A System Concept for a 3D Real-Time OFDM MIMO Radar for Flying Platforms

In this paper a new system concept for a low cost, miniaturized and real-time imaging radar system for flying platforms is presented. The proposed solution is based on the MIMO radar architecture, orthogonal signals for simultaneous transmit capabilities and highly integrated SiGe chipsets. Using beamforming techniques at the receiver together with radar processing techniques, a 3D sensing of the range, azimuth, elevation and Doppler information for an arbitrary number of objects can be estimated through a simultaneous transmission and with real-time hardware implementable FFT processing techniques. A top-level system concept and a complete parametrization is proposed for a radar system which is intended for obstacle warning for helicopters and to enhance flight safety in approach, landing and take-off phases of flight even in degraded visual conditions. The full OFDM MIMO Radar system has been implemented and tested in a MATLAB environment and simulation results are here presented. This paper is the first step towards the implementation of a compact and real-time radar system demonstrator.