



## **A New Processing Chain based on Neural Networks for the Construction of X-SAR DEM: Tuning of new algorithms and Validation of the Output**

Franco Brizio (1), Mario Gentili (1), Marco Fabrizi (1), Francesco Vespe (2), and Catia Benedetto (2)

(1) CSI Ricerca & Ambiente, Viale Cesare Pavese 305, 00144 Roma ITALY(info@csiricerca.org), (2) Agenzia Spaziale Italiana, Contrada Terlecchia snc, 35100 Matera ITALY(francesco.vespe@asi.it)

The main goal of the activity we plan to perform concerns the description of a new approach for the production of Digital Elevation Models (DEM) based on neural network and the relative activity of their validation. The DEM have been extracted from the X-SAR images caught by the COSMO-SKYMED Italian space mission fully devoted to remote sensing.

In particular we have developed in parallel two processing chain to obtain DEMs. The first one applies the conventional algorithms currently used and implemented in the DORIS open source software developed by Delft University. The second one implements our algorithms which apply neural networks to determine the features of the single pixels taking into account also the behavior of neighboring pixels. Thus a comparison of the achieved DEM with the two different processing chain is performed.

For the validation of DEMs obtained with our algorithms we plan to construct a third DEM overlapped to the other two, using the GPS-RTK technique. This technique is capable to return DEMs with a precision of few tens of centimeters; i.e. enough precise to validate the X-SAR DEM.

For the validation activity we have selected an area close to Matera Space Geodesy Center which cover both flat and hilly surfaces.