Analysis of Simulated TerraSAR Data for Mapping and Monitoring of Urbanised Areas

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More than 70 percent of the population of developed countries live in urbanised areas. In developing countries of the third and fourth world the migration to urban areas is continuing at an increasing rate and tends to rise to a peak of 85 %. Therefore urban areas are the most rapidly expanding and fast changing elements of the landscape. Therefore urbanised areas and the urban fringe are the fastest changing areas of our globe covering less than 1% of the earths surface but causing the majority of environmental impact on our ecosystem. Scheduled mapping and monitoring urbanised areas using optical data very often is hampered by cloud cover or smog. Therefore high resolution SAR can play a vital role in urban mapping and monitoring.TerraSAR-X (to be launched 2005) and TerraSAR-L (planned for 2008) will provide for the first time high resolution SAR imagery with a resolution of up to 1m. The availability of high resolution SAR data will facilitate the application of SAR imaging technology in areas where SAR could not fulfil the requirements of users in terms of resolution and information density up to now. In addition the TerraSAR sensors will provide full polarimetric data delivering high information content.To demonstrate the capabilities of such data and to develop customer oriented products derived airborne SAR data (E-SAR) data were acquired and processed to simulate future TerraSAR data. To be able to access the full information content of complex polarimetric data new tools for for SAR data analysis had to be developed to perform decomposition and Within a first stage of the project it could be shown that urban land use types could be classified and single targets detected, even at sub pixel scale, such as light poles, trees etc. The capabilities of TerraSAR will could be detected, using complex data. For automated information extraction new tools have been developed to perform data decomposition and information extraction analysing scattering type, ratio of scattering types, intensity, structure, scale neighbourhood and repetition of detected homogeneous features. Technically the aim of the project is to identify urban land cover classes or objects composing land cover classes by a scene and location independent processing and information extraction approach. These requirements are set in order to concentrate on the development of semi-automatic classification tools