



Preparations for the first CE4 Commander™ trial blast.

New electronic initiation system from DetNet® is a 'game-changer'

South Africa's DetNet®, a global leader in electronic initiation products used in blasting, has launched its CE4 Commander™ system, which it says is a breakthrough technology with the potential to take blasting to the next level. DetNet's Director of Marketing, Johann Smit, describes the system as a 'game-changer' which features advanced microchip (ASIC) design, GPS functionality, wireless activation and seven times faster autonomous programming delivering ease of use, fast deployment, enhanced blast efficiency and uncompromising standards of safety.

The new system also adds considerable value to management information needs through seamless integration with blast design software and real time data transfer enabling optimised blast designs, efficient blasting as per design, accurate reporting and valuable blast analysis.

The system comprises three separate products – the CE4 Commander™, the 4G detonator and the CE4 Tagger. The CE4 Commander™ is the heart of the system and is a multi-purpose device that can be used as a Base Station (in which role it is known as a Base Commander), as a repeater, or on the bench (Bench Commander). Up to six Commanders can be deployed for a single blast using long-distance RF communication from a blasting point. Each Commander has four channels that

can connect up to 300 detonators, giving a total of 1 200 detonators per Commander – which means that the system can control blasts with a maximum of 7 200 detonators.

The 4G detonator forming part of the system is a new generation fully programmable detonator featuring a redesigned Application Specific Integrated Circuit (ASIC) with 15 times more memory than its predecessor, the 3G detonator. It also features a new spooled downline wire option which is tougher and able to handle more impact in deep blast hole applications. Down-hole wire length and other critical information is stored in the expanded, non-volatile memory during detonator assembly. In addition, a delay time and a unique ID are fed directly into the detonator during tagging. The CE4 Tagger, which interfaces with the 4G detonator, is also an entirely new design which can

test up to 300 detonators at a time and is GPS enabled to aid in detonator trouble-shooting.

"The CE4 Commander™ system offers remarkable capabilities which prevent blast delays and speed up blast deployment," says Smit. "These include a fast and simple 'tag by plan' deployment method, autonomous detection and testing of detonators, detonator energy monitoring right up to the point of blasting, the ability to blast through high levels of leakage and a programming speed which is up to seven times faster than existing systems on the market. The system is fully compatible with our ViewShot® Blast Design Software package and also with third-party software such as Maptex's BlastLogic. We can also provide a software interface which allows tablet computers to connect wirelessly to the Bench Commander – which means that the tablet can become the user interface."

The new system is currently being deployed for extended field trials by DetNet's channel partners, AEL Mining Services and Dyno Nobel.

Smit emphasises that DetNet® does not market directly to customers. "We are owned 50 % by AECL, which is AEL's parent, and 50 % by Incitec Pivot, which owns Dyno Nobel. All our product moves to market through either AEL or Dyno Nobel and we work extremely closely with both these companies, which are international leaders in the field of explosives supply and blasting technology with global footprints. What this means in practice is that DetNet's products are used throughout the world."

Smit points out that DetNet® – which is based in modern premises in Modderfontein,



Johannesburg – is one of the pioneers of electronic detonation systems. "The electronic detonator concept goes back to the 1980s when the CSIR first started to look at the concept of using electronic delay elements in detonators," he explains. "The technology started to be commercialised in the late 1980s through two South African companies, whose expertise now resides within DetNet®, which was established in 2002. Building on that expertise, DetNet®

The CE4 Commander™ (centre) flanked by the CE4 Tagger (on the right of the photo) and a rugged tablet designed for use on site.

Seen here (from left) at DetNet's premises in Modderfontein are Johann Smit and colleagues Henry Sekukuni, Ntombi Mathebula and Xolani Mavundla.



has created its own suite of products, starting with the HotShot® product range which was launched in 2002.”

DetNet® is a high-tech company with a reputation for innovation and an ability to deliver leading edge solutions. All design – even of complex microchips – is undertaken in South Africa while much of the manufacturing also takes place locally. “Our electronic control equipment is all made here but our detonators – which are high volume items – are sourced from assembly plants in several countries,” notes Smit.

Apart from the new CE4 Commander™ system, DetNet’s offering comprises industry leading stalwarts – namely DigiShot®, DigiShot Plus®, BlastWeb®, GeoShot® and ViewShot® – which allow users to choose the appropriate mix of flexibility, features and values that best suit their needs. DigiShot Plus®, for example, is tailored to the requirements of mid-sized or large opencast mines where large blasts and remote firing are required while GeoShot® – which has found favour in shale gas exploration – caters for seismic applications where the objective is to map, record and analyse the geological properties beneath the earth’s surface with an energy pulse. BlastWeb®, a network based centralised system, is designed for underground use and is capable of initiating various types of electronic detonators from a surface control room.

The capabilities of DetNet’s products have frequently been demonstrated in record-breaking blasts, the most recent – just weeks ago – at an iron-ore mine in the Pilbara region of Western Australia. This particular blast was implemented using DigiShot Plus® detonators and involved the use of around 2 500 tonnes of explosives to break 10,7 Mt of rock. “The blast has set a new world record for electronic initiation with 6 832 DigiShot Plus® detonators being used,” says Smit. “The previous record was roughly about 5 600 detonators.”

Smit says that DetNet’s reputation has been founded on continuous innovation. “We’re constantly refining existing products and developing new ones. Our next major launch will be a world first. It represents the application of electronic timing to conventional shock tube technology and is based on an accurate timing module that DetNet® has developed which can be initiated by signals generated from shock tube. This provides the benefit of an accurate, electronic timed delay in the hole with the simplicity of a shock tube tie in.”

The system has been under development for four years and has successfully completed lab



View from Base Commander on a recent trial blast.

trials. It is about to go into fields trials and it is anticipated that it will be commercially available in 2018.

Finally, and commenting on present business conditions, Smit says that DetNet® has ridden out the mining recession quite successfully. “Electronic detonation systems are steadily gaining ground on conventional pyrotechnic systems in mining – in fact, we now find there is a ‘pull’ for the product from the industry whereas previously we had to ‘push’ it,” he says. “So we are benefitting from a long-term growth trend that stays in place irrespective of the cycles in mining. In addition, we’ve found that as certain markets decline, others are rising. Generally, we are very positive about the outlook for the company and are confident of continued growth.” ■

What is an electronic detonator?

Electronic detonation is a technology that enables digital communication between a blasting computer and microchip controlled detonators in the blast.

The concept sounds simple enough but the devil, of course, is in the detail and it took many years of research and development for all the problems to be ironed out and for the technology to become widely accepted as a viable alternative to conventional systems such as shock tube.

Advantages of electronic initiation of blasts include the ability to ensure that all detonators are fully functional prior to the blast being fired and the ability to control the blast result through the selection of delays and precision timing.

Electronic detonation tends to be more expensive than pyrotechnic methods but this is more than outweighed by its many benefits, notably improved blasting efficiency, better rock fragmentation, lower vibration levels, excavation profile and wall stability improvements, increased loader productivity and enhanced safety. ■