

**Title**

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**Theme**

- Sub-Theme 2: Implementing and Optimizing a pan-Arctic Observing System
- OTHER - Topics relevant to Arctic Observing

**Author list (in order)**

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**Poster title (brief)**

AIM-North: the Atmospheric Imaging Mission for Northern regions

**Abstract - text box**

Observing the Arctic is important, but maintaining observation networks can be challenging due to its large area, remoteness and harsh environment. Satellite observations can play a key role in an Arctic observing system, but they have their own challenges. Most Earth observing satellites use a Low Earth Orbit (LEO), which allows observations of the polar regions, but with infrequent revisits (days to weeks). Geostationary (GEO) satellites have an equatorial orbit and can give much more frequent revisits (multiple times per day) for latitudes up to ~50-60°N/S, but cannot view the Arctic. The Canadian government has studied Highly Elliptical Orbit (HEO) satellite mission possibilities for many years, since the HEO vantage point enables 'quasi-geostationary' observations of northern regions like the Arctic. Here we present AIM-North ([www.aim-north.ca](http://www.aim-north.ca)), an innovative new HEO mission concept under

consideration by the Canadian Space Agency (CSA) that would provide observations of greenhouse gases, air quality gases and solar induced fluorescence from vegetation with unprecedented frequency, density and quality for the north. Observations would span land from ~40-80°N with 3x3 km<sup>2</sup> pixels, every ~60-90 minutes during daylight. Although clouds would reduce coverage somewhat, intelligent pointing can help to avoid clouds and reduce data loss. AIM-North observations, multiple times per day at a given location, would assist in understanding and quantifying the emission of CO<sub>2</sub> and CH<sub>4</sub> from permafrost thaw, Arctic greening and the uptake of atmospheric CO<sub>2</sub>, and the emission and transport of pollutants from increasing northern resource extraction and transport, which impact both climate and air quality.