Air Force SBIR

Transition

An example of Air Force supported SBIR technology that has been transitioned into an Air Force or other DoD system or subsystem or used by Air Force test ranges and facilities or maintenance depots.

SBIR Topic Number:
AF95-026

Title:
Downhole Chemical Sensing for Percussion Driven Soil Probing Devices

Contract Number:
F41624-96-C-0014

Company Name:
Dakota Technologies, Inc., Fargo, ND

Technical Project Office:
Airbase Technologies Division AFRL/MLQ

Transition Office:
Air Force Center for Environmental Excellence

Expanded Range of Chemical Sensors Used for Finding and Assessing Ground Contamination

- If Warfighter mission requirements produce in-ground chemical contamination, finding and assessing the contamination is required before clean-up can begin.
- Technology transitioned to the Air Force Center for Environmental Excellence (AFCEE).
- SBIR contracts helped expand the range and performance of sensitive chemical sensors used to characterize contamination. Resulting technology reduces costs, mission distraction while helping to return the land to productive uses.

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Air Force Requirements

The Air Force must address the widespread chemical contamination that exists on its bases in the U.S. and abroad. An accurate site assessment must be performed before clean-up procedures can be implemented. One technique is to collect discrete soil and groundwater samples for later testing. Another, more real-time and cost effective technique is called direct push technologies. Direct push technologies involves placing physical and chemical sensors into the ground to continuously measure soil characteristics and groundwater contamination from fuels. One method of direct push technology forces a probe hydraulically into the ground by a massive truck. Another method is percussion, while a more cost effective deployment option, subjects the sensors to severe shock and vibration. A means to protect the chemical sensors and to extend the detection to chlorinated solvents is needed.

SBIR Technology

Dakota Technologies, Inc. (DTI) was awarded Air Force Small Business Innovation Research Program (SBIR) contracts to expand the range of chemical sensors and to deploy them on vehicles known as Geoprobes®. Dakota undertook a number of innovative technological steps in developing the Geoprobe® concept. These steps included the development of armored cable to protect the fiber optics and electrical cables from physical damage, a versatile depth control and analysis module (DCAM) was developed to record the probe depth and control the hydraulic system on the percussion hammer, and a single-rack laser induced fluorescence (LIF) spectrometer was also built for fuel sensing. New chemical sensors brought to the proof of principle stage include a mercury lamp fluorescence spectrometer, a soil color reflectance sensor, and a vapor phase sensor for chlorinated hydrocarbons. After extensive field testing at local sites and Cape Canaveral, the LIF system and DTI's Geoprobe® vehicle were flown to Japan and used to characterize fuel contamination at Misawa Air Base in conjunction with the Air Force Center for Environmental Excellence (AFCEE). Cost savings of approximately $200,000 over conventional approaches were realized. AFCEE is responsible for many other bases requiring characterization and restoration.

Air Force Transition Payoff

This technology has been transitioned to the AFCEE and, via AFCEE, to the U.S. Army Corps of Engineers (USA CoE) for government wide site characterization. The superior site characterization information provided by the technology helps AFCEE and USA CoE design and implement cost-effective remediation systems.

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