

# INSAR Infrastructure monitoring with special radar reflectors

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## Abstract:

TNO investigates together with TU Delft Interferometric SAR techniques for precise infrastructure monitoring, e.g. buildings, bridges, roads, railway, dikes.

INSAR is a powerful technique to monitor changes in infrastructure. It is based on measuring the distance changes between a satellite SAR instrument and a reflection of opportunity from successive satellite passes. However in many cases the reflections are not stable enough over time, e.g. for grassland covered dikes the decorrelation is too rapid for satellites that have exactly repeating orbit durations of days or weeks. In built environment cases (buildings, bridges, etc.) the reflection based measurements can sometimes not be accurately linked to motion of important parts of the infrastructure. The combination of ascending and descending tracks enables to distinguish between vertical and horizontal motion of the reflector. Reliable measurements require that the reflector of opportunity is the same in the ascending and descending passes or that they move in exactly the same way. Don't push your luck! An alternative method is by using specifically designed radar reflectors that can be placed at the positions where the knowledge is needed, e.g. in the case of buildings or dikes.

In this talk the results of several experiments with corner reflectors are discussed. First a test was performed with TerraSAR-X and several corner reflector combinations. An interesting result comes from the combination of reflections from various reflectors to increase the measurement accuracy. The combination of results from single reflectors with ascending and descending tracks has been verified. Next the technique was applied on two demonstration cases: the Veenderij, a peat dike near Amsterdam and the leaning tower of the Oude Kerk in Delft. Results will be shown and discussed.