EARTH OBSERVATION SYMPOSIUM (B1)
Enhancing Earth Observations Through Space Radar (6)

Author: Ms. Agnes Mellot
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), United States, am@dlr.org

NEXT GENERATION OF RADAR SATELLITES WITH INCREASED EARTH OBSERVATION CAPABILITIES.

Abstract

In continuation of the successful public private partnership between DLR and Astrium GmbH a Tandem-X (TerraSAR-X add-on for Digital Elevation Measurement) Earth observing radar satellite system is planned to be launched in September 2009. The TanDEM-X (TDX) radar satellite in formation with TerraSAR-X (TSX) opens a new era in space borne radar remote sensing. It represents the first step for a constellation of radar satellites that will provide a broad spectrum of attractive and unique data product for scientific, commercial and security applications to the user community. The satellites TSX and Tandem-X are flying in a closely controlled formation with typical distances between 200 and 500 meters. Primary mission objective is the generation of a consistent global digital elevation model with high accuracy. TanDEM-X provides a highly reconfigurable platform for the demonstration of new SAR techniques and applications, e.g. single-pass cross-track interferometry with no temporal surface decorrelation, almost no atmospheric distortions and large selectable interferometric baselines. The spacecraft is designed for a nominal lifetime of 5 years and has a nominal overlap with TSX of 3 years. DLR is responsible for the scientific use of the data. The two radar satellites in formation will implement: - a new quality Digital Elevation Models (e.g. for hydrology), - a along-track interferometry (e.g. measurement of ocean currents) and - a new bi-static applications (e.g. polarimetric SAR interferometry). The potential for commercial applications arises from the increase in the efficiency of the TerraSAR-X data production chain, high quality and efficient cartographic capability, as well as implementation of experimental modes and security services for crisis management applications. The German Aerospace Center (DLR)'s next step in Earth remote sensing is a new Tandem-L radar satellite constellation planned for 2012. Together with TSX and TDX it is the German contribution to Global Climate change monitoring with new techniques using L-Band as a complement to X-band and technologies including Pol-InSAR, multiple channel beam forming and optical communication capabilities. The Tandem-L project is planned to be conducted in cooperation with the Jet Propulsion Laboratory in California. The combination of X-band datas and L-band datas enlarges the variety of available geoinformation products e.g. 3D elevation models with and without vegetation.