

# SureWave Technology Ltd



**SP2 Microseismic Monitoring System for:**  
**Pit Sidewall and Mine Stability Monitoring**  
**Trapped Miner Detection**



## SP2 - Unique Capabilities

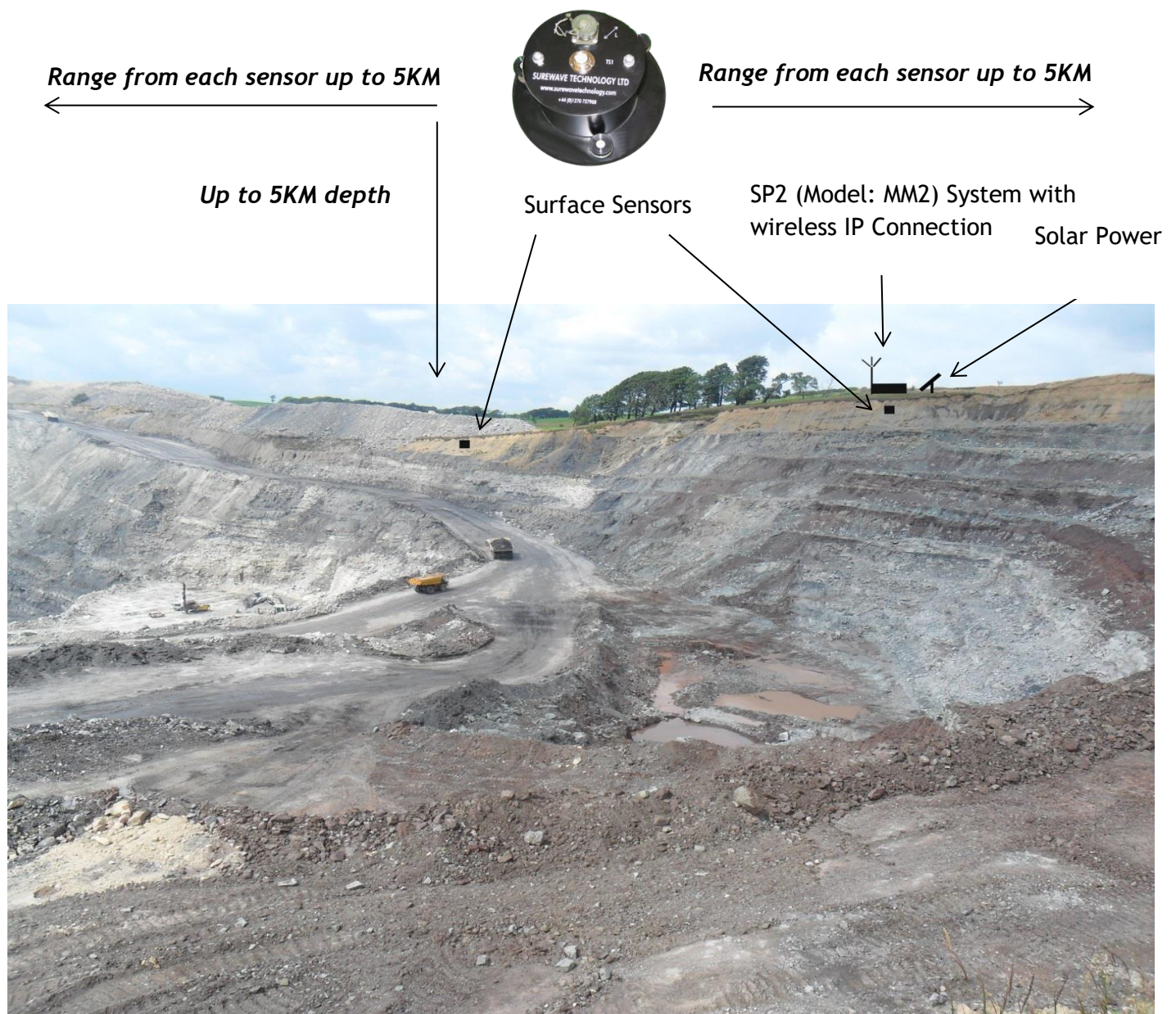
### *Increased Mine & Pit safety - significant potential cost savings*

SureWave Technology has developed a revolutionary technique creating a new level of Microseismic Monitoring. SP2 - redefining the standard for all monitoring needs.

This technology can now be deployed in either open pit or deep mines to monitor and give advanced warning of strata stress changes leading to failure. This can be utilized to increase the side wall angle on stable side walls - producing significant cost savings.

For Open Pit Sidewall Monitoring and Deep Mine Monitoring, the sensors are located just below the surface and mounted directly onto bedrock. Due to the extreme sensitivity and the system's ability to 'see through' the noise of a working environment, bore holes are not required, offering a significant saving on installation costs.

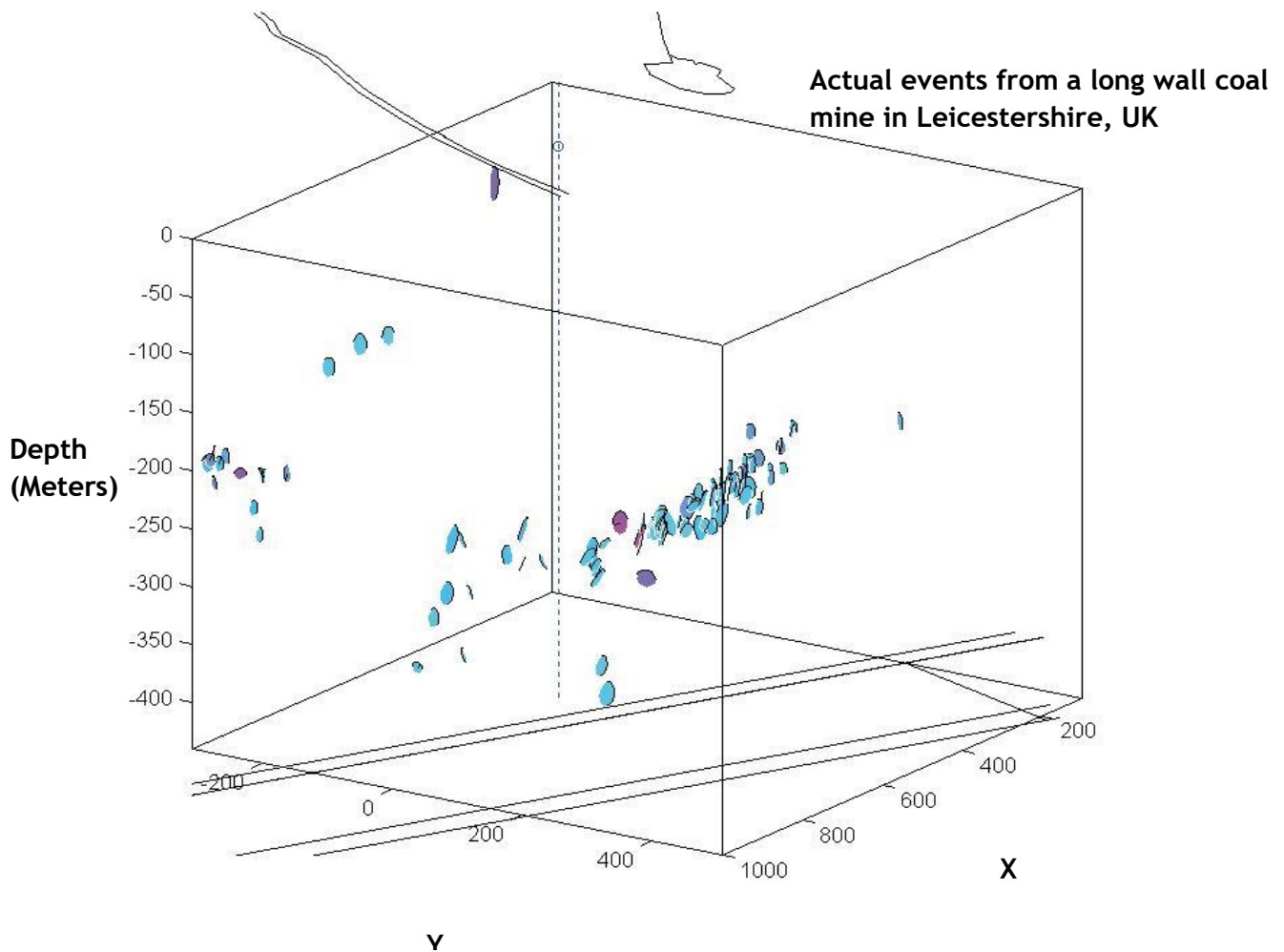
The microseismic events clearly indicate internal stress build up and therefore risk to the structure integrity. These events are transmitted in real-time via an Ethernet cable or wireless IP connection. Unlike other technology that records physical movement, SureWave Technology can detect precursor events prior to any observable event.





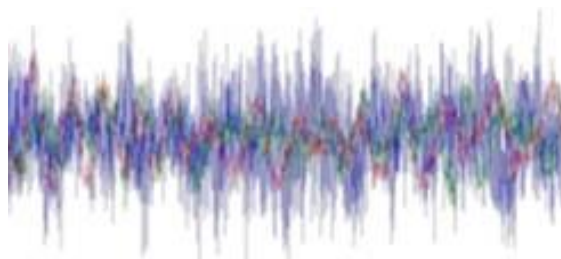
## Ease of use

SureWave's unique technology in detecting microseismic signals below the working noise levels, also allows the user to quickly identify developing seismic activity, indicating potential areas of strata weakness, by visual monitoring of the data superimposed on the site 3D image, presented in real time.

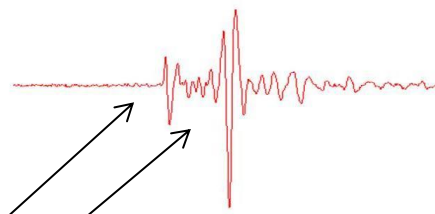


### 3D display of microseismic events

The microseismic data is visualised on the mine/pit 3D plan to enable instant detection of seismic event clustering with the image showing location, direction and magnitude of each seismic event in real time. By setting alarms, the system can be autonomous; alerting through sms text or IP connections to the mine systems.



Raw signal with working noise



P and S waves extracted from the noise

- Primary (longitudinal compress) and Secondary (transverse shear) wave data is extracted by our unique technology that “sees through” the environment and seismic noise of a fully working mine.

## **Case Study - 18 weeks warning ignored leading to mine failure**

(18 weeks warning given to a working long wall coal mine in Leicestershire, UK.)

SureWave's technology SP2, marketed at the time by the inventor Philip Shaw as an SP1 system, was installed on the surface and subsequently detected microseismic events at 23 weeks prior to the incident. This mine was already being monitored using conventional microseismic technology which failed to detect any events right up to the collapse. At 18 weeks before the event, exact timing and magnitude was able to be given by the SP1 technology.

On the day forecast, the mine was cleared of personnel as a precaution and it failed as predicted. This seam was subsequently lost.



*SP1 (predecessor to current SP2 system) was mounted on the surface, solar powered with the sensors mounted on rock in shallow holes.*

*The mine was fully working. Microseismic data was monitored for event clustering with the frequency of events dramatically increasing once the strata sustained stress beyond its limits.*

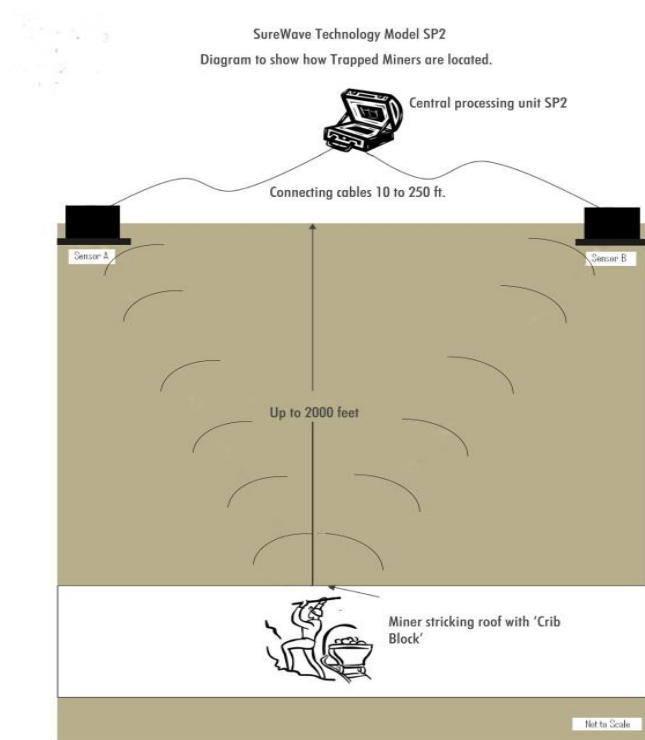


The significance of the detected events and subsequent failure and the impact this would have on the mine owners, justified independent monitoring and analysis by the Department of Earth Sciences, University of Liverpool, UK.

A full independent report was produced and is available detailing the monitoring and the techniques used to accurately predict the eventual roof collapse.

## Detect and locate Trapped Miners - SP2 Model TM2

Following an underground mine incident, a small window of opportunity (typically 24 hours or less) is available to detect whether there are any survivors trapped. Invariably, such an event will disable all mine communications hence details of survivors is unknown. SureWave Technology has developed a **portable rapid deployment Trapped Miner Detection System**, capable of detecting survivors at distances in excess of 650 Meters underground. It is essential that this system is available within 24 hours of any mining areas where miners may become trapped. Once deployed, real time information can be relayed to the emergency response teams immediately.



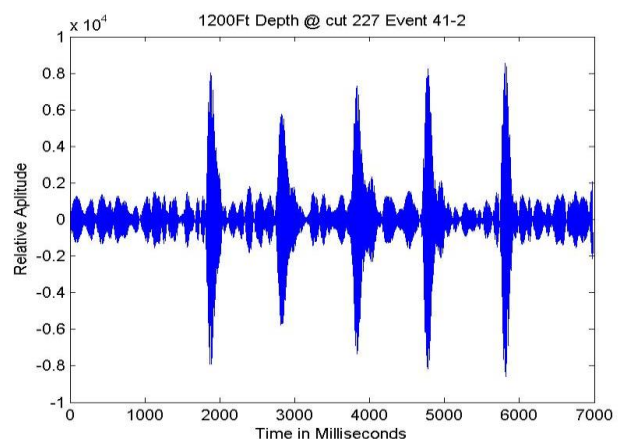
***Trapped miners pound to produce a signal***



***The TM2 system consists of a central CPU, battery pack, cables and sensors***

***The SP2 TM2 Trapped Miner System is supplied in a transport crate suitable for air freight and medium to large SUV. This portability allows the system to be deployed in any terrain and set up within minutes of arriving above the mine.***

***The sensors are mounted on solid material above the mine as shown - no access to the mine is required.***



***The touch screen display instantly indicates Trapped Miner signals with no user setup required. Location can then be determined if required.***

Several independent test reports are available to view on our website:

<http://www.surewavetechnology.co.uk/News-Press.html>



# The SureWave Revolution

After more than ten years of research and development by its founder, SureWave Technology brings to the market a "game-changing" range of products, based on highly sophisticated techniques for measuring and monitoring microseismic activity above and below ground.

SureWave research has revolutionised the sensitivity of existing microseismic monitoring methods to the extent that pre-cursors to catastrophic events can now be detected many months in advance.

In short, SureWave Technology has broken the seismic "sound barrier" which is a momentous technological breakthrough in "seeing through" the background noise.

## The SureWave Advantage

- Significantly improved sensitivity;
- Installation cost savings - expensive bore holes are not required as the system has the ability to monitor from surface mounted sensors;
- Detection range of up to 5KM in all directions;
- Capable of rapid deployment using a portable system for emergency applications;
- Sophisticated software system that provides visualisation of the event history, without the need for post processing.

## About us

SureWave Technology is a UK based product development company with a sales and distribution network in Europe, America and the Asia Pacific Region. Sales and after sales service are provided by our distributor network.

SureWave also supplies a unique range of robust construction noise (Leq) and vibration monitoring systems that are available through our distributors.

**SureWave Technology Ltd**



**The world's leading microseismic  
technology company.**

## Contact Us

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