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# Canada's Space-based Earth Observation Vision

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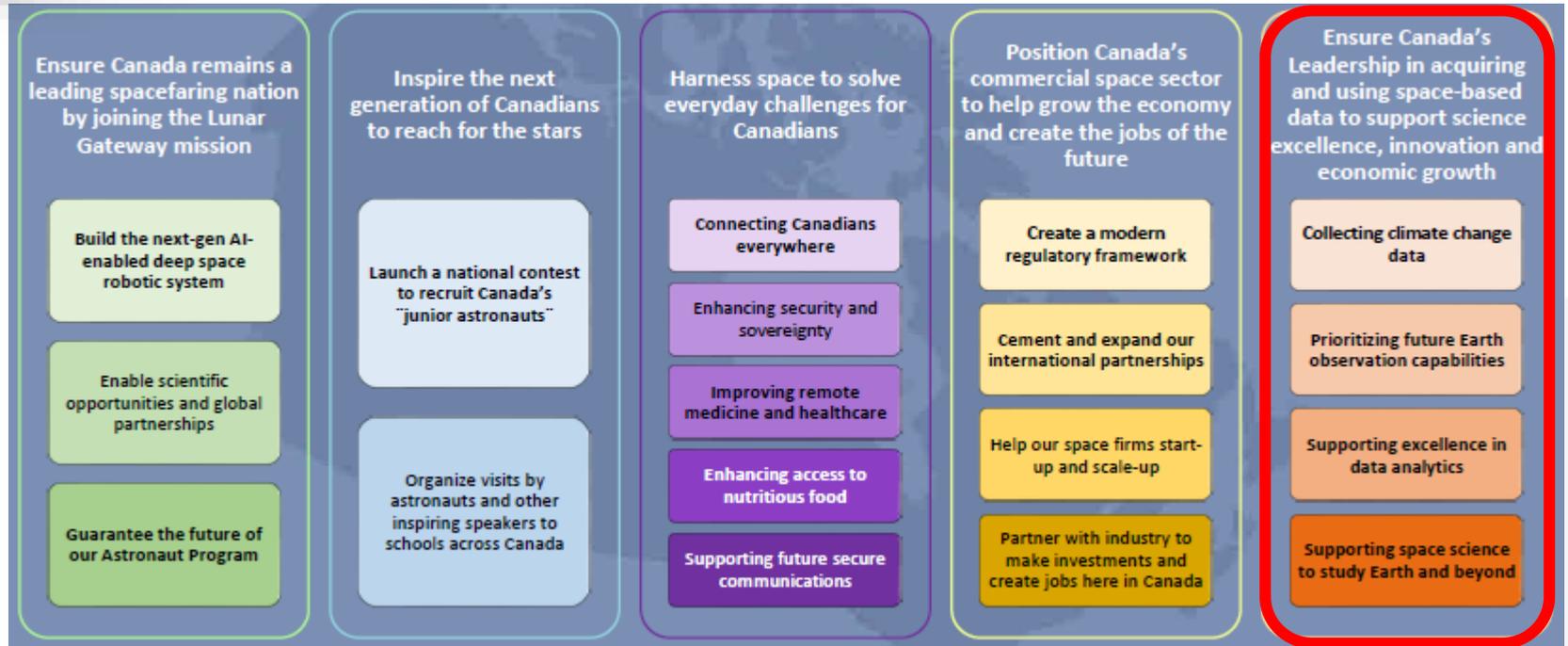
David Harper,  
Director General,  
Monitoring and Data Services  
Environment and Climate Change Canada

Eric Laliberté,  
Director General Space Utilization  
Canadian Space Agency



# The Government of Canada launched a new Space Strategy in March 2019...

- ✓ A strategic long-term investment plan required for Canada to establish itself as a leader is space-based earth observation, addressing the fifth pillar of the Space Strategy



We are here!

...challenging key Federal Departments to bring forth the investment plan essential to support it

# An Interdepartmental effort on SBEO over the past year has led to key deliverables...



- March 2019: **SBEO Diagnostic** outlines the state of affairs for SBEO and the GC
- Oct 2019: **SBEO Vision White Paper** presents a desired end-state for Canada's SBEO landscape
- Summer/Fall 2020 **Interdepartmental Working Groups Roadmaps**

...that provide a framework to assess current and potential SBEO initiatives that will serve Canadians

# The Federal vision for SBEO describes a Government that has SBEO fully integrated into science and operations...

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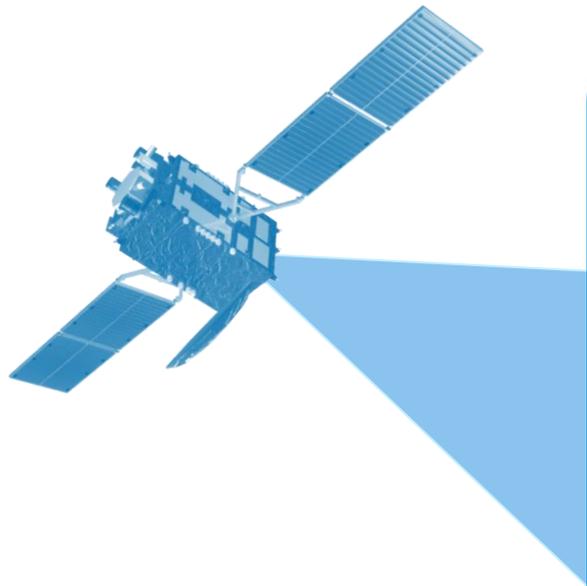
Our vision is a future where advanced satellite Earth observation capabilities are mainstreamed throughout Canada's major sectors, digital economy, and public service to provide solutions in pursuit of major national goals. In this vision government, private sector, and academia collaborate to advance business and research opportunities to serve Canadians.



...and enabled by a long-term, comprehensive, prioritized SBEO investment strategy that will position Canada as a global leader

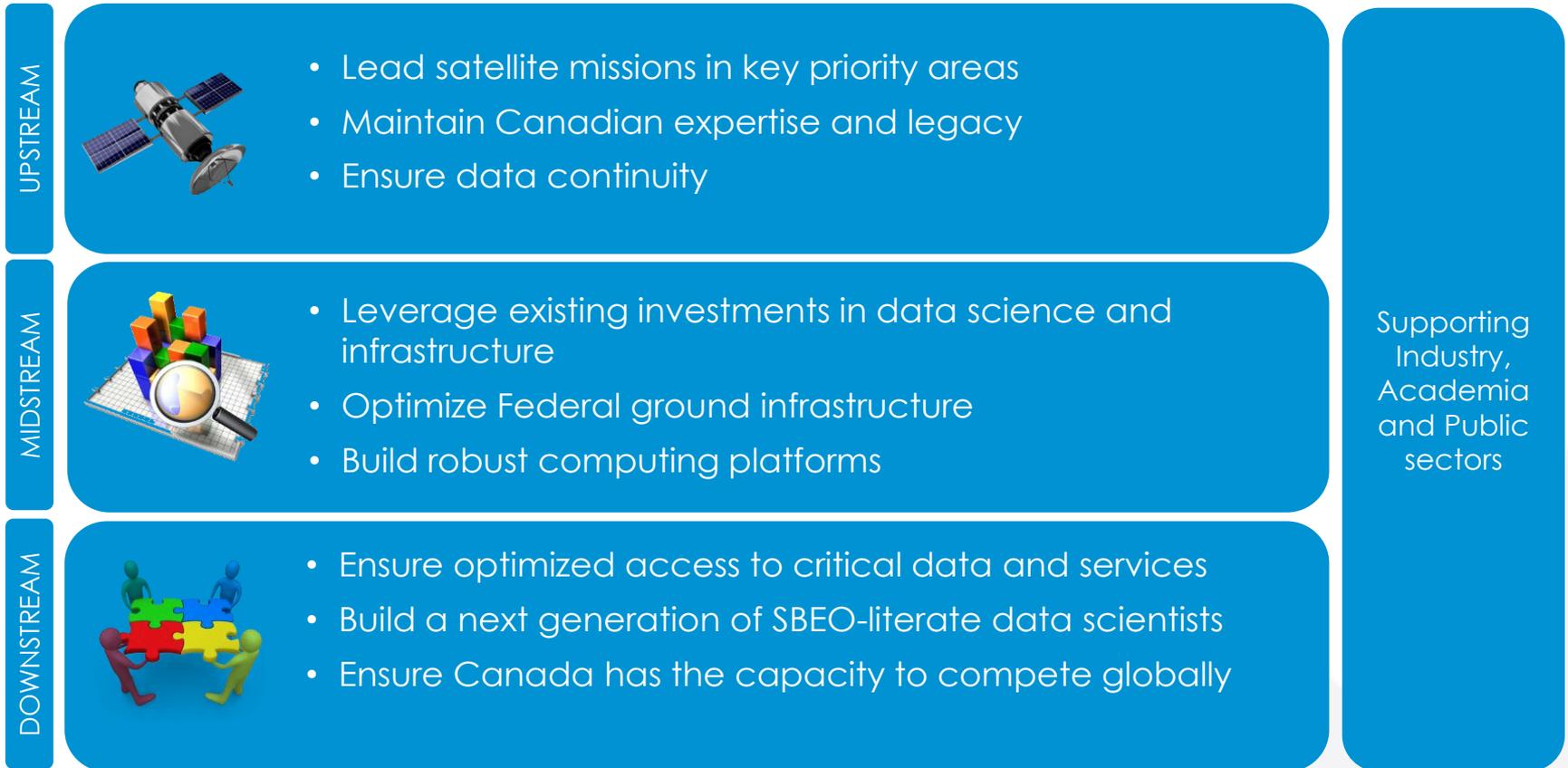
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# Following key guiding principles for advancing SBEO capabilities in Canada...



...will ensure the federal government's approach is smart, collaborative, lasting, and innovative

# A multi-generational Federal investment strategy would position Canada as a global leader in the use of SBEO...



...to drive innovation, economic well-being, sound environmental management, and national security

# **UPSTREAM Initiatives currently considered for the SBE0 Initial Roadmap**



# Planning for a follow-on to the RADARSAT Constellation Mission...

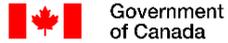
- Canada has been using C-Band Synthetic Aperture Radar (SAR) data without interruption since 1995 with the launch of Radarsat1.
- RCM is the third generation of SAR systems and is forecasted to produce 250,000 images per year. As with any asset, RCM has an 'end of design life'
- Continuity of SAR data post RCM is necessary to avoid a potential service gap.



...to ensure continuity of services based on SAR data



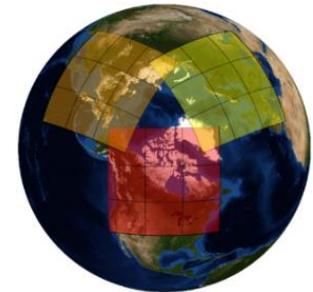
# An Arctic Weather/GHG mission would provide increased monitoring data over the Arctic...



EUMETSAT



- Focus on key priority applications including meteorology, greenhouse gas monitoring, air quality and space weather
- Build on previous work done by ECCO on the Polar Communications and Weather (PCW) satellite and current work on AIM-North (Phase 0 funded by CSA)
- Capitalize on international partnerships and expertise to meet common objectives
- Paired with *in situ* data, provide increased monitoring of northern weather and climate



...to address key priorities in support of climate change monitoring and adaptation, transportation, safety and security in the North, and new opportunities for industry



# Developing wild fire monitoring tools...

This Canadian mission is designed to monitor active fires across Canada, on a daily basis.

Data from this space borne sensor would provide Canadian Forest Service (CFS) and Environnement and Climate Change Canada (ECCC) timely fire diagnosis for

- prediction of fire spread and severity,
- quantification of carbon emissions and
- precise information on smoke and air quality conditions.



IMPACT  
FACTOR  
3.275



Development of the User Requirements  
for the Canadian WildFireSat Satellite  
Mission

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...to address gaps in coverage and provide additional information.

# UPSTREAM Initiatives currently considered for the SBEO Initial Roadmap

## A-CCP

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Canadian contribution to NASA's Aerosol and Cloud, Convection and Precipitation (ACCP) Mission which includes three Canadian science instruments - ALI, TicFire and SHOW. Knowledge gained on this mission is critical to advancing our understanding of climate change, global warming, and will be essential to substantiate climate models. These models are at the core of climate change related policy as they enable our ability to predict the impact of the atmosphere's current state and our present emission levels.

## Terrestrial SnowMass Mission (TSMM)

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Canadian science mission which aims at measuring terrestrial snow mass, sea ice, land ice and ocean winds. Snow plays a critical role in climatological, hydrological and ecological processes across the northern hemisphere. Knowledge gained on this mission will advance our understanding of the cryosphere and its role in both the forcing and responding to the global climate system.

## SciSat 2/ CASS

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SciSat 1 is a Canadian microsat that studies the depletion of the ozone layer with a special emphasis on the changes over Canada and the Arctic. Originally intended to last two years, the satellite is operational since 2003. SciSat2 would provide data continuity to inform environmental policy regarding the protection of the ozone layer.

## WaterSat

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Canadian microsat aims at assessing the "health" of the ocean by measuring oceanic biological activity by optical means. Mapping and understanding changes in ocean colour can assist in the management of fish stocks and other aquatic life, help define harvest quotas, monitor the water quality and allow for the identification of human and natural water pollution such as oil or algal blooms, which are dangerous to fish farms and other shell fish industries.