

Multi-Mode Two-Way Radio Communication and Tracking System for Use Under Emergency and Operational Conditions in Underground Mines

Presented by Stolar Research Corporation
848 Clayton Highway
Raton, New Mexico 87740
(505) 445-3607

At
MSHA Mine Rescue Equipment and Technology Forum
National Press Club
Washington, D.C.
March 13, 2006



Methane Ignition and Coal Dust Explosion in Mine Entry



Mine-Wide Two-Way Radio Communications

Mine-wide two-way Radio Communications are required during the first few minutes of an incident or the situation goes out of control.

- 1984 Welburg Mine Fire
 - 27 dead
 - Only a 900-ft walk to safety
- 2002 Quecreek Water Inundation
 - 9 trapped
- 2004 Sago Mine Explosion
 - 12 dead
 - Only an 1,800-ft walk to safety



Radio Communications and Tracking System Features

- Wireless two-way transmission
- Natural waveguides
 - Through-the-earth waveguide (ultra-low frequency)
 - Conveyor belt/cable waveguide (low frequency)
 - Coal seam waveguide (low frequency)
 - Passageway waveguide (ultra-high frequency)
- Intrinsically safe
 - Operational when ventilation is disrupted



Radio Communications and Tracking System Features

- Three redundant tracking and location subsystems
 - Real-time network with graphic display
 - Surface Delta Tracker to pinpoint location
 - In-mine Fox Hunter Antenna
- Extremely reliable network
 - F1/F1 repeater drilled into roof rock
 - Expandable and self-healing
 - Through-the-earth redundancy
 - Modulated for digital transmission

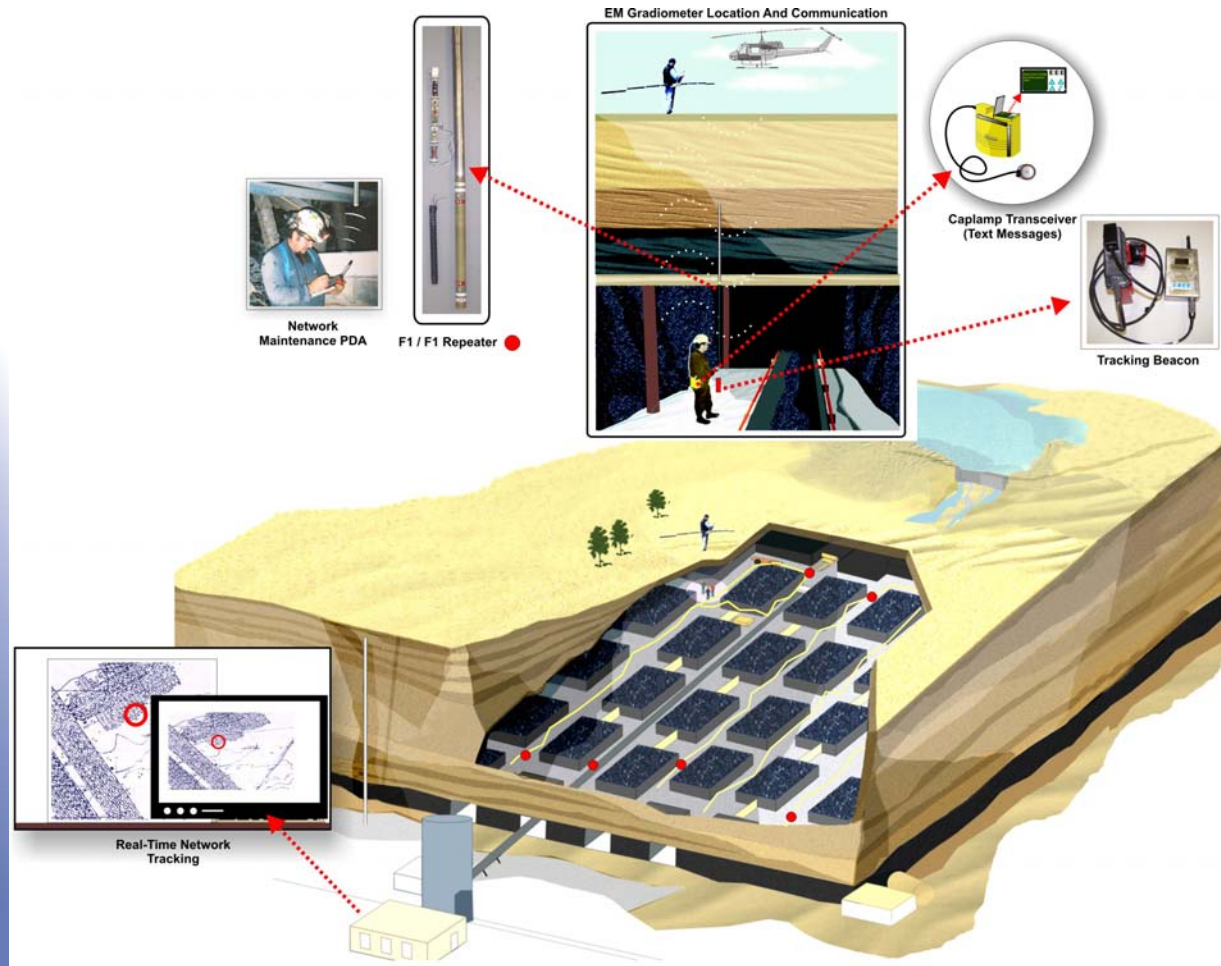


Radio Communications and Tracking System Features

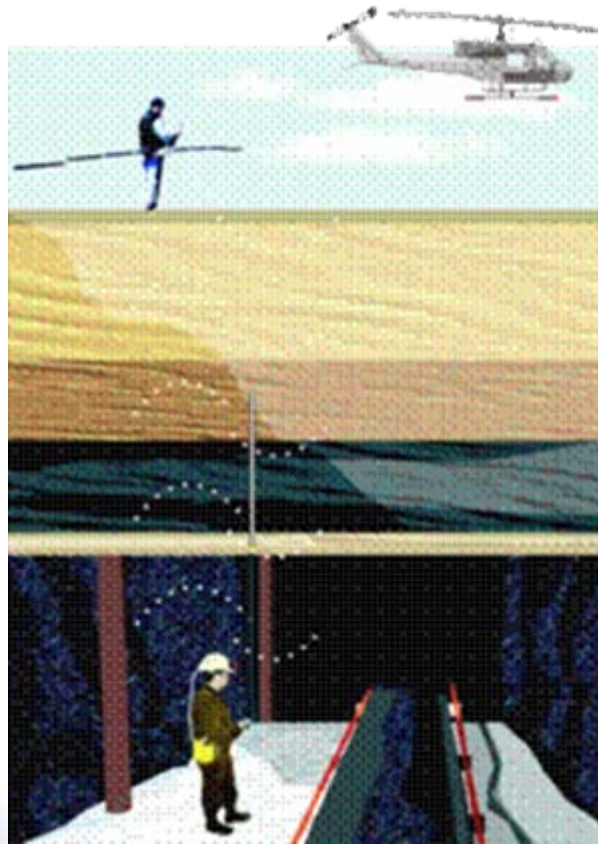
- Cap lamp-powered tracking beacon
- Cap lamp transceiver
 - Multi-mode
 - Two-way text messaging
 - Synthetic voice capability
 - Bluetooth link to monitor physiological condition and provide PDA download



Radio Communications and Tracking System



Tracking Beacon Through-the-Earth Waveguide



Tracking Beacon



MSHA IS Certification
Investigation IA-22294

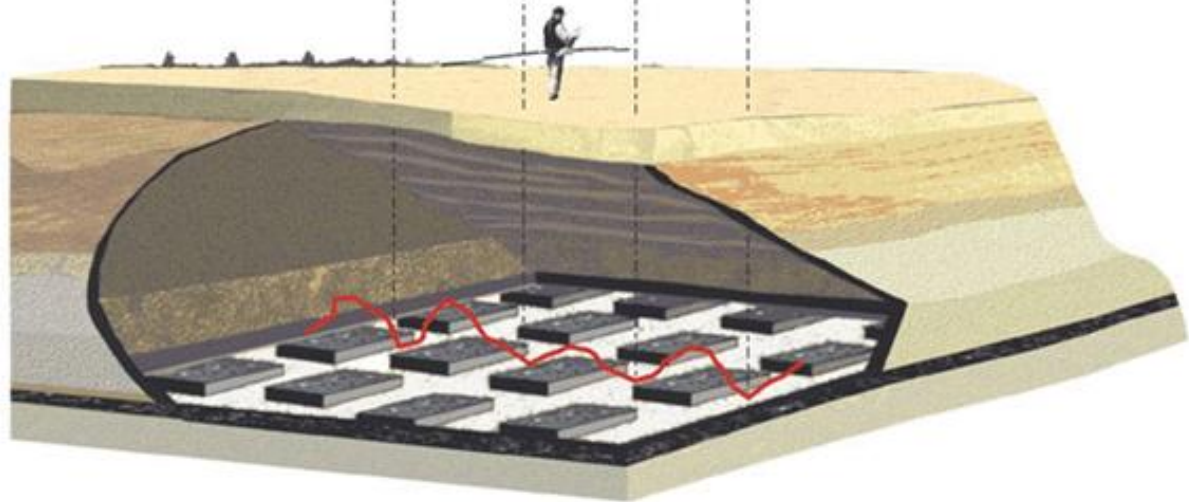
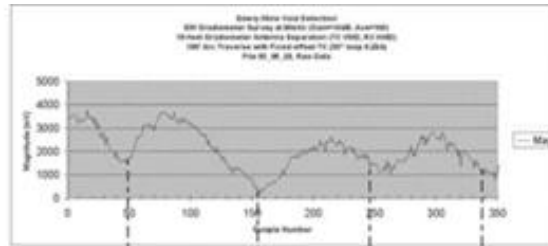
- Keypad
- OLED
- Micro controller
- Class L
Transmitter

Delta Tracker



- Suppresses surface radio frequency interference (RFI)
- Detects spreading EM waves
- Pinpoints trapped miners' location
- Determines depth

Delta Tracker Detection of Mine Voids



Suggested Regulation Changes

- Combine 30 CFR 75:1600 and 30 CFR 49
- Require the same network and equipment
- Require 96-hour system operation when ventilation system is disrupted

Offer Tax Incentives

- Purchase of equipment
- Installation of equipment
- Maintenance of equipment
- Training of maintenance personnel

