# BATTLESPACE SIMULATIONS INC

Don't settle for only part of the Battlespace

# GAINING A COMPETITIVE EDGE IN AN INCREASINGLY CONTESTED WORLD

Make no mistake: our near-peer adversaries are closing in on us. The technological gap between Western-allied nations and our autocratic rivals is shrinking. Armed with the latest capabilities and the means to engage effectively at every level of warfare, we're facing an enemy that's more sophisticated, more complex, and more dangerous than it has been for decades.

New and emerging threats from across continuously evolving, previously inconceivable domains mean we must better prepare personnel for unknowns on the battlefield. Simulation can – and must – play a huge part in achieving this. It offers a more accessible, cost-effective and less risky means of training that's often just as challenging, realistic and effective as the real thing.

It's why we've spent nearly twenty years working in the simulation space, developing and refining solutions like MACE and ARMOR – the first of their kind to simulate Electronic Warfare (EW) in a contextually relevant, realistic and real-time scenario. Armed with both, trainees can rehearse in a virtual world so true to life that they're better prepared for action in the real one.

**40+**
major combat systems use MACE, each with diverse training requirements

**17+**
international commands rely on BSI software, spanning 10 countries
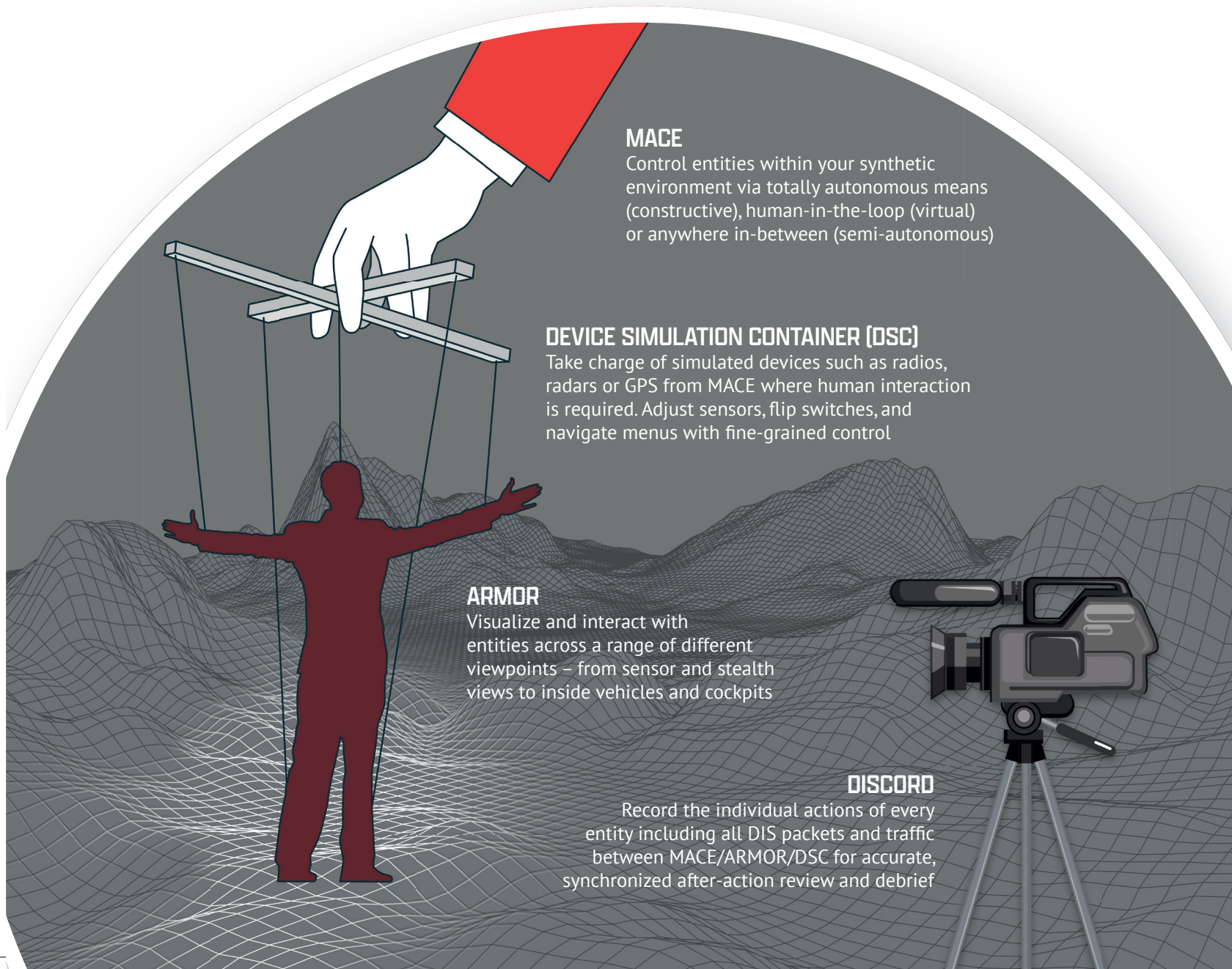
**15+**
years of DoD and international development in our technology

## MODERN AIR COMBAT ENVIRONMENT (MACE): FULL SPECTRUM COMBAT SIMULATION FRAMEWORK

MACE is where you can build and execute training scenarios across multiple domains including air, land, sea and space, each simulated to the hidden electromagnetic spectrum. It's an out-of-the-box PC-based solution comprising a 2D view and support for industry-standard mapping and terrain data formats, providing a complex, realistic and relevant worldwide battlespace.

## AUGMENTED REALITY MISSION OBSERVATION AND REHEARSAL (ARMOR): NEXT-GENERATION VISUALIZATION FOR THE SYNTHETIC BATTLESPACE

Powered by Unity and packaged with MACE, ARMOR is a real-time 3D environment and CIGI-capable Image Generator (IG). Users can build ARMOR terrain anywhere in the world directly within MACE, allowing users to rapidly create and visualize the 3D battlespace from any perspective – from first-person VR in an F-35 cockpit to table-top AR in the back office – for a more immersive, realistic training experience.

### MACE
Control entities within your synthetic environment via totally autonomous means (constructive), human-in-the-loop (virtual) or anywhere in-between (semi-autonomous)

### DEVICE SIMULATION CONTAINER (DSC)
Take charge of simulated devices such as radios, radars or GPS from MACE where human interaction is required. Adjust sensors, flip switches, and navigate menus with fine-grained control

### ARMOR
Visualize and interact with entities across a range of different viewpoints – from sensor and stealth views to inside vehicles and cockpits

### DISCORD
Record the individual actions of every entity including all DIS packets and traffic between MACE/ARMOR/DSC for accurate, synchronized after-action review and debrief

# SIMULATE THE UNSEEN, PREPARE FOR THE UNKNOWN

Bring the global battlespace into your virtual scenarios. MACE is the highest-fidelity electromagnetic simulation software of its kind. It is capable of running real-time, contextually relevant scenarios containing all those essential elements of conflict that modern warfighters must preempt, analyze and prepare for. Armed with MACE, you can train for any mission, anywhere in the world, and across any domain.

## 01

### AN EXTENSIBLE, SCALABLE SIMULATION FRAMEWORK

MACE is all yours. Its plug-in architecture means you can extend, modify and tailor a solution that best suits your training needs, with different customization options designed for every level of user. Add or make features with MACE's C# API, use its embedded codescript editor to tinker under the hood, or create scenarios in a few clicks via a Plain English scripting interface.

## 02

### PULSE-LEVEL FIDELITY

Modern threat systems pose a real challenge. LPI (low probability of intercept), AESA and PESA radar systems create anti-access/area denial (A2/AD) environments for which we must prepare. This is why 'pulse-level fidelity' matters. With MACE, you can not only simulate these systems, you can create them from scratch, including beam patterns, scan patterns and pulse tables. There is no reason to choose video game fidelity when you can choose MACE.

## 03

### PHYSICS-BASED SIMULATION

Don't rely on probabilities. MACE is a physics-based simulation, with aerodynamic and hydrodynamic models for aircraft, weapons and ships. Weapon guidance is likewise physics-based, resulting in the ability to simulate modern multi-mode seekers, loitering weapons, weapons that can fly a defined route, and weapons that can engage other weapons in flight.
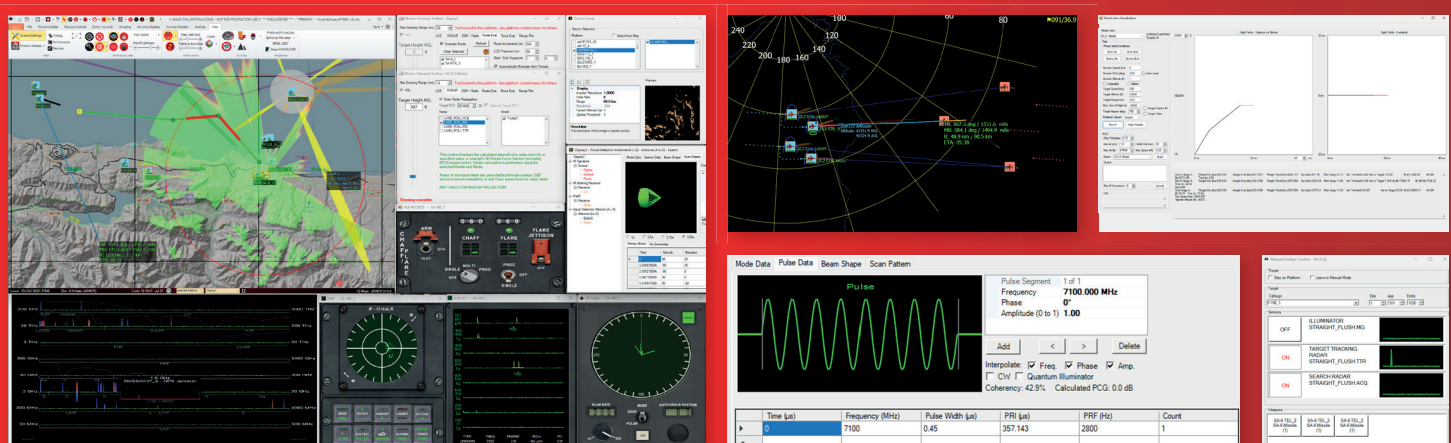
# ARMOR

## TAKE YOUR IMMERSIVE TRAINING TO THE NEXT LEVEL

Step into a virtual world that's as complex as the real one. Whether combined with MACE or as a stand-alone third-party application, ARMOR scales your synthetic environment so you can train more realistically, more collaboratively, and more of the time.

### 01 — OUT-OF-THE-BOX ADVANCED TERRAIN SYSTEM

Train without borders. Draw on an accurate worldwide dataset comprising open-source data to generate ARMOR terrain for anywhere on earth in minutes, with no GIS expertise, additional provider costs or extra software needed. Have your own data sources? Generate your own 3D terrain on-demand in MACE and jump in directly with ARMOR.

### 02 — FULL-SCALE 3D VISUALIZATION

Extend your reality. Immerse yourself in a high-fidelity, highly performant battlespace that faithfully represents real-world environmental conditions and IR night at all ranges. Seamlessly shift through multiple perspectives from any entity for enhanced situational awareness.
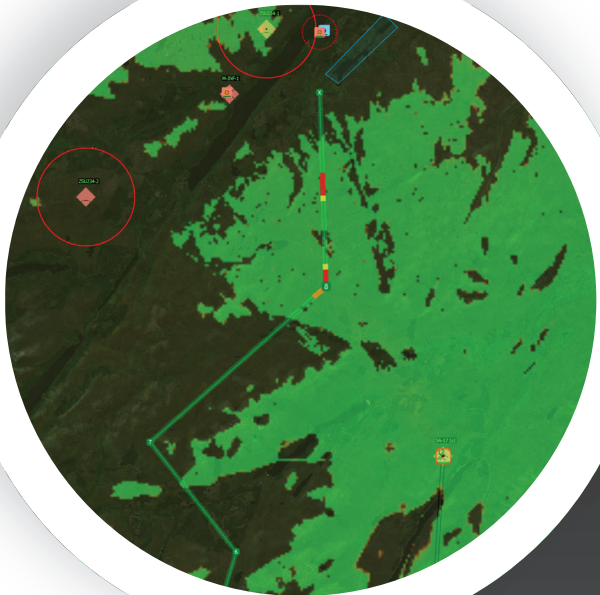
### 03 — POWERFUL GAME ENGINE TECHNOLOGY

ARMOR moves as fast as you do. Its rapid pace of development is driven by Unity and its inherent benefits: a huge developer community, a vast content catalogue and Unity's constant investment into the latest graphics technology and the ever-improving Unity Editor.
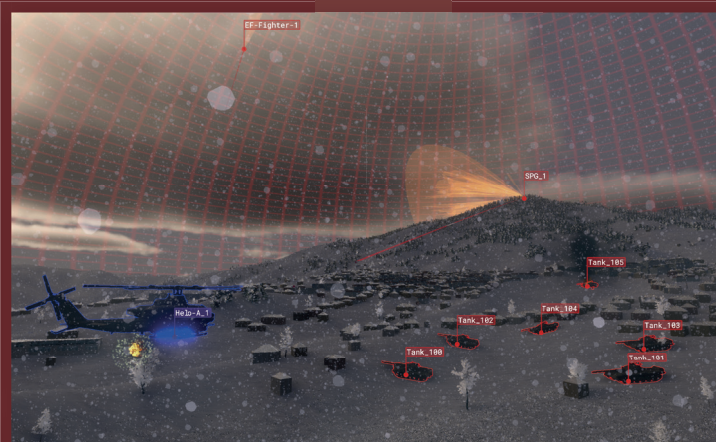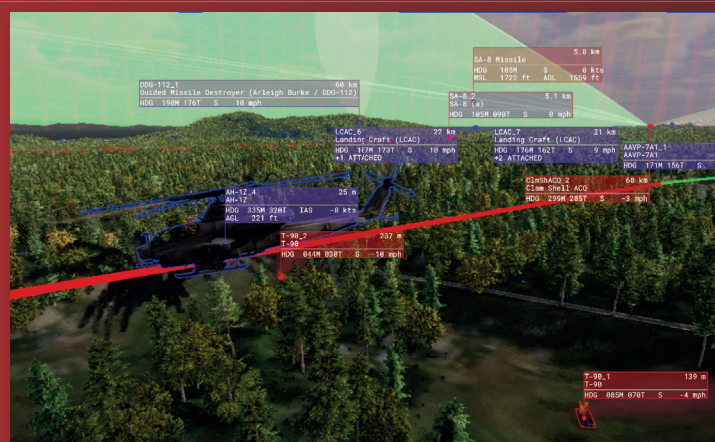
# MACE AND ARMOR IN ACTION
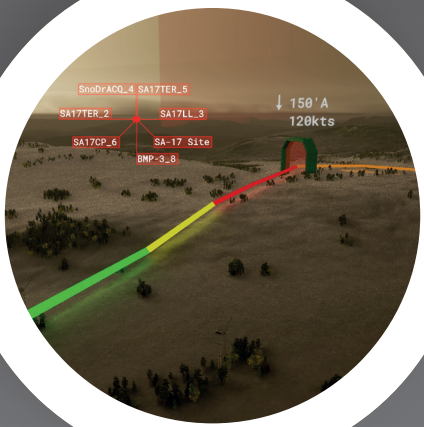
# MISSION ANALYSIS AND PLANNING

Use MACE and ARMOR in tandem to collaboratively plan, test, execute, analyze and brief any mission 'sandbox' style. Throw the synthetic battlespace (ARMOR) on a table and visualize it in MR. Invite users remotely, iterate in person, or both. Whether they're in the room with you or not, you'll be able to see all participants, note their gestures and hear instructions so everyone has a coherent, synchronous understanding of the entire battlespace.

- ⊕ Accessible from anywhere: all you need is some space and a connection

- ⊕ No expertise needed: MACE and ARMOR operate on COTS hardware and over normal networks

- ⊕ Your set-up, but better: easily exchange data between MACE/ARMOR and your existing mission planning tool to extend its capabilities

# MACE AND ARMOR IN ACTION



## MISSION REHEARSAL AND BRIEFING
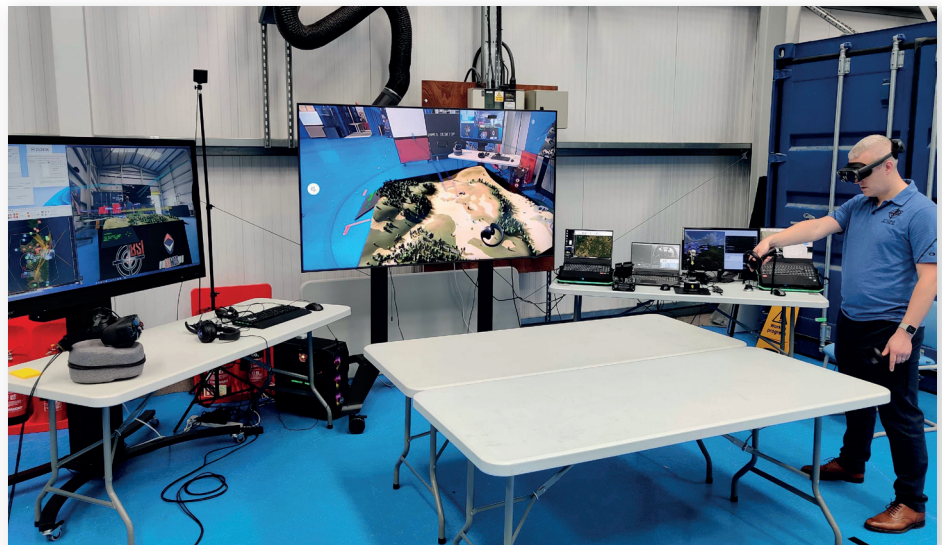
You've planned your mission. Now you can rehearse and improve it. MACE and ARMOR simulate 5th-generation air defence missile systems so you can preempt, respond and adapt to sophisticated EW threats. Assess radar coverage and analyze radio propagation based on terrain, radio parameters and receiver characteristics. Visualize entire routes in advance, rehearse missions and assess risks before stepping foot into an aircraft.

- No nasty surprises: surface synthetic risks to mitigate their real-world occurrence
- Adapt on the fly: simulate outcomes and refine your mission plan based on the results
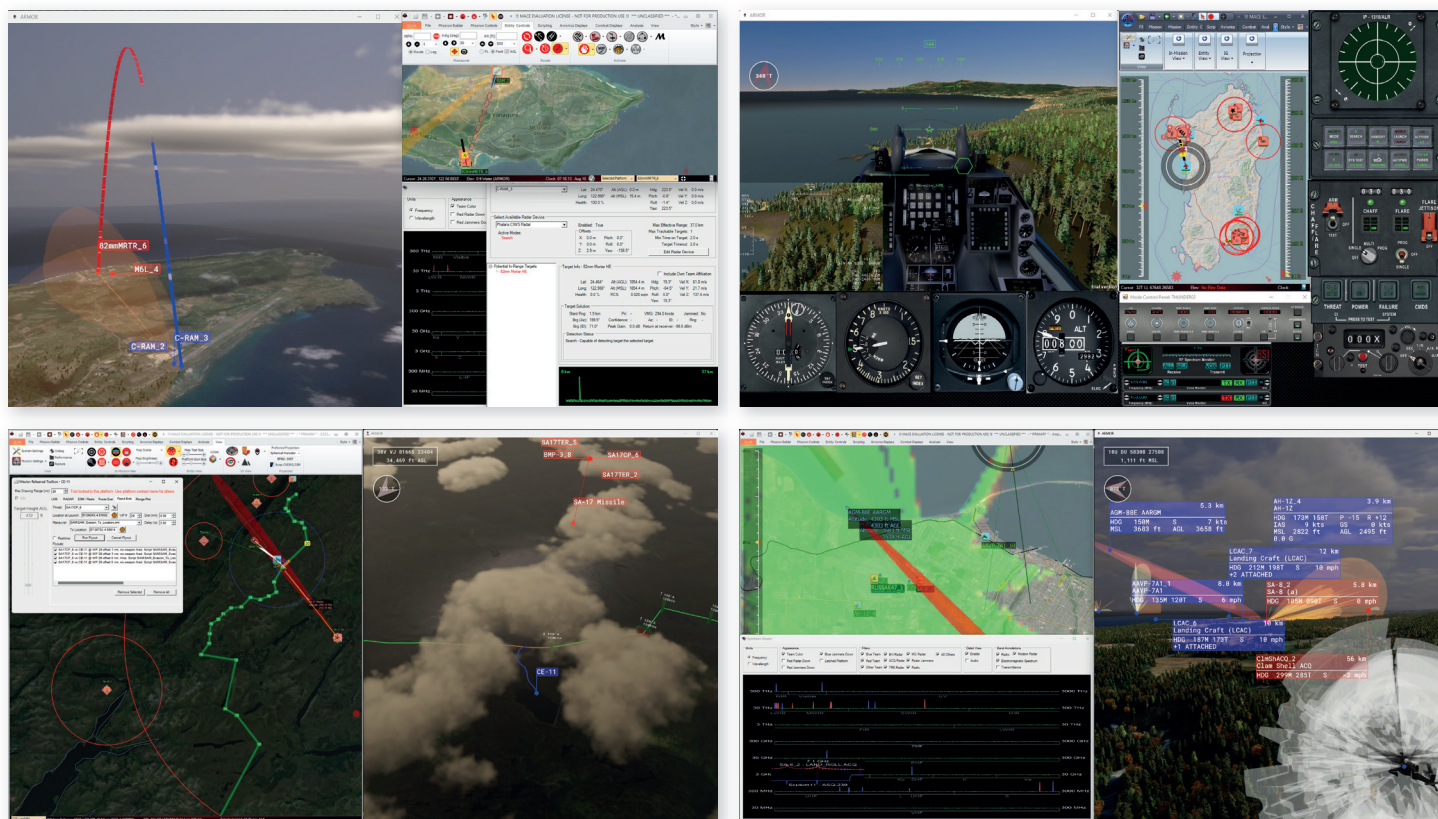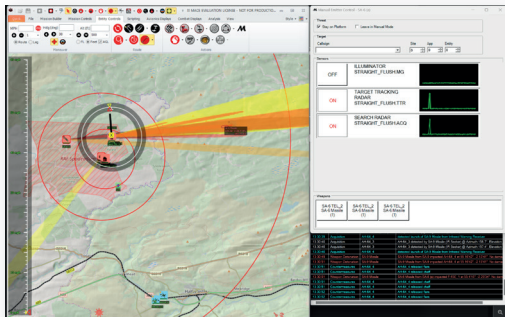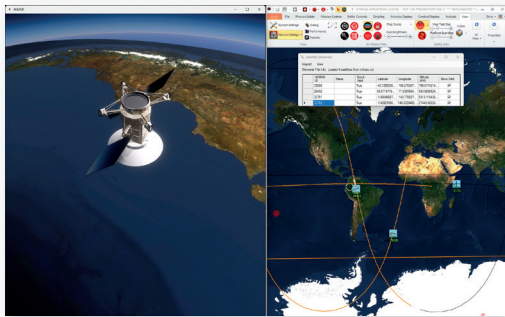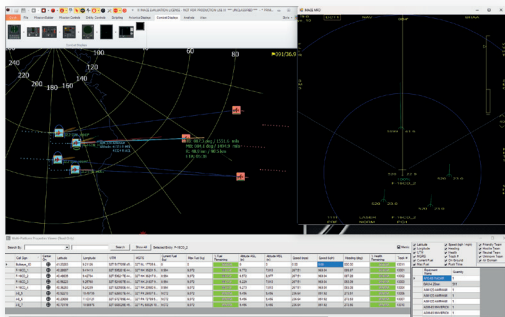
# COMPUTER GENERATED FORCES (CGF)

You may be content with your current CGF. But you'd do better with MACE. Unlike other applications that are often purpose-built for one particular user, system or reason, MACE was designed and built from the ground up as a full-spectrum CGF. It doesn't cut corners, misrepresent systems, fabricate engagements or simulate just part of the battlespace. Users armed with MACE benefit from true-to-life, holistic training scenarios, complete with complex entities that simultaneously exhibit real-world behaviours more accurately than any other CGF.

- Added realism: MACE entities adapt and respond to your decisions and their consequences
- Proven in the field: multiple combat systems use MACE including UAS, Joint Fires, Spec Ops, Fixed and RW Aircraft and 4th & 5th Generation Fighters

# MACE AND ARMOR IN ACTION



## JOINT FIRES TRAINING

JTAC and Joint Fires training are costly to train and challenging to conduct effectively due to real-world constraints. Add in the need to conduct ISTAR and Digitally Aided Joint Fires, it becomes harder still to train as we fight. That's where MACE-based JTAC training systems come in. Use MACE and ARMOR to build a fully accessible Joint Fire training system with a focus on fidelity, realism and accessibility, and with no other host simulation required.
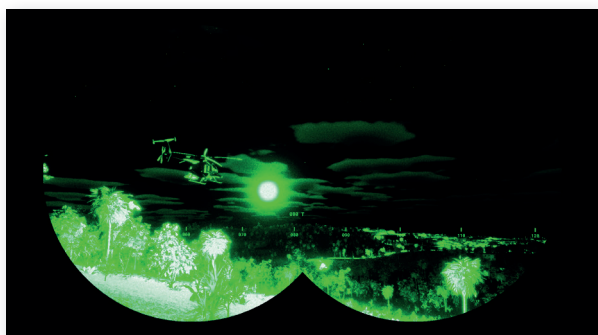
- No mixed messages: JTACs and MACE users can communicate seamlessly via VMF messages including digital CAS-9 Lines, Digital Clearances and BDA
- Business as usual: weapons fly the right profiles, miss targets, and succumb to environmental and malevolent effects – just as they would in the real world
- Ready to roll: MACE has been accredited for use in JTAC training systems the world over







Over one hundred accredited MACE-based JTAC training systems are being used worldwide, including by NATO, United States Special Operations Command (SOCOM), Air Force Special Operations Command (AFSOC), and many more.
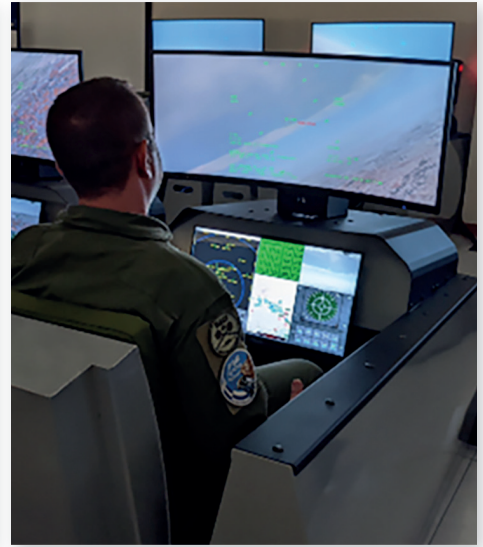
# BLENDED LIVE AND SYNTHETIC TRAINING

MACE's out-of-the-box JREAP-C and Link-16 interface can be used to augment live training exercises to offset costs while retaining mission fidelity and complexity. Virtual Red aircraft can be controlled by a single user within MACE and in cooperation with live Red forces to coordinate manoeuvres and ground-to-air engagement. MACE and ARMOR can also be used to playback combined live mission and synthetic data so users can review, analyse and debrief the entire combined live-virtual scenario.

⊕ Dig deeper: analyse the effectiveness of engagements, missile flyouts, countermeasures and counter-manoeuvres down to the forensic level

⊕ Best of both worlds: combine real-world forces and live feeds with synthetic entities all in one battlespace

MACE is currently used to conduct blended live and synthetic training as part of the NATO Tactical Leadership Programme (TLP) for fighter aircraft.

❝ MACE is our Swiss Army SAF ❞

MACE User, Ft. Campbell, KY

❝ We operate ~80% standalone, which is why MACE is so critical to us. The interface has to be simple, reliable and effective – all proven attributes of MACE. ❞

MACE user, Grayling Air Gunnery Range, Michigan, ANG
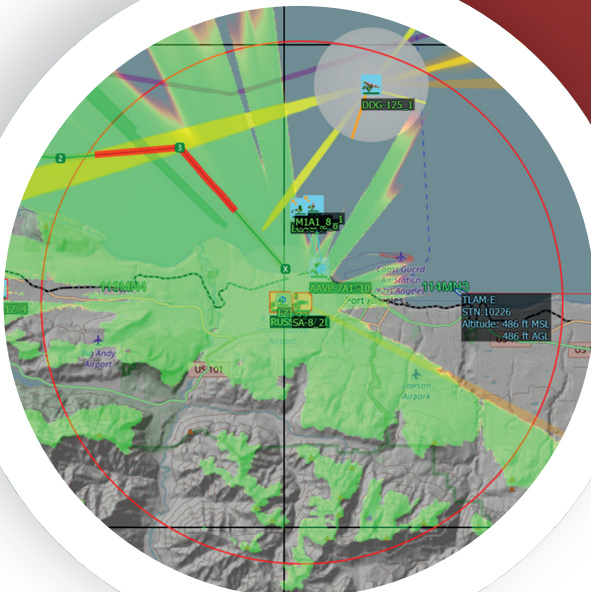
## DISCOVER WHAT MACE AND ARMOR CAN DO

Take both for a spin by requesting a fully functional evaluation copy or book a screen-share demo to ask any burning questions.

**Contact sales@bssim.com**