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FARAWAY, SO CLOSE!

DESPITE ADVANCES IN REMOTE POSITIONING TECHNOLOGY, YOU CAN'T BEAT FIELDWORK IF YOU WANT TO GET THE MOST ACCURATE DATA

Remote sensing, aerial photography, UAVs – the list of tools we can use to acquire positioning information and data at a distance seems to be growing all the time. All these tools have their strengths, particularly the ability to acquire information about large areas quickly and cheaply.

However, as of yet, technology hasn't quite got us to the point where the perfect acquisition tool has been invented and all these tools have trade-offs, usually accuracy. If you want metre- or even centimetre-level accuracy, often the only way to get it is by going out into the field and acquiring it yourself.

This issue, we focus on some of the tools and techniques available not just for improving surveying accuracy but also for understanding the enhanced information available. GPS and other global navigation satellite systems (GNSSs) have revolutionised surveying in the past few decades but even after 'selective availability' was turned off in 2000, their accuracy hasn't always met the needs of the most precise applications.

In our cover story on page 46, we look at how GNSS is being made more accurate in Belize. The rising oceans present challenges for both natural and manmade coastal environments in the Caribbean nation, which is one of the few areas in the region to monitor sea levels. But with sea levels changing by the hour, and the climate change-induced increases to average levels taking years to appear, it's a challenge for any surveyor to achieve the needed accuracy. The answer? A whole range of techniques, including differential GPS and Real Time Kinematics.

Valuable though these techniques are, their need for a reference station against which to compare accuracy has always made them non-trivial techniques that require planning and investment. But on page 38, Reinhard Blasi and Sofia Cilla look at the European Geostationary Navigation Overlay Service (EGNOS) and how surveyors in Europe can take advantage of this open system to improve the accuracy of their work for free. Combining both additional satellites and a system of base stations, EGNOS is available in both real-time and over the internet, providing correction information to anyone with a special equipped receiver or who is post-processing their data.

Remote sensing imagery often needs interpretation to be understood, particularly hyperspectral imagery. Different plants may have different absorption spectra and even the amount of water vapour in the atmosphere during acquisition can affect how certain forms of imagery will look from day to day. That often means going into the field to measure the absorption spectra on the ground, so that vegetation and land-use types can be matched to the imagery. Even then, local variations – and bad weather – can still cause errors.

On page 33, Brian Curtiss shows how using two spectroradiometers to measure absorption can overcome these problems. By linking the spectroradiometers together, surveyors can effectively use the same idea as Differential GPS – a reference station and a mobile unit – to cancel out errors.

Recording data over long periods of time often results in one big problem that no amount of additional equipment can fix: understanding the inevitably complicated results. Graphs, charts and other traditional methods of visualising data can often only show limited amounts of information before they become too difficult to understand. On page 42, Blakelee Mills looks at an alternative technique for plotting data, particularly marine data, that novices and experts alike can use to understand underlying trends in the information they've acquired.

What does the future bring? New and improved hardware? New challenges? New opportunities? If only we had a crystal ball.

One company well known throughout the geospatial industry hopes it has just that – Esri. Every year, the Esri user conference is one of the highlights of the industry's calendar. Held in San Diego in the US, many attendees go as much for the climate as the numerous presentations and break-out sessions.

However, this year, our intrepid columnist Alistair Maclenan went for another reason as well: to meet members of Esri's 'Brains Trust'. Experts in their respective fields, Este Geraghty, Marianna Kantor and Dawn Wright hope to not only predict the future but change the world they envisage to make it a better place.

You can find out what the Brains Trust sees in your future on page 51.

I hope you enjoy the issue.