SureWave Technology Ltd
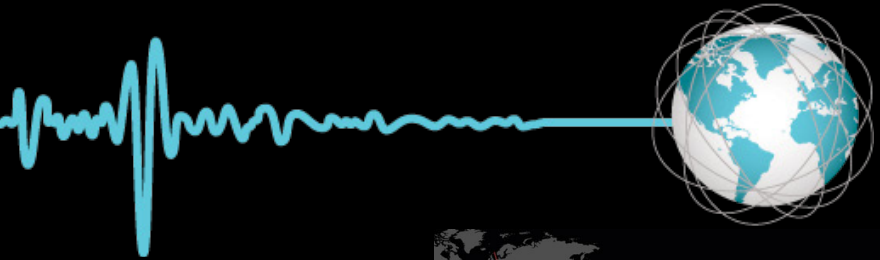
iSC
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INTERNATIONAL SECURITY CONSULTING

Presentation of Proven Technology:

Detecting and Locating Trapped Miners
Illegal Mining Detection

Philip Shaw and Marc Kahlberg
Spring 2015

SureWave Micro Seismic Monitor SP2 Model TM2

Screen image of real time detection and location:

Surface location above miners
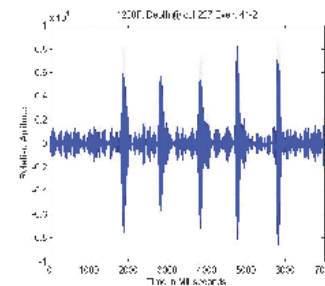

SureWave Technology Ltd

Microseismic Monitoring for Trapped Miners - SP2 Model TM2

Detect and Locate Trapped Miners

Revolutionary technology clearly identifies the signals from Trapped Miners. Proven at 1500 Feet. Confident up to 2000 feet depths. This is achieved by eliminating all of the surrounding noise associated with a fully working mine.

- Multi channel seismic inputs
- Unique proprietary IP 'Sees Through' Mine Noise
- Extreme dynamic range exceeding 130dB
- Stable embedded Windows platform
- Touch screen technology in conjunction with powerful user interface software for ease of use
- Rapid Deployment -Weighs less than 60Kg.
- Multiple Sensors cover a wide area up to 1Km.

philip@surewavetechology.com   www.surewavetechology.com   +44 (0)1270 757900

SureWave Technology Ltd

Presentation of Proven Technology

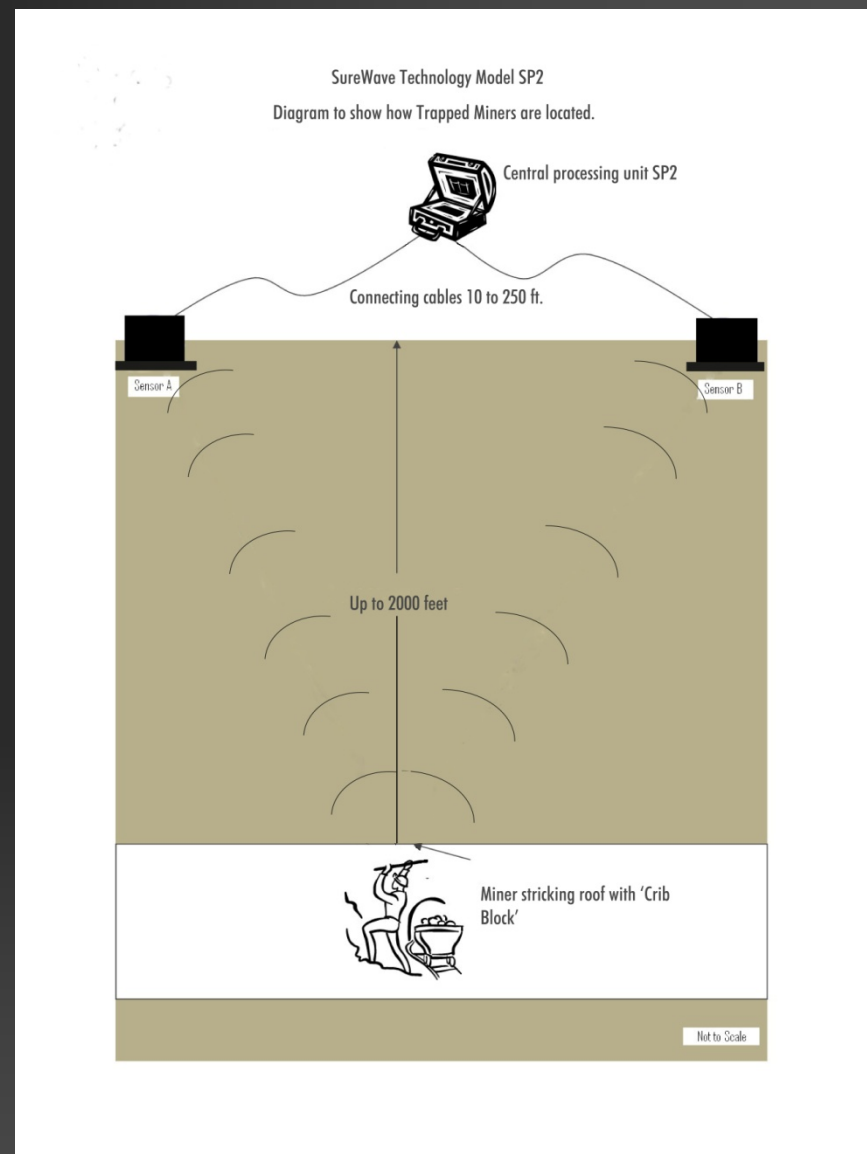Philip Shaw, Managing Director
E-mail: philip@surewavetechnology.co.uk
Telephone: +44 1270 757900

SureWave Micro Seismic Monitor SP2 Model TM2

INSTANT DETECTION AND LOCATION.

SureWave Technology Model SP2
Diagram to show how Trapped Miners are located.

Central processing unit SP2

Connecting cables 10 to 250 ft.

Sensor A

Sensor B

Up to 2000 feet

Miner stricking roof with 'Crib Block'

Not to Scale

Independently verified and certified performance at Federal Mine #2 West Virginia USA - 2011

- Detected at 780 and 1200 feet depth with no signal degradation.
- Successful detection confidently anticipated at over 2000 feet.
- The only technology in the world to be able to 'see through' the noise to achieve this.

Independently verified and certified performance - Side by side test with MSHA System - June 2012

- Setup in 1 1/2 hours using six sensors.
- Successful detection of every event – later confirmed independently.
- MSHA were unable to confirm the detection of any events on the day due to the excessive site noise.
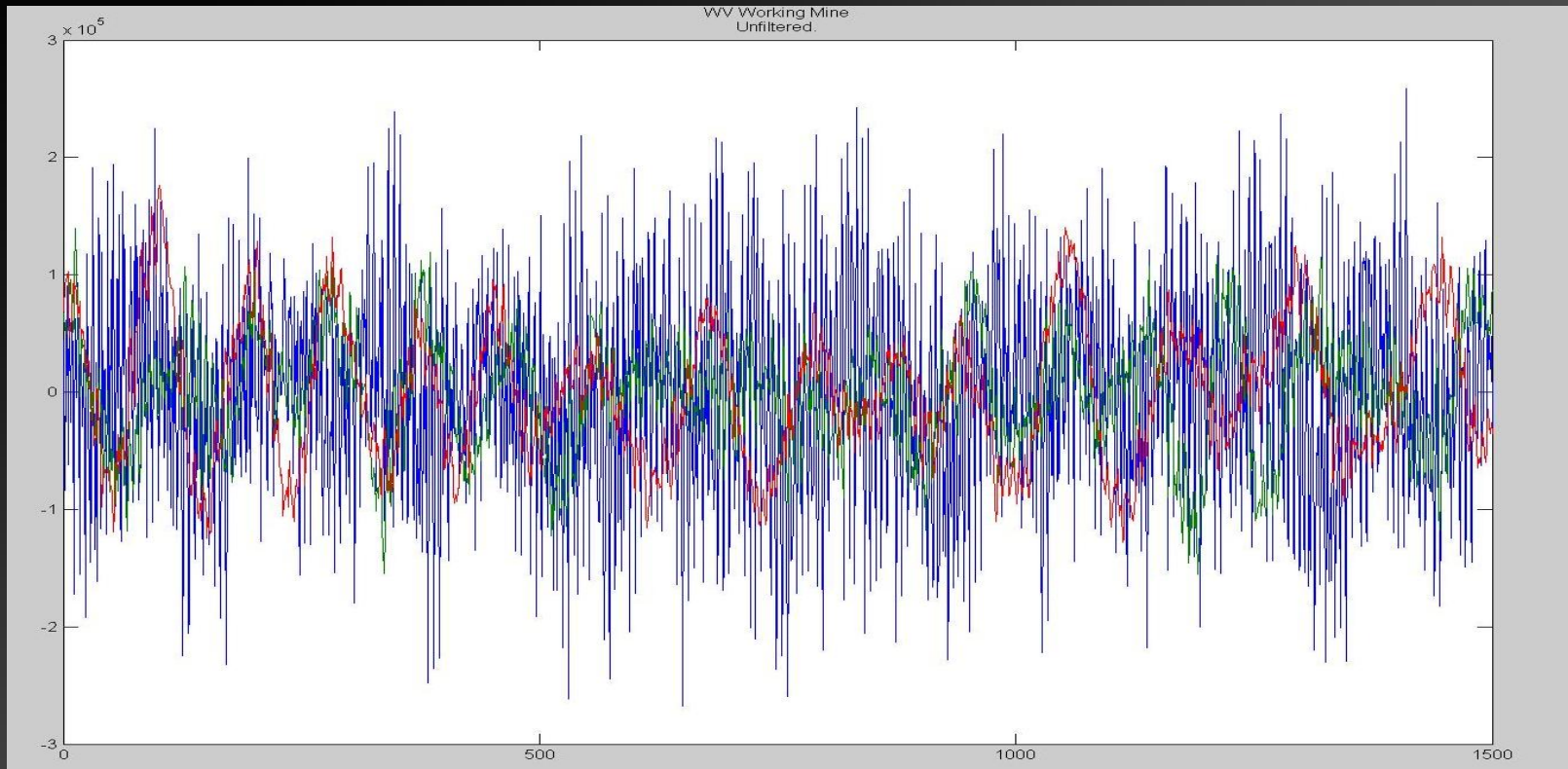- The SureWave system was able to 'see through' the site noise.

SureWave Technology Ltd

Presentation of Proven Technology

Philip Shaw, Managing Director
E-mail: philip@surewavetechnology.co.uk
Telephone: +44 1270 757900

Independently verified and certified performance – NIOSH tests with WVU - December 2012

- Setup in less than 1/2 hour using two sensors.
- Successful detection of every event – to 1200ft depths.
- Confirmed immediately. 1800ft detected weakly through 'GOB'
- The SureWave system is fully automatic – no user adjustment.
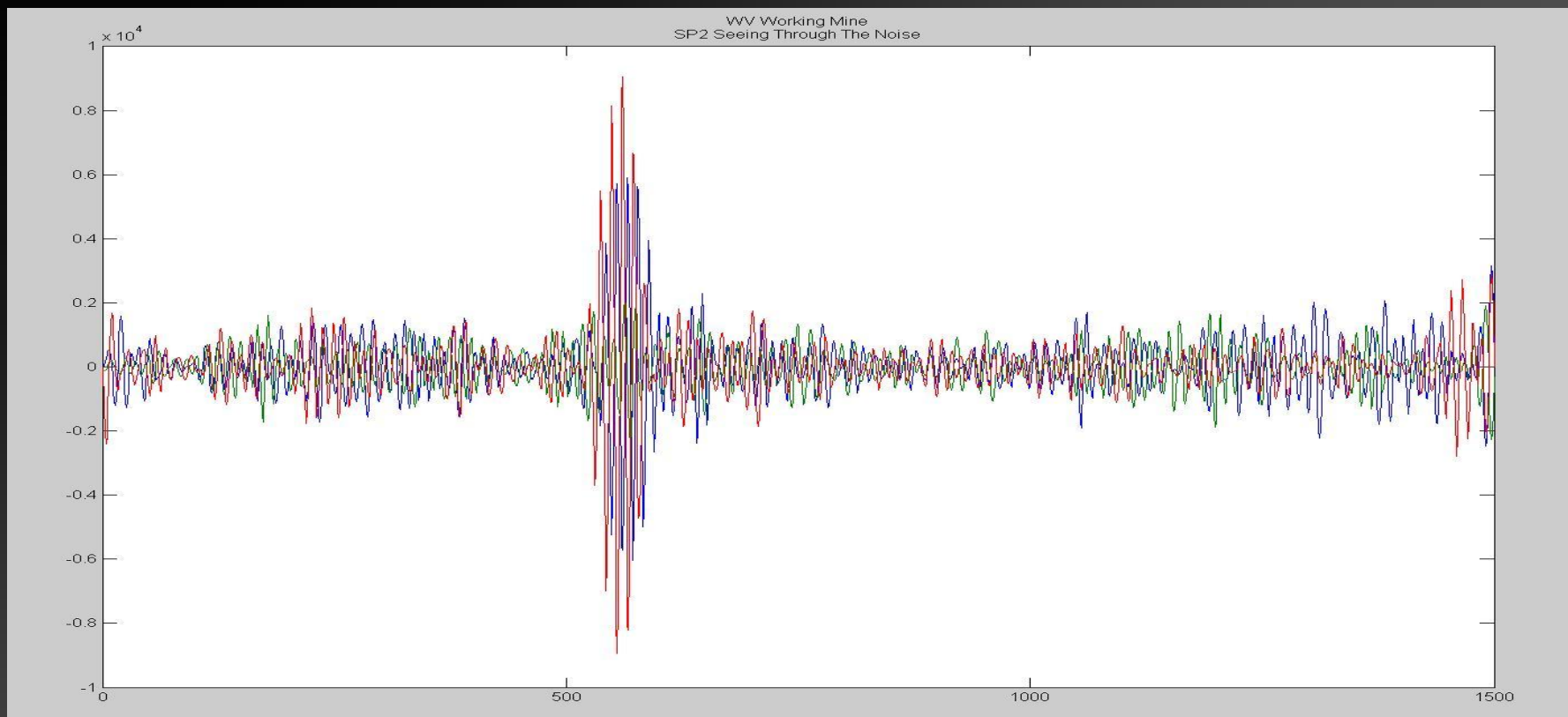- See full technical article in World Coal February 2013.

SureWave Micro Seismic Monitor SP2 Model TM2

Miner's signal is hidden in the noise of the mine often 1000's of times greater.

SureWave Micro Seismic Monitor SP2 Model TM2

WV Working Mine
SP2 Seeing Through The Noise

Proprietary technology 'sees through' the surrounding noise to extract only miners signals.
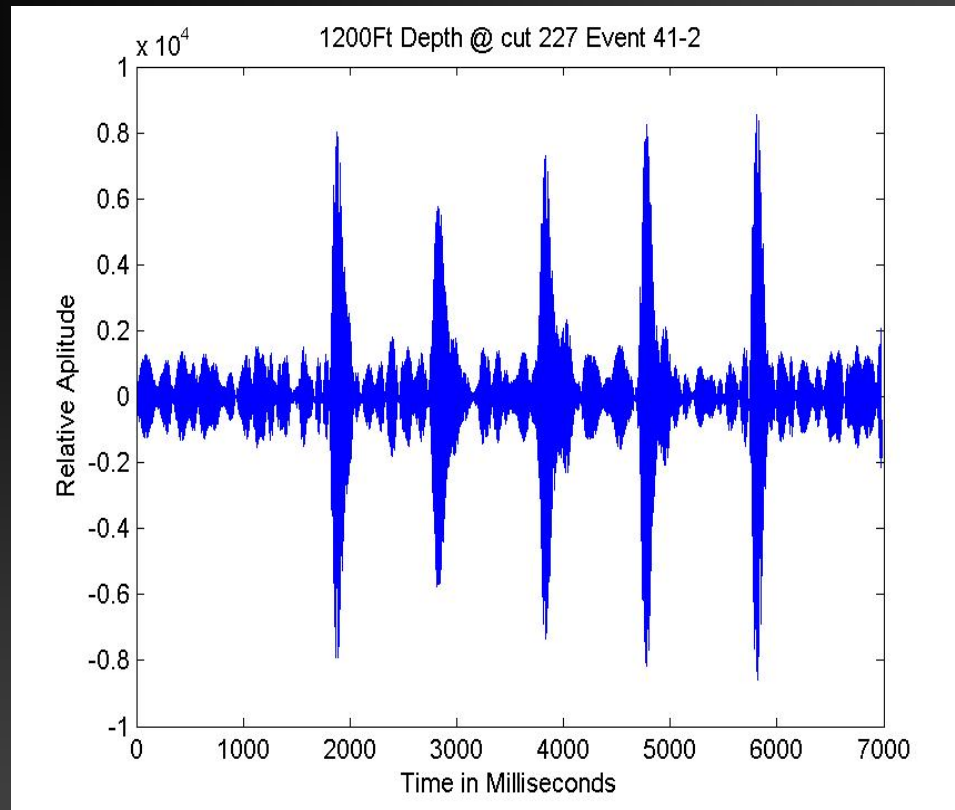
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Philip Shaw, Managing Director
E-mail: philip@surewavetechnology.co.uk
Telephone: +44 1270 757900

SureWave Micro Seismic Monitor SP2 Model TM2

Proprietary technology 'sees through' the surrounding noise to allow the miner's signal to be identified and located.

SureWave Micro Seismic Monitor SP2 Model TM2

QLD, Australia, in a working Surface Coal Mine detecting and real time tracking of underground activity – Water movement shown here.

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E-mail: philip@surewavetechnology.co.uk
Telephone: +44 1270 757900

SureWave Micro Seismic Monitor SP2 Model TM2
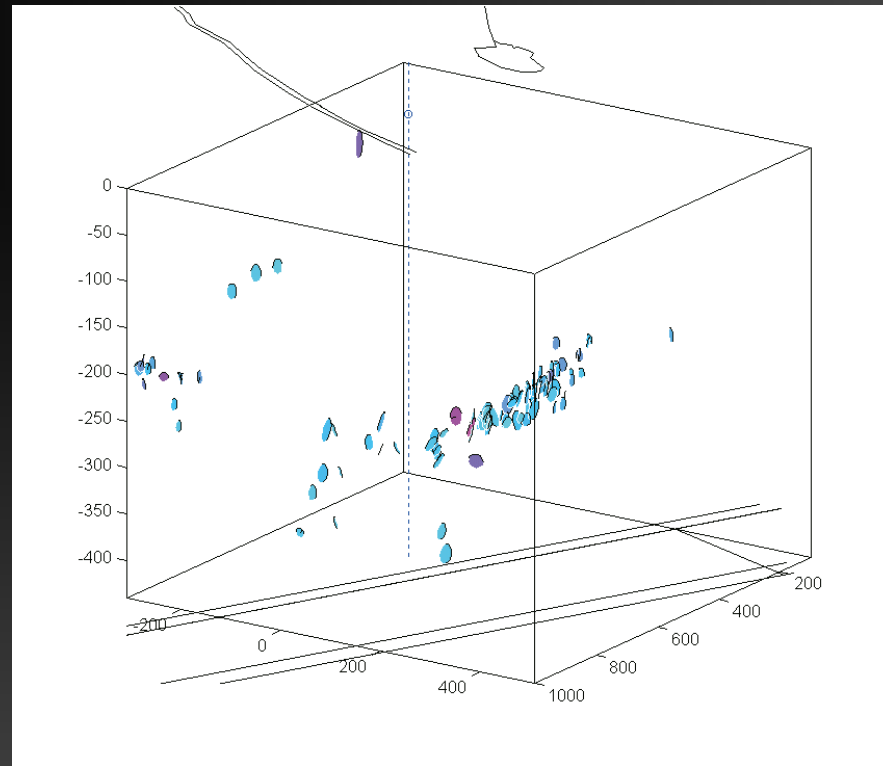
Detected events can be shown in 3D, giving real time tracking of underground activity – Monitoring of a Coal Mine is shown here before a roof fall.

SureWave Technology Ltd

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Philip Shaw, Managing Director
E-mail: philip@surewavetechnology.co.uk
Telephone: +44 1270 757900

Micro Seismic Monitoring

- 'Sees through' the noise of a fully working underground mine 1000's times greater than the miner's signal

- Detects Trapped Miners or Illegal Mining within minutes of setting up

- Surface position vertically above the miners given on any mine plan / map

- Rapid results – Portable – Typical setup in an hour.

- TM2 is ready to be deployed today.

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Telephone: +44 1270 757900

Conclusions

- The only technology in the world to be able to 'see through' the noise to achieve this.
- Can be rapidly deployed.
- Tested and witnessed at 1800 feet in a fully working mine with very large local seismic noise.
- No degradation of signal from 450 feet to 1200 feet giving confidence to over 2000 feet and beyond from strong pounding signals.
- Multiple sensors cover up to 1Km surface area.

Available in South Africa:

International Security Consulting (Pty) Ltd
Ground Floor, Block B
The Offices of Hyde Park, Strouthos Place, Hyde Park
Johannesburg
South Africa Tel: +27 11 2142700 Mobile: +27 72 0668207

SureWave Technology Ltd

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Philip Shaw, Managing Director
E-mail: philip@surewavetechnology.co.uk
Telephone: +44 1270 757900