

ferred to take their chances without them, and many of them were killed—more than 50 over the next four years, according to the EOD Memorial Web site (<http://www.eodmemorial.org>).

In the end, new tactics and techniques emerged based on small, maneuverable robots, gyroscopically stabilized optics, exotic systems to detect buried wires and metal, electronic jammers to defeat radio-controlled IEDs, and blast-resistant vehicles. Meanwhile, for the first time EOD techs were routinely integrated into combat and covert missions, to deal with IEDs encountered while moving through hostile areas.

"The American military has invented, in about three or four years, a way of warfare that didn't exist before," says Daniel Gouré, vice president of the Lexington Institute, a Washington, D.C., think tank. "That's lightning speed."

Today EOD techs have other responsibilities, like postblast and forensic analysis at IED attack sites. The information they gather helps flesh out dossiers on bomb makers, bomb-making cells, and the social, financial, and logistical networks that supply and sustain them.

Regardless of what happens in Iraq and Afghanistan, the new technologies and tactics will endure. Long after the conflicts in those places have subsided, IEDs, including car and suicide bombs, will continue to wreak bloody havoc. Outside of Iraq and Afghanistan, there are more than 200 IED attacks every month around the world, according to the British counter-IED consulting firm Hazard Management Solutions.

"We will be fighting an irregular war for the next 20 or 30 years," says Lt. Gen. Thomas F. Metz, the director of the U.S. military's Joint IED Defeat Organization (JIEDDO), in an interview. "The enemy doesn't want to fight us at sea, or in the air, or in a pitched land battle. The enemy is going to fight us in an electromagnetic environment," using IEDs.

THE DAY BEGAN at Contingency Operating Base Speicher with a predawn briefing and a prayer. Nineteen of us stand around in a circle in the light thrown by our huge armored vehicles. The two Navy EOD specialists—the team leader–driver and the robot operator—and I will be in a Joint EOD Rapid Response Vehicle, or JERRV. We'll be part of a convoy with more than a dozen Army specialists riding in several of these vehicles, all equipped with high-end optics and other systems to help spot and manipulate IEDs.

Most of the soldiers are shouting and joking and laughing; they look like teenagers. By contrast the Navy EOD techs seem subdued and world-weary. They're both in their mid-20s. I'm old enough to be their father.

Two of the Army vehicles are encased in steel cages, to deflect or destroy rocket-propelled grenades. One of them has a giant robotic arm to paw through trash and whatever turns up. Mounted to the front of one of the other vehicles is the same air blower used to dry the track at Nascar races; here it'll blow away trash heaps, which sometimes conceal IEDs.

The briefing covers intelligence on local insurgents and procedures to follow if we find IEDs, come under attack, or need medical evacuation by helicopter. We get our call sign: "trip wire." Then a soldier says a prayer out loud.

After leaving Speicher, we'll travel north on Iraq's main north-south thoroughfare, Highway 1, which the U.S. military calls Main Supply Route Tampa. At some point we'll turn around and drop in for lunch at Forward Operating Base (FOB) Summerall, north of Bayji. If all goes well, we'll be back at Speicher in time for dinner.

This IED-hunting exercise is called route clearance. It keeps the roads open for supply convoys transporting fuel, mail, spare parts, ammunition, computers, soap, video-game consoles, lightbulbs, furniture. And food, of course.

Anyone who has ever spent time in a war zone understands the importance of food. In Iraq, the quantity, quality, and variety of comestibles in the dozens of far-flung U.S. dining facilities result from multiple logistical wonders that occur every day. ("Ice cream!" an EOD veteran had blurted out to me over dinner the night before, laughing so hard he was red in the face. "You've got guys risking their lives so that some far-off FOB can have Baskin-Robbins. Think about it, man!")

The sky is just starting to lighten as we roll out. We pull up to a huge pit, and the Navy techs let me test-fire the JERRV's .50-caliber machine gun into it, provoking amused radio commentary from the soldiers in the vehicles lined up behind us. Then we rumble and bounce through the gates, and the driver flips on the US \$80 000 electronic jammer. It puts out signals powerful enough to swamp the receivers of any radio-controlled IEDs that we might encounter [see Web-only sidebar, "The Electromagnetic Struggle," at <http://www.spectrum.ieee.org/oct08/eodextra>].

We listen to pulsating rock music on an iPod plugged into an excellent sound system, an unofficial "aftermarket" addition to the JERRV, which costs a little over \$1 million, nicely equipped. I sit in the "death" seat next to the driver, wearing headphones that let me talk to the Navy techs and also with the other vehicles in the convoy. Outside the thick Lexan windows flows an overcast tableau of scrubby, rocky, littered desert and the occasional cluster of decrepit concrete houses, villas, and abandoned gasoline stations.

An hour later we're skirting the city of Bayji. Occasionally, we pass men sitting in chairs drinking tea, or working on a car. Five little boys playing near the side of the road wave to us, and the robot operator throws them a handful of lollipops.

After 40 minutes a spotter in one of the vehicles ahead of us sees something in the road and we all stop. It turns out to be a big metal box with two bricks in it and some wires attached—your basic fake IED. Word comes back over the radio and we wait while the Army specialists search for other devices.

Insurgents place dummy IEDs for any of several reasons: to videotape how a route-clearance team deals with an IED so they can refine their methods of attack, for example, or to halt the teams so they can fire rocket-propelled grenades at the vehicles.

A while later we hear over the radio that just after we left, Iraqi Police stopped a car and detained the five men inside it. They had the standard trappings of IED emplacements: long-range cordless phones (used to trigger the bombs), AK-47 assault rifles, and a digital video camera. It's likely we had been videotaped.

We continue on at a pace that seems excruciatingly slow. I ask the team leader what he thinks of the "concerned local citizens," the U.S. military term for the Sunni Iraqis, also known as Awakening members, who are paid modestly to help capture insurgents and disrupt bomb-making networks. "It's the best thing we've got going," the team leader says. "It's not controlled by the IA or the IP"—the Iraqi Army or the Iraqi Police.

"It's probably why this route clearance is so routine," the robot operator chimes in from the back of the truck.

A few minutes later, the team leader, who is on his third deployment, talks about some of his previous missions. "You see weird stuff on route clearance," he says. "I've seen 12 or 15 vehicles get blown up in front of me. You'll see people pop up and squirt out of buildings running. I've dealt with postblast where there were