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3D positioning in radar images using SAR Tomography

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SAR Tomography is the extension of permanent scatterers (PS) technique to allow a full 3D imaging of surface topography. Tomography resolves vertical detail by employing a synthesised vertical aperture, as well as azimuthal detail which is resolved using aperture synthesis in normal SAR.
The aims of this research is to analyze and demonstrate the positioning capability of the PS technique applied for the estimation of target heights in urban areas. Two data sets were used in this study. The first one corresponds to TerraSAR-X satellite data in the SpotLight imaging mode covering south of Tehran. In this data set, the height of Tehran railway station building was estimated by the PSI technique and the accuracy obtained in the range of several tens of centimeters (80 cm). The second data set contains images from Sentinel-1 in StripMap mode for the Sao Paulo urban area. In this dataset, the height of the Eldorado business tower was estimated as the target and its accuracy was measured in the range of 6 meter. The reason for the reduced accuracy in Sentinel-1 result is due to the smaller dispersion of the normal baseline.