



HYPERION AEGIS

orbital digital twin · conjunction assessment

CAPABILITY STATEMENT

ArgentoSims.com

A product of Argento Simulations

Status: in development · demonstrations on request

Hyperion Aegis is a space domain awareness platform that keeps a **live digital twin of the orbital population** — a catalog of more than 16,000 active satellites propagated in real time, screened continuously for close approaches, and rendered on an Earth globe in two clients: an analyst web application and an immersive **Unreal Engine 5** environment, both fed by one API. Built by Argento Simulations' operators for planners and watch floors that need to see the orbit, not read about it.

Core Capabilities

■ Orbital Catalog and Ingest

CelesTrak active-satellite feeds, with Space-Track when credentials are supplied; TLE and OMM (CCSDS) import; element-set history per object; NORAD and COSPAR identity, object type and ownership on every record.

■ Propagation and Reference Frames

The SGP4/SDP4 implementation is pinned to the canonical Vallado reference vectors to within one metre in position over a 24-hour propagation, for both the near-Earth and deep-space reference cases. TEME, ECEF (WGS84), RIC and geodetic frames; ephemeris on demand; a whole-catalog position snapshot in about 40 ms.

■ Conjunction Assessment

Any primary against selected secondaries or the full catalog over a chosen window and miss distance; probability of collision with a combined hard-body radius; results ranked Info / Watch / Warning / Critical and streamed to both clients.

■ Launch Modelling

Ascent simulated from real launch-site geometry with editable generic vehicle definitions (small-, medium- and heavy-lift classes): an event timeline from lift-off through max Q, staging and fairing jettison to insertion, plus planar launch windows and a launch collision-avoidance sweep that re-flies the ascent at each candidate lift-off time. The resulting trajectory is usable in analysis as an object like any other.

■ Analysis Workbench

What-if scenario actions, CCSDS OEM import, an in-track avoidance Δv sweep with re-screened miss distance and probability of collision, and orbital decay *estimated* against NRLMSISE-00 using CelesTrak space-weather data (observed, with daily predictions forward).

■ Cislunar Awareness

The Moon and tracked lunar spacecraft (LRO, Danuri) ingested from JPL Horizons ephemerides and shown alongside the Earth catalog with an Earth–Moon camera pivot; and selenocentric orbits propagated under a lunar gravity field, usable in screening and what-if scenarios.

■ Twin Visualisation, Web and Unreal

CesiumJS globe (CZML) for browser analysis; Unreal Engine 5.8 client through Cesium for Unreal on a WebSocket feed for immersive review, briefing and training. Objects can carry 3D models at true scale from Argento's model library, referenced by id under one twin standard across our products.

At a Glance

Catalog	16,000+ active satellites; CelesTrak and Space-Track; TLE/OMM import
Propagator	SGP4/SDP4 pinned to Vallado vectors, < 1 m over 24 h; TEME, ECEF, RIC, geodetic frames
Screening	Window, threshold and Pc with hard-body radius; 1 vs. catalog / 24 h in about 0.5 s
Clients	Web (CesiumJS, CZML) and Unreal Engine 5.8 (Cesium for Unreal, WebSocket)
Server	ASP.NET Core 10, PostgreSQL 17, REST + WebSocket, Linux or Windows
Deployment	Cloud, on-premise or fully air-gapped; no per-seat map fees

Differentiators

■ Air-Gap Ready by Design

No Cesium ion, no paid map services, no outbound calls required in operation: Apache 2.0 rendering, public-domain imagery offline, on-premise PostgreSQL, cached feeds. Suitable for classified and disconnected networks.

■ One Data Spine, Two Ways to See It

Analysts and decision-makers work from the same propagated state: the web globe for screening and reporting, the Unreal client for walk-throughs and rehearsal. No export, no second model.

■ Open Contracts, No Lock-In

REST, CZML and a documented WebSocket envelope; standard TLE/OMM in, CCSDS-style products out. Government data stays in government formats.

■ Operators Who Build

The same SDVOSB team that delivers Hyperion Securitas and Argento's digital twins builds Aegis — findings move into operational tooling without a vendor hand-off.

Contact Us

CAGE: 9M1W1 **UEI:** FG59XKRYKCW7

SBA Certifications: SDVOSB, VOSB **Work Area:** Nationwide

NAICS and PSC Codes

541511	Custom Computer Programming Services	541512	Computer Systems Design Services	541513	Computer Facilities Management Services
541715	R&D in Physical Sciences	7A20	IT/Telecom - App Development Software	DA01	IT/Telecom - Business App Dev SaaS
DA10	IT/Telecom - Business App Dev Support	R408	Support-Professional: Program Mgmt	R499	Support-Professional: Other

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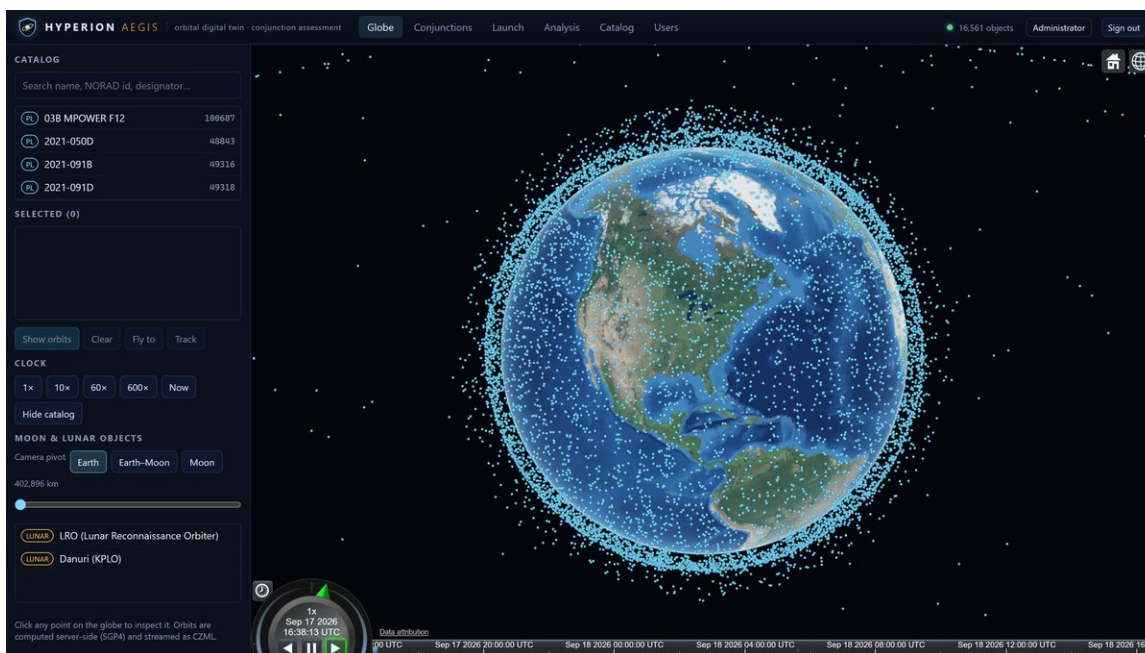
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A development build, running. Both captures are of the live application against the real CelesTrak feed. No value has been retouched.



The catalog, propagated

16,561 active satellites drawn as the shell of low Earth orbit they actually form, over public-domain imagery. Positions are computed server-side and streamed as CZML; the clock runs from 1x to 600x, and the camera pivots from Earth to the Earth-Moon system. Nothing here calls a paid map service.



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Globe

Conjunctions

Launch

Analysis

Catalog

Users

16,561 objects

Administrator

Sign out

Conjunction screening

Primary NORAD ids (comma-separated; blank = all-pairs over the secondaries)

Secondary ids (blank = whole catalog)

Start (UTC, blank = now)

Window (hours)

Threshold (km)

Step (s)

Hard-body radius (m)

25544

2026-09-16T00:00:00Z

24

10

60

20

Screen

1 primaries × 16561 secondaries; 2026-09-17 16:41:34Z → 2026-09-18 16:41:34Z; 3 approaches within 10 km, 534 ms.

Severity	TCA (UTC)	Primary	Secondary	Miss (km)	Radial	In-track	Cross	Vrel (km/s)	Pc	Covariance
Info	2026-09-17 23:51:22	ISS (ZARYA) 25544	STARLINK-1368 45540	8.433	7.520	3.320	-1.880	7.51	0.00E0	modelled View
Info	2026-09-18 00:24:22	ISS (ZARYA) 25544	KOMPSAT-3A 40536	8.701	3.547	6.479	4.599	8.82	2.12E-98	modelled View
Info	2026-09-18 13:58:26	ISS (ZARYA) 25544	GPM-CORE 39574	9.679	6.731	3.835	-5.802	12.77	7.30E-214	modelled View

One primary against the whole catalog, in half a second

The ISS screened against all 16,561 secondaries over 24 hours at a 10 km threshold: three approaches found in 534 ms, each reported with radial, in-track and cross-track components, relative velocity, probability of collision and the provenance of the covariance used. All three rank *Info* — that is what a real 24-hour ISS screen returns. The Watch, Warning and Critical bands are for approaches that earn them.

Mission Fit

Space Domain Awareness

Watch-floor picture of the orbit with continuous close-approach screening.

Planning and Rehearsal

Pass geometry and encounter timelines walked through in 3D before commitment.

Training

The live twin as the training environment: the catalog will see on shift.

Requirements and Architecture

Sensor placement, coverage and tasking answered against a modelled orbit.

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