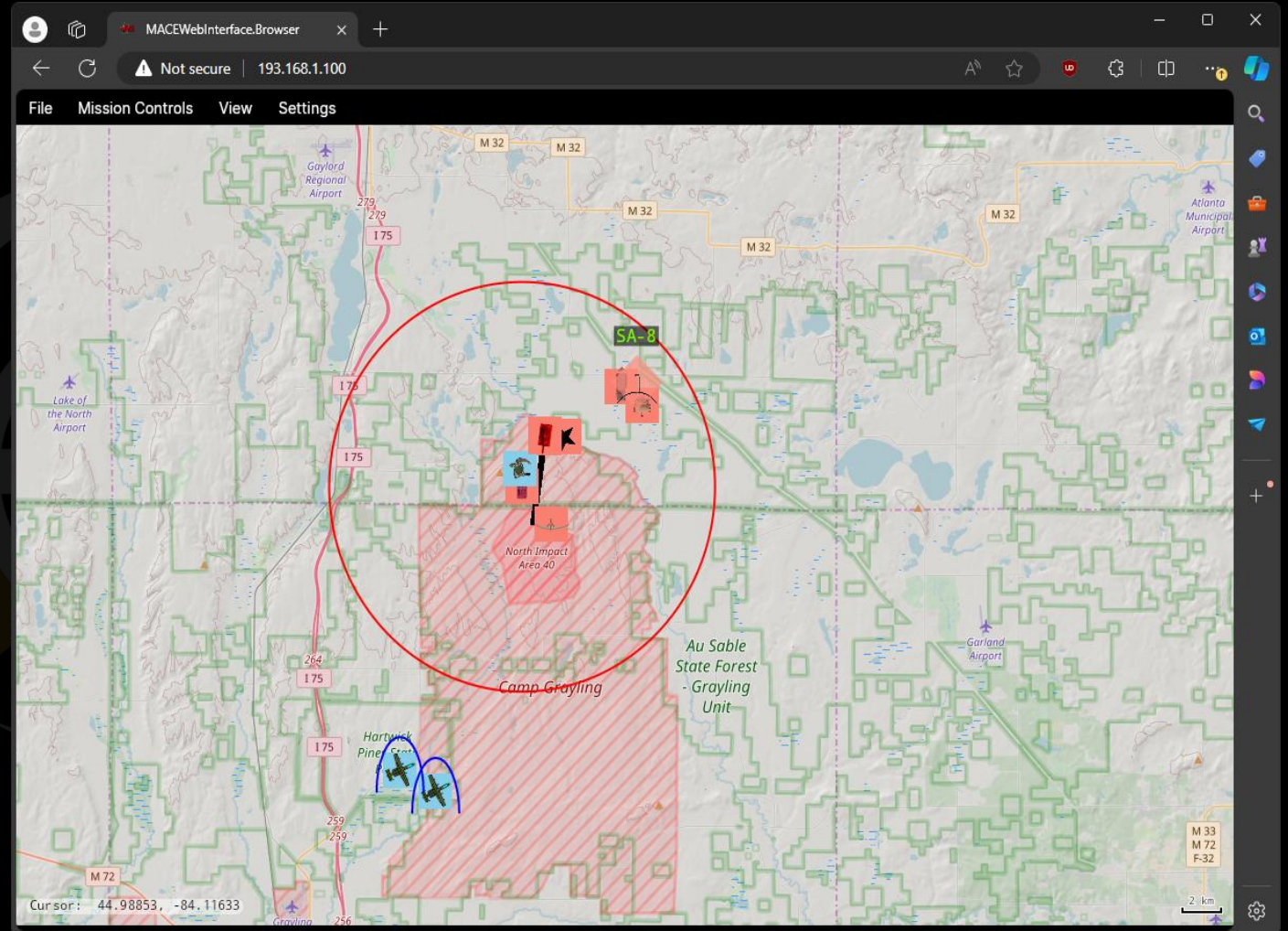
Default to ARMOR IG

- Defaulted cultural list to “Cultural-ARMOR”
- Defaulted IG Control to “ARMOR IG”
- Base Configs are now synchronized with ARMOR.
 - Use Supplementals for VRSG



MACE Web UI

- Draw Platforms / Weapons / Aggregates / Datalinks / WEZs / Laser Designations
- Basic entity control.
- Configure weapons.
- Set platform properties.
- 9-Line
- 5-Line
- CFF



MACE Web API

- Better support for multi-client connections
- More stable socket states
- Additional Sockets
 - Ownship
 - J12.6
 - New shapes (in development)

API Enhancements

- MIL-STD-2525 Symbols Library
- CIGI Symbols Library for custom overlays
 - CIGI v4 compliant
 - Supports textures

MACE Development Roadmap

MACE Development Roadmap

- Historical Background
- Changes in MACE 2025R1
- Goals
- Expectations
- Timeline



Historical Background

- MACE's first commercial release 2011
 - VB.NET
 - C++ (DIS library)
- SGE introduced 2015
 - Device Simulation Container
 - Signal generation runtime
 - C#
 - SimulationLibrary
 - BSILib
- Peaceful coexistence until . . .

Historical Background (cont)

- Microsoft ceased extending VB.NET with new framework improvements in 2020
 - VB.NET in “maintenance mode”
 - New language features limited to C# and F#
- VB.NET effectively unsupported for cross platform applications

MACE 2025R1

- Migration of entire MACE code base to C#
- .NET 4.8.1
- Consolidation of internal libraries

Near Term Expectations

- MACE2026R1
 - .NET 9/10-windows compatibility
 - Skia drawing (migrate from DirectX)
 - Game controller and audio refactoring
 - Starting parallel development of .NET Core headless
 - Linux
 - Android
 - iOS, OSX
 - Unlikely to complete in 2026
 - Dark mode

Goals

- .NET core compatibility
 - Cross platform
- Division of UI and core runtime
 - Migration away from Winforms
 - Adoption of more modern idioms for common tasks
 - Serialization
 - No more BinaryFormatter serialization

Third Party Integration

- MUST recompile any extant plugins for MACE2025R1
 - Interface function signatures changes
 - Technical Bulletin will be published when interface changes are finalized
 - Expected December 2025
- SDK style projects
 - Templates already migrated
 - 4.8.1
 - Templates with optional UI coming
 - .NET 9+



One high fidelity simulation framework

Multiple use cases

For help contact: support@bssim.com

www.linkedin.com/company/battlespace-simulations-inc-/

www.youtube.com/BattlespaceSims