REPORT

GEOINT 2035: Mapping Canada's Future Decision Advantage

How Geospatial Intelligence is becoming the connective tissue of the Canadian Armed Forces' modernization

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A New Era of Intelligence and Sustainment

In the coming decade, Canada's national defence and security posture will be defined not only by its ability to project force, but by its capacity to sense, interpret, and anticipate change in the physical and information domains.

At the heart of that transformation lies **Geospatial Intelligence (GEOINT)**—the integration of imagery, mapping, sensor data, and advanced analytics to illuminate how events unfold across land, sea, air, space, and cyber.

For decades, GEOINT served primarily as a support discipline—tasked with producing imagery and mapping products for planners and commanders. Today, it is evolving into something much larger: the **decision fabric** that connects sensing to sustainment, and data to action, across the entire Canadian defence enterprise.

This shift is captured in the new *Future GEOINT Study (2025–2035): Building Canada's Geospatial Intelligence Advantage*, prepared by **ADGA Group Consultants** under the direction of the **Senior Security Consultant**, **Geospatial Intelligence Services**. The study positions GEOINT not as a niche capability but as a foundational element of the Canadian Armed Forces (CAF) **Operational Sustainment Modernization (OSM)** strategy, linking it directly to the **Defence^{X}**, **Defence Resource Business Modernization (DRBM)**, and **Pan-Domain Command and Control (PDC2)** initiatives.

Why GEOINT Matters Now

The operational environment confronting Canada between 2025 and 2035 is both more complex and more transparent than at any point in history. Adversaries exploit commercial satellites, open-source data, and digital infrastructure to mask intent or generate influence. Meanwhile, climate change and Arctic competition blur the line between environmental monitoring and national security.

In this environment, **time** and **trust** become strategic assets. Decision advantage belongs to those who can collect, verify, and exploit geospatial information faster than their competitors.

Canada's challenge is to fuse its extensive scientific, environmental, and defence geospatial capabilities into one coherent national enterprise.

From Maps to Machines: The GEOINT Evolution

Traditional GEOINT focused on static imagery—an analyst examining photographs to identify equipment or activity. The GEOINT of 2035 is a dynamic, machine-assisted ecosystem where radar, optical, infrared, and hyperspectral sensors feed real-time data into secure clouds, processed instantly by artificial-intelligence algorithms.

This transition marks the convergence of multiple Canadian strengths:

- **Space-based observation** through the *RADARSAT Constellation Mission* and follow-on synthetic-aperture radar (SAR) payloads.
- **Scientific excellence** from *Natural Resources Canada (NRCan)* and *Defence Research and Development Canada (DRDC)* in Earth observation, environmental modeling, and quantum research.
- **Operational expertise** from Natural Resource Canada, Defence Research and Develoment Canada, translating pixels into operational awareness.

The study identifies this fusion as Canada's path toward **GEOINT sovereignty**: retaining sovereign control of core data, infrastructure, and analytic capability while remaining fully interoperable with *Five Eyes (FVEY)* and *NATO* partners.

The Canadian National GEOINT Enterprise (CNGE)

To achieve that vision, the report proposes establishment of a **Canadian National GEOINT Enterprise (CNGE)**—a whole-of-government construct linking Defence, Security, and Science under shared governance.

CORE MEMBERS

Department of National Defence / Canadian Forces Intelligence Command (DND/CFINTCOM), Natural Resources Canada (NRCan), Communications Security Establishment (CSE), Defence Research and Development Canada (DRDC), Public Safety Canada, and selected provincial partners.

FUNCTIONS INCLUDE

- **Strategic Direction:** Defined by DND/CFINTCOM with inter-departmental oversight.
- **Technical Enablement:** Led by DRDC and NRCan to drive innovation.
- **Operational Delivery:** Executed by CFINTCOM and joint commands.
- **Partnership Coordination:** Managed through an inter-departmental GEOINT Council integrating academia and industry.

The CNGE would also formalize partnerships with Canadian aerospace and AI firms, create rapid-prototype innovation labs, and support university-level GEOINT specializations—ensuring a sustainable pipeline of talent and technology.

Aligning with the CAF Operational Sustainment Modernization Strategy

A major addition to this edition of the GEOINT Study is its explicit mapping to the CAF's **Operational Sustainment Modernization (OSM)** strategy. OSM seeks to transform how the CAF generates and maintains readiness by unifying logistics, maintenance, and support data within a digital sustainment enterprise.

GEOINT acts as the information layer linking those sustainment pillars:

OSM Pillar	CAF Focus	GEOINT Contribution
Institutional Sustainment	Enterprise governance, policy, and doctrine	GEOINT standards (ISO 19115 / 19139, STANAG 4545) feed Defence^{X} data layers.
Operational Sustainment	Real-time force readiness and sustainment visibility	GEOINT dashboards show supply routes, depot status, and industrial activity in near real time.
Operational Support	Logistics and infrastructure support to deployed forces	Imagery supports route selection, base siting, and damage assessment.

This alignment means GEOINT no longer ends at the intelligence briefing—it continues through maintenance hangars, supply depots, and field engineering sites, ensuring commanders can visualize and predict sustainment health as clearly as they see the battlespace.

Logistics ISR: Seeing the Supply Chain

The report introduces a new construct—**Logistics Intelligence, Surveillance and Reconnaissance (Log-ISR)**—to bring persistent geospatial sensing to the sustainment domain.

By combining SAR, optical, and open-source data, Log-ISR enables the CAF to:

- Monitor critical ports, rail lines, and airfields for capacity or disruption.
- Track industrial repair networks and depot throughput.
- Predict weather or environmental impacts on Arctic and remote operations.
- Integrate commercial imagery for rapid assessment during humanitarian crises.

Performance targets are ambitious: sub-12-hour detection-to-decision latency for strategic lines of communication and 90 percent coverage of priority nodes by 2030.

These metrics anchor GEOINT as an operational sustainment tool—supporting readiness with precision analytics.

Technology Modernization: From Pixels to Predictions

Technological modernization forms the backbone of Canada's GEOINT advantage. **The Future Study outlines four key pillars:**

1. **Space-Based Systems:** Successors to RADARSAT will expand synthetic-aperture radar coverage and introduce Canadian-built hyperspectral and thermal payloads. Integration with commercial micro-satellite constellations will provide persistent, layered sensing of global activity.
2. **Data Infrastructure:** The **Canadian GEOINT Cloud Environment (CGCE)** will link classified and unclassified users across Defence and civil communities through open-geospatial standards (OGC, STANAG 4559/4609). Secure data lakes with lineage tracking will replace siloed departmental repositories.
3. **Artificial Intelligence and Automation:** AI/ML algorithms will automate change detection, object recognition, and predictive analytics, enabling analysts to focus on interpretation rather than triage. Natural-language interfaces will allow conversational querying of massive datasets.
4. **Quantum and Advanced Computing:** In partnership with DRDC and academic researchers, Canada will develop quantum-assisted geospatial processing and encryption to ensure both speed and security in future data exchanges.

Collectively, these initiatives move GEOINT toward a machine-human teaming model where automation accelerates insight but human expertise ensures context, accuracy, and judgment.

Integrating with Defence[X], DRBM, and PDC2

As Defence[X] digitizes CAF business and resource systems, GEOINT will be exposed as a service layer—delivering geospatial data through secure web-service application programming interfaces directly into supply, infrastructure, and project-management modules.

Metadata from GEOINT holdings will populate the Defence Data Catalogue, while AI-derived risk scores (e.g., supply-chain disruption probabilities or infrastructure change detection) will appear on Defence[X] decision dashboards.

Under **Pan-Domain Command and Control (PDC2)**, GEOINT feeds the common operating picture with automated, structured observations drawn from multiple intelligence disciplines—creating a true **data-to-decision** pipeline that spans operations and sustainment.

The Human Dimension: Training and Culture

No digital transformation succeeds without people. The study emphasizes that Canada's GEOINT workforce must evolve as rapidly as its technology. It calls for a **National GEOINT Training Centre of Excellence**, jointly administered by DND and NRCan, to provide:

- Immersive simulation and augmented reality / virtual reality scenario-based training.
- Cross-domain curricula blending GEOINT with SIGINT, OSINT, and cyber intelligence.
- Tiered certification from entry to expert levels recognized across government.
- Continuous professional exchanges with allied training institutions.

New roles are emerging—**Logistics ISR Analyst**, **Sustainment Data Steward**, **Coalition Sustainment Liaison**—reflecting GEOINT's integration into CAF sustainment governance under CFINTCOM and Assistant Deputy Minister (Materiel).

More broadly, the study highlights a cultural shift: GEOINT analysts are no longer back-room mapmakers but multi-domain integrators shaping operational and strategic outcomes.

Interoperability: Canada in the Allied GEOINT Framework

Canada's future GEOINT posture depends on maintaining seamless collaboration with allies.

Through the **Five Eyes** community, Canada aligns architectures and production methods with the U.S. National Geospatial-Intelligence Agency (NGA), UK Defence Geographic Centre (DGC), Australian Geospatial-Intelligence Organisation (AGO), and Geospatial Intelligence New Zealand (GNZ).

In NATO, Canada participates in GEOINT Working Groups and Centres of Excellence, contributing to the Allied System for GEOINT (ASG).

These partnerships ensure capability parity while protecting Canada's sovereign priorities—leveraging commercial and public-private collaboration under the **Innovation for Defence Excellence and Security (IDEaS)** program to drive domestic innovation.

Toward 2035: GEOINT as a Service

The implementation roadmap outlined in the report proceeds in three phases:

1. **Foundation (2025–2027):** Establish CNGE governance, launch the CGCE design, and initiate training and technology pilots.
2. **Integration (2028–2031):** Operationalize data-sharing standards, deploy AI-enabled analytics, and embed GEOINT in NORAD modernization and Arctic surveillance.
3. **Enterprise Maturity (2032–2035):** Automate TPED processes for real-time analysis, institutionalize CNGE as a standing interdepartmental entity, and link GEOINT to Canada's national digital-twin frameworks.

By 2035, GEOINT will function as an **on-demand service** within Canada's national data infrastructure—secure, AI-augmented, and accessible across Defence, Security, and Science.

A Strategic Inflection Point

The study's conclusion is unequivocal: GEOINT is now an operational necessity, not a technical luxury. Its integration with OSM, Defence[X], and PDC2 ensures that geospatial awareness supports every aspect of the CAF's readiness cycle—from procurement to deployment and recovery.

Through this lens, GEOINT becomes **the bridge between sensing and sustainment**, allowing commanders to see beyond the battlefield into the lifelines that keep the force moving.

Whether monitoring Arctic fuel routes, forecasting supply disruptions, or mapping infrastructure resilience after natural disasters, GEOINT delivers the insight required to sustain operations in contested or degraded conditions.

The Road Ahead

Realizing this vision will demand sustained investment, disciplined governance, and a workforce capable of bridging the divide between analysts and algorithms.

It will also require continued coordination between the CAF, NRCan, DRDC, CSE, Public Safety Canada, and Canada's growing private space and AI industries.

If achieved, the payoff is profound: a sovereign, interoperable, predictive GEOINT enterprise that ensures Canada remains a trusted partner within Five Eyes and NATO while protecting its unique national interests at home and abroad.

CONCLUSION

From Sensing to Decision Advantage

GEOINT has evolved from static imagery to dynamic insight. It enables Canada's commanders and policymakers to perceive not only **where** activity is occurring, but **why** it matters and what will happen next.

As the CAF advances toward 2035, geospatial intelligence will serve as the connective tissue of national defence—linking sensors, data, and decisions in a continuous feedback loop of awareness and action.

In doing so, it will ensure that Canada's forces remain agile, informed, and operationally sustainable in an increasingly complex world.

About the Author

This article is adapted from *Future GEOINT Study (2025–2035): Building Canada's Geospatial Intelligence Advantage*, prepared by **ADGA Group** under the direction of the Tim Winslow CD, Senior Security Advisor, Critical Infrastructure & Public Safety Services.

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