

drilling and blasting

hard- and software solutions



geo-konzept
inventarisieren. kartieren. optimieren.

QuarryManager **BlastManager**
Safety Support
Quality assurance **quarryX** RiGuide QuarryPocket
QuarryX 2D **Blast design** 3D Training
GNSS-survey **VolumeX**
Automatic **Stockpile measurement** QuarryX Connect
Blast design 3D Drilling control
QuarryDetonator **Blast design software**
Hole deviation measurement **3D Face profiling**

Optimized work in the quarry with geo-konzept GmbH:

Fly rock, poor fragmentation, vibrations - we will help you to minimize fundamental problems in the drilling and blasting process. Carry out blasts safely and efficiently!

No more usage of tape measures, no more time-consuming, manual geometric calculations: we bring digitalization, precision, safety and time savings to your quarry.

State-of-the-art systems, user-friendly software and our experts' many years of know-how facilitate the entire drill and blast process: surveying the rock face, stake-out of planned hole positions using GNSS with centimeter precision to planning the ignition and explosives as well as documentation and data analysis.

geo-konzept has been dealing with the topic of blast planning since 2005 and is one of the world's most renowned experts in this field. In addition to the sale and development of state-of-the-art and precise surveying systems, our experts have set a new standard in software-supported blast design with the award-winning „QuarryX“ software.

Save time and money, increase safety and make your work easier - with precise solutions from geo-konzept.



All information are also on our website



**In this brochure we present
our extensive
product portfolio:**

Innovative, modular system solutions including 3D surveying of the rock face and planning of the drill pattern, through drilling the boreholes using GNSS-supported 3D drill rig control, to borehole measurement and planning of ignition and explosives.

The product portfolio is supplemented by software solutions for calculating volumes of stockpiles and pits as well as managing the digital twin of your quarry.

**Blast
design**



**Face
profiling**



**GNSS &
RiGuide**




**Ignition and
explosives de-
sign**



**Hole deviation
survey**



**Service &
Support**



We provide you with two different systems for measuring the rock face to achieve an efficient blast design.

3D laser scanner:

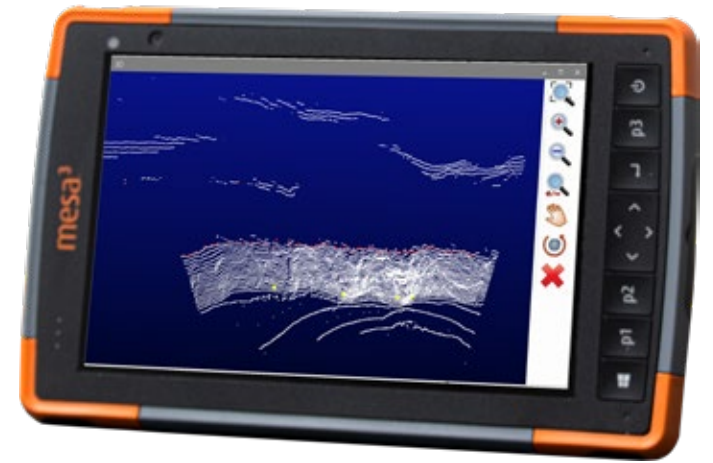
This robust and easily deployable system consists of a rugged outdoor PC with our specially developed measurement software and a 3D laser. A user defined area of the rock face is scanned fully automatically and the data obtained is stored. A real-time 3D model allows the measurement to be checked immediately in the field for quality and consistency. The measurement process usually takes no longer than 10 minutes for a typical blast and delivers repeatable, highly accurate results. Therefore the measurement can be integrated easily without large expenditure of time.

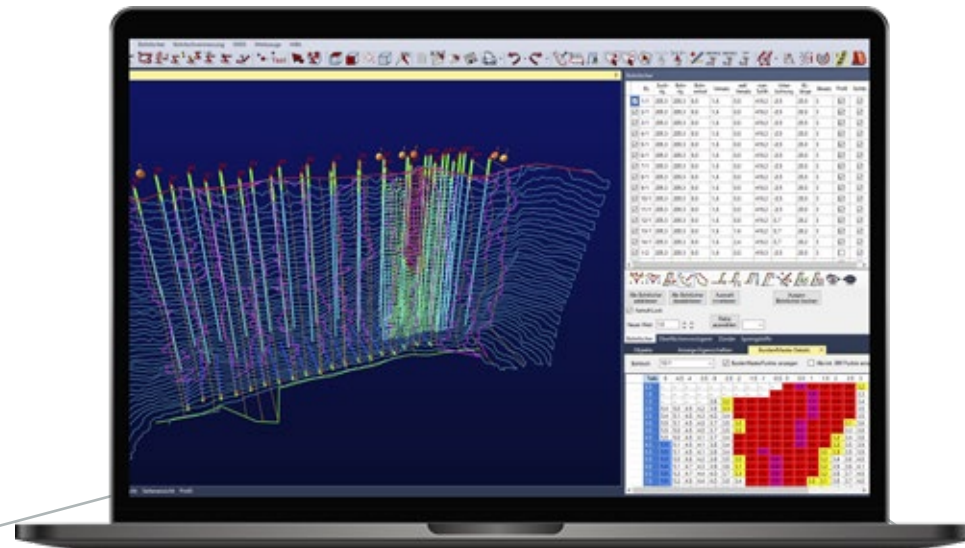
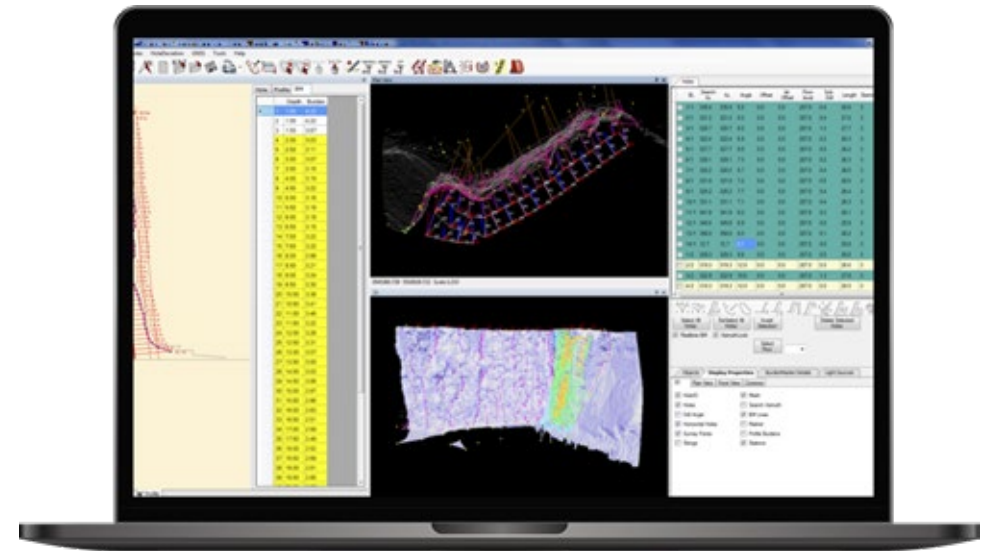
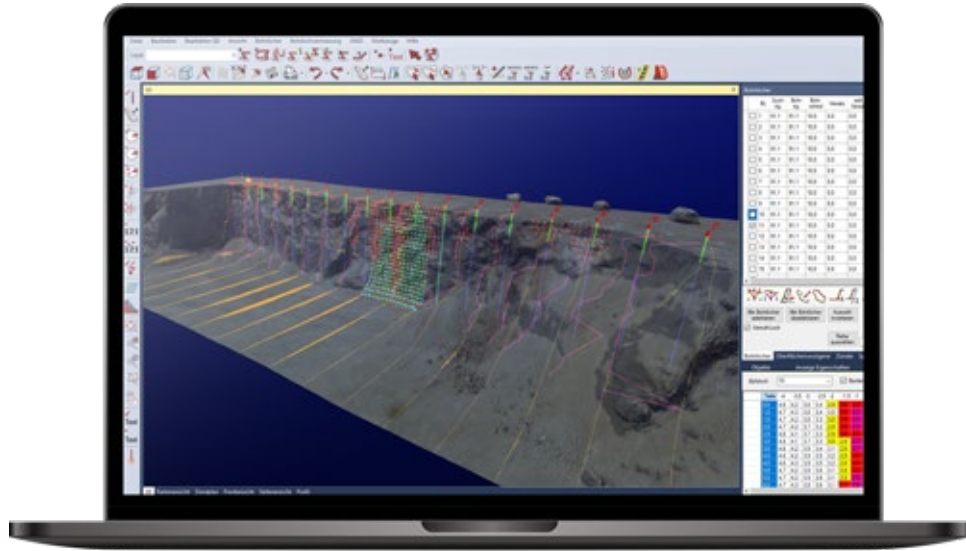
Drone:

A reliable UAV system is available for data acquisition in areas that are difficult to access. Several ground control points are measured with a GNSS system for precise geolocalization of the data. The UAV maps the corresponding area fully automatically according to a previously created flight plan and provides overlapping aerial photos. These images are then processed using a dedicated photogrammetry software resulting in a 3D model of the rock face.

The collected 3D model of both systems is the data basis for the actual blast design process in our QuarryX software.

Quarry rock face survey





Blast design with QuarryX



Even without in-depth PC knowledge, you can easily start working:

Our in-house-developed and award-winning **QuarryX software** is primarily designed for intuitive usability and the automation of work steps. The experiences and suggestions of our customers had a huge impact on the development.

This user-friendly software with a clearly structured user interface in twelve languages can process manufacturer-independent 3D rock face, hole deviation and GNSS survey data from all common systems on the market.


From project-related master data management, through blast planning to ignition and explosives design: **QuarryX** has numerous tools to support the shotfirer in his daily work.

Enhance drilling parameters such as angle, depth, direction and subdrill in real time.

Let **QuarryX** automatically optimize the hole geometry to the conditions of the rock face!

Detect critical burden values along the entire rock face and eliminate unsafe areas!

Export and upload IREDES data to any GNSS drill rig system!



The more complex the blast design, the more difficult the practical implementation: stake out the planned boreholes using GNSS! Simple, fast and precise. Export the coordinates of the planned hole collar positions from **QuarryX** and locate them with the highest level of accuracy using GNSS. Our **QuarryPocket GNSS** software guides you reliably to the planned hole collar positions, including automatic height and position correction.

Real-time control via live profile view:

Use the live profile view for real-time adjustments and make quick and good decisions. A single person can stake-out the most complex drill patterns with the highest level of accuracy faster than ever before. No more tape measures or surveyor's staffs!

Implement even the most complex patterns directly with the drill rig: the **rig control system RiGuide** uses directly the hole design from **QuarryX** and assures, that the design including location,

drilling direction, angle and depth is implemented precisely. Conveniently load the design data directly onto the **RiGuide** terminal in the drill rig and get rid of any manual stake-out process. **RiGuide** automatically adjusts hole length, position and angle even on uneven floorlevels and generates a documentation of the drilling process. The collected data can be used to update the **QuarryX** design model.

The system is also available in a reduced version as a pure GPS compass, which allows the precise implementation of drilling directions, angle and depth. Working with reference points and the consequent disadvantages is no longer necessary.

Avoid vibrations, reduce risks and the amount of explosives, and ensure uniform even beds! **RiGuide** can be retrofitted – regardless of the manufacturer – to all standard drill rigs.

GNSS & RiGuide





Borehole survey

Are the boreholes actually going as previously designed?

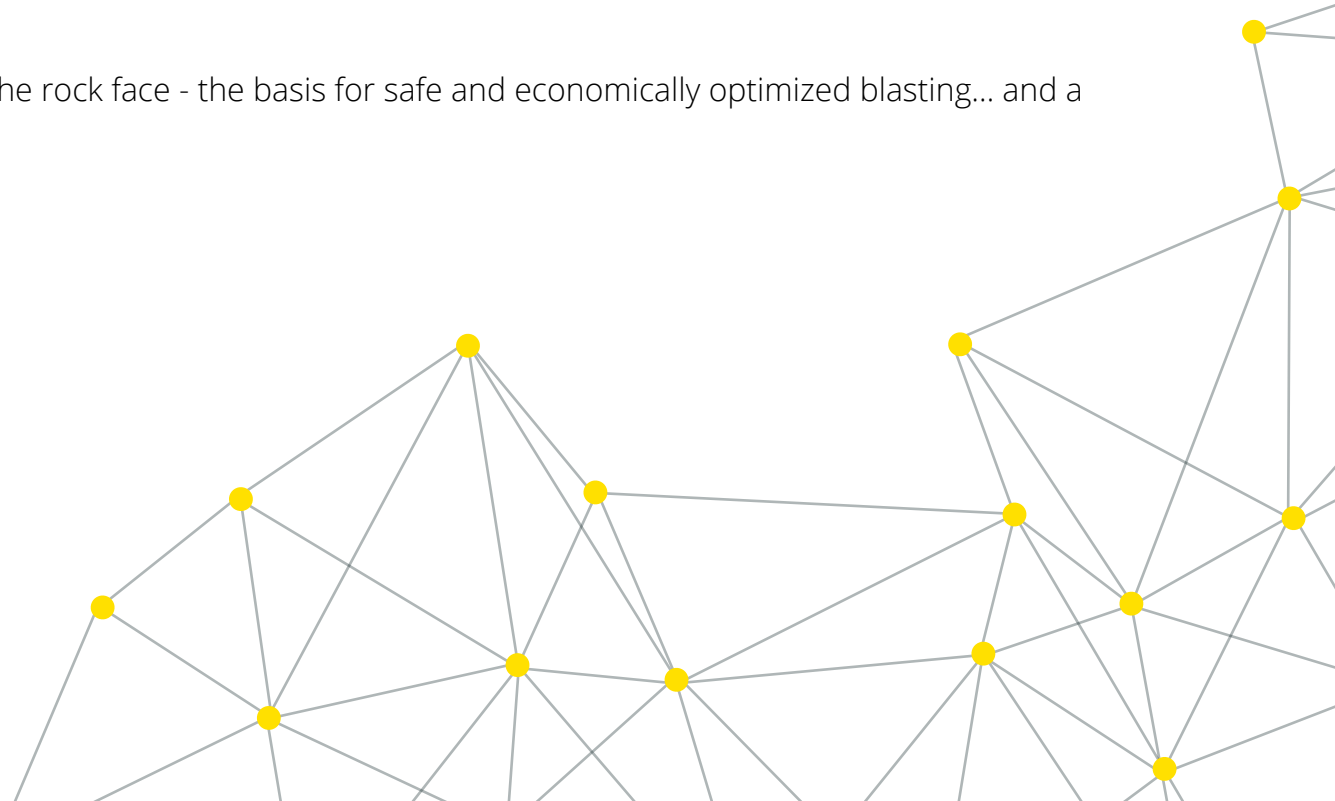
Are the drilling depths met exactly?


Do the direction and angle agree with the design?

In order to keep the potential danger from blasting low, the design should be implemented as best as possible and the real situation should be compared with the design. Our hole deviation measurement system provides you with exactly the data you need for safe (optimized) blasting: a mobile probe determines exactly the true three-dimensional course of the borehole, possible deviations from the target can be displayed immediately in graphic and tabular form.

In addition, the data can be combined with the previously measured rock face model, with all default calculations and views being updated automatically.

A measured model of all boreholes in relation to the rock face - the basis for safe and economically optimized blasting... and a solid basis for decision-making at all further steps.





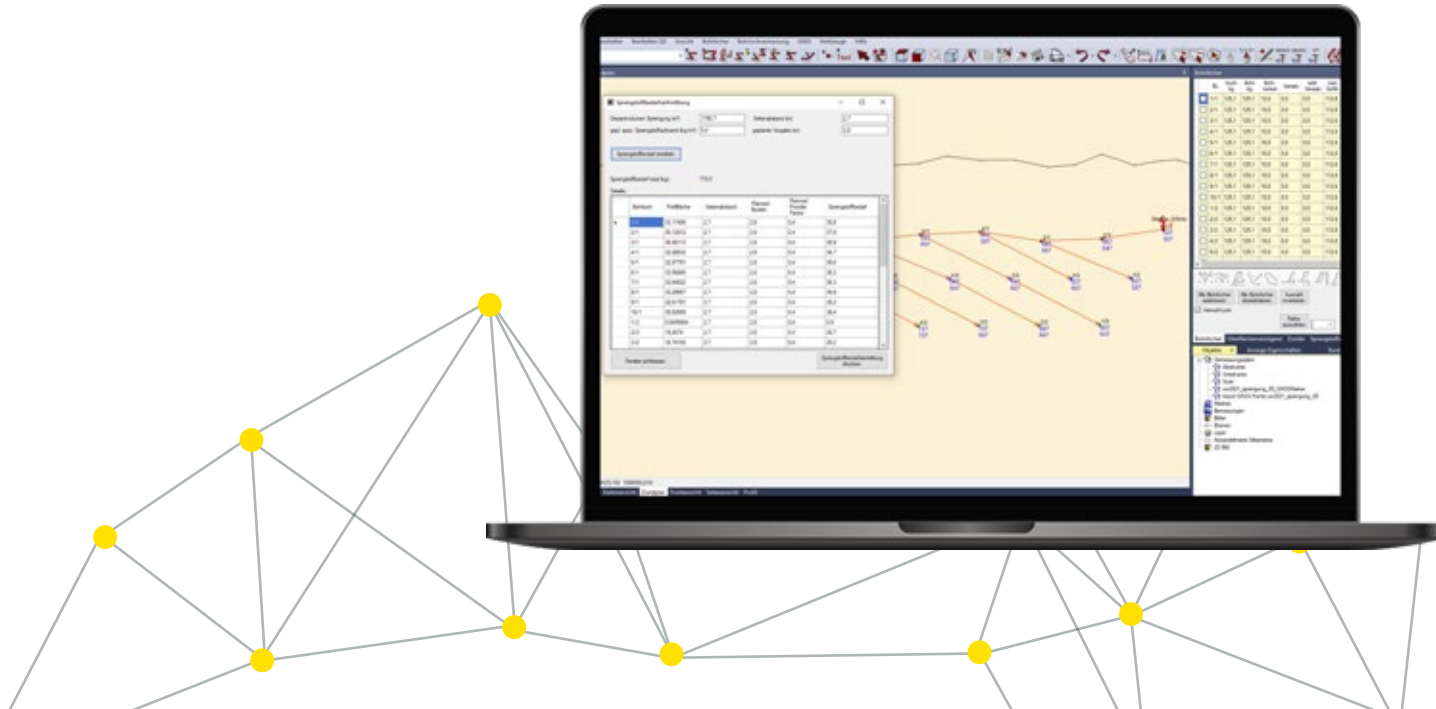
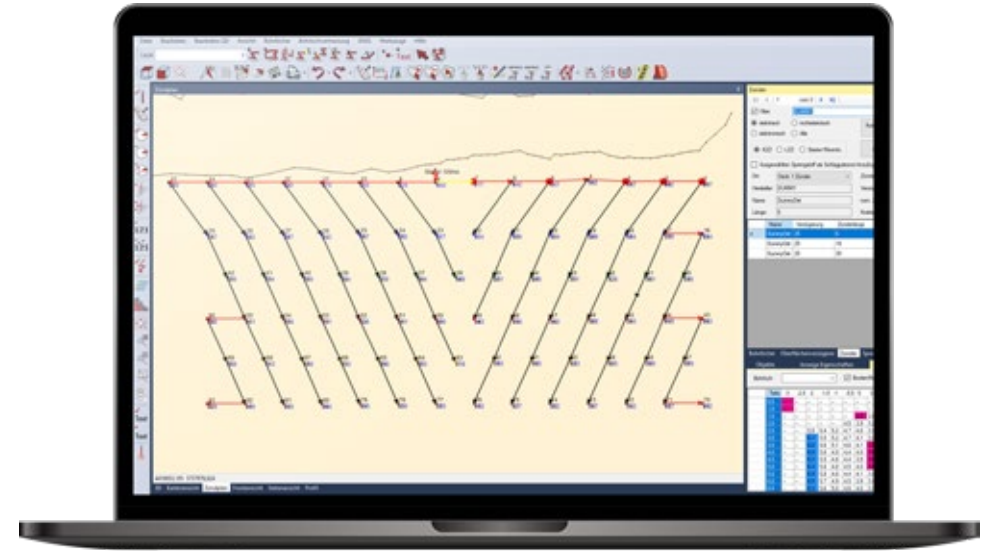
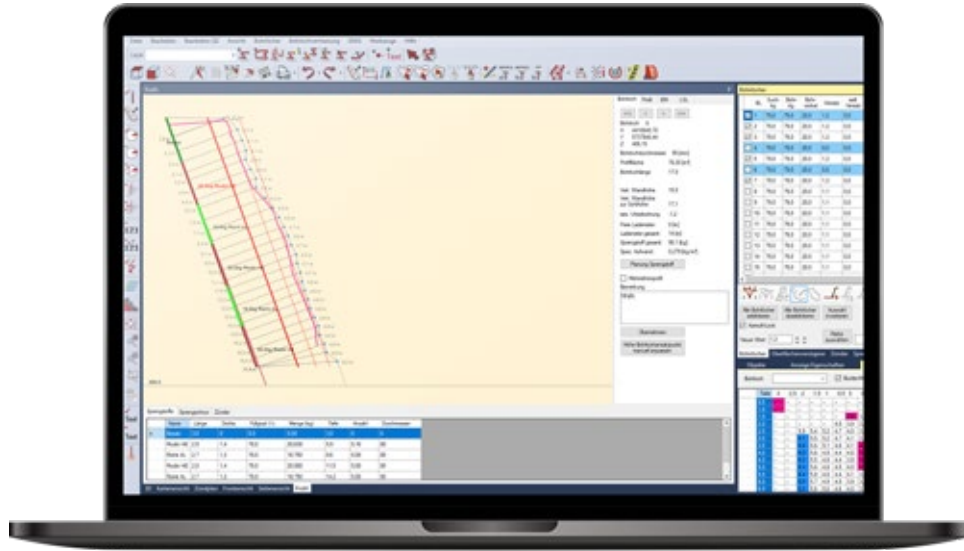
Use your design data and create suitable ignition plans (electrical, non-electrical, electronic) and charging schemes!

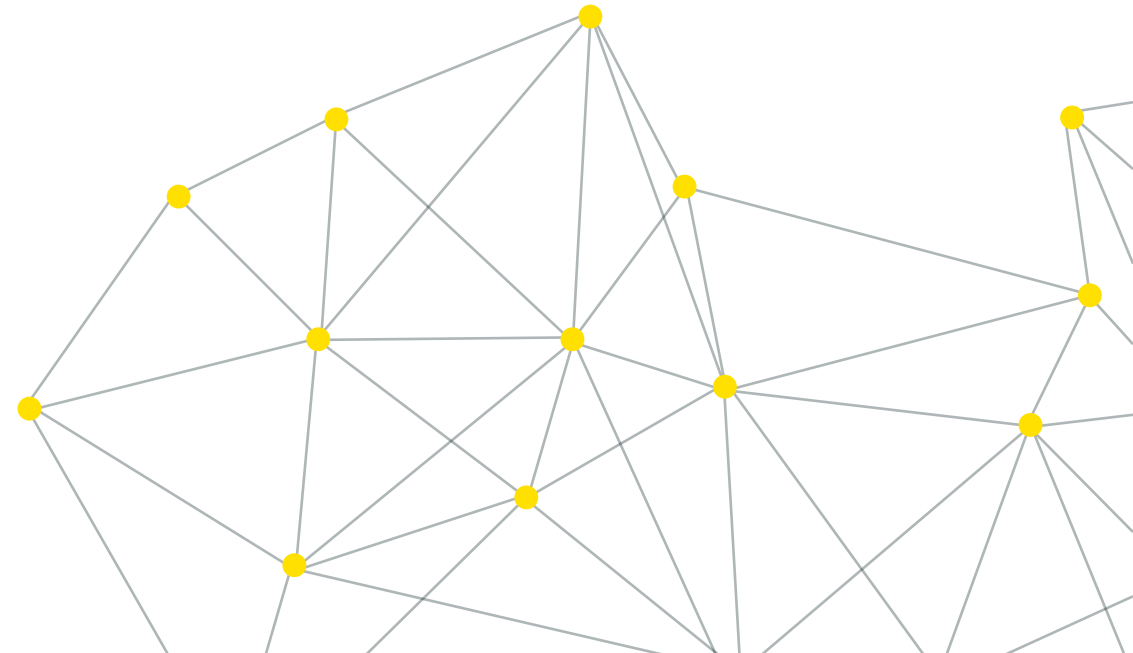
With the QuarryDetonator and QuarryDetonator Pro modules of the QuarryX software, we provide you with the ideal tool:

regularly updated database with all common explosives and detonators; simply select (used) **detonators and assign them to the boreholes** (single and multiple shared charging columns as well as predefined charging schemes possible); Insert surface delay detonators between drill holes with a mouse click; automatic calculation of ignition time for each detonator; digital simulation of the ignition system including checking for overlaps at user-defined time intervals; Exact calculation of explosive amounts for each drill hole.

Optimize security: After planning the explosives, you can easily carry out a check of the amount of explosives per time step and informed yourself of areas with too high or too low local specific charge. Furthermore, the software offers the possibility of a vibration prediction with regression analysis. In this way, previous blasting and vibration measurements are included in to obtain even more precise predictions. Also integrated into the software is a calculation option for the expected fragmentation of the pile. With convenient documentation options, output of complete cost overviews of the blasting including drilling, explosives and other costs, also allocated to tons or cubic meters of material.

Ignition and explosives design






Determination of stockpile volumes and digital maps of a quarry



Your quarry in 3D:

Our software **QuarryManager** is your versatile and user-friendly tool to support (in) your daily work and the ideal basis for short and medium-term mine design! Easily import **QuarryX** projects into the 3D model and update your **digital plan with the current course of the quarry face**. Additional interfaces enable the import of models and data from laser scanners, GNSS systems, drone flights or other CAD programs: digitize changes in the quarry on the screen and include them in the plans; you will receive precise information on mined or existing volumes in an uncomplicated manner.

With the **VolumeX** expansion module, you can determine the **volumes of your stockpiles and pits** with the utmost precision – using GNSS, UAV or laser survey data. Easily generate 3D models and perform accurate volume determinations at little cost.



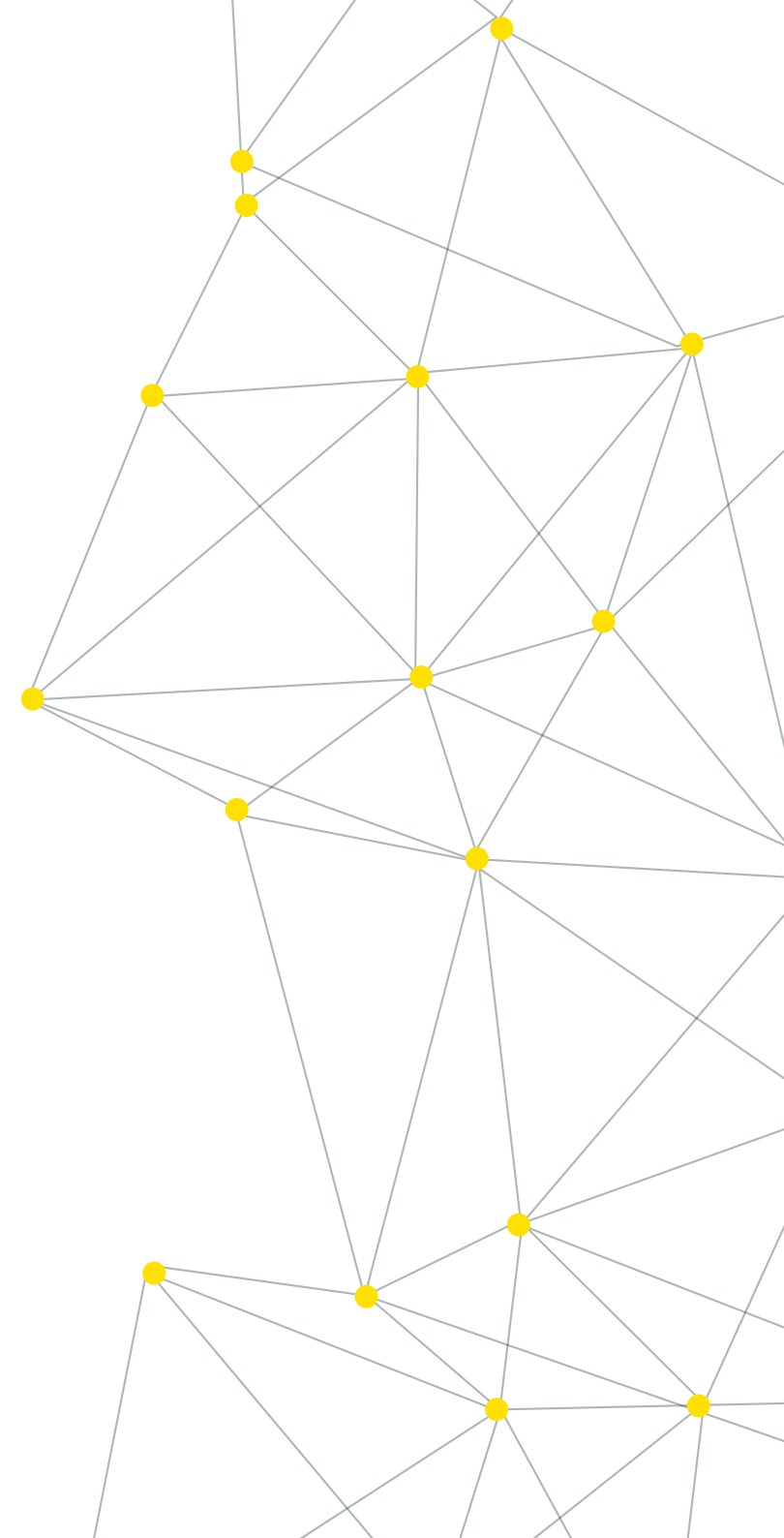
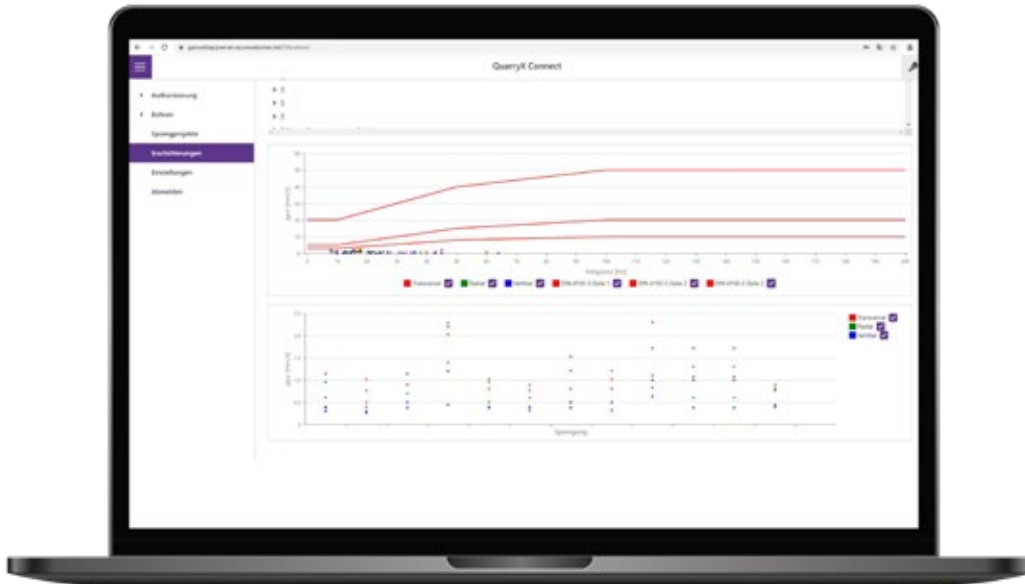
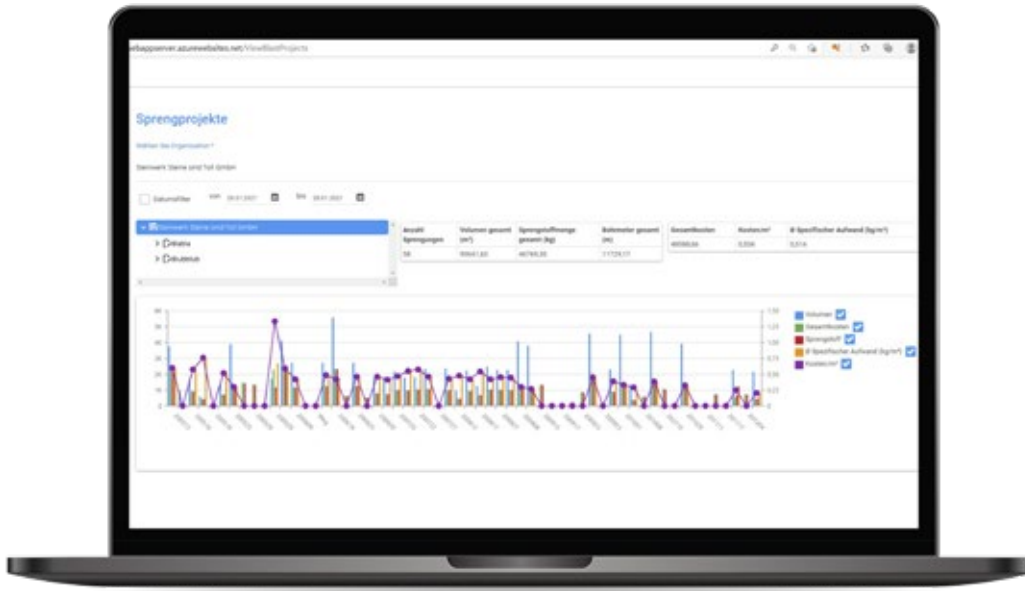
Always keep full control over all running processes - no problem with our solutions!

All surveying and planning data are available to everyone involved in real time: do borehole positions, lengths and their course match the planning? How do possible deviations affect the specifications? Do you have to react actively with a modified charging column? Has the actual loading quantity of a borehole been realized according to planning and how do deviations affect the blasting result?

The diverse analysis and documentation tools for quality assurance and control provide a solid and reliable basis for your decisions.

Drilling meters and costs per ton, actual specific explosives requirement, development of these parameters over time... With our solutions, you always have an eye on the KPIs in order to react promptly to changes.

Quality assurance and control



BREAK LIMITS - OPTIMIZE WORKFLOW



**Quarry X
CONNECT**



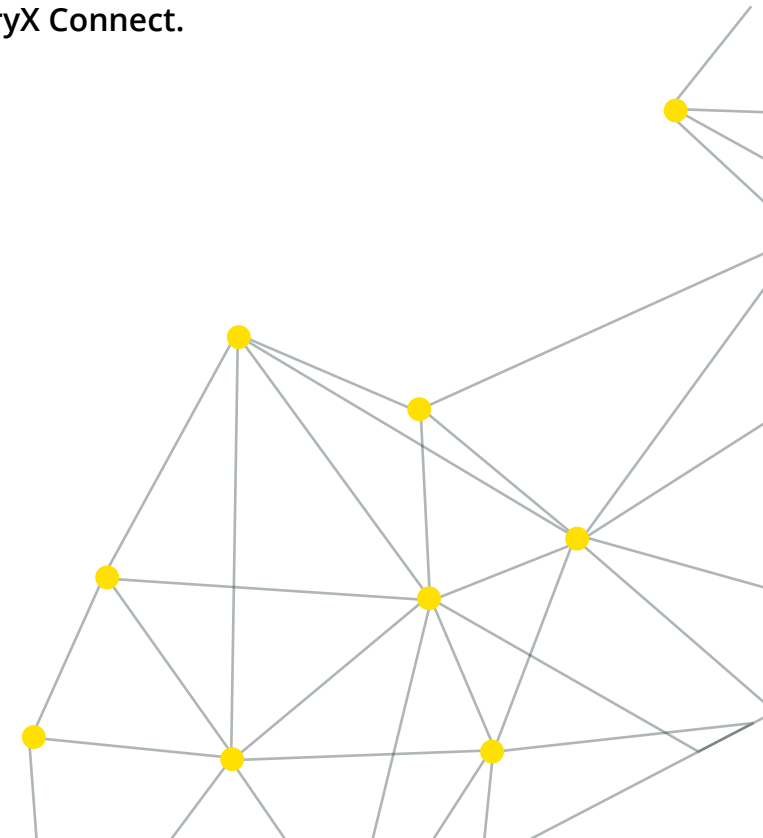
All work steps of an extraction blast are digitally networked via the cloud and synchronized for all parties involved:
ROCK FACE SURVEY, GNSS SURVEY, DRILL PLAN, IREDES DATA, DRILLING PROGRESS, BOREHOLE SURVEY





QuarryX Connect

With the introduction of our in-house cloud solution, all steps and those involved in the quarry are now networked: No more USB sticks, no more paper drilling plans - with **QuarryX Connect** you send the drilling plan wirelessly directly to the drilling rig! The write-back of the holes actually drilled and additional information such as drilling speed or geological information are also transmitted. For all drill rigs that do not support a digital drill plan, we offer a special app for the driller that also supports real-time data transmission. Drilling and blasting are thus even more closely interlinked in order to enable **seamless data transmission** and data analysis. A more extensive commercial evaluation of the drilling and blasting work (KPIs, such as costs/ton, drilling meters/ton) is simplified by the central data storage and synchronization of the data in **QuarryX Connect**.





In addition to our telephone support, we are also offering individual training courses for software and hardware, both on site and online. Our workshops offer the perfect platform for exchanging experiences, imparting knowledge, training and refreshing.

These are unavoidable, especially in the high-tech sector, in order to secure investments made and to maximize the benefits of the new systems.

Optimize your work processes and get the best out of our systems! Benefit from the experience and know-how of our experts.

Our customers' feedback:

„For me it is very interesting to see the whole concept and what possibilities exist with this system.“

~ C. Hasholzner, Sprengverein Bayern e.V.

„The reason why I take part in the workshops every year is that the software lives on through the ideas that we as end customers have and that suggestions for improvement can be submitted, which are also implemented.“

~ F. Tielker, Johannes Nickel GmbH & Co. KG

„The workshops have significant added value, since in daily operations you get very rarely in contact with other companies in this area of work. You meet a lot of colleagues from the industry here with whom you can exchange ideas, also with regard to working with the systems.“

~ M. Nigiz Lhoist Rheinkalk GmbH

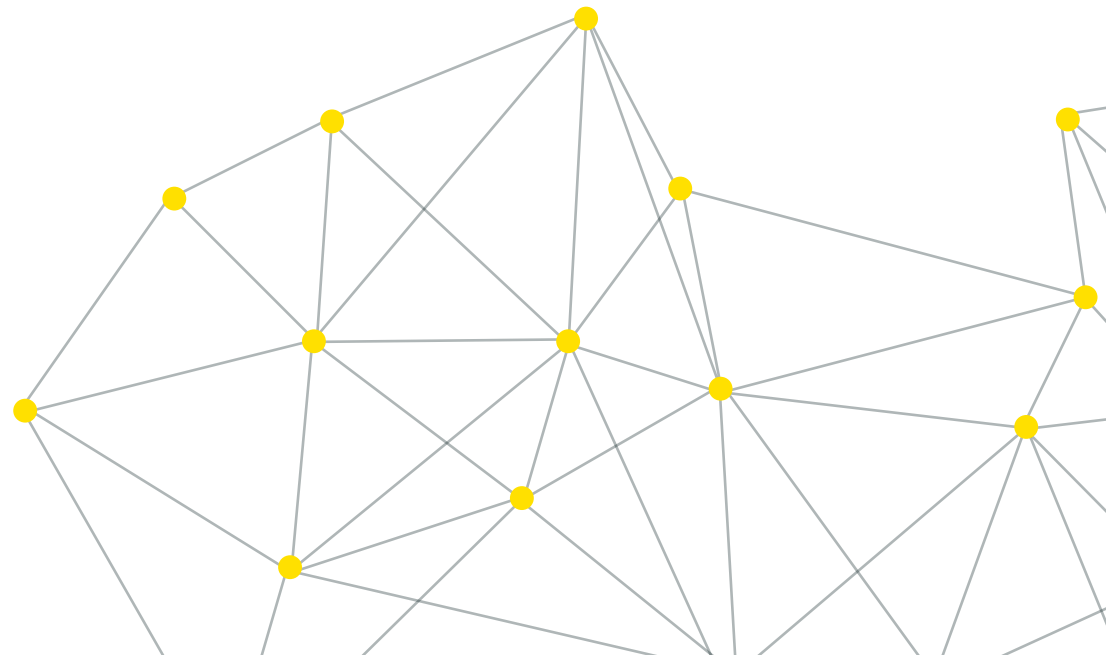
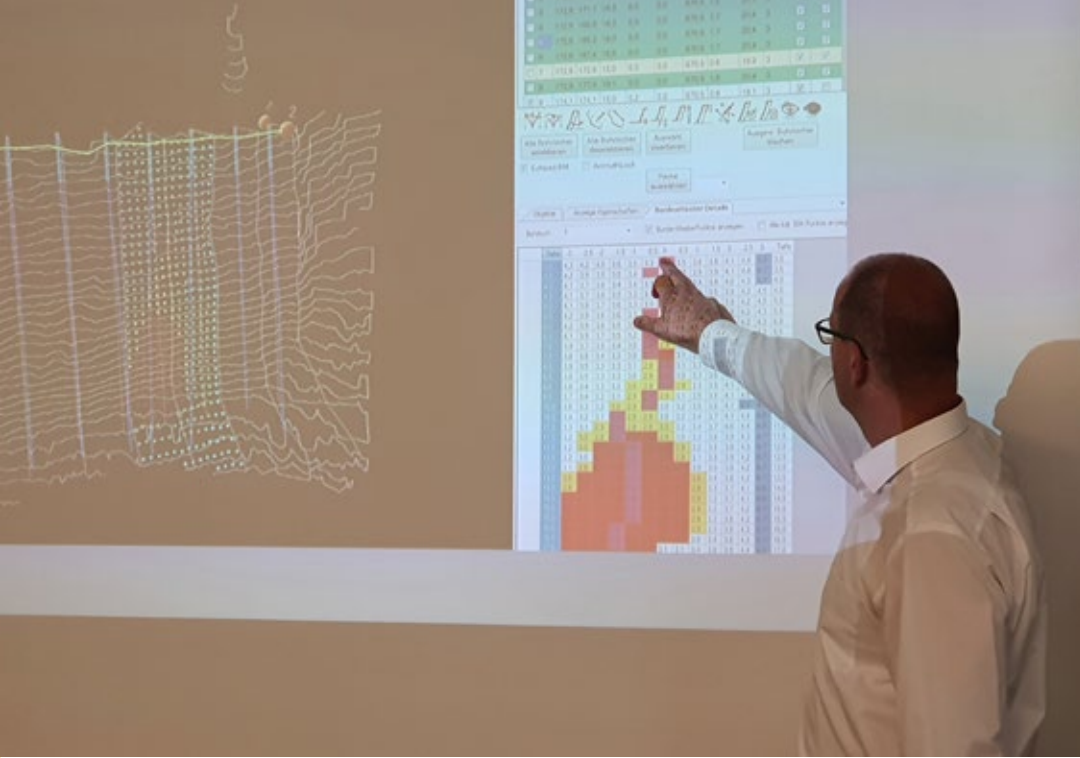
„In practice, there are often minor problems that are noted. These can then be presented to the specialist staff at the workshops. In 99% of the cases, the problems are then solved.“

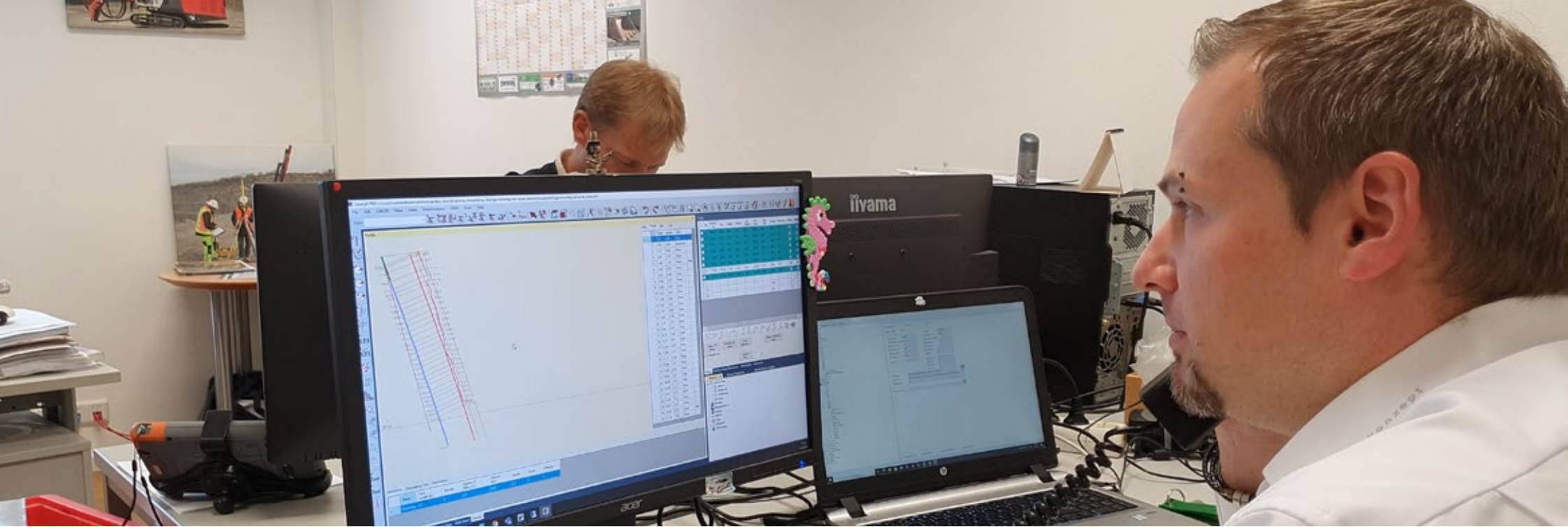
~ R. Salzgeber, Brech- und Siebwerk Lorüns GmbH & Co.KG

„I've been a regular participant since the first workshop because we can bring in our own suggestions for improvement.“

~R. Kalteiß, sprewa Sprengmittel GmbH

Workshops





Service & Support

How good is the best technology if there is no quick and uncomplicated solution for problems? Customer service and support have therefore been a top priority at geo-konzept for over 30 years:

- **Telephone & Internet support from our experts with years of quarrying and blasting experience**
- **Rental equipment service in the case of a hardware failure (subject to availability)**
- **Maintenance and repairs of all equipment in-house**
- **Calibration of your scanners and borehole probes**

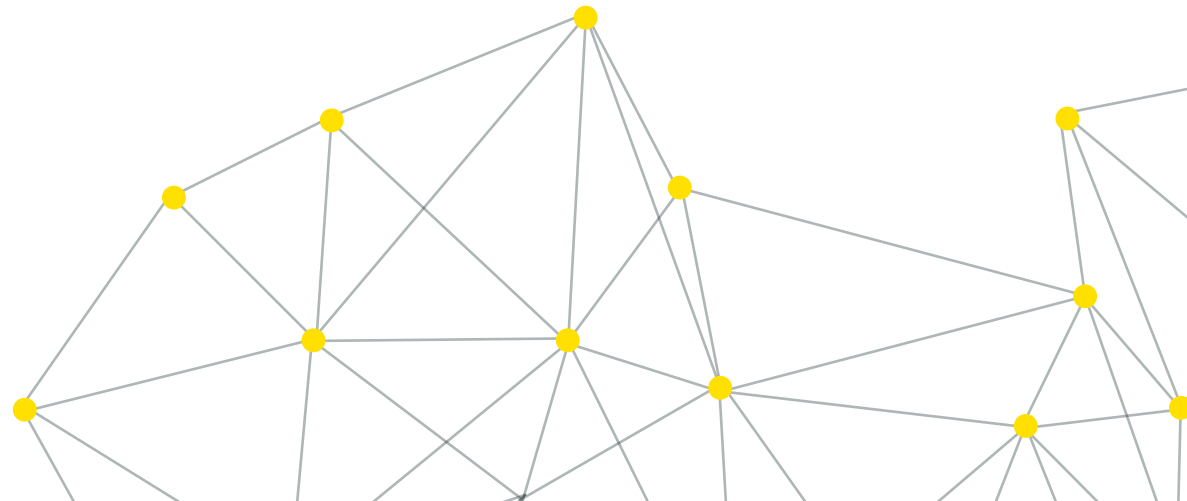


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Monday - Friday 8 am to 5 pm



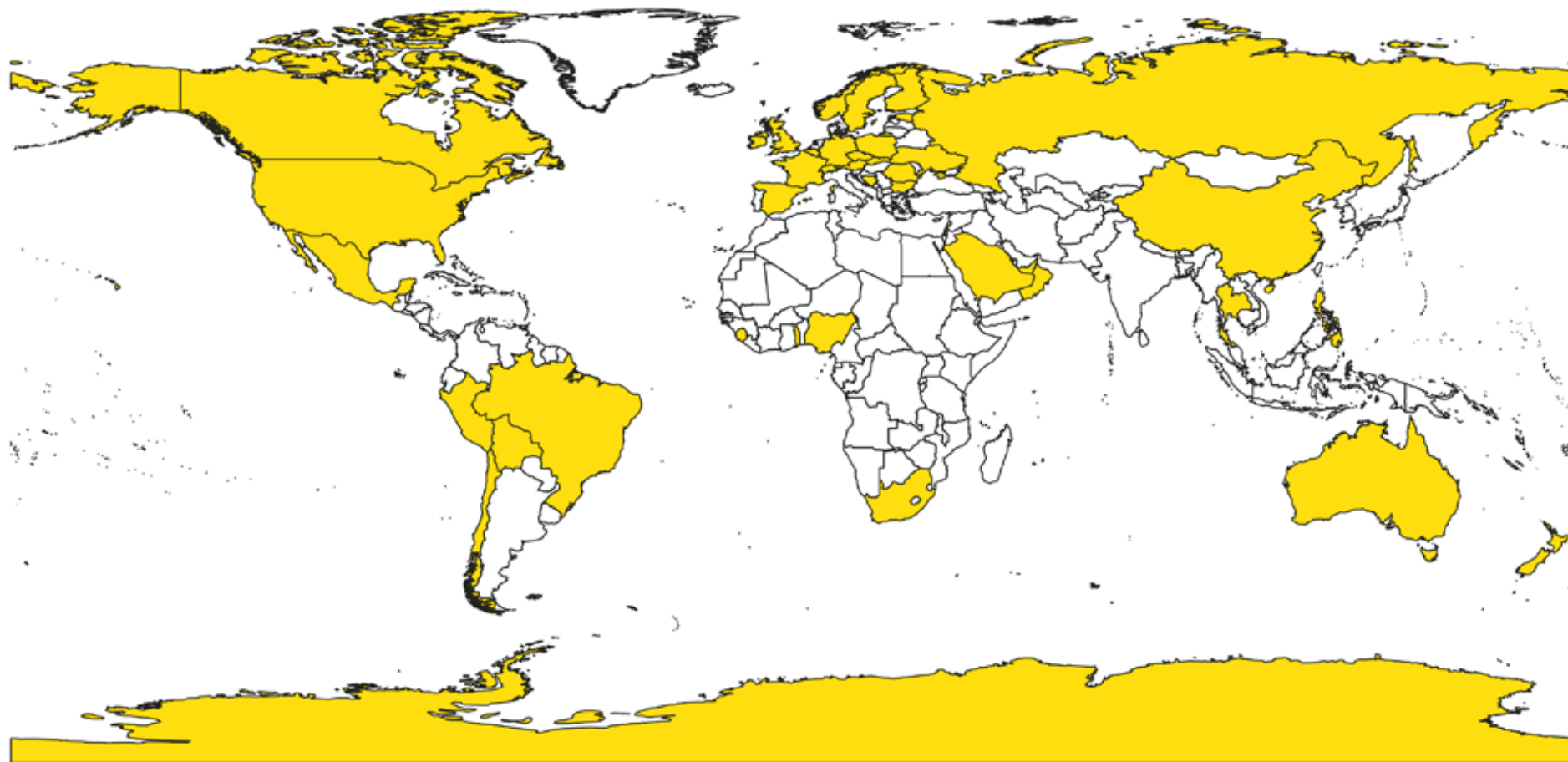
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Reference customers

QuarryX World Map





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