



ADVANCES IN MAPPING technology have made it possible for the insurance industry to pinpoint risk more and more accurately, with underwriters able to gauge the risk of certain events for individual properties rather than whole postcodes.

Geocoding and mapping solutions, such as Royal and Sun Alliance's Geoplatform, Norwich Union's Nextmap and the Environment Agency's flood map, have revolutionised the way flood risks are assessed. Now, satellite mapping company NPA Group is keen to promote its technology to advance the way subsidence risk is assessed. "Insurers have relied on their own claims data to determine risk but our technology could make it much easier to do this," says Ren Capes, European project leader at NPA Group.

Measure of precision

"Additionally, our system could be used by loss adjusters to assess the viability of claims and, by ascertaining the extent of movement, enable them to prioritise their investigations." The group's system, Persistent Scatterer Interferometry (see box, p16), uses satellites to identify movement and, by analysing this with the data it has built up since 1991, can measure the rate of subsidence with

Advances in mapping techniques have already helped insurers pinpoint flood risks. Now a new satellite technology promises millimetric precision in subsidence assessment. **Sam Barrett** investigates its potential value.

assessing subsidence. However, do property insurers believe this technology will prove to be the next big thing or is investment more likely to be diverted elsewhere?

Presently, insurers rely heavily on their own claims data to determine risk. "This data is important," says Alan Gairns, development manager for property underwriting at RSA. "This tells us where claims have happened, which gives us a good indication of where they might occur in the future."

Risk-modelling also plays an important role in assessing the likelihood of subsidence. The data that is used, and the importance of each part of it, varies between insurers but will include factors such as the type of soil and the way the land has been used in the past. For example, has the site previously been used as landfill or for mining, what is the slope of the land, and how has the property been constructed?

Mark Harrison is commercial director of ISL.

vary substantially. "A house built in the 1920s is likely to have much shallower foundations than a property built more recently. Sometimes an insurer will class every house in the street according to what type of build is the most dominant but this can miss important risk information, so we build this into our models," he explains.

Refined risks

Always looking for additional elements to factor into his models, Mr Harrison believes PSI could further refine the way risk is modelled. "This type of data would add value but, to be able to include it within our models, it would need to be delivered on a countrywide basis."

Catherine Barton, a partner at Deloitte, also feels that coverage may pose a problem for the take-up of PSI. Although it will pick up particular points and measure their movement, it is not possible to analyse movement of every building.

► "Buildings in rural areas may well not have many persistent scatterers nearby available for analysis. In regions where the land dynamics are complex, there may not be enough information to form a precise underwriting strategy."

So far, NPA Group has focused on towns and cities, interpreting data for the 20 largest in the UK. "This technology does work particularly well for towns," explains Mr Capes. "These 20 towns account for around 98% of the UK population and, therefore, a large proportion of the insurers' risk." Although he concedes that, because of the smaller number of points that are picked up, results for rural areas are not as useful as for towns, he has not ruled out processing the data for the whole country.

Insurer reservations

Despite her reservations about coverage, Ms Barton does believe PSI could bring benefits. "It will allow underwriting to occur on an individual basis from a position of good information, which should improve underwriting precision considerably." She says that by integrating this data with postcode-mapping software, insurers would be able to create a database of individual postcodes and their relative subsidence risk. "This could then be tracked, allowing poor risks to be easily identified and considered," she adds.

Although NPA Group is not working with any of the insurers yet, there is interest from the industry. At Axa Insurance, Steve Wilcox, household product manager, believes there is definitely room for improvement in the way subsidence is underwritten. "If it demonstrates use-

Just because the ground moves, doesn't mean there's going to be a subsidence claim.

fulness we would consider using it. Some of the tools we currently use can produce fairly meaningless results," he explains, pointing to the soil-moisture content tools as an example.

"These will tell you if the soil is dry and, therefore, more susceptible to subsidence but the difficulty is you don't know what the moisture content was like when the houses were built. If the soil had the same moisture content, then it's likely you'll be fine," he explains.

However, not everyone is convinced that PSI will revolutionise property underwriting, with several commentators raising concerns about how useful the data would be.

Jill Boulton, geographical information systems manager at Norwich Union, believes that although the data it provides is useful, PSI on its own would not enable insurers to underwrite subsidence. "It's interesting but it's just one element of the mix. We want to know which properties are at risk not just where the movement's occurring," she explains.

Mr Cairns is also sceptical about how useful the data would be. "Just because the ground

Persistent Scatterer Interferometry

Persistent Scatterer Interferometry is a technique for measuring ground movement that has been developed by satellite mapping company NPA Group.

Its technique uses data from more than 30 radar satellites that orbit the earth. Each of these satellites beams back images of the earth, covering the whole planet during a period of 35 days.

Once this raw data is obtained, it is interpreted by computer process designed by the Polytechnic of Milan. This recognises any solid features on the earth and, where these features are reflected back in each of the images — hence the term persistent — they can be identified as buildings.

On average, the system will identify between 100 and 200 points in every square kilometre of an urban area, while in rural areas, where there are fewer buildings, it would pick up fewer points.

Next the computer will analyse the information for each of these points and be able to provide details of the relative movement of any of them, down to the sub-millimetre. As well as showing how much movement has occurred, it can also show periods when more, or less, movement has taken place. This would enable an insurer to see how different weather conditions or tunnelling projects have affected movement.

NPA Group has data for the whole of the UK, as well as most of mainland Europe and much of the US and Japan, going back to 1991 when the project began. For instance, its map for London shows that although most of the city is stable, there is evidence of movement, especially where tunnelling for the Jubilee Line Underground extension has taken place.

Not all of its data has been processed to enable it to be interpreted, although Ren Capes, European project leader at NPA Group, says additional areas can be added if required. "We have concentrated on towns so far, as this is where most people live and subsidence poses more of a risk to insurers but if an insurer wanted other areas, this data could be processed too."

subsidence claim," he says. "I don't think PSI data is really that different to what we have already in terms of our claims data."

He does, however, acknowledge that for a smaller insurer with less claims data, or one looking to enter the market, there could be some value in having historical data about where subsidence has occurred.

Frazer Fletcher, a chartered engineer and unit partner in the national subsidence unit at Ashworth Mairs Group, agrees that there is a lot more to subsidence than movement. "It's all very well being able to identify where movement is occurring but with individual properties the cause of subsidence can be much more localised, for instance a tree or a leaking drain."

Mr Fletcher's argument may point to PSI being much more useful as a claims tool, with its data being used to identify the source of the movement that has resulted in subsidence and assess whether it is an ongoing problem. This would enable insurers to tackle the claim in the most appropriate way.

Already, insurers are focusing more heavily on the claims side of subsidence. In particular, during the past 10 years the industry has changed the way it deals with claims, preferring not to simply underpin everything that moves.

Instead of turning to the costly concrete, insurers now prefer to monitor the movement during several months and take other remedial steps such as removing a tree or repairing a water pipe.

Underpinned properties

"It's very expensive to underpin a property and, although it can take time before a claim is resolved, this more measured approach is sensible," says Rob Withers, managing director of Withersnet, a specialist network that provides subsidence repair services to insurers. "There are plenty of properties that were underpinned in the past that didn't need to be."

This approach has resulted in a reduction in the average cost of a subsidence claim, down from between £12 000 and £14 000 to around £8000. Additionally, this approach has also altered the pattern of claims. According to Mr

thousand pounds, perhaps to take these lower-cost steps, but if this action does not rectify the problem there will be a second, more expensive claim if underpinning is required.

Education is another important part of the insurers' armoury. Although homeowners can do little about where their property is built and the type of soil it is built on, they can take steps to prevent problems. "We send out leaflets to our policyholders about how they can reduce the risk of subsidence," says Ms Boulton. "These give details of the types of trees they should avoid planting close to their homes, how to control trees that are already near the property and information about ensuring they have suitable foundations on any extensions they build on their property."

Media attention

Since subsidence cover was introduced in 1971, there have been several years when claims have been sufficiently high to attract media attention. Two years in particular stand out: 1976, following the drought of 1975-1976 when around 20 000 claims were received, and 1989-1990, when 60 000 claims were made.

Although the resulting insurance bill may sound significant — with claims topping £500m in 1990 and 1991, compared to subsidence costing around £200m in an average year — investing in this area is not the primary concern for insurers.

Mr Harrison explains: "In terms of a worst-case subsidence loss ratio, taking a ratio of subsidence claims to domestic property premiums, industry statistics would indicate that the highest has been 15%. This means that flood, storm and theft claims have been more of an issue in terms of historic losses."

Faced with these other more frequent, and more expensive risks, the cost of PSI could be a significant determinant of whether it becomes one of the tools used to understand subsidence. Ms Boulton notes: "Although PSI is interesting, economics will probably mitigate against it; although, as technology moves forward it will get cheaper and this amount