BATTLESPACE SIMULATIONS

Don't settle for only part of the battlespace

Conflict is often determined by what is not seen, such as: Beams and Waves (Lasers, Radars, RF and IR), Countermeasures (Decoys & Jamming), Communications (Radios & Datalinks). BSI specializes in multi-domain combat simulation & analysis in near-peer threat environments, simulating the entire battlespace, seen and unseen using our flagship products: MACE, ARMOR, and Merlin.

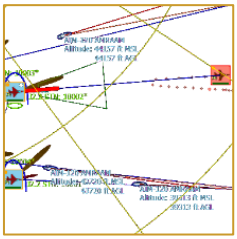
Together these applications provide:

Pulse-level fidelity – Physics-based movement – Worldwide geo-specific terrain – Integrated AI capability

WHAT PEOPLE USE OUR PRODUCTS FOR

Mission Preparation Analysis & Rehearsal (MPAR)

- Uses worldwide GIS data and Mil data to create battlespaces
- Import/Export data for use in other systems
- Simulate, iterate, visualize & analyze with diverse toolset



Computer Generated Forces

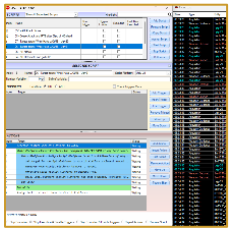
- Multi-domain simulation of tactical platforms & pattern of life
- Driving full mission simulators & distributed simulation
- DMON and CAF-DMO certified

Joint Fires Training

- Accredited as part of national JTAC training
- Train with accurate weapon, flight, and threat models in contested battlespace
- Out-of-the-box integration with DACAS systems

sUAS / ISTAR Training

- Offensive and defensive UAS missions
- Simulate all critical aspects – EM effects, accurate sensor views
- Train, analyze, prepare and rehearse in contested EM battlespaces



Design Analysis

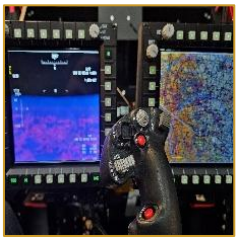
- High detail user-definable content and model parameters
- Constructive scripting engine and code scripting interfaces
- Control multiple scenario iterations & logging

Live Virtual Constructive Simulation

- Live connection with military systems
- Produce synthetic tracks in real-world systems
- Drive software defined emitters

EW Training & Testing

- Complex IADS creation, interaction and editing at pulse-level
- Physics-based countermeasure evaluation
- Multiple visualization and analysis tools



Targeted Fidelity Training

- User-configurable flight models
- Generic avionics and combat displays
- High detail 3D multi-spectrum virtual environment

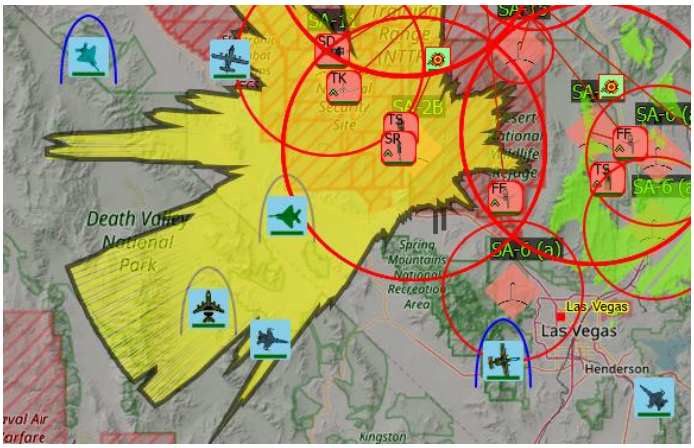
www.bssim.com | sales@bssim.com | www.linkedin.com/company/battlespace-simulations-inc-/ | www.youtube.com/@BattlespaceSims

BATTLESPACE SIMULATIONS

MACE

MACE is a Windows application and framework capable of performing multi-domain simulation and analysis within realistic scenarios, in contested, near-peer adversary environments. It performs physics-based many-on-many simulations, using pulse-level modeling of the electromagnetic spectrum. Detailed simulation of threat environments and precise modelling of sensors enables users to create highly relevant, accurate battlespaces with high fidelity engagements and behaviors.

WORKFLOW: Build and execute scenarios by selecting, dragging, dropping onto a mission area, configuring: platforms, equipment, and autonomous or semi-autonomous behaviors. MACE is built upon a mature Geographic Information System (GIS) core, it has a 2D mission area view of the 3D environment, supporting multiple standard GIS map, elevation & imagery formats.



PHYSICS-BASED SIMULATION: MACE is a real-time physics-based simulation; modeling platform motion such as aircraft, ground vehicles, surface vessels, satellites, and weapons. It models sensors and communications required to make a fully realistic scenario.

The simulation can be fully constructive (hands-off), semi-autonomous, or full human in the loop.

SIGNAL GENERATOR ENGINE: MACE simulates the electromagnetic spectrum (such as electronically scanned radar systems typical of 'double-digit' threat systems, multimode seekers, datalinks and jammers) at the pulse-level. It models all RF (radio and radar) transmitters and receivers for all entities in the MACE mission, and infra-red signal generation and detection. MACE comes with notional IR and RF signature and parameters; users can edit and define emitters with multiple parameters (e.g. beam properties, scan and pulse patterns) and input their own signature data.

USER EDITABLE & EXTENSIBLE DATABASE: Out-of-the-box, MACE comes with an unclassified database; any user (even without developer experience) can extend the MACE order of battle, including new platforms and weapons, movement and emitter models. Edit and adjust the database with accurate data using the same tool as BSI use internally; the Mission Object Configuration Tool (MOCT). For US DOD customers, there is a classified MACE database available for download.

INTEROPERABLE: MACE is ideally suited for both stand-alone scenario creation/mission rehearsal and distributed mission simulation; interoperable with other simulations via the Distributed Interactive Simulation (DIS) and Common Image Generator Interface (CIGI) standard protocols. HLA interoperability is in the planned development roadmap.

SIMULATION FRAMEWORK: MACE is a Simulation Framework that includes a plug-in architecture (C#/.NET) allowing any software developer to add or modify features and capabilities. Users can also write their own semi-autonomous functions from within MACE itself either using a simple UI or using snippets of C# code. Users have access to all the object models in the MACE mission. This means that your software engineers can add new functionality (e.g. visual displays, custom plugins), change default behaviors and mine data for analysis.

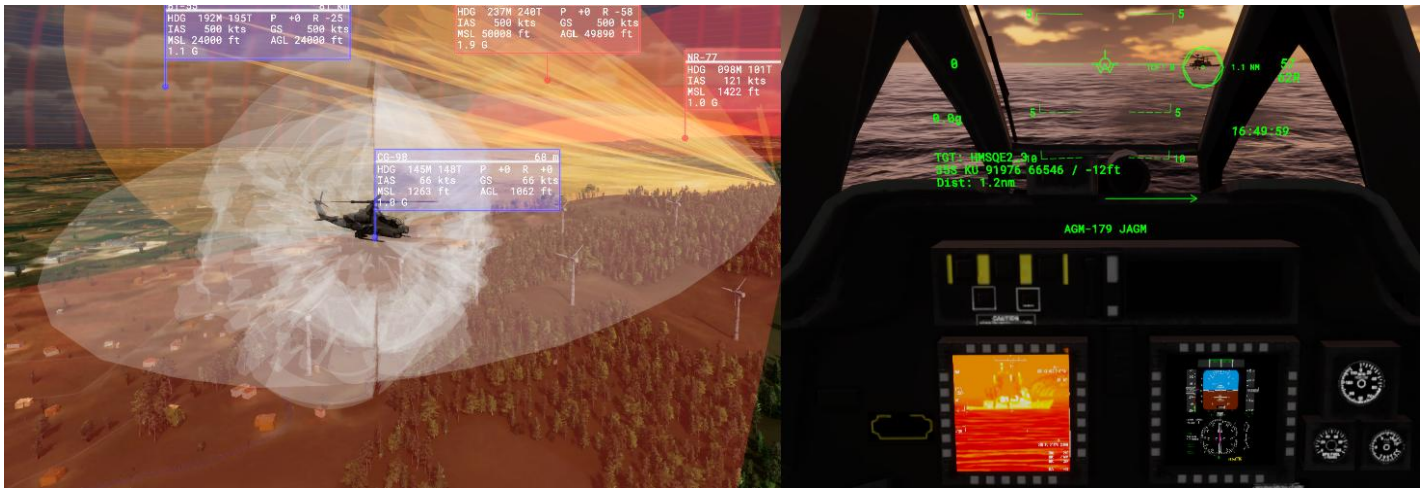
BATTLESPACE SIMULATIONS

ARMOR

ARMOR is a full-planet, round earth, Unity-based 3D visual image generator (IG). It enables interaction with the simulation from multiple perspectives: from first-person control to table-top planning and sensor viewpoints. It supports multiple visual systems from screens and multichannel systems, virtual and mixed reality. Users can generate ARMOR terrain anywhere in the world without any prior GIS expertise.

INTEROPERABLE IMAGE GENERATOR: ARMOR is a CIGI based image generator and can be used with or without MACE by any application that supports the CIGI 4.0 protocol. ARMOR can run on the same PC as MACE (every full MACE ships with a local copy of ARMOR at no extra charge) or as a standalone image generator on networked PCs.

MULTI SPECTRUM VIZUALISATION: With MACE and ARMOR, you can visualize things you normally can't see e.g. radar beam and scan patterns, jamming corridors, 3D radar cross-sections, route vulnerability analysis, line of sight coverage, sensor frusta etc. – all of which are critical to planning against a sophisticated adversary. Emulated sensor views provide visual and material-based (per pixel modelling) IR spectrums, and Night Vision.



RAPID CAPABILITY DEVELOPMENT: With ARMOR it is possible to develop new capabilities at a very rapid pace by leveraging the huge Unity developer community and vast content catalogue. This results in significantly lower engineering costs than when developing with propriety engines.

ARMOR is built with COTS procurement in mind; it runs on normal game specification PCs, and you can plug and play with a multitude commercially available XR equipment.

ACCREDITABLE: MACE and ARMOR have already been accredited for the Joint Fires training simulations, replacing live events as part of national JTAC training programs.

BATTLESPACE SIMULATIONS

MERLIN

Merlin is a companion AI agent application designed for MACE. It serves as an intelligent interface that allows users to interact with MACE events and functionality through a natural language chat interface. Merlin is integrated directly into MACE EW. It vastly reduces the technical knowledge required to make scenarios in MACE and allows a multitude of source data to be parsed into MACE scenarios without any programming or reformatting.

TECHNICAL SKILL NOT A BARRIER: Why does this AI-driven technology matter for the Warfighter? Because technical knowledge shouldn't be a barrier to mission readiness. Merlin takes user instructions and makes mission content.

MULTIPLE DATA FORMATS NOT A BARRIER: There is a 'Tower of Babel' problem, where there is so much data that a human cannot easily parse and understand all the different formats. Merlin makes sense of it all and brings it into your MACE missions the way you need.

RAPIDLY BUILD MISSIONS AND CONTENT: You can use the Merlin AI plugin to create complex scenarios by entering text or voice prompts, providing images, maps (and other relevant data in multiple formats). Merlin does the hard work of collating relevant data and getting it into MACE scenarios or creating MACE entities such as complex emitters or large drone swarms, etc. All can be handled by Merlin while you work on other parts of the scenario. Merlin really is your indispensable scenario and content creation partner.

User Prompt to MERLIN

File: RUS Helo Base.jpg
Using the diagram of a typical laydown of a Russian of deployed helicopter base place units within the Helicopter base location shape including 4 Hind attack helicopters in the LZ area, on the ground using each of the landing zones points described in the mission context L1 L2 L3. Make sure the helicopters are placed at least 10m from each other but not more than 40m. Make the helicopters all face into wind. Place trucks and command vehicles in the base. Place parameter security vehicles with some at the nodes of the helicopter base shape. Make sure the security forces reasonably evenly spread, facing outward, and are within 100m of the perimeter inside the shape. Ignore the air defence items in the image. Place up to 2 fuel trucks near the Helicopters.

Internet Sourced Recon Photo

MERLIN Final Response

Placed a **Red deployed helicopter base** inside the **"Red Forces Helicopter Base"** shape and populated it per your instructions (ignoring any air-defense items from the reference image).

4x Hind attack helicopters (grounded) in the LZ area using L1/L2/L3
Created **4 grounded Mi-24** and positioned them using the **L1/L2/L3** points as references while ensuring **all helicopter-to-helicopter spacing is between ~12m and ~34m** (meets your **10–40m** requirement):

- **RED-HIND-01** at **L1**
- **RED-HIND-02** near **L2** (slightly offset to meet spacing)
- **RED-HIND-03** near **L3** (slightly offset to meet spacing)
- **RED-HIND-04** near **L2** (extra pad position inside the LZ area)

All 4 helos are facing into the wind: heading set to **060°** (wind from 060° per mission weather).

Fuel trucks near the helicopters (up to 2)
- **RED-HB-FUEL-01** (Ural-4320, Green) near the helos
- **RED-HB-FUEL-02** (Ural-4320, Green) near the helos

Trucks + command vehicles inside the base
- **RED-HB-CP-01** (ZIL-131CP) placed in the base support/command area
- **RED-HB-TRK-01** (Ural-4320, Green)
- **RED-HB-TRK-02** (Ural-4320, Green)
- **RED-HB-CMD-02** (GAZ-66)

Perimeter security vehicles (inside shape, within 100m of perimeter, outward-facing)
Placed **8x BTR-80** security vehicles **inside the helicopter base polygon**, distributed around the perimeter with **some positioned near the polygon's corner nodes**. All were set **facing outward** (heading away from base center) and placed ~**30m inside the perimeter** (well within your **100m** requirement):

- **RED-HB-SEC-01** .. **RED-HB-SEC-08**

Posture/settings
- All new units set to **Red**
- Security and helos set **Weapons Free** and **Passive engagement posture** (consistent with how you've been configuring Red forces so far)

Results in MACE and ARMOR

BATTLESPACE SIMULATIONS

Trusted Worldwide

YEARS OF INVESTMENT	ESTABLISHED WORLDWIDE	TRUSTED	BROAD USER BASE
20+ years US DoD and international investment in the technology	2000+ Licenses Worldwide in Multiple Use Cases: Training, Research, Design, & Operational	Installed on more US weapon-system simulators than any other software of this kind	Armies, Air Forces, Navies, Special Operations, Research organizations, & Defense Companies

US Users

- *USAF Academy (Enterprise License)
- *US Marine Corps (Enterprise License)
- *ACC, AFSOC, ANG, JSIL-MJAT - MQ-9 Reaper
- *JTC-TRS / USAF ASOS-STS-CTS - JTAC training
- 7th SOS aviation mission rehearsal
- 160th SOAR aviation mission rehearsal
- 160th SOAR MH-6, MH-47, MH-60 simulators
- ACC A-10 program
- AFSOC - C-130J WST
- AFSOC - AC-130J ACT/WST
- AFSOC - MC-130J WST
- AFSOC - CV-22 FTD/FFS/desktop trainer
- AFSOC - MROC / mission rehearsal
- AFSOC - ARES-D
- MALET-JSIL Aircrew Trainer
- SOTACC - JTAC / CAS classroom training
- MARSOC / SOTACC - JTAC / joint fires classroom
- AFRL - JTAGSS / ASOC / JTAC trainer
- AFAMS
- DMOC / 705 CTS - distributed mission operations
- DTOC - distributed training
- Combat Air Forces DTC
- NMON at Nellis AFB
- ACC / 526th IS - intelligence training
- 805 CTS / ShOC-N / JADC2
- 1AF / AFNORTH / NORTHCOM
- AETC / 479 OSS CSO School –
- ACC - HH-60W WST/OFT
- ANG ASOS/STS - AAJTS / JTAC training
- NSWG-1 - JTC-TRS
- CAVE / EWTGLANT / US Navy
- Naval Postgraduate School
- NAWCTSD Orlando
- JPARC Alaska
- ACC / 549 CTS - iATTACK LVC program
- USAFE-AFAFRICA Warfare Center / WPC
- Polygone / WPC - electronic warfare range
- USFJ DJFT - Deployable Joint Fires Trainer / JTAC

International Users

- UK DSTL – Multiple research projects
- UK MOD CH-47 simulators
- NATO TLP Spain LVC Training and COMAO Training
- European Multinational Helicopter Tactics Centre
- Finnish Defence Forces – F/A-18 simulator
- Sweden Gripen Simulator
- Swedish Air Force Helicopter Wing - helicopter
- German Aerospace Center – Concept Development
- UAE Presidential Guard - Joint Fires / JTAC/JFO
- Royal Jordanian Air Force –JTAC Training
- Canadian DND / CAF - JTAC VTS, including SOFCOM
- Royal Australian Navy / AIR 9000 - Helicopter Sim
- Netherlands Ministry of Defence
- NATO (NSPA) – Model Based Systems Engineering
- Hellenic Air Force – EW Tactics School
- Slovenia - JTC-TRS
- Latvia - AAJTS / JTAC training
- German Air Force – Link 16 training

** 50+ licenses or enterprise licenses*

www.bssim.com | sales@bssim.com | www.linkedin.com/company/battlespace-simulations-inc-/ | www.youtube.com/@BattlespaceSims