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# KNOWLEDGE AND ACTION FOR PLANET EARTH

**“WE ARE GENERALISTS. YOU CAN’T DRAW NEAT LINES AROUND PLANET-WIDE PROBLEMS. PLANETOLOGY IS A CUT-AND-FIT SCIENCE.”**

Ecological science-fiction isn't the largest genre in the world but it's one that naturally speaks to geospatial science. Its first – and perhaps best – exponent was Frank Herbert's *Dune*, which while best known for its giant sandworms, contained many of Herbert's philosophical musings about religion, politics, history and ecology. Set against the backdrop of a futuristic Middle East in space – the almost-waterless desert planet Arrakis, otherwise known as 'Dune' – a part of the book is dedicated to the work of one character, the 'Judge of the Change', who is attempting to turn Arrakis into something capable of supporting life and perhaps even rain. His work is difficult, requiring patience and generations of people working towards his common goal.

Among the books many pearls of wisdom is the idea that to understand the world, you must appreciate that the world changes and you must change in response. "The [generalist] must understand that anything which we can identify as our universe is merely a part of larger phenomena. But the expert looks backward; he looks into the narrow standards of his own specialty. The generalist looks outward; he looks for living principles, knowing full well that such principles change, that they develop. It is to the characteristics of change itself that the [generalist] must look. There can be no permanent catalogue of such change, no handbook or manual. You must look at it with as few preconceptions as possible, asking yourself: 'Now what is this thing doing?'"

As clear a metaphor for the work of surveyors through the centuries would be hard to imagine, as well as a call for the need for both constant fieldwork and data on our very own planet. Which brings me neatly to the theme of this year's InterGEO – knowledge and action for planet Earth. Being held slightly earlier than normal this year in September, as usual it looks at the latest hot topics in geospatial, including remote surveying, open data, smart cities, planning and building in 3D, and UAV optimisation. All these themes respond to Herbert's call: the constant need to be sure of what you know, since the world is changing, and to then take action to achieve your own changes.

Change in the seas around us are one of the world's biggest causes of concern. Climate change is causing sea levels to rise, potentially flooding not just cities but entire countries in some cases. But how much and to what extent? Who will be the most affected? None of these questions can be answered by any one country, so international cooperation is needed to find the answers as well as solutions. This will require standards and new techniques and on page 28, our regular contributor and GSDI Association secretary-general looks at what his organisation and others are doing to create a marine spatial data infrastructure.

Another organisation developing guidance for our changing times is the International Marine Contractors Association (IMCA). Although some older practices are still in use, including the use of taut wires by divers, subsea metrology is evolving to take into account advances such as LiDAR. New on the scene is acoustically-aided dynamic laser mapping using INS from a moving remotely operated vehicle, which mounts a LiDAR scanner on the vehicle and uses underwater acoustic and inertial navigation information to generate centimetre-resolution engineering models and even accurate images, using point cloud information. On page 30, Judith Patten looks at what we can expect from the latest guidance from the IMCA on this area, as well as on other techniques.

One man definitely taking Frank Herbert's advice to heart is Gabriel Lewis. While remote sensing can help to provide information to power climate change models, can we be sure that all the hyperspectral data available to us is as accurate as we hope? Lewis decided to 'look at it with as few preconceptions as possible', put on the modern day, icier equivalent of the Arrakis 'stillsuits' (thermal clothing and an insulated jacket) and head off to somewhere almost as isolated – Greenland to measure ice albedo on the ground. You can find out what Lewis learned on page 32.

"The highest function of ecology is understanding consequences," Herbert maintained. You could say the same thing about geospatial science, too.