INTERGEO®

POST SHOW REPORT 2023

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01.

FACTS & FIGURES

GET INSIGHTS INTO THE GEO-IT EVENT OF THE YEAR.

THE WORLD´S NO.1 EVENT OF THE GEOSPATIAL COMMUNITY

17,246
VISITORS
FROM 112 COUNTRIES

571
EXHIBITORS
FROM 40 COUNTRIES

2 STAGE

1 IN-CONFERENCE UNMANNED SYSTEMS

1 BIM-CINEMA

841
CONFERENCE PARTICIPANTS

300+
SPEAKERS IN CONFERENCE & STAGES

4
INTERNATIONAL KEYNOTE SPEAKERS

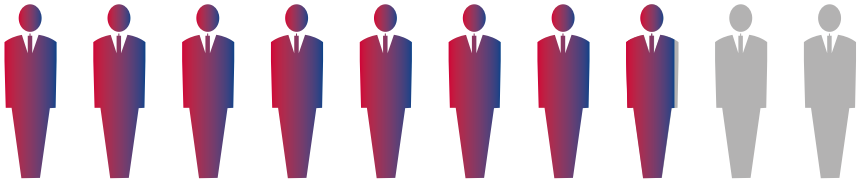
IF YOU WANT TO SEE EVERY COMPANY AND I MEAN EVERY COMPANY IN THE WORLD THAT IS INVOLVED IN THE GEO-SPATIAL INDUSTRY, THEY`RE GOING TO BE HERE AT INTER-GEO. ANYBODY THAT'S TRYING TO LEARN MORE, BE INVOL-VED OR JUST GET STARTED – THIS IS THE PLACE TO COME! INTERGEO 2023 WAS THE BEST EXPERIENCE THAT ME AND I THINK A LOT OF OTHER PEOPLE HAVE HAD. "
Rami Tamimi

PURCHASING AUTHORITY

90,3 %

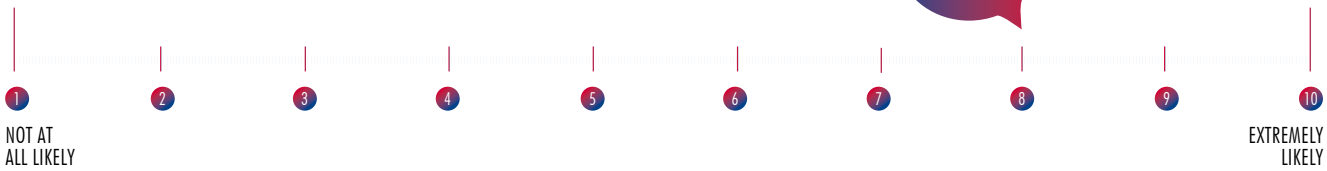
ARE SATISFIED WITH THIS YEAR'S VISIT

79.5%



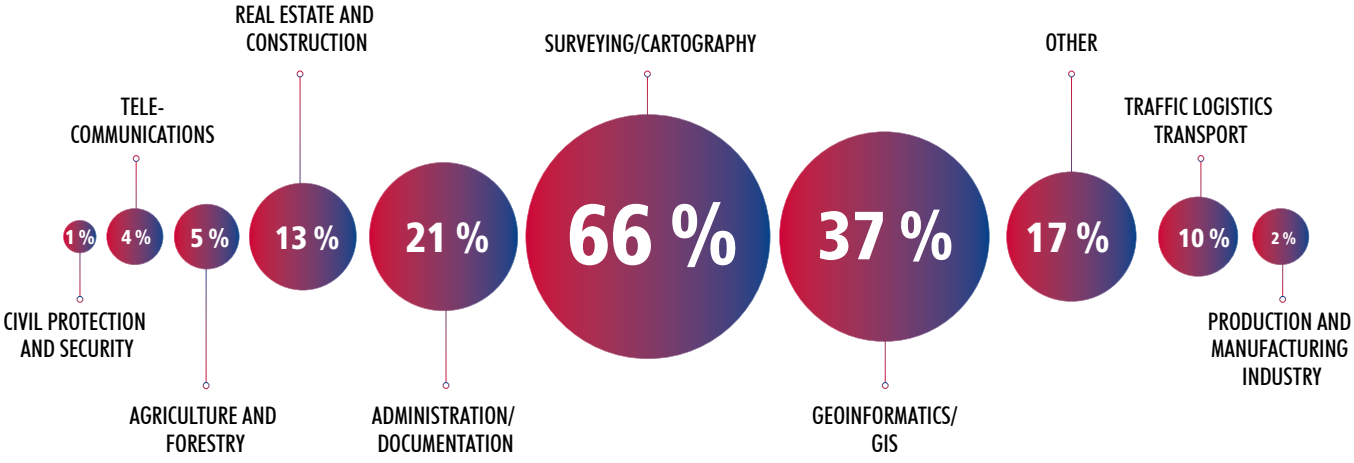
… OF TRADE FAIR VISITORS ARE DECISION-MAKERS.

NET PROMOTER SCORE

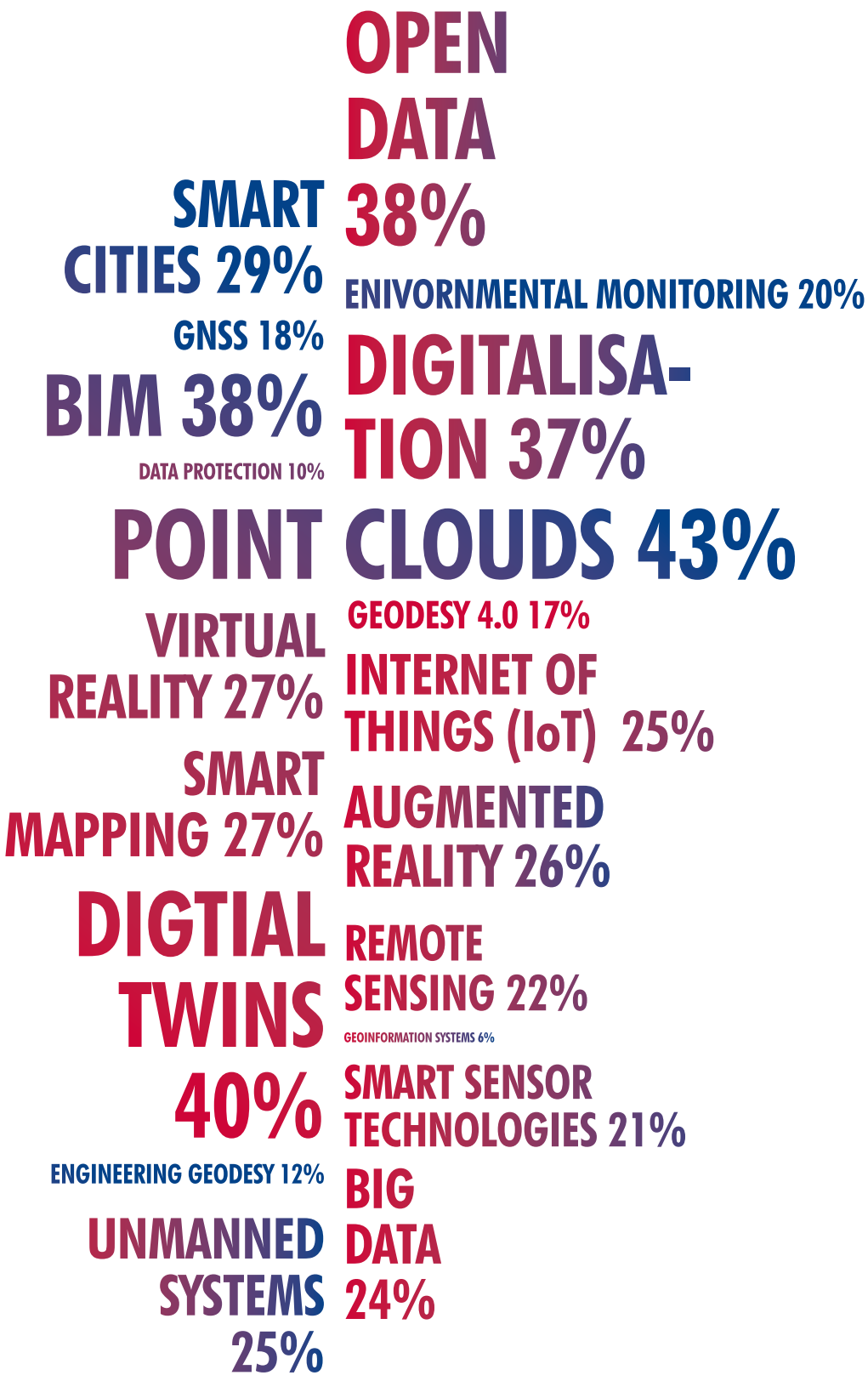


WOULD YOU RECOMMEND INTERGEO TO A FRIEND OR COLLEAGUE?

WORKING AREAS



TOPICS WITH HIGHEST RATE OF INNOVATION



02.

TRENDS AT INTERGEO

DISCOVER
THE TRENDS
FROM
INTERGEO 2023

TREND ANALYSIS INTERGEO 2023

By students and scientific staff from the Chair of Geoinformatics at the Technical University of Munich

RUNDER TISCH GIS E.V.

FOREWORD

INTERGEO – the world's leading trade fair for geodesy, geoinformation and land management – returned after a six-year hiatus, taking place from 10 to 12 October 2023 in Berlin. The event attracted around 17,000 visitors from 110 nations and 570 exhibitors from over 40 countries, which impressively underlined its international importance. In addition to the numerous specialist presentations, visitors were also able to enjoy the programme of the integrated BIM Days Germany, which offered a platform for intensive networking between the geoindustry and the construction sector.

For the 20th time in succession, a team of students and research assistants from the Chair of Geoinformatics at the Technical University of Munich analysed the trend topics at INTERGEO. This analysis was carried out on behalf of Runder Tisch GIS e.V. Key focal points were identified in advance based on specialist literature, discussions with experts and the latest specialist events. Using these focal points as a basis, the trend analysis team then went through the list of exhibitors and drew up a set of specific interview questions. A large number of interviews were conducted with pre-selected exhibitors and further trade fair participants during the event. This verified the existing topic areas and also identified some new ones. The trend analysis report is based on both the interview findings and the numerous specialist presentations. The trend topics range from artificial intelligence, Earth observation, unmanned systems, smart cities and digital twins to building information modelling.

TUM's 2023 trend analysis team in Berlin (from left to right): Marija Knezevic, Tanja Pilz, Benedikt Schwab, Thomas Fröch, Gabriele Aumann, Dawson Stout, Sarah Ovais, Joseph Gitahi, Khaoula Kanna, Olaf Wysocki, Ying Lu and Çeltina Balaj.

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Khaoula Kanna[1], Çeltina Balaj[3], Thomas Fröch[3], Ying Lu[3], Sarah Ovais[3], Tanja Pilz[3] and Dawson Stout[3]
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1. ARTIFICIAL INTELLIGENCE AND CLOUD COMPUTING

Besides offering direct benefits, artificial intelligence (AI) is also increasingly being utilised for advertising purposes, especially by commercial companies. The use of artificial intelligence is perceived as being synonymous with innovation and progress. Accordingly, many manufacturers, software suppliers and service providers mention it in their advertising. The exact way in which they use artificial intelligence varies a great deal. Most of the providers interviewed have developed their own models based on existing model architectures. At present, a development process of this kind can take around two years.

One of the most common uses of artificial intelligence is classifying points in point clouds, with the majority of companies specialising in linear infrastructure applications such as power lines, railway lines and gas pipelines. In addition, however, services are also offered that enable users to adapt AI functionality to their particular needs. The use of artificial intelligence to classify point clouds in urban spaces remains a challenge, though, and research is currently being carried out on this topic. Examples of key problems in this context include the wide variety of building structures and vehicles, and how to detect and correctly classify dropped kerbs. Another challenge that is still being worked on is the AI-based vectorisation of individual objects in point clouds.

A second popular area of application for artificial intelligence is object detection and object segmentation in image and point cloud data. This technology is primarily used in environmental monitoring, the oil and gas industry and the security sector. Whereas classifying the species of individual trees is already well established in environmental monitoring, tasks such as the successful segmentation of individual trees from point clouds remain challenging. The maximum accuracies being achieved at present are around 65%.

When it comes to services based on artificial intelligence, there is a clear trend towards the use of cloud computing. Users can upload their data into the provider's cloud for processing. Especially in the context of the oil and gas industry and the security sector, providers consider it extremely important to emphasise the security of data.

It is also worth mentioning current practices for obtaining training data – one of the big challenges involved in artificial intelligence. For example, large volumes of annotated point cloud data are required to train models for classifying point clouds. The relevant annotations must be added manually by staff in line with customer requirements. In practice, many companies outsource such tasks abroad.

Nowadays, most large models are designed along the lines of black box systems. One area in which research is currently being carried out is how to better understand and explain the decision-making processes of such models. Besides the academic benefits, one objective in this context is increasing the trust of potential users through explainability and transparency. This is referred to as "explainable AI".

Machine learning is also used in the area of 3D visualisation, where super-resolution models create textures, for instance. Using AI to improve photographic images makes it possible to provide a realistic-looking texture for 3D modelling tasks. There are some interesting applications in cartography, too. By generating user-centred designs and maps, AI can ensure maps not only look good, but are also highly intuitive and cater to specific user requirements. In addition, AI can predict environmental phenomena such as forest fires faster and more accurately and react accordingly, potentially saving both lives and resources.

2. EARTH OBSERVATION AND REMOTE SENSING

The field of remote sensing and Earth observation can essentially be split into data providers and data analysts. Satellite providers are currently focusing on launching satellites with hyperspectral and high-resolution sensors. Commercial companies are planning to use multispectral and SAR satellites, which have a very high spatial resolution of up to 0.3 m according to manufacturers. When it comes to hyperspectral remote sensing, the planned satellite missions will provide spectral imaging in the 400 to 2500 nm range, with a spectral bandwidth of between 5 nm and 10 nm and a spatial resolution of up to 30 m. The hyperspectral data not only supports existing applications in the areas of agriculture, energy, mining and defence, but also paves the way for new applications such as monitoring methane and carbon dioxide emissions from point sources.

In the public sector, hyperspectral missions such as Germany's Environmental Mapping and Analysis Program (EnMAP) supply data for monitoring global environmental changes and ecological reactions to human activities in a spectral range of 420 to 2450 nm, with 246 spectral bands and a spatial resolution of 30 m. In the coming years, new satellites from the ESA's Copernicus programme will be taken into service as part of the Sentinel Expansion missions. These missions will use new hyperspectral and high-resolution imaging processes to expand the monitoring of changes in ground cover, the maritime environment, anthropogenic carbon dioxide emissions, climate processes and land surface temperatures for Copernicus. One of the planned missions is called "Copernicus Hyperspectral Imaging Mission for the Environment" (CHIME) and will map natural resources, agriculture and the environment. It covers a spectral range of 400 to 2500 nm, with a spectral bandwidth of 10 nm and a spatial resolution of 30 m. The new data sets are intended to help future programmes such as EvoLand continuously monitor the status of the land surface and update land cover maps.

Commercial companies currently see themselves as synergy partners for the public sector and supply highly specific solutions to private customers for whom the public data is no longer adequate. For this purpose, they offer remote sensing images with a resolution of up to 0.5 m, close to daily global coverage and even shorter repeat intervals for some areas. Data sets of this kind are of interest to private stakeholders on the raw materials market, for crops such as wheat and maize, to forecast future yields and compensate for market fluctuations. Intergovernmental organisations and nation states also use these data sets to supplement publicly available data for numerous applications, including the management of natural resources and agriculture. Representing a complementary data

A model of the PIESAT 1A-01 InSAR satellite, which forms part of an InSAR constellation comprising active and passive X-band SAR satellites. The constellation will provide data with a resolution of up to 0.5 m for the investigation and early detection of significant geological hazards such as subsidence, collapses and landslides.

source from private companies, the Copernicus Contributing Missions add to the data sets collected by Sentinel satellites.

A number of Chinese satellite businesses also exhibited their multispectral and SAR remote sensing products at INTERGEO for the first time with a view to unlocking the European market. These companies advertise a high multispectral resolution of up to 0.3 m and a SAR resolution of 0.5 m. One Chinese company already successfully launched four InSAR satellites into orbit at the beginning of 2023, while another is planning to launch extremely high-resolution multispectral and SAR constellations in 2024.

Although all satellite companies are aware of the problem of space debris and are carrying out in-house work aimed at reducing it, the development of systems to remove space debris is still in the research and design phase. The associated costs are very high, but given that the use of space is getting ever harder to keep track of, the stakeholders are paying increasing attention to this issue. In terms of legislation, ISO 24113:2023 specifies the key requirements for stemming the tide of space debris. The ESA is currently also working on a comprehensive regulatory framework.
An analysis of remote sensing data reveals a trend towards the complete automation of work processes. Non-technical end users of the data offer a great deal of untapped market potential, and providing this target group with findings from Earth observation data would prove useful in terms of managing our natural resources. Although artificial intelligence methods are being used on a large scale for the automatic extraction of characteristics and the classification of remote sensing scenes, large language models (LLMs) are not yet being utilised. There is, however, considerable interest in using LLMs to analyse and interpret remote sensing data through interactive text entry, which is why the sector is expecting LLMs to be integrated into commercial applications within the next two years.

3. UNMANNED SYSTEMS

Innovations in the field of unmanned systems were amongst the key focal points at INTERGEO 2023. The importance of this topic was emphasised on the conference stage which, together with the conference programme, drew a large number of visitors. Unmanned aerial vehicle (UAV) technologies still account for the majority of exhibits in the unmanned systems category. In addition to a varied selection of different UAVs, these also include water-based and land-based systems.

Collection of different systems (left: drone for indoor mapping; top right: drone with fixed wings, with a long flight time of up to 90 minutes and a high flight speed of up to 17 m/s; bottom right: small and compact drone).

Drones are being considered for a growing number of tasks where high precision and data capture accuracy are vitally important, such as cadastral surveying, the documentation of historical objects and the inspection of bridges. Drones no longer simply follow pre-programmed flight paths. Instead, they are able to plan their flight path autonomously based on specific mission objectives. These state-of-the-art systems benefit from real-time mapping, which enables the UAV to recognise its surroundings and adapt its flight route to the evolving situation. This greater autonomy lessens the dependence on external systems and improves the ability of drones to take decisions independently. Fixed-wing drones are now achieving flight times of up to 90 minutes, while multirotor drones can remain in the air for up to 50 minutes. In addition, drones equipped with RTK modules deliver a higher level of precision, achieving horizontal accuracy down to 1 cm and vertical accuracy down to 1.5 cm. They also make it possible to create photogrammetric models with absolute horizontal accuracy down to 5 cm. Using cameras with a resolution of up to 61 megapixels helps achieve this. The increasing automation of data processing and user-friendly mission planning are attracting particular attention. Many software manufacturers offer cloud-based solutions for this. Models are available in virtually all weights and sizes. Exhibits at the event also included delivery drones for applications such as getting medicines and food to regions hit by emergency situations and areas that are hard to access. These drones can transport loads up to a maximum weight of 10 kg. Drones designed specifically for mapping interiors were also on show. Equipped with a variety of sensors – such as LiDAR, a thermal camera, an optical 4K camera and distance sensors – these drones are used for mapping and inspection tasks at locations such as industrial plants that are difficult to access. The user is responsible for controlling the drone during its flight.

Besides the large selection of platforms, a wide range of sensors and accessories are available, too. These include optical cameras, airborne laser scanning systems and onboard Geiger counters to measure radioactive contamination, and UAV-based sonar systems. Relevant insurers also provide special policies for aerial drones of all kinds.

When it comes to land-based systems, one particular type of robot has become established. Robot vehicles are also being developed that offer a wider choice of vehicle types. Amongst other things, these vehicles carry laser scanner systems and are used in applications such as road construction. Marine platforms were another category of unmanned systems exhibited at INTERGEO 2023. Most of these were relatively small boats weighing around 15 kg and referred to as unmanned surface vehicles (USVs). They are primarily used to survey shallow waters up to a maximum of around 100 m deep and to determine environmental variables such as water quality. Echo sounders or side-scan sonar systems are mostly used for this, achieving horizontal accuracy down to 8 mm and vertical accuracy down to 15 mm. Larger models weighing several metric tons are used, for instance, for monitoring tasks lasting up to 25 days and can transport payloads of around one metric ton. Another interesting development is the use of underwater vehicles for a variety of applications, especially in the field of environmental monitoring. An acoustic modem with a range of up to 3500 m communicates with the electrically powered vehicle, which can operate at depths of up to 150 m.

On the left is a drone solution for bathymetric surveying and on the right a service vehicle for hydrology applications.

4. SMART CITIES

In view of the growing challenges, an increasing number of smart city concepts and solutions are being used to make cities more efficient, more sustainable and more resilient. The core elements of smart city solutions of this kind are technologies such as building information modelling (BIM), 3D urban models, digital twins, location intelligence, the Internet of Things (IoT) and spatial analyses. A focal point at INTERGEO 2023, BIM was identified as one of the key components for creating smart cities. When asked about the elements required to implement smart cities, interview participants gave a variety of answers. However, the consensus amongst the various city administrations and solution providers is that open data platforms are a must when it comes to organising smart cities.

The DigiZ-DE platform developed by Germany's Federal Agency for Cartography and Geodesy (BKG) aims to create an open digital twin that uses highly accurate, nationally standardised 3D data from LiDAR mapping and is regularly updated (every two to five years). This platform, which is due to be up and running by 2027, is being developed in collaboration with the EU-wide digital twin project Destination Earth (DestinE).

One problem regularly highlighted in the context of digital twins is the need for cross-system standards. Standardisation normally depends on the individual subdisciplines, such as IoT, BIM and 3D modelling, but specific standards for digital twins are also being worked on. DIN SPEC 91607 "Digital twin for cities and communities" is currently being compiled in Germany to establish a uniform perspective and a standardised approach to the creation of digital twins. This specification is scheduled for publication in January 2024.

Another development is the transformation from static digital twins to dynamic equivalents that can be updated with real-time data on an ongoing basis to enable better decision-making. A distinction is made between different types of digital twins. A number of manufacturers use the term "prototype" for a digital twin that exists before the physical object and includes all relevant information as well as specifications required to manufacture a physical version. The term "digital twin instance" refers to a virtual representation of an existing physical object that remains linked to this physical object throughout its lifecycle. Another type of twin is the "predictive digital twin", which focuses on predicting and forecasting future scenarios. However, these designations are only used by some manufacturers and do not represent official definitions. The predictive twin is particularly important, because cities are focusing on creating resilient systems that adapt to difficult environmental conditions and climate change. According to one major software manufacturer, Vienna's "Aspern Seestadt" project is one of the most ambitious urban development projects in Europe and a model smart city testbed. It is helping to achieve climate protection goals and to improve both sustainability and energy efficiency. The digital twin also enables data-driven decision-making and facilitates collaboration between the project participants.

Given that sustainability is a key issue for smart cities, there are initiatives to monitor CO_2 emissions and air quality and to reduce the urban carbon footprint. Data acquisition methods include using IoT sensors fitted to taxis to continuously monitor air quality. Satellite remote sensing with thermal imaging is also becoming an important source of data for monitoring land surface temperatures. It can be used to map urban heat islands with a spatial resolution of up to 30 m and a daily repeat rate. Airborne thermal imaging is another method used to map different heat sources on urban surfaces. Carried out at night, it offers a high spatial resolution of 25 cm to 1.5 m and supports applications such as monitoring heating networks, mapping the urban climate and detecting heat losses in buildings. IoT-compatible intelligent building elements such as PDLC smart glass adapt to environmental conditions and user preferences by automatically regulating the amount of light, which improves energy efficiency and user comfort.

5. VIRTUAL 3D URBAN MODELS, 3D VISUALISATION AND VR/AR

3D urban models and 3D visualisation remain core topics, especially as key components of digital twins. Besides their graphical representation function, semantic 3D urban models also structure and make available thematic information and therefore create a basis for developing these digital twins. The latest developments include the official adoption of CityGML 3.0 encoding in mid-2023, which paves the way for the next generation of semantic urban and landscape models. Some GIS software providers already support CityGML 3.0 data set reading, and work is currently underway to support the creation of urban models. The OGC standard 3D Tiles is a popular visualisation format for streaming massive and heterogeneous 3D geodata for web applications, gaming engines and both augmented reality (AR) and virtual reality (VR) applications. At the beginning of 2023, the Open Geospatial Consortium (OGC) approved the new-generation 3D Tiles 1.1 as a Community Standard. Enhancements include semantic metadata in multiple granularities and implicit tiling for improved analytics. Leading geodata providers and open-source GIS tools, including QGIS Desktop, now support visualisation using the 3D Tiles data format. In parallel with this, the OGC Community Standard "Indexed 3D Scene Layers" (I3S) also has a growing number of users. For example, the CesiumJS open-source library for creating globes has supported the rendering of streamed I3S data since February 2023.

The automatic reconstruction of 3D urban models from point clouds and photogrammetric methods remains a challenge and is an active field of development. Semi-automatic modelling of 3D urban models normally requires user input during the generation process and not during correction or verification. Some processes aim for fully automatic reconstruction of semantic models based on 3D point clouds through a combination of AI-based semantic segmentation and geometric instancing. Nowadays, reality mapping and data integration are used in a variety of applications such as environmental monitoring, spatial planning, design, construction and network management, and also during operation and maintenance.

Although an Internet giant has appropriated the term "metaverse" in a media context in recent years, the original concept dates back to the 1990s. Even back then, it was used to describe a virtual

3D world that can be experienced immersively and is separate from the physical world. Given that the metaverse is currently the subject of much discussion, a number of companies are also using this buzzword and are often referring to virtual worlds and the use of VR and AR. Many people currently regard the metaverse as a technology that will become established in the future and are therefore discussing what role the GIS sector should play in this context. However, there is no consensus as to whether interactions with other metaverse users should primarily take place in imaginary worlds or whether users should also be able to see models of the real world. The World Geospatial Industry Council (WGIC) has set itself the goal of strengthening the role of the GIS industry and has published a report examining the opportunities and risks in the emerging commercial metaverse. Integrating a spatial reference for the metaverse represents a focal point of work in this area. At the trade fair, however, people were still discussing how exactly the metaverse differs from the term "digital twin".

Virtual reality in the construction industry.

6. BUILDING INFORMATION MODELLING

At INTERGEO 2023, BIM was showcased in collaboration with the hybrid event for digital construction – BIM Days Germany – which had its own dedicated area at the exhibition grounds in Berlin. Discussions centred around geodata as a foundation and key element of BIM, as a means of surveying the environment and recording details. Scan2BIM was the buzzword for projects aiming to use point clouds for the automated reconstruction of BIM models of existing buildings. The potential for quickly creating digital twins of existing buildings was addressed in a number of different ways. The future of Scan2BIM involves developing AI to speed up the management of point cloud filtering and classification and to improve the detection of obstacles in contact with the laser. Clustering, classification and attribute derivation take place with the help of machine-learning processes such as deep-learning approaches. AI is also being used to monitor change detection, although these ideas are still largely at the development stage. Specific applications include efficient monitoring of structures (e.g. their general condition or repair requirements over time) and damage assessments following natural events.

Machine-learning algorithms are being used for the semi-automatic generation of BIM models. Initial floor plans and extruded floor plans can be generated, for instance. However, models created with the help of AI normally need to be checked manually and then corrected if necessary. What's more, the degree of automation depends to a great extent on the quality and completeness of the input data. The integrated functions thus represent a support system for a human modeller. It is also worth mentioning that companies are focusing on developing cloud-based solutions that enable surveyors to make complex data available to non-experts, too, in a user-friendly environment for checking, feedback and collaboration purposes.

INTERGEO EXPO speakers emphasised the importance of digital transformation for small companies. If these businesses, too, are to use the BIM method, its practical benefits and added value must be demonstrated. The objective is to ensure the long-term viability of small and medium-sized enterprises through initiatives and collaboration with associations such as buildingSMART Deutschland. The plan is to provide straightforward, workable recommendations.

Another important BIM trend is integration using augmented reality (AR). Site scans are carried out during the construction phase to generate point cloud data that is then automatically converted into mesh surfaces (mesh models). These can in turn be integrated into AR applications so that workers on site can locate actual positions of the 3D model corresponding to the planned BIM model. This means problems can be identified at an early stage and paves the way for potential cost and time savings. The continuous integration of GIS data into BIM projects is another trend worth highlighting. This synergy between BIM and geodata technologies enables more accurate and context-based construction projects, improved site analyses and 3D visualisations for everyone involved.

The latest version of the Industry Foundation Classes (IFC) BIM data format is Version 4.3. Published in 2022, it is currently undergoing final approval for accreditation as an ISO standard, which is likely to be published in early 2024. Infrastructure units were integrated into the IFC schema for IFC 4.3 and the main focus of work at present is on adding tunnel entities. These enhancements will be published at some point in the future as IFC 4.4.

With effect from February 2023, land-use plans such as urban development and landscape plans must be created and edited based on the Xplanung format as standard. Supporting tools offering a comprehensive solution for urban land-use plans in Xplanung formats are now available. It is also worth noting the growing trend towards using BIM not just on building sites, but also for the transport sector (e.g. rail, road) and water infrastructure (e.g. dams).

Last but not least, one of the driving forces behind the digitalisation of building sites is the predicted shortage of personnel, which will lead to the loss of know-how and also hit productivity. It is envisaged that digitalisation will achieve a higher level of productivity with fewer staff. In the period to 2030, it is predicted that 1.35 million workers in Germany will retire, whereas just 686,000 people will start working there.

Further information about the interface between geodesy and BIM can be found in the latest version (Version 3.2) of the "Geodesy and BIM Guideline", which was compiled by DVW e.V. and Runder Tisch GIS e.V. and presented at INTERGEO. [1]

[1] The guideline (in German only) is available via the link: https://www.rundertischgis.de/publikationen/

7. GEODETIC MEASURING TECHNOLOGY AND SATELLITE NAVIGATION

The industry is continuously moving towards automating surveying technologies, while also maintaining a high level of precision. In recent years, GPS devices have been launched on the market that no longer need to be perfectly perpendicular and horizontal to deliver high-quality position data. Furthermore, the accuracy of GNSS receivers using both GNSS and photogrammetry has steadily improved. Laser scanners have become much more accurate, recording more points and doing so at a higher speed. However, industry experts confirm that there have been no significant technical developments in traditional geodetic surveying instruments such as total stations. A GNSS rover with an integrated camera was amongst the products exhibited at INTERGEO 2023. The points to be measured can be selected on a corresponding controller.

Developments in satellite navigation have mainly focused on correction techniques. While the most common technique when it comes to satellite correction is OSR (observation space representation), SSR (state space representation) represents an innovative development in this sector. OSR requires consistent processing of identical signals at each reference station within a homogeneous network, with the user simultaneously accepting these signals. SSR corrections make it possible to provide accurate PPP-RTK (precise point positioning real-time kinematic) services at local and regional level and global PPP services that ensure continuous and uniform assessment of satellite parameters. The scalable correction options on offer are suitable for carrying out multiple corrections simultaneously. This is particularly advantageous for smart city applications with a number of self-driving vehicles and mobile IoT devices.

Researchers from the GFZ German Research Centre for Geosciences have succeeded in achieving centimetre-level PPP-RTK without atmospheric corrections. They used several constellations on available frequencies and single-epoch observations for this purpose. Simulations and analyses of real-time data based on multi-GNSS solutions such as GPS, Galileo, BDS and QZSS and optimum assessment methods have shown that accuracy improves as the number of frequencies used increases. On 12 August 2023, Galileo satellites started transmitting I/NAV improvements that are freely accessible via the I/NAV message carried by the E1-B signal. At the time of writing, 23 out of a total of 28 Galileo satellites are operational and in use. They achieved accuracy down to 3 cm with three frequencies and sub-centimetre accuracy with five frequencies. With the aim being to make access easier for users, SAPOS® has been subject to a new AdV Fee Directive (AdV = Working Committee of the Surveying Authorities of the Laender of the Federal Republic of Germany) since 1 August 2023.

8. MOBILE MAPPING AND LASER SCANNING

Another issue is the continuing challenge of reconciling the speed of mobile mapping with the accuracy of stationary methods. This is crucial given that accuracy is vitally important in many applications. One hybrid solution is the stop-and-go method, which combines the speed of MLS with the accuracy of TLS. Such methods are used in building monitoring, in applications such as scanning with robot dogs.

One interesting innovation at INTERGEO 2023 was the use of videos instead of images in mobile mapping applications. These videos are combined with simultaneous localisation and mapping (SLAM) and photogrammetry to create precise models. This technology makes it possible to record and process information from moving scenes. Demand for detailed images is growing, too. The 16K Ultra HD panorama function reflects the industry's efforts to create high-resolution, detailed images. There were also a number of companies exhibiting mobile phone holders integrated into laser scanner holders, thus enabling users to view scan results in real time. This technology can be used to record complete point clouds on site without any post-processing or any need to return to the measuring location.

A wide range of data processing solutions were presented, including cloud and offline processing methods and the possibility of processing on site via servers from remote PCs. Post-processing techniques such as integrating GNSS data and localising the data in coordinate systems further improve accuracy to between 1 and 3 cm. The local and global accuracy depends on the GNSS reception and control point accuracy. The point clouds and vectorised data provided can be shared via web platforms and displayed on a variety of viewers, which reduces the dependence on specific software. These technologies are primarily used in surveying, road construction and the creation of tree cadastres. One further application is navigating and mapping roads to obtain information for subsequent classification and other purposes.

In the face of growing data security concerns, the trend is towards protecting confidential map information. The automatic recognition and blurring of personal information such as faces and distinguishing marks is one example of this. Colourless point clouds have the advantage of containing fewer personal details.

Another trend is towards multifunctionality. Links to different modules (thermal, multispectral, RTK, etc.) mean devices are now far more versatile and can meet a variety of mapping requirements. In addition to this, devices should be platform-independent and enable a scanner system to be fitted on a car, lorry, locomotive, military jeep or rucksack. Mobile mapping devices and their data are also being used in a number of different areas. Nowadays, both municipalities and private companies from the automotive industry are mapping data and using mapping data (point clouds and images). Point clouds can now be downloaded as a service in over 50 countries around the globe.

9. GEODATA INFRASTRUCTURES AND OPEN GEODATA

One aspect of open data is state provision of basic spatial data. Companies, authorities, scientific institutes and individuals can build on this data and derive specific information from it. Open-data initiatives vary between Germany's federal states. Especially in the case of airborne laser scanning (ALS) flights, low-resolution raw data can be included. One key point to note is that the state is not in direct competition with private companies, as it provides fundamentally different data and products. This offers scope for collaboration and value creation.

The EU Commission obliges member states to provide high-quality data sets relating to geospace, Earth observation and the environment, meteorology, mobility, statistics, companies and shareholdings in open-data format. Following a 16-month transitional period, the PSI Directive for public sector open data and its re-use enters into force on 9 June 2024. This directive covers AAA data, including ALKIS, ATKIS and AFIS, and is expected to drive further progress when it comes to the use of geodata infrastructures in Germany. The Bavarian Surveying and Mapping Authority significantly extended its existing open-data portfolio on 1 January 2023.

The INSPIRE (Infrastructure for Spatial Information in Europe) project is particularly important in the EU, as it aims to facilitate the use of geodata across borders by creating a common geodata infrastructure in Europe. Although Germany is making progress with geodata management through projects such as basemap.de, some of the manufacturers interviewed emphasised the importance of standardised interfaces. Using such interfaces ensures equal competition by enabling integration into other manufacturers' systems. The European satellite programme Copernicus plays an important role in the environmental protection context. Germany's national and state authorities are increasingly using data provided by this Earth observation programme. By contrast, little use is being made of Copernicus data at municipal level. The "Copernicus Network Office Municipal" now offers a consulting, information and dialogue platform to encourage utilisation of the available products. Municipalities can obtain information and advice about potential applications.

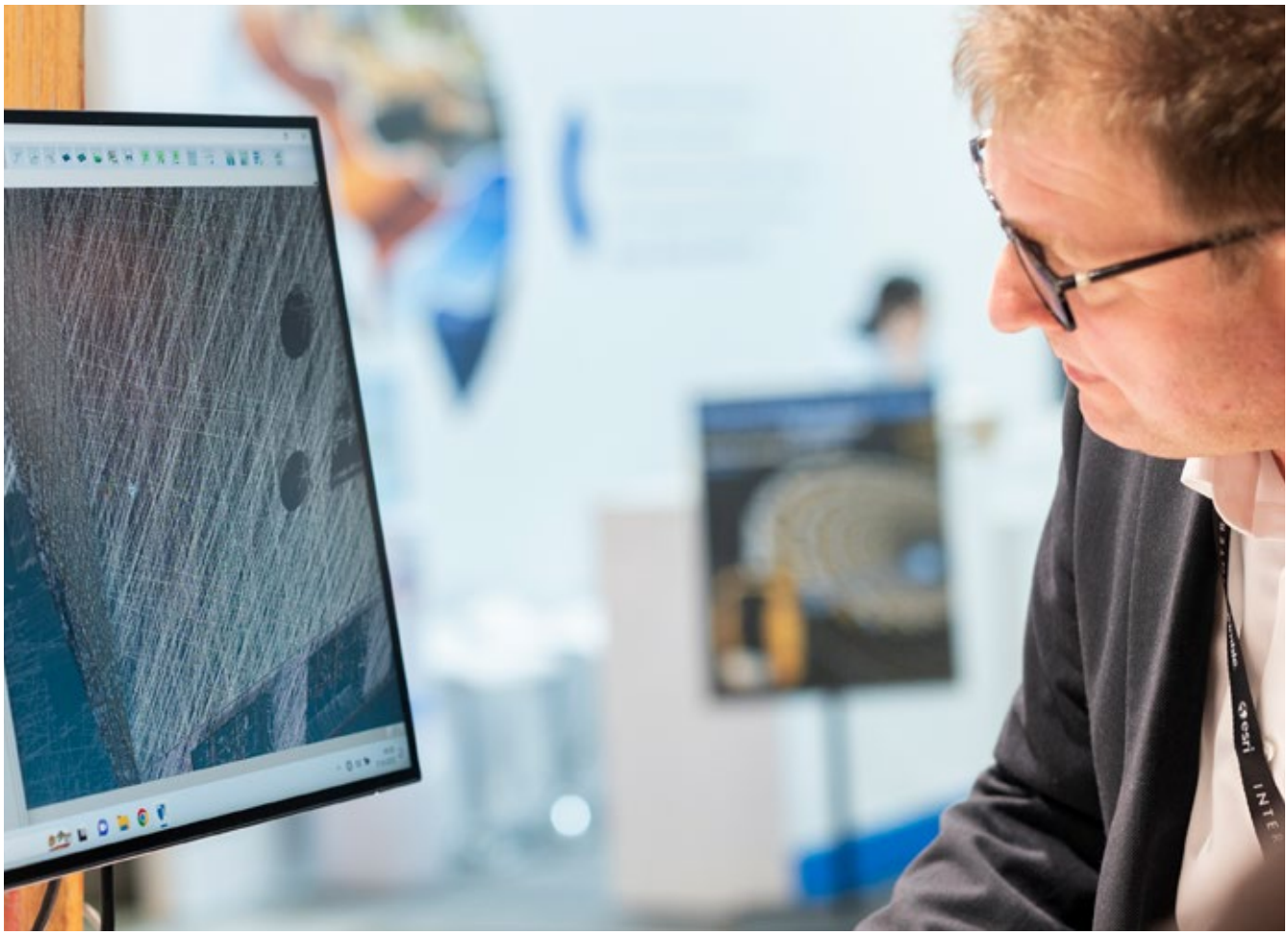
The German state of Saxony-Anhalt has been providing SAPOS® services free of charge since 1 July 2023. The tenth federal state to do so, it was to be followed by the federal state of Mecklenburg-West Pomerania on 1 January 2024.

10. MOBILE GIS

More or less all major providers of GIS software solutions have now switched to also offering mobile GIS applications. Primarily designed for fast and efficient GIS field work, one particular focus during development is on ease of use so that these applications can also be used by staff without a specific background in GIS. One key element of many mobile GIS systems2 is bridging the kind of gaps in the mobile network that can occur in tunnels or more remote regions, for instance. The possibility of using a GIS system on a mobile device enables data to be edited locally first and stored on the mobile device on a temporary basis. This data can then be uploaded when the mobile network is available again.

Various surveying apps with applications that go beyond simply providing snapshots of the existing situation and also include staking out points or carrying out Earth mass and volume calculations are being enhanced thanks to the possibilities of augmented reality. For example, a pipe that is to be laid can be depicted graphically in 3D on a smartphone. The availability of LiDAR scanners on the latest generation of smartphones opens up new options for the various manufacturers of such surveying apps. According to manufacturers, for instance, it will be possible to generate a 3D mesh with an accuracy down to 5 cm and a maximum measuring distance of up to 70 m. Since a system of this kind relies on positioning using a GNSS receiver, use indoors or in other shadowed areas is limited. Sufficiently accurate positioning indoors using a mobile network, for example, is impossible. Given the lack of adequately trained personnel, manufacturers also always emphasise the importance of making such surveying apps easy to use.

[2] The new Version 5.0cgis.de/publikationen/



CONCLUSION

At INTERGEO 2023, it became apparent that artificial intelligence methods will be increasingly integrated into the product and service landscape. No one product stands out, though. It is more a case of the widespread, gradual introduction of technologies. The development of applications to improve sustainability is particularly evident in the case of Earth observation and smart cities. This includes airborne thermal imaging for the monitoring of heating networks and buildings with smart glass for the automated regulation of the amount of light allowed through. The key driving force in this context is the desire for cities and regions to be more efficient, more sustainable and more resilient. In addition to this, work is continuing on making instruments and software tools easier to use, with the aim of reducing the initial obstacles faced by staff starting out on their careers or switching careers. One resource worth highlighting for young people with an interest in this sector is the newly revised web portal "Arbeitsplatz Erde" (Workplace Earth)3, which provides a well-structured overview of places to study and available places on courses in German-speaking countries. The new layout is currently attracting 1000 visitors per month. The portal is a joint project

by the German Association for Geodesy, Geoinformation and Land Management (DVW) the German Association of Surveyors (VDV) and the German Association of Publicly Appointed Surveyors (BDVI).
In addition to subject-specific innovations, it is also apparent that individual disciplines are growing ever closer. Examples include BIM and GIS and the use of UAVs in maritime areas. INTERGEO will once again be offering a networking platform from 24 to 26 September 2024 in Stuttgart.

The authors would like to finish by thanking the interviewees, as the trend analysis would not have been possible without their expertise and specialist knowledge. They also wish to say a special thank you to Runder Tisch GIS e.V. and HINTE Messe, who made their visit to the trade fair in Berlin possible.

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[3] https://www.arbeitsplatz-erde.de

03.

MEDIA REACH

LET´S TAKE
A SELFIE!

MEDIA REACH
Period: SEP. 2023 - DEC. 2023

ONLINE MEDIA

262,382
READERS

849
RESULTS

33 GLOBAL MEDIA PARTNERS

SOCIAL MEDIA

1,752
RESULTS

1,900 K
IMPRESSIONS

2,900 K
PROFILE VIEWS

400 K
POST VIEWS

23 K
VIDEOS VIEWS

FOLLOWER

8,000+
FOLLOWERS

10,000+
FOLLOWERS

4,000+
FOLLOWERS

3,500+
FOLLOWERS

1,394 K
FOLLOWERS/
FRIENDS HAVE BEEN REACHED

995 K
IMPRESSIONS
ON GOOGLE

28 K
KLICKS
ON GOOGLE

04.

INTERGEO TV

INTERNATIONAL NEWS CHANNEL OF THE GEOSPATIAL COMMUNITY

INTERGEO TV ON YOUTUBE

INTERGEO TV NEWS DAY 3
https://youtu.be/9_CrlFNNSXU?si=Xdqb-n-9zInuGaZd

INTERVIEW WITH YOUTUBE STAR RAMI TAMIMI
https://youtu.be/hlXkxkb-q4k?si=DdSEbi40LG_WBeba

INTERGEO 2023 IMPRESSIONS FROM BERLIN
https://youtu.be/hWe18yiOTss?si=U8qoipHmZCmFftCP

800,6 hr
VIEWING HOURS

24,721
VIDEO VIEWS

399,238
IMPRESSIONS

FIND MORE INTERVIEWS, TALKS AND FURTHER INSIGHTS INTO THE GEOSPATIAL WORLD AT INTERGEO'S YOUTUBE CHANNEL ON:

https://www.youtube.com/channel/UCxfJTnyQM331Vv3uzN4MbyA

05.

WE TOOK PART

Aussteller *Exhibitor*	Halle *Hall*	Stand *Stand*
3		
3Dflow S.r.l.	3.2	C3.043
3DScan Solutions GmbH	3.2	A3.024
3Dsurvey	25	D25.63
3D TARGET S.r.l.	25	C25.73
4		
4DAGE CO., LTD	5.2	A5.033
4S Mapper + Lee Seungho	1.2	B1.011
5		
5DScan Worldwide GmbH	5.2	A5.020
0		
030Solutions GmbH	1.2	A1.038
A		
ABRIS - E.P.S.	25	B25.99
Abstract GmbH	1.2	A1.052
ACENTISS GmbH	27	I27.19
Advanced Navigation	27	E27.51
AdV c/o LDBV Bayern	3.2	A3.046
aedificium digital GmbH	3.2	A3.024
Aerial Photogrametry and Remote Sensing Group	3.2	D3.015
AeroDCS GmbH	5.2	C5.020
Aerolaser System	1.2	A1.032
AEROWEST GMBH	27	F27.19 / F27.20
Africa Surveyors Online	5.2	D5.032
Agvolution GmbH	25	B25.38
AirborneHydroMapping GmbH	27	B27.46
Airborne Technical Systems - ATS	25	E25.98
Airbus Defence and Space GmbH	1.2	D1.041
Airclip Service GmbH & Co. KG	5.2	B5.014
AirWorks	5.2	C5.038
AISPECO, UAB	25	A25.07
AKG Software Consulting GmbH	27	H27.28
Alberding GmbH	1.2	D1.048
allnav GmbH	27	E27.27
ALLSAT GmbH	25	E25.23
ALLSAT GmbH	1.2	C1.037
AllTerra Deutschland GmbH (Dettelbach)	27	E27.27
AllTerra Deutschland GmbH (Wunstorf)	27	E27.27
Alteia SAS	27	H27.18
Amberg Technologies AG	25	A25.52
Amuse Oneself Inc.	25	C25.24
AndroTec GmbH	25	A25.11
Apglos B.V.	5.2	A5.033
APLITOP, S.L.	25	E25.76
ARC-GREENLAB GmbH	27	B27.52
Archizem LLC	3.2	C3.023
aRES Datensysteme	25	C25.23
Argosdyne Co., Ltd.	1.2	B1.011
Aro Technologies GmbH	5.2	A5.020
Asseco BERIT GmbH	25	B25.38
atene KOM GmbH	1.2	A1.038
ATIS.cloud	1.2	C1.060
ATMOS UAV B.V.	1.2	C1.045
Autel Robotics Europe GmbH	5.2	D5.020
Autodesk GmbH	27	E27.01
AutoMap Pty Ltd	27	I27.22
auxalia GmbH	27	E27.01

Aussteller *Exhibitor*	Halle *Hall*	Stand *Stand*
B		
b-plus technologies GmbH	25	E25.47
Barthauer Software GmbH	27	C27.58
Basetime BV	1.2	A1.054
BauCaD - BauWolke - Kempter GmbH	25	A25.11
BayesMap Solutions SAS	1.2	B1.010
Beagle Systems GmbH	27	H27.10
Beijing BDStar Navigation Co., Ltd.	27	D27.19
Beijing LADARTek Technology Co., Ltd	25	A25.34
Beijing Qiyue Tianchuang Technology Co., Ltd.	25	A25.30
Bentley Systems International Ltd.	25	A25.82
Berliner Hochschule für Technik	5.2	A5.012
Bernhard Harzer Verlag GmbH	1.2	D1.041
BEYLESS CO., LTD	1.2	B1.011
Beyond Sky	5.2	D5.032
BIMcosmos	3.2	A3.024
BIM Events GmbH	3.2	A3.024
BIMm Services GmbH	27	E27.60
BIMm Solutions GmbH	27	E27.60
Bimprinter SRL	3.2	B3.010
Blue Marble Geographics	1.2	C1.044
Bluesky International Limited	25	E25.75
brainLight GmbH	5.2	B5.042
Bricsys, part of Hexagon	25	B25.16
BSF Swissphoto	25	B25.38
Build Informed GmbH	3.2	A3.024
buildingSMART Deutschland e.V.	3.2	D3.037
Bund der Öffentlich bestellten Vermessungingenieure e.V.	3.2	D3.037
Bundesamt für Kartographie und Geodäsie (BKG)	3.2	B3.036
Bundesnachrichtendienst	5.2	B5.034
Bundeswehr	5.2	A5.030
C		
C-Astral d.o.o.	25	B25.82
CADdy Geomatics GmbH	5.2	B5.033
CADMAP - Consulting Ingenieurgesellschaft GmbH	3.2	B3.046
CamFLY	5.2	D5.013
Camptocamp SA	27	I27.56
CAMPUS GEOINNOVATION	5.2	A5.012
Carlson Software Inc	27	E27.28
CCT- Consulting UG (haftungsbeschränkt)	5.2	A5.020
Changchun Changguang Boxiang UAV Co., Ltd	25	A25.26
Changzhou FuTian Optoelectronic Technology	25	A25.34
CHC Navigation | CHCNAV	27	A27.02
Chengdu JOUAV Automation Technology Co., Ltd	3.2	A3.035
Chengdu Rainpoo Technology. Co., Ltd.	25	C25.09
China Siwei Surveying Mapping Technology Co., Ltd	3.2	D3.015
Cintoo SAS	1.2	D1.050
CiS GmbH	25	B25.38
CISS Technische DV-Informationssysteme - GmbH	1.2	D1.041
Cities Today	5.2	D5.032

Aussteller *Exhibitor*	Halle *Hall*	Stand *Stand*
ClearEdge3D, Inc.	27	I27.18
CLGE	3.2	D3.037
ComNav Technology Ltd.	25	C25.88
ComNav Technology Ltd.	27	A27.41
Consortium 'Kaylas Group'	1.2	A1.008
constellr GmbH	27	B27.28
Contelos GmbH	27	E27.01
con terra GmbH	27	D27.01 / D27.04
Correvate Ltd	25	E25.08
Cremer Programmentwicklung GmbH	1.2	D1.024
CycloMedia Deutschland GmbH	25	A25.66
D		
DAT/EM Systems International	27	F27.19 / F27.20
DataDEV d.o.o	27	A27.21
deeeper.technology GmbH	25	C25.70
DeepForest Technologies Co., Ltd.	5.2	D5.012
DEF-C LLC	3.2	B3.006
Deqing iSpatial Co., Ltd.	25	B25.90
Deutsche Gesellschaft für Kartographie e. V. (DGFK)	3.2	D3.037
Deutsche Hydrographische Gesellschaft e. V. (DHyG)	3.2	D3.037
Deutsche InfraSoft GmbH	5.2	A5.020
Deutsche Modellsportorganisation	5.2	C5.020
Deutscher Christlicher Techniker-Bund e.V.	3.2	A3.051
Deutscher Dachverband für Geoinformation e.V. (DDGI)	1.2	D1.041
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)	3.2	B3.050
Deutsche Telekom Business Solutions GmbH	27	B27.28
Dez Novin Sanat	27	F27.60
DGPF e.V.	3.2	D3.037
Diamond Aircraft Industries GmbH	25	A25.90
Die Autobahn GmbH des Bundes	25	A25.79
Digital Realities SAS / Topotrade	25	E25.36
Diversified Communications US	27	I27.62
DJI GmbH	27	C27.54
DMT GmbH & Co. KG	27	B27.46
DMT GmbH & Co. KG	25	A25.52
dronelife	5.2	D5.032
Dronesperhour GmbH	5.2	A5.020
Dronivo GmbH	3.2	B3.028
DVW e.V.	3.2	C3.032
DVW e.V.	3.2	D3.037
E		
EAGLEPROJECTS S.p.A.	3.2	B3.016
EarthArt	5.2	D5.028
East View Geospatial	25	B25.19
EFTAS Fernerkundung Technologietransfer GmbH	1.2	D1.041
eGPS Solutions	1.2	C1.023
EKM Global Consulting GmbH	3.2	D3.031
ELYA TEKNOLOJI SANAYI VE TIC A.S.	3.2	D3.056
Emesent Pty Ltd.	27	I27.42
EMLID Tech Kft.	25	E25.46 / E25.66
ENEKA Energie & Karten GmbH	25	B25.38
enliteAI	3.2	C3.056
Eos Positioning Systems Inc.	1.2	C1.029
Epotronic GmbH	5.2	C5.016
EPS LLC	25	B25.99
Epson Europe Electronics GmbH	1.2	D1.039
EPS Works SL	25	E25.100
ESN EnergieSystemeNord GmbH	1.2	B1.035
Esri Deutschland GmbH	5.2	A5.007
Esri Inc.	27	B27.52
European Space Agency (ESA)	3.2	B3.050
European Space Imaging GmbH	27	B27.28
EvoLogics GmbH	25	E25.84
F		
F. W. Breithaupt & Sohn GmbH & Co KG	25	E25.11
FARO Europe GmbH	27	F27.10
Feima Robotics Co. Ltd.	1.2	B1.030
FIXAR-AERO LLC	5.2	A5.040
Fixposition AG	5.2	A5.038
FJ Dynamics International Ltd.	1.2	A1.058
FLAI D.O.O.	27	G27.60
Flota 3D Sp. z o. o.	3.2	A3.025
Flyability SA	27	G27.20
Forest IT Design Sweden AB	27	I27.23
FPM Holding GmbH	3.2	B3.058
Frankfurt University of Applied Sciences	3.2	C3.025
Fraunhofer-Institut für Physikalische Messtechnik	25	E25.35
FROX GmbH	25	E25.23
Fukuda Laser Precision Instrument Co.,Ltd	1.2	A1.030
Förderkreis Vermessungs- technisches Museum e.V.	3.2	C3.029
G		
G & W Software AG	25	C25.23
G-tec Positioning GmbH	1.2	B1.055
GAF AG	27	B27.28
GDDC GmbH	5.2	C5.016
GDU-Tech Co. Ltd.	27	F27.46
GE Digital	1.2	B1.035
General Laser GmbH	5.2	C5.034
Genspow GmbH	25	B25.88
GEO++ GmbH	25	C25.07
GEO-PLUS Inc	27	E27.54
GEO Business & Digital Construction Week	27	I27.61
GEOcareer	5.2	A5.007
GeoConnexion Magazine	1.2	D1.032
GEOCONSULT Deutschland GmbH	1.2	D1.038
GeoCue Group Inc.	1.2	C1.038
Geodata Surveying & Monitoring Group	5.2	B5.026
Geodetic	25	A25.20
GEODNET	25	A25.96
GEO DV GmbH	25	E25.84
geodäsie.nrw	5.2	A5.012
GeoFly GmbH	25	E25.69
GeoInformatics	5.2	D5.032
GEOkomm e.V.	25	B25.38
GeoLas Systems GmbH	27	A27.57
GEOMAGIC GmbH	1.2	B1.035
GEOMAX INTERNATIONAL GmbH	1.2	C1.023
GEOMAX INTERNATIONAL GmbH	25	C25.74
GeoMessTechnik Heger	25	B25.80
Geophysical Survey Systems, Inc.	1.2	B1.056
Geoplex GIS GmbH	1.2	B1.051
Geospatial Media and Communications	5.2	D5.032
Geospatial Media and Communications	3.2	A3.011
Geospatial Ventures Ltd	3.2	D3.019
geoSYS / gis-trainer.com	25	B25.38
GEOSYSTEMS GmbH	25	B25.21
GEOTECH Bratislava, s.r.o.	27	A27.37
Geotechnik, Geoinformatik & Service GmbH	1.2	B1.036
GeoTrade BV	25	A25.77
Germandrones GmbH	5.2	D5.024
GESBRO GmbH	1.2	A1.038
Get Kids into Survey	5.2	A5.012
Gexcel S.r.l.	27	F27.02
GIM International	3.2	D3.030
GIS-Akademie GmbH	3.2	C3.028
GIS Cadastral Association of Ukraine	1.2	A1.006
GIS Consult GmbH	1.2	B1.035
gisplay.pl	5.2	D5.032
GisPoint	3.2	C3.026
GISPRO SA	1.2	A1.023
Glunz Technik GmbH	25	C25.79
Goecke GmbH & Co. KG	25	A25.52
GoSLAM	1.2	B1.053
Gottlieb NESTLE GmbH	25	C25.74
GRAD & GON GmbH	25	E25.23
Green Valley International Co., Ltd.	27	I27.28
grit GmbH	25	D25.02
Gter srl	1.2	A1.006b
Guangzhou Alpha Geo-Info co. Ltd	3.2	C3.046
Guangzhou Alpha Surveying Technology Co.,Ltd	1.2	C1.032
Guangzhou Geosurv Information Technology	1.2	B1.049
Guangzhou Great Rallway Science&Technology Co.,Ltd.	1.2	A1.010
Guangzhou Toksurvey Information Technology	1.2	B1.033
GUIDELINE GEO AB	3.2	D3.043
H		
HafenCity University Hamburg	5.2	A5.012
Handheld Germany GmbH	5.2	A5.036
Hangzhou Qiantang Digital Economy Research Institute	25	B25.90
Hangzhou Xuan Yi Information Technology Co., LTD	25	B25.90
Hasso-Plattner-Institut für Digital Engineering gGmbH	25	B25.38
Herzog GmbH	27	E27.27

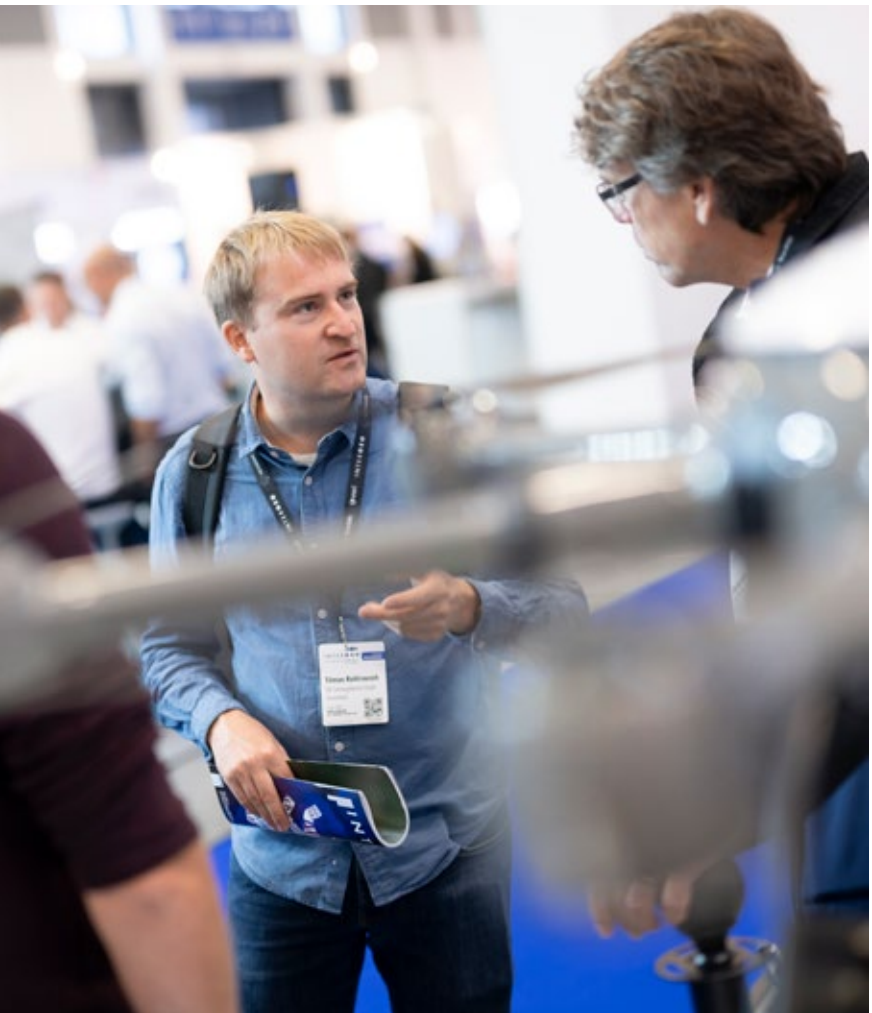
Aussteller *Exhibitor*	Halle *Hall*	Stand *Stand*
Hexagon AB	25	B25.16
Hexagon AB	Outdoor	Hall 24
Hexagon – Autonomous Reality Capture	5.2	B5.041
HHK Datentechnik GmbH	27	E27.27
Hi-Target International Group Ltd.	25	B25.70
HIAANXI HONGQI INDUSTRIAL GROUP	3.2	D3.015
Hochschule Anhalt, FB3	5.2	A5.012
Hochschule Bochum	5.2	A5.012
Hochschule Mainz - University of Applied Science	5.2	A5.012
Hochschule Neubrandenburg	1.2	A1.027
Honeywell HGuide Inertial Sensors and Navigators	25	E25.37
Horus View and Explore B.V.	27	I27.54
HottScan GmbH	25	B25.17
HP Construction Services	3.2	A3.020
HPRC CASES - Plaber Srl	27	D27.61
Hunan Bynav Technology Co. Ltd.	1.2	B1.031
Huss-Medien-GmbH	3.2	A3.024
Hybrid-Airplane Technologies GmbH	5.2	B5.012
Hydrogen Craft Corporation Ltd	25	B25.90
I		
IABG mbH	27	I27.19
IB&T Software GmbH	25	C25.23
ibR Geoinformation GmbH	27	D27.09
IDS GeoRadar, part of Hexagon	25	B25.16
IGI Ingenieurgesellschaft für Interfaces GmbH	1.2	B1.052
ILV - Fernerkundung GmbH	25	C25.80
imajing SAS	25	A25.17
ImiSight	3.2	C3.024
imp GmbH	27	E27.10
ImpulseRadar Sweden AB	5.2	B5.030
Indo- German Science and Technology Centre	3.2	D3.036
Inertial Labs Inc.	25	A25.95
infrakit Group Oy	3.2	A3.024
INFRAPLAN GEOSPATIAL SL	27	F27.59
infrest - Infrastruktur eStrasse GmbH	3.2	D3.025
Ingenieurbüro Dr.König | Scalypso	3.2	A3.024
Ingenieurgesellschaft Nordwest mbH	1.2	C1.012
inovi GmbH	27	E27.01
iNovitas AG	25	B25.52
Inside Unmanned Systems	27	I27.58
Institut Cartogràfic i Geològic de Catalunya	27	F27.59
Institute for Q-shu Pioneers of Space, Inc	3.2	B3.022
INTERGEO Rebooking-Area	5.2	A5.021
intermetric GmbH	27	E27.22
International Federation of Surveyors, FIG	3.2	D3.037
IP SYSCON GmbH	27	B27.52
isl-kocher GmbH	1.2	D1.012
ITRES Research Limited	27	H27.00
ITS Geo Solutions GmbH	27	E27.52
ITS Informationstechnik Service GmbH	1.2	B1.035
IVB Krause + Partner	25	B25.38
iXblue SAS	25	C25.78
J		
Jade Hochschule Oldenburg - University of Applied Sciences	5.2	A5.012
JAVAD GNSS Inc.	1.2	C1.037
Jens Janßen	25	A25.53
JIANGXI WONDER SURVEY CO.,LTD.	25	A25.81
Jiangxi Xintuo Enterprise Co., Ltd.	27	G27.10
Jinan Langrui Detection Technology CO., LTD	3.2	D3.049
Jinhua MAKA Technology Co.,Ltd.	25	A25.28
Jobware GmbH	5.2	A5.007
Josef Attenberger GmbH	25	B25.23
Juniper Systems Limited	25	A25.47
K		
K21 media GmbH	5.2	D5.032
Kalmar Systems GmbH	25	E25.03
Karriere-Forum	5.2	A5.007
Kavel 10 BV	25	C25.69
KHL Group LLP	5.2	D5.032
KickTheMap Sarl	1.2	C1.034
Komora Engineering SRL	1.2	B1.006
KonGeoS	3.2	D3.038
Kontur AS	1.2	B1.048
Koordinierungsstelle GDI-DE im BKG	3.2	B3.036
Kosminis Vytis UAB	1.2	D1.029
Kumo Software GmbH	5.2	A5.020

Aussteller *Exhibitor*	Halle *Hall*	Stand *Stand*
L		
Landesamt GeoInformation Bremen	27	I27.30
LandPlan OS GmbH	5.2	B5.012
Laserscanning Europe GmbH	27	G27.12
Laser Technology, Inc.	25	E25.11
Leibniz Universität Hannover	3.2	A3.029
Leica Geosystems, part of Hexagon	25	B25.16
LidarSwiss Solutions GmbH	1.2	B1.010
Limited Liabiliti Companni 'Podilskyy zemelnyy tsentr'	3.2	D3.058
LITEF	27	F27.52
LocLab, part of Hexagon	25	B25.16
Lovion GmbH	27	G27.52
LTD 'Kaylas Aero/GIS Technologies'	1.2	A1.008
LUP Luftbild Umwelt Planung GmbH	25	E25.69
Lupos3D GbR	25	A25.39
M		
M.O.S.S. Computer Grafik Systeme GmbH	3.2	B3.046
Manifold Tech Limited	1.2	D1.001
MARITIME ROBOTICS	27	G27.02
Marxact B.V.	3.2	A3.032
Matterport Inc	5.2	C5.016
maxon international ltd.	5.2	C5.020
Maxtena Inc.	3.2	A3.047
mdGroup Germany GmbH	1.2	C1.038
Media Center	5.2	D5.032
mediaGEO soc. coop.	5.2	D5.032
Meixner Vermessung ZT GmbH	25	C25.68
Mena3D GmbH	25	C25.51
Mensch und Maschine Deutschland GmbH	27	E27.01
MERVISOFT GmbH	25	A25.11
Metirionic GmbH	25	B25.38
Metridynamic (Chengdu) Technology Co., Ltd	3.2	D3.017
Mettenmeier GmbH	1.2	B1.035
MGGP Aero Sp. z o.o.	27	D27.13
MILAN Geoservice GmbH	27	B27.46
Miviso GmbH	3.2	A3.024
MOBILTECH Co. Ltd.	27	F27.09
Mosaic - 360° Camera Solutions / Unirmi s. r.o.	Outdoor	FG.01
Mosaic - 360° Camera Solutions / Unirmi s. r.o.	27	G27.48
Mosaic - 360° Camera Solutions / Unirmi s. r.o.	1.2	C1.054
MOST Robotics GmbH	27	H27.52
Move Solutions S.r.l..	27	D27.57
MRK Media AG	25	B25.38
Multiplex Modellsport GmbH & Co.KG	5.2	B5.036
My Coordinates	5.2	D5.032
MyCumulus B.V.	3.2	D3.047
N		
N+P Informationssysteme GmbH	27	E27.01
NavVis GmbH	27	F27.28 / F27.36
NEXUS GEOGRAPHICS	27	F27.59
NLBL Niedersachsen	27	I27.30
NORBIT ASA	25	E25.03
Nord Coast Media, LLC.	5.2	D5.032
north.io GmbH	3.2	B3.018
NovAtel, part of Hexagon	25	B25.16
NTI Deutschland GmbH	27	E27.01
NV5 Geospatial (L3Harris Geospatial)	27	E27.13
O		
OHB Digital Connect GmbH	25	B25.21
OHB Digital Services GmbH	25	B25.21
OHB SE	25	B25.21
Omniasphere GmbH	5.2	B5.038
Omnidots BV	1.2	B1.043
OPEGIEKA Sp. z o.o.	25	C25.77
OPENGIS.ch GmbH	3.2	C3.047
ORBICA Ltd.	25	C25.71
ORBITS Engineering Firm	3.2	B3.026
Orthodrone GmbH	25	C25.40
Ouster, Inc.	27	H27.60
Outsight SA	25	A25.85
Oxford Technical Solutions Ltd.	1.2	B1.012
P		
Panaro Srl	25	E25.49
Panasonic Connect Europe GmbH	25	A25.19

Aussteller *Exhibitor*	Halle *Hall*	Stand *Stand*
ParaZero Technologies	5.2	D5.017
Patzer Verlag GmbH & Co.KG	5.2	D5.032
Pavemetrics Systems Inc.	3.2	D3.029
Pelixar SA	1.2	A1.023
Penta-b for GIS	3.2	A3.025
Phase One Industrial A/S	25	C25.38
Phoenix LiDAR Systems	27	A27.57
PIESAT Information Technology Co., Ltd.	25	E25.09
Pinnacle BIM Technology GmbH	3.2	A3.024
Pix4D SA	27	I27.12
Planet Labs Germany GmbH	1.2	D1.041
Podilsky Land Center	3.2	D3.058
PointCab GmbH	27	G27.12
Point Cloud Technology GmbH	25	B25.38
Pointly GmbH	5.2	A5.020
PP-Solution	1.2	B1.011
PPM Precise Positioning Management GmbH	25	A25.37
Prevu3D Inc	27	I27.24
Private enterpirse 'Kaylas-K'	1.2	A1.008
Private enterpirse 'Kaylas-K'	3.2	D3.058
ProFlyCenter GmbH	5.2	C5.016
proNIVO Messgeräte Handels GmbH	25	B25.23
Q		
Qianxun Spatial Intelligence Inc.	25	B25.90
Qianxun Spatial Intelligence Inc.	3.2	C3.054
Quantum Systems	27	F27.54
Quectel Wireless Solution Co. Ltd.	1.2	A1.012
R		
rabo - R. Bormann & Sohn	25	B25.38
Radiodetection Ltd.	1.2	B1.005
rapidlasso GmbH - LAStools	1.2	C1.048
rasdaman GmbH	1.2	B1.022
RIB Software GmbH	27	F27.44
RIEGL Laser Measurement Systems GmbH	27	B27.46 / A27.38
rmDATA GmbH	25	C25.10
ROTER Precision Instruments Pvt. Ltd.	1.2	A1.002
Rothbucher Systeme	25	B25.23
Rugao Sanyuan Surveying Instruments Co., Ltd.	27	D27.59
Runder Tisch GIS e.V.	27	B27.28
RZI Software GmbH	25	C25.23
S		
Safe Software Inc.	27	D27.01 / D27.04
Satel Oy	27	E27.59
SatLab GeoSolution i Göteborg AB	25	B25.70
Satpro M&C Tech Co., Ltd	3.2	D3.015
SBG Systems SAS	27	H27.30
Scan & Go S.r.l.	25	A25.09
Schneider Digital e.K	27	C27.59
Screening Eagle Technologies	5.2	E5.020
Senceive Limited	1.2	B1.044
Seongnam Cty	1.2	B1.011
Septentrio nv	25	B25.23
Settopsurvey S.L.	27	D27.12
Shaanxi Deruite Industry & Trade Co., Ltd.	25	E25.02
Shaanxi Fengdon Yunkong Information Technology	3.2	D3.015
Shaanxi Muxing Jituian Space Technology Co.,Ltd	3.2	D3.015
Shaanxi Pavilion	3.2	D3.015
Shaanxi Space Intelligent Manufactoring Aerospace	3.2	D3.015
Shaanxi Tower Star-x Aerospace	3.2	D3.015
Shanghai AllyNav Technology Co., Ltd.	3.2	C3.048
Shanghai BOFA Spatial Information Technology	5.2	B5.024
Shanghai eSurvey GNSS Co., Ltd	27	D27.20
Shanghai Merrypal Import & Export Co., Ltd	25	B25.86
Shanghai UniOne Science&Technology CO., Ltd.	3.2	C3.031
Shanghai Zoomsmart Technology Co.,Ltd	25	A25.32
Shangrao Haodi Imp & Exp Trading Co., Ltd.	1.2	A1.033
Shanhai Galaxy International Trade Co., Ltd.	1.2	A1.051
Shenzhen BLV Technology Co., Ltd	1.2	A1.036
Shenzhen Share UAV Technology Co., Ltd	25	E25.77
SIERRASOFT S.r.l.	27	F27.04
SI Imaging Services	27	A27.25
Silicon Sensing Systems Ltd	1.2	D1.060
SimActive Inc.	27	A27.01
SingularXYZ Intelligent Technology Ltd.	27	I27.00
Skyability GmbH	27	B27.46
Skyland Innovation Company Limited	25	B25.84
Skyline Software Systems. Inc.	25	C25.62
Smart Delta Systems & Solutions	1.2	B1.043
SMART GEO EXPO 2023	1.2	B1.011
SOARABILITY	3.2	A3.015
Solectric GmbH	5.2	C5.016
Solv3D inc.	27	I27.02
SOMAG AG Jena	25	A25.90
Sony Europe B.V.	3.2	B3.028
South Navigation Limited	1.2	A1.024
Space Flight Laboratory (SFL)	27	D27.10
Spatial Media LLC	1.2	C1.048
specter automation GmbH	3.2	A3.024
SPIE InfoGraph GISMobil GmbH	3.2	B3.039
SPIE SAG GmbH, CeGIT	3.2	B3.039
SPM3D LLC	25	A25.01
Stabi Alert B.V.	1.2	B1.043
Stellar Vision Systems, Inc.	1.2	A1.034b
STONEX S.r.l.	27	A27.27 / A27.28
SuperGeo Technology Inc.	1.2	C1.001
SuperMap Information Co., Ltd	25	B25.90
SuperMap Software Co., Ltd.	25	C25.56
Surestar LIDAR	1.2	D1.026
Surveying Group	5.2	D5.032
Survey Max Ltd.	1.2	C1.023
Suzhou Geoleni Import and Export Co.,Ltd.	25	A25.05
SwissOptic AG	5.2	A5.027
Synerex INC.	5.2	C5.012
T		
Tallysman Wireless Inc.	27	I27.25
technet GmbH gründig + partner	27	H27.22
Technische Akademie Esslingen e.V.	5.2	D5.032
Technische Universität Clausthal	3.2	A3.029
TELEDYNE	27	G27.46
TERRASOLID Oy	25	A25.70
Tersus GNSS. Inc.	1.2	C1.031
TheCrossProduct SAS	1.2	C1.024
THE GEOHOLICS	5.2	B5.028
Tianjin Qiling Measurement and Control Technology	3.2	B3.024
Tianjin SETL Survey Equipment Co. Ltd.	3.2	C3.057
Tianjin Xing Ou Surveying Instrument Manufacture	1.2	A1.004
TinyMobileRobots ApS	1.2	D1.059
TOPCON EUROPE Positioning B.V.	1.2	C1.053
TopoDOT	25	A25.02
TOPODRONE SA	27	A27.24
TopoFlight Systems	25	A25.90
TOPO graphics GmbH	25	B25.38
Transforming Cities	5.2	D5.032
TRE ALTAMIRA S.L.U.	1.2	D1.038
Trimble Applanix	27	E27.27
Trimble Germany GmbH	27	E27.27
TU Darmstadt / Frankfurt University of Applied Sciences	3.2	C3.025
Twinsity GmbH	27	A27.47
TYKER TECHNOLOGY B.V.	5.2	A5.025
U		
u-blox AG	25	E25.27
UAV DACH e.V.	5.2	C5.020
Ukrainian Aerial Geodesic Association	1.2	A1.006
Ukrainian Society of Geodesy and Cartography	1.2	A1.006
Uncrewed Systems Technology	5.2	D5.032
Universität Salzburg | FB Geoinformatik	5.2	A5.012
Unmanned Systems Technology	5.2	D5.032
UVM Systems GmbH	3.2	C3.030
V		
Valley Media Inc	5.2	D5.032
VectorNav Technologies	27	H27.02
Verband Deutscher Vermessungsingenieure e. V.	3.2	C3.039
Verband Deutscher Vermessungsingenieure e. V.	3.2	D3.037
Verbändepark	3.2	D3.037
Vermessung3D	27	B27.59
Vermessungsbüro Rink GmbH	27	H27.54
Vermessungstechnik Engelmann KG	25	E25.23
VertiGIS GmbH	27	G27.40
Vexcel Imaging GmbH	25	C25.50
vh software tools	5.2	A5.036
Viametris Business SAS	27	E27.36

Aussteller *Exhibitor*	Halle *Hall*	Stand *Stand*
vigram GmbH	3.2	A3.024
virtualcitysystems GmbH	27	A27.46
Virtual Surveyor NV	1.2	D1.030
Visicom	3.2	A3.007
Visimind AB	3.2	A3.016
Vision Engineering Ltd	27	F27.19
Vogel IT-Medien GmbH	5.2	D5.032
Voxelgrid GmbH	5.2	A5.020
VRscan3D	25	A25.01
Vsion, Inc.	1.2	B1.011
W		
Wellhausen & Marquardt Mediengesellschaft bR	5.2	D5.032
Wenger-Wiethüchter Vermessungstechnik GmbH	25	E25.23
WICHMANN VERLAG im VDE VERLAG GMBH	25	B25.15
Wingtra AG	27	A27.20
Wißner-Verlag GmbH & Co. KG	5.2	D5.032
Wißner-Verlag GmbH & Co. KG	3.2	D3.037
World Geospatial Industry Council	3.2	C3.035
Wuhan Eleph-Print Tech Co., Ltd	25	A25.16
Wuhan Geosun Navigation Technology Co., Ltd.	1.2	C1.025
X		
X-Eye AG	5.2	A5.034
XBuild GmbH	3.2	A3.024
XenomatiX N.V.	25	E25.80
Xer Technologies AG	3.2	D3.027
Xi'an Dadi Surveying &Mapping Co.Ltd	3.2	D3.015
Xi'an Kunlan Electronic Technology Co.Ltd	3.2	D3.015
XI' AN SATVIEW SATCOM CO. , LTD	3.2	D3.015
Xi'an Webber Software Co.Ltd,	3.2	D3.015

Aussteller *Exhibitor*	Halle *Hall*	Stand *Stand*
Y		
Yangzhou Oner Tools Co. Ltd.	25	A25.36
YellowScan	27	E27.44
Yetitmoves Srl	1.2	A1.006b
Z		
ZenaDrone Inc.	5.2	C5.020
Zeusch Aviation BV	25	A25.83
Zhejiang Department of Commerce	25	B25.90
ZHEJIANG JC Antenna Co.,Ltd	1.2	A1.034
ZHEJIANG JC Antenna Co.,Ltd	25	B25.90
ZHEJIANG YUYANG INTELLECTUAL PROPERTY	25	B25.90
Zhejiang Zhengyuan Geographic Information	25	B25.90
ZHEJIANG ZHONGZHIHUIYUN INFOMATION TECHNOLOGY	25	B25.90
Zimmermann Optik GmbH	25	E25.23
Zoller & Fröhlich GmbH	25	C25.53
ZZCOMM Technology (Suzhou) Co. Ltd.	1.2	C1.040



06.

CONFERENCE

KEYNOTE
SPEECHES LOOK
TO THE FUTURE

CONFERENCE PROGRAMME
TUESDAY, 10.10.2023

EUROPEAN UNION
European Regional
Development Fund

09:30 – 11:30 Raum beta 8+9 | DE+EN

1.1.1. OPENING KEYNOTES - INSPIRATION FOR A SMARTER WORLD

09:30 **Begrüßung und Grußworte**
Prof. Dr.-Ing. Rudolf Staiger, DVW Präsident

09:45 **Grußwort Bundesministerium des Innern und für Heimat**
Jörn Thießen, Bundesministerium des Innern und für Heimat

09:55 **Wie gestaltet sich die Zukunft der Geoinformation in Deutschland?**
Prof. Dr. Paul Becker, Präsident, Bundesamt für Kartographie u. Geodäsie

10:10 **Geography and GIS – a platform for sustainability**
Jack Dangermond, Esri Inc., Founder and CEO

10:40 **Trust. Connect. Transform. Unlocking The Power of Geospatial Data**
Scott Crozier, Vice President Survey & Mapping, Trimble

12:00 – 13:00 Raum beta 8+9 | DE+EN

1.1.2. THE POWER OF EARTH OBSERVATION TO UNDERSTAND GOBAL CHALLENGES

Moderation: Godela Roßner, Deutsches Zentrum für Luft- und Raumfahrt e.V.

12:00 **Impacts and perspectives of Earth observation**
Henri Laur, Head of the Mission Management & Product Quality Division of the EO Mission Management & Ground Segment Department

12:20 **COPERNICUS and the Green Deal**
Elisabeth Hamdouch, European Commission, Deputy Head of Unit DEFIS.C3 – Earth Observation

12:40 **Earth observation - an important tool for rational political decisions**
Dr. Anna Christmann, Federal Government Coordinator for Aerospace and BMWK Commissioner for Digital Economy and Start-ups

14:00 – 15:00 Raum beta 8+9 | DE+EN

1.1.3. EARTH OBSERVATION - FROM GLOBAL MONITORING TO LOCAL ACTION

Moderation: Godela Roßner, Deutsches Zentrum für Luft- und Raumfahrt e.V.

14:00 **Overview of Earth Observation applications**
Dr. Martin Lenk, BKG

14:15 **Space-based Earth observation applications for emergency response**
Dr. Michael Judex, Bundesamt für Bevölkerungsschutz und Katastrophenhilfe

14:30 **Benefits of Earth Observation for mining and infrastructure**
Prof. Dr. Ralph Watzel, Präsident, Bundesanstalt für Geowissenschaften und Rohstoffe

14:45 **European EO Industry supports European policies monitoring**
Markus Probeck, Director of the European Association of Remote Sensing Companies (EARSC)

15:30 – 16:30 Raum beta 8+9 | DE+EN

1.1.4. PODIUMSDISKUSSION: SATELLITENFERNERKUNDUNG IN DER GEOINFORMATIONSVERWALTUNG

Moderation: Dr.-Ing. Jens Riecken, Bezirksregierung Köln

15:30 **Verleihung des Geodäsie-Preises an Lea Schollerer**
Prof. Dr. Erich Kanngieser, Vorstandsvorsitzender der Nico Rüpke Stiftung
Prof. Dr.-Ing. Rudolf Staiger, DVW Präsident

15:45 **Satellitenfernerkundung und Künstliche Intelligenz**
Stefan Sandmann, Referent, Innenministerium NRW

15:50 **Landbedeckung aus Satellitenfernerkundung für die Bundesverwaltung**
Dr. Michael Hovenbitzer, BKG

15:55 **Statement zu Innovation durch KI**
Dr. Andreas Müterthies, Leiter Business Development, EFTAS Fernerkundung Technologietransfer GmbH

16:00 **Cop4ALL-DE in Sachsen-Anhalt**
Cordula Jäger-Bredenfeld, Präsidentin, Landesamt für Vermessung und Geoinformation Sachsen-Anhalt

16:05 **Statement aus Nutzersicht**

16:10 **Podiumsdiskussion Satellitenfernerkundung**
Dr. Michael Hovenbitzer, BKG
Stefan Sandmann, Referent, Innenministerium NRW
Cordula Jäger-Bredenfeld, Präsidentin, Landesamt für Vermessung und Geoinformation Sachsen-Anhalt
Dr. Andreas Müterthies, Leiter Business Development, EFTAS Fernerkundung Technologietransfer GmbH

17:00 – 18:00 Raum beta 8+9 | DE+EN

1.1.5. KLIMAANPASSUNGSSTRATEGIEN - GLOBAL UND LOKAL

Moderation: Prof. Dr.-Ing. Annette Eicker, DVW Forum Klimawandel; HCU

17:00 **Geodäsie für Klimawandel und Klimaanpassung**
Prof. Dr.-Ing. Annette Eicker, HafenCity Universität Hamburg

17:05 **CoKLIMAx | Entscheidungsgrundlagen zur klimaresilienten Stadtplanung am Beispiel Konstanz**
Dr. Vanessa Reinhart, Researcher, Climate Service Center Germany (GERICS), Helmholtz-Zentrum Hereon

17:25 **Geodata as a Service als neues Paradigma im Umgang mit Geodaten beim Küstenschutz in Schleswig-Holstein**
Jann Wendt, CEO, north.io GmbH

17:40 **Klimawandel und Klimafolgenanpassung – Aktivitäten der Kreise auf dem Weg zu klimarobusten Regionen**
Dr.-Ing. Stefan Ostrau, Vertreter des Deutschen Landkreistages im Lenkungsgremium GDI-DE; Kreis Lippe

Host: DVW e.V.
Conference organiser: DVW GmbH
Expo organiser: HINTE Expo & Conference GmbH

TUESDAY, 10.10.2023

12:00 – 13:00 Raum beta 6+7 | DE+EN

1.2.2. TECHNOLOGIETRENDS

Moderation: Prof. Dr. Robert Seuß, University of Applied Sciences Frankfurt am Main

12:00 **Cloudbasierte Lösungen für die Verwaltung und Verarbeitung von Geodaten - powered by HxDR**
Jürgen Mayer, President Reality Capture, Hexagon Geosystems division

12:20 **Cross-Plattform Integration durch Digitale Zwillinge**
Dr. Ilka May, CEO, LocLab Consulting GmbH

12:40 **Open.Data für die Stadtentwicklung - Minecraft-Wettbewerb zum mitmachen und AR für die Geschichte**
Christoph Kany, DVW Arbeitskreis "Geodatenmanagement"

14:00 – 15:00 Raum beta 6+7 | DE+EN

1.2.3. THE FUTURE OF GIS

Moderation: Christoph Kany, Leiter DVW-Arbeitskreis Geodatenmanagement

14:00 **Wie sieht ein zeitgemäßes Geodatenmanagement aus? Ein kurzer Impuls aus der Arbeit des DVW**
Christoph Kany, DVW Arbeitskreis "Geodatenmanagement"

14:10 **Geodaten als Beitrag zur Wärmewende**
Andreas Becker, Abteilungsleiter Netz- & Geodaten / Niederlassungsleiter TRIGIS NET GmbH, enercity Netz GmbH

14:25 **Wie man Monteure zu GIS Nutzern macht und dabei Trassenpflege und Versorgungssicherheit verbessert**
Dr. Sophie Crommelinck, Product Owner, Netze BW

14:40 **Podiumsdiskussion**
Christoph Kany, DVW Arbeitskreis "Geodatenmanagement"
Dr. Sophie Crommelinck, Product Owner, Netze BW
Andreas Becker, Abteilungsleiter Netz- & Geodaten / Niederlassungsleiter TRIGIS NET GmbH, enercity Netz GmbH

15:30 – 16:30 Raum beta 6+7 | DE+EN

1.2.4. DATENRÄUME, GAIA-X UND DIENSTE 2.0

Moderation: Susanne Kleemann, DVW-Vizepräsidentin

15:30 **Wie die EU Datenstrategie und Datenräume das Geoinformationswesen betreffen**
Prof. Dr.-Ing. Gerd Buziek, Esri Deutschland GmbH

15:50 **The Marispace-X Projekt: Wie man ein ganzheitliches digitales Ökosystem des Ozeans auf Basis von GAIA-X aufbaut**
Jann Wendt, CEO, north.io GmbH

16:10 **kataster.bev.gv.at – Das österreichische Katasterservice**
DI Philipp Mitterschiffthaler, IT Application Designer, BEV

17:00 – 18:00 Raum beta 6+7 | DE+EN

1.2.5. DIGITALE DATENSOUVERÄNITÄT

Moderation: Prof. Dr. Robert Seuß, University of Applied Sciences Frankfurt am Main

17:00 **From critical networks to (linked) open data – moving different kinds of spatial data to the cloud**
Hans Viehmann, Director Product Management, Oracle Global Services GmbH

17:20 **Mit Cloud und GeoIT die Zukunft gestalten**
Dr. Thore Fechner, Teamleiter, con terra GmbH

17:40 **Digitale Souveränität für die Lösungen des amtlichen Vermessungswesens**
Dipl.-Ing. Elmar Happ, Director Public Sector, Prokurist, VertiGIS GmbH

12:00 – 13:00 Raum beta 5

1.3.2. PANEL DISCUSSION: WGIC METAVERSE REPORT LAUNCH

Moderation: Barbara Ryan, World Geospatial Industry Council (WGIC) | Executive Director

12:00 **Panel Discussion**
Gunter Schreier, German Space Agency (DLR)
Simon Musaues, Hexagon
Hans Viehmann, Oracle Global Services Germany GmbH
Jim Van Rens, RIEGL
Marius Swanepoel, TomTom

15:30 – 16:30 Raum beta 5

1.3.4. POSITIONALE I: POSITIONIERUNG IN INDUSTRIE UND LANDWIRTSCHAFT

Moderation: Prof. Steffen Schön, Leibniz Universität Hannover, Institut für Erdmessung

15:30 **Die mobile Roboterplattform RITA – automatisiertes Positionieren mit Präzision**
Dr.-Ing. Christoph Naab, Karlsruher Institut für Technologie (KIT), Geodätisches Institut

15:50 **Wie die Industrielle Bildverarbeitung von Unsicherheiten profitiert**
Dr.-Ing. Markus Hillemann, Wissenschaftlicher Mitarbeiter, Karlsruher Institut für Technologie (KIT)

16:10 **Kinematische Vermessung für die Digitale Landwirtschaft**
Dr. Lasse Klingbeil, Universität Bonn, Institut für Geodäsie und Geoinformation

17:00 – 18:00 Raum beta 5

1.3.5. POSITIONALE II: PPP/RTK UND GALILEO HIGH ACCURACY SERVICE

Moderation: Prof. Steffen Schön, Leibniz Universität Hannover, Institut für Erdmessung

17:00 **PPP-RTK ein Innovationsprojekt der AdV**
Andreas Gerschwitz, Landesamt für Vermessung und Geoinformation Schleswig-Holstein

17:20 **Sofortiges PPP-RTK unter Verwendung kombinierter Mehrfrequenz-GPS-, Galileo-, BDS- und QZSS-Daten**
Dr. Andreas Brack, GFZ Potsdam

17:40 **Precise Point Positioning with Galileo High Accuracy Service (HAS)**
Dr.-Ing. Patrick Henkel, Gründer und Geschäftsführer, ANavS GmbH

WEDNESDAY, 11.10.2023

09:30 – 10:30 Raum beta 8+9 | DE+EN

2.1.1. SMART CITIES - GEGENWART UND ZUKUNFT

Moderation: Dr.-Ing. Frank Friesecke, Prokurist STEG Stadtentwicklung GmbH

09:30 **Smart Cities – Zwischen Wunsch und Wirklichkeit**
Dr.-Ing. Timo Munzinger, Deutscher Städtetag, Referent Hoch- und Städtebau

09:50 **Das Kooperationsprojekt Connected Urban Twins: Urbane Digitale Zwillinge für die Stadtentwicklung der Zukunft**
Dr. Nora Reinecke, Gesamtprojektleiterin, Connected Urban Twins

10:10 **gemeinsam digital - Smart City Projekte in Berlin (AT)**
Magdalena Konieczek-Woger, Senatsbauverwaltung Berlin

11:00 – 12:00 Raum beta 8+9 | DE+EN

2.1.2. PODIUMSDISKUSSION ZUM PROJEKT CONNECTED URBAN TWINS (CUT)

Moderation: Ulrich Gellhaus , Landesamt GeoInformation Bremen

11:00 **Podiumsdiskussion zum Projekt Connected Urban Twins**
Dr. Nicole Schubbe, Landesbetrieb für Geoinformation und Vermessung Hamburg
Mathias Boedecker, GeodatenService Leipzig
Mandana Moshrefzadeh, GeodatenService München
Dr. Nora Reinecke, Gesamtprojektleiterin, Connected Urban Twins

13:30 – 14:30 Raum beta 8+9 | DE+EN

2.1.3. DER WEG ZUR SMART CITY - EINSATZ VON SENSOREN

Moderation: Dr. Torben Stefani, Stadtverwaltung Erfurt, Amtsleiter

13:30 **Smart City – Mobile & Luftgestützte Sensoren für die Digitalisierung von Städten**
Christian Schäfer, Business Director Mobile Mapping, Leica Geosystems, part of Hexagon
Klaus Neumann, Vice President Sales, Hexagon Geosystems Division

14:00 **Smart City: Dynamische Digital Twins mit Sensordaten**
Christoph Zonsius, Head of Sales State and Local Government, Esri Deutschland GmbH

15:00 – 16:00 Raum beta 8+9 | DE+EN

2.1.4. ECHTZEITANWENDUNGEN FÜR DIGITALE ZWILLINGE (IOT)

Moderation: Christoph Kany, Leiter DVW-Arbeitskreis Geodatenmanagement

15:00 **Urbanes eScooter-Management mit Hilfe Digitaler Zwillinge**
Sonja Löwa, LB Geoinformation und Vermessung Hamburg

15:20 **Digital Twin Technology as a new approach for Infrastructure Management**
Elshan Musayev, Consultant, EKM Global Consulting GmbH

16:30 – 17:30 Raum beta 8+9 | DE+EN

2.1.5. URBANE DIGITALE ZWILLINGE – INNOVATIONSMOTOREN FÜR DEUTSCHE STÄDTE UND KOMMUNEN? - DIN SPEC 91607 ERSCHLIESST DIE DIGITALE WERTSCHÖPFUNGSKETTE

Moderation: Joachim Schonowski, Principal Consultant Smart Sustainable City msg systems ag und Vorsitzender DIN Smart City Standards Forums

16:30 **Kann man einen Zwilling standardisieren?**
Joachim Schonowski, Principal Consultant Smart Sustainable City msg systems ag und Vorsitzender DIN Smart City Standards Forum

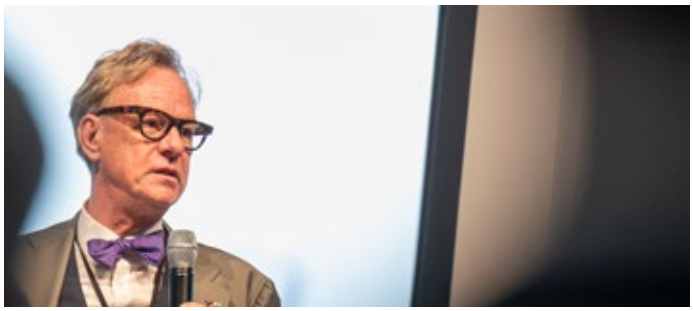
16:35 **Was haben Digitale Zwillinge mit Raketenwissenschaften zu tun?**
Prof. Dr.-Ing. Jörg Blankenbach, RWTH Aachen University, Geodätisches Institut

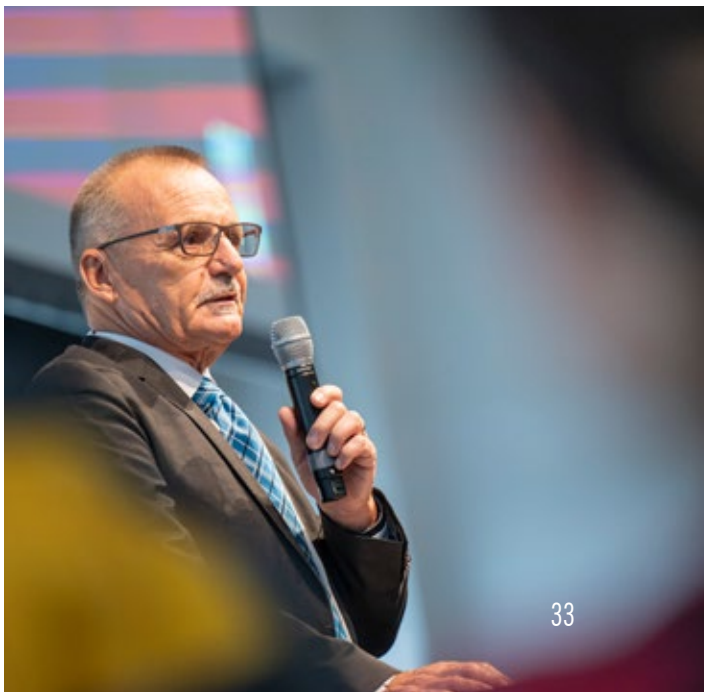
16:40 **BIM – ein Informationslieferant für den urbanen digitalen Zwilling? Können digitale Zwillinge die BIM-Informationsmanagement-Strategie sinnvoll nutzen?**
Ulrich Hartmann, ORACLE Construction and Engineering Global Business Unit

16:45 **Urbane Digitale Zwillinge aus der Sicht der Städte**
Markus Mohl, Vorsitzender des Arbeitskreises Geoinformation (Deutscher Städtetag) und Leiter des Kompetenzzentrums Digitaler Zwilling München, GeodatenService München

16:50 **Kommunale Digitale Zwillinge – neue Chancen für eine Stadtentwicklung auf Augenhöhe**
Ludmilla Middeke, Stellvertretende Amtsleitung und Seniorprojektmanagerin für Strategie- und Innovationsentwicklung im Digitalisierungsbüro der Stadt Bielefeld

16:55 **Podiumsdiskussion Standardisierung für Smart Cities**
Ulrich Hartmann, ORACLE Construction and Engineering Global Business Unit
Ludmilla Middeke, Stellvertretende Amtsleitung und Seniorprojektmanagerin für Strategie- und Innovationsentwicklung im Digitalisierungsbüro der Stadt Bielefeld
Markus Mohl, Vorsitzender des Arbeitskreises Geoinformation (Deutscher Städtetag) und Leiter des Kompetenzzentrums Digitaler Zwilling München, GeodatenService München
Prof. Dr.-Ing. Jörg Blankenbach, RWTH Aachen University, Geodätisches Institut





WEDNESDAY, 11.10.2023

09:30 – 10:30 Raum beta 6+7 | DE+EN

2.2.1. PODIUMSDISKUSSION ZUR BEDEUTUNG VON BIM IN DEUTSCHLAND

Moderation: Prof. Dr.-Ing. Jörg Blankenbach, RWTH Aachen University, Geodätisches Institut

09:30 **Statement aus Sicht der Politik**
Fehn Krestas, Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen

09:40 **Statement aus Sicht der Bundesingenieurkammer**
Dr.-Ing. Heinrich Bökamp, Präsident, Bundesingenieurkammer Berlin

09:45 **Statement aus Sicht des Bund Deutscher Baumeister**
Friederike Proff, Vizepräsidentin Bund Deutscher Baumeister

09:50 **Statement aus Sicht der Industrie**
Thomas Janka, Customer Experience Manager, Trimble Structures

09:55 **Podiumsdiskussion**
Thomas Janka, Customer Experience Manager, Trimble Structures
Fehn Krestas, Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen
Friederike Proff, Vizepräsidentin Bund Deutscher Baumeister
Dr.-Ing. Heinrich Bökamp, Präsident, Bundesingenieurkammer Berlin

11:00 – 12:00 Raum beta 6+7 | DE+EN

2.2.2. BIM, GIS UND DIGITALE ZWILLINGE: EINSATZFELDER, CHANCEN UND AUSBLICK

Moderation: Prof. Dr.-Ing. Christian Hesse, DVW-Vizepräsident; dhp:i Vermessung

11:00 **BIM, GIS und digitale Zwillinge: Einsatzfelder, Chancen und Ausblick**
Ralf Mosler, Leader BIM Transformation, Autodesk

11:20 **Die Zukunft des Infrastrukturbaus: Herausforderungen, Umbrüche, Innovationen & praktische Beispiele**
Sebastian Pache, Head of AEC, Esri Deutschland GmbH

11:40 **BIM und Digitale Zwillinge – Einsatzfelder, Chancen und wie sich die Technologien ergänzen**
Fabio Ponzio, Executive Vize President Hexagon Geosystems Division

13:30 – 14:30 Raum beta 6+7 | DE+EN

2.2.3. INFRASTRUKTUR-BIM – STRATEGIE UND UMSETZUNG

Moderation: Dr.-Ing. Ines Prokop, BVBS e.V., Geschäftsführerin

13:30 **Digitaler Zwilling für die Straße der Zukunft**
Prof. Dr.-Ing. Jörg Blankenbach, RWTH Aachen University, Geodätisches Institut

13:50 **Implementierung der BIM-Methodik bei der Deutschen Bahn AG**
Dipl.-Kfm. Candy Friauf, Beauftragter der Deutschen Bahn AG für BIM-Infrastruktur, Deutsche Bahn AG

14:10 **Erhaltungsmanagement unterstützt durch BIM-basierte Zustands- und Schadensvisualisierung im Pilotprojekt A 10/A 24**
Anne-Sophie Knappe, Digital Construction, Wayss&Freytag Ingenieurbau AG

15:00 – 16:00 Raum beta 6+7 | DE+EN

2.2.4. INNOVATIVE BIM-ANSÄTZE AUS ANWENDERSICHT

Moderation: Gunther Wölfle, Geschäftsführer, buildingSMART

15:00 **Entwicklung eines abgestimmten BIM-Klassenkatalogs für die Wasserwirtschaft**
Daniel Wüst, Björnsen Beratende Ingenieure GmbH

15:20 **Whitepaper BIM und GIS erste Ergebnisse/Empfehlungen**
Dipl. Ing. (TU) Markus Hochmuth, CEO / Vorstandsmitglied, OBERMEYER Digital Solution GmbH / buildingSMART Deutschland

15:40 **BIM Klassen der Verkehrswege**
Arnulf Pucher, STRABAG AG

16:30 – 17:30 Raum beta 6+7 | DE+EN

2.2.5. INNOVATIVE BIM-MODELLIERUNG IN DER INFRASTRUKTURPLANUNG

Moderation: Uwe Hüttner, BVBS und CEO IB&T Software GmbH

16:30 **DIN SPEC GEO-Referenzierung von BIM-Modellen**
Prof. Dr.-Ing. Christian Clemen, HTW Dresden

16:50 **Smarte parametrisierte Straßenmodellierung**
Marius Reuters, IB&T Software GmbH

17:10 **Parametrisierte Brückenplanung**
Dr. Martin Siffling, Sofistik AG

DEUTSCHER KARTOGRAPHIE KONGRESS DURCHGEFÜHRT VON /
GERMAN CARTOGRAPHY CONGRESS CONDUCTED BY

DGfK

WEDNESDAY, 11.10.2023

09:30 – 10:30 Raum beta 5

2.3.1. KEYNOTE: GENERALISIERUNG MIT MACHINE LEARNING-VERFAHREN

Moderation: Prof. Dr. Jochen Schiewe, Präsident DGfK

09:30 **Generalization using Machine Learning**
Prof. Monika Sester, Professorin, Institut für Kartographie und Geoinformatik, Leibniz Univ. Hannover

10:00 **Verleihung der Ehrenmitgliedschaft an Prof. Dr. Wolf Günther Koch**

10:10 **Kartographie in Zeiten halluzinierender Maschinen**
Prof. Dr. Sebastian Meier, Interaction Design Lab, Fachhochschule Potsdam

11:00 – 12:00 Raum beta 5

2.3.2. SMART MAPPING

Moderation: Dr.-Ing. Anja Hopfstock, Bundesamt für Kartographie und Geodäsie

11:00 **Die neue basemap.de geht online**
Dr. Markus Seifert, Bayerische Vermessungsverwaltung

11:15 **Next Generation Map**
Karsten Pippig, Projektkoordinator, swisstopo

11:30 **Kartenherstellung von weltweiten zoombaren Karten am Beispiel von OpenStreetMap**
Mathias Gröbe, WhereGroup

11:45 **Digitale, proaktive Verkehrssicherheitskarte als Beitrag zur Verbesserung der Straßeninfrastruktur und für sicheres Routing**
Arno Wolter, Initiative für sichere Straßen GmbH, Geschäftsführer

13:30 – 14:30 Raum beta 5

2.3.3. AKTUELLE ENTWICKLUNGEN

Moderation: Prof. Dr. Mark Vetter, DGfK - Sprecher der Kommissionen

13:30 **Empirisch ermittelte Minimaldimensionen für kartographische Signaturen auf Smartphones**
Dr. Florian Ledermann, Senior Lecturer, TU Wien

13:45 **Geomatik-Ausbildung mal anders: vom Pilgerweg zum Brettspiel**
Erik Hannibal, LGB (Landesvermessung und Geobasisinformation Brandenburg)

14:00 **Dialogbasierte Gamification-Elemente für den Geographieunterricht mit VR**
Marco Weißmann, Wissenschaftlicher Mitarbeiter, Ruhr-Universität Bochum

14:15 **Hochwasserlagen und Risikoanalyse unterstützt durch Social Media Crowdsourcing und hochpräzises Laser Scanning**
Dr.-Ing. Yu Feng, Technische Universität München

15:00 – 16:00 Raum beta 5

2.3.4. NEUESTE ENTWICKLUNGEN IN ATLASFORSCHUNG UND-DESIGN

Moderation: Eric Losang, Leibniz-Institut für Länderkunde

15:00 **Storytelling in Interaktiven Atlanten – Gestaltung und Einsatz von Stories im Atlas der Schweiz**
Dr. René Sieber, ehem. Projektleiter , ETH Zürich, Institut für Kartografie und Geoinformation

15:20 **Versuchsballon hybrider Atlas – von Startschwierigkeiten und dünner Luft**
Jakob Listabarth, ITC – University of Twente's Faculty of Geo-Information Science and Earth Observation

15:40 **Crowdsourcing für Atlasproduktionen - Erfahrungen mit dem "SDG's in action"-Atlas**
Dr. techn. Markus Jobst, Forschungsgruppe Kartographie, Department für Geodäsie und Geoinformation, TU Wien

16:30 – 17:00 Raum beta 5

2.3.5. KARTENKURATION

Moderation: Wolfgang Crom, Staatsbibliothek Berlin

16:30 **Geodaten in Bibliotheken**
Dr. Martin Jeske, Leitung Referat Digitale Kartographie und Geodaten, Staatsbibliothek zu Berlin - Preußischer Kulturbesitz

16:45 **Eine Kartensammlung mit landesbibliothekarischen Aufgaben**
Martin Scheuplein, Leiter der Kartensammlung, Universitäts- und Landesbibliothek Sachsen-Anhalt

17:00 **Kartographien Afrikas und Asiens (1800-1945). Ein Digitalisierungsprojekt zur Sammlung Perthes**
Dr. Petra Weigel, Abteilungsleiterin Sammlung Perthes, Forschungsbibliothek Gotha der Universität Erfurt

17:15 **Koordinatenbasierte Erschließung und Recherche**
Marc Friede, Herder-Institut für historische Ostmitteleuropaforschung, Kartensammlung

THURSDAY, 12.10.2023

09:30 – 10:30 Raum beta 8+9 | DE+EN

3.1.1. ZUKUNFTSTHEMEN DER AMTLICHEN GEOINFORMATIONSVERWALTUNGEN

Moderation: Dr.-Ing. Jens Riecken, Bezirksregierung Köln

09:30 **Impuls zu Zukunftsthemen der amtlichen Geoinformationsverwaltungen**
Karin Schultze, Stellvertretende Vorsitzende AdV

09:50 **Podiumsdiskussion zu Zukunftsthemen der amtlichen Geoinformationsverwaltungen**
Dr.-Ing. Jens Riecken, Bezirksregierung Köln
Kerstin Will, Innenministerium NRW
René Käker, Leiter AdV-Arbeitskreis IK
Karin Schultze, Stellvertretende Vorsitzende AdV
Ulrich Gellhaus, Amtsleiter, Landesamt GeoInformation Bremen

11:00 – 12:00 Raum beta 8+9 | DE+EN

3.1.2. BASIS DLM UND ALKIS IN ZEITEN VON SPATIAL DATA HUBS... - GEOBASIS DE - DIE ZEIT IST REIF!

Moderation: Dr.-Ing. Christian Lucas, Landesamt für Vermessung und Geoinformation Schleswig-Holstein

11:00 **Einführung und Impuls durch Christian Lucas**

11:10 **Schleswig-Holstein auf dem Weg zur GeoBasis SH**
Cornelia Weber, Direktorin, Landesamt für Vermessung und Geoinformation Schleswig-Holstein

11:15 **Statement Rheinland-Pfalz**
Dr.-Ing. Marcel Weber, Abteilungsleiter & Vizepräsident, Landesamt für Vermessung und Geobasisinformation Rheinland-Pfalz

11:20 **Statement Arbeitskreis Geotopographie der AdV**
Steffen Patzschke, Leiter des Arbeitskreises Geotopographie der AdV, Ministerium für Infrastruktur und Digitales Sachsen-Anhalt

11:25 **Statement ALKIS Modellpflege der AdV**
Ralf Pauly, Leitung Projektgruppe ALKIS des AK LIKA, Arbeitsgemeinschaft der Vermessungsverwaltungen der Länder der Bundesrepublik Deutschland (AdV)

11:30 **Zum Einsatz des ATKIS Basis-DLM im Flächennutzungsmonitoring – ein Erfahrungsbericht**
Dr. Gotthard Meinel, Leibniz-Institut für ökologische Raumentwicklung e.V. Dresden

11:35 **Podiumsdiskussion GeoBasisDE**
Ralf Pauly, Leitung Projektgruppe ALKIS des AK LIKA, Arbeitsgemeinschaft der Vermessungsverwaltungen der Länder der Bundesrepublik Deutschland (AdV)
Dr.-Ing. Marcel Weber, Abteilungsleiter & Vizepräsident, Landesamt für Vermessung und Geobasisinformation Rheinland-Pfalz
Cornelia Weber, Direktorin, Landesamt für Vermessung und Geoinformation Schleswig-Holstein
Steffen Patzschke, Leiter des Arbeitskreises Geotopographie der AdV, Ministerium für Infrastruktur und Digitales Sachsen-Anhalt
Dr. Gotthard Meinel, Leibniz-Institut für ökologische Raumentwicklung e.V. Dresden

13:30 – 14:30 Raum beta 8+9 | DE+EN

3.1.3. DISKUSSIONSRUNDE DES BDVI ZUR THEMATIK „WOHNUNGS- UND TEILEIGENTUM – AUFGABE DER GEODÄTEN“

Moderation: Michael Zurhorst, BDVI e.V.

13:30 **Wohnungs- und Teileigentum - Aufgabe der Geodäten**
Michael Zurhorst, Präsident, BDVI e.V.

13:35 **Stockwerkeigentum, ein Uberblick über die Schweiz**
Maurice Barbieri, Manager, Géodétec SA

13:35 **Statement Dietrich Kollenprat**
Dipl.-Ing. Baurat h.c. Dietrich Kollenprat, Vormals selbständig als Zivilingenieur für Vermessungswesen; nun noch Gerichtssachverständiger und Delegierter der BAIK

13:50 **Abgeschlossenheitsbescheinigungen durch Geodäten!**
Christian Wieck, Geschäftsführung, Ingenieursozietät Rek & Wieck

13:50 **Statement Dr. Egbert Kümmel**
Dr. Egbert Kümmel, Rechtsanwalt und Notar, Wanderer und Partner Rechtsanwältinnen und Rechtsanwälte PartGmbB

13:55 **Podiumsdiskussion zum Nachweis von Wohnungs-/ Sondereigentum**
Dr. Egbert Kümmel, Rechtsanwalt und Notar, Wanderer und Partner Rechtsanwältinnen und Rechtsanwälte PartGmbB
Dipl.-Ing. Baurat h.c. Dietrich Kollenprat, Vormals selbständig als Zivilingenieur für Vermessungswesen; nun noch Gerichtssachverständiger und Delegierter der BAIK
Christian Wieck, Geschäftsführung, Ingenieursozietät Rek & Wieck
Maurice Barbieri, Manager, Géodétec SA

15:00 – 16:00 Raum beta 8+9 | DE+EN

3.1.4. DIGITALISIERUNGSSTRATEGIEN IM LIEGENSCHAFTSKATASTER

Moderation: Dr.-Ing. Jens Riecken, Bezirksregierung Köln

15:00 **Möglichkeiten und Grenzen der digitalen Fortführung des Liegenschaftskataster durch beliehene Vermessungsingenieure (ÖbVI) in Schleswig-Holstein**
Steffen Burkhardt, Referent für Vermessung und Geoinformation, Ministerium für Inneres, Kommunales, Wohnen und Sport des Landes Schleswig-Holstein

15:20 **Berliner Liegenschaftskataster in der Open Telekom Cloud**
Dipl.-Ing. Anette Blaser, Referatsleiterin Geobasisinformationssysteme, Senatsverwaltung für Stadtentwicklung, Bauen und Wohnen

15:40 **Podiumsdiskussion**
André Schönitz, Vorsitzender der AdV
Dipl.-Ing. Anette Blaser, Referatsleiterin Geobasisinformationssysteme, Senatsverwaltung für Stadtentwicklung, Bauen und Wohnen
Steffen Burkhardt, Referent für Vermessung und Geoinformation, Ministerium für Inneres, Kommunales, Wohnen und Sport des Landes Schleswig-Holstein
Clemens Kiepke, BDVI e.V. - Vizepräsident

THURSDAY, 12.10.2023

09:30 – 10:30 Raum beta 6+7 | DE+EN

3.2.1. PODIUMSDISKUSSION: ENERGIEWENDE – OHNE RÜCKSICHT AUF (FLÄCHEN-)VERLUSTE?

Moderation: Andreas Grotendorst, Bürgermeister a.D.
Moderation: Dagmar Bix, Bezirksregierung Münster

09:30 **Begrüßung durch Dagmar Bix und Andreas Grotendorst**

09:35 **Statement Jonas Böhm**
Jonas Böhm, Wissenschaftlicher Mitarbeiter, Thünen-Institut für Betriebswirtschaft

09:40 **Statement Heiko Knopf**
Dr. Heiko Knopf, Stellvertretender Bundesvorsitzender, BÜNDNIS 90/DIE GRÜNEN

09:45 **Statement: Theresa Kärtner**
Theresa Kärtner, Referentin für Erneuerbare Energien und Gesellschaftspolitik , Deutscher Bauernverband e.V.

09:50 **Podiumsdiskussion zur Energiewende**
Jonas Böhm, Wissenschaftlicher Mitarbeiter, Thünen-Institut für Betriebswirtschaft
Dr. Heiko Knopf, Stellvertretender Bundesvorsitzender, BÜNDNIS 90/DIE GRÜNEN
Theresa Kärtner, Referentin für Erneuerbare Energien und Gesellschaftspolitik , Deutscher Bauernverband e.V.

11:00 – 12:00 Raum beta 6+7 | DE+EN

3.2.2. PODIUMSDISKUSSION: "BLEIBT ALLES ANDERS? - BAULANDUMLEGUNG 2030!"

Moderation: Prof. Dr.-Ing. Alexandra Weitkamp, TU Dresden

11:00 **Begrüßung Alexandra Weitkamp**
Prof. Dr.-Ing. Alexandra Weitkamp, TU Dresden

11:05 **Berücksichtigung neuer Infrastruktursysteme in der Baulandumlegung**
Prof. Dr.-Ing. Hans-Joachim Linke, Fachgebietsleiter Landmanagement, TU Darmstadt

11:10 **Statement Susanne Klinke**
Susanne Klinke, Fachbereich Planen und Stadtentwicklung Hannover

11:15 **Bereitstellung von Flächen für den Sozialen Wohnungsbau und Klimaschutz**
Dr. Torben Stefani, Amtsleiter, Stadt Erfurt

11:20 **Podiumsdiskussion Baulandumlegung**
Dr. Torben Stefani, Amtsleiter, Stadt Erfurt
Prof. Dr.-Ing. Hans-Joachim Linke, Fachgebietsleiter Landmanagement, TU Darmstadt
Susanne Klinke, Fachbereich Planen und Stadtentwicklung Hannover
Prof. Dr.-Ing. Alexandra Weitkamp, TU Dresden

13:30 – 14:30 Raum beta 6+7 | DE+EN

3.2.3. NACHHALTIGKEIT IN DER IMMOBILIENBRANCHE (ESG)

Moderation: Dr. Monika Teigel, GLS ImmoWert GmbH
Moderation: Albert Fittkau

13:30 **Verleihung DVW-Promotionspreis an Matthias Soot**
Prof. Dr.-Ing. Rudolf Staiger, DVW Präsident

13:40 **ESG und Real Estate - Impulsvortrag Regulatorik**
Sabine Wieduwilt, Partner, Rechtsanwalt, Dentons Europe (Germany) GmbH & Co. KG

13:55 **ESG, Nachhaltigkeit und Immobilienbewertung: etwas Grundsätzliches und etwas Praktisches**
Dr. Matthias Morgenstern, GLS ImmoWert GmbH

14:10 **Immobilienbewertung via KI als effizientes Werkzeug im ESG-Kontext**
Christian Sauerborn, MRICS, COO Sprengnetter AVM, Sprengnetter Immobilienbewertung

15:00 – 16:00 Raum beta 6+7 | DE+EN

3.2.4. PODIUMSDISKUSSION: ESG - AUSWIRKUNGEN AUF DIE BEWERTUNG

Moderation: Dr. Monika Teigel, GLS ImmoWert GmbH
Moderation: Albert Fittkau

15:00 **Podiumsdiskussion ESG - Auswirkungen auf die Bewertung**
Sabine Wieduwilt, Partner, Rechtsanwalt, Dentons Europe (Germany) GmbH & Co. KG
Christian Sauerborn, MRICS, COO Sprengnetter AVM, Sprengnetter Immobilienbewertung
Dr. Matthias Morgenstern, GLS ImmoWert GmbH

THURSDAY, 12.10.2023

09:30 – 10:30 Raum beta 5

3.3.1. INGENIEURGEODÄSIE

Moderation: Prof. Dr.-Ing. Ingo Neumann, Leibniz-Universität Hannover und DVW Arbeitskreis 4

09:30 **Details zur Selbstkalibrierung eines Vermessungsinstrumentes am Beispiel des Trimble X9**
Michael Vogel, Leiter der Systemgruppe & Stellvertretender Geschäftsführer Trimble Jena GmbH, Trimble

09:50 **Qualitätssicherung mobiler Plattformen aus geodätischer Sicht**
Dominik Ernst, Wissenschaftlicher Mitarbeiter, Leibniz Universität Hannover

10:10 **Neue Wege in der Bauwerksprüfung: Beitrag von 3D-Punktwolken zur flächenhaften Überprüfung von Stahl- und Stahlverbundbrücken**
Dr.-Ing. Brigitte Husen, Die Autobahn GmbH des Bundes

11:00 – 12:00 Raum beta 5

3.3.2. TRENDS FÜR PROZESSIERUNG VON 3D-PUNKTWOLKEN

Moderation: Prof. Dr.-Ing. Christoph Holst, TU München und DVW Arbeitskreis 8

11:00 **Von kinematisch erfassten Punktwolken zu hochgenauen Oberflächenmodellen für die Simulation**
Dr.-Ing. Sebastian Tuttas, Head of Software Development, 3D Mapping Solutions GmbH

11:20 **Punktwolken und KI (AT)**
Dr. Rico Richter, Point Cloud Technology

11:40 **Auswertung von Mobile Mapping Daten mit KI für den beschleunigten Glasfaserausbau in Deutschland**
Prof. Dr. Alexander Reiterer, Fraunhofer Institute for Physical Measurement Techniques IPM

13:30 – 14:30 Raum beta 5

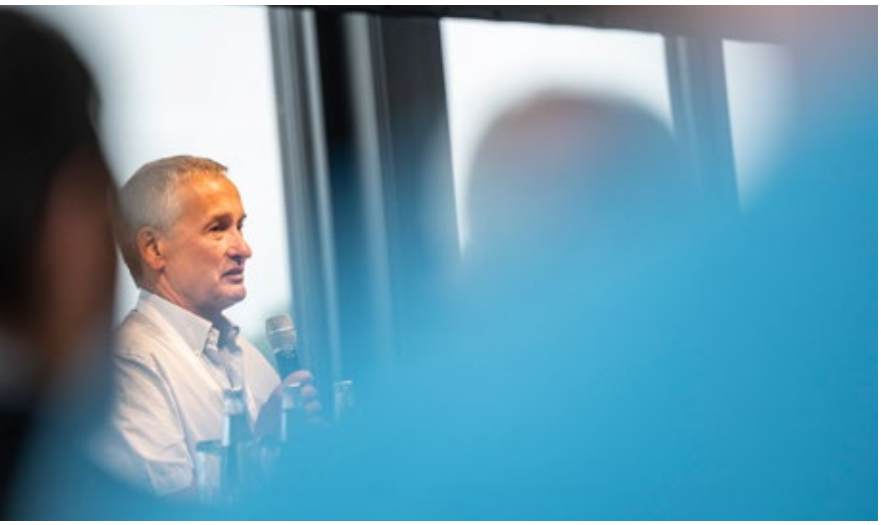
3.3.3. EINSATZ VON KI FÜR NACHHALTIGE ANWENDUNGEN

Moderation: Wilfried Grunau, Präsident VDV

13:30 **KI4Forst – Waldmonitoring mit Satellitendaten und KI**
Ralph Schmidt, Landesamt für Vermessung und Geoinformation Schleswig-Holstein

13:50 **Geo Data Science für die Energiewende am Beispiel der Standortbewertung für Kleinwindenergieanlagen**
Prof. Dr. Sascha Koch, Jade Hochschule - Institut für Angewandte Photogrammetrie und Geoinformatik (IAPG)

14:10 **Bremen lebenswert gestalten: Lösungen für ein verbessertes Stadtklima**
Ulrich Gellhaus, Amtsleiter, Landesamt GeoInformation Bremen



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DHyG
buildingSMART Deutschland
BVBS Bundesverband Bausoftware e.V.
DLR German Space Agency at DLR
WGIC World Geospatial Industry Council
BIM-TAGE DEUTSCHLAND 2023
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DVW

Host: DVW e.V.
Conference organiser: DVW GmbH
Expo organiser: HINTE Expo & Conference GmbH

07.

INSIGHTS FROM INTERGEO 2023

INSIGHTS FROM INTERGEO

THE POWER OF EARTH OBSERVATION

Space is the best place from which to observe Earth.

To understand global changes, you need to view them from space. That is according to Dr. Godela Rossner, who hosted the conference session entitled "The power of Earth observation to understand global challenges". Henri Laur, Head of EO Mission Management at ESA, spoke about ESA's Earth observation and research missions in his presentation, which he started with the statement "Space is the best place from which to observe Earth". Laur gave his audience numerous examples, including both optical and radar missions – from the oil pollution caused by the Prestige oil tanker that sank off the coast of Spain in 2002, the drought index in Europe and precise measurement of the rise in sea levels and NO2 levels to magnetic field changes and overviews of the situation following natural disasters such as the devastating earthquake in Turkey and Syria. The best thing about Sentinel data is that it is a public good and available free of charge as open data. According to Laur, collaborations with commercial service providers are explicitly welcome. In further presentations, Elisabeth Hamdouch from the European Commission made reference to the outstanding role played by the European Earth observation system Copernicus. She explained that, in the context of the European Union's zero-emissions policy, Copernicus supplies data for areas such as the construction industry, mobility planning, the industrial transformation and agriculture. Hamdouch, too, mentioned the numerous possibilities for collaboration. Member of the German Bundestag and Federal Government Aerospace Coordinator Dr. Anna Christmann emphasised Earth observation data's value to society, the economy and the environment. She also referred to Germany's satellite mission EnMAP (Environmental Mapping and Analysis Program) to highlight climate-relevant processes, which was launched in April 2022.

DR. GODELA ROSSNER
Head of Earth Observation at the German Space Agency, DLR

GEOGRAPHY AND GIS – THE FOUNDATION FOR SUSTAINABILITY

Esri CEO Jack Dangermond talks about the huge potential of the universal language of geodata.

"The time is yours!" were the opening words of Jack Dangermond, founder and CEO of the GIS software company Esri, in his widely acclaimed keynote speech before an audience of geodesy, geoinformation and land management experts at INTERGEO 2023. He emphasised that time is on the side of geographers and GIS experts, because they are the foundation for a sustainable future. Dangermond continued by explaining that, as an earth science, geography teaches people to see and understand and is the basis for identifying sustainable practices. He made reference to the now world-famous John Hopkins map showing the geographical distribution of coronavirus infections, which over four billion people used to track how the virus was spreading across the globe.

Dangermond also described geography as a universal language that is more important than ever given that the limits of what is possible have been reached. "We are living beyond our means," he insisted, adding that what is important now is to develop a shared understanding of our planet's ecosystem to overcome the critical challenges of our time. According to Dangermond, sustainability starts with geography. As a foundation for digital twins, GIS enables people to understand consequences, to model scenarios and to use this as a basis for reaching the necessary decisions. No other science can predict as accurately what awaits us.

In his view, the huge potential of geographical data will only be realised if the resulting digital twins come together in a dynamic, living and open system of digital twins. Artificial intelligence will bring about significant progress in the interpretation of images and will change many industries. A ray of hope – over 650,000 organisations are working with Esri tools alone. Across the globe, a growing number of stakeholders from the worlds of science, business and public administration are relying on geo-based technology to protect the foundations for future generations. Dangermond made the following appeal to his audience: "We must act now!"

JACK DANGERMOND
Founder and president of Esri

UAV FIRMLY ESTABLISHED IN SURVEYING

UAV DACH e.V. – the Unmanned Aviation Association – presented a number of applications and innovations on the Unmanned Systems Stage at INTERGEO.

UAV DACH provided an insight into UAVs and associated solutions at INTERGEO in Berlin. What new findings did you take with you from the event?

It's impressive to see how firmly unmanned aviation systems have already become established in surveying. It's now a case of using them as efficiently as possible and processing data effectively – using automated solutions as far as possible and with optimum data quality. Networking stakeholders and ensuring the best possible sharing of information is an important task of INTERGEO and a key objective of UAV DACH – a perfect fit.

UAVs are established tools in the geosector. Which applications impressed you at INTERGEO?

What impressed me at INTERGEO were the increasingly sophisticated sensors to obtain data and the ever-better software solutions for automated data processing. Top-quality data is being collected ever more quickly, including different data on a single flight in some cases, and transport tasks are being undertaken at the same time. That will result in commercial progress for the drone economy, which will benefit everyone.

On a scale of 1 to 10, how important are UAVs when it comes to finding sustainable solutions for the planet?

Definitely a 10! Drones are, in themselves, already a sustainable technology that will play a key role in shaping all climate-friendly air traffic. What's more, not only can more resource-friendly solutions for surveying applications be implemented using drones, but also solutions for the emergency services, logistics, agriculture and other sectors.

Thank you for talking to us, Mr. Wieland.

MICHAEL WIELAND
Manager Head Office
UAV DACH

ARTIFICIAL INTELLIGENCE AND EARTH OBSERVATION – TRENDS AND OPPORTUNITIES

Earth observation solutions offer excellent market potential.

The discussion forum hosted by Muthukumar Kumar relating to artificial intelligence (AI) and Earth observation brought together representatives from technology companies and the worlds of consulting and science to explore the potential of artificial intelligence in interpreting mass data from Earth observation. Aleksander Buczkowski, Director of the Global Centre of Excellence in Drone and Earth Observation Technologies at auditing and consultancy company PricewaterhouseCoopers (PwC), Annett Wania from the Earth observation company Planet, Arnis Kadakovskis from the EU Agency for the Space Programme, Laura Costa, co-founder of the data company tilebox, and Dobrina Laleva from the technology company Up42 all took part in the constructive and controversial discussion. Everyone agreed that there is great market potential in Earth observation solutions, that standardising data and processes is a key element in allowing the sector to grow, and that rapid access to data is a must to leverage its value. Amongst other things, the participants see potential in agriculture and forestry and in the protection of resources. They emphasised that drones and satellite data can complement one another – the two technologies are not in competition – and that combining them is also a conceivable option. Earth observation data must become even more local and its temporal density must increase further still. The participants are open to the increased use of AI in Earth observation and have great expectations. They believe that this can generate significant added value in virtually all possible applications and "change things for the better". "We are at the start of our journey with AI," said Buczkowski, adding that a great deal will be happening in the next three to five years. According to Wania from Planet, what we need is a ChatGPT for geospatial data to "penetrate the tsunami of data". The revolution has only just started!

HOST: MUTHUKUMAR KUMAR
GEOAWESOMENESS
SPEAKER: ARNIS KADAKOVSKIS
EU Agency for the Space Programme, Consultant, Market, Downstream and Innovation
ANNETT WANIA
Planet, Senior Manager, Earth Observation Lab
ALEKSANDER BUCZKOWSKI
PwC, Director, Global Centre of Excellence in Drone and Earth Observation Technologies
LAURA COSTA
Tilebox, Co-founder
DOBRINA LALEVA
UP42, Senior Product Marketing Manager

SMART CITIES – PRESENT AND FUTURE

Understanding cities and planning them sustainably.

Dr. Timo Munzinger from the German Association of Cities, a speaker during the "Smart cities – present and future" conference session, explained that smart cities are helping to tackle all challenges that are of relevance to municipalities, but that they cannot solve everything. He gave examples such as serious infrastructure damage, the space requirements of the new mobility mix that is needed for the mobility transition, and the resilience of cities and municipalities after shock events such as extreme weather. Munzinger presented smart city projects such as the participation platform in Münster, car-to-city communication in Kaiserslautern, the smart irrigation of trees in Bochum and a barrier-free guidance system in Lemgo and Kalletal. He described smart city projects as municipal services that should always aim to improve the local quality of life. He also referred to the risks of overmechanisation and unbudgeted follow-on costs of digitalisation projects. Munzinger said the important things during implementation were a cross-departmental strategy, a high level of public involvement and integrated urban planning. He added that project evaluation should not be neglected. Dr. Nora Reinecke, Overall Project Lead of the Connected Urban Twins project that won a DVW award in 2022, outlined the developments in the pilot cities of Leipzig, Munich and Hamburg. Magdalena Konieczek-Woger from the Smart City model project in Berlin presented pilot projects that form part of Berlin's smart city strategy "Together Digital: Berlin", including Kiezbox 2.0 – Data in Everyday Life and Crisis, Smart Space Hardenbergplatz, which is intended to transform mobility, and "Smart Water", which aims to make the city's areas of water and green spaces climate-friendly. DVW Vice-President Dr. Frank Friesecke guided the audience through the programme.

DR. TIMO MUNZINGER
Deutscher Städtetag

DIGITAL TWINS OF THE OCEANS

A brief interview with Prof. Martin Visbeck from GEOMAR about maritime solutions.

PROF. DR. MARTIN VISBECK
GEOMAR

At the GEOMAR Helmholtz Centre for Ocean Research, you also look at the role of the ocean in relation to climate change. Is enough attention paid to the ocean in climate research?

Even though it covers two-thirds of the Earth's surface and absorbs 90 percent of excess heat – and despite the fact that rising sea levels represent an extremely complex challenge for the future – the ocean is often something of a side note in climate research. There are several reasons for this. To start with, we humans inhabit the land and feed ourselves from the surrounding atmosphere. Surveying the ocean is far from easy and our understanding of it is poor compared with other components of the Earth system. Nevertheless, I and many others take every opportunity to highlight the role of the ocean in climate change and to appeal for greater attention to be paid and more time to be devoted to all aspects of marine research, including increased sharing of knowledge.

The blue economy aims to protect the Earth's ecosystem and rolls out technologies and solutions for this purpose. In your opinion, which technologies offer the greatest potential for advancing ocean protection?

First of all, the blue economy – as I understand it – refers to all economic activities that involve the sea and enable profits to be made there. That includes tourism, maritime trade, fishing, oil and gas extraction and other mining of materials and substances from the sea. If we also want to make the blue economy green, we need to pay particular attention to the negative impact of these economic activities on the sea – normally overexploitation and pollution. A sustainable blue economy thus endeavours to achieve an intelligent balance between protection and utilisation. To this end, the right economic and administrative (political) marine spatial planning framework needs to be defined and implemented with legal effect. This calls for an efficient ocean observation system – improved simulation and models of the ocean that can then be combined in the sense of digital twins of the ocean. Using digital twins, it is possible to develop current and future frameworks for using and protecting the ocean, and to optimise these in terms of sustainability.

Within each sector, technologies can help optimise utilisation and minimise pollution and other undesirable side-effects. The technology portfolio includes smart fishing methods, drives that generate low levels of CO2 and noise, safe drilling and conveying systems, etc.

And, finally, what were the takeaways from your discussion forum, but also from your visit to INTERGEO as a technology show for geodata-based sustainability solutions?

The discussion demonstrated that we have not yet harnessed the full potential for networking between the worlds of science, business and public administration. This is a complex field with many different dimensions, and there will be no easy solutions. Nevertheless, much can be improved, including by using geodata.

Thank you for talking to us, Professor Visbeck.

SCAN2BIM – DIGITAL PLANNING AND CONSTRUCTION BASED ON SCANNING SOLUTIONS

BIM is part of Germany's national sustainability strategy.

Dr. Josef Kauer, President of the BIM Days Germany organisation that is cooperating with INTERGEO, hosted the Scan2BIM slot on the EXPO stage. He emphasised the particular importance of reality capture – scanning the (built) reality – when it comes to existing buildings. Kauer added that INTERGEO was a meeting place for the global elite of the scanning society, leading him to the following crystal-clear conclusion: "The cooperation with INTERGEO will continue." Prof. Steffen Warmbold, Vice-President of Verband Beratender Ingenieure e.V. (VBI), called for more digitalisation in construction as soon as possible. He said the German government had made an unequivocal statement that building information modelling (BIM) was on its way. He also commented that the BIM Portal Deutschland, which provides contracting authorities with information about all phases of services, was proof of the government's firm commitment to BIM. Warmbold demonstrated how BIM is already being used in Germany's road and rail infrastructure. He said green BIM was part of the country's national sustainability strategy, too, and a model for all aspects of infrastructure and structural engineering. "As planned, as built, as is" was how Warmbold described the objective, also emphasising that BIM would increasingly become the project standard during planning and construction with a view to decarbonising. He said one area in which Scan2BIM offered great potential was the detection of damage – on bridges, for instance – and added that artificial intelligence would make things even more efficient. Both Warmbold and the following speaker Gregor Willhauck, Cloud Solutions Market Manager at Trimble, underlined the vital importance of breaking down data silos and creating comprehensive solutions. Willhauck revealed that the Trimble Connect platform, on which 30 million users are already mapping their workflows, was created for this very purpose.

DR. JOSEF KAUER
President, BIM Days Germany

BASIC SPATIAL DATA HAS A KEY FUNCTION WHEN IT COMES TO THE CHALLENGES OF OUR TIME

A brief interview with Karin Schultze, chairperson of the AdV.

KARIN SCHULTZE
Chairperson
AdV

Ms. Schultze, you are head of the Department for Digital Society and Geoinformation at the Saxony-Anhalt Ministry for Infrastructure and Digital Affairs and also chairperson of the AdV, the Working Committee of the Surveying Authorities of the Laender of the Federal Republic of Germany. For the benefit of our readers, can you summarise and prioritise the major challenges facing ministerial geoinformation administrations in three short sentences?

Nationally standardised basic spatial data has a key function when it comes to challenges such as safety and security, crises, climate protection, disaster control and digital transformation. Given the ever-shorter technology innovation cycles, we need basic spatial data that is quick and easy to use – digitally, on a permanent basis and free of charge. We are also facing an acute skills shortage and limited resources.

How are public administrations dealing with this?

Cooperation within the AdV is an absolute must. Optimisation options in the individual federal states have been exhausted and collaborations are the key to further efficiency gains. Centralised (virtual) production facilities will play a major role. The AdV looks at technological, economic, social, and political developments in order to unlock the potential of basic spatial data at an early stage as a state infrastructure service and a strategic building block for digitalisation, and also in order to harness innovations for its own processes.

INTERGEO also always offers a platform for networking and dialogue. Especially in terms of your focal point of digitalisation, were you able to identify, discuss, bring into focus and maybe even further develop topics with key relevance for the future?

It goes without saying that INTERGEO offered an excellent opportunity for communication and networking. The AdV was actively involved and also benefited from this. For example, it was agreed to enter into dialogue about the further development of BIM.

Thank you for talking to us, Ms. Schultze.

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INTERGEO EXPO STAGE

INTERGEO
EXPO
STAGE

STAGE 1

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STAGE 2

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