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NEAR YET SO FAR

WATER IS ALL AROUND US, BUT MAPPING DATA FOR IT IS FAR WEAKER THAN FOR DRY LAND

Back in 2013, Robert Ward, the president of the International Hydrographic Organization (IHO), pointed out that we have better maps of the Moon and Mars than we do of most of our seas, oceans and coastal areas. On dry land, governments base their decisions around accurate maps and geospatial data, such as placing new schools in the areas that need them most and building transport links to ensure businesses can prosper. But in the water, things are very different, with most governments seemingly regarding matters hydrographic as an afterthought or annoyance – certainly nothing to invest money in.

Since Ward's statement, little has changed. But in this issue, as well as looking at how geospatial technologies and processes are making marine management more viable, we'll be looking at how people are taking matters in their own hands.

As we saw last issue with the Humanitarian OpenStreetMap Team, crowdsourcing has the potential to fill in the gaps in mapping data around the world. But how do you do the same when there are literally no volunteers 'on the ground' to make measurements?

On page 30, Tim Thornton reports on advancements in crowd-sourced bathymetry (CSB), a technique that began in the early 2000s to meet the needs of fishermen but which has since expanded to many other domains – the IHO has even set up a working group to create guidelines for hydrographic offices using CSB. If each of the 10 million seagoing vessels around the world were able to log their GPS and depth data at they went about their normal activities, they could contribute a huge amount of useful bathymetric data. But the technique isn't easy and Thornton also looks at how issues such as recruitment and accuracy can be dealt with.

Sometimes, marine surveys can't take place because of logistical problems, no matter how important they may be. Some of the most important marine surveys involve the measurement of borders and continuing from their article on land borders last issue, Christophe Dekeyne and Cyril Romieu explains on page 29 how hydrographers around the world – particularly French hydrographers – determine countries' maritime boundaries. Among the examples they look at is the baseline for the Gulf of Guinea, which has only been determined once… 170 years ago. To update it will require patience and a quest for the elusive 'lowest astronomical tide', which occurs only once every 18.6 years.

By contrast, the Panama Canal is easy to get to and being one of the most important shipping routes in the world, surveys of it are highly important. But closing it is out of the question, making surveying a question of timing. Fortunately, modern multi-beam technology makes the job much easier, and on page 34, José Alexis Primelles Cardenas and Jorge F Rodriguez look at how the Panama Canal Authority uses it to keep the 77km-long route safe and available to ships at all times.

Improvements in imaging technology mean that 'eyes in the sky' can be just as useful in marine surveying. UAVs are a relatively new arrival on the scene, but they're rapidly finding applications in marine management. In the Czech Republic, water is discharged from lakes every one to two years, to allow people to catch freshwater fish – a Christmas delicacy. During this discharge, for only a few days, the entire bottom of even the largest lakes is uncovered, presenting authorities with the chance to map these areas and compare the rate and amount of silting on the bottom.

In November last year, Jakub Karas was involved in a project to create an orthophotomap of the bottom of Bezdrev, the second largest lake in the country. In just three hours of UAV flight time, he was able to map the entire area. Find out how he managed it on page 42.

But surprisingly, even satellites can also now be used in marine applications. Synthetic aperture radar imagery has been in use for some time, of course, but the images can be difficult to interpret, have a slow refresh rate and can only really be used to identify vessels longer than 20m when the water is relatively calm. But very high resolution satellite imagery has opened up a whole new range of applications, such as pollution control, border control, emergency response and anti-drug trafficking measures. On page 38, Penelope Richardson looks at these and other uses around the world.

Thanks to geospatial technology, the water need no longer be the mystery it once was. All we need is for it to be used.

I hope you enjoy the issue.

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