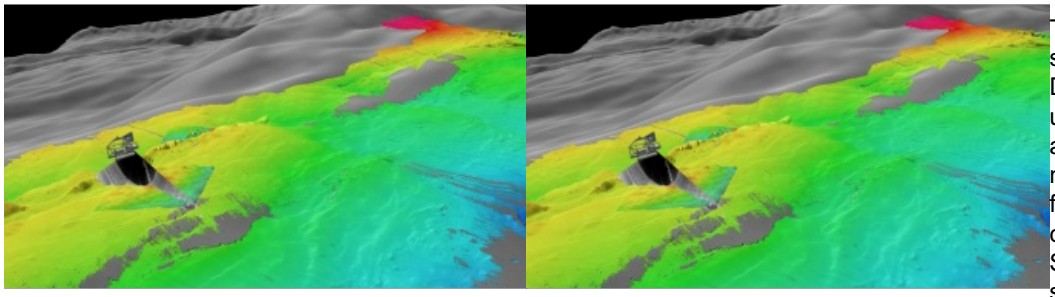
Please Look Down!



The US space agency NASA has successfully pushed the asteroid Dimorphos out of its original orbit in the universe, according to a recent announcement. The space rock was hit 11 million kilometres from Earth. This is the first time that humans have changed the course of an extraterrestrial object. Scientists are ecstatic about the successful experiment, and rightly so, with the mission labelled a huge breakthrough and a new era for humanity by several experts.

It is a scenario reminiscent of the film *Don't Look Up*, about the discovery of a comet orbiting the solar system on a direct collision course with Earth. The problem that shapes the main part of the plot is that it doesn't seem to interest anyone at all, and the film contains a very topical message about how we communicate, our priorities and the climate crisis. It is a very funny film, but above all a very important one.

Problems from outside our own planet such as the ones highlighted in the film are what NASA deals with in real life – and there are of course enough pressing issues on Earth, to put it mildly. However, the purpose of this editorial is not to focus on all kinds of doomsday scenarios, but to consider the solutions to our problems. And, if we zoom in on our own area of expertise, it is great to see the solutions coming from the hydrographic sector. How can our industry contribute to the challenges we face?

Mapping the Oceans to Gain Vital Insights

Perhaps the most obvious way in which the hydrographic profession can contribute to problems that threaten our future is by mapping the ocean floor. Technological breakthroughs have accelerated the process of making this happen. For a number of reasons, mapping the oceans provides us with all kinds of extremely useful insights. For example, bathymetric data can alert scientists to environmental changes and allow researchers to better analyse sea-level rise, land erosion and land subsidence. It is also a crucial tool for understanding life in the ocean, as the shape of the seabed has a significant influence on a whole range of ocean processes. A good example of this is currents: if you can predict ocean current patterns, you can consider the movement of water bodies, which in turn can be used by scientists to model sea-level rise. Such understandings will prove crucial to how we protect our coasts.

The article 'Bathymetric Surveys: Improvements and Barriers' by Italo Oliveira Ferreira and Laura Coelho de Andrade takes you on a journey through how remote sensing has increasingly been used to conduct underwater surveys, highlighting several key methodologies that are employed in hydrographic surveying. As the article reveals, the rise of acoustics, optics and radar techniques has catapulted our knowledge of bathymetry over the past decades. On top of this, methodologies have been developed that are capable of providing a better quality control of the acquired hydrospatial information. Now, in the era of machine learning and artificial intelligence, classifying the seafloor with unprecedented accuracy is becoming reality.

Rare Earth Metals

There is another reason why people might find the seabed interesting. Some areas of the deep seafloor contain minerals that are commonly used in modern technology, known as rare earth metals. Would a more complete picture of the ocean floor open the way for greater exploitation of these resources? And, to what extent is that something we should find desirable?

Maybe it is a good suggestion to study the impact of a new industry before the industry starts. This is exactly what Hendrik De Beuf describes in his article 'Landing on the Abyssal Plain', which focuses on how thorough environmental data has been collected to assess the impact of collecting polymetallic nodules. Some of these nodules are rich in the metals needed for the transition to a green economy, such as manganese, copper, cobalt and nickel: metals that are crucial for the production of batteries, solar panels and wind turbines. It should be clear that the large-scale extraction of these rare earth materials must be done with the utmost care, and I sincerely hope that everyone is interested in handling our ocean bottom with such care. So, don't just look up, but please also look down!

Advancing the general knowledge and understanding of the worldâ€™s ocean and, in particular, the deep sea and the deep seabed is essential to manage the challenges of the future. (Courtesy: German Federal Institute for Geosciences and Natural Resources/BGR)