ACCOLADE

Situational Awareness Suite/
Mine Operations Center (SA/MOC)

Fixed Mesh Node (FMN) to Leaky Feeder (LF)
FMN/Miner Mesh Radio (MMR) to FMN/MMR
MMR to MMR
Sensor Mesh Node (SMN) to FMN
Wide Area Network (WAN)
Existing LF

L-3 ACCOLADE network components and proposed deployment/ operation

ACCOLADE Wireless Mesh Mine Communications System

L-3 Global Security & Engineering Solutions (L-3 GS&ES) and its partners have developed the L-3 ACCOLADE Wireless Mesh mine communications system for underground coal mines. This system was generated under a competitively awarded research and development contract from the National Institute for Occupational Safety and Health (NIOSH).

The ACCOLADE Wireless Mesh system provides a self-healing, redundant, and survivable voice and data network, which allows communication among miners underground (peer-to-peer) and communication between below- and above-ground personnel. The system also provides a real-time situational awareness capability and will have the ability to integrate with existing/future mine sensors. Moreover, the ACCOLADE Wireless Mesh system has the inherent flexibility to integrate with existing wired mine communications systems, including Leaky Feeder and Ethernet, and is tailorable for mines of all sizes.

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Wireless Mesh Mine Communications System

Miner Mesh Radio

Fixed Mesh Node

The ACCOLADE Wireless Mesh system includes the following key components:

- Miner Mesh Radios provide each miner with robust voice and data communications, as well as a locating capability.
- Fixed Mesh Nodes strategically located throughout the mine allow for dynamic routing of all communications throughout the network.
- Gateway Nodes serve as interface points between the above- and below-ground networks.
- Mine Operations Center provides the central point for monitoring the network and tracking the position of all personnel within the mine.

A complete prototype version of the ACCOLADE Wireless Mesh system was deployed in an operational mine in October 2008; large-scale commercial deployments throughout the coal-mining industry began in 2009.

About the L-3 Mine Safety Office

The L-3 Mine Safety Office (L-3 MSO) is L-3 Communications' lead organization for the exploration and development of mining safety systems. L-3 MSO's current mine safety portfolio includes the ACCOLADE Wireless Mesh communications system and the ultra wideband (UWB)-based TRU-TRACKER Precision Location System. Both of these programs were originally developed under federally generated mandates for advanced systems to enhance the safety of coal mine operations in the United States. In addition, L-3 MSO is also pursuing ongoing research into other mine safety areas to help ensure that all miners return home safely at the end of every shift.

L-3. Headquartered in New York City, L-3 Communications employs more than 64,000 people worldwide and is a prime system contractor in aircraft modernization and maintenance, C3ISR (Command, Control, Communications, Intelligence, Surveillance and Reconnaissance) systems and government services. L-3 is also a leading provider of high-technology products, systems, and subsystems. The company reported 2008 sales of $14.9 billion.

L3 communications
Global Security & Engineering Solutions

For more information, please contact:
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ACCOLADE Wireless Mesh System Equipment Specifications

Below-Ground Components

Fixed Mesh Node

- MSHA Approval No. 23-A080015-0 (inclusive) and 23-ISA080005-0
- Operating Frequency: 900 MHz
- Operating Protocol: 802.15
- Number of Channels: 4 voice, 1 data
- Data Transmission Rate: 500 kbps
- Operating Voltage: 24VDC
- Power Output: RF @ 900 MHz; +31 dBm
- Dimensions: 11.8″ x 11″ x 4.25″
- Weight: 11.4 lbs.
- Battery Life: >48 hours with 36 Amp-Hour battery
- Operating Temperatures: -30 to 60 degrees C
- Operating Humidity: 5 to 95%
- Storage Temperatures: -30 to 60 degrees C

Battery

- MSHA Approval No. 23-A080015-0 (inclusive) and 23-ISA080005-0
- Power Output: 1.25 A @ 6VDC
- Dimensions: 16″ x 13″ x 6.87″
- Weight: 22 lbs.
- Operating Temperatures: -10 to 40 degrees C
- Operating Humidity: 5 to 95%
- Storage Temperatures: 5 to 25 degrees C

Power Supply

- MSHA Approval No. 23-A080015-0 (inclusive)
- Operating Voltage: 120VAC Mine Power
- Power Output: 24VDC, 3A
- Dimensions: 11″ x 9″ x 6″
- Weight: 14 lbs.
- Operating Temperatures: -20 to 60 degrees C
- Operating Humidity: n/a - Coated
- Storage Temperatures: -40 to 85 degrees C

J-Box

- MSHA Approval No. 23-A080015-0 (inclusive)
- Dimensions: 3″ x 7.5″ x 2.25″
- Weight: 2 lbs.
- Operating Temperatures: -20 to 60 degrees C
- Operating Humidity: n/a
- Storage Temperatures: -40 to 85 degrees C

United States Department of Labor MSHA Mine Safety and Health Administration

West Virginia Office of Mine Safety, Health & Training

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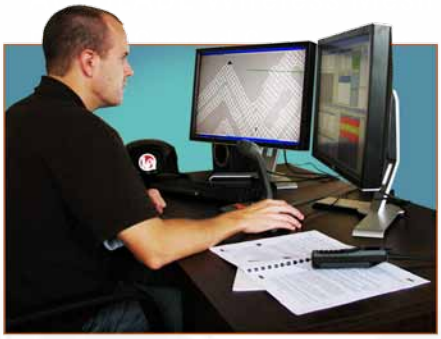
Above-Ground Components



Situational Awareness Suite/ Mine Operations Center (SA/MOC)

Mine Operations Center

- Situational Awareness Computer: Dell Intel XEON with multiple quad core processors; Redundant Array of Independent Disk (RAID) Data Protection
- Operating System: XP Professional
- Battery Backup: Smart-UPS with greater than 30 minutes power failure backup and audible alarm
- Monitors: Dual 24-inch-wide screen
- Internet Access: >300kbps
- Enclosure Features: Filtered positive pressure air flow; metal base with casters
- Operating Temperature: 10 to 35 degrees C
- Operating Humidity: 20 to 80% noncondensing
- Storage Temperature: -40 to 65 degrees C
- Total Weight: 280 lbs.

Gateway Node (variant of the Fixed Mesh Node; interface node at mine entries)

- Operating Frequency: 900 MHz
- Operating Protocol: 802.15
- Number of Channels: 4 voice, 1 data
- Data Transmission Rate: 500 kbps
- Power Output: RF @ 900 MHz; +13 dBm (above ground)
- Dimensions: 11.8" x 11" x 4.25"
- Weight: 11.4 lbs.
- Battery Life: >36 hours with 36 Amp-Hour battery
- Operating Temperatures: -30 to 60 degrees C
- Operating Humidity: 5 to 95%
- Storage Temperatures: -30 to 60 degrees C

Miner Mesh Radio

- MSHA Approval No. 23-A080020-0
- Operating Frequency: 900 MHz
- Operating Protocol: 802.15
- Number of Channels: 4 voice, 1 data
- Power Output: RF @ 900 MHz; +13 dBm (above ground), +30 dBm (below ground)
- Dimensions: 2" x 2" x 12"
- Weight: 1 lbs.
- Battery Output: 3.75 VDC, 4.8 Amp-Hour
- Avg. Battery Life: >24 hours with 90/5/5 (90% standby, 5% talk, 5% receive) operation
- Text Messaging: Free-Form and Prescripted Messages
- Operating Temperatures: -20C to +40C
- Storage Temperatures: -40C to +80C
- Operating Humidity: 0 to 100%
- Meets International Protection Rating 54 (IP 54) Standards

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