

Benchmark Monitoring



Kaboom
Real-time air blast & vibration monitoring

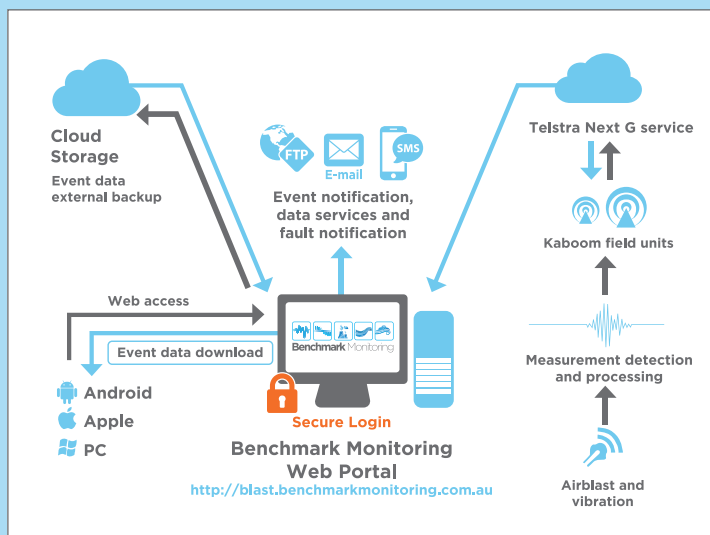
The latest monitoring solution
for real-time compliance monitoring
of air blast and vibration for the
mining and construction industry



The Kaboom System

The Kaboom system offers a turnkey air blast and vibration monitoring solution with the latest data acquisition technology and on board wireless communications. Kaboom provides superior measurement resolution and data quality over conventional hardware.

- ➔ The Kaboom system, which operates in accordance with AS2187.2-2006, continuously measures the vibration and air blast at a high sampling frequency.
- ➔ Kaboom comprises of field monitoring systems (field units) and the web portal that constantly share data and information amongst the monitoring canopy.
- ➔ Each Kaboom field monitoring system provides real-time event data that is transmitted via a private Telstra VPN data link to the Benchmark web portal that can be accessed remotely via the web



The Kaboom Data Hub

The Data Hub provides a secure and user friendly web portal for easy overview and management of blast monitoring activities. The hub is based on an SQL database that also allows access to data from historical blast events.

Key features of the Kaboom web portal are:

- ➔ High resolution auto-import of data from triggered blast events
- ➔ Trigger criteria can be set by the user via the web portal
- ➔ SMS and/or email notification of blast events including peak event data
- ➔ Retrospective event detection for non-auto triggered events facilitated by the ability to examine low resolution data to select the period of interest and trigger a manual event to download full resolution data with ease
- ➔ Tabulated and graphical interface for ease of data evaluation against assigned limits
- ➔ Geographical interface enabling peak event data at triggered stations to be visualised
- ➔ Status summary clearly indicating status of entire monitoring network
- ➔ Cross referencing with blasting schedules
- ➔ Data downloads accompanied by blast event information detail
- ➔ Multi-level user access control to enable different administration permissions levels
- ➔ User friendly web based interface fully customisable by Benchmark Monitoring
- ➔ Retrospective over pressure validation
- ➔ Auto generation of monthly reports

Kaboom Field Monitoring Unit

Key features of the Kaboom field monitoring unit are:

- ➔ Control module housing the master processor, communications hardware and air blast microphone with integrated preamplifier equipped with digital processor
- ➔ Robust digital measurement system capturing high resolution vibration and air blast data at 900 or 1800 samples per second
- ➔ On-board 24 bit signal processing provides low noise, high resolution data
- ➔ Simultaneous sampling of all measurement channels (as opposed to sequential sampling) at 24bit
- ➔ Vector Peak Particle Velocity (VPPV) resultant determined instantaneously by the on board processor
- ➔ Individual raw data points time-stamped and stored in memory at 900 or 1800 samples per sec
- ➔ Multi-tasking measurement routines conducting event management, data storage and communication simultaneously
- ➔ Vibration ground module, mounted on a seismic mount, equipped with tri-axial vibration measurement, frequency response from 2-250Hz, and on-board digital processing
- ➔ Microphone and integrated preamplifier provide an ultra-low frequency response and extremely high sensitivity for air blast measurements
- ➔ Hydrophobically treated 80 ppi density microphone windscreen reducing wind noise to improve the accuracy of air blast measurements
- ➔ In house calibration of air blast and vibration measurement systems against externally certified reference standards
- ➔ Continuous monitoring with minimum 11 days high resolution data storage buffer
- ➔ Retrospective download of data from buffer
- ➔ Expandable memory to enable increased instrument buffer capacity to 150 days
- ➔ Automatic triggering via proximity or threshold
- ➔ Simultaneous upload of blast event data to Data Hub while still maintaining continuous field measurement
- ➔ GPS time synchronization measured enabling high accuracy auto-synchronization of time to within 1 μ sec resolution and position to within 2.5 metres globally
- ➔ Integrated wireless communication technology for Penta band cellular and bluetooth
- ➔ Solar powered with intelligent power management for enhanced operation under low sunlight and high dust loading with battery capacity to enable unit to run for 5 days without sunlight
- ➔ Low voltage notification facility
- ➔ Auxiliary port for additional discrete analogue and digital devices such as wind sensors and gas monitors
- ➔ Rugged components designed for the tough Australian mining and quarry conditions
- ➔ Fully customisable by Benchmark Monitoring

The Kaboom system is Australian manufactured and supported by fully trained professionals located in the Hunter Valley enabling responsive field support, by mining industry professionals in the areas of environmental, technical trades and engineering.

System Hardware

On-board Environmental Sensors	Temperature sensor • Range -10 °C to +50 °C • Accuracy +/- 0.2 °C Pressure sensor • Range 800-11 mbar • Accuracy at +/- 2 mbar
System power	<ul style="list-style-type: none"> • 40 Watt solar panel • 48 Ahr AGM battery • Low voltage protection and integrated charging system • Intelligent power management system, providing greater than 5 days without sun • System low power alarming via email and SMS

On board Data Storage

Standard*Memory	11 days @ 900 Hz 22 days @ 450 Hz
Data Acquisition rate	900 samples per second (Standard Resolution) 450 samples per second (Low Resolution)

Wireless Communication

HSPDA	Quad band HSPDA enabling TCIP and UDP modes On-board GSM/GPRS/EDGE/HSPA
GPS auto synchronisation	Accuracy + - 2.5 metres
UTC auto synchronisation	Accuracy + - 0.001 seconds
Bluetooth	IEEE 802.15 – for device configuration and data download
Serial interface	115200 Baud – for device configuration and data download
Analogue interface	For optional WS/WD sensor or other analogue and digital measurement device.

System Events Capture

Automatic event detection	Automated event detection, allows for blast events to be uploaded to web portal, in seconds of a blast event with no minimum time between events
Manual event data recovery	Rapid analysis and acquisition of retrospective non-triggered event data via Benchmark's web portal

Ground Vibration Measurement System

Sensor Type	Tri-axial vibration measurement using 3x 2.0Hz industrial geophones
ADC Processor	3 channel 24 bit signal processing
Processor	24 bit processor
Measurement Range	0.0002 -25 mm/s
Measurement resolution	0.000006 mm/s
Frequency range	2Hz to 250 Hz
Accuracy	+ - 7%

Air Blast Measurement System

Sensor	Infrasonic microphone and integrated preamplifier Specialised low porosity (80 ppi) waterproof and UV stabilized windscreen
ADC Processor	1 channel 24 bit signal processing
Processor	24 bit processor
Process	Single channel 24 bit signal processing
Measurement Range	0 to 190 Pascals (140 dB)
Measurement Resolution	0.00012 Pa
Frequency Range	1Hz – 250 Hz
Accuracy	+ - 0.3 dB

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