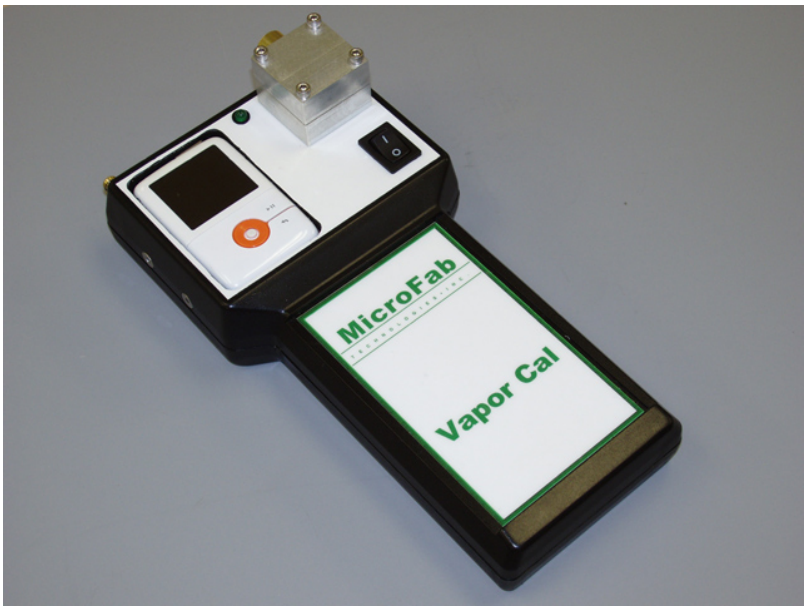

MicroFab Technologies announces the award of an NSF Phase II SBIR program entitled, "Vapor Generator for the Calibration of Explosive Trace Detectors."

This Small Business Innovation Research Phase II project proposes to develop digitally controlled generators of explosive vapors: a research oriented system for the development of new explosive vapor trace detectors which can also be used for production QC, targeting manufacturers; and a portable system that will be used for field testing and calibration, intended for end users. Phase I demonstrated the use of digitally controlled ink-jet dispensing to precisely eject minute amounts of dilute explosive solutions that are converted into vapor. We have also identified unique requirements of distinct vapor trace detector methods and models, and the actual needs of the market: a system for developers/manufacturers and a portable calibrator for end users. The Phase II of the project will: design and fabricate the two systems; generate the software control program; formulate explosive solutions customized for commercial explosive vapor trace detectors; develop test protocols for each system; and evaluate the systems with commercial vapor trace detectors. The research performed will include: material compatibility; distribution of the explosive vapors by flow simulations; reliability and repeatability of the vapor generation; shelf life of the cartridges containing the solutions; and development of methods to calibrate the cartridges for the explosive solutions. Quantitative measurements for these studies will be obtained using gas chromatography mass spectrometry.

Thousands of explosive vapor trace detectors deployed in the field require frequent verification and calibration to guarantee their proper operation. Manufacturers require a method to evaluate the development of the next generation detectors, but existing technology cannot provide this.

The work proposed for Phase II leads to products (vapor generator systems and associated consumables) that will satisfy these currently unfulfilled but urgent needs. These products will also provide the means to compare the various explosive trace detectors and to identify the most sensitive ones. Ultimately, the ability to further miniaturize the vapor generators will lead to units that are embedded into next generation detectors for real-time verification and calibration. The overall societal benefit of successfully developing vapor generator products will be improved protection of the public, both real and perceived, from terrorist threats while minimizing the cost and negative perception related to false alarms. Technological advances in Phase II will facilitate basic research on detection mechanisms for explosives, drugs and chemical threats. Researchers in government labs and academia will be able to use the vapor generator to evaluate and quantify improvements of promising detection methods. The technology also has spin-off opportunities in olfaction based medical diagnostics.