RADARSAT-2 Image Quality and Calibration Update

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RADARSAT-2 continues to operate well and without any degradation in image quality. It continues to support operational imaging using approximately 300 different beams in 20 different modes (15 Strip-map modes, 4 ScanSAR modes, and a Spotlight mode), as well as several experimental and calibration beams. It continues to support options for different polarization selections and both left- and right-looking satellite orientation.

This presentation provides an update on RADARSAT-2 SAR image quality and calibration. As part of ongoing operations, images and other forms of data are systematically collected and analyzed in order to monitor the performance of the system. The data acquisitions are planned carefully in order to span the large number of beams and modes efficiently. The analysis produces a variety of image quality measures and antenna parameters, which are systematically checked against expected thresholds, collected and tracked throughout the mission. (This is in addition to other forms of quality assurance through visual inspection of imagery and detailed monitoring of spacecraft telemetry.)

Results show the stability of key measures including:

- Geolocation accuracy, measured with precision surveyed corner reflectors located in Canada and at international sites
- Impulse response width, measured using corner reflectors in the finer resolution modes and antenna dishes in coarser resolution modes
- Radiometric accuracy, measured using the Amazon rainforest in conjunction with a gamma reference model
- Precise beam pointing, measured using Doppler frequency and elevation angle offset estimates obtained from Amazon rainforest data
- Polarimetric accuracy, measured using Amazon data in conjunction with a distributed target scattering model
- Noise levels, measured using special receive-only modes at all pulse bandwidths

As necessary, this combined information is used to apply ongoing calibration adjustments, including refinements to antenna patterns of selected beams, adjustments for progressive variations in polarimetric calibration, and compensation for seasonal variations in phase differences between antenna wings in dual-receive-aperture modes.