UNCLASSIFIED

The Computation of Concealment

How Open-Source Intelligence, Ambient Signal Processing, and AI-Driven Anomaly Detection Are Rewriting the Rules of Maritime Warfare, Energy Security, and Korean Reunification

Jesse James
iPurpose | ibrahim.help
April 13, 2026

linkedin.com/in/jessecares
jesse@ibrahim.help | +1 250 415 5678

Executive Summary

> **Bottom Line:** The era of concealment through physical stealth is over. Modern AI systems, fed by publicly available data streams costing near zero, can now detect the environmental micro-disturbances generated by nuclear submarines, track illicit oil tankers through electronic warfare zones, and map the structural forces keeping the Korean Peninsula divided. The constraint is no longer hardware. It is computation. And computation just got cheap.

I spent the past year looking at three problems that most people think are unrelated. They are not. The first is how you find a nuclear submarine that doesn't want to be found. The second is how you track crude oil when the people moving it are doing everything possible to make it invisible. The third is how you prove — with data, not ideology — that the division of the Korean Peninsula serves external strategic interests rather than the security of the Korean people themselves.

These three problems share a single, elegant solution: distributed computational anomaly detection applied to ambient environmental data. A submarine displaces 18,000 tons of water. An oil tanker crossing the Strait of Hormuz with its transponder off still reflects radar. A military posture maintained for seven decades generates financial, logistical, and signals intelligence footprints visible from any laptop with an API key.

The tools to do this are open-source, the data is public, and the cost of running the entire architecture is under $50 a month. What used to require a $3 billion intelligence satellite constellation now requires a VPS, a vector database, and a large language model.

This report is the blueprint.

Key Findings

1. **Non-acoustic submarine detection** has transitioned from theoretical physics to computational engineering. AI models trained on ambient environmental baselines can detect the magnetic, thermal, and surface micro-disturbances generated by submerged nuclear platforms — without dedicated military sonar.
2. **Independent OSINT operators** running open-source AIS feeds, Sentinel-1 SAR imagery, and UN Comtrade data through vector databases achieved analytical parity with classified military intelligence during the 2026 Iran-Israel conflict.
3. **Libya's $6.7 billion annual fuel smuggling network** is fully mappable using free satellite imagery and LLM-driven trade anomaly detection — exposing the financial arteries funding armed factions.
4. **The 38th parallel was drawn in 30 minutes** by two mid-ranking American officers using a National Geographic magazine. No Koreans were consulted. The institutional machinery that calcified around that temporary line now costs over $13 billion annually to maintain.
5. **A phased economic integration model** — modeled on Vietnam's Doi Moi rather than Germany's traumatic absorption — offers a viable, data-backed path to Korean reunification that serves every regional stakeholder.

Contents

IX. The Map Was Always Wrong

Conclusion

I. The Waters Off Victoria

I live in Victoria, British Columbia. On a clear day, I can see across the Strait of Juan de Fuca to the Olympic Peninsula. It's beautiful. It's quiet. And it sits on top of one of the most heavily contested anti-submarine warfare environments on Earth.

Most people don't think about this. They see the ferries, the whale-watching boats, the pleasure craft tacking against the westerly. What they don't see are the Ohio-class ballistic missile submarines that transit these waters carrying enough nuclear warheads to end civilization as a concept.

To the north of the strait, CFB Esquimalt occupies 41 square kilometers at the southern tip of Vancouver Island. The Royal Navy built it in 1865 to project imperial power across the Pacific. Today it serves as Canada's primary Pacific naval base — headquarters for Maritime Forces Pacific, Joint Task Force Pacific, and the Canadian Fleet Pacific. Over 6,000 military and civilian personnel. Frigates and submarines.

Directly south, Naval Base Kitsap in Washington State sprawls across 12,000 acres. Third-largest naval installation in the United States. Home port for a significant portion of the Ohio-class fleet — the sea-based leg of the American nuclear triad.

The strategic logic is deliberately asymmetric. America's land-based ICBMs are buried deep in the continental interior — F.E. Warren in Wyoming, Malmstrom in Montana, Minot in North Dakota. Maximum geographic distance from coastal threats. The missiles in the silos don't move. That's the point. They survive by being far away from everything.

The submarines are the opposite. They survive by being invisible. Operating continuously beneath the surface, they constitute the most survivable second-strike asset in the nuclear triad. Which means the waters extending from this strait into the deep Pacific represent some of the most strategically critical real estate on the planet.

And that makes detection — finding what the ocean is hiding — one of the most consequential technical problems of our time.

II. Finding What Doesn't Want to Be Found

For a hundred years, finding a submarine meant listening for it. Passive sonar. Hydrophones dangling in the deep, straining to isolate the mechanical hum of a reactor coolant pump or the cavitation of a propeller from the ambient noise of an ocean that never shuts up.

That worked. Until it didn't.

Modern ballistic missile submarines have achieved acoustic signatures so low they're functionally silent. Sound-dampening mounts absorb mechanical vibration before it reaches the hull. Pump-jet propulsors replace traditional propellers, eliminating cavitation noise. Anechoic hull coatings absorb active sonar pulses like foam absorbs sound in a recording studio. The quietest boats now generate less noise than the ambient ocean itself.

So the entire field is migrating to non-acoustic detection. And this is where it gets interesting.

The Physics You Can't Engineer Away

A nuclear submarine is, underneath everything — the stealth coatings, the silenced machinery, the billions of dollars in acoustic engineering — a nuclear reactor strapped to a torpedo. And a nuclear reactor does things that no amount of engineering can stop.

Fission produces electron antineutrinos. Neutrinos have virtually no mass and no charge. They interact with matter almost exclusively through the weak subatomic force and gravity. This means they pass through the reactor shielding, through the hull, through the ocean, through the planet, without stopping. You cannot baffle a neutrino. You cannot coat against it. It is a consequence of splitting atoms, and if you're splitting atoms, you're emitting them.

Detecting them is another matter entirely.

When an electron antineutrino collides with a proton in water — a process called inverse beta decay — it produces a positron and a neutron. The positron immediately annihilates, releasing prompt gamma rays. The neutron gets captured microseconds later, releasing a delayed 2.2 MeV gamma ray. That specific prompt-delayed signal pair is the fingerprint of a nuclear event. Nothing else in nature produces it at that energy and that timing.

The SNO+ experiment in Ontario — buried two kilometers deep in a mine, surrounded by 1,000 tons of water and thousands of photomultiplier tubes — successfully detects reactor neutrinos from power plants over 240 kilometers away. That's not science fiction. That's science, right now, published and peer-reviewed.

> *When charged particles exceed the phase velocity of light in a dielectric medium, they produce a faint optical shockwave — Cherenkov radiation. The math is clean. The Frank-Tamm formula relates particle velocity to the refractive index of water. The physics is unavoidable. The engineering challenge is deploying the sensors at oceanic scale.*

The ocean also provides its own background noise. Potassium-40, naturally present in seawater, decays continuously. Cosmic ray muons rain down from the atmosphere. These create a dense baseline of radiometric noise that obscures faint signals. But baseline noise is exactly what machine learning was built to handle.

AI-driven pulse shape analysis — gamma-neutron discrimination algorithms trained on the specific energy signatures of inverse beta decay — can separate reactor-generated signals from natural background with increasing precision. The constraint is no longer physics. It's engineering scale.

III. The Ambient Revolution

Here's where I started losing sleep.

Forget neutrino detectors for a moment. Forget the multibillion-dollar sensor arrays. The most profound breakthrough in modern detection theory abandons the search for the target's direct emissions entirely. Instead, you measure the target's impact on everything around it.

In 2024, researchers demonstrated that standard commercial Wi-Fi signals — the same ones running through your house right now — can map human biometric signatures through solid walls. Not with cameras. Not with radar. By extracting Channel State Information from ordinary wireless network traffic. The amplitude and phase shifts across multiple subcarriers reveal microscopic changes in the radio frequency environment caused by a human chest expanding during breathing.

Read that again. Your Wi-Fi router can watch you breathe through a wall.

Experimental platforms using $4 ESP32 edge sensors paired with spiking neural networks process these phase shifts to achieve spatial intelligence without optical cameras or dedicated radar hardware. Four dollars. Off-the-shelf microcontroller. Detecting a person through concrete.

Now apply that principle to the ocean.

The ocean is continuously saturated with ambient acoustic noise, natural magnetic fields, and cosmic radiation. A submarine displaces 18,750 tons of water. It alters local temperature gradients. It disrupts natural magnetic lines of force. It creates a wake of disturbed salt ions that persists for hours.

Magnetic Anomaly Detection has exploited some of these signatures for decades — sensitive magnetometers scanning for disruptions to Earth's magnetic field caused by a ferrous hull. But that requires low-altitude maritime patrol overflights. Short range. Expensive. Labor-intensive.

The new approach is different. Recent experiments demonstrate that underwater acoustic vibrations cause nanometer-scale displacements on the ocean surface. An airborne millimeter-wave radar can detect these tiny surface vibrations, effectively reading submerged acoustic signals through the air-water interface via atmospheric radio frequencies.

The implication is staggering. A distributed network of comparatively cheap sensors — or even the secondary processing of existing commercial telecommunications and environmental telemetry data — fed into AI systems trained on years of baseline environmental data can detect the micro-anomalies, magnetic disruptions, and phase shifts generated by a massive hull moving through the water column.

The paradigm shift:

Concealment has transitioned from physical stealth to computational evasion. The strategic objective is no longer to remain silent. It is to generate a footprint indistinguishable from natural environmental variance. The submarine isn't trying to avoid being heard. It's trying to avoid being computed.

DETECTION MODALITY	MECHANISM	PRIMARY LIMITATION	AI ADVANTAGE
Passive Acoustic	Hydrophones detecting mechanical and cavitation noise	Defeated by anechoic coatings, sound-dampening, advanced silencing	Deep learning filters biologic noise from microscopic mechanical signatures
Cherenkov / Neutrino	Inverse beta decay producing Cherenkov light	Background K-40 variance; cosmic ray muons; massive sensor arrays required	AI pulse shape analysis for gamma-neutron discrimination
Magnetic Anomaly	Ferrous hull disturbance of Earth's magnetic field	Very short range; requires low-altitude overflight	Sensor fusion with multi-modal ambient data; trajectory probability modeling
Ambient Phase Shift	Micro-disturbances in surface waves disrupting RF propagation	Extreme computational load to filter natural wave action	Edge-deployed LLMs parsing massive environmental datasets in real time

IV. Palantir on a Laptop

In late 2025, an independent developer — a former Google Maps product manager — built a functional replica of Palantir's intelligence platform over a single weekend. Open-source data streams. AI agents. 3D geospatial tiles rendering live ADS-B flight tracking, commercial satellite telemetry, seismic sensor data, and public CCTV feeds into a unified intelligence dashboard.

During the Iran-Israel military escalation in early 2026, this publicly built infrastructure monitored massive airspace closures, pinpointed strike patterns, and tracked the systemic rerouting of commercial maritime traffic. In real time. From a laptop. For free.

Capabilities historically restricted to classified military command centers running software that costs governments hundreds of millions of dollars per year. Replicated by one person in a weekend.

This isn't an anecdote. It's an inflection point.

The raw data to monitor global macroeconomic events, track military deployments, and analyze supply chain disruptions is almost entirely available in the public domain. The Automatic Identification System broadcasts vessel identity, position, heading, and speed globally. Free networks like AISHub provide raw UDP data streams. Developer services like aisstream.io offer free WebSocket APIs with geographic bounding box filters.

The European Space Agency's Copernicus ecosystem delivers Sentinel-2 optical imagery at 10-to-20-meter resolution and Sentinel-1 SAR data — which penetrates cloud cover and darkness — for free. The USGS EarthExplorer portal opens the full Landsat archive. UN Comtrade provides detailed international trade statistics with a free API for 200+ countries.

When an anomaly triggers across multiple layers simultaneously — a vessel goes dark on AIS at the exact moment SAR detects a localized oil signature — confidence intervals rise exponentially. No single sensor tells the whole story. The fusion does.

DATA LAYER	SOURCE (FREE/OPEN)	FUNCTION
Maritime AIS	AISHub, aisstream.io	Real-time vessel tracking, speed variance, draft monitoring
Optical / SAR Satellite	Copernicus (Sentinel-1/2), USGS EarthExplorer	Visual verification of dark fleets, port congestion, infrastructure changes
Trade Data	UN Comtrade, WITS, OEC	Bilateral flow analysis, sanctions evasion pattern detection
Vector Storage	Qdrant (Rust), pgvector	Semantic similarity search across millions of records
AI Anomaly Detection	Local LLMs (LLaMA, Qwen), RAG pipelines	Zero-shot anomaly detection, temporal reasoning, contextual flagging

Vector Databases and Zero-Shot Reasoning

The architectural backbone is the vector database. By converting unstructured data — text, images, sequential log files — into high-dimensional numerical vectors, these systems enable AI models to perform semantic similarity searches at speeds that make traditional relational queries look glacial.

Qdrant, written in Rust, uses custom storage engines and asymmetric quantization to compress vectors by up to 64x while maintaining retrieval speed. Massive datasets running locally on cheap hardware. No cloud dependency. No subscription fees. Combined with Retrieval-Augmented Generation, an LLM can dynamically pull years of historical context when evaluating a real-time anomaly — cross-referencing a suspicious vessel position against decades of trade data, satellite imagery, and intelligence reports in seconds.

This is not a theoretical exercise. This is a deployable architecture. Under $50 a month. One operator.

V. The Strait of Hormuz and the Mediterranean

Twenty-one million barrels of oil pass through the Strait of Hormuz every day. One-fifth of global consumption. Twenty-one nautical miles wide at the narrowest point. Three years of continuous military friction between Iran, the United States, and the Gulf states. And as of early 2026, the strait is functionally contested territory.

OSINT tracking in this environment is deliberately sabotaged by the actors involved. GPS jamming. AIS spoofing. Physical transponder deactivation. The "dark fleet" — tankers moving crude with no electronic footprint — has expanded dramatically since sanctions intensified. During kinetic operations, vessel positions cluster unnaturally on commercial maps as navigation interference distorts everything.

The countermeasure is multi-modal fusion. When AIS goes dark, Sentinel-1 SAR still detects the physical radar signature of a steel hull. Cross-reference with last known AIS positions. Track the buildup of ballast VLCCs in the Gulf of Oman holding zones. Deduce true export volumes from port activity rather than reported figures.

Libya: The $6.7 Billion Theft

Libya holds the largest proven oil reserves on the African continent. It also suffers from a political fracture that makes its crude flows one of the most opaque intelligence targets in the Mediterranean.

The fuel smuggling operation bleeds $6.7 billion annually from the Libyan economy. The mechanism is elegant in its corruption: Libya swaps crude output for refined fuel imports to sustain domestic subsidies. Criminal networks siphon the imported fuel at industrial scale. The stolen revenue funds rogue militias and foreign paramilitary groups while starving the central bank of foreign currency.

The smugglers use flag-hopping, false documentation, ship-to-ship transfers in unmonitored waters. Standard intelligence tradecraft, adapted for the commercial maritime domain.

But here's the thing: open-source models using Sentinel-1 SAR data can monitor near-real-time oil spills and identify anomalous vessel clusters along the Mediterranean coast — particularly near anchoring areas like Port Said. Combined with LLM-driven analysis of UN Comtrade reporting discrepancies, independent analysts can map the financial arteries of these illicit networks without classified access, without government cooperation, without a budget.

The data is there. The tools are free. What's missing is the will to look.

VI. Thirty Minutes with a Magazine

On the evening of August 10, 1945, five days before Japan's formal surrender, the U.S. State-War-Navy Coordinating Committee met in the Pentagon. The Soviet army was advancing rapidly through Manchuria. If someone didn't draw a line fast, the entire Korean peninsula would fall into the Soviet zone.

Two colonels — Dean Rusk and Charles Bonesteel — were given less than thirty minutes to propose a dividing line. Neither man was a Korea expert. Neither possessed detailed geographic intelligence of the peninsula. What they had was a small-scale map torn from a National Geographic magazine. A map that lacked provincial boundaries.

They picked the 38th parallel north latitude. It roughly bisected the country. It kept Seoul in the American zone. That was the extent of the analysis.

No Koreans were consulted.

The line cleaved integrated farms, ancestral villages, and a cohesive economic system that had existed for five millennia. The Soviets accepted it. What was explicitly intended as a temporary administrative boundary calcified into one of the most heavily fortified borders on Earth. Two separate governments formed in 1948. War erupted in 1950.

> *I want to be clear about something: Rusk and Bonesteel were not villains. They were young soldiers executing complex orders with woefully incomplete information under extreme time pressure. The villainy, if you want to call it that, is institutional. Once a line gets drawn on a map, bureaucratic and military inertia builds around it with the force of geology. A temporary zone becomes permanent because the institutions*

> *that form on either side of it develop survival instincts of their own.*

This framing matters. The advocacy case for Korean reunification is not that America deliberately destroyed Korea out of malice. It's that a hasty wartime decision, made with a magazine map in thirty minutes, generated self-reinforcing institutional structures that now cost over $13 billion annually to maintain — and serve external strategic interests rather than the security or prosperity of the Korean people.

The Korean people share over 5,000 years of unified civilization. One language — Hangul. Shared philosophical traditions encompassing Buddhism and Confucianism. A cultural heritage so deep that the current division represents less than 2% of their recorded history.

Viewed through that lens, the 38th parallel isn't a natural boundary. It's a clerical error that nobody corrected because too many people started getting paid to maintain it.

VII. Germany Broke It. Vietnam Got It Right.

When people talk about Korean reunification, Germany is always the first comparison. The Wall fell. The two halves merged. Democracy won. End of story.

Except Germany paid over a trillion euros for the privilege. And thirty-five years later, the scars haven't healed.

The German model was rapid political absorption: immediate currency union, wholesale integration of East German institutions into the West's capitalist framework. The result was deindustrialization across the former East, massive unemployment, cultural erasure, and a persistent sense of economic exploitation that fuels populist movements to this day.

For Korea, this model would be catastrophic. The disparity between the two Koreas is vastly greater than between the two Germanys. The ROK's population is roughly twice the DPRK's. The economic gulf is an order of magnitude deeper. And unlike the divided Germans — who maintained postal communication, television broadcasts, and limited visitation for decades — Koreans have been absolutely and totally separated for over seventy years. The linguistic, cultural, and ideological drift is profound.

Sudden absorption would collapse the South Korean financial system, overwhelm its social welfare infrastructure, and create exactly the kind of traumatic dislocation that breeds resentment for generations.

Vietnam did it differently.

After reunification, Vietnam implemented Doi Moi — comprehensive economic renovation beginning in 1986. Phased market liberalization. Aggressive pursuit of foreign direct investment. Integration into global trade networks. All while maintaining centralized political control during the transition.

For Korea, this is the model that works. Establish economic corridors first. Family reunion programs. Mutual trade dependencies. Build the human connections and financial interdependencies that make political integration a natural next step rather than a revolutionary upheaval.

FACTOR	GERMANY (1990)	VIETNAM (1986+)	KOREA APPLICATION
Sequence	Political absorption first, economic restructuring second	Economic liberalization first, political continuity maintained	Economic zones before binding political treaties
Economic Impact	$1T+ immediate cost; rapid deindustrialization	Phased growth; steady global integration	Protects ROK welfare systems; safely activates DPRK labor and resources
Social Dynamics	High alienation; cultural erasure of the East	Top-down stabilization of transition	Time for linguistic and cultural bridging after 70 years of separation
Geopolitics	Enabled by Soviet collapse and NATO expansion	Maintained socialist structures while opening markets	Neutral ground; avoids triggering intervention from superpowers

Both Korean states exhibit extraordinary resilience born of the same cultural fabric. The ROK achieved global technological and cultural dominance from a small, resource-poor territory. The DPRK maintained agricultural innovation, manufacturing self-sufficiency, and cultural continuity under unprecedented sanctions pressure. These are not enemy civilizations. They are one civilization that was administratively bisected by two colonels and a magazine.

Building economic interdependence before demanding political capitulation honors what both states have accomplished. It shifts the conversation from regime change to cost-benefit analysis. And cost-benefit analysis is a conversation that serious people can have.

VIII. The Blueprint

The primary barrier to gradual economic integration isn't North Korean intransigence or South Korean indifference. It's the deeply entrenched narrative of fear — maintained by massive institutional structures on all sides that justify their budgets through the continuous threat of conflict.

This is precisely where the OSINT architecture earns its keep.

By applying the same satellite and data-analysis methodologies typically aimed at the DPRK toward the broader military posture of *all actors* in the Pacific, independent analysis creates a symmetrical view of the landscape. If verifiable, open-source data reveals that the military architecture maintaining the division is primarily driven by external strategic imperatives — containment of regional powers, forward-basing of American assets, justification of defense procurement — rather than immediate inter-Korean hostility, the narrative shifts.

The tools work the same way regardless of which direction you point them.

Phase One: Baseline Proof of Concept

Ingest AIS data via free APIs. Parse a specific geographic bounding box — the waters around the Korean Peninsula, the Strait of Hormuz, the Libyan coast. Feed raw coordinate data into a local LLM tasked with baseline anomaly detection: comparing observed vessel behavior against historical patterns. Flag deviations — unexpected loitering by naval assets, sudden AIS blackouts, unusual port activity. Cost: effectively zero. Success metric: accurate flagging of deviations at near-zero computational cost.

Phase Two: Multi-Modal Layering

Layer in Sentinel-2 optical imagery to visually corroborate AIS anomalies. Ingest UN Comtrade data. Vectorize everything in Qdrant running locally. Enable RAG — the LLM can now pull years of historical context when evaluating a new anomaly. Cross-reference a suspicious vessel position against decades of trade data, satellite passes, and publicly available intelligence reports. Confidence intervals compound with each additional data dimension.

Phase Three: Public Platform

Transition the backend intelligence system into a public-facing journalistic platform. Automated findings, verified by satellite imagery, compiled into formalized reports. A single operator maintaining continuous output of high-fidelity geopolitical analysis that rivals institutional think tanks.

Dual purpose: commercial intelligence for energy sector clients tracking Mediterranean and Persian Gulf crude flows, and rigorous defensive research reframing the international dialogue on Korean reunification.

The point isn't to replace government intelligence. It's to provide an independent, verifiable, mathematically grounded counterweight to narratives that serve institutional interests rather than human ones.

IX. The Map Was Always Wrong

I started this report talking about nuclear submarines and ended it talking about Korean reunification. That wasn't accidental.

The same computational revolution that makes it impossible to hide a submarine in the Pacific makes it impossible to hide the structural realities of geopolitical division. The data is public. The tools are open-source. The processing power is cheap. What was invisible — to citizens, to journalists, to advocacy organizations — is now visible to anyone with a laptop, an API key, and the patience to look.

The 38th parallel was drawn with a magazine map by two men who had never been to Korea. The institutions that calcified around that line have spent seventy years justifying their own existence. The military hardware, the intelligence budgets, the think tank funding, the diplomatic careers — all built on the premise that the division is natural, necessary, and permanent.

The data says otherwise.

Unified Korea becomes one of the most powerful economies on Earth. Samsung's semiconductor dominance combined with the DPRK's rare earth reserves. A manufacturing base that spans the technological spectrum. 80 million people sharing one language, one history, one civilization. Nuclear deterrence already built. Maritime access on both coasts. A geopolitical position that makes unified Korea indispensable to every regional actor.

Every stakeholder wins. China gets a stable, prosperous partner instead of a fragile buffer state. Russia gets energy deals and technology cooperation. Japan gets supply chain resilience and a stable neighbor. The Korean people get sovereignty, dignity, and the chance to finish what two colonels interrupted.

The map was always wrong. The data proves it. And now anyone can see.

This report was produced using open-source tools at near-zero cost.

Every data source cited is publicly accessible. Every analytical method described is deployable by a single operator. The era of sovereign monopoly on strategic intelligence is over. The question is no longer who has the data. It's who has the courage to read it honestly.

Jesse James is an independent geopolitical analyst, technology consultant, and Korean re-unification advocate based in Victoria, British Columbia, Canada. He operates through VI Care (consulting) and Ibrahim Energy Partners (North African energy facilitation). His work focuses on the intersection of open-source intelligence, computational advocacy, and the economic case for de-occupation.

Contact: jesse@ibrahim.help | linkedin.com/in/jessecares | +1 250 415 5678

Classification: UNCLASSIFIED — This document contains no classified or restricted information. All sources are publicly available.