

ONR: Helping to train the future canine force

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Army Spec. Jose Cruz and his working dog, Fil, search for mixed and unmixed odors associated with homemade explosives during an Office of Naval Research-sponsored demonstration conducted at the US Army's Blossom Point Research Facility in Maryland. Credit: John F. Williams

Canines have proven to be expert bomb detectors for U.S. troops in Iraq and Afghanistan. But with combat operations winding down, the Office of Naval Research's (ONR) Expeditionary Canine Sciences program is taking a fresh look at how dogs are trained to identify different explosive devices—and their roles in future conflicts.

"We don't know what challenges the battlefield of the future will present," said Chief of Naval Research Rear Adm. Mat Winter. "Our canine warfighters must be as well trained as their human counterparts. It's critical that we learn as much as we can about how canines process scents and how long they retain scent memory."

Researchers hope to streamline and enhance canines' training so they can work with any Navy or Marine Corps dog handler, not just one. Another goal is to get the [dogs](#) to the point where they can even work without a handler's leash.

In previous years, research and training focused primarily on developing physically strong dogs that could withstand the harsh climate, terrain and stress of combat. ONR's new research focuses on cracking the code of olfactory and cognitive optimization—essentially, how dogs recognize and remember odors, and for how long and to what degree.

For example, different combustible elements are used to make improvised explosive devices (IEDs). Researchers want to find out if bomb-detecting dogs can expand their recognition of odors within these diverse elements and in what ratios.

"Before, dogs were trained on one dominant odor to identify explosive devices," said Dr. Joong Kim, who oversees the canine program. "In this research, we want to expose them to a variety of elements and odors. Also, it's not known whether dogs forget odors over time, so our tests will see how long dogs can remember smells before requiring

retraining."

ONR-sponsored tests are already underway in places like Maryland's Blossom Point Research Facility. There, researchers from the Naval Research Laboratory, as well as from the Explosive Ordnance Disposal Technology Division at Naval Surface Warfare Center Indian Head, work with U.S. Army dog handlers to test canines using Mixed-Odor Delivery Devices (MODDs)—small, cube-shaped boxes containing vials of substances used to make IEDs.

Each MODD holds two to four vials, presenting varying scent mixtures for the dogs to detect. The canines also sniff out explosives hidden in abandoned vehicles and underneath tin cans and wooden boxes.

In addition to challenging dogs' noses, ONR-sponsored research is studying their minds. Canines' brains are evaluated using functional MRI machines (fMRIs) to determine how well they respond to various forms of motivation—snack treats, verbal praise or physical affection such as petting. While traditional MRI machines generate images to map out brain structure, fMRIs measure brain activity by detecting changes in blood flow.

Kim envisions ONR's Expeditionary Canine Sciences program going beyond just military needs, encompassing law enforcement and homeland security missions. ONR is currently developing an interagency program with the Department of Homeland Security and the U.S. Army Research Office to coordinate scientific research that will benefit both military and public safety functions.

"Dogs are and will continue to be a key part of our future expeditionary forces," said Kim. "They are mobile, smart and resilient, and can help warfighters through a host of battlefield situations."

Provided by Office of Naval Research

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