



MSHA COMMUNICATION AND TRACKING GUIDANCE

Stakeholders Meetings

March 2009



2006 MINER Act (Current Requirements)

- A redundant means of communication with the surface for persons underground, such as secondary telephone or equivalent two-way communication.
- Consistent with commercially available technology and with physical constraints of the mine, above ground personnel must be able to determine the current or immediately pre-accident location of all underground personnel.
 - Any system so utilized shall be functional, reliable, and calculated to remain serviceable in a post-accident setting.



2006 MINER Act (June 2009 Requirements)

- Post accident communication must be provided between underground and surface personnel via a wireless two-way medium.
- An electronic tracking system must be provided that permits surface personnel to determine the location of any persons trapped underground.



Other Key MINER Act Language

- Post Accident Communications
 - “Not later than 3 years after the date of enactment of the MINER Act, a plan shall, to be approved, provide for post accident”
 - “Where such plan sets forth the reasons such provisions cannot be adopted, the plan shall also set forth the operative’s alternative means of compliance. Such alternative shall approximate, as closely as possible, the degree of functional utility and safety protection provided by the wireless two-way medium and tracking system...”



MINER Act Compliance Issues

- Definition of “wireless”
 - question regarding whether MINER Act intended 100% wireless
- Back-up power supply capacity
- Survivability requirements
- Tracking precision
- Mine coverage



MSHA Communications and Tracking Guidance

- A program policy letter (PPL) was developed to assist mine operators in developing their communication and tracking plans for the emergency response plan (ERP).
- The PPL content is “guidance,” not “requirements.”
 - Technology is not sufficiently developed at this time to justify a regulation
 - When technology matures, a regulation most likely will be developed
- The final PPL was posted on the MSHA website on January 16, 2009.



MSHA Communications Guidance

- Post Accident Communications:
 - “Un-tethered device”
 - Group of miners or each miner working alone
 - Voice or text
 - Audible, visual or vibrating alarm to alert of incoming signal
 - Emergency message capability



MSHA Communications Guidance

Communication Coverage area:

- “Throughout” each working section
- Continuous coverage along escapeways
- Coverage zones 200’ inby and outby of “strategic areas.”
 - Strategic areas are where miners normally work or may congregate in an emergency, such as belt drives, transfer points, power centers, loading points, refuge alternatives, SCSR caches
- Other areas deemed necessary by DM
- Check in/Check out procedure for leaving coverage area (e.g. bleeders)



MSHA Tracking Guidance

- Tracking Performance
 - 200 foot precision on working section
 - 2000 foot spacing in escapeways
 - 200 foot precision at strategic areas
 - Must track maximum number of people expected in coverage area
 - 60 second scanning rate
 - Unique identifier
 - Store location data for 2 weeks



MSHA Communications and Tracking Guidance

- Systems must be MSHA approved as permissible
- Standby power capacity
 - 24 hours for infrastructure
 - 12 hours for portable communication and tracking devices (due to available technology)
 - 5% transmit time, 5% send time, 90% idle time (5/5/90)
- Surface Facilities
 - Line powered surface component with standby power source to ensure continuous operation
 - Provides communications and tracking at facility required by 30 CFR 75.1600-1
 - Trained person always on duty



MSHA Communications and Tracking Guidance

- Survivability
 - Redundant signal pathways
 - One system with multiple pathways, or
 - Different systems in different entries
- Maintenance
 - Manufacturer provided maintenance schedule and checklist
 - Operator ensures:
 - Communication and tracking procedure for system or component failures
 - Ensures restoring of 24 hours of standby power
 - Weekly recorded functional checks to maintain proper operation condition
 - Daily checks of un-tethered devices



CURRENTLY MSHA APPROVED

- Page and trolley phones
- Leaky feeder systems
- Portable Hand-held Radios
- One way text messaging system (PED)
- RFID Tracking
- Node-based Communications and Tracking Systems



RECENT APPROVAL ISSUANCES

- 12 Approvals in 2006 including:
 - Kenwood portable radio
- 23 in 2007 including:
 - Tunnel Radio Leaky feeder system
- 33 in 2008 including:
 - Becker enhanced leaky feeder
 - Venture Design wireless tracking and text messaging system
 - Motorola Portable Radio
 - Matrix Design Group RFID tracking system
 - NLTech IEEE 802.11 node over fiber
 - IWT and L3 wireless mesh
- 4 in 2009 including:
 - Minecom (Pyott Boone) Leaky Feeder System
 - Active Control Active Mine System



Miner 1
Transmitting

Coupled Mode



Radiating Mode

Leaky Feeder

Functions as a
power line,
communications
link, and a
distributed antenna

Secondary Base Station

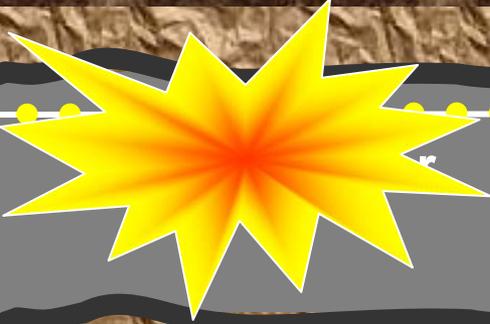


Overland Link

Primary Base Station

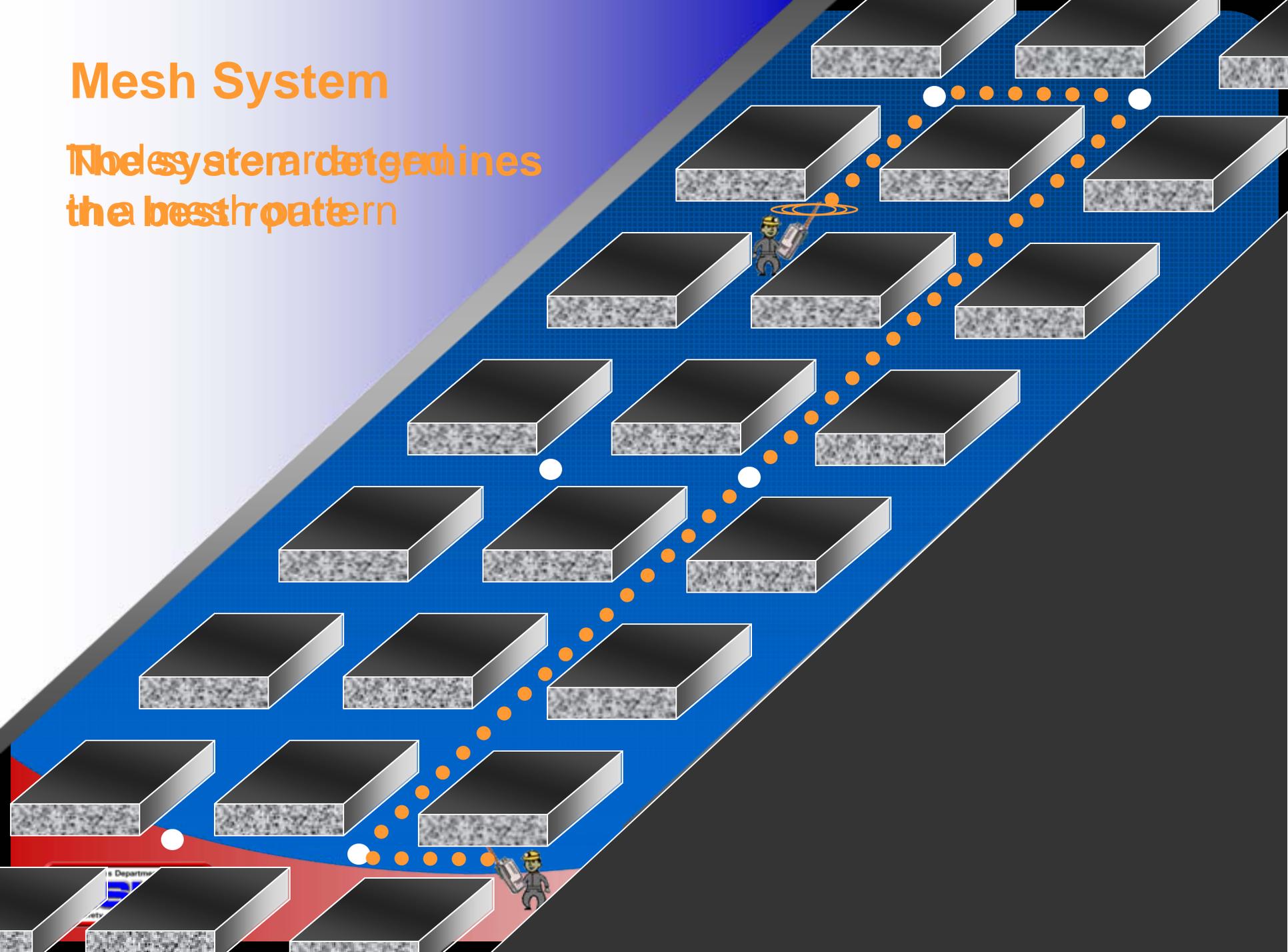


Mine Shafts



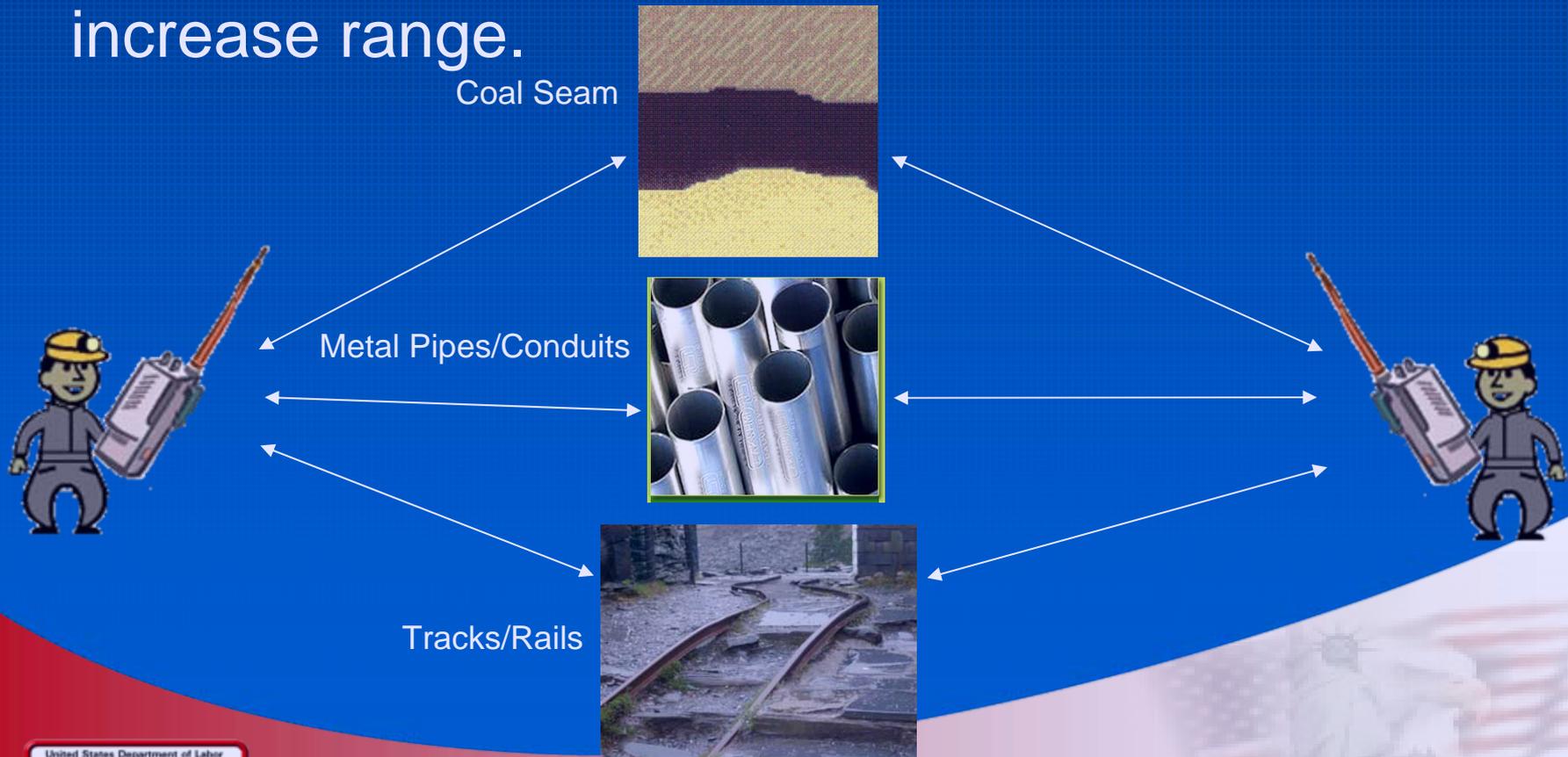
Mesh System

The system automatically determines the best pattern



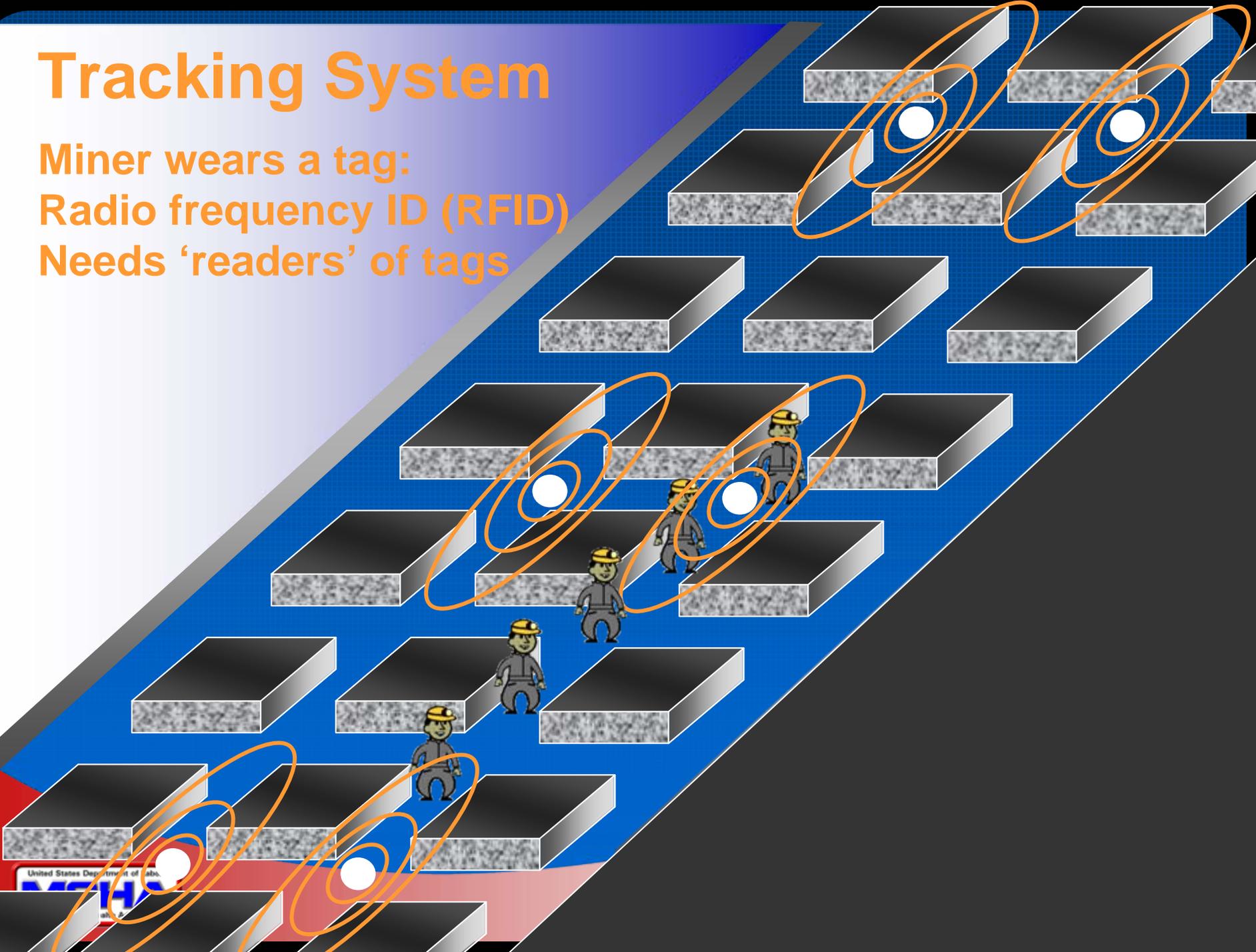
Medium Frequency (MF) Radio Communications

- Doesn't require special cable.
- Radio signal couples to other conductors to increase range.



Tracking System

Miner wears a tag:
Radio frequency ID (RFID)
Needs 'readers' of tags





Questions?

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