Scott Crozier

Vice President
Survey & Mapping, Trimble

1 **The companies represented at INTERGEO 2023 offer numerous solutions that support sustainable processes significantly. INTERGEO 2023 therefore has an eye on earth observation and monitoring as well as BIM and digital twins. What is the potential of this? And how does your company contribute to this?**

Trimble recognizes the great potential of a connected ecosystem, underpinned by precise geospatial data, to provide a vivid and dynamic understanding of the world. This knowledge promotes the efficient use of natural resources through reduced waste and higher productivity, enhances the performance and lifecycle of civil infrastructure, and empowers environmental project teams.

With Trimble's trusted hardware and software solutions and connected cloud environments, surveyors and geospatial professionals can truly monitor a project throughout its lifecycle. Connected workflows enable teams to capture, monitor, analyze, process, share, update, synchronize, and house data in an efficient and safe way. BIM and digital twins rely on this data, which fosters collaboration and provides advanced analytics to shape decisions.

2 **The Blue Economy in particular will be of much greater importance in the future. How do you position your company with this in mind?**

Trimble is committed to combating negative climate change impacts, including the effects on our oceans and coastal regions, and we provide innovative solutions to enable our customers to do the same. With the right solutions, organizations can operate cleaner, safer, faster – and greener.

Trimble's solutions are uniquely designed to support marine resource monitoring and management. Our positioning technology enables geomorphological monitoring of coastlines to address marine submersion risk. It is used to pinpoint leaks in pipelines to reduce waste and contamination of water resources. It also provides satellite imagery and object-based image analysis (OBIA) to monitor changes in coral reefs and detect marine litter on remote beaches.

3 **What potential do you currently see in the implementation of artificial intelligence in your products and services? Where do you see the drivers, what could be the obstacles?**

Artificial intelligence and machine learning (AI/ML) are already broadly used in Trimble products because of their ability to turn large quantities of data into valuable insights, make "intelligent" decisions, and adapt and improve performance over time.

Already, AI/ML has many applications in a wide range of fields. In one recent project, a digital twin of a dam incorporated AI/ML to automatically detect anomalies such as cracks and spalls. Supporting the digitization of the German rail infrastructure, Siemens uses custom-built AI programs to automatically classify assets and extract features from mobile mapping point clouds.

As we move to more automated, robotic – even autonomous – solutions, AI/ML will provide a foundational intelligence, while the industry must address obstacles in data privacy and security.

4 **What new developments in the industry can we look forward to in the next 3 to 5 years?**

There's a widespread thirst for more data, gathered more frequently to deliver more insights that will support productivity and sustainability in the construction environment.

Accurate, trusted data drives transformative change and addresses complex challenges like climate change. Trimble is at the forefront of making that data more usable and available by integrating it into workflows through solutions such as Trimble Connect, a common data environment. This environment enables a digital transformation to cloud workflows that integrate data seamlessly into shared systems. It is a shift that will deliver groundbreaking efficiency and generate returns on our growing investments in the geospatial world.

We will certainly see more accessible data to a broader audience through digital twin / cloud solutions. But even more, we expect to see an evolution in reality capture hardware solutions in the way of performance, cost and usability, along with advancements in hybrid solutions that combine reality capture within GNSS and total stations, enabling more people to capture more data more often.

5 **What are you most looking forward to at the upcoming INTERGEO in Berlin?**

I always look forward to connecting with customers, channel partners and industry professionals at INTERGEO. This key industry event allows us to share our vision for connected workflows with a global audience, fostering trust in technology advancements and cloud-based processes. I look forward to being back in Berlin, a fascinating city with a rich history, and being with like-minded people who are transforming the industry.

The interview was conducted by Christiane Salbach, DVW.

 This article also is digitally available under www.geodaesie.info.

Thomas Harring

**President of
Hexagon's Geosystems Division**

1 The companies represented at INTERGEO 2023 offer numerous solutions that support sustainable processes significantly. INTERGEO 2023 therefore has an eye on earth observation and monitoring as well as BIM and digital twins. What is the potential of this? And how does your company contribute to this?

Hexagon plays a key role in harnessing the potential for applications in all these areas by enabling digital twin creation and utilisation at any scale. At Hexagon, we prefer to talk about Smart Digital RealitiesTM, which are even more impactful. These continuously updated, digital representations of an object or an environment fuse the real and the digital world into one reality. They include relevant information and insights and drive our vision of an autonomous future in which industry, people and the planet sustainably thrive.

2 The Blue Economy in particular will be of much greater importance in the future. How do you position your company with this in mind?

With our market-leading bathymetric LiDAR solutions and a strong development team, we are well positioned to support the Blue Economy with geospatial solutions. One of our flagship projects is a collaboration with Hexagon's sustainability venture R-evolution and the nonprofit Beneath The Waves. Using bathymetry solutions, we produce multidimensional, intelligent maps to assess the density of The Bahamas' seagrass ecosystem and its carbon storage potential. The ability to scale the accurate mapping of seagrass meadows and to establish their contribution to mitigation is essential to protect them and enable sustainable business models.

3 What potential do you currently see in the implementation of artificial intelligence in your products and services? Where do you see the drivers, what could be the obstacles?

Hexagon is at the forefront of leveraging AI to analyze, visualize and make sense of data, helping customers gain insights and enhance efficiency. AI and machine learning are obvious solutions for the large volumes of data collected, for example, in aerial mapping. We use AI extensively for LiDAR point cloud classification, mesh creation and orthophoto mosaic seamline generation. Generative AI further unleashes the power of geospatial simulation and visualization, enabling the creation of immersive environments for exploring, predicting and understanding complex situations. It puts the industry and digital twins onto a new trajectory with previously unthinkable outputs such as simulation-ready

3D models for applications in public safety, environmental modelling, city planning, smart manufacturing, construction, and more.

4 What new developments in the industry can we look forward to in the next 3-5 years?

Our study with a leading industry research company showed that construction companies are adopting autonomous tech and benefit as expected: They improve productivity and quality, ensuring safety and sustainability. Construction companies will have to integrate geospatial technologies as key parts of their business models. The same will be true in sectors that are only starting to appreciate geospatial data. As the technology becomes more accessible, it unfolds its full potential. Reality Cloud Studio, powered by HxDR, is a Software as a Service (SaaS) application that makes geospatial data processing easy to use while delivering professional results.

Our GeoCloud, powered by HxDR, supports measurement professionals through a range of services starting with GeoCloud Drive, a comprehensive cloud storage solution featuring easy data transfer and sync. Such cutting-edge cloud solutions enhance collaboration, improve scalability, enable real-time data analysis and boost surveying efficiency and productivity. The AI advancements I mentioned plus robotics technology – like the Leica BLK2FLY and the Leica BLK ARC – as well as automated machine control solutions on construction sites, which enable collision avoidance and autonomous mission planning, empower geospatial work in the field and offer real-time insights in the office.

5 What are you most looking forward to at the upcoming INTERGEO in Berlin?

INTERGEO is an amazing event. The fair and conference program is well-organized, providing countless opportunities to learn. I always gain valuable insights from the geospatial community. I look forward to seeing our customers engage with our new software and sensor solutions and to experiencing their reactions first-hand. Berlin is a vibrant city: It is global and diverse, has a rich history and keeps evolving. The perfect environment for innovative minds to come together.

The interview was conducted by Christiane Salbach, DVW.

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Jack Dangermond

Founder & President, Esri

1 **The companies represented at INTERGEO 2023 offer numerous solutions that support sustainable processes significantly. INTERGEO 2023 therefore has an eye on earth observation and monitoring as well as BIM and digital twins. What is the potential of this? And how does your company contribute to this?**

I want to acknowledge INTERGEO's focus on sustainability. My own personal view is it will take everyone's participation in collaboration to address these very difficult challenges.

Eye on earth observation combined with digital twins is a good technological framework to start. Esri is working in both areas. We offer a complete geospatial image data management and exploitation software system that supports digital twins. GIS is actually a living digital twin that can integrate all types of information and can be transactionally maintained as part of government activities. We are also heavily involved in building advanced reality capture software that creates integrated point clouds and meshes based on imagery from drones, aircraft, and satellites.

The City of Gothenburg in Sweden for instance is on the cutting edge of bringing GIS into Game Engines, creating a digital twin for the city to test planning and design decisions. Understanding the impacts of alternative transportation infrastructure on mobility and how people move is incredibly important as cities transition away from car dependency. Gothenburg's digital twin uses real-time data to assess and control the way it delivers important city services. These types of digital twins can enable simulations, to test floods for example, which means we can start to plan for catastrophic disasters before they happen.

2 **The Blue Economy in particular will be of much greater importance in the future. How do you position your company with this in mind?**

The blue economy is a catch-all phrase for the developing economic forces that take advantage of the earth's ocean. There are hundreds of applications that require geospatial information and tools. It starts by measuring everything from physical characteristics of the marine environment to sea life of all types. The applications include more efficient shipping, more sustainable use of ocean resources, and geographic planning for areas that should be conserved and better managed. We imagine building a massive GIS for the ocean environment, much like we have done for terrestrial systems. This will be multidimensional and integrate all the various content types into a system for ocean management. Implementing this vision will take partnership activities among many organizations – both public and private. We are interested in exploring how we can leverage best-of-breed technologies, data, and science to create a system that can help us better sustain ocean environments.

Esri has always been focused on greater engagement with the ocean science community, as complex ocean science questions and data are increasingly emerging as a key to understanding the health of the planet. We continue to improve and expand our products, tools, services, and partnerships to evolve the Blue Economy, not just for ocean conservation, but for broader sustainability goals.

3 **What potential do you currently see in the implementation of artificial intelligence in your products and services? Where do you see the drivers, what could be the obstacles?**

Inside of ArcGIS, our product, we have implemented multiple forms of AI and machine learning technologies. We've also been building image-based models and providing them to our users. At this point, we have developed and shared over 60 of these models, and they are being used by thousands of organizations for practical applications.

4 **What new developments in the industry can we look forward to in the next 3 to 5 years?**

What's coming in the next few years will be very important. We see the integration of all types of scientific information using geography as a framework. GIS will emerge as an open science platform for exploitation by many organizations, within the scientific community as well as government and industry.

I refer to this as a new kind of infrastructure – geospatial infrastructure. This will support a transformation across society. What I am calling the geographic approach, where people approach problem solving of all types using integrated environmental, economic, and social information layers. It's my hope that this will help people better understand the complexity of our world, and enable better collaboration. We are currently experiencing the ever-growing impact of human activities on our natural resources. And I strongly believe that the geospatial community, working together, can make a difference.

5 **What are you most looking forward to at the upcoming INTERGEO in Berlin?**

I am mostly looking forward to the opportunity to meet colleagues who are interested in the intersection of technology and geospatial information. I believe making connections and collaborating will be an important part of how we address global challenges of sustainability.

The interview was conducted by Christiane Salbach, DVW.

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