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PRECISE 2-D AND 3-D GROUND TARGET LOCALIZATION WITH TERRASAR-X

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Abstract. Previous studies have demonstrated the unprecedented absolute pixel localization accuracy of the German SAR (Synthetic Aperture Radar) satellites TerraSAR-X and TanDEM-X. Now, using global navigation satellite system data to locally correct for atmospheric delay, range accuracies of 1 cm are demonstrated to be attainable. Using globally available tropospheric and ionospheric delay information such accuracies can even be approached world-wide. When such accurate estimates are available for two or more SAR images from different orbits, techniques such as stereo SAR can be used to generate DEMs (Digital Elevation Models) using only the amplitude signal, completely bypassing interferometry. The first experiments of this type described here show that an absolute 3-D localization accuracy better than 10 centimeters is achievable.

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