

## Implementation of Circular Polarization on SAR

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The classical synthetic aperture radar (SAR) that adopts linear polarization (horizontal (H) and vertical (V) polarization) is known to be an effective way for monitoring the Earth surface. We approach new SAR configuration that adopts circularly polarized antennas on both transmitter and receiver, namely, circularly polarized SAR. The circularly polarized SAR is known as a robust system for polarization mismatch losses caused by the Faraday rotation effect and antenna misalignment. Also, that of dual polarimetric mode have shown the very promising result regarding classification capability, which is known as compact polarimetry.

To implement and study this concept, we developed circularly polarized SAR constructed by field programmable gate array (FPGA), RF transmitter/receiver, PC, and microstrip circularly polarized patch array antennas, developed for unmanned aerial vehicle (UAV). Also, circularly polarized SAR imaging and target decomposition analysis have been conducted by vector-network analyzer-based circularly polarized SAR system with proper polarimetric calibration technique. For applying to complex real world target, we conducted long-term rice monitoring using ground-based circularly polarized SAR.

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