

# WORLD MONITOR

Complete Technical & Functional Documentation

*For Personal Recreation Reference*

Source Repository: [github.com/koala73/worldmonitor](https://github.com/koala73/worldmonitor)

Live App: [worldmonitor.app](https://worldmonitor.app)

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License: MIT | Current Version: v2.5.7

# 1. Project Overview

World Monitor is a real-time global intelligence dashboard that aggregates data from 100+ sources, performs multi-signal analysis, and presents unified situational awareness through an interactive map and specialized panels. The system operates entirely in the browser (TypeScript/Vite) with serverless backend functions (Vercel Edge) for API proxying and caching.

It is 100% free and open source (MIT license), positioning itself as a free alternative to expensive OSINT tools. The project has grown rapidly, reaching 14,900+ GitHub stars and 2,300+ forks by February 2026.

## 1.1 What It Solves

Problem	Solution
News scattered across 100+ sources	Single unified dashboard with 100+ curated feeds
No geospatial context for events	Interactive map with 25 toggleable data layers
Information overload	AI-synthesized briefs with focal point detection
Expensive OSINT tools (\$\$\$)	100% free & open source
Static news feeds	Real-time updates with live video streams
No anomaly detection	Welford's online algorithm for temporal baseline analysis

## 1.2 Live Variants

Variant	URL	Focus
World Monitor	worldmonitor.app	Geopolitics, military, conflicts, infrastructure
Tech Monitor	tech.worldmonitor.app	Startups, AI/ML, cloud, cybersecurity
Finance Monitor	finance.worldmonitor.app	Markets, economics, financial data

All three variants run from a single codebase, controlled by the VITE\_VARIANT environment variable at build time.

## 2. Full Technology Stack

### 2.1 Frontend

Category	Technology	Purpose
Language	TypeScript (80.5% of codebase)	Type-safe application code
Build Tool	Vite	Dev server + production builds; HTML plugin for variant switching
Map Rendering	deck.gl (WebGL)	GPU-accelerated rendering of 25+ data layers
Map Base	MapLibre GL	Vector tile base map rendering
Styling	CSS (9.1% of codebase)	Custom dark/light theme with variant support
Browser AI	Transformers.js (T5)	NER and sentiment analysis without server dependency
Browser AI 2	TensorFlow.js	Fallback ML inference in browser
PWA	Service Worker + Web Manifest	Installable app on desktop and mobile

### 2.2 Backend / Edge Functions

Category	Technology	Purpose
Hosting	Vercel Edge Functions	30+ serverless functions, each handling one data source
Caching	Upstash Redis	Cross-user deduplication, AI call caching, temporal baselines
AI Primary	Groq (Llama 3.1 8B)	Threat classification & World Brief generation
AI Fallback	OpenRouter	Secondary LLM if Groq fails
Local AI	Ollama (desktop only)	First in the fallback chain for desktop app
Desktop App	Electron + Node.js Sidecar	Native desktop wrapper with system tray
Storage	IndexedDB (browser)	Local persistence for user preferences, cached data

### 2.3 External APIs & Data Sources

API / Source	Data Type	Requires Key?
OpenSky Network	Live military & civilian flights (ADS-B)	Yes
VesselFinder / MarineTraffic	AIS ship tracking	Yes
NASA FIRMS (VIIRS)	Satellite thermal hotspot / fire detection	Yes
Cloudflare Radar	Internet outage detection	No (public)
GDELT Project	Global event database (protests, conflicts)	No
ACLED	Armed conflict location & event data	No (free tier)
USGS	Earthquake data	No
NASA EONET	Natural disasters (volcanoes, wildfires, floods)	No
FRED (Federal Reserve)	Economic indicators	No
EIA	Energy/oil price data	No
Polymarket	Geopolitical prediction markets	No
100+ RSS Feeds	News from global outlets	No

## 2.4 Dev & Build Tooling

Tool	Purpose
npm / package.json	Dependency management
tsconfig.json	TypeScript compiler config
vite.config.ts	Build config with variant HTML plugin and tree-shaking
Playwright	End-to-end testing (npm run test:e2e)
buf / Seobuf	Protocol Buffers — typed API contracts between edge functions and frontend
make / Makefile	Top-level task runner (make install, make generate)
GitHub Actions	CI/CD for auto-versioning and release creation
PostHog	Analytics (US region, privacy-respecting)

## 3. System Architecture

### 3.1 High-Level Architecture

World Monitor uses a three-tier browser-first architecture:

- Tier 1 — Browser (Client): All analysis, scoring, clustering, and rendering runs client-side. No backend compute dependency for core intelligence.
- Tier 2 — Vercel Edge Functions: 30+ serverless functions act as a lightweight API proxy layer. Each function handles exactly one external data source — proxying, normalizing, and caching.
- Tier 3 — External APIs & Redis: Raw data sources and Upstash Redis for cross-user state persistence (temporal baselines, AI classification cache).

### 3.2 Core Application Flow

Phase	What Happens	Key File
1. Init	IndexedDB setup, ML worker init, AIS stream, render layout	src/App.ts (L223-280)
2. Load Data	Parallel fetch from all services, freshness tracking triggered	src/App.ts (L1248-1459)
3. Analyze	CII scoring, geo-convergence detection, military surge analysis	src/App.ts (L1461-1585)
4. Render	Map layers update, panels subscribe to data changes	src/components/*
5. Refresh	Different intervals: 5s (live AIS), 10m (news), 30m (economics)	src/App.ts (L1728-1831)

### 3.3 Folder Structure

Directory / File	Purpose
src/	All TypeScript source code
src/App.ts	Central orchestrator — the god class that wires everything together
src/components/	UI components: MapContainer, DeckGLMap, panels, modals
src/services/	Data fetching and processing services (rss.ts, protests.ts, clustering.ts, etc.)
src/config/	Variant configuration and defaults (defaults.ts)

src/styles/	CSS theming and layout
api/	Vercel Edge Functions (one file = one data source: acled.js, gdelt.js, etc.)
data/	Static JSON data: military bases, nuclear facilities, cables, pipelines, APT groups
docs/	DOCUMENTATION.md, ADDING_ENDPOINTS.md, CONTRIBUTING.md
scripts/	Build and utility scripts
public/	Static assets: icons, favicons, OG images
index.html	App entry point with CSP headers, OG meta, PWA manifest link
vite.config.ts	Build config with variant switching and tree-shaking
package.json	Dependencies and npm scripts
CLAUDE.md	Instructions for AI coding assistants working on this repo

## 4. Core Features Deep Dive

### 4.1 Interactive Global Map (25 Data Layers)

The map is rendered using deck.gl (WebGL) on top of a MapLibre GL base map. It supports 25 toggleable data layers organized by category:

#### Geopolitical Layers

- Conflict Zones — Active war zones with escalation tracking and severity coloring
- Intelligence Hotspots — Geo-tagged news clusters with escalation scores
- Social Unrest / Protests — ACLED + GDELT protest events
- Sanctions Regimes — Country-level sanctions overlays
- Weather Alerts — Severe weather and storm events

#### Military & Strategic Layers

- Military Bases — 220+ bases from 9 operators (US, Russia, China, UK, France, NATO, etc.)
- Live Flight Tracking — ADS-B military aircraft in real time (OpenSky)
- Naval Vessels — AIS ship positions including warships
- Nuclear Facilities — Power plants, weapons sites, gamma irradiators
- APT Cyber Threats — Nation-state cyber actor attribution map
- Spaceports & Launch Facilities

#### Infrastructure Layers

- Undersea Cables — Global submarine cable routes with landing points
- Oil & Gas Pipelines — Strategic energy infrastructure
- AI Datacenters — 111 major clusters globally
- Internet Outages — Cloudflare Radar real-time outage detection
- Critical Minerals — Strategic mineral deposit locations
- Satellite Fires — NASA FIRMS VIIRS thermal hotspot detection

#### Tech Ecosystem Layers (Tech Variant Only)

- Tech Company HQs — Big Tech, unicorns, publicly traded
- Startup Hubs — Funding data and activity
- Cloud Regions — AWS, Azure, GCP availability zones
- Accelerators — YC, Techstars, 500 Startups locations
- Tech Conferences — Upcoming events calendar

## Map Interaction Features

Feature	Description
Smart Clustering	Markers intelligently group at low zoom; expand on zoom in
Progressive Disclosure	Detail layers (bases, nuclear, datacenters) only appear when zoomed in
Zoom-Adaptive Opacity	Prevents clutter at world view
Label Deconfliction	Overlapping labels suppressed by priority (highest severity wins)
8 Regional Presets	Global, Americas, Europe, MENA, Asia, Africa, Oceania, Latin America
Time Filtering	1h, 6h, 24h, 48h, 7d event windows
URL State Sharing	Map view, zoom, coords, time range, active layers all encoded in URL params
Pinnable Map	Pin map to top while scrolling through panels

## 4.2 AI-Powered Intelligence

### World Brief

An LLM-synthesized summary of top global developments. Generated via Groq's Llama 3.1 8B at temperature 0, cached in Redis. Refreshes cross-user so only one LLM call is made regardless of how many people are viewing the dashboard.

### Threat Classification Pipeline (Two-Stage Hybrid)

Every news item passes through two stages:

- Stage 1 — Keyword Classifier (instant): Pattern-matches against ~120 threat keywords organized by severity tier (critical → high → medium → low → info) and category (conflict, terrorism, cyber, disaster, etc.). Returns immediately with a confidence score.
- Stage 2 — LLM Classifier (async): Fires in background via Vercel Edge Function calling Groq Llama 3.1 8B at temp 0. Cached in Redis for 24h keyed by headline hash. Overrides keyword result only if its confidence is higher.

This means the UI is never blocked waiting for AI. Users see keyword results instantly, with LLM refinements arriving within seconds.

### Focal Point Detection

Correlates entities across news, military activity, protests, outages, and markets to identify convergence. A focal point requires convergence across multiple signal types before escalating to critical — no single source is trusted alone.

## AI Fallback Chain

If the primary AI source fails, the system cascades through fallbacks:

- 1. Ollama (local, desktop app only)
- 2. Groq (Llama 3.1 8B)
- 3. OpenRouter
- 4. Browser-side T5 (Transformers.js — no server required)

Redis cache failures degrade to in-memory fallback with stale-on-error, ensuring the dashboard never shows blank panels.

## 4.3 Country Instability Index (CII)

Each monitored country receives a real-time instability score from 0 to 100 computed from four weighted components:

Component	Weight	Details
Baseline Risk	40%	Pre-configured per country reflecting structural fragility
Unrest Events	20%	Protests scored logarithmically for democracies, linearly for authoritarian states. Boosted for fatalities and internet outages
Security Activity	20%	Military flights (3pts) + vessels (5pts); foreign military presence gets doubled weight
Information Velocity	20%	News mention frequency weighted by event severity, log-scaled for high-volume countries

Additional boosts apply for hotspot proximity, focal point urgency, and conflict-zone floors (e.g., Ukraine is pinned at  $\geq 55$ , Syria at  $\geq 50$ ).

## 4.4 Hotspot Escalation Scoring

Intelligence hotspots receive dynamic escalation scores blending four normalized signals:

Signal	Weight
News Activity (article count + severity)	35%
Country Instability (CII score)	25%
Geo-Convergence Alerts	25%

Military Activity (vessel clusters + flight density)	15%
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The system blends static baseline risk (40%) with detected events (60%) and tracks trends via linear regression on 48-hour history. Signals cool down for 2 hours to prevent alert fatigue.

## 4.5 Geographic Convergence Detection

Events are binned into  $1^\circ \times 1^\circ$  geographic cells within a 24-hour window. When 3+ distinct event types converge in one cell, a convergence alert fires. Scoring formula: type diversity  $\times$  25pts per unique type + event count bonuses  $\times$  2pts. Alerts are reverse-geocoded to human-readable names.

## 4.6 Temporal Baseline Anomaly Detection

Rather than static thresholds, the system learns what 'normal' looks like using Welford's online algorithm for numerically stable streaming computation of mean and variance, stored in Redis with a 90-day rolling window.

Each event type (military flights, naval vessels, protests, news velocity, AIS gaps, satellite fires) is tracked per region with separate baselines per weekday and month.

Z-Score	Severity	Example
$\geq 1.5$	Low	Slightly elevated protest activity
$\geq 2.0$	Medium	Unusual naval presence for a Tuesday
$\geq 3.0$	High/Critical	Military flights 3x above baseline for January

Minimum 10 historical samples required before anomalies are reported — prevents false positives during the learning phase.

## 4.7 Live News & RSS System

- 100+ RSS feeds across geopolitics, defense, energy, and tech
- Per-feed circuit breakers with 5-minute cooldowns — prevents cascading failures
- Domain-allowlisted CORS proxy via Vercel Edge Functions — hides origin servers
- Source tiering (Tier 1: Reuters/AP/BBC → Tier 4: blogs) affects confidence weighting
- State-affiliated sources (RT, Xinhua, IRNA) included but visually tagged with propaganda risk flag
- Entity extraction auto-links countries, leaders, organizations from headlines

- 74-hub location database infers geography from headlines via keyword matching

## 4.8 Military Surge & Theater Analysis

5 operational theaters are monitored: Middle East, Eastern Europe, Western Europe, Western Pacific, Horn of Africa — with 38+ associated bases. The system classifies vessel clusters:

- Deployment — carrier present with 5+ vessels
- Exercise — combatants present in formation
- Transit — vessels passing through

Foreign military presence is dual-credited: the operator's country is flagged for force projection, and the host location is flagged for foreign military threat. AIS gaps (dark ships) are flagged as potential signal discipline indicators.

## 4.9 Signal Aggregation Pipeline

All data sources feed into a central signal aggregator (`src/services/signal-aggregator.ts`) that builds a unified geospatial intelligence picture. Each signal carries severity (low/medium/high), coordinates, and metadata. The aggregator:

- Clusters by country — groups signals from diverse sources into per-country profiles
- Detects regional convergence — identifies multi-signal spikes in the same geographic corridor
- Feeds downstream analysis — CII, hotspot escalation, focal point detection, and AI insights all consume the aggregated picture

## 4.10 Story Sharing & Social Export

- Generate shareable intelligence briefs with CII scores, threat counts, theater posture
- Multi-platform export: Twitter/X, LinkedIn, WhatsApp, Telegram, Reddit, Facebook
- Canvas-based PNG image generation with QR codes linking back to live dashboard
- Deep links: `/story?c=<country>&t=<type>` with dynamic Open Graph meta tags

## 4.11 Data Freshness Monitoring

A singleton tracker monitors 14 data sources with status categories: fresh (<15 min), stale (1h), very\_stale (6h), no\_data, error, disabled. Explicitly reports intelligence gaps — what analysts cannot see — preventing false confidence when critical data sources are down.

## 4.12 Prediction Market Integration

Polymarket geopolitical markets are queried using tag-based filters (Ukraine, Iran, China, Taiwan, etc.) with 5-minute caching. Market probability shifts are correlated with news volume — if a prediction market moves before matching news arrives, this is flagged as a potential early-warning signal.

## 5. Edge Functions Architecture

World Monitor uses 30+ Vercel Edge Functions as a lightweight API layer. Each handles exactly one data source concern — proxying, caching, or transforming external APIs. This keeps API keys server-side while avoiding a monolithic backend.

Edge Function	Purpose
api/rss.js (proxy)	Domain-allowlisted CORS proxy for 100+ feeds; hides origin servers
api/ai-classify.js	Groq LLM classifier with Redis deduplication; identical headlines across concurrent users trigger only one LLM call
api/ai-brief.js	Groq World Brief generation, Redis-cached per session
api/acled.js	ACLED protest/conflict data adapter — normalizes to consistent schema
api/gdelt.js	GDELT event stream adapter
api/opensky.js	Military flight data from OpenSky ADS-B
api/vessels.js	AIS ship tracking via VesselFinder
api/nasa-firms.js	NASA FIRMS VIIRS satellite fire detection
api/outages.js	Cloudflare Radar internet outage data
api/earthquakes.js	USGS earthquake feed
api/polymarket.js	Prediction market data with 5-min cache
api/fred.js	Federal Reserve economic indicators
api/temporal-baseline.js	Welford's algorithm state in Redis — builds statistical baselines across requests
api/theater-posture.js	Composite military theater posture calculation
api/*.js (scrapers)	Custom scrapers for sources without RSS (GitHub Trending, tech events, etc.)

All edge functions include circuit breaker logic and return cached stale data when upstream APIs are unavailable.

## 6. Key Algorithms

### 6.1 News Clustering

Uses a hybrid Jaccard + semantic similarity approach with an inverted index for optimization. This prevents  $O(n^2)$  comparisons across hundreds of articles by only comparing articles that share at least one token. Steps:

- Build inverted index: token → list of article IDs
- For each article, find candidate matches via shared tokens
- Compute Jaccard similarity on token sets
- If Jaccard  $\geq$  threshold, optionally compute semantic (TF-IDF cosine) similarity
- Group articles above combined threshold into clusters

### 6.2 Welford's Online Algorithm (Anomaly Detection)

Used for numerically stable computation of streaming mean and variance without storing all historical data. Per observation n:

```
delta = x - mean
mean += delta / n
M2 += delta * (x - mean)
variance = M2 / (n - 1) # Bessel's correction
z_score = (x - mean) / sqrt(variance)
```

State (count, mean, M2) is stored per (event\_type, region, weekday, month) in Redis, persisting across serverless function invocations.

### 6.3 Infrastructure Proximity Correlation

When a news event is geo-located, the system automatically identifies critical infrastructure within a 600km radius — pipelines, undersea cables, data centers, military bases, and nuclear facilities — ranked by Haversine distance. This provides instant geopolitical context without any manual tagging.

### 6.4 News Geo-Location

A 74-hub strategic location database infers geography from headlines via keyword matching. Hubs span capitals, conflict zones, and strategic chokepoints (Strait of Hormuz, Suez Canal, Malacca Strait). Confidence scoring is boosted for critical-tier hubs and active conflict zones.

## 7. Setup & Local Development

### 7.1 Prerequisites

- Node.js 18+
- Go 1.21+ (for buf / Sebuf protocol buffer tooling)
- npm

### 7.2 Quick Start

```
git clone https://github.com/koala73/worldmonitor.git
cd worldmonitor
make install           # installs buf, npm deps, Playwright browsers
npm run dev            # starts dev server at http://localhost:3000
```

The app runs fully without any API keys — affected layers simply won't appear. For full functionality, copy `.env.example` to `.env.local`.

### 7.3 Environment Variables

Variable	Service	What It Unlocks
GROQ_API_KEY	Groq	AI summarization, threat classification, World Brief
UPSTASH_REDIS_REST_URL	Upstash	Cross-user caching, temporal baselines, deduplication
UPSTASH_REDIS_REST_TOKEN	Upstash	Authentication for Redis
OPENSKY_USERNAME	OpenSky	Live military flight tracking (ADS-B)
OPENSKY_PASSWORD	OpenSky	Authentication for OpenSky
VESSELFINDER_API_KEY	VesselFinder	AIS naval vessel monitoring
NASA_FIRMS_API_KEY	NASA FIRMS	VIIRS satellite fire/thermal hotspot detection
OPENROUTER_API_KEY	OpenRouter	LLM fallback when Groq is unavailable
ACLED_API_KEY	ACLED	Armed conflict and protest event data
FRED_API_KEY	FRED	US Federal Reserve economic indicators
POLYMARKET_KEY	Polymarket	Geopolitical prediction market data

## 7.4 NPM Scripts

Command	Action
npm run dev	Start dev server — full/world variant (localhost:3000)
npm run dev:tech	Start dev server — tech variant
npm run dev:finance	Start dev server — finance variant
npm run build	Production build — world variant
npm run build:tech	Production build — tech variant
npm run build:finance	Production build — finance variant
npm run typecheck	TypeScript type checking
npm run test:data	Data integrity tests
npm run test:e2e	Playwright end-to-end tests
make generate	Regenerate TypeScript clients from .proto files

## 7.5 Variant System

The VITE\_VARIANT environment variable controls which configuration is bundled at build time. A Vite HTML plugin transforms meta tags, OG data, and PWA manifest. Each variant tree-shakes unused data files:

- World variant — excludes stock exchange listings; includes military bases, APT data
- Tech variant — excludes military base coordinates and APT group data
- Finance variant — focused on market and economic data layers

Runtime switching in the desktop app uses `localStorage['worldmonitor-variant']` without requiring a rebuild.

## 8. Static Data Files

The /data directory contains curated static JSON files bundled at build time. These are tree-shaken per variant:

Data File	Contents	Count
Military Bases	9 operators: US (DoD), Russia, China, UK, France, NATO, India, Australia, Turkey	220+
Nuclear Facilities	Power plants, weapons sites, gamma irradiators	~200
Undersea Cables	Submarine cable routes with landing point coordinates	~500 cables
Oil & Gas Pipelines	Strategic energy infrastructure globally	100s
AI Datacenters	Major compute clusters with operator info	111
APT Groups	Nation-state cyber threat actor attribution data	~100
Strategic Hubs	74-location database for news geo-location inference	74
Conflict Zones	Baseline conflict zone polygons and point data	20+
Critical Minerals	Strategic mineral deposit locations	100s
Spaceports	Launch facility coordinates	20+

## 9. Reliability & Resilience Design

### 9.1 Multi-Tier Caching

Layer	Technology	TTL / Behavior
L1 — In-Memory	JavaScript Map in browser	Session lifetime; instant reads
L2 — IndexedDB	Browser persistent storage	Survives page reload; used for user prefs + cached data
L3 — Redis (Upstash)	Serverless Redis	AI classification: 24h TTL; baselines: 90-day rolling window; briefs: per session
Stale-on-error	All tiers	If cache read fails, serve last known data rather than error

### 9.2 Circuit Breakers

- Per-feed circuit breakers with 5-minute cooldowns prevent cascading failures when an RSS source goes down
- 14 data sources are tracked with freshness status: fresh / stale / very\_stale / no\_data / error / disabled
- Intelligence gap reporting explicitly tells analysts what data is unavailable, preventing false confidence

### 9.3 Architecture Principles

Principle	Implementation
Speed over perfection	Keyword classifier is instant; LLM refines asynchronously. Users never wait.
Assume failure	Per-feed circuit breakers. AI fallback chain: Ollama → Groq → OpenRouter → browser T5.
Show what you can't see	Intelligence gap tracker reports data source outages rather than silently hiding them.
Browser-first compute	Analysis (clustering, instability scoring, surge detection) runs client-side — no backend compute dependency.
Multi-signal correlation	No single data source is trusted alone. Focal points require convergence across news + military + markets + protests.
Geopolitical grounding	Hard-coded conflict zones, baseline country risk, and strategic chokepoints prevent noise from generating false alerts.

## 10. What Makes It Unique

Differentiator	Detail
Browser-first intelligence	All analysis runs in the browser — no expensive backend compute. CII, clustering, convergence detection, surge analysis are all pure TypeScript functions.
Hybrid AI pipeline	Instant keyword classification + async LLM override. Result is UI never blocks on AI while still getting high-confidence LLM results.
Temporal anomaly detection	Welford's algorithm builds statistical baselines over 90 days, learning weekday/month patterns. This catches 'unusual for a Tuesday in January' anomalies that static thresholds miss.
Single-codebase multi-variant	Three completely different products (geopolitical, tech, finance) built from one codebase with build-time tree-shaking. Zero runtime overhead per variant.
Intelligence gap reporting	Explicitly reports what it cannot see. Most dashboards hide data source failures; this one treats them as intelligence gaps requiring disclosure.
Infrastructure proximity correlation	Automatically links geopolitical events to nearby critical infrastructure (cables, pipelines, datacenters, nuclear) within 600km — no manual tagging required.
Prediction markets as signals	Integrates Polymarket as a leading indicator — detects when market probability shifts before news coverage, flagging as potential early-warning.
Free & open source	Positions as a zero-cost OSINT platform competing with expensive commercial tools.
Geographic convergence scoring	$1^\circ \times 1^\circ$ grid binning detects when 3+ different signal types co-occur in the same cell — finds the 'signal in the noise' that topic-specific feeds would miss.
Source credibility tiering	RSS feeds are tiered (Tier 1–4) with propaganda risk ratings. State-affiliated sources are visually tagged. Classification confidence is weighted by tier.

## 11. Personal Recreation Guide

This section provides a step-by-step approach to building your own personal version of World Monitor.

### 11.1 Recommended Stack for Personal Use

Component	Recommendation	Why
Frontend Framework	Vite + TypeScript (same as original)	Fast dev, great TS support
Map	deck.gl + MapLibre GL (same)	WebGL layers + free vector tiles
AI	Groq (free tier available)	Fast, generous free tier for Llama 3.1
Caching	Upstash Redis (free tier)	Free serverless Redis, 10k req/day
Deployment	Vercel (free tier)	Edge functions + hosting, generous free tier
Flight Data	OpenSky (free account)	Free ADS-B data with account
Ship Data	MarineTraffic free tier or skip	VesselFinder needs paid plan
Protests/Conflicts	GDELT (free, no key)	Comprehensive free event database
Earthquakes	USGS (free, no key)	Official USGS earthquake API
Fires	NASA FIRMS (free API key)	Free satellite fire detection
News	RSS feeds (free)	100+ free RSS feeds, no keys needed

### 11.2 Minimal Viable Version

To get a working dashboard quickly, build in phases:

#### Phase 1 — Map + News (no API keys needed):

- Vite + TypeScript project
- MapLibre GL base map with free tile provider (MapTiler free tier or OpenStreetMap)
- deck.gl for WebGL layers
- RSS proxy edge function (Vercel) for 10–20 key news feeds
- Client-side keyword threat classification
- Basic news panel with severity coloring

#### Phase 2 — Add Static Data Layers:

- Import static JSON from the original repo: military bases, nuclear facilities, undersea cables, pipelines
- Render as deck.gl ScatterplotLayer or IconLayer
- Add GDELT protests (free, no key)
- Add USGS earthquakes (free, no key)

#### **Phase 3 — Add AI (Groq free tier):**

- GROQ\_API\_KEY (free at console.groq.com)
- Implement the two-stage classifier (keyword instant + LLM async)
- Add World Brief generation
- Add Upstash Redis for caching (free tier)

#### **Phase 4 — Add Live Tracking:**

- OPENSKY\_USERNAME + PASSWORD (free account)
- NASA FIRMS API key (free)
- Implement CII scoring using the documented formula

### **11.3 Key Configuration to Replicate**

These are the most important pieces to understand and replicate correctly:

- Vite HTML plugin for meta tag injection at build time (index.html manipulation)
- CSP headers in index.html — critical for security, see the original index.html for the full policy
- The threat keyword list (~120 keywords across severity tiers) — you can copy this from the source
- 74 strategic location hub database for geo-inferring news headlines
- Country baseline risk values for CII (the 40% static component)
- Conflict zone floors (Ukraine ≥55, Syria ≥50, etc.)

### **11.4 Data Sources You Can Use Without Registering**

Source	URL	Data
GDELT	api.gdeltproject.org	Protests, political events, news events
USGS Earthquakes	earthquake.usgs.gov/fdsnws	Real-time seismic data
NASA EONET	eonet.gsfc.nasa.gov/api/v3	Wildfires, volcanoes, floods
Cloudflare Radar	api.cloudflare.com/client/v4/radar	Internet outage data (free)

Polymarket	<a href="https://clob.polymarket.com/markets">clob.polymarket.com/markets</a>	Prediction market probabilities
RSS Feeds	Various	100+ news sources, no auth needed
OpenStreetMap Tiles	<a href="https://tile.openstreetmap.org">tile.openstreetmap.org</a>	Free base map tiles

## 11.5 Recommended Approach for Personal Use

Since this is for personal use only, you can simplify significantly:

- Use Vercel hobby plan (free) — sufficient for personal traffic
- Use Upstash free tier (10k requests/day) — enough for solo use
- Use Groq free tier (14,400 requests/day) — more than enough
- Skip VesselFinder (paid) — use AIS data from MarineTraffic's free widget or skip naval tracking
- Clone the static data files (bases, cables, nuclear, etc.) directly from the repo — MIT licensed
- Focus on the layers you actually care about — you don't need all 25

## 12. Official Roadmap

- API for programmatic access to intelligence data
- Mobile-optimized views
- Push notifications for critical alerts
- Historical data playback
- Self-hosted Docker image
- Election calendar with CII scoring integration (community PR in progress)
- HappyMonitor — positive news dashboard (community PR in progress)

## 13. Quick Reference

### 13.1 Key Source Files

File	What It Does
src/App.ts	God class — orchestrates everything. Start here to understand the app.
src/components/DeckGLMap.ts	WebGL map with all 25 layers
src/services/country-instability.ts	CII scoring algorithm
src/services/clustering.ts	News clustering (Jaccard + semantic)
src/services/signal-aggregator.ts	Central signal fusion pipeline
src/services/rss.ts	RSS feed fetching and parsing
src/services/protests.ts	ACLED/GDELT protest data
api/ai-classify.js	Two-stage threat classification edge function
api/temporal-baseline.js	Welford's algorithm state in Redis

### 13.2 URL Parameters

The app supports deep-linking via URL parameters — every map state is shareable:

Parameter	Example	Description
lat	lat=20.0000	Map center latitude
lon	lon=0.0000	Map center longitude
zoom	zoom=1.00	Map zoom level
view	view=global	Regional preset

timeRange	timeRange=7d	Event time window (1h/6h/24h/48h/7d)
layers	layers=conflicts,bases,nuclear	Comma-separated active layer IDs

### 13.3 All Layer IDs

Layer IDs used in the 'layers' URL parameter:

conflicts, bases, hotspots, nuclear, sanctions, weather, economic, waterways, outages, military, natural, fires, cables, pipelines, datacenters, minerals, spaceports, cyber, vessels, flights, protests, tech, startups, cloud, accelerators