Lab Bench for Synthetic Aperture Radar Imaging System

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Abstract : Radar Imaging techniques provides extensive applications in the field of remote sensing, majorly Synthetic Aperture Radar (SAR) that provide high resolution target images. This paper work puts forward the effective and realizable signal generation and processing for SAR images. The major units in the system include camera, signal generation unit, signal processing unit and display screen. The real radio channel is replaced by its mathematical model based on optical image to calculate a reflected signal model in real time. Signal generation realizes the algorithm and forms the radar reflection model. Signal processing unit provides range and azimuth resolution through matched filtering and spectrum analysis procedure to form radar image on the display screen. The restored image has the same quality as that of the optical image. This SAR imaging system has been designed and implemented using MATLAB and Quartus II tools on Stratix III device as a System (Lab Bench) that works in real time to study/investigate on radar imaging rudiments and signal processing scheme for educational and research purposes.

Keywords : synthetic aperture radar, radio reflection model, lab bench, imaging engineering

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