L Band Circularly Polarized Synthetic Aperture Radar onboard Microsatellite : Research Model

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ABSTRACT

Synthetic Aperture Radar (SAR) is well-known as a multi-purpose sensor that can be operated in all-weather and day-night time. As our laboratory roadmap for SAR onboard microsatellite, aircraft, and unmanned aerial vehicle development, our laboratory develops SAR sensors, especially Circularly Polarized Synthetic Aperture Radar (CP) or Elliptically Polarized Synthetic Aperture Radar (EP) (Patent Pending 2014-214905) to monitor global land deformation. The sensor is designed to transmit and receive left-handed circular polarization (LHCP) and right-handed circular polarization (RHCP). The main mission of circularly polarized SAR is to do the basic research on elliptically polarized scattering and its application developments. The circular polarization’s mission has benefit, as circular polarization performs better than the HH polarization at lower incidence angle. Circular polarization exhibits multiple benefits over linear polarization including avoiding polarization losses due to TX and RX antenna misalignment, where it also has the ability to reduce interference between direct and reflected signal due to multipath propagation. This paper explains progress on development of Research Model of Circularly Polarized SAR onboard microsatellite, including parabolic gold coated mesh parabolic antenna and its deployment system, and RF system. We also will shows system of C and X band SARs for Boeing 737-200 and Cessna 182 for ground test (validation and calibration) of our Circularly Polarized SAR pre and post launching the microsatellite.