

## Virtual Shooter reduces responder injuries

The U.S. Immigration and Customs Enforcement (ICE) Office of Firearms and Tactical Programs (OFTP) Armory Operations Branch test fires approximately 200,000 rounds each year, supporting more than 62,000 armed Department of Homeland Security (DHS) officers through the evaluation of new firearms and ammunition for the DHS arsenal and quality inspections. Much, if not all, of OFTP's testing is currently carried out manually, with personnel firing each individual round by hand.

Constant recoil from repetitive firing has led to law enforcement officers developing stress injuries and caused them to take extended sick leave or medical retirement. To address this concern and reduce physical strain on OFTP testers, the DHS Science and Technology Directorate (S&T) worked with Radiance Technologies to develop a gun holder device—the Virtual Shooter—to mimic the movements and reactions of a human firing a gun.



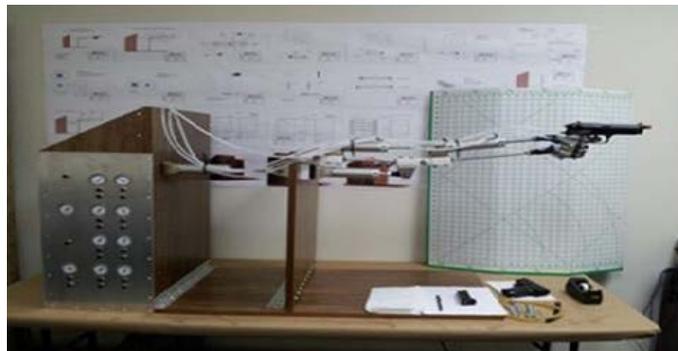
Measuring a shooter's physical recoil response

## S&T replicates the physical firing of a handgun and a shooter's reaction to recoil

By taking on the majority of firing responsibilities at OFTP, the Virtual Shooter will reduce wear and tear on personnel (and the firearms being tested), allow for more consistent test results and enhance testing productivity.

The Virtual Shooter itself consists of (1) a mechanical arm and hand that mirror the major human bone and muscular structure; (2) air cylinders that serve as “muscles” to aim

and resist recoil forces in the wrist, forearm, upper arm and shoulder and (3) a pressurized backboard mount that simulates the shooter's torso.



Virtual Shooter prototype

The Virtual Shooter will provide several immediate benefits to OFTP and later to a wider law enforcement community, including:

- Achieving highly quantitative testing results while avoiding physical risks to ICE personnel;
- Strengthening OFTP handgun and ammunition evaluation capability;
- Significantly decreasing the potential for human tester injury from repetitive recoil effects; and
- Providing quantitative firing data with realistic representations of a wide range of human shooters.

Additional potential users include firearms and ammunition manufacturers, other law enforcement agencies and the military services.

## A working prototype for field testing is being built

S&T funded the Virtual Shooter project through the Small Business Innovation Research program, an awards-based initiative that matches small businesses with federal agencies for innovative R&D purposes. Over two phases (lasting up to two years) S&T and Radiance Technologies determined the feasibility of the Virtual Shooter concept, developed a prototype, and tested the technology with OFTP.

Virtual Shooter is in its second and final phase. In March 2014, a prototype was delivered and tested at the OFTP facility in Altoona, PA. The final prototype will be transitioned by March 2015.

