Background

Silvus SC3500 MIMO radios were tested in a mobile video mesh network configuration at the Edgar Experimental Mine, part of the Colorado School of Mines in Idaho Springs, CO.

The purpose was to determine the performance and coverage area Silvus MIMO radios provide in an underground tunnel environment.

Figure 1. Inside view of tunnel

Silvus Mobile Ad-Hoc Mesh Network

The Silvus SC3500 IP radio is a high throughput full duplex solution that allows multiple streams in either direction to be carried by the same radio. The SC3500 allows for a self-forming, ad-hoc mesh network providing the user extended range of operation around multiple corners in challenging NLOS terrain. The same radio is used for the vehicle, OCU and repeater and can be easily swapped out or interchanged with each other.

Test Setup & Radio Configuration

4 Silvus SC3500 MIMO radios were dropped "on the fly" at proper locations to maintain the link as a vehicle drove along a predetermined test course.

Video rates were capped at 2 Mbps and 10 frames per second. Generated rates fluctuate with time based on contents of the video.

The radio drop locations start at 1 and end at 4 as shown in Figure 2.

- 1 Watt total TX power
- 3 dBi omni antennas
- Link Adaptation turned on
- Radios placed on ground, antennas inches off ground
- PTZ camera

Results

Silvus MIMO radios were consistent throughout the tests, with 0% PER over 4 nodes with the 4th node covering an impressive 4 corners in the challenging tunnel environment.

Key Statistics:

- 4th node maintained link around 4 corners
- PER (Packet Error Rate): 0%
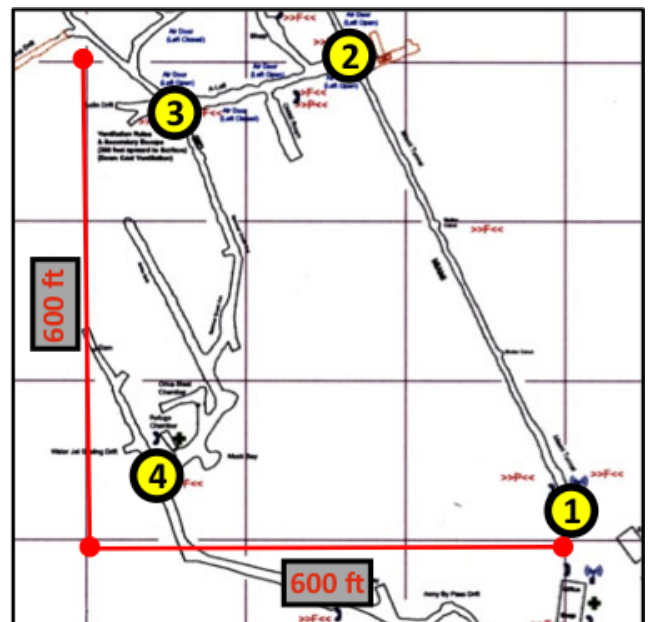- Static 4 node ping average 14.7 ms

Figure 2. Radio path and locations inside mine

User Feedback

"The Silvus MIMO radios were very consistent in their performance over many various test trials. We were able to successfully transmit stable video through 4 nodes around multiple corners". Test Lead