



OAK DEFENSE — EW SUITE

Forty-eight integrated applications. One spectrum picture.

UNCLASSIFIED · ITAR-FREE · TRAINING & ANALYSIS

The EW SUITE is an **integrated electronic-warfare, SIGINT and cyber training, analysis and wargaming platform** — forty-eight interactive applications that share one scenario, one map and one threat picture. From characterising an emitter and quantifying a jam, to denying GNSS, modelling a cyber kill-chain and fighting a joint BLUE-vs-RED engagement, every result is computed by **faithful, transparent physics and probability models** — not canned animations. Built for the schoolhouse, the lab and the briefing room.

THE FORTY-EIGHT APPLICATIONS

- 1 ECM — Jamming Effectiveness.** J/S, burn-through range, noise vs deception.
- 3 Radar Bench.** Echo generator + receiver: pulse compression, Doppler/MTI, CFAR; cognitive-radar & advanced waveform design.
- 5 Comms Receiver.** COMINT 20 MHz–6 GHz: IQ, demod, modulation classification.
- 7 CEMA Threat Modeller.** Attack-graph, kill-chain, risk matrix; live CTI feed — IOC extraction + STIX 2.1 (conceptual).
- 9 Detection Lab.** Synthetic-telemetry detection trainer, ROC / PR curves.
- 11 Tactical Ops Console.** Map-based EW/cyber COP; task effects, score outcomes.
- 13 EO/IR Sensor.**IRST detection, NETD/MRTD, Johnson DRI ranges.
- 15 Video Tracker (EO).** EO auto-tracker: detect, track & classify UAV/fighter/missile/projectile.
- 17 ELINT Receiver Workstation.** Live PDW deinterleave from a real receiver (TCP / UDP / SCPI) — standalone.
- 19 Counter-UAS.** Detect-track-ID-mitigate vs the 5 DoD UAS groups; RF/GNSS defeat; swarm leakers.
- 21 Cognitive / Adaptive EW.** Sense-decide-act-adapt loop; a learning jammer out-learns a fixed technique.
- 23 RF Coverage / Propagation.** Terrain-masked coverage footprints over DTED; Deygout knife-edge diffraction.
- 25 Scenario & Threat Library.** One authored scenario / threat DB feeds every app via the shared bundle.
- 27 Undersea / Acoustic (Sonar).** Passive & active sonar equations, transmission loss, convergence zones.
- 29 AI EW Advisor.** ML classifies emitters, assesses threat/priority, recommends a COA; calibrated confidence + OOD flag, explainability, report export.
- 31 AI EW Assistant.** Natural-language Q&A over the scenario from the suite's own models.
- 33 CBRN Hazard Prediction.** Gaussian-plume dispersion of a chem/bio/radiological release; downwind hazard areas.
- 35 ISR Collection Manager.** Task ISR sensors against named AOIs; coverage/revisit; collection-deck optimisation.
- 37 Artillery & Munition ID.** Identify munition/firing-system from a weapon-locating track; counter-battery origin/impact; counter-fire priority.
- 39 AI COA Generator.** Generates, scores & ranks ingress COAs vs an IADS; mapped route, explainability, top-COA confidence.
- 2 ELINT Workstation.** OAK RX-style pulse analysis + Emitter Studio emitters; intra-pulse LPI classifier & chirp estimation.
- 4 Threat Simulator.** Scenario → PDW stream → signal generator over SCPI/TCP.
- 6 Comms Jammer / GNSS.** Comms denial, GPS jamming, GNSS-spoof analysis.
- 8 Cyber Tactical Wargame.** Red-vs-blue Monte-Carlo, MITRE ATT&CK reference.
- 10 COA Planner.** Course-of-action decision aid over the engagement model.
- 12 Joint Wargame.** Turn-based BLUE/RED force-on-force; EW, cyber, ASM raids.
- 14 Training & AAR.** Quizzes computed live from the models; after-action review.
- 16 EO Tracker Workstation.** Live EO tracking from a real feed (file / TCP / camera) — standalone.
- 18 Space (SDA / SATCOM-EW).** Orbits, ground track & passes; SATCOM link budget; uplink-jamming geometry.
- 20 IADS / SEAD-DEAD.** Terrain-masked SAM threat rings, route survival, SEAD/DEAD option scoring; tactical-AI planners (WTA · min-Pk route · GDOP).
- 22 Spectrum Manager / EMCON.** Own-force frequency plan, EMI/fratricide matrix, EMCON posture.
- 24 Multi-INT Fusion.** ELINT/COMINT/EO-IR/radar correlated into one common track picture.
- 26 NAVWAR / PNT Resilience.** GNSS denial, INS holdover by IMU grade, PNT-resilience score.
- 28 Multi-Domain Synchroniser.** Schedule & deconflict effects across all domains; combined mission effect.
- 30 AI Model Trainer.** Five pure-numpy classifiers over suite physics or 11 public datasets; cross-validation, feature importance, model export.
- 32 Autonomous Cognitive-EW Agent.** Closed-loop agent that learns to beat a fixed jamming doctrine.
- 34 Information / Influence Ops.** Narrative diffusion (SIR), bot amplification, counter-messaging; bot-detection ROC.
- 36 CASEVAC / Combat Health.** Golden-hour MEDEVAC routing & sequencing; time-to-care; expected survivors.
- 38 AI Campaign Planner.** Minimax force allocation across objectives + posture; re-plans vs an adaptive RED to beat a fixed doctrine (wargame rehearsal).
- 40 Force-mix Optimizer.** Greedily sites air-defence assets for max weighted coverage of the defended area vs a naive even-ring (force

41 Strategic ISR / I&W. Fuses strategic indicators into an indications-&-warning level + drivers + a timeline that rises ahead of an event.

43 Adversarial ML / Counter-AI. Attacks & hardens the suite's own classifiers (evasion + poisoning vs defences); synthetic features only (NIST AI 100-2).

45 Battlespace Management System. Capstone & standalone product: a live COP from real feeds (track-link, CoT/TAK, multi-sensor geolocation) — MIL-STD-2525 tracks, a Kalman tracker, TEWA, effect tasking, KML/CoT export & V&V evidence.

47 EW Test & Evaluation Planner. M&S→SIL→HITL→ISTF→OAR continuum, MOP/MOE library, trials-needed statistics, VV&A scorecard.

protection).

42 CIMIC / Civil-Military. PMESII/ASCOPE civil estimate, host-nation resilience scorecard & DIME effects (NATO CIMIC Handbook).

44 World Map / Global Terrain. Offline basemap — ETOPO5 relief & bathymetry, Natural Earth vectors, 3-D globe, polar charts, geodesic rings & routes.

46 Advanced Geolocation. CRLB 95% error ellipses & CEP (AOA/TDOA/FDOA), GDOP heatmap, MUSIC super-resolution DF.

48 3-D Battlespace Wargame (Panda3D). Real-time GPU 6-DOF wargame: live radar/ESM → track picture → IADS command → PN missiles → EW terminal fight; campaign, replay, LAN multiplayer.

WHY IT STANDS OUT

Integrated, not siloed

One **scenario bundle** drives the console *and* the wargame; emitters flow from ELINT to ECM to the map. Auto-generated **HTML** + **PDF briefing** across all domains.

Faithful physics

Real EW, radar, EO/IR and GNSS maths with every assumption visible — a teaching tool that shows *why*, plus **hill-shaded DTED/SRTM terrain** & line-of-sight.

Safe & deployable

Representational & **unclassified**; cyber is conceptual with **no exploit content**. One offline Windows executable — air-gap and export friendly.

VERIFY REAL SYSTEMS — ACCEPT & SUSTAIN

It connects to **45+ instrument and data interfaces** — analyzers, SDRs, recorders, comm receivers and signal generators (SCPI / VITA-49 / SigMF) — ingests **live ADS-B / AIS / drone Remote ID** tracks, **geolocates emitters** from a networked DF picture, and shares the COP over **Cursor-on-Target (TAK)**, **Link 16** and **DIS**, or to **QGIS**. Beyond the schoolhouse, the suite drives **real hardware**: Threat Simulator emits a known emitter to a signal generator over **SCPI/TCP** and into the ship's own ESM, radar or RWR — a repeatable **predict → stimulate → measure → compare** loop with validated physics. Run it for **acceptance before deployment** and to **prove a repair restored performance** afterwards: the identical stimulus makes before-vs-after a true apples-to-apples check — no silent regression after a card swap, antenna or software update.

ONE PHYSICS CORE, NINE PRODUCTS

The suite's engines also power a family of focused standalone products: **OAK BMS** (live battle-management COP) · **OAK Space** (SDA & space-EW) · **OAK Arctic** (maritime DA & dark-vessel detection) · **OAK Sentry** (C-UAS site defence) · **OAK Trainer** (scored EW training) · **OAK Drone AI** · **OAK Joint Fires** · **OAK AI Assurance** · **OAK Synthetic Environment** — every product ships requirements-traceable V&V evidence.

WHO IT'S FOR

EW & SIGINT schoolhouses and training academies · **Universities** teaching radar, comms & cyber · **Defense primes** & system houses for onboarding and concept demos · **Test & evaluation ranges** for pre-mission familiarisation · **Depot & maintenance facilities** for acceptance & post-repair regression testing · **CEMA / cyber-defence** course providers. Runs on a standard Windows laptop — no cloud, no licences to phone home.

3-D battlespace in every app

Shared scenario bus

Real DTED / SRTM terrain + LOS

SCPI instrument control

Monte-Carlo analysis benches

HIL acceptance & post-repair test

One-click suite report

Requirements-traceable V&V evidence

Real-time 3-D wargame (6-DOF)

Single offline .exe

Unclassified · ITAR-free · Representational / educational use. The EW SUITE is a training, analysis and wargaming aid built on transparent models; it is not an operational EW system and contains no operational exploit, payload or attack code. Specifications subject to change. © OAK DEFENSE LTD.

Request a live demo

robbymiles@oakdefenseltd.com

www.oakdefenseltd.com/ew-suite

1-613-462-8803