

“Taste of InSAR”

Satellite Interferometric Synthetic Aperture Radar (InSAR) uses a space-borne radar antenna to send out a powerful radar beam to the surface of the Earth. Features on the ground surface interact with this radar beam and reflect part of it back to the satellite. The same radar antenna detects the reflected radar signal and measures the round trip time and hence the distance between satellite and the ground feature, in a similar fashion to the EDM (electronic distance meter). This measurement cycle is repeated many times a second so that as the satellite flies over a site, the radar beam typically illuminates an area of 100km by 100km in a few seconds. The pixel size of such a radar image (ground resolution) can be in the range of 1-30m.

After some time (multiples of a satellite cycle, e.g. 11-46 days, depending on the satellite used), the satellite will re-visit the same site and acquire another radar image. By comparing two radar images taken of the same site, it is possible to calculate the change of the distance between satellite and ground features to an accuracy of a few millimetres. We have been studying this technique for the last ten years and have demonstrated its effectiveness by comparing against ground survey results.

Our work has been so successful that Earth Remote Sensing Data Analysis Center, which operates the PALSAR Ground Data Processing System, has recently placed our recent results on their web site:

http://www.palsar.ersdac.or.jp/e/doc/Min_Subsidence_Monitoring_en.htm

You can see clearly how ground surface sinks as mining progresses.

Multiple longwalls / collieries can be easily covered and you can have regular updates on mine subsidence. Heavy vegetation may degrade the accuracy but otherwise the method is very cost-effective and works extremely well as a complement to ground survey. The Cooperative Research Centre for Spatial Information and University of New South Wales therefore jointly offer this opportunity to interested mine surveyors and managers to trial this new radar remote sensing technology.

What do you need to provide?

- coordinate (latitude / longitude) of the centre for your area of interest (AOI)
- period of interest
- (for underground mining) longwall plan, digital format is preferred, in order for us to overlay InSAR result
- ortho-rectified aerial photograph
- ground survey data if it is necessary to compare between the two techniques

What do we deliver?

- subsidence profiles and deformation map between two radar acquisitions
- deformation map in GIS raster format (GDA94 or MGA projection)
- a brief report with the summary of the results

Cost:

AUD\$10,000 (exclusive of GST) with satisfaction guarantee.

Time required

If there are at least two suitable radar images available for the AOI, the results and a brief report will be delivered within 10 working days.

Contact details

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