Assessment of polarimetric information for target detection improvement using SAR

Connetable, Paul Jacques; Skriver, Henning; Nielsen, Allan Aasbjerg

Publication date: 2019

Document Version
Publisher's PDF, also known as Version of record

Link back to DTU Orbit

Citation (APA):
Assessment of polarimetric information for target detection improvement using SAR

Paul Connetable, Henning Skriver, Allan A. Nielsen
Technical University of Denmark (DTU)

Fully polarimetric SAR gives valuable information on the nature of scattering mechanisms, which can be used for vehicle detection. This project aims at comparing the contrast between vehicles and background offered by different polarimetric features, at different wavelengths and under different orientation angles. The study is based on data acquired with DLR’s F-SAR, in Oksbøl, Denmark, at X, S and L bands. This work can lead to further improvements in target detection by selecting individual features or a combination of features optimizing contrast between vehicles and their surroundings.

Analysis of the results
At X-band (ground resolution of 15 by 15 cm), features based on the total received power give the best contrast results, while the information on the type of scattering doesn’t give as much contrast. As frequency decreases, information contained in type of scattering becomes more important. At L-band (ground resolution of 30 by 60 cm), the contrast offered by the total power and the determinant of the covariance matrix have decreased a lot. On the other hand, the contrast offered by the double bounce and the helix part of the scattering have both drastically increased. Furthermore, the determinant of the covariance matrix gives interesting results. It gives information on both the total received power and the polarimetric complexity. It performs very similarly to the total power at X-band, and better than it at L-band.

Acknowledgments
This work is funded and the data was provided by DALO and Terma A/S.

References