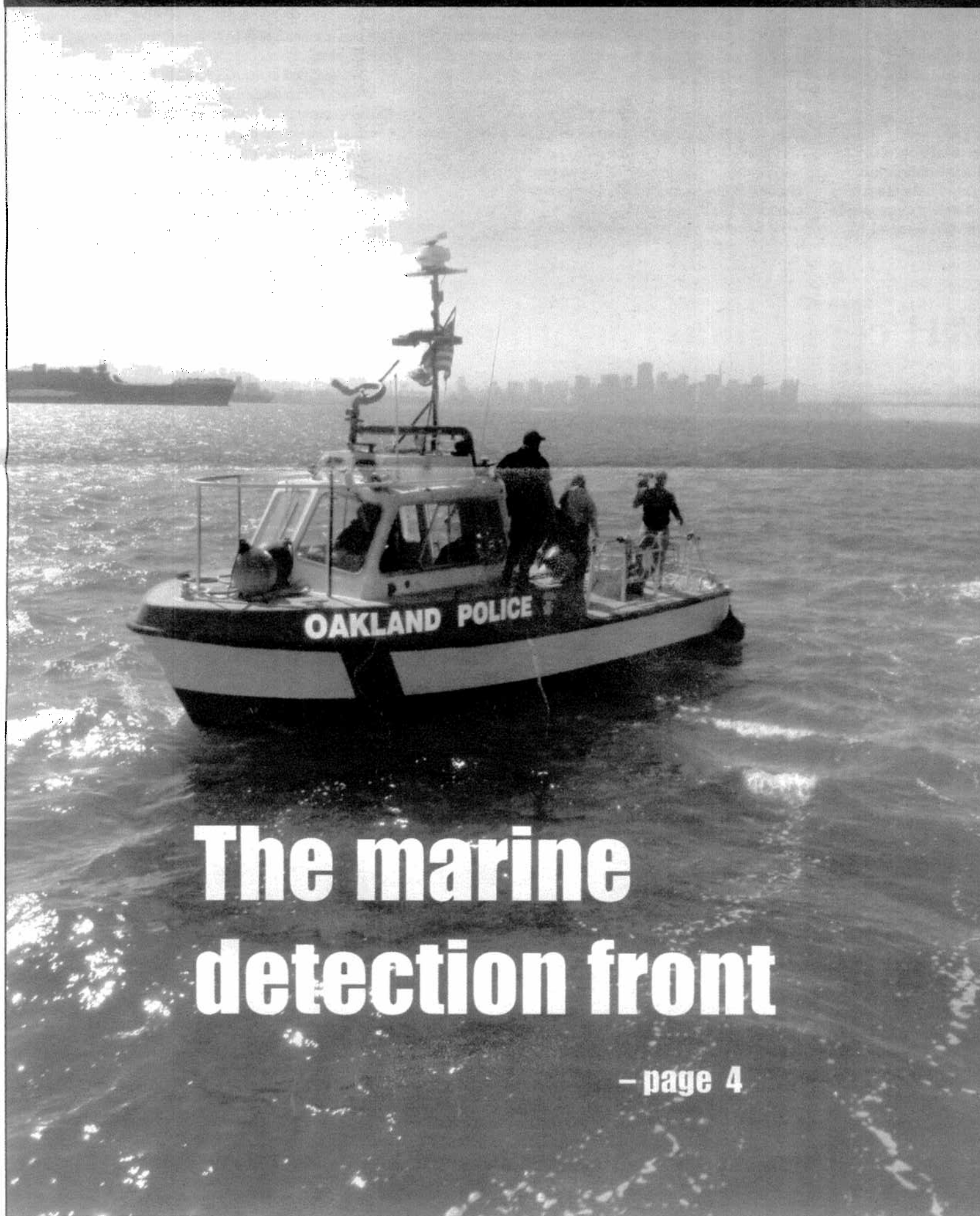


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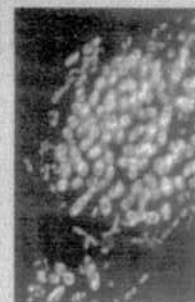
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SCIENCE NEWS

Marine experiment tests detection capability

By David Schwoegler
Newsline staff writer

Smoke detectors, radiant signs and a container load of bananas share some similarities. All three can move freely in commercial vehicles or vessels on highways and waterways. And all three can cause radiation detectors to alarm.

Smoke detectors contain small amounts of americium. Radiant signs glow because of tritium, a radioactive hydrogen isotope. And bananas, a fine source of dietary potassium, contain a small fraction of potassium-40 that emits ionizing radiation. A whole container-full will make a Geiger counter tick or tick.

From a national security perspective, a major hurdle in radiation detection is the issue of discrimination: How to pick out the bad stuff against a background containing multiple benign radiation sources. Enabling discrimination is complicated by the need for technical expertise to interpret the scientific signals emitted from complex detectors. When these instruments are focused on a commercial vessel that is under way, false positives can prove both economically costly and politically embarrassing.

Marine-enforcement first-responders face an enormous challenge attempting to screen cargo inside the endless stream of containers that enter a major facility like the Port of Oakland, fourth largest container port in the United States. Successful interdiction requires not only modern technology, but also excellent intelligence and communications.

"The best time to interdict nuclear materials is at sea, or well removed from our borders, not as the vessel is passing Middle Harbor and heading down the Oakland Estuary," Bill Dunlop of the National Security Office explained.

Dunlop and Arden Dougan are directing the Lab's



DON GONZALEZ/TID

Above: The Lab's Bill Dunlop (second from right) briefs law-enforcement and scientific participants before the radiation sources are brought aboard the target vessel. Inset: A federal agency worker examines a container housing a shielded depleted uranium source before it is secured aboard the target vessel.



participation with the Naval Postgraduate School (NPS) of Monterey in conducting a series of experiments aimed at detecting, identifying and interdicting nuclear materials in open waters. Alex Bordesky heads the efforts for NPS. This work with NPS is under a memorandum of understanding for cooperation between Livermore and NPS, and is supported by the National Security Office. Other participants and observers included elements from the Department of Defense, Department of Energy, Department of Homeland Security, other three-letter federal agencies, as well as military representatives from several nations.

In essence the experiments detect a moving vessel emitting signs of ionizing radiation. Coast Guard officers and sometimes Laboratory researchers — playing Coast Guard Officers — board the vessel and take in-depth

readings with portable radiation-detection instruments. Those readings are immediately radio relayed to scientific experts, who may be continents away. Their results are radioed back to the boarding vessel for use by first responders on the scene.

At the end of August another in a series of three-day experiments was conducted in San Francisco Bay, between Yerba Buena Island and the Port of Oakland. Alameda County Marine Enforcement provided both the operations center and the boarding vessel, while the Oakland Police boat played the bad guy or target vessel.

"Experiments of this sort are iterative. We find out what works well, what needs improvement, and what's unsuccessful. The next exercise will incorporate improvements from the lessons learned this time," Dunlop said.

According to Dougan: "Our principal goals were to test communications between moving ships at a distance, and to be able to send large data files and communicate in real time."

NPS's Bordesky dubbed the exercise, "...another successful step.... We managed to conduct drive-by radiation detection, networking and collaboration with the boarding and target vessels on the move, together with ... geographically distributed expert/command teams."

"These important experiments could not take place without the cooperation of local marine enforcement agencies," Dougan said. "Their involvement makes a major contribution to cutting-edge science in the interest of national security. Participants view first-hand the scientific minds and cutting-edge technologies that combine to make our homeland a safer place to live. In the end, these agencies will be the ultimate users and the ultimate beneficiaries of what we're developing with their help today."

On the cover: With two radiation sources secreted aboard, the target vessel, a.k.a. the Oakland Police Boat, awaits the early morning start of a nuclear materials interdiction exercise conducted in the waters of San Francisco Bay and the Port of Oakland. The Laboratory was a principal participant in the experiment, which was conducted with the Naval Postgraduate School as the lead agency.



Inter-agency cooperation key to experiment's success

When language differences, cultural difference and time differences combine with the universal applicability of Murphy's Law, experiments of this nature could go awry at any step along the way.

What differentiated between disaster and success was the multitude of hands and minds carefully shepherding every step of the experiment to minimize chaos. Livermore participants included Arden Dougan, Bill Dunlop, Mike Cornell (DOE Livermore RAP Team Lead), Mike Frank, Zack Koenig, Ross Marrs, Jeremiah Gruidl, Gary Mattesich, Dave Trombino, David Schwoegler and Don Gonzalez. Additional helping hands were provided by four interns from Hawaii: Yusef

Marra, Tiari Kitagawa, Justin Delp and Tyler Enos who not only observed, but also assisted with the exercise under the supervision of Marjorie Gonzalez.

Major domestic participation was composed of the Naval Postgraduate School (lead), U.S. Coast Guard District 11 & PAC Area, U.S. Army Biometric Fusion Center, Alameda County Sheriff's Department Marine Unit, Oakland Police Department Marine Unit, the Company IST, Naval Surface Weapons Center and USSOCOM.

Global participants included Foo Yu Chiann of Singapore, CDR Leif Hanson of Sweden, Ulrich Hofmann and Ulrich Wagner of Austria.