**SENSOR INTEROPERABILITY: COMBINING SAR AND OPTICAL DATA FOR FOREST RESOURCE ASSESSMENT**

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**ABSTRACT**

Recent times have seen an increased awareness of the role of forests in offsetting greenhouse emissions and a leaning towards national accountability of forest and carbon stocks. Quantitative information on baseline forest extent and at least annual rates of change are required for Monitoring, Reporting and Verification (MRV) on the state of forests and national carbon accounting. Satellite measurements provide the only viable means of collecting spatially explicit and timely data for wall-to-wall or national scale reporting. Moderate resolution optical sensor data such as that acquired by the Landsat series of sensors has provided long-term, historic baseline data from which annual rates of deforestation can be determined, especially in temperate environments.

More recently however data acquired from Synthetic Aperture Radar (SAR) has proved advantageous in tropical regions or those frequented by cloud cover, smoke and haze.

 In this presentation we investigate the interoperability of optical and radar data acquired over Tasmania, Australia for forest information monitoring. The independent and combined use of optical and radar data for forest extent mapping, with the emphasis on processing time-series data, is discussed.

Also the retrieval of forest information from multi-frequency SAR data acquired over Tasmania Australia is presented. Both C- and L-band SAR sources are used independently and interoperably to map forest cover and evaluate change on annual or decadal timeframes. SAR backscatter intensity is highly dependent on target structure and dielectric properties, and typically, the backscatter recorded at different wavelengths and polarisations is required for optimal understanding of the forest target being imaged.

The interoperability methodologies presented are robust, consistent over a time-series and globally applicable.