

LOS ANGELES BUSINESS JOURNAL

[PRINT](#) | [CLOSE WINDOW](#)

Flashes of Restraint

By HOWARD FINE - 1/28/2008

Los Angeles Business Journal Staff

Law enforcement agencies around the nation have long been searching for ways to subdue suspects without injuring or killing them.

Batons got a bad rap after the Rodney King beating and the resulting riots, while Tasers, beanbags, rubber bullets, pepper spray and other techniques have occasionally caused injuries or deaths.

Torrance-based Intelligent Optical Systems, a 10-year-old optics research and development laboratory, has answered a call from the federal Department of Homeland Security for a better nonlethal method of subduing suspects. Using a \$1 million grant from the department two years ago, the company has developed a flashlight that uses light-emitting diodes in a strobelike way to temporarily blind or paralyze threatening suspects.

"Using LEDs in flashlights is the wave of the future and you can see LEDs coming everywhere," said John Farina, chief executive of Intelligent Optical. "But the concept of using this technology to disorient people is new and that's where we come in."

Unlike lasers, which can cause eye damage, or Tasers, which use electrical charges to immobilize suspects, light-emitting diodes on strobe frequencies – meaning rapid flashing – cause only temporary disorientation and do not leave permanent damage. The key, Farina said, is to alter both the frequency and the color of the strobe to send confusing signals to the brain. The person is immobilized as the brain tries to sort out the mixed signals.

'Puke ray'

That's the theory, and it has held up in laboratory tests. Indeed, Optical Systems' technology, called the "LED incapacitator," holds so much promise that Time Magazine selected it as one of its "Best Inventions of 2007." And one trade journal dubbed the device the "puke ray," for the queasiness it can cause.

The next step, Farina said, is to use the technology under field conditions. The Los Angeles Sheriff's Department is planning tests this summer. Then, by the end of this year, the LED incapacitator would be marketed to various law enforcement agencies.

"If these tests are successful, we think we'll be able to use this out on patrol and especially in our jails to help prevent the spread of riots," said Los Angeles Sheriff's Department Cmdr. Charles "Sid" Heal, head of the department's technology exploration unit.

Heal said the LED strobe light would probably work best in dark or controlled lighting situations. But he added that there's still some question as to whether it would actually be strong enough to allow deputies to move in and capture suspects or immobilize prisoners in a riot situation.

"It's notoriously difficult to overstimulate the eyes without causing damage," Heal said.

Farina acknowledged that creating enough intensity to immobilize people has been the key challenge.

"We are constantly tweaking things, trying to boost that intensity," he said.

He added that his lab is also working on a related technology: creating an LED stun grenade for hostage situations. Conventional flash-bang grenades use incendiary devices to create stun effects and have caused fires. When tossed into a structure, the LED stun grenade would only emit an LED strobe and computer-generated sound.

Farina and Heal said that the LED immobilizing devices will not by themselves subdue suspects and bring them into custody. Rather, the goal is to buy time so that law enforcement agents can move in with other nonlethal weapons to arrest suspects.

“Right now, the ways we have of immobilizing suspects from a distance can only be used once,” Heal said. “If it doesn’t work, then you have to step up your use of force. And in situations where the suspect has a weapon, that often means drawing firearms. Assuming it works as it’s supposed to, this LED immobilizer can be used more than once and in conjunction with other techniques. It gives law enforcement more flexibility.”

For Farina and the rest of the team of 16 Ph.D.’s and two dozen other workers at Intelligent Optical Systems, the success of the incapacitator flashlight would mark a key milestone in the company’s attempt to move from a pure research and development laboratory to a profitable enterprise.

Intelligent Optical Systems was formed in 1998 when a group of scientists working at local aerospace and technology companies – all veterans of the renowned Bell Laboratories – teamed up to develop optical sensors to monitor wide areas.

For most of the past decade, Intelligent Optical has been developing various technologies and then licensing them to other firms. The company has collected 35 U.S. patents, with 20 pending.

Many of the patents are for the company’s core technology: implanting sensors in fiber-optic cables to detect high concentrations of hazardous chemicals. Farina said the fiber-optic cables have been deployed or are being tested in chemical facilities, utility plants, subway stations and spacecraft launch sites.

For example, the Metropolitan Transportation Authority of Los Angeles County is currently testing Intelligent Optical’s sensors at one of its subway stations.

Krishnia Murthy, MTA’s deputy chief capital management officer, said the test has been running for four months and will go for another year. He said the test has gone “fairly well,” but that there have been instances when the Intelligent Optical sensors have had false positives, giving warnings that gases was present when none were confirmed by cross-checks with other devices.

Also, the sensors don’t have the capability to detect all of the gases that MTA officials want to monitor and there are competing technologies – such as “air sniffers” – that are already on the market.

“We’re going to evaluate how this product stacks up against these other products before we make a decision on whether to deploy it,” Murthy said.

Intelligent Optical has also used this core sensor technology to develop high-speed switches to help route calls through fiber-optic networks.

Research grants

Currently, Intelligent Optical Systems receives about two-thirds of its \$10 million in annual revenues in the form of contract research grants from various federal government and private sector

resources. The remaining revenue comes from licensing of technologies and direct sales of a laser ultrasonic product used in aerospace manufacturing.

Farina, who joined Intelligent Optical two years ago after leading several other tech companies, said the goal is to boost the licensing and direct product sales so that they at least equal, if not surpass, dollars coming in from research grants.

“Both LEDs and optical sensors are in their infancy. There’s so much more we can do with these technologies,” he said.

Intelligent Optical Systems Inc.

Year Founded: 1998

Core Business: Developing optical sensors and light-emitting diode technologies

Employees in 2007: 40

Employees in 2008: 40

Goal: To transform what is primarily a research and development operation into a company that brings optical and light-emitting diode products to market

Driving Forces: The market for detection of dangerous chemicals; the market for improvement of fiber-optic networks; law enforcement’s need for effective nonlethal weapons to subdue suspects

Los Angeles Business Journal, Copyright © 2008, All Rights Reserved.