18th International Conference on Space Operations, Montreal, Canada, 26 - 30 May 2025.

SpaceOps-2025, ID # 464

SAR Data Management Operations of the Radarsat Constellation Mission in its Sixth Year After Launch

Stéphane Côté[a]*, Pierre-Philippe Vézina[a], Mélanie Lapointe[a], André Boyer[a], Éric Arsenault[a], Rémi Laflamme[a], Christian Carrié[a]

[a] *Canadian Space Agency, Canada, stephane.cote@asc-csa.gc.ca, pierre-philippe.vezina@asc-csa.gc.ca*
* Corresponding Author

Abstract

The latest mission of the Canadian Space Agency's RADARSAT Program, the RADARSAT Constellation Mission (RCM) ensures Earth Observation data continuity for the Government of Canada, sustaining decision making and remote sensing-based application evolution with departments. The mission is currently its sixth year since its launch in June 2019. Departments of the Government of Canada completed their full transition to the constellation in summer 2020. As Government's primary Earth Observation data source, the RADARSAT Constellation Mission delivered close to 700 minutes of data per day on average, addressing high volume and low latency demand for maritime and land observational requirements. This paper presents the status of RCM's operations, with a focus on data ordering, planning, acquisition, calibration, processing, and delivery of Earth Observation products supporting Government of Canada departments in the delivery of their mandates.
Keywords: RCM, Coverage, Data, Acquisitions, Calibration, Access

Acronyms/Abbreviations

Automatic Identification System (AIS)
Area of Interest (AOI)
Department of National Defence (DND)
Earth Observation (EO)
Government of Canada (GC)
Long-Term Archiving System (LTAS)
Natural Resources Canada (NRCan)
Radarsat Constellation Mission (RCM)
Research and Development (R&D)
Shared Services Canada (SSC)
Synthetic Aperture Radar (SAR)
Telemetry-telecommand and Control (TT&C)

1. Predecessor Missions

The vast Canadian territory, including the significant maritime and ice domain extent of the Arctic Archipelago, acted as the impetus to depend on space-based EO to fulfil Canada's needs to monitor and manage navigation through Canada's ice-filled waters.

1.1 RADARSAT-1

In the 1990s, Canadian technological advances in spaceflight hardware culminated with the design, fabrication and launch of Canada's first EO satellite, RADARSAT-1, in 1995. The spacecraft was equipped with a SAR sensor payload, executing its remote sensing operations independently of daylight and weather conditions, and providing operational imagery services to Canadian Government and commercial users worldwide. From 1995 until its end of life in 2013, the mission expanded SAR data use to domains such as agriculture, cartography, forestry, oceanography, geology, and maritime pollution monitoring. The quality, quantity and reliability of RADARSAT-1 data attracted many users who became reliant on SAR data for their operational and R&D needs. The CSA has undertaken a multi-year plan to open the RADARSAT-1 archives, which holds tremendous historical value spanning more than 16 years of continuous EO data.

1.2 RADARSAT-2

Building upon this heritage, the successor mission RADARSAT-2 was designed in the late 1990s and early 2000s in a Public-Private arrangement with the GC. Designed, owned and operated by MacDonald Dettwiler Associates Ltd, RADARSAT-2 is a commercial mission that was launched in 2007 that is still fully operational to this day. Compared to its predecessor, the mission operates a more advanced SAR instrument, an active array antenna, and a ground segment with enhanced processing capabilities offering a variety of heritage as well as advanced imaging modes, including SAR polarimetric options. RADARSAT-2 significantly contributed to the development and operationalization of existing and new applications, increasing SAR data consumption (volume) within the GC by a factor of five (5).

2. Radarsat Constellation Mission

Beginning in 2005, the CSA initiated a round of consultations with GC SAR users to assess their future EO needs post RADARSAT-1. Consultations continued concurrently with the utilization the RADARSAT-2 by Government departments, who continued to acquire expertise and experience with SAR data use in support of further operational integration of SAR data in an increased number of mandates within the GC. This data utilization experience contributed to the formulation of future observational needs and requirements into a Mission Requirements Document, which set off the design and development of the GC-owned, RADARSAT Constellation Mission.

At the onset of the design phase, it was determined that the GC SAR demand volume would increase 10-fold relative to the RADARSAT-2 GC data consumption, and that coverage and revisit requirements called for a constellation of three SAR satellites.

2.1 Mission Objectives

The RCM is conceived to respond to core needs expressed by GC Departments to ensure continuity and enhanced exploitation of operational SAR imagery. At the highest level these can be summarized as:

- Daily coverage of Canada's territorial and adjacent waters for maritime surveillance, including ship detection and monitoring of ice, marine wind and oil pollution; and,

- Monitoring of all of Canada for disaster mitigation on a regular basis (monthly to twice-weekly) to assess risks and damage-prone areas; and,

- Regular coverage of Canada's land mass and inland waters, up to several times weekly in critical periods, for resource and ecosystem monitoring.

To achieve these objectives, CSA led the development of several critical technologies in partnership with Canadian industries in the area of small-satellite bus, transmit/receive modules for the SAR antenna, payload central electronics, SAR antenna design, and value-added applications utilizing SAR image products.

All three RCM satellites were launched on June 12, 2019, aboard a SpaceX Falcon 9 fairing. Launch and Early Orbit Phase was completed on June 18, followed by a 5-month commissioning period at the end of which the RCM was declared operational, by mid-November 2019 [1]. RCM has since become the GC's premier EO mission, delivering all-weather, day and night imagery in support of Canadian priorities in the area of environmental monitoring, natural resources management, Northern development, sovereignty and security.

The three-satellite constellation allows for daily revisit of Canada and its surrounding waters. Compared to previous RADARSAT missions, revisit capacity increases significantly in Canada's North, for example providing opportunity of coverage of the Northwest Passage three to four times daily (see Fig. 1). Increased revisit capacity improves likelihood of timely repeat coverages for emerging applications such as land deformation and operational disaster management.

2.2 Space Segment

The space segment is comprised of three small satellites (1,400 kg each, compared to 2,800 kg for RADARSAT-1 and 2,200 kg for RADARSAT-2), flying evenly spaced at 120° on the same orbit. The satellites operate in a sun-synchronous low-earth polar orbit, at an altitude of approximately 600 kilometres, corresponding to satellites following each other after 30 minutes. Each spacecraft consists of a bus module and two payloads: a Synthetic Aperture Radar (SAR) payload and an Automatic Identification System (AIS) payload. The bus module provides attitude and orbit control, power generation and storage, payload commands, telemetry, thermal control and the primary support structure. AIS payload operations is treated in the next section, while the rest of the paper focuses on the exploitation, operation and maintenance of the SAR payload.

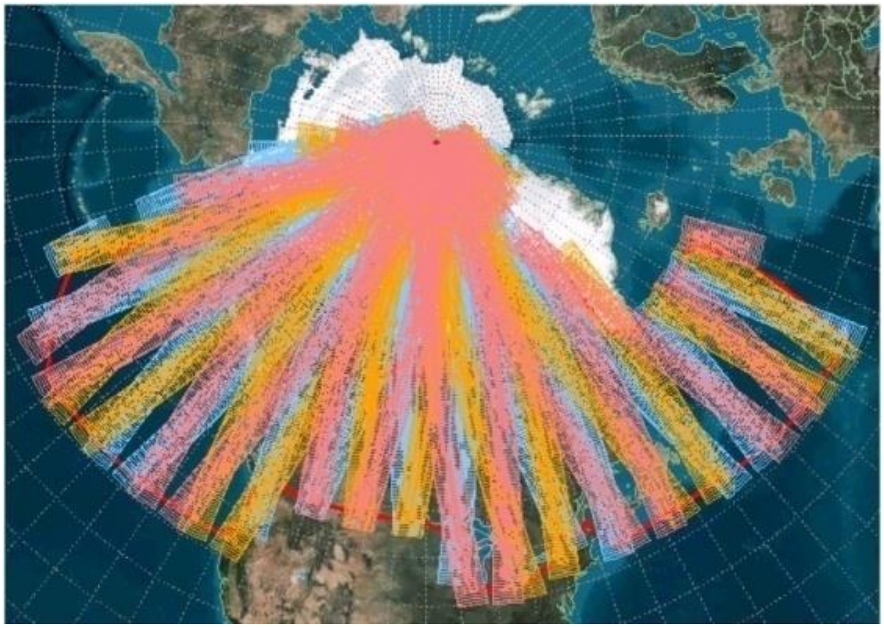

Fig. 1. Twenty-four hour coverage, Canada and Northern polar regions, RCM satellites 1, 2 and 3 in blue, pink and orange respectively.

2.3 AIS Payload

Space-based AIS enhances Canada's goals of conducting national and continental operations and defending Canada. The International Maritime Organization requires that all ships beyond 300 tons (Class A) transmit their identification, location, bearing and velocity with an AIS transponder. The on-board RCM AIS receiver captures the aforementioned information across a broad expanse of open ocean, which includes the swath of the imaged area. Incorporating AIS messages with RCM imagery provides a greatly enhanced product for maritime surveillance. The AIS payload enables the detection of illegal vessels in Canadian waters and up to 1,000 nautical miles from the shore. Having SAR and AIS payloads on the same satellite provides near "real time" maritime surveillance, leading to an effective surveillance solution compared to the fusion of separate AIS and SAR data streams.

The value-added from coupling both technologies is that RCM can detect vessels that have lost their AIS signal or deliberately turned-off their AIS transmitter to avoid detection and identification. Both SAR and AIS payloads can be activated on-demand by the Department of National Defence.

2.4 SAR Payload

The SAR instrument payload performs all imaging operations, stores the acquired data, which are then transmitted to a ground receiving station.

Together, the three RCM satellites provide a four-day exact revisit (compared to 24-day for RADARSAT-1 and RADARSAT-2), allowing high revisit coherent change detection. Many of the requests from GC users require re-look at least daily and an exact revisit once to twice weekly for interferometric change detection applications. Frequent revisit capability is critical to disaster management.

The RCM can provide on average 15 minutes of imaging time per orbit per satellite, with peak imaging of 25 minutes per orbit per satellite outside the eclipse season, which occurs from early May to early August.

In response to the various observational needs of users, each RCM satellite offers an extensive set of SAR imaging modes and polarization options, as shown in Fig. 2 and in Table 1. With wide area imaging modes, the RCM SARs acquire data over large areas of interest at medium and low resolutions (from 16 m to 100 m). In High-Resolution and Very High-Resolution modes, the RCM acquires specific on-demand images at a spatial resolution of 5 m and 3 m, respectively. RCM also has Spotlight mode with a 1 m (azimuth) by 3 m (range) resolution. In addition, the RCM has a dual-polarization capability, a fully quadri-polarimetric mode, as well as a compact polarization option available with most RCM imaging modes. Polarization options maximize the information content in the collected data, and greatly facilitates a large variety of classification-based value-adding applications.

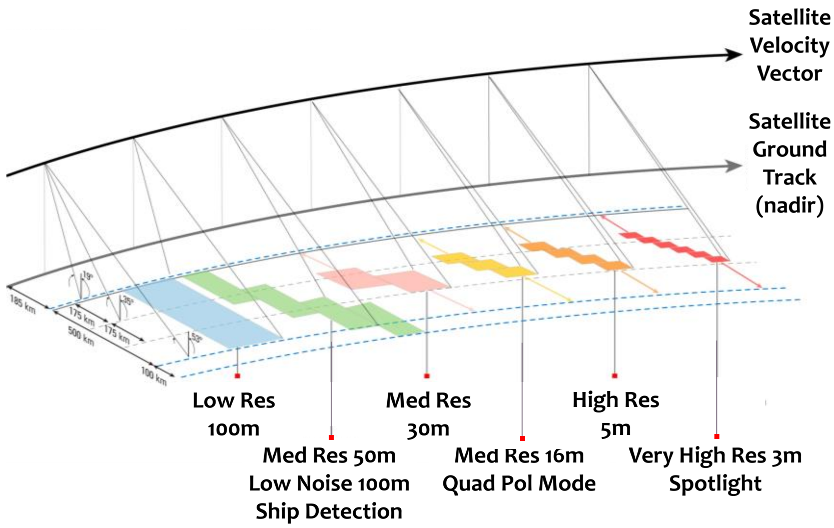

Fig. 2. RCM Imaging Modes

Table 1. RCM imaging modes. Low Res 100m, Med Res 50m, Med Res 30m, Low Noise, and Ship Detection are ScanSAR imaging modes, while the other modes are of Stripmap type.

Imaging Mode	Resolution (m)	Swath Width (accessible, km)	NESZ Spec. (dB)	Polarization Options				
				Single Pol. (HH, VV, HV or VH)	Dual Pol.		Compact Pol.	Quad. Pol. (HH+HV + VV+VH)
					HH+HV or VV+VH	HH+VV		
Low Res 100m	100	500 (500)	-22	X	X	X	X	
Med Res 50m	50	350 (600)	-22	X	X	X	X	
Med Res 30m	30	125 (350)	-24	X	X	X	X	
Med Res 16m	16	30 (350)	-25	X	X	X	X	
High-Res 5m	5	30 (500)	-19	X	X	X	X	
Very High-Res 3m	3@35°	20 (500)	-17	X	X	X	X	
Low Noise	100	350 (600)	-25	X	X		X	
Ship Detection	Var.	350 (350)	Var.	X	X		X	
Quad. Pol.	9	20 (250)	-24					X
Spotlight	1 (az.) X 3 (ground range)	20 (350) (5 km in az.)	-17	X	X		X	

The RCM instrument also includes a stepped receive capability that allows to steer the receive beam in elevation in discrete steps during the receive time window. This capability improves SAR imaging performance by reducing the noise-equivalent sigma-zero as well as the range ambiguity levels compared to conventional operation with a fixed beam position during radar signal reception. This capability provides the most improvement in wide swath cases, and thus, it is used operationally in all ScanSAR modes of operation (Low Res 100m, Med Res 50m, Med Res 30m, Low Noise, and Ship Detection).

2.5 Ground Segment

The RCM requires ground stations with vast coverage over Canadian maritime zones of interest in order to provide data within the 10 to 30 min. downlink-to-delivery data latency requirements. The ground segment is required to perform the following tasks: handling of data acquisition orders from users, commanding and monitoring the satellites for navigation and imaging; receiving satellite telemetry; receiving data from the satellites' payloads; processing downlinked raw data into image products; delivery of image products to users, archiving of raw data acquired.

The overall RCM ground segment infrastructure is represented in Fig. 3. Since the beginning of the RADARSAT Programme, the CSA maintains mission operation agreements with partners from GC departments and industry that have EO data expertise and/or own satellite operation infrastructure.

Fig. 3. RCM ground segment infrastructure.

In continuity with this approach, RCM operations is based on existing and new infrastructure exploited through partnerships, with the CSA responsible for the overarching operation of the mission. At the CSA Operations Centre in Longueuil (Quebec) is the Primary Control Facility, where are conducted flight operations, data processing, operational data services, as well as calibration-validation activities performed with ground calibration equipment deployed in Longueuil, Fairbanks, (Alaska) and Kiruna (Sweden). CSA RCM operating partners are:

- MDA Ltd, supporting routine operations at the Primary Control Facility in Longueuil;
- NRCan, which operates and maintains receiving (X-band) and TT&C (S-band) stations in Gatineau (Quebec), Prince Albert (Saskatchewan) and Inuvik (Nunavut), as well as the data and product archive interface and discovery system known as the EODMS;
- DND, which operates coastal receiving stations in Masstown (Nova Scotia) and Aldergrove (British Columbia), in order to support near-real time maritime surveillance;
- SSC, which hosts the LTAS in Barrie (Ontario);
- Swedish Space Corporation, which operates a receiving and TT&C station in Kiruna, Sweden.

2.6 Data Planning and Delivery

The RCM SAR data generation, processing and delivery flow is summarized in Fig. 4 in a simplified form. GC users first proceed with their image orders through the Order Handling Subsystem. All orders, each defined by desired imaging mode(s), geographical AOI(s), duration, and revisit frequency, are aggregated by the Mission Planning Subsystem for concurrent planning and de-confliction, which are executed as imaging orders continue to come in. Once the satellites tasking plans preparation is complete, plans are uploaded to the spacecraft via the Spacecraft Control Subsystem.

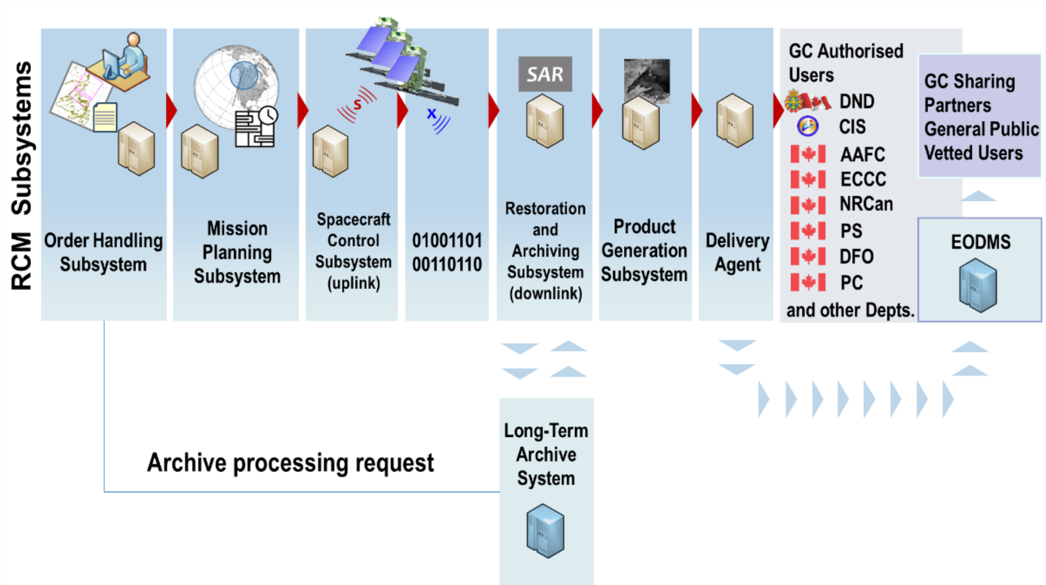

Fig. 4. RCM SAR data flow. Major GC users of RCM data are: DND, Canadian Ice Service (CIS), Agriculture and Agri-Food Canada (AAFC), Environment and Climate Change Canada (ECCC), Natural Resources Canada (NRCan), Public Safety (PS), Department of Fisheries and Ocean (DFO) and Parks Canada (PC).

Imaging activities are then normally executed by the SAR payload per tasking schedules, and raw SAR data are then downlinked to a receiving station, ingested into the Restoration and Archiving Subsystem and a) pushed in the LTAS while also b) sent to the Product Generation Subsystem to be processed into the product formats ordered. Image products are then delivered to the intended GC users. From the Order Handling Subsystem, GC users can also request reprocessing of archived raw data, which are then sent to the Product Generation Subsystem to be processed into image product(s) and delivered. In addition, processed products are also stored in the EODMS to facilitate access to authorized non-GC users such as sharing partners to GC users, vetted users, or the public; these groups having different levels of RCM data access.

Data latency requirements vary depending on user needs. For ecosystem monitoring, data delivery latency of several days is generally sufficient. However, maritime surveillance and disaster monitoring have more demanding timeliness requirements. For ship detection in Canadian and adjacent waters, the RCM provides a 10-minute latency from acquisition to delivery of data, and 30 minutes for other maritime surveillance applications. For global and Canadian disaster management, the RCM provides a 2-hour downlink-to-delivery data latency.

The ground segment also incorporates a fast-tasking capability which has a four-hour latency from order input to actual satellite tasking. The CSA makes use of fast tasking to provide timely imagery to the International Charter Space and Major Disaster, an inter-agency initiative where member organisations support management and recovery from natural disasters, by providing EO data of affected areas to relief organisations.

3. Mission Status

Now at the beginning of its sixth year of operations at time of writing, the RCM operates with all three RCM spacecraft and ground segment systems performing nominally, and in compliance with image quality and calibration levels and specifications.

Regular ground track and inclination manoeuvres continue to be executed to contain all three spacecraft in a 120 m orbital tube to maintain Coherent Change Detection and interferometric imaging performance.

3.1 Data Acquisition and Delivery

In term of data demand volume, the RCM has progressively gotten near its SAR on-time capacity with the geographical distribution of AOIs and the overall planning patterns resulting from GS users.

The SAR on-time, in minutes/week since the beginning of GC users transition to RCM after commissioning, is shown in Fig. 5. After GC users completed their transition to RCM, data demand stabilized by late 2020 and until mid-2024, overall data demand experienced a progressive but steady increase in data volume, from around 15,000 minutes/month in 2020, to peaks of about 20,000 minutes/month in 2023 and in early 2024. During the same period, overall data ordering patterns followed a seasonal variation where data demand tended to be higher during the second half of each year. During that late 2020 to mid-2024 interval, progressive refinements to deconfliction practices between concurrent data users, as well as updates to the Mission Planning Subsystem contributed to constrain the increase of SAR on-time. Since mid-2024, adjustment and rationalization of extensive geographical coverages by important user departments led to a decrease and stabilization of the overall SAR on-time usage to around 16,000 to 17,000 minutes/month.

Each year between early May and early August, the Earth's tilt and its orientation with respect to the Sun, together with the dawn-dusk orbit inclination of the RCM satellites, cause the orbit to be in the Earth's shadow over part of the Southern hemisphere. During these annual eclipse periods, the SAR instrument is not operated while in the shadowed segment of the orbit, while an overall SAR on-time ceiling value is prescribed over the uneclipsed part of the orbit, to provide a duty-cycle saving margins. Prior to eclipse season each year, resource usage strategies are reviewed and adjusted based on previous eclipse season experience, which have led to refined, less constrained SAR on-time restrictions for the May-August eclipse period.

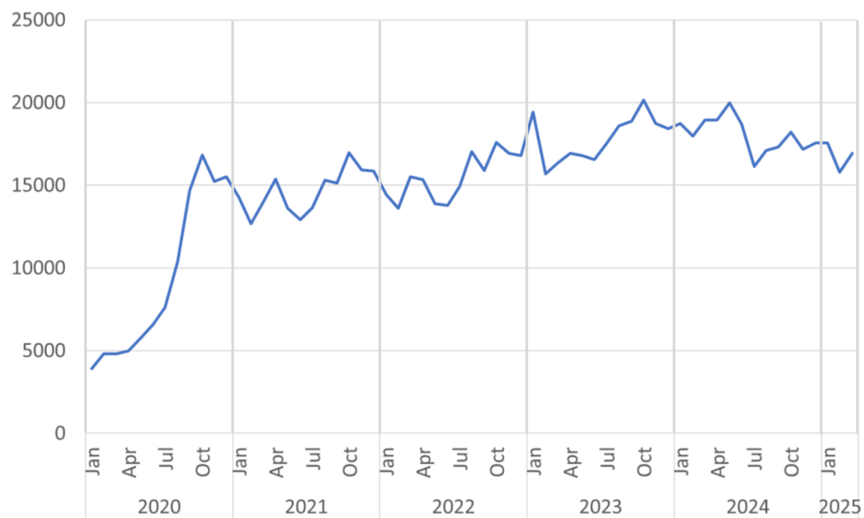

Fig. 5. SAR on-time (minutes/week), from January 2020 to March 2025.

With RCM, most acquisitions are part of standard observation scenarios known as Standard Coverages. Standard Coverages consist of pre-defined and pre-planned acquisitions based on common set of order parameters such as imaging modes, AOI(s), revisit frequency, polarimetric configuration, delivery latency, and order priority, duration of order. The objective is to provide consistent and predictable SAR coverage for key applications over sustained periods and large geographic areas. Standard Coverages are governed by a Standard Coverage Working Group, where representatives from user departments participate in the governance and coordination of coverages fulfilling operational as well as research and development purposes, while maximizing the use of the RCM imaging capacity. For example, the SCWG can examine the impact of modifications to existing Standard Coverages on other users, or assess and endorse new Standard Coverages.

RCM image products from Standard Coverages are archived and made discoverable and accessible to the public from the Earth Observation Data Management System (EODMS) web portal, with the intent of fostering a wider utilization of the data for the benefit of industry or academia (see **Figure 4**). As of this writing, EODMS is being populated by approximately 8000 image products per week, predominantly with wide swaths, medium and low-resolution modes, a result of the large coverage and high revisit requirements of operational GC users.

In addition to Standard Coverages, RCM acquires a number of continuing observation scenarios to support the international user community. An example is RCM's extensive ice coverage around Greenland and in the Barents Sea in the Arctic, as well as in the Southern Ocean around Antarctica, supporting international maritime navigation. RCM also enables data exchange partnerships with agencies or organizations from other nations, where RCM data is acquired in exchange for data of interest to Canadians from foreign Earth Observation missions. Government users can also submit image requests for specific, limited duration ad hoc needs not served by a Standard Coverage, in support of emergencies, R&D, or operational activities.

Maps of RCM Standard Coverages are published and made available to a wider user base outside of the GC through the CSA web site [2], while the Open Government / Open Maps portal [3] gives access to past and planned RCM acquisition plans, with information on location, revisit period and imaging modes acquired by the RCM. Both RCM Standard Coverage maps and RCM acquisition plans are available to the public.

3.2 Imaging Performance

The monitoring and maintenance of SAR calibration and image product quality levels are a significant component of the RCM operation effort, because of the extensive set of SAR imaging modes offered, each being available over an extensive array of swath positions covering a large range of incidence angles, and the multiple polarimetric options (Table 1). It is of note that each RCM satellite must be monitored independently for calibration and image quality, and imaging performance levels must be maintained in a consistent manner across all three satellites. Moreover, the Product Generation Subsystem can deliver most of the available imaging modes and polarimetric combinations in a variety of product formats:

- Slant range georeferenced, single-look complex (SLC);
- Slant range georeferenced, multi-look complex (MLC), consisting in a spatially averaged version of the SLC product condensed into a multi-burst image (for ScanSAR modes only);
- Ground range georeferenced, detected (GRD);
- Ground range georeferenced, complex (GRC);
- Geocoded detected (GCD);
- Geocoded complex (GCC).

The RCM Calibration Plan draws from RADARSAT-1 and RADARSAT-2 experience, with an emphasis on in-flight validation of antenna patterns and transmit-receive elements, as well as imaging performance characteristics such as resolution and noise. Many of these measurements either require SAR imagery to be acquired at reference sites, or specialized non-imaging activations of all or a subset of antenna elements in transmit and/or receive only, for example to assess noise levels or monitor individual antenna element performance.

Most end-to-end SAR imaging calibration and quality monitoring activities are performed through routine imaging over two categories of sites:

3.2.1 Artificial point targets

Artificial point targets sites are generally open areas where ground equipment such as corner reflectors or precision transponders are deployed (see Fig. 3). These classes of instruments reflect radar pulses back to the satellite, when SAR images are acquired at the area. On the resulting images, a visible point-like image artefact is used to validate a series of image quality parameters, including resolution and geolocation accuracy of RCM products, among others. For transponders, point-like reflections are calibrated for radiometric assessments, and electronic capabilities allow the recording of the incoming radar signal and the SAR antenna azimuth pattern.

3.2.2 Natural Reference Sites

Natural reference sites are typically large uniform areas recognized for their stability, uniformity and isotropy when imaged by SAR. These qualities are often a by-product of the area's flatness, ecosystem homogeneity, as well as temporal stability as perceived through radar imaging. Such sites are efficient at providing statistics across the entire swath of an image and therefore, are exploited for the validation of elevation and azimuth antenna patterns, relative radiometric levels, as well as burst boundaries for ScanSAR modes. For RCM, natural reference sites are also used for extracting of cross-talk and channel imbalance terms (in phase and magnitude) for the calibration of polarimetric parameters related to the compact polarimetric imaging options and the quadri-polarimetric mode.

Point targets are used to verify compliance with geolocation accuracy requirements for all RCM imaging modes, with products generated with downlinked orbit data (<50 m or <100 m depending on imaging mode) or definitive orbit data (for stripmap and spotlight modes: <25 m *for Med Res 16m* mode, <10 m for *High Res 5m* mode, *Very High Res 3m* mode and *Spotlight*). As an example, Fig. 6 shows geolocation accuracy measurements for *High Res 5m, Very High Res 3m* and *Spotlight* images, processed with definitive orbit data. Results are generally within the 10 m requirement, except for a few outliers in May 2023 due to an anomaly that was quickly resolved. As well, compliance to resolution requirements is routinely confirmed using point target sites, for all beam mode types.

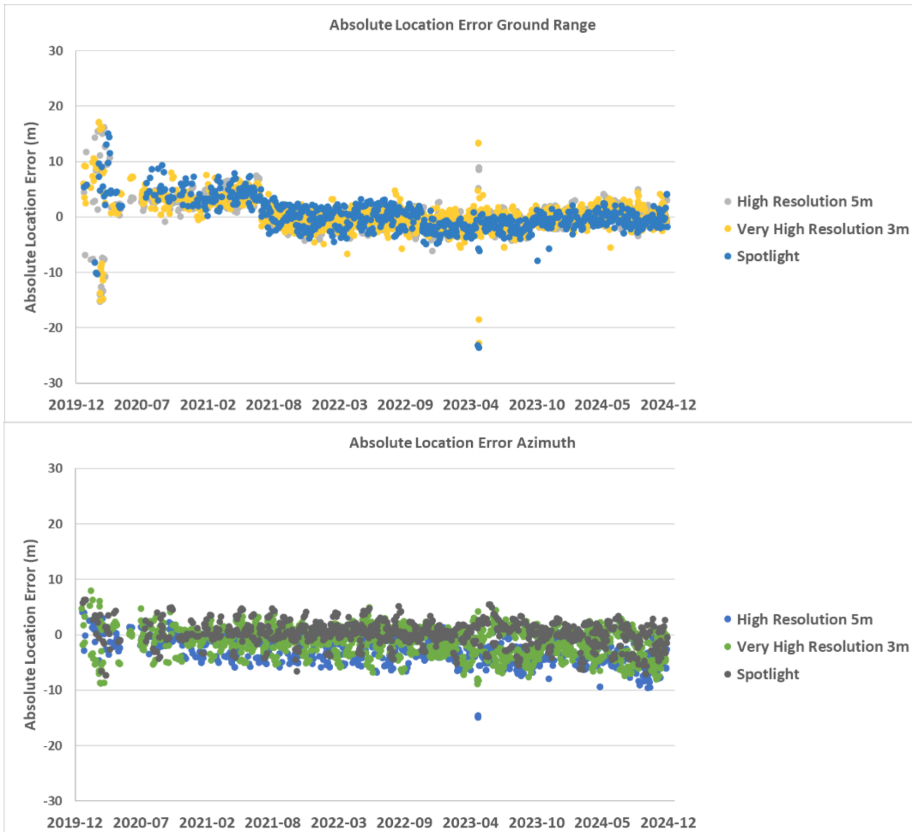

Figure 6. Image product geolocation accuracy measurements (m), definitive orbit data, 3 RCM satellites, *High Res 5m*, *Very High Res 3m* and *Spotlight* modes.

For RCM, monitoring antenna beam patterns and other radiometric performance indicators at natural target sites requires extensive and ongoing acquisition campaigns over the Amazon and Congo basins, with over 700 acquisitions per satellite per 4-month monitoring cycle. Elevation beam pattern shape validation is a key radiometric measurement performed using the rainforest, with most results compliant with the 1 dB radiometric accuracy requirement for validated beams.

Fig. 7 shows burst/beam radiometric boundary measurements on a *Med Res 50m* scene acquired at the Congo rainforest. The area's excellent uniformity renders the boundaries visible in this example.

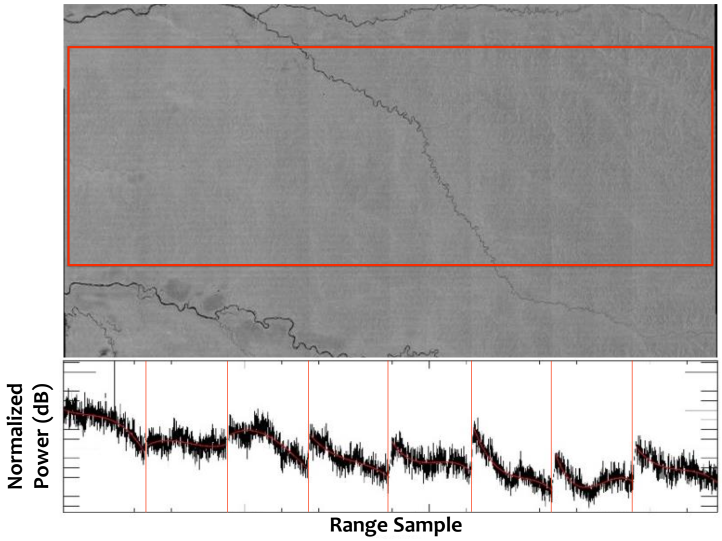

Fig. 7. ScanSAR beam boundaries measurement example, *Med Res 50m* mode, RCM-2, Congo rainforest.

More details on RCM's image quality and calibration status are available in [4] and [5]. Other imaging performance parameters monitored as part of the RCM Calibration Plan include:

- Coherent Change Detection spectral overlap. The RCM requirement for 2D bandwidth overlap in a 4-day repeat pass between two images is, at a minimum, 75% for Medium Resolution 30m and 16m modes. Regular spectral overlap measurements confirm compliance to this requirement;
- Antenna pointing;
- Ground coverage monitoring (location of expected image footprint);
- Antenna diagnostics (non-imaging calibration);
- Noise levels (Noise Equivalent Sigma Zero).

4. Conclusion

Now in its sixth year of operation, the RADARSAT Constellation Mission continues to ensure EO data continuity for Government of Canada's RADARSAT users, with an emphasis on repeatable and efficient observation coverage, accomplished thanks to the distributed sensing capacity across three SAR satellites equally spaced around the same orbit. RCM fulfills its operational daily coverage requirements of Canada's very large territorial waters, as well as its twice weekly monitoring of the Canadian territory for disaster mitigation, resource and ecosystem monitoring. This represents a significant volume of data demand compared to previous RADARSAT missions, with an important portion delivered with near-real time latency requirements of 10 minutes for Ship Detection in Canadian waters, 30 minutes for other maritime surveillance applications, and 2 hours downlink-to-delivery for Canadian disaster managements. Such delivery latency capabilities have, among others, enhanced Canada's support to the disaster relief efforts of the International Charter Space and Major Disasters, and the monitoring of tropical cyclones internationally.

Responding to a considerable range of EO needs for the GC, RCM's comprehensive imaging options represents a challenge from the perspective of calibration maintenance, and for mission planning de-confliction. The former is overcome by reliance on an extensive, ongoing and systematic calibration-validation campaign on key calibration reference sites, while the other requires an interdepartmental GC working group to govern the management and coordination of RCM's Standard Coverages to support mission planning. At this point, RCM data demand appears to have stabilized, after progressively and steadily increased until the second half of 2024. Since RCM commissioning, the CSA invested in system optimizations targeted at improving planning efficiency, while working together with the GC user community to refine deconfliction processes. RCM users have also contributed to maximizing the RCM's capacity through reviews and optimizations of their acquisition plans.

The constellation's EO capacities has the potential to further provide support in maturing and developing applications in the areas of coherent change detection and compact polarimetry. Together with the AIS payload, the large and diverse set of EO capacities brought about by the RCM reinforces Canada's commitment to maritime surveillance, disaster management and ecosystem monitoring.

References

[1] S. Cote, M. Lapointe, E. Arsenault, M. Wierus, S. Iris, The RADARSAT Constellation Mission, Workshop of the CEOS SAR Calibration Validation Working Group, Frascati, Italy, 2019, November 18-22.

[2] RCM Standard Coverage maps are available at the Canadian Space Agency web site (www.asc-csa.gc.ca) under: Discover the themes > Satellites > Earth Observation Satellites > RADARSAT Constellation Mission > Discover > Access to RCM data > Standard Coverage Maps.

[3] RCM Acquisition Plans are available at the Open Government web site (www.open.canada.ca), accessing 'Search for open data and information', and searching for 'RCM'. Selecting 'Acquisition plans of the RCM', then selecting View on Maps is suggested.

[4] S. Cote, M. Lapointe, D. De Lisle, E. Arsenault, M. Wierus, The RADARSAT Constellation: Image Quality and Status, 13th European Conference on Synthtic Aperture Radar, Leipzig, Germany, 2021, 29 March – 1 April.

[5] M. Lapointe, RCM Image Quality and Calibration Status, Workshop of the CEOS SAR Calibration Validation Working Group, Oberpfaffenhofen, Germany, 2023, October 16 – 18.