

## Hannover 2007 Workshop ISPRS WGs I/5 and IV/3

**Title:** The NextMap Program - National Scale DEMs Created from Airborne InSAR  
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### Abstract:

The objective of this presentation is to provide an update on a program to create a single uniform DEM (Digital Elevation Model) for Western Europe and for the USA over the next two years. This program is referred to as the NextMap program and utilizes airborne InSAR (Interferometric Synthetic Aperture Radar) technology. In the course of the presentation the technology and the platforms with which this program is to be accomplished will be summarized. Some details on the operational implementation and current status will be provided. Moreover it will be placed in context with other programs such as the SRTM, the planned Tandem-X mission and with other technologies such as airborne lidar.

While airborne radar programs were instrumental in creating two dimensional maps three-four decades ago, particularly in the cloud-covered tropics, their role in producing DEMs (Digital Elevation Models) at mapping scales of interest was somewhat limited until airborne InSAR technology was developed and commercialized about 10 years ago. More recently the SRTM mission has resulted in the availability of a 3" (~90 meter) posted DSM (Digital Surface Model) at (usually) 5-10 meter RMSE vertical accuracy over 80% of the land-mass of the world. The Tandem-X mission, according to plan, should commence in 2009, so that by 2012-2013, a global 12-meter posted DSM of 1-2 meters RMSE vertical accuracy (relative) should become available.

Meanwhile airborne InSAR technology has been developing and in particular production capacity has been improving. The accompanying productivity and performance gains have led to the initiation (by Intermap Technologies Inc.) of national scale programs with the goal of creating DSMs, corresponding orthorectified radar images (ORIs), and derived products ( e.g. DTMs, 3-D road vectors, merged products) available at accuracy and post-spacing that are suitable for a host of new as well as traditional mapping applications. The first national program was NextMap Britain and was completed in 2003. Lessons learned from that program have been incorporated into subsequent programs including NextMap Germany, data acquisition being completed in the summer of 2006. Planning is currently underway to commence data acquisition for other countries in western Europe. Intermap has recently built two additional airborne InSAR systems which are currently undergoing commissioning tests, bringing the total number of platforms to five. A common product specification is transparent to which of the platforms acquired the data. For example, the DSM specification relevant to the NextMap Europe and USA initiatives, is 1 meter RMSE vertical accuracy at 5 meter post spacing, with an accompanying 1.25 meter ORI.

At the other end of the competitive spectrum from SRTM and Tandem-X, are the airborne lidar systems and service providers which are ubiquitous in North America and Europe, and are capable of routinely producing DSMs and DTMs (Digital Terrain Models) at high spatial densities (1-2 meter posts) and vertical accuracies of less than 20 cm RMSE. However these products are typically 1-2 orders of magnitude more expensive (on a unit area basis) than the NextMap InSAR products, and moreover tend to be available in specific but limited areas so that from many user's points-of-view they represent complementary rather than competitive solutions.

Apart from summarizing the status of the technical contents and status of the NextMap program, this presentation will briefly address the competitive environment within which it has positioned itself.