Update on current and proposed Canadian satellite initiatives (ECCC/CSA)

Presented to CGMS-54 Plenary Day 3

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EXECUTIVE SUMMARY

- Canada continues to advance national satellite EO initiatives to address key environmental monitoring gaps over its vast lands, waters and atmosphere, including the Arctic, in alignment with its National Satellite Earth Observation Strategy

- This presentation delivers an update on key Canadian satellite systems including funded missions - RADARSAT+, WildFireSat, High-altitude Aerosols Water vapour and Clouds (HAWC), as well as missions under consideration - the Arctic Observing Mission (AOM) and the Terrestrial Snow Mass Mission (TSMM)

- These missions are being advanced with leadership from Environment and Climate Change Canada (ECCC), the Canadian Space Agency (CSA), Natural Resources Canada (NRCan) as well as stakeholder partnerships to leverage expertise across the EO value chain and maximize benefits

- Outcomes of these proposed missions will advance operational services and research programs to support the health and safety of Canadians, with the potential of positive impacts for international partners

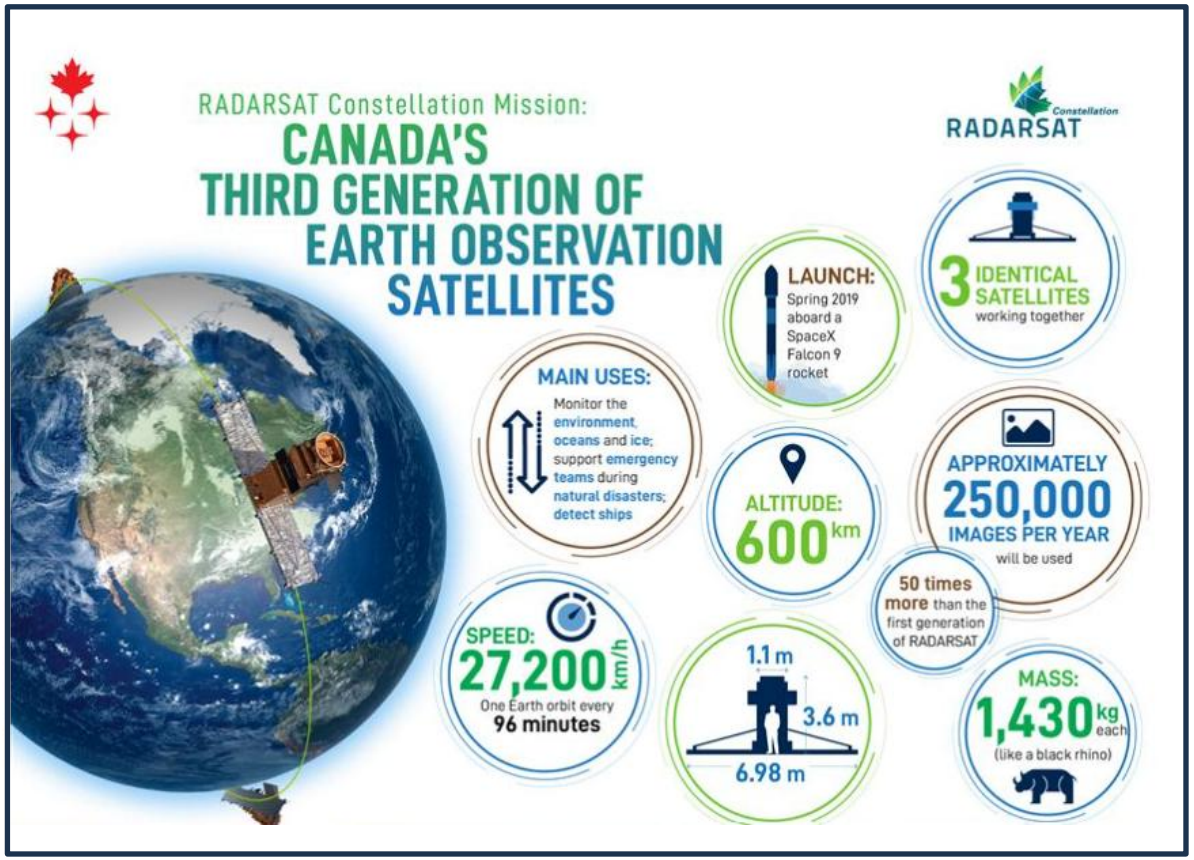
CURRENT LEO SATELLITES

RADARSAT Constellation Mission (RCM)

- Support ecosystem monitoring, disaster management as well as maritime monitoring including ice, surface wind and oil pollution
- Launched in 2019, a three-satellite constellation, each with SAR payload and a 7-year lifetime provides high and medium resolution modes and daily imagery access including up to 4 times a day in the Arctic

Recent Developments (under RADARSAT+):

- RCM Replenishment: A contract has been awarded to purchase specialized parts in support of an additional satellite for RCM to enhance its resilience



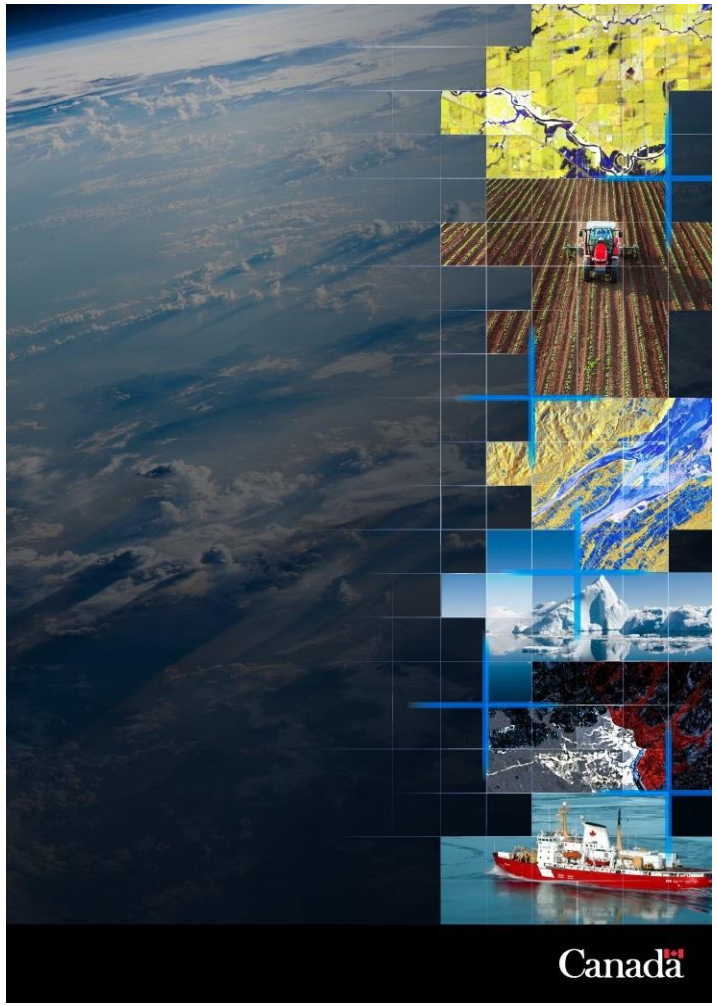
FUTURE LEO SATELLITES

RADARSAT+ *Next Generation*

- Definition of the next-generation satellite system to succeed RCM and maintain Canadian capabilities
- Collection and consolidation of the Gov't of Canada's future user needs

Recent Developments:

- Three Canadian companies are working on concept studies for the new generation of Earth observation satellites



FUTURE LEO SATELLITES

WildFireSat (WFS)

- Satellite system to monitor active wildfires across Canada and globally and provide essential data for fire management

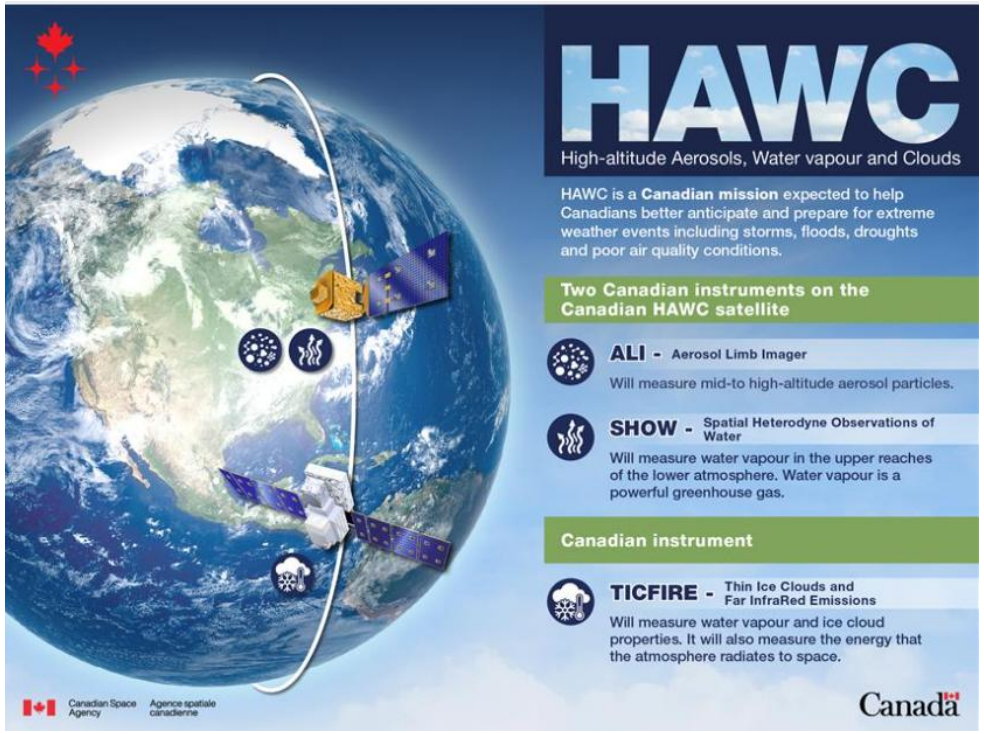
Recent Developments:

- In July 2025, at the G7 Leaders' Summit, the Prime Minister of Canada announced the expansion of WFS to provide global coverage, as a signature deliverable under the G7 Kananaskis Wildfire Charter
- The contract with the supplier for the WildFireSat mission has been terminated for convenience. The Government of Canada will soon be engaging with industry and begin working closely with stakeholders on how best to advance the continued development of this important mission

FUTURE LEO SATELLITES

High-Altitude Aerosols, Water Vapour and Clouds (HAWC)

- Canadian satellite mission advancing our understanding of weather, climate, and atmospheric processes. To launch in early 2030s. Will employ 3 instruments: **ALI** (Aerosol Limb Imager) and **SHOW** (Spatial Heterodyne Observations of Water), both hosted on a Canadian satellite (**HAWCsat**); and **TICFIRE** (Thin Ice Clouds and Far Infrared Emissions) to fly in formation with HAWCsat



Recent Developments:

- **TICFIRE:** Awarded two Phase A contracts for instrument studies and technology development (Autumn 2025)
- **ALI:** Completed Phase 0 Contract for concept design (Autumn 2025)
- **SHOW:** Updated Phase 0 Contract to develop and test core interferometer technology (Summer 2026)
- **HAWCsat:** Completed Phase 0 study of spacecraft (Autumn 2025)
- **Science & Applications grants:** Completed 2 cycles supporting 12 projects. Approved 2 more grant cycles for 2026/27
- **Polar Night Experiment (PONEX)**: 1st ever Polar Night Experiment in Inuvik, NT, January 2026. Collected data from ground, balloons, aircraft, and satellites during the polar night
- **Interagency agreements**
  - Signed an MOU with ECCC to begin updates of weather, climate, and air-quality models
  - Signed an Interagency Financial Agreement with NRCan to provide sub-orbital infrastructure for HAWC campaigns

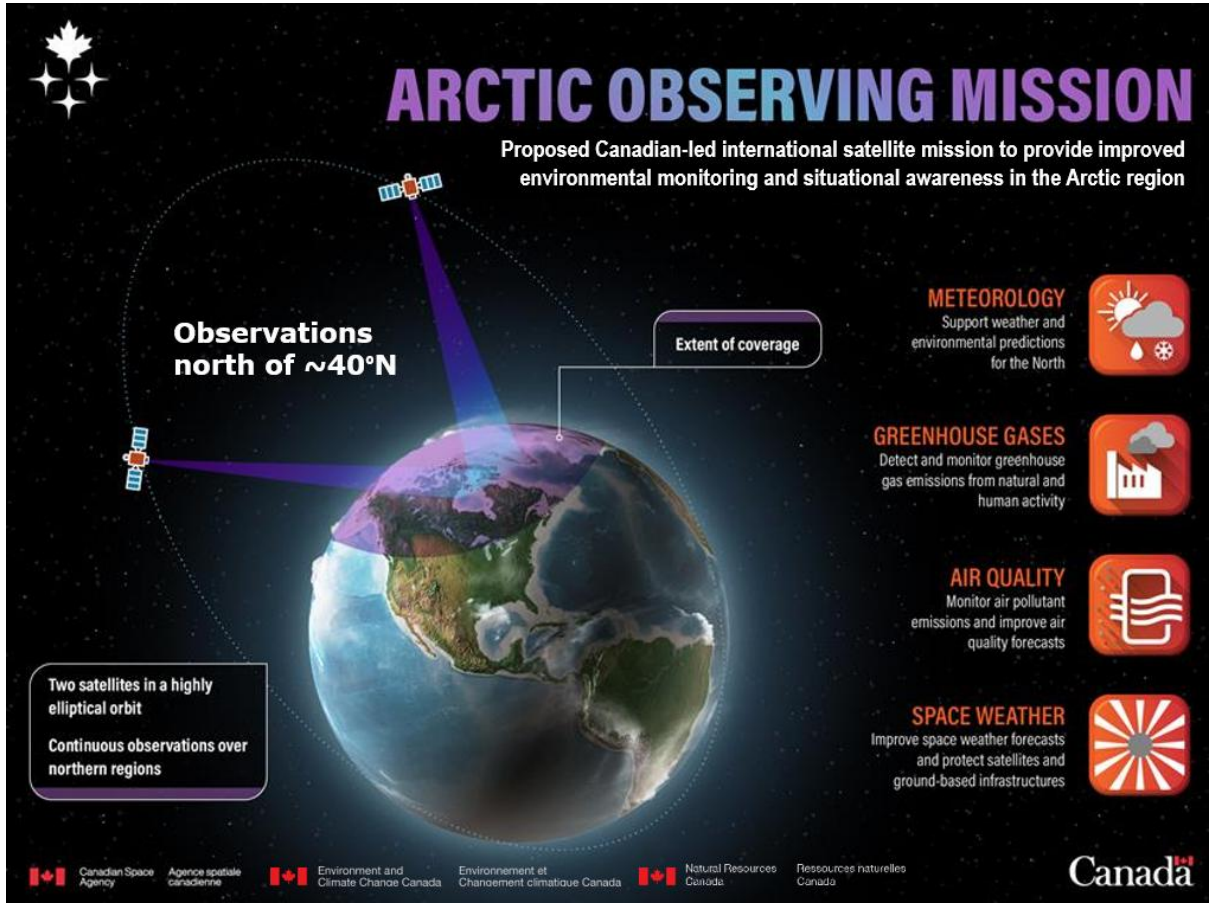
FUTURE HEO SATELLITES (UNDER CONSIDERATION)

Arctic Observing Mission (AOM)

- A proposed Canadian-led international mission with 2 satellites in a highly elliptical orbit (HEO) for observations focused on the North (> 40°N)

Recent Developments:

- Assessing multiple meteorological imager options
- Scope has been expanded to include a space weather instrument suite
- Expanded IR sounder with long- and mid-wave IR (LWIR-MWIR) spectral bands for applications in meteorology, air quality and climate
- Letters of support: CEOS, WMO, FMI, NordMet
- Advancing EUMETSAT partnership discussions



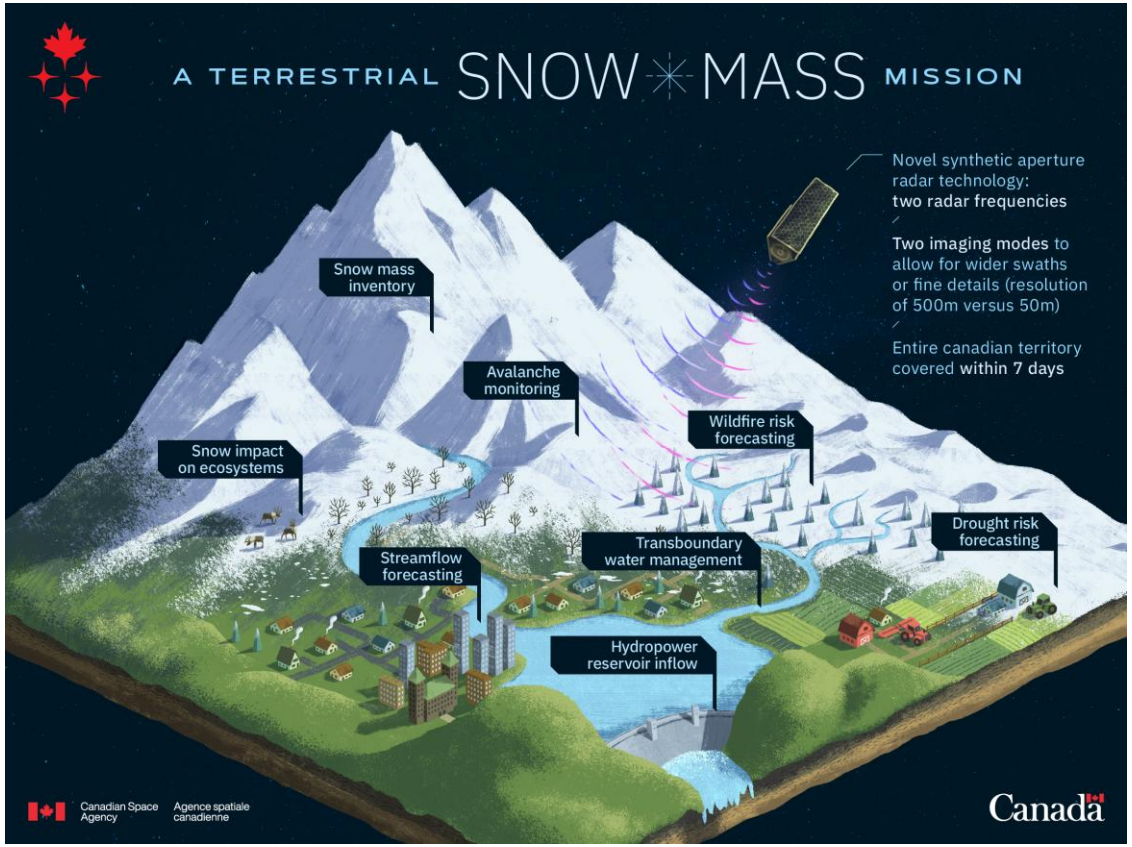
FUTURE R&D SATELLITES (UNDER CONSIDERATION)

Terrestrial SNOW MASS Mission

- Ku-band radar measurements to address Canada's freshwater security and transboundary watershed management, and to meet clean energy regulations
- Would provide the first space-based estimates of the amount of water stored in snow at 500 m resolution with weekly global coverage, enabling snow water equivalent information for Canada, Northern Europe, and Eurasia

Recent Developments:

- Science advancement activities
  - Airborne and in situ field campaigns completed to validate algorithms over Arctic, agricultural and alpine landscapes. Future campaigns targeting boreal forest landscapes.
  - Retrieval algorithm openly published, with code sharing and knowledge exchange with external collaborators including ESA and NASA
- Stakeholder engagement
  - Strong partnerships and renewed support in Canada from academia (18 Universities), all provinces/territories, and industry (Hydro-Quebec, Rio Tinto, and more)
  - Active international collaboration (ESA, EUMETSAT, FMI, NASA)



COMMERCIAL DATA SOLUTIONS (UNDER CONSIDERATION)

- One way to ensure continuity and growth of critical Government of Canada (GC) services is through commercial data
- Exploring scalable, adaptable ways to acquire and share SAR C-band and complementary data to meet GC needs

KEY ISSUES OF RELEVANCE TO CGMS:

- Canada continues to pursue both funded and initiatives under consideration to advance national capacity in addressing key observational gaps of the Earth system, especially in the Arctic, and contribute to international community in support of global priorities
- Development on RADARSAT+, WildFireSat and HAWC funded missions continue to advance in partnership with key stakeholders across the full EO value chain
- Proposed AOM and TSMM missions continue to advance with activities contributing to the development, validation, and readiness of these mission concepts
- Canada is grateful to all partners for their ongoing involvement and expertise in mission development and will continue strengthening international engagement with key partners to maximize value for the global community