

Semi-Autonomous Pipe Bomb End Cap Remover

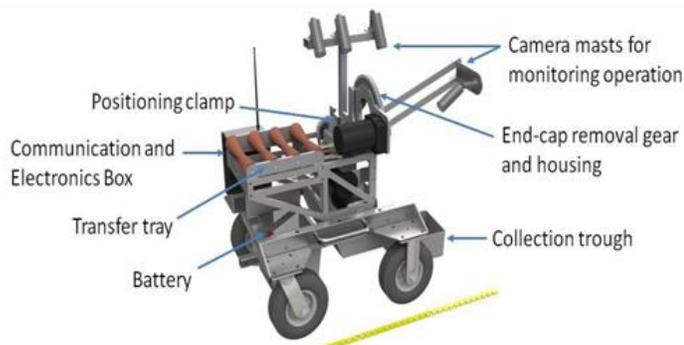
Why it's needed

Pipe bombs are simple to construct, can be crafted from readily available materials, and are lethal both from the blast and from the fragments of the casing. According to the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), from 1978 to March 2010, the ATF investigated more than 25,000 bombings and attempted bombings, more than 900 accidental explosions, and more than 21,000 incidents involving recovered explosives or explosive devices. The majority of these cases involved the use of customized explosive weapons or homemade bombs, with the most common being pipe bombs.

Rendering pipe bombs safe, while minimizing the risk to the responder and the public, is a challenge. Current approaches include the use of tools that require area preparation and direct responder interaction with the explosive device. They destroy evidence and require the bomb technician to interact directly with the explosive device. These methods pose undue risk to bomb technicians and can damage the integrity of the bomb reducing its value as evidence.

How it works

The Department of Homeland Security (DHS) Science and Technology Directorate, in partnership with RE², Inc., is developing the Semi-Autonomous Pipe Bomb End Cap Remover (SAPBER) system which will remove end caps from pipe bombs while keeping operators at a safe distance and collecting video and physical evidence from the pipe bomb.



The SAPBER system is a cart-like carrier with an end-cap cutter/remover, collection trays, remote viewing cameras, and communications gear. It can be towed behind a robot or rolled into place by an operator. Once in position, a robot places the pipe bombs on the system, enabling the operator to control the system remotely through wireless communications. The system unscrews or cuts off the end caps from the pipes, using pipe-cutting devices similar to those used by plumbers. These tools then cut the pipes without sparking or heat generation, preserving evidence through video and sample collection.

The value

Based on needs identified by the DHS Office of Bombing Prevention, National Bomb Squads Commander's Advisory Board (NBSCAB), and municipal bomb squad commanders, S&T's SAPBER system is a small, low-cost system capable of remote operation and accommodating a range of possible pipe bomb sizes and configurations. Weighing about 135 pounds and able to collapse to 26 inches long by 22 inches wide by 27 inches high, its unit price is expected to be under \$12,000. The SAPBER design makes heavy use of proven commercial technology to minimize development risk, schedule, production cost, and complexity to maintain. The SAPBER approach solves many of the problems with current methods for pipe bomb disposal by decreasing the risk of accidental detonation, removing the bomb squad technician from harm's way, and preserving physical and video evidence for forensic analysis.

The practitioner community has been engaged throughout the development process, and the final design has been reviewed and critiqued by DHS, NBSCAB, and various city bomb squads.



Next steps

An operational field assessment of engineering prototype was successfully completed in May 2012, using live scenarios and concepts of operations established with ATF personnel assistance. Based on this success, two prototypes will be provided to ATF and Fairfax County, Va. bomb squads for their use.

