MSHA Activities To Address Communication and Tracking Issues

• Investigate Mine Site Technologies PED and TRACKER systems

• Evaluate available new technology
  – Received more than 80 proposals
  – Requested proposals through www.msha.gov
  – Reviewing proposals to determine which to pursue further
Mine Site PED and TRACKER Investigation

- Investigate PED installations at:
  - Peabody Air Quality and Twentymile Mines
  - Consol Blacksville and Robinson Run Mines
  - BHP San Juan Mine (only surface-installed antenna in the US)

- Travel to Australia to investigate TRACKER installation
**Pros and Cons of PED**

- **Pros:**
  - Can send evacuation instructions to miners in early stages of fire
  - Can be retrofit for Koehler, NLT and MSA cap lamps
  - System can be deployed in emergency by arranging surface loop antenna

- **Cons:**
  - Underground antenna could be compromised in fire or explosion
  - Reports of some areas where signals can’t be received (shadow zones)
  - Can interfere with existing mine systems
  - Communications limited to one-way
  - No confirmation that message has been received
**Pros and Cons of Tracker**

- **Pro:** Can provide last known location of miner before loss of power

- **Cons:**
  - Cannot provide precise location of personnel
  - System will become non-operational upon loss of power
**System Evaluation Criteria**

- System capability – precise tracking and 2-way voice and text preferred
- Survivability in a fire or explosion
  - Focusing on completely wireless communication
- Current availability
  - Available or near term available hardware vs. conceptual
- Capability of complying with MSHA requirements
FIELD TESTING EVALUATION GOALS

• Determine how well signals propagate (maximum distance between nodes)

• Determine how much overburden systems can penetrate if capable of through-the-earth communication

• Determine mine coverage area (i.e. are there blind spots and why?)

• Explore interference issues

• Determine accuracy of tracking features
Current Technologies Under Evaluation

- Wireless node-based systems using IEEE 802.11 protocol
- Wireless node-based systems using IEEE 802.15.4 protocol
- Ultra-Wide Band Communications and Tracking
- Low frequency, narrow band through-the-earth (TTE)