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Cooking up ways to stop terrorists

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ATLANTIC CITY, N.J. — Eight years after the Sept. 11 attacks, the front line in America's war on terrorism runs through a little-known federal laboratory where engineer Nelson Carey holds what appears to be a bratwurst in a bun.

"This is a Semtex sausage," says Carey, as he pinches the pink, plastic explosive long favored by terrorist groups.

On his table lie a green Teletubbies doll stuffed with C-4 military explosives, a leather sandal with a high-explosive shoe insert, an Entenmann's cake covered in an explosive compound that looks like white frosting, and other deadly devices Carey and his colleagues have built. None has a detonator, so all are safe.

"We let our imaginations go wild," Carey said. "The types of improvised explosive devices are endless."

So are possible solutions, at least in theory. That's where the Transportation Security Laboratory comes in. Scientists here dream up ways an enemy might slip a weapon or a bomb onto a plane, and then try to build defenses to detect or counter the danger. The work is part cutting-edge science, part Maxwell Smart.

Staffers have experimented by exploding more than 200 bombs on junked jetliners. They also have filled a warehouse with nearly 10,000 lost or abandoned

suitcases and other packed luggage.

"We build bombs in them" and run them through airport-style screening machines, said Susan Hallowell, the lab director. If the bomb escapes detection, technicians try to figure out why and how to catch it next time. "We call it the art of bagology."

Most important, the lab evaluates and certifies all the equipment purchased from outside vendors to search, sniff or scan passengers and their luggage at some 450 U.S. airports.

Colin Drury, distinguished professor emeritus of engineering at State University of New York, Buffalo, calls the lab "one of the best in the world for the kind of work they do."

"They think broadly, and have new ideas, and maybe 90 percent don't work," he said. "But that's OK, as long as 10 percent do."

About 125 chemists, physicists, engineers and others work in the lab's low-slung buildings on a wooded campus behind high fences and armed guards at the edge of the Atlantic City International Airport.

Inside is an odd mix of standard cubicles and blast-resistant rooms with thick steel doors and three reinforced walls. If an accident occurs, the design is supposed to channel the explosion to the fourth wall, which faces outside.

It's a work environment filled with painful reminders of how terrorism has changed the world.

Hallowell, 56, joined the lab as an analytic chemist when it first opened after the 1988 terrorist bombing of a Pan Am Flight 103 over Lockerbie, Scotland. The lab still keeps a mock-up of the

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Semtex-filled boombox that brought the jet down, killing 270 people.

She was named director shortly after the 2001 attacks on New York's World Trade Center and the Pentagon that turned the backwater lab into a national priority. Its budget has seesawed over time, but it now is about \$45 million a year.

Like "Q" in James Bond films, Hallowell clearly enjoys the unusual tools — and the dark humor — of her profession. She takes a woman's shiny black pump off a shelf. It hides an inert explosive in the heel.

"I've always liked this shoe," she said. "It's my size."

Much of the lab's work focuses on far-off technology.

In one room, chemist Inho Cho has put liquid explosive in a small purple bottle of NutriPals, a nutrition drink for children. It sits in a blast-proof, see-through box while he tries to determine how sensitive a screening portal must be to identify vapors that leak from the bottle.

"Maybe five years from now, the sensors will be sensitive enough," he said.

In a bomb-hardened lab, explosives expert Theresa McGhee sews suicide vests with slabs of Semtex and other explosives, then wears the garment to see if she can foil the latest bomb detection systems.

"I'm both the designer and model," she said.

As lab director Hallowell walks through the facility, she stops by a pile of old-fashioned alarm clocks wired to sticks of fake dynamite, the cartoon image of a terrorist bomb.

"I call these our Road Runner bombs," she said with a laugh.

Her dream: to build a "tunnel of truth" in each airport lined with hidden sensors, scanners and rays. Passengers would get zapped and sniffed as they passed, but wouldn't need to take off their shoes, toss their liquids or anything else.

"The ideal is to get us back the freedoms we had before," Hallowell said. "Wouldn't that be nice?"

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