# Detection of air targets in SAR imagery

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This presentation explores some of the challenges in detecting airborne targets in synthetic aperture radar (SAR). SAR is a mature technique for generating high resolution imagery of the radar backscatter of a scene. SAR image formation relies on the assumption that all objects in the scene are static over the coherent processing interval. Detection of moving targets in SAR images has been an enduring field of research, with countless papers exploring the detection of ground and maritime moving targets. However, the literature has been sparse regarding the detection of airborne targets. The key challenge in detecting airborne targets is in addressing potentially large acceleration and velocity values with SAR collection paradigms designed to image stationary scenes. These challenges lead to excessive blurring of target signatures due to uncompensated phase errors and significant range migration. In order to detect such dispersed target signatures and enable estimation and correction for these effects, suppression of the stationary ground clutter via cross track interferometric techniques can be beneficial.

In this presentation we examine the performance of various compensation approaches using simulations and experimental data from exemplar L- and X-band imaging radars. A method for correcting range walk based on an ISAR approach is examined using exemplar SAR data. Finally different multi-channel stationary ground clutter suppression strategies, including both conventional and adaptive (Capon) beamformers, are examined for the airborne target detection problem.