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A Big Bang and Flash With LTL

What if you were confronted by a flash of light so bright that it rivaled looking directly into the sun and were simultaneously blasted by a bang that reached a painful 170 decibels?

You certainly would be disoriented; your behavior, greatly altered. You no doubt would be less aggressive, if not in retreat or full flight.

You also would have just experienced a variable-range, less-than-lethal ballistic round that may soon provide law enforcement and corrections with an additional option in dealing with noncooperative or aggressive individuals and crowds up to 100 yards away.

"If you are the target, it would be pretty terrifying. You probably will think you are going to be incinerated," says Greg MacAleese, president and CEO of Law Enforcement Technologies (LET), which has received funding from the National Institute of Justice (NIJ) to develop this new generation flash-bang round.

According to MacAleese, when the round bursts, flake aluminum is ejected and ignited to create a brilliant flash that is comparable to looking directly into the sun for 60 milliseconds but causes no permanent damage to a person's vision. In addition, the flake aluminum poses no appreciable burning hazard. It cools to the ambient temperature within a fraction of a second. The acoustics, he says, reach a painful level of 170 decibels but, again, cause no permanent damage.

"The whole idea is to simultaneously attack most of your senses," MacAleese says. "It will disorient individuals and make it easier for a SWAT team, in a standoff situation, to take someone into custody without killing them. It is designed to take the resistance out of somebody."

NIJ is funding LET to develop two versions of the flash-bang round. One version will enable the user to manually select the range at which the round will burst. The second, a more sophisticated version, will have a radar-controlled burst capability.

The selectable-range version will be able to be fired from any 40mm (military) or 37.5mm (law enforcement) launcher. The shooter will manually set the round to burst at one of three range settings. This version is expected to be commercially available this year at a cost of about $30 per live round and about $15 per training round.

Unlike the selectable-range round, the radar-controlled round will require a dedicated launcher system, which LET is developing using its own funds. The launcher will be capable of determining the range from the shooter to the target and the proper aiming elevation. When the shooter has aimed the launcher at the target and positioned it at the correct angle, a LED (light emitting diode) displays flashes to notify the shooter that the round is ready to be fired.

"When the round is fired, that's when the genius behind the design comes in," MacAleese says, referring to the system's nearly autonomous capability that was devised by LET's partners, Sandia National Laboratories and Martin Electronics. As the round leaves the chamber, it passes over a sensor, which activates a transponder. That transponder sends signals back to a radar array on the firing platform. The radar locks on the target, and when the round—traveling at 250 feet per second—comes within 9 feet of its target, the launcher's electronics signal an electronic match to detonate the round and ignite the flake aluminum.

"This sounds like Buck Rogers, but it uses all off-the-shelf existing technology," MacAleese says. "What we wanted to do was develop a flash-bang that could be fired accurately from approximately 20 to 100 yards from a target." Most projectiles, he says, have an error range of plus or minus 10 percent because of the variability of propellants used in the ballistics. "If you are 20 yards away, that's 2 yards, that's not so bad. If you are 100 yards away, that's 10 yards, and you begin to run into problems. This new round is designed to be accurate within 6 inches, but the real challenge was making it that accurate from different distances."

The radar-controlled system is expected to be ready for field testing later this year and available commercially in 2004. Live rounds are expected to cost about $60 and training rounds about $30. The launchers will be priced at approximately $2,500, but the company plans to develop leasing options to help keep them affordable to departments and agencies with limited budgets.

LET already plans to enhance the rounds by adding irritating chemicals or paint that could mark a suspect indelibly. Testing is under way to determine suitable flame-resistant paints and irritants.

"We are taking tremendous pains to make it safe—but uncomfortable—for the target," MacAleese says. "I don't think the target will necessarily appreciate this, but we are trying to create a kinder, gentler projectile."

Even without the added irritants, the effect of the round's burst will last somewhere between 45 seconds and 15 minutes, depending on factors such as time of day, whether the individual looks directly at the burst, and how close the burst is to the individual.

The project's objective, MacAleese says, was to come up with something for departments of all sizes, with varying budgets and varying needs. "As a former cop, I know their needs pretty well. We're trying to develop options that will make their jobs a lot easier and a lot safer."

According to Amon Young, NIJ project manager, this flash-bang system is different because it is capable of being deployed against individuals or groups at a distance. NIJ senior program manager Joe Cecconi adds that the "flash-bang has been used in the past in grenade fashion by being thrown into a room. The officer has to pull the pin and there are only a few seconds of delay. Officers have injured their hands . . . . This particular device will represent less of a hazard in that regard."

MacAleese says that most firefights take place within a range of 10 yards or less, and at that range, a bursting round would impact the shooter as much as the targeted individual or group. However, he says, the LET system will give law enforcement its first less-than-lethal flash-bang option effective within a 20- to 100-yard range.

Developing options that will make the lives of law enforcement officers easier and safer is what NIJ's Less-Than-Lethal (LTL) Technologies program is all about. The program provides funding for the development and evaluation of technology that gives law enforcement and corrections officers effective alternatives to lethal force. Two LTL technologies that could be commercially available in the near future include—

MultiSensory Grenade. Scientific Applications and Research Associates is developing the MultiSensory Grenade (MSG) for the U.S. Marine Corps. The grenade combines sound, light, and odor to overwhelm three of the five human senses. Unlike existing LTL weapons, the design of the MSG allows for easy configuration so that the sensory subcomponents can be changed to adapt to new uses. NIJ is funding an evaluation of baseline MSG prototypes with the assistance of various law enforcement agencies.

Ring Airfoil Projectile. The Ring Airfoil Projectile (RAP) is a 2-inch rubber ring that inflicts pain but no permanent bodily injury when it strikes an individual. (See "NIJ Takes the Rap," *TechBeat,* Winter 1998, at www.justnet.org/techbeat/justnet.html.) The ring potentially could be filled with pepper powder and break open on impact. NIJ sponsored the development of a single-shot prototype by Guilford Engineering, which was demonstrated at NIJ's 2001 Mock Prison Riot. However, in field testing, law enforcement agencies did not like the single-shot concept. Cecconi says NIJ hopes to have a prototype of an eight-shot device ready for testing by fall 2003.

For more information on the variable range, less-than-lethal flash-bang round project or other projects under the National Institute of Justice's Less-Than-Lethal Technologies Program, contact Joe Cecconi, 202–305–7859, or e-mail cecconij@ojp.usdoj.gov.

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