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Xtreme Defense

Lightning guns, heat rays, weapons that can make you hear the voice of God. This is what happens when the war on terror meets the entrepreneurial spirit

By Sharon Weinberger
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"This is very clandestine," Pete Bitar whispered, as his red Dodge Caravan idled in the parking lot of a Burger King near Fort Belvoir. "They called last week, and they wanted delivery this week."

It did feel a little clandestine, if a bit unlikely. Yet there, in the Burger King parking lot, a small transaction in America's war on terror was about to take place. In the minivan were Bitar, the president and founder of Xtreme Alternative Defense Systems (XADS), Edward Fry, the company's research coordinator, and George Gibbs, of Marine Corps Systems Command, who two years ago plucked Bitar's obscure company out of its paper existence and provided it with more than half a million dollars in Pentagon funding.

They were waiting for Superman.

Bitar had battled start-up disappointments and even ridicule -- not to mention January cold and Beltway rush-hour traffic -- to seal his first Pentagon deal. The procurement order had gone through so quickly that the Indiana-based Bitar, who was in town for a conference, agreed to make his final delivery at the Burger King to avoid the hassle of getting onto the Virginia Army base.

Bitar flipped open a case containing his first sale: the "dazzler," one in a line of about a half-dozen "nonlethal" weapons that XADS is marketing to the military. It looked like an executive pen: slick, green and flecked with gold. But the pen was really a green laser designed to disorient and temporarily blind an enemy. Sale price: \$1,100 apiece.

It looked, to use one of Bitar's favorite phrases, really cool.

Bitar glanced up. "There's Superman."

Sure enough, a broad-shouldered man materialized in front of the Caravan. He was wearing a leather jacket embroidered with the familiar "S" emblem and a matching tie.

Superman stuck out his hand and introduced himself: Shane Gilmore. Pentagon folks seem especially fond of quirky nicknames and are not above cultivating that mystique. Asked about the Kryptonian symbols, he'd say only, "I'm Superman." But today he wasn't saving the world, just trying to protect it as part of an Army task force buying equipment for troops in Iraq. They had placed an order for 13 of Bitar's dazzlers. Supercharged versions of commercial laser pointers, dazzlers are the lowest-tech of Bitar's weapons, and they're not what initially caught the Pentagon's eye. Rather, it was his concept for a gun that could shoot bolts of artificial lightning to paralyze, but not kill, an enemy, like a "Star Trek" phaser set on stun.

Advertisement



After handing over the goods, Bitar explained his unusual entry into the high-tech weapons market as he headed into Arlington for dinner. The lightning gun began, literally, as a daydream when Bitar was running a Styrofoam recycling business in the early 1990s. Watching the machinery that cut up the used material, he noticed sparks shooting into the air. He began to wonder, at first idly and then more intensely, if there was a way to extend the sparks' range.

But he had no engineering or technical expertise, and his speculation went nowhere.

A decade later, Bitar was no closer to becoming an experimental weapons entrepreneur. But he did have a new business, founded largely to fund an "extreme" hobby of his, powered paragliding. The idea was to turn enthusiasts of the sport -- who strap motors to their backs, take off running, then yank open a parachute -- into flying billboards. He called it XADS -- for "Xtreme Ads," as in advertising.

Undeterred by his lack of engineering qualifications, he began to apply for Department of Defense research and development contracts set aside for small businesses. Bitar started out pitching an idea related to his paragliding business involving a parachute design. But no one at the Pentagon was biting. Then one day, Bitar learned that the Pentagon was seeking ideas for a taser gun. It was like being struck by lightning. He dusted off his decade-old idea and, in 2002, was granted a contract to develop his lightning gun. Suddenly, he needed a new name for his company. "Xtreme Advertising" would sound pretty silly at defense trade shows. Fortunately, XADS had a handy "D" for Defense.

Now his company consists of two full-time employees, himself and Fry, but he hires physicists and engineers as consultants to design and build the parts for his weapons that aren't commercially available. His job is to be the visionary. "I call myself the glue -- I kind of had the idea and vision of what it could be," Bitar said.

Back in his lab in Anderson, Ind., Bitar has a large apparatus -- 11 feet high -- that shoots sparks about 16 feet. It's too large and cumbersome to be a portable weapon; he thinks it could be used for securing U.S. embassies. He also produces smaller units -- dubbed "StunStrike" -- that he says shoot four-foot bolts of lightning.

His prototype for a rifle weighs about 25 pounds and can shoot electricity about 12 feet, he says.

Gibbs, the Marine Corps official who first funded Bitar, has a fondness for edgy ideas. A chemical engineer and longtime proponent of nonlethal weaponry, Gibbs funds other offbeat projects, such as Medusa, an attempt to develop a weapon that uses low-power microwaves -- believed to cause an audible buzzing in subjects' heads -- to make people think God is speaking to them. Another such weapon would use beams of energy to make people dizzy and lose their balance.

Gibbs acknowledges that electrical engineers in his office said that Bitar's lightning gun would never fly because of a variety of technical hurdles. But, he says, he figured "it was minimal risk to the Marine Corps to try it." He gave XADS the initial \$100,000 (that's "minimal risk" in Pentagonese). Bitar was able to prove, by the end of the nine-month contract, that he could generate a one-foot spark with some degree of control, which led to more funding.

Striding into a Lebanese restaurant at Pentagon Row, Bitar greeted the servers in fluent Arabic. "Pete, you never cease to amaze me," Gibbs said to Bitar, as the group was guided to a quiet booth in the back.

Bitar traces his interest in nonlethal weapons to his heritage as a Christian Arab. His father was born in Syria, his mother in Lebanon and he in Michigan. "We're sitting in an Arabic restaurant, speaking Arabic. Honestly, it gives me a little bit of an ad-vantage," he said. "I can think the way a Middle Eastern mind thinks. I understand where they're coming from. So, we can design tactical solutions that deal with that."

Lightning, for example, is a very big fear for Arabs, Bitar contends. Peter Bechtold, the head of Near East studies at the State Department's Foreign Service Institute, was dubious that Arabs would be more frightened than anyone else by lightning guns. "It sounds strange," Bechtold said, when presented with Bitar's idea. But ideas are what Bitar overflows with. His latest is to use ultrasonic waves in the dazzler not to just blind enemies, but also to convey messages into their heads, similar to Gibbs's Medusa project. Hearing voices from God is a "big thing" in Arab culture, according to Bitar. "We flash-blind them. And, while their eyes are shut, you could send a recorded message or deep guttural voice that echoes in the inside of their head. They're looking around, 'Hey, did you hear that?'"

Bitar laughed. "That's the psych warfare side of this thing."

Suddenly serious, he leaned back. "You know, I'm a Christian, and I just believe in preserving life," he said. "Yet, preserving it in the context of order, law and force, if needed."

Gibbs interrupted Bitar's soliloquy as dinner arrived. "What if I say grace before we eat?" he asked.

With soft Arabic music playing in the background, Bitar and Fry lowered their heads as Gibbs began: "Dear Heavenly Father, we thank you for this marvelous meal. We thank you for this opportunity we have to share with each other and do great stuff for our country."

After grace, Bitar resumed with his vision of bloodless warfare. Hostage situations would be as easy as hosing down a whole group of people with the lightning gun, and "then you could separate them out: hostages and non-hostages," he said.

"Um, just the capability to employ force, achieve American objectives and protect ourselves and yet not kill," he said.

"I mean, this whole war on terror, that's exactly what we have to do. We have to be able to minimize our collateral damage because, frankly, we can't afford for the whole world to hate us for very long."

"They always will," Gibbs interrupted again.

Over the past year, Bitar has received almost \$1 million to develop his weapons. That includes money from the Marine Corps, a contract from the Navy and a smaller amount of matching funds from the state of Indiana. Of all the products Bitar is developing, he describes a handheld lightning gun as the "Holy Grail." But there is at least one barrier he hasn't even approached.

"We haven't done human testing," Bitar said.

"We haven't done animal testing," Gibbs added.

"Yeah, not officially," Bitar said with a sly smile. He would not elaborate on any unofficial testing.

Anyone happening upon the Quantico Marine Base in April might have thought someone was staging a

county fair. Brightly striped canopies crowded the grounds, and concessionary booths advertised snow cones, nachos and ice-cold sodas, as visitors milled about and long lines formed for barbecue and hot dogs.

This was the Force Protection Equipment Demonstration, or FPED, the world's largest trade show for counterterrorism technology. Instead of local crafts and game booths, vendors offered the opportunity to check out the latest in bomb containment devices, among other things. Booth after booth of space-age decontamination suits, newfangled barriers, advanced sensors, X-ray machines, weapons and data destruction devices clamored for people's attention, even as a discordant mix of Bond music and reveille drowned out conversation.

One booth allowed visitors the chance to shoot high-powered pepper balls at dummies. Taser International, the country's largest manufacturer of stun guns, was demonstrating its weapon on any willing takers, provided they'd sign a liability release form. Taser's stun gun (which delivers an electric charge through wires attached to two darts) works by disrupting the body's nervous system, immobilizing its victim. By mid-morning, Taser had more than a dozen volunteers, including Sergio, a dark-haired young man whose friends cheered and laughed as he sat in a chair to be zapped, one leg flying up straight in front of him as the jolt hit his body.

The expo is a testament to the entrepreneurial spirit of America, but it's also a vision of its future: a nation mired in barriers and locks, fitted out with all-seeing sensors and closed-circuit television, where terrorism, as one company's slogan goes, "is reduced to a minor inconvenience."

Even among military trade shows, FPED is unique. With only five major companies left in the U.S. weapons market, most of today's military expos feature an orderly array of brightly colored PowerPoint briefings displayed next to plastic mockups of weapons. With so few companies, the jockeying of a typical trade show is absent.

FPED, in contrast, harks back to a different era: the 1980s and the Cold War, when an imminent threat of annihilation fueled a market full of companies competing for a slice of the Pentagon's budget. What started off after the 1996 bombing of Khobar Towers in Saudi Arabia as a show for a few dozen specialized companies has today grown to more than 500 vendors crowding two massive aircraft hangars and an entire airfield.

The counterterrorism business is booming. And for those who want to break into the market, FPED is the place. The expo was closed to the public, but representatives of law enforcement and military agencies crowded the grounds, shopping for the latest technology. Traffic into the huge base was backed up for more than two miles on the first day of the three-day show.

XADS's 10-by-10 booth was set up at the back of the first hangar; a table in front displayed an assortment of the company's latest products, including its full line of laser dazzlers. XADS had also added a new acoustic weapon called Screech, which true to its name emits an ear-piercing shriek designed to disperse crowds and cause headaches, Bitar said.

The most striking feature of the XADS booth, at first glance, was a framed poster, mounted on a pedestal, that Bitar called concept art. On it, dark, vaguely Middle Eastern-looking men attack a U.S. Embassy, only to writhe in pain as giant bolts of XADS lightning hit them. A graphic artist who draws for GI Joe and Spider-Man comics designed the poster.

But the star attraction was a simple black briefcase that Bitar promised would shoot lightning bolts. He and Fry placed the briefcase (innocuous-looking, if you ignored the pointed needle a few inches long sticking out the side) on top of a carpeted podium, plugged it into a wall socket and flipped a switch. Then they stood back.

Iridescent streaks of purple lightning snaked out of the briefcase, accompanied by the deafening rattle of what sounded like an M-16, and even in the noisy hangar, conversations momentarily ceased.

"It looks like something out of a 1950s movie," one onlooker commented.

Bitar's technology is based on a technique pioneered more than 100 years ago by the eccentric Serbian inventor Nikola Tesla. The StunStrike uses an electrical charge to break down the air in front of the weapon to create a path for sparks generated by a "resonant transformer," better known as a Tesla coil. Unlike a typical Tesla coil, however, Bitar's invention uses electronics to tune and direct the spark stream. It goes about four feet.

"We can tune it all the way down so it feels like broom bristles, and all the way up to knock you down," Bitar informed a group of gawkers.

Electricity that shoots out even a few feet is enough to grab people's attention. A small, wiry man wearing a CIA badge and a lanyard emblazoned with "In-Q-Tel," the agency's venture capital arm, stopped at the booth. He paused to look at the lightning, nodded approvingly and picked up a business card before moving on.

Many of the vendors at the expo were strikingly similar to Bitar: men with ambitious ideas who entered the counterterrorism market as a second career. George Cairnes, a former pilot, is now selling full-body restraining cuffs. The elaborate bondage gear was developed for police as an alternative to "hog-tying," and is being used by the military, according to Cairnes. He said he had an order for 200 going to Guantanamo Bay. Joe Villa, a mechanical engineer, founded US Bunkers, a Florida-based company specializing in flying saucer-shaped mini-fortresses that can fit in your back yard. Villa conceived the idea after 1992's Hurricane Andrew as a way to protect people and property from violent storms, but he, too, is expanding into the counterterrorism market: Imagine a safe room to be used after a biochemical attack; the company points out it could also double as a sauna. A promotional poster depicts a family grilling next to a bunker.

With so many vendors, drawing visitors to individual displays -- particularly visitors with money -- is cutthroat competition. Charles Smith, a former Nokia salesman, persuaded a childhood friend from Texas, an attractive blonde, to stand with him at his booth. His strategy appeared to work, as a crowd assembled to look at the blonde, and Smith's product, a desktop machine designed to drill holes through computer drives, destroying sensitive data.

Hesco Bastion, the world's largest manufacturer of sand-filled barricades (ubiquitous in Iraq and Afghanistan to shield against attacks), took a similar route: It hired midriff-baring models to serve soft drinks from a bar made of its sandbags. The show's organizers wouldn't let them serve beer.

Some vendors go negative. Grant Haber, a former police officer and now a distributor of bomb-proof trash cans designed for subways and other public places, hung out by the press trailer, trying to entice a reporter to examine his file of allegations against a rival manufacturer "They've been fraudulent," he said, clutching the folder. "I have proof of falsified test reports."

Back at Bitar's booth, the draw was StunStrike. When the crowd would thin, all Bitar had to do was flip the switch, and people would flock to the booth.

At noon on the second day, XADS captured the attention of a VIP. Marine Corps Col. David Karcher, who heads the Pentagon's Joint Nonlethal Weapons Directorate, stopped to watch the demonstration, and promised to return.

The vendors' eyes followed Karcher, a man who controls \$55 million in annual funding, as he walked slowly past the exhibits, explaining his role: He pays firms to develop nonlethal technology and to test it against strict Pentagon and international standards. For example, his office helped develop the Active Denial System, a weapon that uses millimeter waves -- a supercharged version of microwaves -- to heat up the skin's nerve endings, creating a burning sensation similar to touching a 100-watt light bulb. Except the beam, while painful, does not actually burn the skin.

The weapon was only recently declassified, and the Pentagon still won't divulge how far the beam goes, but Karcher says it could be used to control crowds at feeding stations in countries like Somalia and Iraq. "Often you see the people pushing their way to the front of the crowd are young men," he said. "They'll push women and children out of the way."

Karcher pointed to a demo of the system set up at Raytheon's booth. No required release forms here; Raytheon took a more direct approach: self-infliction. "We can't do it to you, but if you want to do it to yourself," the vendor said, handing over a control switch.

When a reporter hesitated, Karcher quickly offered up his own hand. "Press the button," he instructed. The invisible beam clicked on.

"I put my hand there, it starts to hurt, I take my hand way," Karcher explained calmly as he slowly slid his arm away from the beam. The point, he continued, is not to hurt someone, but simply to force a particular action, or to condition a response.

"Sort of like Pavlov's dogs," interrupted the enthusiastic Raytheon vendor.

Comparing humans to dogs who salivate on command didn't seem to sit well with Karcher, who winced. The Pentagon's nonlethal work, particularly that which relies on pain, is under intense public scrutiny and subject to international legal conventions. But the main problem with the Active Denial System, and similar directed energy weapons, is size, according to Karcher. Now the weapon goes on a Humvee, but the military is finding that troops in Iraq want smaller, handheld devices -- phasers.

But it's precisely those goals -- small and long-range weapons -- that place phaser technology, at least for now, in the realm of science fiction. The largest lightning guns in the XADS lab are too big to be mobile weapons, and while the rifle has generated sparks of up to 12 feet, Bitar says, the system has blown out repeatedly and isn't stable beyond four feet.

The military would like something that can go 30 to 100 feet. "We can fire a taser and be very effective at 15 feet," Karcher said. But 15 feet is almost "knife fight" range, he added, and in that case, troops may want a more lethal option, like a rifle.

But for every naysaying expert, there always seems to be a Pentagon official who believes the risk is

worthwhile. Franz Gayl, one of the officials who contacted Bitar after hearing about XADS from news accounts, agrees there are barriers to a lighting gun, but he argues for helping nascent companies. The concept of a lightning gun, though risky, offers a potential payoff, according to Gayl. He noted a military officer who built a Tesla coil weapon, claiming to have tested it by shooting it "into the grille of an annoying rude driver in a traffic jam."

Back at the show, Bitar looked bitterly across the way at Raytheon, which was handing out customized jars of spicy hot fajita powder to promote its "burning" nonlethal weapon. Other experienced vendors dished out logo-inscribed chocolate and pens. XADS had only postcard-size brochures and business cards.

It was the end of the third day, and still no sales. A man who introduced himself as a buyer for the Turkish military asked if he could get a free sample of Bitar's lasers, or barring that, could he borrow one and return it if the Turkish military wasn't interested. Bitar said that wasn't likely.

"We're not going to do that," Bitar chuckled. "We're not Wal-Mart."

But Bitar noticed that foreign militaries were the most interested in his weapons, and officials from Asia, the Middle East and Europe had all visited his booth. "It's kind of weird, especially because when it comes to weapons, you'd rather arm your own country than someone else," he said.

But he shrugged and added, "A customer is a customer."

Toward the end of the expo, Bitar was demonstrating the lightning gun when he suddenly recoiled in pain. "It bit him," Fry said with a note of concern. One of the electric tentacles had reached around and grabbed Bitar. He rubbed his shoulder. Since electricity seeks the quickest route to complete its circuit, it will reach out and touch the first thing that's grounded, such as a person holding the gun.

Bitar appeared unusually downbeat. He'd been standing for three days straight at the booth, and he was worried about how to keep his business going. Even with \$1 million total in start-up funds, he'd have to close shop in about six months if he didn't get orders. "I didn't sleep well last night," he acknowledged. "Busy thinking about things, like how to get through to the Joint Nonlethal Directorate, so they take us a little more seriously."

At dinner the night before, Bitar's confidence -- shaken by the competition at the show-- seemed to ebb. He would be turning 40 soon. The initial success of XADS allowed his wife to stay home with their young son. His bravado momentarily gone, he talked about his previous businesses, which, while not failures, had not really been successes either. The Styrofoam recycling company sold at break even, and his parachute logo business barely made a profit.

Back at the show, Bitar sighed. "You get all this stuff going against us."

But a few minutes later, he was uptempo again.

"I just think we're only limited by our funding," Bitar said, pausing to pack up the cartoon poster of their weapons. "We could do so much more than the big companies." He pointed to the Raytheon booth. "These guys are burning your hand at 10 feet away with \$50 million worth of research."

He gestured to the StunStrike. "We've got \$10,000 worth of research in that thing, and we can do the exact

same thing."

Pausing, he added, "Okay, we haven't been through all the studies and testing because we haven't had all the money to put into it."

Bitar's concerns are not just about big companies like Raytheon, but also about his nemesis Ionatron, a start-up backed partly by investment from the CIA venture capital fund. Ionatron, whose weapons are based on a similar concept for channeling lightning, was founded in 2002, and its stock is now worth more than half a billion dollars on the Nasdaq Stock Market.

Unlike Bitar, who won his early contracts through a competitive process, Ionatron's most significant contract, for \$12.6 million, came through a congressional line item, which typically requires high-level lobbying. Another difference from XADS: Ionatron would like the nonlethal lightning guns to be, if necessary, lethal.

But both companies face an age-old problem with harnessing lightning: It is notoriously difficult to control. Making it go straight and far requires breaking down the air, like drilling a path through wood for a nail. Creating this path for any more than a few feet presents a formidable challenge.

Bitar's idea for doing this, like Ionatron's, is to use pulsed lasers to create a conductive path ahead of the lightning. A pioneer in this method is a New Mexico-based physicist named Jean-Claude Diels. The Belgian-born scientist says he started his research not to build "zap guns," as he calls them, but to prevent deaths from lightning, which kills on average 67 people a year in the United States, according to the National Weather Service. But the military was never terribly interested in his work, he said, and nonmilitary funding for research is hard to come by these days.

Now caught in a bind, Diels takes money from Ionatron. He doubts it would be possible to shrink the weapon down to the size of a pistol, although he believes a portable system, such as one mounted on a car, is possible.

"It's taking a disturbing turn," Diels said with a sigh. "I feel a little bit like the German scientists of the Third Reich, who have no option but to do this research because that's what the government funds."

What's wrong with the idea of a stun gun? "This nonlethal technology, I mean, aimed at electrocuting a crowd of protesters?" he said. "That's not really appetizing, I must say."

As the spectators at FPED thinned out, Bitar started to pack up, and Fry went to get the car. They'd be back in town the next week for another show, but Fry needed to return home for an exam: He's getting a master's degree in theology and peace studies. On the way out, Fry looked back at the weapons bazaar and shook his head.

Toward the front, a banner for Hawaiian Shaved Ice had fallen askew.

Perhaps what makes U.S. military trade shows seem so incongruous is that they treat their market -- war and terrorism -- as if it were plastics, medical supplies or textiles. And Bitar is just another entrepreneur. Despite his lack of big orders, back in Indiana a couple months later, he enthused over his company's progress. Field reports from Iraq on his dazzlers were "stellar," he said, and several Pentagon offices had placed small trial orders. A European television crew wanted to follow him around for six months.

The Pentagon also is preparing for the first time to buy large numbers of commercial dazzlers from several manufacturers and give them to troops in Iraq. Gayl, the Pentagon official who has supported Bitar's work, cautions now that he is concerned that some companies, including XADS, are making lasers so intense that they would permanently blind the people they target. The XADS lasers "are way out of line," Gayl said recently.

Bitar adamantly disagrees that his lasers will cause permanent blindness, saying they are eye-safe, if used properly. It's a key point for his company, since the StunStrike weapon has slipped to the back burner, and the dazzlers' time appears to have arrived. Bitar said he was negotiating with what he called a major supplier for the military and law enforcement on a new version of XADS's dazzler. The PD/G-105 is a souped-up laser that would be twice as powerful as the ones Bitar sold at the Burger King back in January.

The supplier, Bitar said, was looking at orders in the tens of thousands.

"It'll totally kick butt," he said.

Sharon Weinberger is writing a book about the Pentagon and fringe science, to be published by Nation Books next year.

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