Editorial:
Rob Buckley, Editor - GeoInternational
robertbuckley@geoconnexion.com

Peter FitzGibbon, Editor - GeoUK
peterfitzgibbon@geoconnexion.com
+44 (0) 1992 788249

Alan Plumley News Editor
+44 (0) 1438 715124
news@geoconnexion.com

Columnists:
GeoInternational
Louise Friis-Hansen, FIG
Daniel Katzer, Hinte Messe
Roger Longhorn, GSDI
Alistair Maclenan, Quarry One Eleven
Geoff Sawyer, EARSC

GeoUK
Chris Harris, Modern Surveying
Graham Wallace, AGI News
Francois Gervaix, Guest Blog
Terri Freemantle, Observations

Publisher:
Mai Ward
+44 (0) 1223 279151
maiward@geoconnexion.com

Advertising:
Micki Knight, Sales & Marketing Director
+44 (0) 7801 907666
mickiknight@geoconnexion.com

Mailing Address & Subscription Enquires:
GeoConnexion Limited,
PO Box 594, Cambridge,
CB1 0FY, United Kingdom
+44 (0) 1223 279151
info@geoconnexion.com
subscription@geoconnexion.com
www.geoconnexion.com

Design:
Lucy Carnell
AT Graphics Ltd
www.atgraphicsuk.com

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ROB BUCKLEY
EDITOR
robertbuckley@geoconnexion.com

THE VIEW FROM ABOVE

GROUND SURVEYING AND REMOTELY ACQUIRED IMAGERY CAN COMPLEMENT EACH OTHER - IN THEORY. BUT IN PRACTICE, THEY OFTEN HAVE TO REPLACE ONE ANOTHER

As anyone dealing with geospatial information knows, there is a symbiosis between data collected on the ground and remotely acquired imagery. Sending surveyors into the field to collect data for large areas is impractical, time-consuming and expensive, whereas data from aerial sources and satellites can be acquired for large areas relatively quickly and cheaply. But for small areas, the ground survey offers greater accuracy and quality than remote acquired data can. Combine the two and you have the best of both worlds.

That's the theory, anyway. But the practice is always more complicated. For example, in most developed countries, we now almost take having timely satellite data for granted, thanks to constellations such as Sentinel and Landsat. Indeed, it's now reached the point where companies are considering offering 'satellite imagery as a service'.

On page 28, Vincenzo Massimi and colleagues set out this new model for the use of satellite imagery and demonstrate its use in the creation of a new service for companies managing integrated water and sewage networks. The idea is that land and infrastructure monitoring traditionally require regular monitoring of large and remote areas, which costs considerable financial resources and time and is often complex to implement. Using satellite data can overcome these limitations and provide frequent, accurate and accessible information. By combining Sentinel data with cloud infrastructures, there is the chance to shift from the provision of data to the provision of services – continuous access to information for the users, rather than 'on request monitoring services', with users paying for the information not the processing.

Massimi's company chose Sentinel imagery for many reasons, including its open provision of data and frequency of capture, something that clients in countries such as Italy can expect. But elsewhere, such data isn't necessarily available, even when it's supposed to be. Belize's islands are at the forefront of climate change. Rising seas have the potential to swap them and the villages on them. To make decisions about how to respond requires long-term planning – the sort that satellite imagery should offer.

However, as Peter LiCalsi reports, when a team of GIS volunteers went looking for the data, they couldn't find it. One of the team leaders reports: "Unfortunately, we can't say for certain why high-resolution satellite imagery of Belize is not publicly available. Resolution of the available satellite imagery tends to vary as it is gathered from multiple sources. For instance, the Worldview-4 satellite from DigitalGlobe has a resolution of 31cm but we are not seeing imagery in Belize approaching this level of detail; most imagery appears to be over 1m resolution with date of capture going back nearly 10 years."

So the team was forced to obtain the data themselves. They together with villagers on the islands went out with UAVs to capture imagery at resolutions of up 3.2cm, while using Mobile GIS to map the locations of marine debris washed up on the shore. The result is information that at last can be used to plan for the islands' future.

Equally, ground survey can face its own problems. The Indian city of Hyderabad has grown from having one million inhabitants in 1951 to about 10.2 million in 2016 – something for which it was never designed. Knowing how the land is being used now was the first step to determining what additional resources are needed and if there are dangerous uses of the land that need to be mitigated for, particularly when there's the potential for flooding. Going out into the field would have provided the information needed, but as well as the daunting 650 square kilometres that would have needed to have been covered, some areas would have been inaccessible, while others could have been dangerous. Such a venture also wouldn't have revealed how land use had changed over time, since there were few historical records.

Accordingly, as Chiara Solimini and Ana Isabel Martínez report on page 22, earth observation imagery from Landsat and Deimos satellites were used to determine both current and previous land uses, as well as determine elevations for DEM that could be used in future hydrological modelling.

I hope you enjoy the issue.