

SEAMLESS NON-LINE-OF-SIGHT COMMUNICATIONS FOR URBAN WARFARE

Project duration: 07/01/2005 – 07/01/2006

Project Summary

Significant improvements in non-line-of-sight communications will have a great impact in the military, government, and commercial sectors. Historically, the telecommunications field has always been limited by the rate of data that can be transmitted by the technology of the time. Whenever newer technology was introduced to provide higher and more reliable transmission rates, new applications soon appeared that pushed the limits of the new technology. MIMO technology has ignited a new revolution in information communications and short and long range wireless connectivity. By using multiple antennas at the two ends of a communication link, the channel capacity between a transmitter and a receiver in a fading, scattering environment grows linearly with the number of antennas.

The objective of this proposal is to demonstrate the feasibility of significantly increasing the reliability and data rates of non-line-of-sight communication links, such as SINCGARS, by using adaptive signal processing techniques in conjunction with multi-element antenna arrays. New space-time coding (STC) techniques, using multiple input-multiple output (MIMO) technology, combined with state-of-the-art video compression, promise to exploit the scattered, multi-path signals inherent in urban environments by expanding the current limits of channel capacity in existing narrowband audio channels to an extent where transmission of real-time video is feasible.

Commercial wireless applications ranging from mobile telephones to digital broadcast TV to wireless broadband systems would benefit from increased channel capacity. The wireless communications industry is continually searching for new technologies that increase transmission rates on existing bandwidths and that provide reliable delivery in urban environments. Broad and almost unlimited commercial opportunities are available for this technology in personal and property protection, surveillance, and homeland security sectors.