



2015 JECAM Annual Science Meeting

Canadian Space Agency Contribution and Engagement in Support of the JECAM Science Objective

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Outline



- Context
- CSA's Engagement and Focus
- CSA Space Assets (The RADARSAT missions)
- Direct contribution
- Current Interests of CSA
- New Modus Operandi
- Summary



Guiding Principles



"Technology and science are only as good as our ability to use the information they provide"

THUS

"The successes are dependent on our ability to relay the information the final mile to the people"

Marine Scientist, No. 17, 2006
About the tsunami warning system

SAR for Agricultural Monitoring Workshop, Kananaskis, Alberta, Canada – November 2009

For the space agencies

- To open a dialogue with international science communities
- To understand the data needs and requirements regarding agriculture monitoring that can be addressed by Earth observation data products.
- Contribute data as fluidly as possible and support transition data into information products and services

For the Agriculture CoP

- Identify and prioritize the needs of the agriculture monitoring community
- Communicate the information requirements and operational needs to facilitate coordinated access to EO data
- Advance science under an open sharing, coordinated, and collaborative framework

Current Perspective and Responsibility



- **Changing Environment:**
 - Agricultural areas are sensitive and significantly affected by climate change
 - Regional issues = Global ramifications
- **Stronger Awareness:**
 - National and International Policies for Agricultural areas and practices and enhanced awareness of climate anomalies (i.e. G20 support of GF)
- **Exceptional Space Assets:**
 - The “Gold Standard” for Earth observation
 - Broad range of satellites (avoiding “mono-technology”)
- **Key Factors:**
 - Transition from a measurements era to an information and services era
 - Availability of data (i.e. Sentinels model)
 - New technology and business models (i.e. nano-satellites)
 - New working environment (i.e. data cubes, cloud computing)

Today, the Space Agencies and the science communities share the common responsibility of maintaining an open “dialogue” in order to put the “best minds” at work using the best technology assets possible on Agriculture issues.



The Canadian Space Agency overarching objectives in support of JECAM:

- To support Agriculture-related science which will benefit the government, the private sector and eventually Canadians
- To enable end-users to exploit the large amount of SAR data that is now or will soon be available in support of their programs for Agriculture
- Focusing our investments
 - Supporting and providing access to missions that meet user requirements
 - Investing in operationally focused science and ensuring transition towards operationalization
 - Going beyond the science into Societal benefits



RADARSAT Missions



RADARSAT-1 (1995)

RADARSAT-2 (2007)

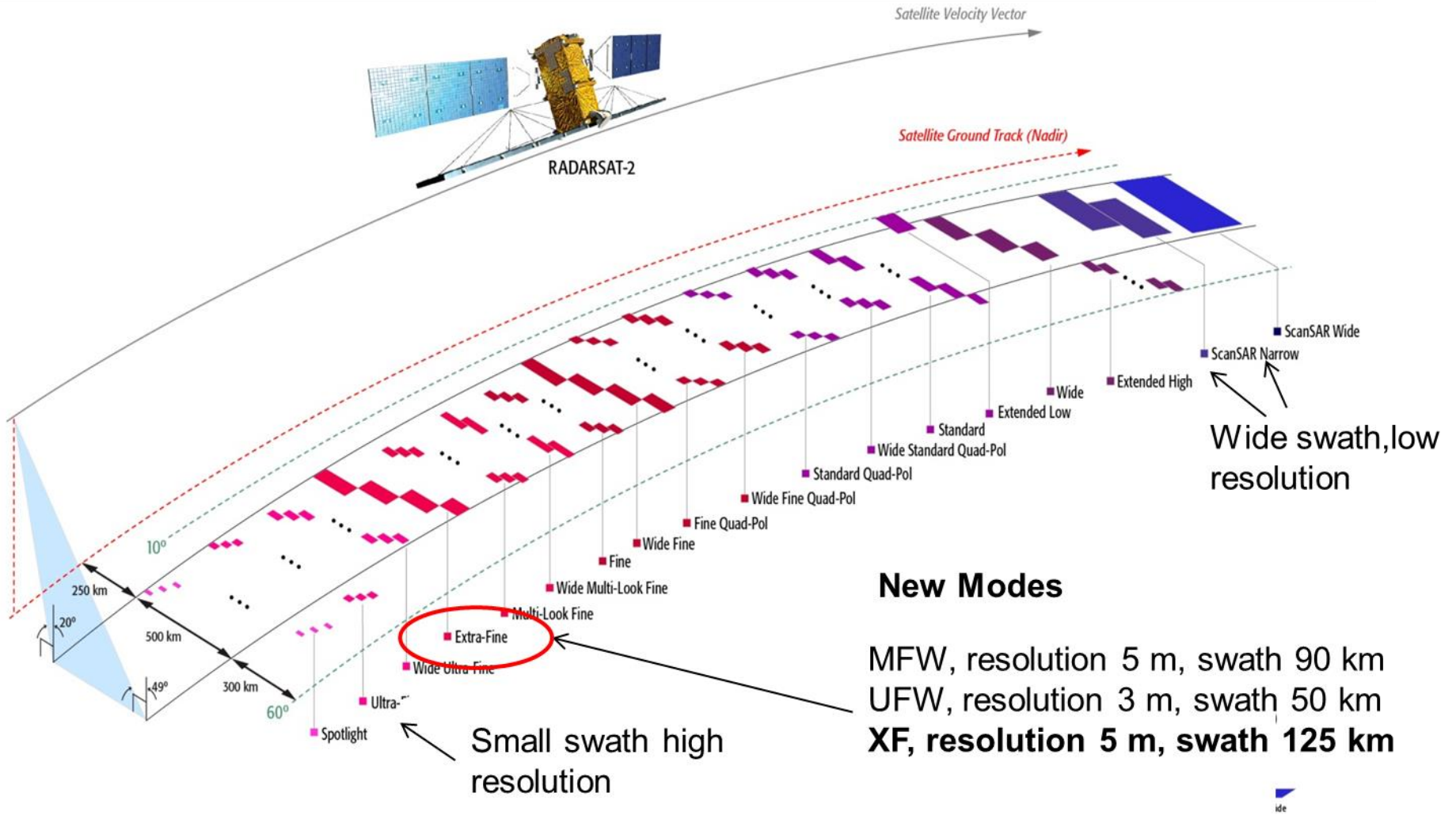
RCM (2018)



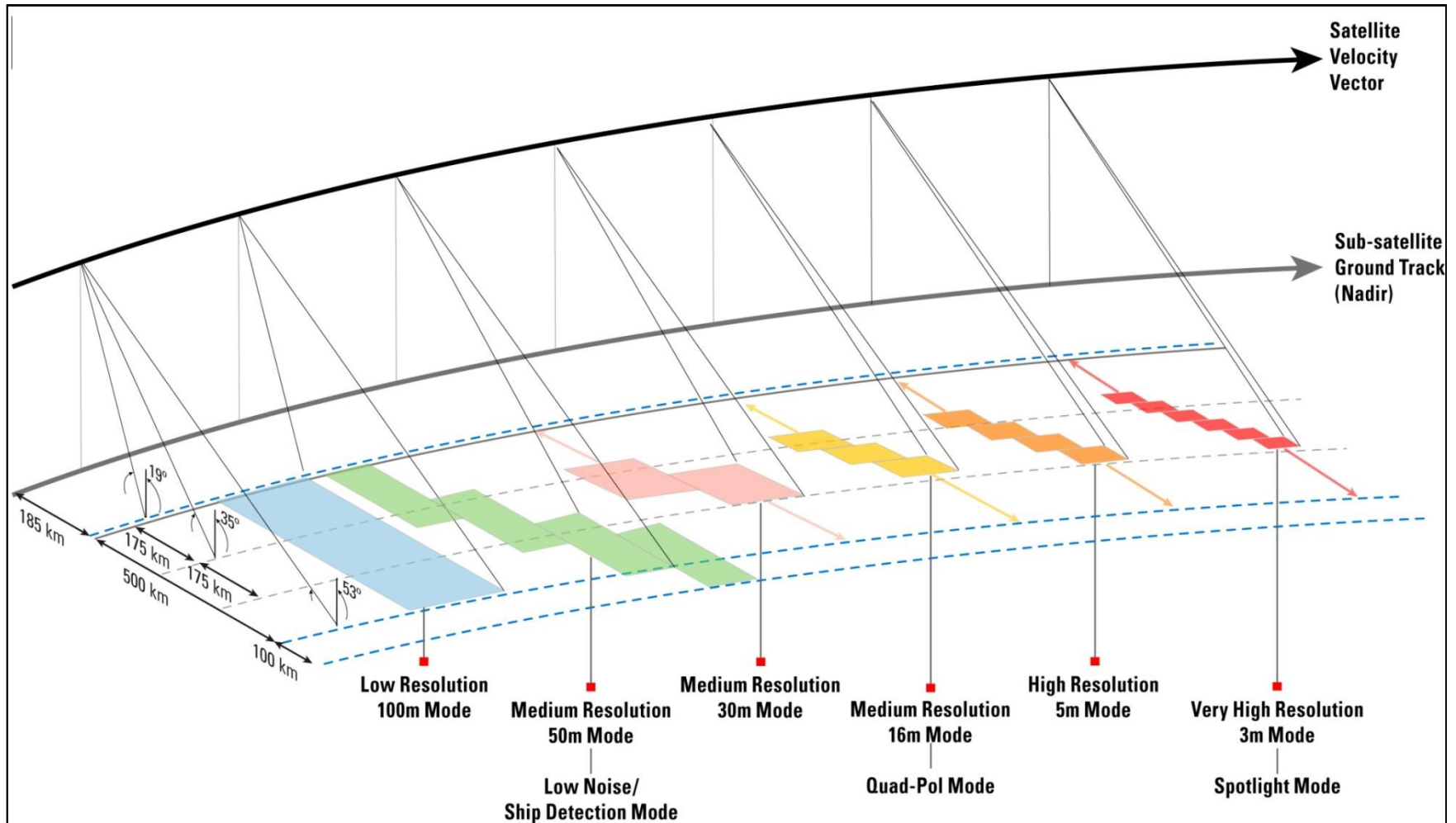
	RADARSAT-1	RADARSAT-2	RCM
Mass	2750 kg	2280 Kg	1430 Kg
Complete Coverage	2-3 days	2-3 days	Daily coverage
Exact Revisit	24 days	24 days	4 days
Imaging time /orbit	28 min	28 min	15 min /sat
antenna span	15 m	15 m	6.75 m
Polarization	Single HH	Single, Dual, Polarimetric	Single, Dual, Compact Pol
Altitude	800 km	800 km	600 km



RADARSAT-2 – SAR Imaging Modes



RCM – SAR Imaging Modes



CSA Direct Contributions



- We have been enthusiastic supporters of JECAM from the inception
 - Organization of the Space Agencies session at the first JECAM meeting (Kananaskis, November 2009)
 - Participation in the early JECAM Monitoring community meeting (Hong Kong, Sept 2010)
 - Co-organizer with AAFC of the Data provider meeting (Ottawa, June 2011)
 - Co-organizer of the GEOGLAM co-community meeting on requirements (CSA, July 2012)
 - Interface between CEOS and GEOGLAM/JECAM (2012-13)
 - Support of Canadian JECAM activities through a co-investment program
 - RADARSAT-2 data contributions to JECAM sites via SOAR program.



Current Interests of CSA



- CSA is limited to supporting science related activities as identified and endorsed by the JECAM science framework
- Development of SAR-based approaches, algorithms, and methods that are feasible and sustainable to support local, regional, national, continental and global agriculture monitoring.
- Bias towards the following topics:
 - To support science and R&D activities demonstrating clearly the contribution of C-Band data in an individual, interoperable and complementary basis.
 - To enable end-users to exploit the large amount of SAR data that is now or will soon be available in support of their programs for agriculture management, stewardship and downstream decision making process
 - To support the development of documented, validated and repeatable algorithms directed to the development of products on agriculture attributes – this should avoid the constraints related to restricted data policy
- Preparation for RCM and high availability of SAR missions in near future



New Modus Operandi



- The CSA will continue to contribute new RADARSAT 2 data in the JECAM context
- Moving from a SOAR-based data dissemination approach to an open sharing process as defined within a potential data service element à la GEOGLAM – assuming a secured cloud computing and data repository environment
 - Require a thorough a priori identification of image products and certification of data user organizations and individuals;
 - Number of scenes and access is project dependent and is to be determined in advance
- Operating under background mission framework
- No cost to JECAM users – all processing and data costs will be covered by CSA
- As a counterpart, we are assuming open sharing of ground data, methods, and derived results
- Data requests need to comply with the Canadian Remote Sensing Space System Act (RSSSA) and underlying Master Agreement principles between the Government of Canada and MDA



Summary



- Since Kananaskis, we observe a growing appetite for Earth observation data and related information products and services
- Golden age of space based missions – within the next few years a plethora of SAR missions will be available for terrestrial monitoring.
- Of particular interest for the CSA, the benefits for SAR missions as an individual source of data or under an interoperability /complementarity framework, require new research and engaged stakeholders.
- The CSA will continue to support the JECAM task as a framework to achieve the agriculture science objectives.