Methane Emissions Management Solution: Gas Emissions Management System, GEMS

SUMMARY

This case study highlights how Alberta-supported innovation can achieve global impact. It showcases GHGSat's journey from a Canadian technology company to an internationally recognized leader in emissions monitoring, demonstrating how expertise developed in Canada and tested in Alberta is helping industries and governments around the world improve environmental performance.

GHGSat's success reflects how the support of Alberta's innovation ecosystem across technology development, validation, and commercialization has helped transformative companies bring world-class solutions to market. Today, the company's satellite-based monitoring services are used internationally to improve emissions transparency and support more informed environmental decision-making. To date, GHGSat has launched 20 satellites and has recently unveiled plans for a second-generation constellation, launching in early 2028, strengthening its ability to provide high-resolution emissions monitoring services across multiple industries and jurisdictions worldwide. Since the company's founding in 2011, GHGSat has raised over $150M to develop and scale its satellite and aircraft emissions monitoring platforms.

PTAC is proud to present this success story because it shows how Alberta's support for innovation can generate lasting environmental and economic value well beyond Canada's borders. GHGSat's achievements demonstrate the long-term return from investing in technology development: practical global emissions reductions enabled by Canadian expertise, innovation, and leadership.

TECHNOLOGY INCEPTION AND DEVELOPMENT IN ALBERTA

From its Canadian roots, GHGSat has grown into a global climate technology leader with pioneering emissions-monitoring capabilities that improve industrial efficiency and environmental performance. Using its own satellite constellation and aircraft equipped with proprietary remote-sensing technology, the company provides high-resolution, facility-level methane monitoring. Each satellite carries GHGSat's patented sensor, which detects emissions with exceptional precision and resolution compared with other commercial systems. By tracing emissions directly to their source, GHGSat delivers source-level data with industry-leading delivery times.

At the heart of this success is GHGSat's emissions intelligence platform, which turns sophisticated measurements into frequent, actionable insights. Businesses, governments, and regulators can use these insights to manage emissions, improve operational agility, and advance environmental and safety objectives. GHGSat's monitoring solutions are tailored to meet customer-specific needs and offer both independent and integrated monitoring options. Customers can develop satellite or aircraft monitoring programs, or a combination, through GHGSat's tiered monitoring approach. Satellites offer global coverage with frequent monitoring that can scan critical assets daily for methane plumes. When more granular insights are required, aircraft are deployed, using the industry proven hyperspectral sensor to verify and validate repairs or help prioritize remediation.

GHGSat further differentiates its service through industry-leading artificial intelligence and machine learning. The company rapidly detects and quantifies emissions and delivers plume alerts within 24 hours, enabling timely action. Measurements flow into a secure cloud platform, where algorithms quantify leak rates and map emissions to individual assets before human verification. Processed data is then delivered through SPECTRA, GHGSat's secure Emissions Intelligence Platform, giving customers interactive dashboards, compliance-ready reports, and automated alerts.

ALBERTA FUNDING AND INNOVATION SUPPORT

GHGSat's collaboration with PTAC helped create the conditions for successful technology development and international growth. During the company's initial commercialization phase, engagement with end users, government funders, and innovation ecosystem partners strengthened market understanding and supported broader deployment. Through PTAC platforms such as domestic events, the Methane Leadership Summit, Digital Innovation Forum, the TEREE committee, and international conferences including CERAWeek, OTC, COP 29, and the World Petroleum Congress, GHGSat gained valuable exposure to Canadian producers and global markets. These opportunities helped de-risk international market development and provided a level of scale and visibility the company could not have achieved alone. They also supported export diversification beyond the United States while reducing financial risk through modest funding assistance. The result has been growth in sales and employment despite geopolitical headwinds, with further expansion anticipated.

TECHNOLOGY COMMERCIALIZATION LESSONS

GHGSat's commercialization experience demonstrates the value of combining technology development with direct engagement from industrial end users, government funders, and innovation partners. Early collaboration helped the company better understand how operators use emissions information, what level of detail supports action in the field, and how monitoring services must fit within existing operational and reporting processes. This feedback supported the transition from technology validation to a service that could be deployed across different facility types and jurisdictions.

The company's experience also shows that successful commercialization requires more than a high-performing sensor. Customers need an integrated service that can detect emissions, verify findings, deliver information securely, and convert complex measurements into practical insights. GHGSat's combination of satellites, aircraft, analytics, human verification, and a secure intelligence platform allows customers to select a monitoring approach that reflects the scale, location, and needs of their assets.

PTAC's industry network, domestic forums, and participation in international events helped GHGSat share its capabilities with Canadian producers and global audiences. These connections increased visibility, supported market learning, and reduced some of the cost and risk associated with entering new markets. The experience illustrates how sustained commercialization support can help an Alberta-tested innovation build credibility and expand internationally.

DRIVERS FOR INTERNATIONAL TECHNOLOGY ADOPTION

GHGSat's international growth is supported by rising demand for timely, credible, facility-level methane information. Operators managing remote or widely distributed assets need monitoring that combines broad geographic coverage with the ability to identify specific emissions sources for closer investigation. GHGSat meets this need by integrating satellites, aircraft, analytics, and secure data delivery so customers can prioritize follow-up and mitigation activities.

Market access requirements, evolving regulations, corporate emissions commitments, and the economic value of preventing lost product are further accelerating adoption. GHGSat's transparent, audit-ready information helps companies demonstrate progress, support reporting, and respond to the expectations of regulators, customers, investors, and other stakeholders.

GHGSat's international commercial reach demonstrates the relevance of this service across different markets. In 2025, the company conducted business with organizations in 22 countries. In 2025, the company conducted business globally, with customer bases in regions including North America, the Middle East, Europe, and Oceania. GHGSat also identified an extensive customer base that includes organizations such as Exxon, Aramco, Petrobras, and the UK Space Agency. These examples illustrate demand from both industry and public-sector organizations.

By detecting large leaks quickly, GHGSat helps operators prioritize repairs and reduce emissions more efficiently. Its ability to monitor individual well pads, pipelines, and facilities anywhere on the planet makes the service especially valuable for remote and distributed asset portfolios. The integrated satellite-aircraft-analytics approach improves operational efficiency, lowers monitoring costs, and supports transparent, audit-ready reporting for regulatory and ESG commitments.

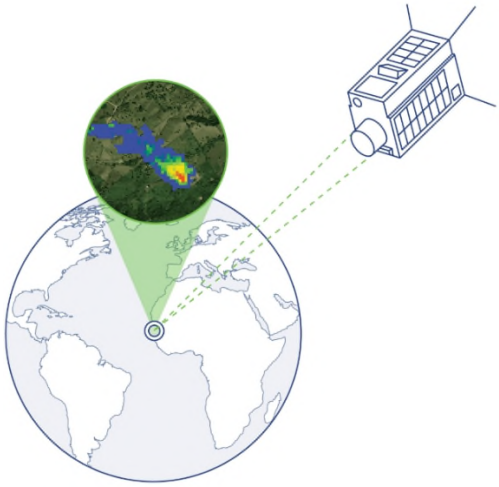


Figure 1: GHGSAT's Remote Sensing and detection of Methane Plumes Using Satellite Observations.



Figure 2: GHGSAT's Satellite Constellations Enable Global Environmental Monitoring.

QUOTES

"We're proud of our continued membership with PTAC, a valued collaboration that enabled GHGSat to share methane insights with oil and gas operators in Canada, supporting energy security goals and increased profitability, all while driving impact: methane detection and reduction on a global scale."

- *Stéphane Germain, CEO, GHGSat*

CONCLUSION

GHGSat's journey demonstrates how Canadian innovation, Alberta-based validation, industry collaboration, and sustained commercialization support can transform a promising technology into a globally deployed emissions-management solution. By combining satellite and aircraft monitoring, advanced analytics, and secure data delivery, GHGSat enables operators and governments worldwide to identify methane emissions, prioritize mitigation, and improve environmental performance. The company's success illustrates the economic and environmental value of a strong innovation ecosystem that connects technology developers with industry, government, investors, and international markets.

PTAC

Petroleum Technology Alliance Canada (PTAC) has supported innovation, operational performance, and environmental improvement across Canada's oil and gas sector for three decades. As a neutral, industry-led organization, PTAC connects industry challenges with practical technology solutions, helping reduce risk, attract investment, and advance innovations from concept to field deployment. Through this work, PTAC continues to deliver value across Canada's energy innovation ecosystem. https://ptac.org/