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SAVER TechNote

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LESS LETHAL TECHNOLOGIES FOR LAW ENFORCEMENT

Less lethal technologies are devices designed to be less likely to cause death when deployed than conventional weapons like firearms. Less lethal technologies are used by law enforcement in two primary situations: crowd control and one-on-one suspect apprehension. For each of these situations, technology subcategories exist based on the modalities of the technology, such as chemical, kinetic and conducted energy.

Overview

Less lethal technologies grant law enforcement officers an additional tool to de-escalate situations. In *A Multi-Method Evaluation of Police Use of Force Outcomes*—a study commissioned by the National Institute of Justice (NIJ)—authors found less lethal weapons reduce the rates of injuries for law enforcement personnel and offenders [1]. Compared to using physical force (e.g., hands, fists, feet), using pepper spray or conducted energy weapons (e.g., stun guns) reduced the likelihood of suspect injury by 65 and 70 percent, respectively [1].

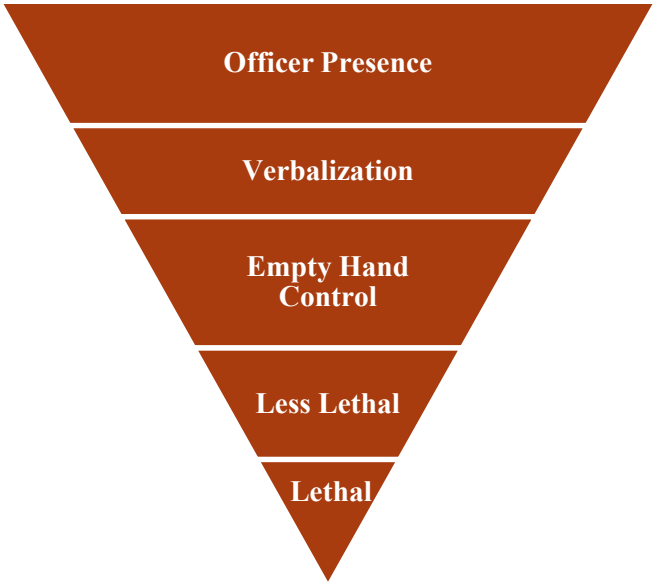

Figure 1. NIJ Use-of-Force Continuum

Figure 1 depicts NIJ's use-of-force continuum—that is the options available to an officer to de-escalate a situation [2]. Less lethal technologies occupy an important location on the NIJ's use-of-force continuum as they are an officer's last option before resorting to lethal force.

Safety

All less lethal technologies have risks and may cause serious injury or even death in some instances. It is important that agencies deploying new less lethal technologies provide sufficient training to officers being issued the new technologies. Agencies must also consider how to integrate new technologies into their existing use-of-force continuum. If implementing more than one less lethal technology, agencies should ensure that officers know when each is appropriate in a given circumstance, as part of their use-of-force continuum.

The U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions.

DHS S&T's Nation Urban Security Technology Laboratory (NUSTL) manages the SAVER Program and conducts objective assessments and validations on commercial equipment and systems. These results, along with other relevant equipment information, are provided to the emergency response community in an operationally useful form. SAVER provides information on equipment that falls within the categories listed in the DHS Authorized Equipment List.

The SAVER Program is supported by a network of technical agents who perform assessment and validation activities. Further, SAVER focuses primarily on two main questions for the emergency responder community: "What equipment is available?" and "How does it perform?"

For more information on this and other technologies, contact NUSTL by e-mail at NUSTL@hq.dhs.gov or visit the SAVER website: www.dhs.gov/science-and-technology/SAVER.

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Modalities of Less Lethal Technology

Chemical

Chemical technologies generally include tear gas, pepper spray and other malodorants. The compound 2-chlorobenzalmalononitrile (CS), commonly referred to as tear gas, causes irritation of the mucous membranes, including the nose, mouth and throat, as well as a burning sensation and tearing of the eyes, making it difficult to keep the eyes open. CS is solid at room temperature. To make it usable as an aerosol it is either heated, dissolved in a solvent or ground into a powder and mixed with silica anti-clumping agents.

Pepper spray and mace are generic terms for a variety of self-defense sprays available on the market. The most common form is oleoresin capsicum (OC) spray. OC uses capsicum—the irritant found in chili peppers—as the primary lachrymator. Other sprays use CS or phenacyl chloride (CN). The use of CN is decreasing due to the availability of both less toxic and more effective spray types. Another, newer, option is pelargonic acid vanillylamide (PAVA). PAVA is less common in the United States, but has gained some popularity overseas, especially in the United Kingdom. PAVA must be sprayed directly into the eyes of the suspect to be effective. This requires more precision in deployment but reduces the possibility cross-contamination.

Malodorants are chemicals used in less lethal devices that use smell as the irritant. While the use smell as a weapon is not new, these products are relatively new to modern policing. They are less common than the other chemicals, but have seen some use internationally for riot control.

Kinetic

Kinetic technologies include any technology which acts primarily by impacting the subject with a projectile. The projectiles are generally made of either rubber or lead enclosed in a fabric sack, which distributes the impact's energy over a wider area.

Common form factors for kinetic projectiles are 12-gauge shotgun and 37- or 40-mm launchers. The 12-gauge shells can either be fired by standard shotguns or special launchers, which fire less lethal shells, but not standard shotgun shells. This reduces the chance of an accidental discharge of lethal ammunition by an officer who thinks a weapon is loaded with less lethal ammunition.

Another form of kinetic technology are devices designed to immobilize a suspect using weighted hooks and string. A compressed gas charge propels two barbed weights connected by Kevlar string. The string impacts the suspect and the weights wrap the string around the suspect; the barbs then penetrate the suspect's clothing or skin, preventing the string from unraveling. These devices have only been available since 2018, and have not yet seen widespread use. They have been used successfully at least once, by Fort Worth Police Department [3].

Conducted Energy

Conducted energy weapons use electricity to incapacitate a target by disrupting electrical signals between the brain and muscles. There are two primary modalities for delivering the electric current: direct contact between the device and the suspect and sharp metal barbs that are fired from the device to penetrate the suspect's skin before being electrified via wires connecting them to the weapon.

References

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[3] Wrap Technologies
https://wraptechnologies.com/bolawrap-successfully-deployed-during-violent-confrontation-resulting-in-no-injuries/