Joint Chemical Sensing with Microstructured Optical Fibers

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Project Summary

The objective of this effort is to develop a microstructured optical fiber based sensor that is compact, lightweight, sensitive and rugged for vehicle interiors, aircraft, individual personnel, shipboard, and fixed site locations. The proposed device will offer an improvement to the performance of current JCAD technology demonstrated by the commercially ChemSentryTM from BAE Systems. The sensor design will be limited to a detection response time < 5 seconds and package weight <1 lb. Microstructured optical fibers (MOFs) are specialty optical fibers in which a series of carefully spaced periodic micron-sized cavities within an air-silica lattice in the cladding of the fiber provide extraordinary waveguide characteristics not demonstrated by standard optical fibers. The tools for efficient chemical weapon detection to accomplish this task must also be developed and specified. The work will be performed under the auspices of Center for Advanced Communications, Villanova University, which is currently under a contract from the Army Research Lab to perform research related to urban sensing using RF technologies.