

## Current states and future application of TerraSAR-X

# Takashi Nonaka[1]

[1] PASCO

This paper presents the latest states of TerraSAR-X, which is the state-of-the-art X-band first commercial radar satellite developed by German Government (DLR) and EADS Astrium and applicable for both scientific and commercial purposes. It was successfully launched in June, 2007, and after the commercial data service has begun since January, 2008, acquisitions of global data are continuously in progress and sales of the archived data is started. Acquired images are utilized for various application purposes, such as topographic/land cover mapping, hazard recognitions, agriculture monitoring, environmental issues, oceanography etc. Several joint projects were recently conducted for the technical development and some potential application areas are formulated with both domestic and foreign research institutions and private companies.

TerraSAR-X has three different acquisition modes, and users can select according to their required purpose. Highest resolution of TerraSAR-X image is achieved by the High-resolution SpotLight mode (300MHz) image up to 1m of resolution for both azimuth and range directions. It is used for grasping the damage conditions of the areas of disaster. In the past months, we completed two case studies for estimating the damaged area of Iwate-Miyagi Nairiku Earthquake and heavy rain/ flooding situation in Okazaki-city in Aichi prefecture analyzing TerraSAR-X data.

The orbit accuracy of TerraSAR-X is well controlled better than 20cm (3D, 1 sigma), and it is suitable for interferometry. Several studies for creating DEM in the Himaraya region showed the possibility to generate high-resolution DEM with high accuracy from TerraSAR-X data.

Complex data and amplitude data is provided to the users as basic products. The geometric accuracy of the ortho-product which is geocoded and orthorectified by DEM (EEC, Enhanced Ellipsoid Corrected) depends on the resolution or the accuracy of utilized DEM. In the flat areas, the accuracy of the EEC product generated by SRTM DEM is about several meters, and it is applicable for the mapping purposes.

TerraSAR-X will obtain quadratic polarization image data this year, and a next satellite TanDEM-X is planned to be launched in September 2009. Quadratic polarization will be used for agriculture and land cover classification etc. In addition, global high-resolution DEM (DTED: Level 3) is planned to be created utilizing both TerraSAR-X and TanDEM-X by single-pass interferometry.