WiFi tracking aid in mining communication

9 February 2006

In wake of recent mining tragedies, some technology companies have suggested extension of wireless real-time location technology using WiFi networks to pinpoint miners trapped underground -- a solution that could save lives in the future.

One such company is Northern Virginia-based Ekahau Inc. who announced its Real-Time Locating Systems, which uses any standard WiFi network to track exact locations of the movement of miners trapped underground in mines or tunnels in real time.

The company cites itself as being the only available technology on the market that can leverage any brand of existing WiFi networks inside a mine without the need for any proprietary hardware or system installations.

"It's basically an indoor GPS system," said Tuomo Rutanen, vice president of business development for Ekahau. "It has many uses underground, keeping track of explosives, trucks, compressors, drills and above all, the well-being and safety of employees."

The same RTLS that companies like Ekahau proposed is not new, having been used within the healthcare system, tracking assets, patients, and doctors and meant to be used in large sprawling campus environments, he said.

With the increase of WiFi networks in mines for Voice over IP phone lines, the proliferation in WiFi networks has created a standard wireless infrastructure in which products like Ekahau's wireless tracker device can operate.

The small battery powered WiFi tag called Ekahau T201, about $60, has a call button which a miner pushes letting the tag alarm by sending the precise location to a remote server outside of the mine.

Then using wireless computers, outside staff are able to access location information on internal Web pages by pointing their Web browsers to an intranet page. Movement and location of each tagged miner is tracked in a database and shown on a visual map. And the last known locations of a miner will be mapped, in the event the WiFi network has collapsed.

The system works inversely as well, allowing management outside to alert those underground signaling caution.

So far, Ekahau has implemented the system in a tunnel work site in León, Spain, as well as in South America, Africa, and other parts of Europe.

It takes just under two weeks to set-up and is dependent on the WiFi infrastructure place, Rutanen said, mentioning they had deployed the system in Spain fall of last year.

The 25 kilometer-long tunnel could not have supported installation of any proprietary tracking system or antennas, so a tracking system using WiFi was necessary.

And as long as the WiFi network extended with the coverage of depth or length of the area underground, then the tracking device would be able to stay connected with the central computer, he said.

According to Rutanen, the only downside could be employees not wanting to be tracked; therefore an efficient system would need to be place when employees aren't tracked during downtime like lunch.

"The safety system in the mining industry should evolve with the technology that is being made available," he said. "WiFi technology is evolving and products like ours are becoming cost effective."

However, Ekahau and other mining safety technology companies are now under review, seeking approval from the Mine Safety Health Administration before it can provide its equipment for mining operations in the U.S. industry.

Safety technology continues to be reviewed by an independent group chosen by the MSHA, studying what technology is necessary and effective for specific mining conditions, and an interim report is expected to be released mid-year.

One current tracker system approved is Mine Site Technologies' Tracker IV system for underground gassy atmospheres, although there have are no installations of the system in the United States, just one coal mine in Australia.

The Model TAG IV Transmitter approved by MSHA sends out a unique pulsed signal that is received by strategically placed "beacons" which is not approved by MSHA, who says it is safe only if placed in an explosion proof box.

The upside to the system is that even if disrupted it still provides the last known location of personnel and equipment but conversely, the system is subject to damage from fire and explosion which could compromise the ability to track or send messages on a data line, according to MSHA.

Moreover, it says tracking is dependent on identifying the zone between two beacons where a transmitter is located.

Recent mining accidents are fresh in many people's minds after 16 West Virginian miners in total died as a result of fatal mining accidents a little over one month into 2006 including the Sago Mine accident and the conveyer belt fire at the Aracoma Alma Mine No. 1.

The Bush administration has been under recent attacks for mining safety with calls for safety inspections and legislations into the country's mining industries especially now that a report prepared by the Democratic staff of the House Education and the Workforce Committee blasts the Administration's mine safety record for having weakened regulations and under funding the MSHA.

from https://phys.org/news/2006-02-wifi-tracking-aid.html