



RESEARCH Geodesy and Geospatial Engineering

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Development and applications (geodetic, geophysical and environmental) of high-precision GNSS:

- GNSS processing strategies, global and regional GNSS network processing, Precise Point Positioning and integer ambiguity resolution, GNSS solution combination, modelling of systematic biases, including atmospheric effects on GNSS signals, automated quality control and data evaluations of large GNSS networks, specific GNSS station investigations and station monumentation, stochastic modelling of time series, including noise analyses, sidereal and spatial filtering;
- Long-term, near-real-time and real-time monitoring of atmospheric water vapour for climatology and meteorology (fore-casting and now-casting, severe weather tracking);
- Long-term monitoring of 3D land movements in relation to climate change and sea level change studies, modelling of glacial isostatic adjustment processes and modelling of plate motions and crustal deformation;

Development and applications (geodetic, geophysical and environmental) of remote sensing and 3D imaging technology:

- Remote sensing, 3D image processing methods, digital photogrammetry, laser scanning from terrestrial and aerial platforms (including UAVs), Light detection and ranging (LiDAR), synthetic aperture radar (SAR), persistent scatterer interferometry, mobile mapping;
- Long-term monitoring of 3D land movements in urban areas (e.g. mining and ground water extraction) and around tide gauges in relation to climate change and sea level change studies and geodetic datum definition using SAR;
- Long-term monitoring of buildings and structural (infrastructure) deformations using airborne and terrestrial digital photogrammetry and laser scanning technologies;

Development and application of digital engineering and geospatial technologies for digitalisation:

- Building Information Modelling (BIM) within sustainable construction (design for deconstruction, material banks);
- Building Information Modelling (BIM) / Geographical Information Systems (GIS) integration (city modelling);
- Machine learning for classification and feature extraction in geospatial Big Data for improved 3D city modelling