

Modern Technology Moves Mining Forward

From as far back as archaeologists can trace, mining has been a part of every human culture across the globe. But people have come a long way from the shallow mines of prehistoric man. We have dug deeper and further than our ancestors could have ever imagined – utilising the wealth of resources under our feet.

The Mining Reliance

And, just like man, mining has evolved through the ages. We moved past digging with our hands to using great machines. We even take advantage of satellites and geospatial intelligence to inform when and where digging takes place. Whether a team is deep under the earth or in the open pit, modern technology and tools are crucial to moving forward. No one knows this better than geo-konzept GmbH (<https://geo-konzept.de>), which has been supplying solutions for the mining industry for over 15 years.

There are two key components an effective open pit mine relies upon: precision and safety. These are the two most vital components to success in the open-pit, above-ground mining industry – particularly when it comes to properly setting shots and blasting rock faces – and one cannot be achieved without the other. Whether for quarry blasting or for creating the perfectly inclined roads in and out of open-pit sites, ensuring the process is done correctly at every step is the key to safety for each crewmember and a job done right.

In an open-pit mine or quarry, there are three factors that must be taken into account before a blast is performed – all require absolute precision:

- **Safety:** eliminating or minimising damage from fly-rock.
- **Vibration minimisation:** reducing vibration particularly in urban sites or locations that are in close proximity to infrastructure, like railroads or high-rise buildings.
- **End-result material production:** creating material (rock) that comes out of a blast at a specific size that fits the operation's crusher, resulting in lower energy costs and higher crusher throughput.

Managing these factors determines whether a job stays on schedule and within budget, which is the bottom line for most operations. 'The better we plan the blast, the safer it will be, and the more effective the subsequent



Juniper Systems' Mesa Rugged Tablet is designed to perform reliably in the harshest environments.

**ROCK
SOLID.**
**FIELD
READY.**

‘The equipment that blasting crews use has to be ready and work properly when it's time to blast. Time is money’.
—Johannes Kutschera: geo-konzept Product Specialist

production steps will be’, said Mr Johannes Kutschera, geo-konzept product specialist.

Each plan needs to be precise and carefully arranged to ensure work is performed efficiently and safely, yet also meets project deadlines. A large amount of data is collected and analysed when mapping a successful blast, which requires software to manage the data and a device to run the software. To address these needs, geo-konzept GmbH created an innovative software solution, QuarryX, for quarry and mine use.

Two Tools, One Mission

geo-konzept is a leader in the mining technology field, specialising in satellite, laser-scanning, remote sensing, and GIS technology, as well as software solutions. With more than 15 years of experience in blasting, they have created over 600 blast-design systems which are currently being used in 20 countries worldwide. QuarryX software is used on-site to help plan, optimise, and document blasts in real-time.

The QuarryX software solution consists of office and mobile applications which must run on a portable data collector or tablet, and – due to the outdoor and severe nature of the open-pit work environment – any hardware used in conjunction with QuarryX software and the company's mining solutions needs to be durable, efficient and versatile. To ensure that its software could perform accurately across locations and projects, and to accommodate users of different skill levels, geo-konzept chose the field computing solutions of Juniper Systems Limited (<https://junipersys.com>) and their Mesa Rugged Tablet.

Rough and Tumble

There are many reasons geo-konzept chose the Mesa Rugged Tablet (Mesa) to run QuarryX software solutions, most importantly because the Mesa is designed for virtually any extreme environment, making it perfect for open-pit mining. With an IP68 rating, it is sealed against the ingress of dust, dirt, sand, and rain, and is resistant to water submersion up to 1.5 metres for up to 30 minutes – all necessary qualities for working in the field, especially where geo-konzept's clients operate. The rain, sleet, and dust that occur in an open-pit mine are elements that less rugged machines cannot withstand. Plus, the Mesa's shockproof design can resist the blasts that occur at mine sites.



The Mesa Rugged Tablet displays data from geo-konzept's QuarryX software as the borehole positions are planned in the quarry.

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QuarryX software also runs huge amounts of data to ensure precision and safety in the open pit, and it needs a computer that runs large applications without problems and which can transmit data quickly. The Mesa is designed for just that. Its high-speed wireless capabilities are crucial for geo-konzep't's software to function properly.

Because the Mesa can connect to both traditional serial ports and networks via RS-232 serial interface, Wi-Fi® or Bluetooth®, it is the ideal companion to QuarryX. Especially when it comes to bore-hole planning, marking, and drilling, the flexibility of an RS-232 serial interface or a Bluetooth connection allows adjustments in real time. This ensures connectivity no matter the conditions or equipment being used, eliminating the need to carry separate laptops, pens, paper, and notebooks in the field. Moreover, the internal 4G modem of the Mesa allows real-time synchronisation with geo-konzep't's QuarryX Connect data cloud service.

Whilst being a virtually indestructible computer, the Mesa also boasts a capacitive, high-visibility touchscreen with superior clarity that's particularly friendly when wearing gloves. It keeps working in any weather or temperature conditions, even with rain on the display or dust and debris swirling around.

Using the Tools to Make a Difference

When it comes to their clients, geo-konzep't works to provide the best experience possible and use the evolution of the mining industry to their advantage. The Mesa Rugged Tablet helps them do just that.

Utilising the Mesa Rugged Tablet, QuarryX analyses data from 3D quarry face scans, hole deviation, and GNSS surveys to create a complete, three-dimensional representation of a blasting project. The software provides various tools and analysis options to plan borehole positions that meet hole angle, depth and direction specifications, among many other factors critical to a safe and successful blast.

Once the boreholes have been planned, they are mapped out and marked on the associated rock face, which requires GNSS coordinate positioning – data which is read in the field on the Mesa.



A mining specialist plans a blast using QuarryX software running on the Mesa Rugged Tablet.

MESA RUGGED TABLET

- Choice of operating system: Android™ or Microsoft® Windows
- IP68 rating
- Tested to MIL-STD-810G
- Water, dust, and shock-proof
- 10-hour battery life
- Hot-swappable battery
- Sunlight-viewable 7-inch display
- Capacitive touchscreen
- Operating temperature -20° C to 50° C
- Dual cameras
- Wi-Fi® & Bluetooth® connectivity



Staying on Schedule

Many owners of quarries and open-pit mines do not perform blasting themselves and often contract crews to do the work. Contractors are on a schedule and need to be sure the equipment they use is in top working order and can perform reliably through a full day without a need to recharge computer batteries.

The high-capacity battery in the Mesa Rugged Tablet has power to operate with the screen in use for up to 10 hours and can provide up to five more hours of operating time with the hot-swappable, optional, internal battery. This makes the Mesa perfect for both in-house or contract blasting crews, getting jobs done without downtime for battery charging.

‘Blasting crews don’t have a lot of time’, said Mr Kutschera. ‘So the equipment they are using has to be ready and work properly when it’s time to blast. Time is money’.

The Preferred Solution

While QuarryX software solution can be used with a wide variety of hardware, geo-konzept recommends running it on the Mesa Rugged Tablet.

‘When clients purchase our software directly from us, we always provide the Mesa. The blasting process is very complex, and Juniper Systems’ Mesa and our products together facilitate success’, said Mr Kutschera. ‘The Mesa helps us do business, and it helps our clients do business’.

About geo-konzept GmbH

Founded in 1992, geo-konzept offers reliable and robust satellite-navigation, laser-scanning, remote sensing and GNSS technology, plus corresponding software solutions, for the mining, agriculture and forestry industries.

About Juniper Systems

Based out of Logan, Utah, USA, and Birmingham, UK, Juniper Systems is a world leader in the design and manufacture of ultra-rugged handheld computers and provides field data collection solutions for use in extreme environments. Since 1993, professionals have utilised Juniper Systems’ innovative mobile technology in the mining, railway, geomatics, mapping, surveying, construction, industrial, natural resources, military, utilities and public sector markets.



The Mesa Rugged Tablet is a robust computer that runs multiple applications all day in open-pit mines.

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