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Development of Circularly Polarized Synthetic Aperture Radar for UAV and Microsatellite

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Synthetic Aperture Radar (SAR) is a multi purpose sensor that can be operated in all-weather and day-night time. Recently, our Research Center is developing the Circularly Polarized Synthetic Aperture Radar (CP-SAR) onboard Unmanned Aerial Vehicle (UAV) and microsatellite to retrieve the physical information of Earth surface. In this research, the CP-SAR sensor is developed to radiate and receive elliptically polarized wave. The sensor is designed as a low cost, simple, light, strong, low power or safe energy, low profile configuration to transmit and receive left-handed circular polarization (LHCP) and right-handed circular polarization (RHCP), where the transmission and reception are both working in RHCP+LHCP. Then these circularly polarized waves are employed to generate the axial ratio image (ARI). This sensor is not depending to the platform posture, and it is available to avoid the effect of Faraday rotation during the propagation in ionosphere. Therefore, the high precision and low noise image is expected to be obtained by the CP-SAR.

Keywords: Synthetic Aperture Radar, Circular Polarization, Unmanned Aerial Vehicle (UAV), Microsatellite