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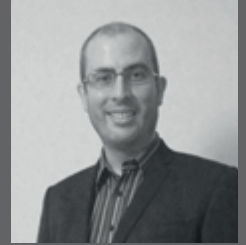
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THE RIGHT PAIR OF EYES

MEASUREMENTS ARE THE FIRST STEP IN ADDRESSING
NUMEROUS PROBLEMS FACING US AROUND THE WORLD.
ALL THAT'S NEEDED ARE THE RIGHT TOOLS

When most people are confronted by a problem, their first instinct is to act. If they do nothing, that can often make a problem worse, as in the case of global climate change. But the first action may not be the best action, and working that out can take a lot longer.

As geospatial experts (and novices) around the world will know, acquiring data for analysis is often the first step that needs to be made. But although a good workman shouldn't blame his tools, often we can be limited by the technology we have available or the difficulties of using it in practice, meaning measurements are either too imprecise or are even impossible to take.

Thankfully, the great and the good, the smart and the curious, around the world are developing new tools and new techniques, seemingly every day, to improve what measurements we can make. In this issue, we look at some of the cutting edge efforts being made, focusing particularly on remote sensing and photogrammetry.

On page 22, Krista Montgomery and Christoph Streacha report on a team project in Switzerland to see if it was possible to accurately map all the outdoor and indoor features of an island castle to generate a complete 3D model. Mounting surveys by land, air and water, the team took advantage of everything from UAVs to consumer cameras with fisheye lenses, to try to acquire as accurate a picture as possible as quickly as possible – all without damaging the castle.

Another group using UAVs for very different purposes is Flying-Cam. The company has worked on movies including Transformers 4 and the Harry Potter series, sending in their unmanned helicopters to film footage while surrounded by special effects and world famous actors. But the exacting requirements of Hollywood are such that the technology is applicable to other areas, unexpectedly including inspecting open pit mining, where dust, explosions and inaccessibility are the norm. On page 32, Stephen Epstein looks at what two such seemingly different applications have in common and what happens when the movie business meets the stills business.

From the heights of UAVs to tunnels beneath the sea: Upon its completion in 2018, a new tunnel connecting Norway's coastal city of Stavanger to its Ryfylke region will be

the world's longest, deepest subsea roadway tunnel, spanning 14.3km and reaching 291m below sea level at its deepest point, replacing a ferry between the two areas and cutting travel time by two-thirds. But the engineering challenges workers face in the tunnel are amplified by the frigid, wet environment where they perform their work: the tunnel's surfaces can range from muddy and slippery to rough and jagged; temperatures can drop below freezing; and humidity, dust and potential drops all pose threats to ordinary technology.

On page 38, Sofia Löfblad reports on how the companies involved are using ruggedised tablets not only to record data but also to automate many aspects of data acquisition, reducing downtime and making their work just a little bit more comfortable.

Infrastructure like this is intended to last a long time – but not forever. In cities around the world, decades-old roads and buildings are starting to show their age, some more than others. The question is: what needs fixing first? On page 34, Mark Carmichael looks at some new techniques for using data from satellite-based radar systems to find out what's on its last legs and what can survive a few years longer, enabling cash-strapped decision-making makers to work out their priorities.

Another issue particularly affecting those living in cities around the world is air pollution. Despite in some ways having cleaner air than we had a century ago, cars, industry and other polluters are producing new, different pollutants that are damaging people's health and causing thousands, if not millions of premature deaths each year.

Yet measuring these new pollutants to find out how bad the problem is and what its causes are isn't as simple as it was when looking at how much soot was falling from the sky was all that was needed. On page 28, James Eddy looks at some of the new air quality monitoring devices being developed around the world and the uses to which they're being put.

In his article, James touches on an important question: with all the data being acquired, who's going to be analysing it? And that, of course, is the next step that needs to be taken to work out the best action.

I hope you enjoy the issue.