HITCHHIKER - Multi Channel SAR Sensor

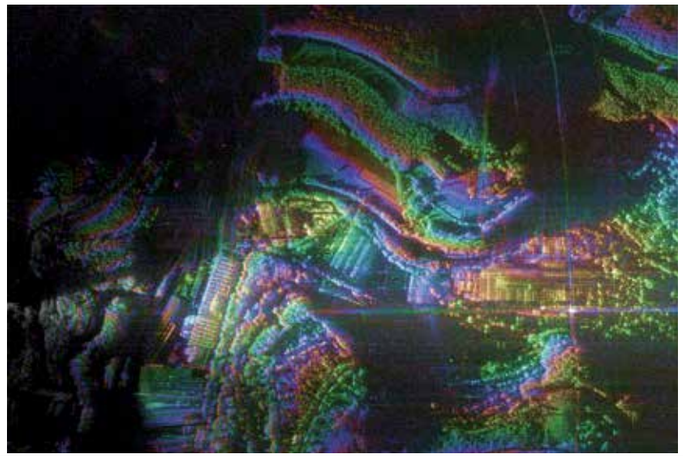
Continuing the microwave based bistatic imaging line, the Hitchhiker system is being upgraded to a fully operational flexible multi waveform interferometric Synthetic Aperture Radar Imaging system. Designed in 2009, Hitchhiker was initially a purely passive bistatic receiver system working with TerraSAR-X microwave illumination with two coherent channels, one channel for the direct signal of the transmitter and another one for scene echoes. This restricted the interferometric usage to repeat pass interferometry, exploiting the TerraSAR-X 11 day orbit cycle, but featuring strong temporal decorrelation, especially over vegetated areas.

To overcome these limitations, the system was extended to four receiving channels, enabling a receiver based single pass interferometry. Such a system can be advantageously used for building up large interferometric stacks, thus enabling bistatic differential interferometry/bistatic stationary scatterer interferometry in order to detect and monitor small surface movements in the range of millimeters per year.

In a parallel development line a multi waveform (including thermal noise, broadband radar waveforms) transmitter with a bandwidth > 500 MHz system is built up to complete the system to a stand-alone interferometric SAR sensor. This flexible transmitter system, mounted on a mobile plattform will be independent of the formerly used satellite based transmitter systems and allows a scene selection, which is independent of a satellite's orbit. The use of the (thermal) noise waveform opens up the possibity of multistatic experiments with a number of transmitter systems with independent waveforms even in continuous wave mode.

Closeup of the receiver system

Experimental radar setup at the University of Siegen at the Adolf Reichwein Campus



Focused Radar image of the village of Dreis Tiefenbach acquired at the University of Siegen

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