



SEMTECH®

SmartCap



**Connected Fatigue
Monitoring Improves
Mining Safety for
SmartCap**

QUICKFACTS

Company

SmartCap
www.smartcaptech.com

Customer Profile

Founded in 2008, SmartCap was formed to develop solutions to address limitations in fatigue monitoring technologies.

Objectives

Develop a fatigue monitoring solution that would protect the safety of mining crews moving goods outside mine sites.

Results

Improves safety for mining crews, reduces accidents and subsequent costs for mining companies.

Semtech Products and Services

- [AirLink® RV50 Industrial LTE-Advanced Router](#)
- [AirLink Services](#)
- Connected through the AirLink router, the SmartCap system monitors driver fatigue in real time, with alerts to drivers and dispatchers.



“ One of our keys to success in mining and elsewhere has been to work closely with our customers on change management. Deploying a SmartCap system in a mine or a long-haul trucking operation involves balancing the needs of companies and workers, and addressing concerns all the way through the process. ”

Greg Smyth
 Engineering Manager,
 SmartCap Technologies

INTRODUCTION

SmartCap Technologies is an award-winning example of a successful partnership between the public and private sectors. It was founded as a result of collaborative research, funded by mining operators, to develop a fatigue monitoring solution that would protect the safety of mining crews moving goods outside mine sites.

The technology behind SmartCap was developed within CRCMining, a Cooperative Research Centre established by the Australian government, supported by four universities and 13 industry partners including equipment manufacturers and mining companies. Anglo American Metallurgical Coal (previously Anglo Coal Australia) and the Australian Coal Association Research Program (ACARP) supported this work for a number of years, which led to successful field trials in surface mining operations to monitor operators of haul trucks, excavators, dozers, graders and water trucks. Today SmartCap is used by some of the world’s biggest companies and has expanded far beyond mining.

SmartCap has the unique ability to provide accurate and truly predictive information that enables the elimination of microsleeps, the number one cause of driver accidents in the workplace.

CHALLENGE

One of the biggest dangers in mining is fatigue. Mines run 24 hours a day, and mining by-products are transported around large confined areas.

The gold standard for monitoring fatigue is the use of EEGs—electroencephalograms—which are used widely in healthcare. The challenge was taking that monitoring technique and making it “portable,” so that it could be administered outside a medical facility. At the time, there was no commercially available product that could be used on mine site.

The original solution developed by SmartCap Technologies was targeted at mining companies, as they had provided the initial funding and early requirements, and included a display that was mounted in the cab, with Wi-Fi connectivity to enable communications around the site. But mines were equally concerned about improving safety during the transit of goods from mines to ports and railways, which led to a search for a 3G/4G communications device that could be used on public cellular networks.



SOLUTION

Initially, SmartCap evaluated products from a local vendor. “We initially trialed a product from a local vendor, but found that the product just wasn’t reliable or rugged enough for our requirements,” said Greg Smyth, Engineering Manager, SmartCap Technologies.

SmartCap Technologies had worked with Semtech for modules in the past, so they asked to evaluate a 4G LTE router. Through a local distributor – M2M Connectivity, they received samples quickly and got the help and responsiveness they needed to have a successful evaluation. “Product reliability and ease of use were paramount,” explained Mr. Smyth.

The solution is completely contained in a “ball cap,” which is worn by heavy machine operators during their shifts. It monitors electrical activity in the brain and sends this information wirelessly to a SmartCap display in the cab. The display is connected to an AirLink router that captures the data from the headwear, so it can alert the driver locally if the fatigue level is high, and also sends the data to SmartCap Technologies’ web application where it can be monitored in the mine control room.

Fatigue is measured in numbers – level 2, 3, 3+ and 4. Levels 2 and 3 are seen as normal alertness, level 3+ early indicator of fatigue and Level 4 indicates a high risk of fatigue. “It’s a unique fatigue algorithm we use to measure fatigue in a commercial environment not a medical environment,” says Smyth. The EEG measurement goes into an algorithm to operators and, while they are driving goods around the site or over highways, the fatigue information is being hosted locally to warn the driver in certain cases, and also to alert operations.

RESULTS

SmartCap Technologies has been successful in the mining industry, with customers in North and South America, Australia and South Africa. They are now working with long-haul trucking companies.

“One of our keys to success in mining and elsewhere has been to work closely with our customers on change management,” said Smyth. “Deploying a SmartCap Technology system in a mine or a long-haul trucking operation involves balancing the needs of companies and workers, and addressing concerns all the way through the process.”

About Semtech

Semtech Corporation (Nasdaq: SMTC) is a high-performance semiconductor, IoT systems and cloud connectivity service provider dedicated to delivering high-quality technology solutions that enable a smarter, more connected and sustainable planet. Our global teams are committed to empowering solution architects and application developers to develop breakthrough products for the infrastructure, industrial and consumer markets.

To learn more about Semtech technology, visit us at [Semtech.com](https://www.semtech.com) or follow us on [LinkedIn](#) or [X](#).

“Semtech”, “Sierra Wireless” and “AirLink” are registered trademarks of Semtech Corporation or its subsidiaries. Other product or service names mentioned herein may be the trademarks of their respective owners. © 2023 Sierra Wireless, Inc. © 2024 Semtech Corporation. All rights reserved. 2024.10.03