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High Resolution, Wide Area Detection of Anthropogenic Forest Change Using RADARSAT-2

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RADARSAT-2 SAR data were used to develop a monitoring program for Canadian forest lands with the aim to provide information on forest clear cut/partial cuts and to develop algorithms for the detection of forest disturbances due to unauthourized activities. The solution was based on the use of newly-developed RADARSAT-2 modes that provide 5 m resolution with swath width of 125 km, thus providing wide-area coverage with suitable resolution to detect forest changes.

The forest-change methodology was based on a MDA-developed filtering and detection approach that highlights spatially small changes that occur due to canopy changes. The high resolution imaging mode allowed for the measurement of small structural changes in the context of speckle/noise. A key aspect of the data acquisition strategy was the collection of a time-series of data which not only allowed the detection of changes over time, but resulted in a significant reduction in radar speckle without loss of detail via the application of multitemporal filtering.

Test sites in Canada that encompassed three forest types were selected to validate the output of change detection algorithm, which was compared to ground validation data. Initial results indicated that deforestation (permanent change due to due anthropogenic input) can be detected at scales that are 10 to 20 times the radar resolution, thus for the 5 m mode, changes for areas that were ~ 0.5 Ha to 1.0 Ha were detected.

The paper will conclude with a discussion of techniques for the development of information products that are interpretable and interoperable and delivered to the end-user using a web-based interface with the objective to make access as seamless and intuitive as possible.