

# Immediate identification

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Soldiers in war zones, and law enforcement and first responders on the scene will soon have the ability to collect and immediately analyze trace amounts of potentially dangerous chemical, explosive or biological agents with the help of a surface swabbing device developed and prototyped by a Maine-based technology company with the help of the University of Maine Advanced Manufacturing Center (AMC).

The device, roughly the size of a penny, snaps on the end of a wand to swab a potentially contaminated surface. Residue on the swab then can be immediately scanned and identified using a portable instrument developed by Smiths Detection, a prominent U.S. defense contractor, according to UMaine alumnus Eric Roy, project manager and senior research scientist at Orono Spectral Solutions (OSS) in Bangor, where the “surface sampler” was designed.

OSS and the AMC are working with prospective manufacturers to mass-

produce the surface swabbing devices, which will then be distributed by Smiths Detection. The swabs have been tested at Edgewood Chemical and Biological Center, a secure U.S. Department of Defense facility in Maryland, with chemical warfare agents, biological warfare agents, explosives and other threat materials.

The Defense Department funded the research and development of the new device.

The OSS swabs work like a “nanosponge” that interfaces directly with a portable, computerized, infrared spectrometer made by Smiths Detection, Roy says. It promises revolutionary advancement in field-testing of suspect powders and liquid residues, he says, and allows almost instant identification, a process that now requires much larger samples, and days or weeks to identify.

“It’s really the first technology of its kind that allows field-portable infrared spectrometers to identify unknown trace residues,” says Roy, who received his Ph.D. in oceanography from UMaine in 2009 and has been leading the development of the swabbing material for about a year and a half. “When a mortar shell containing a chemical weapon explodes in a war zone, or military personnel come across a clandestine laboratory, the nature of any additional chemical or biological threat must be assessed immediately.”

OSS, an 8-year-old University of Maine spin-off company comprising UMaine faculty and graduates, has a patent pending on the new absorptive material.

AMC Director John Belding designed the plastic chassis for the material and developed a procedure to attach the material to the button-like base. He says development of the swabbing device was straightforward but involved testing a variety of materials before settling on one suitable for

battlefield conditions, and which could be easily mass-produced. He designed the swab with a 3D computer for concept visualization, made prototypes on computer-controlled machining equipment and developed basic automation equipment to prove out full-scale production methods.

“We worked with OSS to first define the design parameters of the swab, then we looked at the different aspects of manufacturability,” says Belding. “It’s important with any development to not just make a part, but make that part so that it can be easily produced and manufactured in volume.”

Roy expects that thousands of OSS swabs will be ready to be distributed by Smiths Detection following the product launch this fall. He and his team already are working on next-generation modifications of the novel swab material, which will be suited for other defense, homeland security and environmental applications.

Close proximity to the university, where OSS rents lab space at the College of Engineering Laboratory for Surface Science and Technology, makes it possible for OSS to work in Maine, Roy says. AMC, in conjunction with other advanced campus centers, works with hundreds of small Maine businesses, helping them solve problems, convert innovative new products into beta prototypes or modifying old products for increased efficiency. The process both preserves and creates jobs, Belding says.

Provided by University of Maine

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