Earth Science Missions Status

May 16, 2017
Active Canadian Assets Monitoring Earth

LAND & OCEAN
2007
RADARSAT-2
Monitors sea ice, land, glaciers and natural disasters

ATMOSPHERE
2006
CloudSat
Measures vertical structure of clouds

ATMOSPHERE
2001
OSIRIS on Odin
Measures profiles of ozone, NO2, and aerosols

ATMOSPHERE
2003
SCISAT
Measures profiles of ozone, greenhouse gases and over 40 trace gases and aerosols

ATMOSPHERE
1999
MOPITT on Terra
Measures carbon monoxide in the lower atmosphere

Listed for each sensor: Primary target, launch date, partner countries, name, principal function
• Satellite continues to perform nominally
• Over 534,000 image acquisitions to date (commercial + GoC)
• Quad-Pol data + VNIR very useful for Wetland Characterization (Franklin, S. and Ahmed, O. PE&RS, Vol. 83 No.1 pp. 27-36)
RADARSAT Constellation Mission RCM

- Assembly, integration and testing of flight hardware for the three satellites and development of the supporting ground infrastructure making good progress.
- Still on track for launch in July 2018
RCM SAR Data Integrated in Government of Canada Service Delivery

- Ice
  - Ice & Icebergs
  - Ice data Assimilation
  - Ice Dynamics

- Oil
  - Integrated Satellite Tracking of Pollution (ISTOP)

- Winds
  - National SAR Winds
  - Wind Data Assimilation

- Ecosystem
  - Arctic Coastline
  - Wetland monitoring

- Land
  - Land Surface & Water Extent

- Agriculture
  - Crop Inventory
  - Soil Moisture

- Security & Defence
  - Maritime Surveillance
  - Land Surveillance

- Monitoring
  - Ocean Features
  - INSAR Hazards Deformation Infrastructure Glacier

- Emergency
  - Emergency Geomatics Service

- R&D
  - Compact Pol CCD
  - Geohazards Wetlands
  - Security & Defence
First RCM Spacecraft at the David Florida Laboratory for TVAC testing (January 2017)
Soil Moisture Active Passive

SMAP

• NASA mission where Canada is involved in Cal/Val and science development.
  • L-band radiometer and radar.
    ▪ Radar instrument lost in July 2015
  • ECCC and AAFC are leading the research in Canada with scientists from 5 Canadian universities supported by CSA
  • Main focus is on Soil Moisture and Soil Freeze-Thaw (F/T)
    ▪ To circumvent the unavailability of active data, NASA is merging SMAP data with Sentinel 1 to provide 9 km resolution L-band data products

Major Cal/Val field campaigns took place in 2010, 2012 and 2016
Surface Water and Ocean Topography
SWOT

• NASA-CNES-CSA Mission planned for launch in early 2021
• Ka-band cross track interferometry
• Oceanography: Ocean circulation, eddies, coastal phenomena
  ▪ High vertical accuracy (≤1 cm)
  ▪ High spatial resolution (15 km)
• Hydrology: Discharge and storage changes for lakes > (250 m)² and rivers larger that 100 m.
  ▪ Vertical accuracy: ~10 cm
  ▪ Spatial resolution: ~50 m
  ▪ Slope accuracy: ~1 cm/km
CSA has created 3 Advisory Committees

- **Solar-Terrestrial Science Advisory Committee**
  - focuses on the study of the Earth's space environment, how it is affected by the Sun, and its interaction with the Earth and its atmosphere.

- **Atmospheric Science Advisory Committee**
  - focuses on the study of the Earth's atmosphere, its chemical and physical processes, the effects that the Sun and other Earth systems have on the atmosphere, and the effects of the atmosphere on these other systems.

- **Earth System Science Advisory Committee**
  - multidisciplinary approach to studying Earth as a system. This approach involves studying the processes and interactions (cycles) among the atmosphere, hydrosphere, cryosphere, biosphere, and geosphere.

Science advisory committees support the planning, validation and updating of long-term roadmaps and program strategies for the CSA. The committees provide feedback on CSA programs and initiatives, and provide independent advice on science priorities.
Call for Letters of Interest – Canadian CubeSat Project

• The CCP aims to ensure equitable opportunities for students across Canada, and will award up to 13 grants, one for each province and territory (each grant will be worth about $200,000)

• The CSA will also make arrangements for the Cubesats' launches from the International Space Station (ISS) and cover the associated costs.

The CSA will use your response to evaluate your level of interest in developing a Cubesat and training students in this endeavour as well as to identify the resources the CSA will require to make the CCP a success.

http://www.asc-csa.gc.ca/eng/ao/2017-cubesat.asp