STIC Note

Enhanced Firearms Training Systems

BACKGROUND AND PROBLEM STATEMENT

U.S. Coast Guard members often have little to no experience with firearms when entering the service, and firearm instruction is a requirement for all service men and women to teach (or improve upon) marksmanship. Firearm instructors guide students in many areas including grip, finger placement, and recoil anticipation. Providing this type of guidance requires instructors to work one-on-one with students, and at most training commands, high student-to-instructor ratios limit the personal guidance instructors can provide.

Cadet on the Firing Line

To help ease instructor load and improve instructor effectiveness, lasers can be an effective tool to help the student learn target acquisition and identification. However, lasers cannot identify fundamental deviations as the trigger is pulled. One-on-one instructor time is at a premium; students would learn faster with access to immediate, personalized feedback.

METHODS

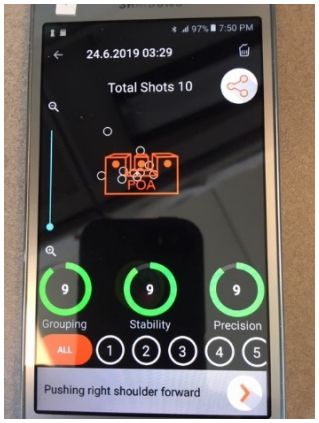
The Science and Technology Innovation Center (STIC) at the CG Research and Development Center (RDC) conducted thorough market research that identified two potential training systems to consider for evaluation.

The Targetize and MantisX systems are commercially available personal firearm training systems. Both systems provide comparable visual feedback via a tablet or smartphone, use the Picatinny rail for sensor attachment, and have similar costs of around $150 per unit. The cost includes a motion sensor and an app that provides visual feedback to the user. The user must provide a tablet or common Bluetooth–enabled smartphone to display the app. As the user fires the weapon, the motion sensor records the movement of the weapon. The app then uses an algorithm to relay instruction to the user via Bluetooth to a smartphone or tablet. Both systems provide a dry-fire mode, expanding the ability to achieve desired training outcomes.

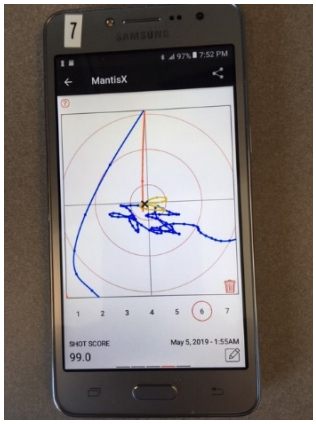
Members of the STIC team purchased and evaluated the Targetize and MantisX to gain familiarity prior to conducting a Limited User Evaluation (LUE). The team came to the consensus that, while both devices worked well, the display for the MantisX provides more information to the user. The MantisX app also has a verbal output option allowing the user to receive instruction without having to pause a drill to look at a screen.

EVALUATION

The STIC team engaged the Weapons Section at the U.S. Coast Guard Academy in New London, CT for assistance in evaluating the selected devices. The Weapons Section is responsible for cadet firearm training. The Gunners Mates (GM) for the Weapons Section conducted a LUE of the MantisX and Targetize systems. GMs at the CG Training Center (TRACEN) in Cape May, NJ provided additional enthusiastic LUE feedback, as did an RDC member who is a licensed gun dealer.



Targetize Grouping Display with Scores



MantisX Display Shot of Firearm Motion Prior to, During, and After Discharge

CONCLUSIONS

The GMs unanimously preferred the MantisX system, primarily because they found the graphics and verbal output superior to the Targetize system. The TRACEN users and local member also identified the graphics and verbal output as discriminators in their preference of the MantisX. While there are additional advanced drills included in the Targetize app, training courses generally focus on firearm basics; thus, students have little need for advanced drills.

Firearms training systems can provide firearms instructors with an easy-to-use and inexpensive tool to help explain and clarify their instruction and feedback. The dry-fire mode is significant in that it allows students to practice virtually anywhere they want and without the cost of or limitation on the amount of ammunition.

FUTURE WORK

The STIC team identified a third device during the market research phase that requires the user to wear a sensor ring on their finger rather than attach the sensor to the firearm. Locating the sensor on the user's finger rather than the Picatinny rail could be beneficial especially during drills that require a holster. Unfortunately, this product is not yet commercially available. The STIC will consider conducting a similar LUE when this product becomes available.

The Science and Technology Innovation Center (STIC) is a DHS S&T and USCG collaboration.