**FREE SPACE OPTICS**

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**Abstract:**

Free space optical communications (FSO) is now common for point to point communications between fixed locations on land, and is also used for communication between moving platforms on land, on the surface of the sea, in air, and in space. Free space implies that it is not practical to use optical fiber to connect the points that need to communicate or exchange telemetry data. After the cold war in the new environment of GWOT, U.S. submarines are capable of accomplishing missions that would require them to be at periscope depth, communicating critical information at high data rate with the other moving platforms. Submarines' covert surveillance abilities are capable of attaining important tactical information, however, that information may be of greatest value when it is communicated in real time, at high fidelity, to other platforms that are participating in joint operations and to high level decision makers. Free space optical communications (FSO) can provide covert, difficult to jam or intercept, high speed, broadband connectivity for submarines with other platforms. In addition, there are test scenarios that include requirements for telemetry of large volumes of data. Free space optical communications (FSO) would provide the infrastructure to support those telemetry requirements. This paper will discuss the current implementations of free space optical communications (FSO) and telemetry, and will describe concepts for integrating this capability into the existing and future DoD and submarine applications.

With the worldwide demand for larger bandwidth & greater mobility there is a rapid advancement in the area of broadband wireless communications. The high capacity & low loss of optical fiber has seen its exploding growth in the last few decades in the WANs and LANs. Free space optical (FSO) wireless communication has emerged as a viable technology for bridging the gap in existing high data rate fiber network and as a temporary backbone for rapidly deployable mobile wireless communication infrastructure. Free-space optical communication offers the potential to send large amounts of data securely over moderate distances without the expense of laying fiber optic cable. The technology is useful where the physical connection of the transmit and receive locations is difficult. FSO systems represent one of the most promising approaches for addressing the emerging broadband access market and its last mile bottleneck. These robust systems, which establish communication links by transmitting laser beams directly through the atmosphere, have matured to the point that mass-produced models are now available. FSO systems offer many features, principal among them being low start-up and operational costs, rapid deployment, and high fiber like bandwidths.

Thank you.