Three Questions to

Roland Zelles, PhD

Senior Vice President of Autodesk Global Territory Sales

zfv | Was the geospatial industry able to benefit from the acceleration of digitization caused by the Corona crisis?

Zelles | We see, that building construction and infrastructure projects becoming more complex, just to name urbanization and the impact of climate change and available resources. Owners and project stakeholders are challenged to do their job with less resources by means of available expertise and manpower. That leads to a need of entering a next level in collaboration. While some industries suffered due to the impact caused by the pandemic, the Geospatial and AEC industry benefited. Being open to the changes driven by accelerated digitization, engineering firms were faster in adopting a changed work environment. Having the right processes in place gave them a competitive advantage and made them more resilient. Looking at Europe, many countries did speed up their efforts to drive digitization in order to survive the negative impact on their economic situation. In addition, most governments are creating stimulus packages and investments to renew and retrofit the infrastructure, which creates tremendous economic opportunities for suppliers in the infrastructure and construction industry, but requires them to do more with less. COVID-19 created the necessary awareness to drive digitization faster and to re-imagine the way of working.

More and more designers and engineers discover the value of Connected BIM, driven by the increasing need for a better and smarter way of working together. They are relying heavily on digital collaboration tools that ensure business continuity by connecting the teams with minimal interruption. And there are a lot of other examples, where Building Information Modelling and Virtual Design for Construction became an essential process for the new "digitized" engineers and contractors: They use 4D and 5D simulation to re-design projects and optimize schedules.

zfv | Do you see a trend in your industry towards increased interdisciplinary work? Which are the main topics you expect in this context?

Zelles | On global scale, we see more and more requests from building and infrastructure owners and managers to have a holistic approach for their projects. In fact, BIM already represents a means to integrate structured, multi-disciplinary data to produce a digital representation of their assets.

BIM already enables seamless collaboration between all stakeholders and generates insights that empower robust decision making and accelerates better project outcomes. With acceleration of digitization caused by the Corona crisis coupled with the holistic approach from the demand with BIM, we are witness of an increased interdisciplinary work. Standards like ISO 19650 regulate the interdisciplinary information exchange. Since it was launched in 2018, we see more and more requests to comply with this standard in our customers' projects. Furthermore, IFC is at the heart of interdisciplinary work. We have already certified our technology stack for IFC4 in the building industry and are actively participating in its further development, for example in the InfraRoom of buildingSMART.

And obviously, the Cloud is the most flexible, fastest deployable, and most secure means to connect disciplines. And we are following countries' data security and sovereignty regulation with attention.

Considering all the above, we have noticed a real acceleration of interdisciplinary digitalization, coupled with the BIM and GIS convergence, we see a real infatuation and some advanced implementations. Thanks to those technology means and industry trends, we perceive the emergence of certain areas of expertise around sustainability, taking advantage of this increased connectivity between disciplines to decarbonize the world in which we live.

zfv | In your opinion, which technological developments will be particularly important in the future regarding sustainability and climate protection?

Zelles | With the Sustainability Goals from the United Nations in place, we are getting a lot of requests for supporting technology from the market. The New Green Deal of the European Union will add to that with investments and clear requirements, like for instance the "right to be repaired". And we, as technology provider, have a big responsibility and also a huge opportunity to help improving the future through the professionals that use our solutions.

There is a lot of technology to assist sustainability and climate protection in place, and a lot more is currently being developed. Most of these technologies share one commonality: They are helping professionals to understand the environmental impact of everyday decisions in the context of other goals.

For example, together with ESRI, we at Autodesk are bridging the gap between BIM and GIS for more informed design decisions and together with Oris and their Digital Material Platform, we are reimagining the road design by equipping our customers with artificial- and business intelligence to aid reducing CO2 emission of roads already in the planning phase.

In the construction industry we help designers, architects and engineers to work collaboratively on reduction of environmental impact with the build in tools for space and thermal analysis, for climate and heating systems and glassing of a building. Greenbuilding Studio is incorporated into Autodesk Revit.

Also Design Automation and Generative Design will evolve and even more assist: both technologies enable us to use resources efficiently and productively, thereby saving money and reducing waste and emissions.

Three Questions to

Thomas Harring

President
Hexagon Geosystems

zfv **| Was the geospatial industry able to benefit from the acceleration of digitisation caused by the Corona crisis?**

Harring | Even before the current crisis, digitalisation had accelerated in the geospatial industry. The Corona crisis has reinforced this development and the trend will continue once the crisis has passed. The adoption of digital solutions in more traditional areas has increased, and the crisis has not delayed planned investment projects. The power of digitally enabled workflows has also shown the benefits transparently to those decision-makers who, so far, had not been aware of solutions from the geospatial industry.

Due to the ongoing convergence of real and digital worlds, the geospatial industry — with its solutions that capture, measure and visualise the physical world — is on the forefront to facilitate automation and to provide autonomous decision support. There are several topics which have gained relevance, such as real-time collaboration between office and field using digital tools, frequent remote progress monitoring as well as increased demand for accurate and reliable digital realities.

We ourselves and all interested in the geospatial industry should use the momentum of the "next normal" to further strengthen the geospatial industry and move towards ever-more customer-centric, sustainable, and autonomous digital solutions.

zfv **| Do you see a trend in your industry towards increased interdisciplinary work? Which are the main topics you expect in this context?**

Harring | The nature of many of today's most crucial challenges is pushing more and more towards interdisciplinary work. In the digital world, methods, which previously existed separately – such as GIS or BIM – are increasingly converging. Companies operating with geospatial technology are facing ongoing innovation pressure due to the rapidly changing development of technologies, such as Lidar, Cloud, IoT, AI and many others. Successful end-to-end solutions require the pairing of leading technology with domain expertise. For example, the blurring boundaries between the AEC sector and the geospatial industry reinforces the need for "surveying" capabilities throughout the whole lifecycle of infrastructure and buildings. Accurate, reliable positioning and measuring as well as planning and simulation in digital realities generated with scanning and imaging technologies support the use of geospatial data for all professions involved.

Collaboration has always been at the core of the geospatial industry, now the other industries also see the advantages of interdisciplinary cooperation, developing digital customer solutions jointly and on an equal footing.

zfv **| In your opinion, which technological developments will be particularly important in the future regarding sustainability and climate protection?**

Harring | We strive to solve customers' urgent challenges while making smarter use of the earth's resources, and we uphold high standards of sustainability in our internal operations and activities. All our technological developments include sustainability, as innovative solutions to increase productivity, quality and safety, and economical success do not contradict sustainability.

Obviously, energy innovations will be crucial. We won't solve the climate crisis without quantum leaps in renewable energy generation, storage and transmission. That's why Hexagon's newly launched business venture R-Evolution has a special focus on renewables. Within R-Evolution, for example, we used our own digital solutions to analyse data and processes and learned that measuring the angle of sunrays accurately and ensuring that wind turbines have an optimal angle can increase energy generation by up to 40 %. That example shows that developing new technologies is important, but so is using reality capture, data visualisation and automation to make the most of existing and emerging technologies.

We firmly believe that the path to economic growth does not have to come at the expense of the planet and people. We have always done a lot for sustainability, but we haven't talked too much about it, now we will do even more for sustainability and talk about it more clearly.

Three Questions to

Ron Bisio

Senior Vice President Trimble Geospatial

zfv **| Was the geospatial industry able to benefit from the acceleration of digitization caused by the Corona crisis?**

Bisio | The global pandemic is moving us toward a new economy that is very digitally based across all of our lives. COVID-19 restrictions haven't significantly impacted the traditional methods of surveying and mapping, but it has put additional attention on innovative alternatives enabling more remote operations and process automation to support operating in more virtual environments. This evolution includes continuous connectivity between field and office via cloud solutions to eliminate unnecessary trips, remote sensing using high-resolution satellite imaging and UAS data, and processing automation using distributed computing and cloud processing.

Surveying and mapping solutions, for example, will be integral in developing a digital twin of a city's most critical assets, including utility network and transportation infrastructure, such as metro stations. 3D laser scanning systems, whether mobile or terrestrial, enable comprehensive street-level data capture, while feature extraction software makes it easier to generate deliverables such as 3D city models and building facades, and supports the use of technology for inspection and compliance, such as storage tanks. To make cities smarter, we need baselines to understand the existing behavior of assets and map them against the expected performance. Then we need to continuously monitor the improvements using both automated (24/7) and traditional surveying and mapping solutions.

We are also seeing further integration of building information modeling (BIM) and geographic information systems (GIS), as BIM is usually placed in the broader context of the land registry, utility infrastructure and transportation infrastructure. GIS helps define where the building is located, who owns it, who is responsible for taxes, how water and electricity get to the building, proximity to public transportation stations used by commuting employees, and road infrastructure used to take goods in and out.

zfv **| Do you see a trend in your industry towards increased interdisciplinary work? Which are the main topics you expect in this context?**

Bisio | To make the most out of the post-pandemic era, we must enhance our skills and fully embrace the potential of technology to advance our processes across disciplines and the project lifecycle.

One question surveyors must ask themselves is whether they have adequate technology and related interdisciplinary knowledge to really be competitive. The demand may be above and beyond what it has been previously, not only because of social distancing at work, but also because technology has moved on to more modern, digital solutions. Mobile mapping, 3D laser scanning, track surveying and measurement, tunneling as-built and real-time reporting systems are examples. They can be leveraged in end markets that are historically underserved and underpenetrated with technology, such as roads, bridges, rail and tunneling. This allows our customers to take advantage of the situation and diversify business opportunities well after COVID-19 is behind us.

As the existing workforce retires from the industry and new technological innovation changes how projects are imagined and built, the industry has a unique opportunity to attract a new type of worker who may never have given surveying and geospatial professions a second thought. Because today's youth are digital natives, they are great candidates for technical degrees at universities or vocational or trade schools, which often provide highly specific technology skills needed for immediate jobs – from 3D modeling to simulations – as well as exposure to adjacent disciplines for a broader education base. As a way to give back to the survey community, Trimble actively supports a number of universities across the globe through our Trimble Technology Labs and provides local colleges and trade schools with the latest equipment, software and training by experts.

zfv **| In your opinion, which technological developments will be particularly important in the future regarding sustainability and climate protection?**

Bisio | Efficiency gains born of new geospatial technologies provide improved capabilities for sustainable land and water management and informed decision-making. Software processes and BIM/GIS integration help streamline complex project communications, leading to a reduction in rework. Reducing rework also means less materials and less waste because we built correctly the first time.

With spatial analysis becoming pervasive across every industry, one of the most impactful opportunities for mapping and GIS today is mapping the environmental impact of climate change. This includes water management tools, coastal impact, disaster mitigation, public works projects – and in the context of these changing models – endangered species mapping. For example, scientists in the Caribbean are using satellite imagery and Trimble's eCognition® object-based image analysis (OBIA) software for automatically classifying and mapping small reef areas to create the first-ever high-resolution map of the basin's coral reefs. This insightful tool will help conserve the coral reefs in the region and the livelihoods of the locals who depend on them.

There's a lot that fits in the bucket related to climate-change analysis. We've moved from tracking only what is physical to what is intangible, to understand and better plan for the future.

