Canada – Copernicus Partnership

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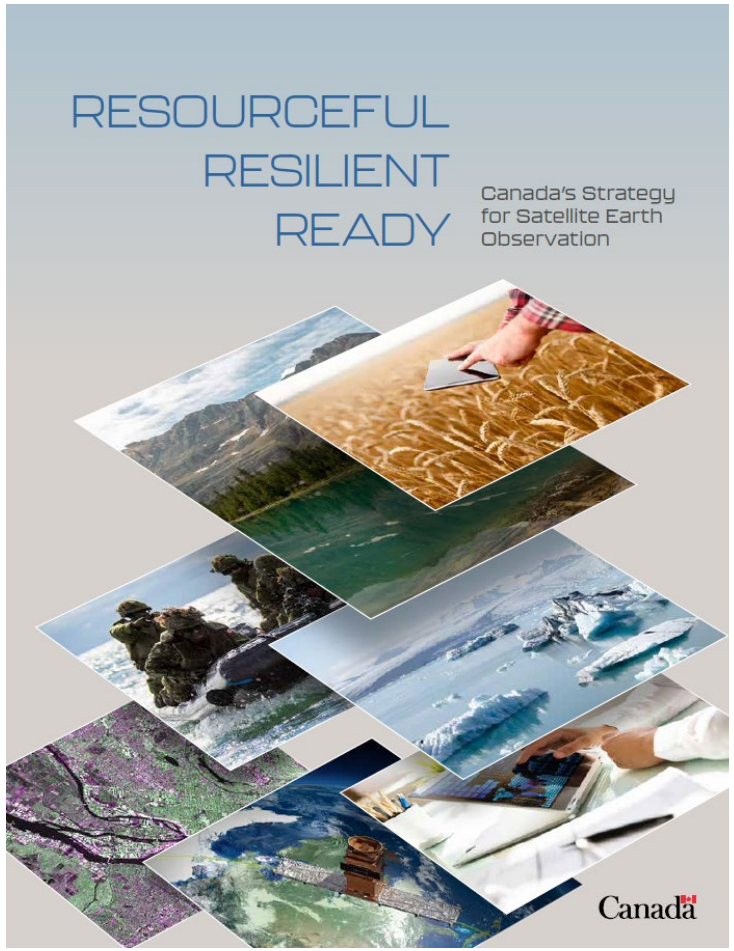
Canada

Resourceful, Resilient, Ready:
Canada's Strategy for Satellite Earth Observation



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The Canadian Space Agency, Environment and Climate Change Canada, and Natural Resources Canada led a whole-of-government effort to seek input from industry and academia to develop Canada's long-term satellite Earth observation strategy.

Strategy Objectives:

1. Ensure the benefits of satellite EO are maximized.
2. Harness satellite EO to tackle climate change and issues that matter to Canadians.
3. Strengthen delivery of critical services to keep Canadians healthy, safe and informed.
4. Inspire satellite EO skills and capacity development for the next generation.

Canada – Copernicus Cooperation To Date

- Canada-ESA Cooperation Agreement since 1979:
  - Canadian companies contributed to the development of Sentinels satellites prototype units

- 2015 Sentinel Collaborative Ground Segment arrangement was signed between the Canadian Space Agency and ESA that allows deployment of a « Canadian mirror site » at the Canada Centre for Mapping and Earth Observation (CCMEO) to provide Government of Canada fast access

- Collaboration Workshop held at CSA in July 2019, attended by 40+ participants, including 12 representatives from European organizations.
  - Nine actions defined, including the need for a cooperation arrangement.

A Cooperation Arrangement was signed on May 16th between the Canadian Space Agency and the European Commission

The CSA-EC *Cooperation Arrangement*

- **Facilitate access** to data and **develop bilateral collaborations** between Canada and European organisations engaged in the use of EO data to ensure mutual benefits

- In preparation for the **implementation** of the Arrangement, several actions were jointly undertaken over recent years with significant progress:
  - Canada delivers RCM data to Copernicus
  - Canada has provided access to several repositories of in-situ data
  - Canada and ESA collaborating on the definition of next generation RCM and S-1 satellites
  - Four potential Technical Operating Arrangements have been defined:

    NextGen Synthetic Aperature Radar (SAR) Oceans Atmosphere Climate Change

Copernicus – Radarsat Constellation Mission Data Exchange and Mutual Support

- Copernicus data is the second most common source of data used by the Canadian government after RCM data.
  - To date, 230 TB of data (500,000 products) was downloaded and for 2021 alone, 38 TB of data for 93,000 products.

- Since the beginning of RCM operations in December 2019 vetted members of the EU and European Economic Area (EEA) have ordered 183K scenes from RCM.

- Canada is currently providing RCM data to mitigate the loss of Sentinel-1B to Copernicus Service providers and state members.

Canada's typical government uses of Copernicus data

Thematic program areas	Description	# of apps
Sustainable Agriculture and Food Security	Sentinel 1, 2 & in **drought/soil moisture mapping, land cover/use mapping, crop identification, crop yields** and more applications	14
Climate Change Action and Resilience	Sentinel 1-3 and 5p to **monitor air quality, carbon balance, monitor wildlife habitat and ice mapping** and more applications.	30
Healthy Canadians	Sentinel 2 for mapping of **vector-borne** and **water-borne disease research**.	3
Competitive and Sustainable Ressource Sectors	Sentinel 1-3 to detect and **monitor wildfires, assess forest damage from insects, forestry management, emergency response, monitoring risks to infrastructure**. and many more applications related to **land and ice cover**.	28
Clean Water	Sentinel 1-3 & 6 to detect **harmful algae blooms, monitor pollution and oil spills, and ocean currents** as well as other applications.	20
Disaster Reponse and Support	Sentinel 1 and 2 for **monitoring of river ice and floating for flood mapping**, as well as for **flood and earthquake disaster support**.	6
Public Safety and Envrionmental Management	Sentinel 2 for **land covering mapping, erosion mapping, wetland inventory, and land use mapping**.	5

SOURCE: Value-chain of Copernicus data and Services within the Federal Government. Euroconsult. June 30, 2021

Arctic Collaboration

- Existing collaboration with Europe supports Arctic research and operational programs in environmental monitoring:
  - Canada relies on data from Copernicus as a complementary data source for many Arctic applications including marine monitoring, Arctic sea ice motion, navigational charts, coastal and ocean applications, ecosystem monitoring
  - Danish Meteorological Institute (DMI) is using RCM data more heavily since S-1B outage and integrate Canadian Ice Service Ice chart information into their own products
  - Canada collaborates with Europe to estimate snow and ice thickness in the Canadian Arctic

WAY FOWARD :

- To further explore and advance the Canada-Europe Copernicus Arctic Potential Technical Operating Arrangement (ocean and sea-ice, in-situ, climate monitoring and atmosphere)
- Expand collaboration on Arctic monitoring and leverage complementary capabilities (e.g. use of Eureka/PEARL, Canadian High Arctic Research Station (CHARS)
- Advance space missions for mutual benefit such as Arctic Observing Mission, Terrestrial Snow Mass Mission

Path forward

- Canada, the European Commission and Copernicus partners are already contemplating to foster a **broader collaboration** for the Copernicus Programme and possibly other areas of space
- A new Implementation Committee will be set up to coordinate the **exploration of concrete opportunities** on Copernicus
- We have mutual interests in EO for complementarity, compatibility and contingency

Canada

Copernicus
Europe's eyes on Earth