

IAF EARTH OBSERVATION SYMPOSIUM (B1)
International Cooperation in Earth Observation Missions (1)

Author: Mr. Ciro Farinelli
Airbus Defence and Space, Germany, ciro.farinelli@airbus.com

Mrs. Nora Meyer zu Erpen
Airbus Defence and Space, Germany, nora.meyer-zu-erpen@airbus.com

EARTH OBSERVATION SAR DATA FROM TERRASAR-X TO SUPPORT SOCIAL CHALLENGES:
GLOBAL HIGH RESOLUTION DIGITAL ELEVATION MODEL APPLIED IN CASES OF RIVER
INUNDATION AND COASTAL FLOODING IN GHANA AND GUATEMALA

Abstract

Disasters triggered by natural hazards considerably affect human populations in exposed regions and due to climate change the number and the magnitude of the events are continuously growing. Satellite-based Earth observation data can serve as an input to model and simulate potential disaster events or to monitor exposed areas. In this context, earth observation using Synthetic Aperture Radar (SAR) technology, allows multiple benefits, thanks to the weather-independent acquisitions and capability of capturing data with distinctive features. In particular, the satellite constellation of TerraSAR-X, TanDEM-X and PAZ, offers high acquisition frequency regardless of area of interest or weather conditions. Beside the very high-resolution imagery, the elevation data WorldDEMTM is a key data set for modelling applications and simulations. Due to its global coverage, the WorldDEMTM products can be used for modelling applications even in remote areas, where there is usually a scarcity of available data.

Within a framework between Airbus Defence and Space and the United Nations Office for Outer Space Affairs (UNOOSA), in collaboration with the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), different use cases have been developed using the WorldDEMTM as an input for river inundation and coastal flood modelling. The aim of the joint effort has been the development of a scalable approach independent of size and location, using open source software.

One recommended practice has been developed to identify coastal areas that are likely to be flooded due to storm surges in a fast and cost-efficient way. The method can serve as a first assessment for a more in-depth analysis. This is intended to facilitate access to hazard information for emerging countries and can serve as a first step towards preventive actions in exposed regions. Different use cases have been developed in Guatemala for potential river inundation also using WorldDEMTM. This paper considers also the case of Ghana where a storm-surge hazard modeling has been developed for the coastal area of Accra, in cooperation with the National Disaster Management Organization of Ghana (NADMO). The capital of Ghana is indeed regularly affected by coastal flooding mainly caused by storm surges.