

OAK SPACE

Space Domain Awareness & Space Electronic Warfare — sovereign Canadian, ITAR-free

A software workstation for building and reasoning about the space picture: who is on orbit, what is approaching what, who is maneuvering, what is coming down, and where a SATCOM jammer is transmitting from. First-principles orbital mechanics and RF physics — no black boxes, no operational catalog required — so it runs offline on a laptop for analysis, training, course-of-action work and concept development.

Operational SDA tools

Catalog COP — a multi-object common operating picture over a world map: LEO / MEO / GEO payloads, a co-orbital inspector, decaying debris, each with its sub-satellite ground track and class.

Conjunction screening — automated pairwise close-approach across the catalog: time-of-closest-approach, miss distance, relative speed and a RED / AMBER / GREEN risk tier, with a coarse-then-fine solver.

Rendezvous & proximity ops (RPO) — a chaser's relative motion in the target's radial / in-track / cross-track frame; closest-approach geometry for co-orbital inspection and threat assessment.

Maneuver detection — residual of a measured arc against the propagated ephemeris flags a burn and estimates its epoch and Δv .

Decay & re-entry — atmospheric-drag lifetime and re-entry epoch for a decaying object.

Up-link interference geolocation — angle-of-arrival cuts from ground sites fix a terrestrial SATCOM jammer, with a CEP estimate.

Space-EW workstation

Ground track · ground-station pass prediction (AOS / TCA / LOS / max elevation) · SATCOM up/down link budgets (C/N_0 , C/N , margin).

Up-link jamming geometry (J/S, antenna discrimination) · space-based intercept margin · coverage footprint · Doppler · counter-space threat taxonomy (reference).

Why it stands out

First-principles Keplerian + J2 propagation, link budgets and jamming geometry — auditable physics, not a wrapped commercial tool.

Sovereign & portable pure-Python, no GPU, offline world basemap — Canadian IP, ITAR-free, runs on a ruggedised laptop.

Portfolio-native shares the OAK DEFENSE EW SUITE's sensing, EW and fusion libraries — the space layer of a multi-domain picture.

Aligned to

NORAD modernization

Space domain awareness

Counter-space / space-EW

SATCOM protection

Training & analysis

Unclassified · representational / educational only · no exploit content, no real TLEs.

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