LCLUC Abstract

The Development of a Fine Resolution, Continental-Scale Forest Monitoring System Using SAR Imagery

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A variety of sensors and international partnerships are required to globally monitor forest cover and forest cover change. While Synthetic Aperture Radar (SAR) has a well defined role in the global observing strategy (providing coverage over persistently cloudy areas), there are many integration issues that have never been executed in an operational environment; for instance, reconciling SAR/AVHRR/Landsat classification schemes. In addition, prior SAR land cover mapping projects, such as the Global Rain Forest Mapping Project (GRFM), have been research activities rather than operational systems.

We propose to prototype the development of a fine resolution forest monitoring system using SAR imagery applicable to continental scale regions that could become operational in the NASDA ALOS PALSAR era beginning in 2002. This end-to-end processing system incorporating commercial off the shelf software would consist of the following elements : level 0 signal processing, terrain correction, calibration, georeferencing, classification, and mosaicking to a resolution as fine as 30 meters. Using NASDA JERS-1 SAR imagery, this prototype development will deliver fine resolution, calibrated, continental scale image and classification mosaics of sub-tropical regions in Africa and South America, areas currently undergoing rapid changes in land cover. Imagery of these regions was acquired by the JERS-1 SAR between 1993 and 1996, but much of this imagery was never processed.

The land cover classification will include the classification of flooded vegetation areas, as well as land cover types compatible with coarse resolution and other fine resolution land cover products. This prototype data set will allow an unprecedented snapshot of the state of forest cover currently unobtainable over perpetually cloudy regions in African and South American sub-tropical areas. The terrain correction will be based upon the best available Digital Elevation Model (DEM), with the Shuttle Radar Topography Mission (SRTM) DEM being incorporated in the final year of the 3 year task.

An important component of this work will be the utilization of the data products in partnership with individuals and institutions from South America and Africa. The development of the processing system will be accomplished in close cooperation with the National Space Development Agency of Japan (NASDA). The key technology this task incorporates will demonstrate inexpensive but efficient processing architectures for continental scale mapping activities.