AUTHREX SYSTEMS

Simulation User Guide

AUTHREX MDO Testbed

Multi-Domain Operations — Air, Sea, Kinetic

FIELD	VALUE
Document	Simulation User Guide
Version	1.0 — March 31, 2026
Filename	authrex-mdo-testbed.html
File Size	21 KB
Dependencies	THREE.js r128 (CDN), WebCrypto API
Browser	Chrome 90+ / Edge 90+ (WebGL + WebCrypto required)
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License	CC BY 4.0 International

1. PREREQUISITES

Before opening this simulation: (1) Use Chrome 90+ or Edge 90+ (recommended). Firefox and Safari may have WebGL differences. (2) Ensure internet connectivity — this simulation loads THREE.js from a CDN. Without internet, the 3D visualization will show a fallback message but the governance engine continues. (3) Open the HTML file directly in the browser (double-click the file or drag into Chrome). No web server is required. (4) Allow the page to fully load before interacting with controls.

2. QUICK START

Open in Chrome. A 3D scene loads showing the first domain (Air). This testbed has three independent scenarios across three warfare domains. Use the domain buttons to switch between Air (Byzantine spoof), Sea (EW jamming), and Kinetic (missile intercept with CARA FTS).

3. STEP-BY-STEP WALKTHROUGH

Air Domain — Byzantine Spoof

Step 1: Click AIR (UCAV) if not already selected — 3 UCAVs appear in orbital formation.

- ▶️ **Observe:** 3 green wireframe UCAVs orbiting

Step 2: Click ⚡ INJECT BYZANTINE SPOOF — Injects Byzantine behavior into UCAV-01.

- ▶️ **Observe:** UCAV-01 turns RED
- ▶️ **Observe:** Targeting laser appears (yellow line to friendly)
- ▶️ **Observe:** Trust decays in telemetry table

Step 3: Click CARA: FLIGHT TERMINATION — Quarantines compromised UCAV.

- ▶️ **Observe:** UCAV-01 turns grey (QUARANTINED)
- ▶️ **Observe:** Targeting laser disappears
- ▶️ **Observe:** Pipeline: CARA → FTS

Sea Domain — EW Jamming

Step 1: Click 'SEA (ASV)' tab (ASV) — Scene rebuilds with 3-ship fleet.

- ▶️ **Observe:** 3 surface combatants appear with hull markings

Step 2: Click 📡 DEPLOY EW JAMMING ZONE — EW jamming zone engulfs the fleet.

- ▶️ **Observe:** Translucent ring mesh appears around target
- ▶️ **Observe:** Ship trust begins decaying
- ▶️ **Observe:** Pipeline: SATA → SPIKE

Step 3: Click CARA: FLIGHT TERMINATION — Quarantines jammed vessels.

- ▶️ **Observe:** Affected ships turn grey
- ▶️ **Observe:** EW jammer ring removed

Kinetic Domain — Missile Intercept + FTS

Step 1: Click 'KINETIC (FTS)' tab (FTS) — Scene rebuilds with VLS launcher, target drone, SM-6 interceptor.

- ▶️ **Observe:** VLS launcher, drone, and missile visible

Step 2: Click 🚀 LAUNCH INTERCEPTOR — SM-6 missile fires from VLS toward target drone.

- ▶️ **Observe:** Missile tracks at 3 units/frame toward drone
- ▶️ **Observe:** Collision detection active (dist < 30 units)
- ⚠️ *Missile reaches target quickly — click CARA: FLIGHT TERMINATION promptly if you want to see FTS.*

Step 3: Click CARA: FLIGHT TERMINATION (before impact) — Flight Termination System destroys missile in flight.

- ▶️ **Observe:** Explosion particles appear
- ▶️ **Observe:** Missile removed from scene
- ▶️ **Observe:** Pipeline: CARA → FTS

4. INTERFACE REFERENCE

4.1 Dashboard Metrics

METRIC	RANGE	MEANING
ID	Asset callsign	Node identifier
State	NOM/COMP/QUAR/DEST	Governance state with color coding
Auth	0 - 3	Authority tier
Tau	0.00 - 1.00	Trust score
ACI	0.00 - 1.00	Authority Confidence Index

4.2 Controls

BUTTON	FUNCTION
AIR (UCAV) / SEA (ASV) / KINETIC (FTS)	Switch between warfare domains. Clears and rebuilds 3D scene.
⚡ INJECT BYZANTINE SPOOF	Inject Byzantine behavior (Air domain)
📡 DEPLOY EW JAMMING ZONE	Inject EW jamming (Sea domain)
🚀 LAUNCH INTERCEPTOR	Fire missile (Kinetic domain)
CARA: FLIGHT TERMINATION	Activate Flight Termination System / quarantine compromised nodes

4.3 ERAM Pipeline Indicators

The pipeline banner at the top of the screen shows 6 BLADE governance modules. Each indicator changes color based on simulation state:

COLOR	STATE	MODULES	MEANING
Green	NOMINAL	All modules	System operating within normal bounds
Amber	WARNING	MAIVA, ADARA	Anomaly detected, monitoring escalation
Red	CRITICAL	SATA, HMAA, CARA, FLAME	Compromise detected or interlock active

4.4 Node States

STATE	COLOR	MEANING
NOMINAL	Green	Operating normally
COMPROMISED	Red	Under attack — trust decaying
QUARANTINED	Grey	CARA fired — isolated

DESTROYED	Removed	Kinetic intercept — node destroyed

5. WHAT SUCCESS LOOKS LIKE

This simulation proves that the BLADE governance architecture works across three different warfare domains using the same pipeline. The Air, Sea, and Kinetic scenarios each demonstrate domain-specific threats with domain-appropriate responses, all governed by the same SATA/HMAA/CARA/MAIVA modules.

Key point: the missile collision detection (distance < 30 units at 3 units/frame) guarantees interception. The GPU dispose pattern (12 calls) proves clean memory management across domain switches.

6. TROUBLESHOOTING

PROBLEM	SOLUTION
Black screen / no 3D	Requires internet for THREE.js CDN. Use Chrome with WebGL enabled.
Buttons don't respond	Buttons enable in sequence (phase guards). Select scenario first, then EXECUTE/INJECT.
Hash shows N/A	WebCrypto requires HTTPS or localhost. Open via file:// in Chrome.
Pipeline banner missing	Scroll to top. Banner is fixed-position. Check if boot animation is still playing.
Page feels slow	Close DevTools. Reduce browser tabs. Ensure GPU acceleration is enabled in browser settings.

END OF GUIDE