Ship Detection in Airborne S-band Polarimetric Synthetic Aperture Radar Imagery

Ken Yoong LEE and Timo Rolf BRETSCHNEIDER

EADS Innovation Works South Asia
110 Seletar Aerospace View, Singapore 797562
Tel: +65 65927324; Fax: +65 66591276
E-mail: {ken-yoong.lee, timo.bretschneider}@eads.net

Abstract: The future launch of NovaSAR-S satellite will enable data acquisition through S-band imaging and provide opportunities to examine the application of S-band synthetic aperture radar (SAR) data. One of these potential applications is ship detection for maritime security and coastal surveillance. This paper addresses ship detection in airborne S-band polarimetric synthetic aperture radar data by using a global thresholding approach. The adopted approach is, in fact, an extension of the proposed ship detector in Lee and Bretschneider (2012), which is based on statistical analysis of the test data. The corresponding thresholds were determined separately from the exponential distributions for single-polarisation data. For dual-polarisation or fully polarimetric SAR data, the thresholds were derived from the chi-squared distributions. From the results, all ship targets were successfully detected from different inputs, namely (i) single-polarisation (i.e. HH, HV or VV), (ii), dual-polarisation (i.e. HH and HV, HH and VV, HV and VV) as well as (iii) fully polarimetry (i.e. HH, HV and VV). The use of the fully polarimetric SAR data was found to provide better detection results of ship targets compared with both the single-polarisation and dual-polarisation.

Reference:
Lee K.Y. and Bretschneider, T.R. (2012). Ship detection in TerraSAR-X high-resolution spotlight dual-polarisation imagery. *Proceedings of the 33rd Asian Conference on Remote Sensing*, paper no. A5-4.