

Velocity Estimation of Moving Targets on the Sea Surface by Azimuth Differentials of SAR Image

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Most methods estimated the velocity of moving targets from the distance difference between the road and moving targets or between ship and the ship wake. However, the methods could not be always applied to moving targets because it is difficult to find the road land the ship wake. Recent analysis of a Synthetic Aperture Radar (SAR) velocity experiment has shown that azimuth image shift can provide useful information for the detection of moving targets with a velocity component in SAR images using azimuth differentials.

In this paper, we use a method for estimating the velocity of moving targets from azimuth differentials of range-compressed image. This method is based on a phenomenon that Doppler center frequency shift of moving target causes a phase difference in azimuth differential value. The phase difference is linearly distorted by Doppler rate due to the geometry of SAR image. The linear distortion is eliminated from phase removal procedure, and then the constant phase difference is estimated. Finally, range velocity estimates for moving targets are retrieved from the constant phase difference.