

Silvus Demonstrates 3x—4x Wireless Coverage Increase over COTS WiFi Solution in Urban Los Angeles



Background

Mobile ad-hoc networks (MANET), originally developed for the military, have become increasingly popular in commercial markets over the past decade. This has resulted in the availability of a myriad of commercial-off-the-shelf (COTS) Wi-Fi solutions with MANET or mesh capability. Although these COTS solutions may suffice for consumers who want to simply extend the coverage of their home Wi-Fi networks, they have many shortcomings when used in challenging outdoor environments. Silvus' StreamCaster™ radio, with Mobile Networked MIMO (MN-MIMO) technology at its core, was specifically engineered to address these shortcomings.

Silvus Mobile Networked MIMO

MN-MIMO is a revolutionary new digital communications waveform developed by Silvus Technologies. MN-MIMO is the result of more than 7 years and \$25M in U.S. Government funded research in cutting-edge communications technologies. Leveraging the latest innovations from across the communications industry, MN-MIMO has been engineered from the ground-up with a specific focus on providing reliable, high bandwidth, mesh video and data communications in challenging mobile and non-line-of-sight (NLOS) environments where traditional COTS technologies fail.

Coverage Comparison

To validate the superiority of the MN-MIMO waveform, the Silvus SC3500 MIMO radio was compared to a COTS 802.11 a/b/g/n mesh Wi-Fi adapter in a 6 node mesh network. Both sets of radios were configured as follows:

- Center Frequency: 2.457GHz (Wi-Fi Channel 10)
- Bandwidth: 20MHz
- Transmit Power: 50mW (17dBm)
- Antennas: 3dBi Omni

The radios were spread around urban West Los Angeles and were positioned to provide maximum coverage area. Of the six nodes used, five nodes were stationary (labeled 1 through 5 in Figure 1) and one node was mobile (followed the colored path in Figure 1). The mobile node was sending a target rate of 1Mbps data back to node 1. Figure 1(a) shows the coverage area of the COTS 802.11 adapter and Figure 1(b) shows the coverage area of the Silvus SC3500 MIMO radio.

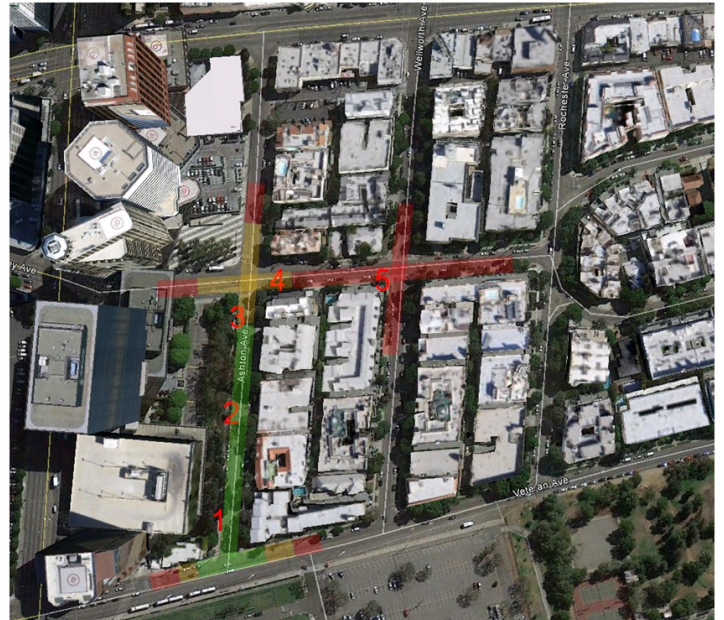


Figure 1. (a) WiFi 6 Node Coverage (Top), (b) Silvus SC3500 6 Node Coverage (Bottom)

SC3500 1 Watt Coverage

The comparison above provides an apples-to-apples comparison of the MN-MIMO waveform and 802.11n with like power levels. In reality the Silvus StreamCaster™ radios provide a nominal 1 watt of output power and can also be used with external power amplifiers to provide even more range. The coverage map on the next page shows a 6 node

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mesh coverage using StreamCaster™ SC3500 radios at their nominal 1 watt output power. Here we can see that under normal operating parameters, the coverage area of the SC3500 is much larger. In the heart of urban Los Angeles, using 5 stationary nodes, a 6th mobile node was able to have connectivity across 16+ square blocks and a 2 kilometer span at the furthest distance.

Conclusion

With like power levels, frequency, and antenna gain, the Silvus SC3500 demonstrated a significant range advantage over 802.11n Wi-Fi. These tests were performed with just 50mW power output; however, the Silvus StreamCaster™ radios provide a nominal 1 watt of output power and can cover a much larger range with their standard settings.



Figure 2. StreamCaster™ 3500 Mesh Coverage with 1 Watt Nominal Power (Above), compared with 802.11n 50mW coverage (Below)