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## **MagneLink™ Magnetic Communication System (MCS)** Through-The-Earth Two-Way Emergency Wireless Communications for Mine Industry Safety



# MagneLink™ Magnetic Communication System (MCS)



The MagneLink™ Magnetic Communication System (MCS) is a self-contained through-the-earth wireless system that will provide post-accident, two-way, emergency voice and text communications independent of surface or in-mine infrastructure. MagneLink MCS will provide extended range performance for shallow to deep mines, enabling trapped miners to communicate effectively to assist mine emergency response and rescue teams in determining status and location under extreme post-accident emergency conditions when no other form of communication is possible.

The MagneLink MCS system is comprised of at least one Surface MCS and one In-Mine MCS. The operational concept envisions mine emergency responders placing a portable Surface MCS in an above ground location in proximity to where an underground In-Mine MCS signal can be received to establish two-way communications with trapped miners. Once communications are established, the responders and trapped miners will communicate using digital voice or text. Alternatively, a trapped miner can turn on the In-Mine MCS and activate an automatic beacon signal to the surface that will alert responders and closely approximate the miner's location.

MagneLink MCS will function similarly in an overburden or slant range condition where it might be inconvenient or impossible to get positioned directly overhead the trapped miner's location.

Since the In-Mine MCS is transportable, individual units can be strategically placed along planned escape routes or co-located with underground emergency refuge shelters. Additional MagneLink MCS units can be added, or existing units easily repositioned, using underground equipment as a mine develops in size over time.

MagneLink MCS also can be equipped to interface to Miner Emergency Radios (MER), allowing miners to directly communicate to the surface simply by switching to a pre-selected emergency channel on their MER.

MagneLink MCS is designed to be highly reliable, minimizing mine operator maintenance requirements. In addition, the MagneLink MCS is designed for the harsh environmental conditions expected within an operating coal mine.

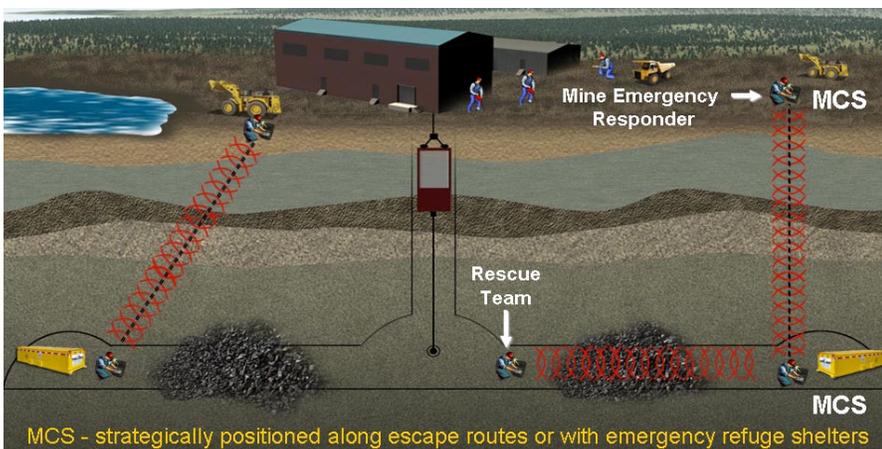
Lockheed Martin has designed the MagneLink MCS to enable cost-effective future technology insertion. Future capabilities include networked MagneLink MCS units, extended communications ranges, and remote activation and monitoring. Networked MagneLink MCS will further extend the range by automatically passing messages, and enable bridging of surviving RF-type systems using existing emergency channel handheld tracking devices. Remote activation and monitoring will enable MagneLink MCS units to remotely activate another unit and monitor the location for activity via microphone.

MagneLink MCS will provide wireless two-way emergency through-the-earth communications to facilitate the rapid location and rescue of trapped miners. Features include:

- Digital voice and text
- Portability (Surface MCS) and Transportability (In-Mine MCS)
- Remote activation and monitoring
- Beacon Signal or Beacon Location
- High reliability

The In-Mine MCS and Surface MCS have common transmit and receive antenna. The In-Mine MCS has a Transceiver Unit inside a Mining Safety and Health Administration (MSHA) approved Explosion Proof (XP) enclosure. The Surface MCS has a Transceiver Unit housed in a lighter weight, man-portable enclosure.

The In-Mine MCS began the MSHA equipment safety certification process in the summer of 2009. Pre-production models designed to meet MSHA intrinsic safety requirements have exceeded National Institute of Occupational Safety and Health (NIOSH) range goals during in-mine testing. Pre-production MagneLink MCS range performance has proved sufficient to meet deep mine post-accident emergency communications requirements. Lockheed Martin expects to bring MagneLink MCS to the market following MSHA safety certification.



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