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SYMPOSIUM KEYNOTE: TANDEM-X: A RADAR INTERFEROMETER WITH TWO FORMATION
FLYING SATELLITES

Abstract

- Invited Paper -

TanDEM-X (TerraSAR-X add-on for Digital Elevation Measurements) is an innovative formation flying radar mission that opens a new era in spaceborne radar remote sensing. The primary objective of TanDEM-X is the generation of a global digital elevation model (DEM) with unprecedented accuracy and resolution (12 m horizontal and 2 m vertical resolution). This goal is achieved by extending the TerraSAR-X synthetic aperture radar (SAR) mission by a second, TerraSAR-X like satellite (TDX) flying in close formation with TerraSAR-X (TSX). Both satellites form together a large single-pass SAR interferometer with the opportunity for flexible baseline selection. This enables the acquisition of highly accurate cross-track interferograms without the inherent accuracy limitations imposed by repeat-pass interferometry due to temporal decorrelation and atmospheric disturbances. Besides the primary goal of the mission, several secondary mission objectives based on along-track interferometry as well as new techniques with bistatic SAR have been defined, representing an important and innovative asset of the TanDEM-X mission. TanDEM-X is implemented in the framework of a public-private partnership between the German Aerospace Center (DLR) and EADS Astrium GmbH.

The TanDEM-X mission was successfully launched in June 2010 and started operational data acquisition in December 2010. This paper provides an overview of the TanDEM-X mission and summarizes its actual status and performance. Furthermore, the results from several scientific experiments will be presented that show the great potential of future formation flying interferometric SAR missions to serve new applications.