RADAR SATELLITE DATA FOR

THE CONSTRUCTION INDUSTRY

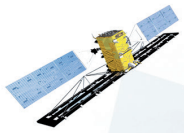
Detect the movement of ground and individual structures with TRE Altamira's radar satellite-based measurements

TRE ALTAMIRA

A CLS Group Company

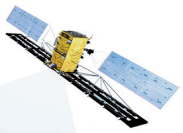
Ground Settlement and Infrastructure Stability Monitoring

SqueeSAR® accurately and remotely maps **surface displacement** and **building settlement** induced by tunnelling and civil engineering groundworks, as well as monitors long-term infrastructure stability.



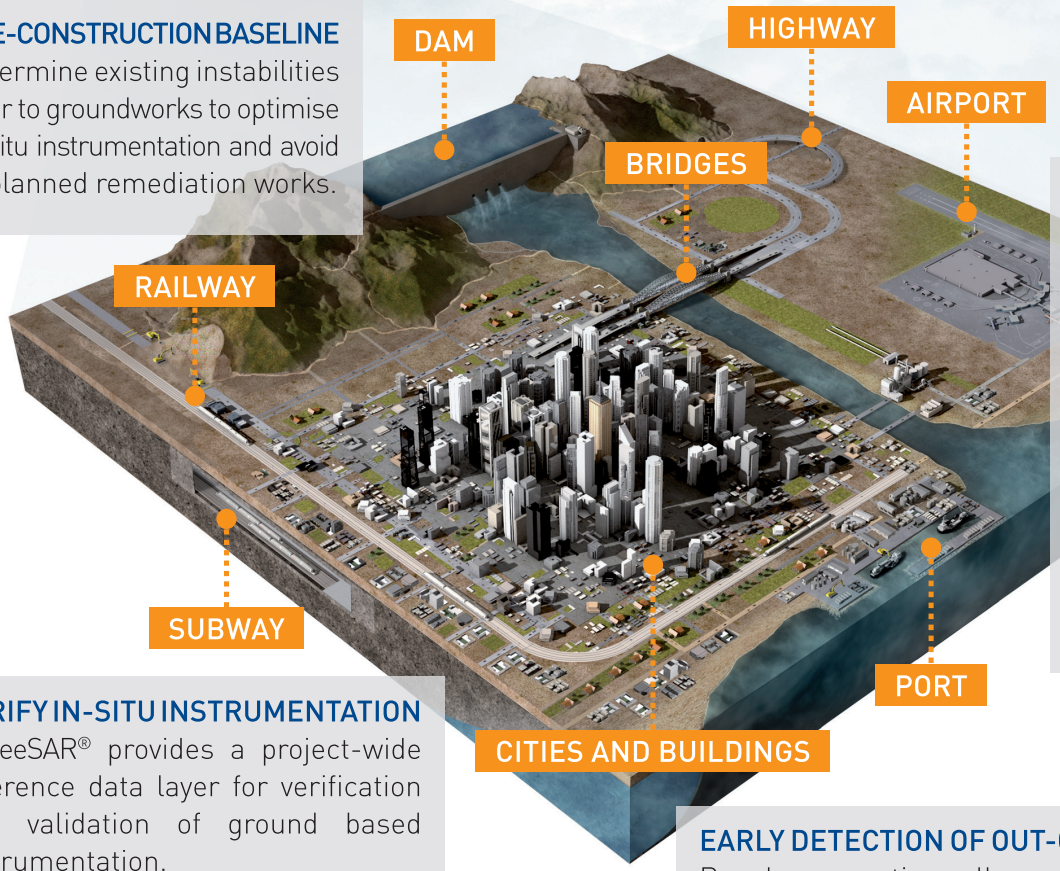
GEOTECHNICAL ZONE OF INFLUENCE

SqueeSAR®'s wide-area analyses monitor well beyond traditional surveying techniques and determine the full spatial impact of groundworks, including the influence of dewatering and groundwater changes.



PRE-CONSTRUCTION BASELINE

Determine existing instabilities prior to groundworks to optimise in-situ instrumentation and avoid unplanned remediation works.



SUPPORT FOR DISPUTES

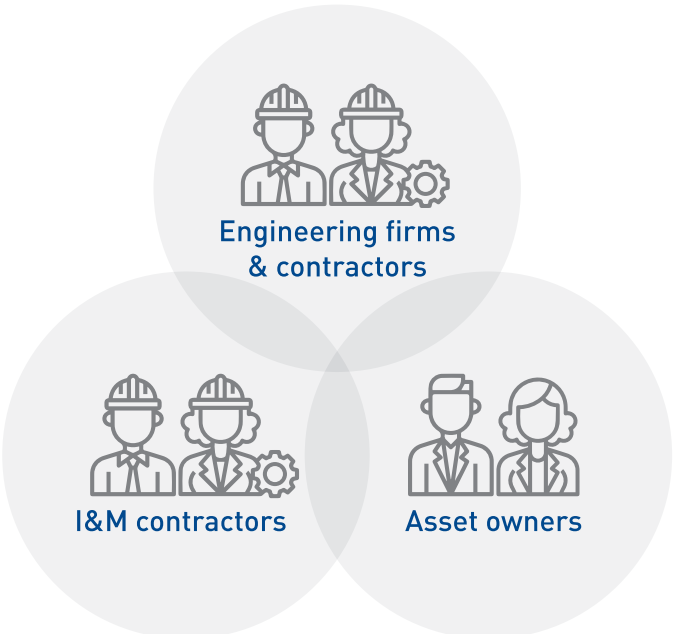
By analysing satellite imagery acquired before and throughout construction projects, the temporal and spatial onset of settlement induced by different groundworks projects can be separated, providing support for disputes or damage claims.

VERIFY IN-SITU INSTRUMENTATION

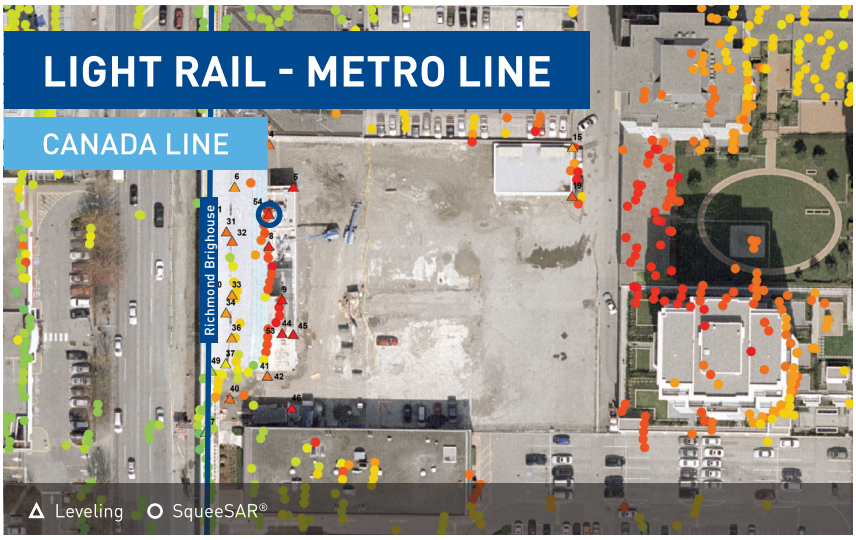
SqueeSAR® provides a project-wide reference data layer for verification and validation of ground based instrumentation.

EARLY DETECTION OF OUT-OF LIMITS MOVEMENTS

Regular reporting allows for early identification of out-of-limits displacements, reducing risk of damage to buildings and equipment.



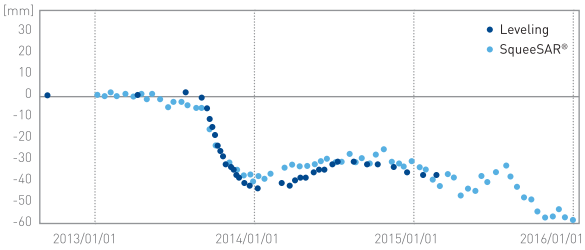
- Reduce damages risk
- Optimise in-situ instrumentation
- Completely remote
- Millimetre accuracy



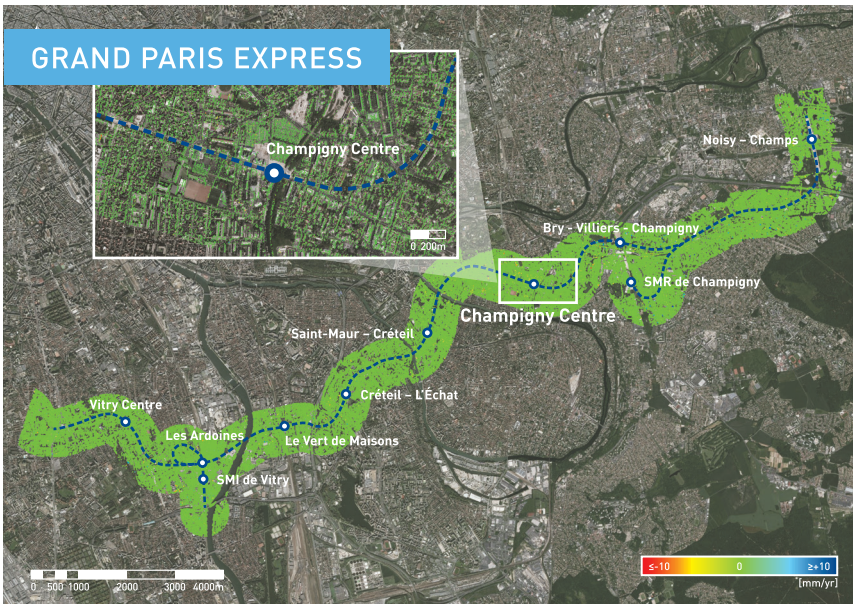
A seven-year satellite monitoring over the rapid transit system linking Vancouver downtown to the airport and the city of Richmond, to detect ground instabilities along the line.

The image refers to the Brighouse station area during construction.
SqueeSAR® measurements were used to:

- **Complement traditional monitoring** with leveling by extending motion detection to a broader area
- **Settle subsidence claims**

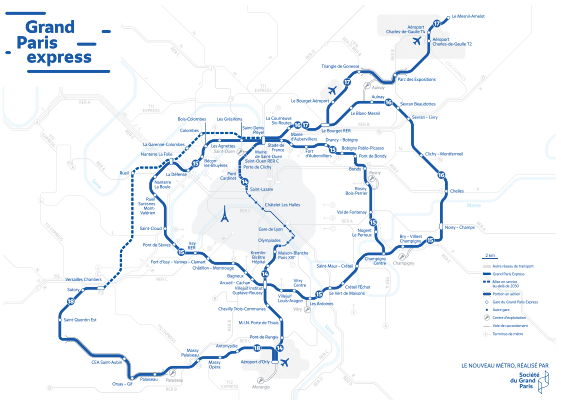


Comparison and agreement between SqueeSAR® and leveling data.

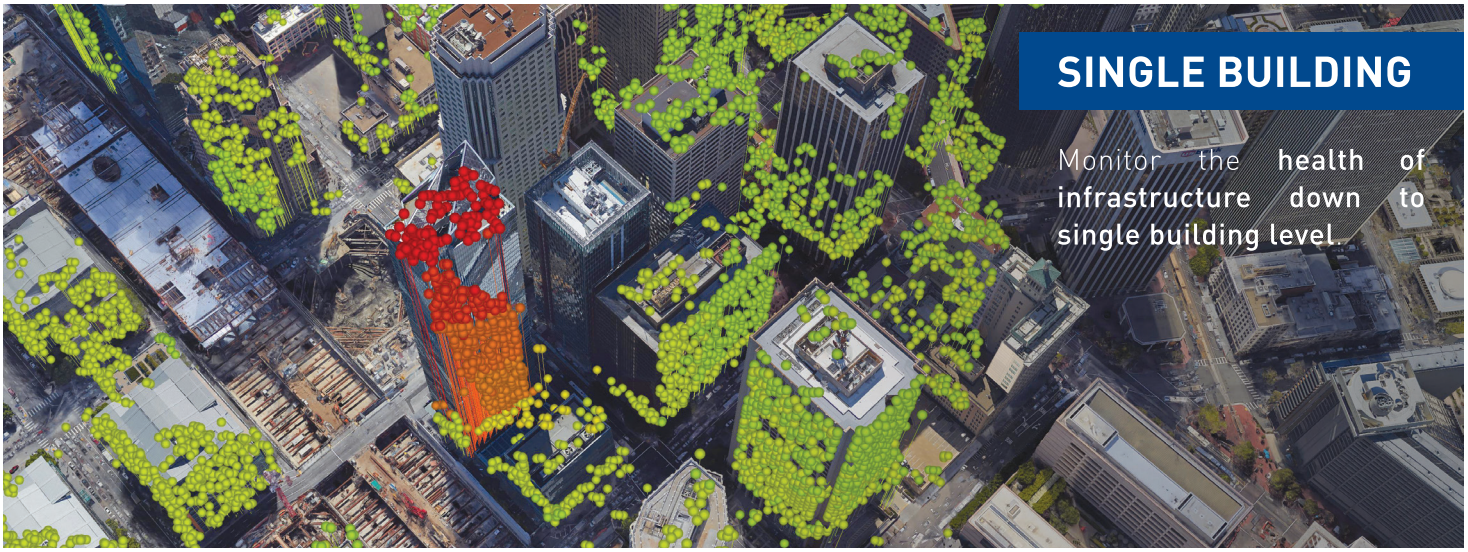


With 200 km of underground metro lines, the GPE is the world's largest project to monitor the impact of tunneling operations on existing surface structures along the alignment and adjacent areas using SqueeSAR®.

SqueeSAR® baseline over the eastern section of Line 15, before work began in mid-June 2016, which shows the spatial extent of **pre-construction displacement**.



- **Regular updates of our measurements** during construction and post-construction **until 2030**.

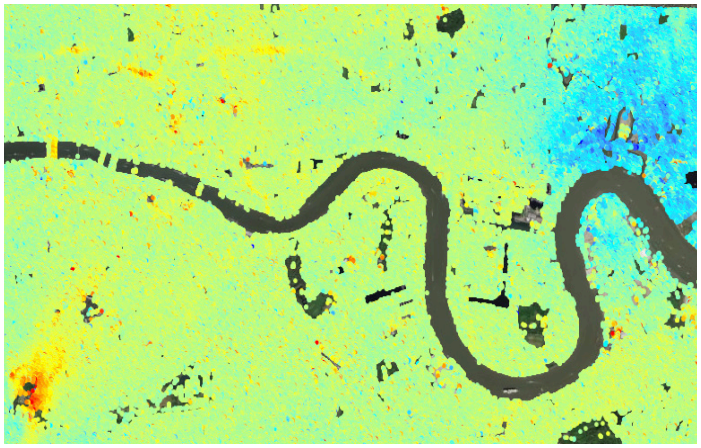


OUR EXPERTISE

SqueeSAR® TECHNOLOGY

Setting the industry standard for advanced InSAR processing

By processing radar imagery acquired by satellites orbiting at 800 km above the Earth's surface, SqueeSAR® identified a dense network of measurements points to measure ground displacement to millimetre precision with every new satellite acquisition.



WEB GIS PLATFORM

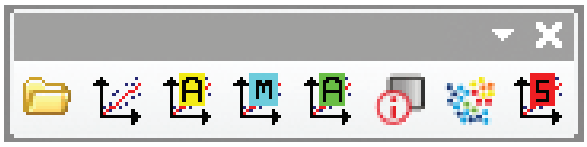
Visualise and interpret satellite results on a dedicated and secure web platform

Our proprietary TREmaps® platform provides:

- Georeferenced data visualisation
- Time-series analysis
- Interrogate displacement, velocity, acceleration, seasonality
- Create cross-sections
- Integrate Client dataset

ArcGIS TOOLBAR

We have also designed a toolbar for advanced analyses of our results in an ArcGIS environment.



CLIENT SUPPORT

With a global presence and over 20 years' experience in satellite InSAR, TRE Altamira offers engineers and project managers timely and reliable ground settlement information over wide areas to mitigate risk, optimise operations and plan future operations.

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