



Personal information

First name, Surname: Andreas Reigber
 Title: Dr.-Ing. habil.
 Organization: German Aerospace Center (DLR) e.V.
 Microwaves and Radar Institute



About the Author

Andreas Reigber was born in Munich, Germany, in 1970. He received the diploma degree in physics from the University of Constance, Germany, in 1997, the Ph.D. degree from the University of Stuttgart, Germany, in 2001, and the habilitation from the Berlin University of Technology, in 2008. From 1996 to 2000, he has been with the Microwave and Radar Institute of the German Aerospace Center (DLR), working in the field of polarimetric SAR tomography. In 2001, he joined the Antenna, Radar and Telecom laboratories of the University of Rennes 1, Rennes (France), for a post-doctoral fellow on radar polarimetry and polarimetric interferometry. From 2002 to 2007, he has been research associate at the Computer Vision and Remote Sensing laboratories of the Berlin University of Technology, Germany. Since 2008 he is back at the DLR Microwave and Radar Institute, where he is now head of the SAR technology department.

Research interest

His current main research interests are the various aspects of multi-modal SAR, like SAR interferometry, SAR polarimetry, SAR tomography and time-frequency analyses, but also hyperspectral remote sensing and the application of computer vision and machine learning approaches in remote sensing.

Summary

Applications of SAR polarimetry

Modern SAR sensor technology offers, in addition to several traditional imaging modes, also possibility of polarimetric data acquisition. Polarimetric data has a significantly enhanced information content compared to single-channel data and consequently a much wider range of application. The analysis of polarimetric signatures allows distinguishing several basic scattering mechanisms inside a single resolution cell, opens the possibility of statistical classification techniques and is the base for various geo- and biophysical parameter estimation techniques.

This tutorial first gives an overview of the most important image processing tasks necessary for correct handling polarimetric SAR data. This includes in particular the different representations of polarimetric data (Sinclair, Covariance, Pauli-representation), and strategies for optimum preprocessing of PolSAR data for various applications. Then follows an excursion through several possible fields of PolSAR applications, including crop monitoring and damage assessment, in forestry clear cut mapping, deforestation and burn mapping, in land surface structure (geology) land cover (biomass) and land use, in hydrology (soil moisture, flood delineation), in sea ice monitoring, in oceans and coastal monitoring (oil spill detection). Finally, a brief overview over the new field of polarimetric interferometry is given, focusing in particular on the topic of physical parameter estimation through backscattering model inversion.