



4DSkin

Remote measurement of displacements over large areas

YOUR CHALLENGES

- **Monitor displacements over large areas:** unstable rock masses, landslides, cliffs with risk of rockfall, large embankments, mines, large infrastructure
- **Measure displacements** in real-time to **enhance infrastructure's** and **buildings' safety**



OUR SOLUTION



Contactless deformation measurement:

4DSkin allows contactless deformation measurements over large areas, up to a few kilometers, at high frequency (typically every 2 minutes), and with very high accuracy (typically 0.2 mm).

4DSkin generates displacement maps of all pixels in the area, and time-based graphs tracing the evolution of each pixel.

4DSkin is based on the use of interferometric synthetic aperture radar technology.

THE BENEFITS

- **Remote monitoring** of **large areas**, at high frequency where necessary, without installation of targets
- **Fast installation** and **configuration**: a 100% operational system is possible in a few hours
- **Real-time alerts**, for example for falling rocks



Sixense's

• Our reputation for excellence is built on our client's satisfaction.

• The worldwide specialists in accurate and useful measurements.

• Expertise in measurements + geotechnical expertise + competence in site interventions: Our teams understand your requirements and can develop optimised solutions for your project.

CONTACT US

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over large areas

TECHNICAL PRINCIPLE

4DSkin is based on techniques derived from displacement measurements using satellite radar principles.

The device is set up facing the area to be monitored and records successive radar images of the area. Each radar image contains, for each pixel, information on the phase of the return signal. By comparing the phase differences using interferometry between pairs of images collected at different times, we can calculate the displacement of each pixel between two images in the direction of sight.



APPLICATIONS



4DSkin allows monitoring of:

- Unstable rock formations (excluding vegetation) over large areas
- Large critical structures
- Landslides
- Hills, cliffs and embankments
- Open pit mines

SPECIFICATIONS

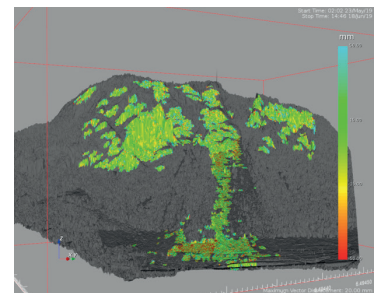
- **Measurement accuracies** range from **0.1 mm** to a **few mm** for data points up to 3-4 km distance
- **Sub-millimetric resolution** range
- **Measurement frequency** of the entire zone: 2 minutes
- **Maximum measurement distance:** 4 km

LIMITATIONS

- To visualise the data, a **Digital Terrain Model** of the area is needed.
- Measures in the line of sight
- The system is usually used for **real-time monitoring with alarms**, as opposed to slow evolution monitoring over years

ASSOCIATED TOOLS & SERVICES

- A **turnkey service** from installation to provision of **pre-processed data** in an accessible webspace
- **Geotechnical expertise** needed to interpret measurements in ways that meet your requirements more accurately
- **Data quality control** and monitoring is optimised through **proactive maintenance** to ensure that **measurements** are **accurate** and **useful**
- A **culture of innovation** committed to the continual development of solutions more closely aligned with the practical challenges of our clients



REFERENCES

- Cliff monitoring,
La Saulcette, France

- Arcature wall monitoring, Fontan,
Roya Valley, France

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