Canadian Space Agency | Agence spatiale canadienne

CSA ASC

THE RADARSAT CONSTELLATION MISSION

The Canadian Space Agency pursues a mandate promoting the peaceful use and development of space; advancing the knowledge of space through science; while, ensuring that space science and technology provide social and economic benefits for Canadians. In consultation with other departments, the Canadian Space Agency is leading the design, development and operation of the RADARSAT Constellation Mission to help the Government meet its key priorities.

Earth Observation has greatly evolved over the years and Canadian satellites RADARSAT-1 and RADARSAT-2 are a true measure of our advanced technology. In the wake of their global success, Canada is developing the RADARSAT Constellation Mission using small satellites to further maximize our capability to carry out round-the-clock surveillance from space.

Canada

THE RADARSAT CONSTELLATION MISSION

Design

The RADARSAT Constellation Mission – comprised of three small identical satellites – will provide complete global coverage and offer daily revisits of Canada's vast territory and coastal approaches of all three Oceans: the Atlantic, the Arctic and the Pacific.

Circling the Earth every 96 minutes, the satellites of the RADARSAT Constellation Mission will offer daily access to 90% of the world's surface.

Each satellite in the constellation will carry a synthetic aperture radar, as well as an Automated Identification System for ships (AIS), that will be used independently or in conjunction with the radar. The spacecraft will each have a capability to perform 15 minutes of active detection per orbit, for a total of 45 minutes across the constellation, enabling near-complete imaging of Canada and its maritime approaches on a daily basis, and partial coverage internationally.

The three satellites will be deployed on a single launch in 2018. Each satellite of the RADARSAT Constellation Mission has an estimated lifetime of seven years.

Scope

The RADARSAT Constellation Mission will provide a "big picture" overview of Canada's vast land mass, especially the Arctic, and navigable sea routes and coastal areas. The RADARSAT Constellation Mission will increase Canada's ability to monitor and manage its natural resources and environment, while enhancing the vigilant surveillance of our territory assuring Canada's safety, security and sovereignty.

MARITIME SURVEILLANCE:

- Ice and iceberg monitoring securing safe maritime navigation;
- Marine winds monitoring improving weather forecasts and meteorological research;
- Oil pollution monitoring and interception of polluting vessels;
- Ship detection supporting national security and fisheries monitoring.

Arctic Monitoring

The Arctic is already experiencing an increase in shipping, due primarily to oil and gas development, and tourism. More activity can be expected as diminishing ice cover in the summer months makes Arctic marine transportation safer and more viable.

The RADARSAT Constellation Mission will support Canada's need for monitoring ice, oil spills, shipping and other activities in the Arctic and the Northwest Passage by providing full coverage of the area every 10 hours.

DISASTER MANAGEMENT APPLICATIONS:

- Regular collection of data to support risk assessment and dispatch of rescue, aid and relief;
- Detecting shifting infrastructure over large areas and landslides;
- Generating wide area coverage to map the extent of large flooded areas;
- Hurricane monitoring.

Flood Monitoring

The RADARSAT Constellation Mission's contribution to flood monitoring will be its ability to capture images, day-and-night in all weather conditions. The RADARSAT Constellation Mission will assist the disaster management community by monitoring the extent, duration and impact of floods, identification of areas at risk of developing infectious diseases, while supporting the critical development of flood mitigation measures.

Operational disaster management services will be better served with the increased availability of global data images supplied by the RADARSAT Constellation Mission.

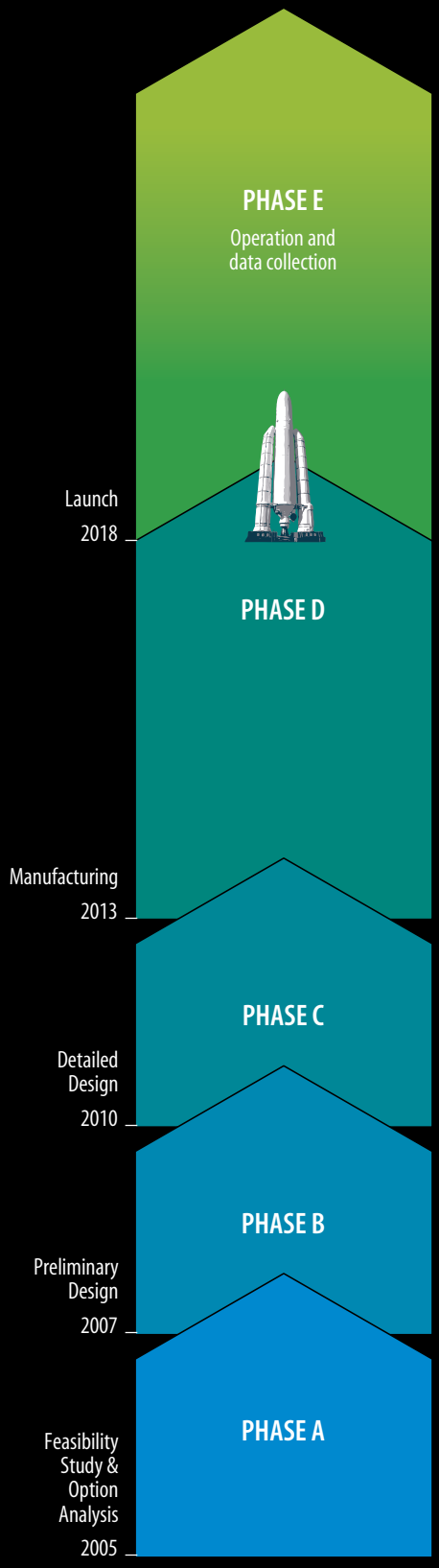
ECOSYSTEM MONITORING:

- Assuring support for the sustainable development of agriculture and forestry resources;
- Contributing to enhancing our understanding of climate change and its impact on ecosystems;
- Detection of changes over time in Canada's coastal areas, wetlands and wildlife habitats;
- Monitoring environmental impact of mineral exploitation.

Agriculture

With the ability to provide unique data about crop structure, conditions and moisture content of the soil, coupled with day-and-night imaging capability regardless of weather, radar satellites are becoming an important source of information for agricultural planning. Considering the spectrum of information that may be gathered, the RADARSAT Constellation Mission will represent a significant advance in the monitoring and mapping of the changing conditions of agricultural crops, farm management activities and soil moisture.

PROJECT TIMELINE



OVERVIEW OF APPLICATIONS

The following table outlines the various applications of the RADARSAT Constellation Mission data in the areas of maritime surveillance, disaster management and ecosystem monitoring.

Application	Geographic Coverage	Revisit	Resolution	End use
Ice and iceberg monitoring	Great Lakes Coastal zones (3 oceans) Shipping lanes	Daily	Medium	Ice charts
Marine winds	Great Lakes Coastal zones (2 oceans)	Daily	Low	Weather forecasts
Oil pollution	Shipping lanes Coastal zones	Daily	Medium	ISTOP Spill response
Ship detection	1200nm (above 42˚ N)	Daily or better	Medium to high	Domain awareness product
Disaster mitigation	Canadian urban areas Transport and energy corridors	Daily or monthly	Medium	Risk maps
Disaster warning	River basins Geohazard risk area	Daily or monthly	Variable	Warning bulletins
Disaster response	Global	Daily access for period of crisis	High (except floods – low)	Situational awareness; damage assessment
Disaster recovery	Global	Daily access for several weeks	High	Maps
Forestry	Forest areas of Canada	Annual	Medium	State of the forest report
Protected areas and wildlife habitat	Parks and sensitive areas	Annual	Medium to high	Change map
Agriculture	Cultivated land in Canada	Weekly (seasonal)	Medium (30m)	Crop classification, crop yield products, tillage practice product
Wetlands	Wetlands in Canada	Annual	Medium to high	Change map
Coastal change	Coastlines 3% highly sensitive	Monthly	Low to medium	Change map

TECHNICAL DATA

Satellite	Mass:	1602 kg
	Imaging time per satellite:	15 minutes average per orbit
Radar	C-Band:	5,405 GHz
AIS	Channels:	161.975, 162.025, 156.775, and 156.825 MHz
	Acquistion time:	17 minutes average per orbit
Orbit	Altitude:	586.9 km to 615.2 km
	Inclination:	97.74 degrees
	Period:	96.4 minutes

KEY CANADIAN GOVERNMENT USERS OF THE RADARSAT CONSTELLATION MISSION DATA

ABORIGINAL AFFAIRS AND NORTHERN DEVELOPMENT CANADA
AGRICULTURE & AGRI-FOOD CANADA
CANADIAN COAST GUARD
CANADIAN ICE SERVICE
DEPARTMENT OF NATIONAL DEFENCE
ENVIRONMENT CANADA
FISHERIES & OCEANS CANADA
NATURAL RESOURCES CANADA
PARKS CANADA
PUBLIC SAFETY CANADA
ROYAL CANADIAN MOUNTED POLICE
STATISTICS CANADA
TRANSPORT CANADA

RCM-info@asc-csa.gc.ca

CONTACT:

RADARSAT Constellation Mission
Canadian Space Agency
6767 route de l'Aéroport
Saint-Hubert, Quebec J3Y 8Y9
CANADA

RADARSAT Constellation