

CSA and GHCP: Expectations and Interactions

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Outline:

- Introduction to CSA
- CSA EO Assets and activities
- Radarsat Datasets
- SAR for Geohazard
- Framework of collaboration
- Conclusion







Context: Canadian Space Agency (CSA)

- Canadian Government organization responsible to develop and implement the Canadian Space Program
- Earth Observation : >50% Budget
- Co-operation Agreement with ESA







CSA Earth Observation (EO) Strategy

Enabling Government
Departments to use space
to better deliver their
mandates and programs;
focus on sovereignty, safety
& security, environment and
resources











CSA ASSETS

CSA Missions

Programs & Activities













CSA Supported Missions 1/3

RADARSAT-1



- In operation since 1996 confirmed continued operations until 2011
- Demonstrated potential for routine observation (support science and operational activities)
 - <u>13+ years of archive collected over the globe still imaging</u>















CSA Supported Missions 2/3

RADARSAT-2

- Advanced SAR instrument polarimetric high-resolution, heritage modes
- Ocean/Marine monitoring focus.
- Owned and operated by MDA
- <u>GoC data allocation available for science</u> <u>activities and development and</u> <u>demonstration of operational applications</u>









Agence spatiale Canadian Space canadienne Agency RADARSAT-2 Data and Product © MacDonald, Dettwiler and Associates Ltd. (2008) - All Rights Reserved.



CSA Supported Missions 3/3

RADARSAT Constellation

- Evolution of the RADARSAT Program (i.e. 3 satellites 32 minutes separation);
- Average daily global access of land and oceans (daily revisit 50m res.) & int. areas;
- Focus on NRT needs expressed by marine operational end-users (ice, icebergs, wind and ocean features, illegal oil spills monitoring, vessel detection).







OUR Programs and Activities

- ✓ Governmental Related Initiative Program (GRIP)
 - ✓ Fosters the use of Canada's space resources by the Government of Canada. Focuses on developing government use of space-based land, ocean, and atmospheric observation systems and services

Earth Observation Application Development Program (EOADP)

✓ aims to promote the development of application by the Canadian private sector that will maximize the utilization of Earth observation (EO) satellite data

Strategic Sectors Opportunity (SSO)

 Develop initiative to demonstrate the contribution of EO in strategic sectors (climate change, carbon, security, etc.)

Science and Operational Application Research (SOAR)

 ✓ International Announcement of Opportunity to provide RADARSAT-2 advanced modes products (dual polarization, polarimetric and ultra-fine) for R&D purposes

Data for Research Use (DRU)

✓ In collaboration with MDA GSI, DRU offers RADARSAT-1 data for research activities Agence Agency Agency

* CSA FO Programs web site: www.asc-csa.gc.ca/eng/observation/applications.asp



CSA activities related to Geohazard

- International Charter on Space and Major Disasters;
- CEOS: Disaster/InSAR Supersites;
- GEO : Caribbean Satellite Disaster Pilot;
- New Orleans Subsidence Monitoring
- Disaster Watch Program









CSA activities related to Geohazard

Domestic activities

- InSAR Monitoring of Active GeoHazard Sites in Canada (NRCAN-CCRS, AB GS);
- Frank Slide InSAR Monitoring (Atlantis, AB GS);
- Integrated Pipeline GeoHazard Monitoring Service (MDA-GSI);
- Monitoring Subsidence in urban areas (Vexcel);
- InSAR Monitoring of Volcanic Complex in BC (GSC);
- InSAR Monitoring of Critical Infrastructures
 (C-Core and MDA)





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CSA Existing Datasets

Radarsat 1

- Globe cover
- Canadian Interferometric coverge (CIM)

Radarsat-1/2

- Polar regions
- Tropical and Boreal Forests
- Oceanic islands
- Volcano watch
- Hurricane watch
- Disaster watch
 - +Earthquake watch







SAR for Geohazard

- Over 15 years of multi-frequency/polarization data available over Land mass
 - Multi frequency (L-, C-, X-Band)
 - Multi-dimension (from single to dual polarisations to polarimetry)
 - Temporal series since 1992
 - Multi resolution (from wide swath continental to fine resolution local)
- New sensors new capabilities new opportunities
- All weather imaging system
- Multi-dimension analysis to enhance single data set value

Agence so Complementary information to optical data





SAR for Geohazard (- - -)

- SAR archive acquired over Land mass are under used/exploited
 - Used in isolation limited added value
 - Assessment of coherence (timing, consistency, systematic acquisition plans, etc.)
- SAR requires planning and specific imaging characteristics to optimize information content (new acquisitions)







Framework of collaboration

- Development of a coordinated effort to optimize satellite SAR resources from a number of space agencies; (ex: IPY, FCT)
- Engage the science community currently involved in Geohazard (GHCP coordination role?);
- Strengthen their work by providing satellite SAR resources and capabilities in a systematic manner.
- Contributes to the development of a Global Earth Observing System of Systems (GEOSS).









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Conclusion: Benefits for All

Benefits for the User Community and the GHCP will:

- Improved provision of the data needed for global monitoring of Geohazard.
- Enhanced content of multi-layered SAR data sets (e.g. multitemporal SAR for InSAR monitoring and change detection and multifrequency for richer information) for scientific research.
- Long term datasets for better understanding of geohazard

Benefits for the Space Agencies:

- Increased use of satellite SAR data by pooling new and archived data sets.
- Increased cooperation of space agencies and scientific user groups, thus leveraging the investments of each of the agencies.
 - Improved validation of satellite SAR products.

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Thank you!

Questions?

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