Strategic Operations, Inc.

Galil DMC-4080 Helps Guide Remote Controlled Vehicle Used in Hyper-Realistic Military Training

There's a big lump in the throat of the infantryman as he fires a warning shot to halt the fast approaching sedan that has just exited the well-known terrorist stronghold. But the car speeds up toward the checkpoint, and shots to flatten the tires are not slowing this maniac down. The soldier fires again, the windshield bursts, and blood splatters from the driver as the sedan screeches to a halt.

No worries. This enemy sedan isn't real; it's remote controlled with dummies inside!

For the infantryman, he can breathe a sigh of relief. Not only for a job well done, but because he also knows that the enemy combatant isn't real. The sedan's frame is hardened foam. The enemy is a dummy—literally. Even the enemy village isn't real.

They're all props set up by Strategic Operations, Inc. (STOPS), a San Diego-based company specializing in creating Hyper-Realistic™ training environments for military, law enforcement and homeland security operations. Since 2002, the company has provided such training to over 450,000 Marines, soldiers, sailors and Coast Guard personnel to prepare them for the battlefields of Iraq, Afghanistan and other hostile places.

"Our company uses movie-industry special effects along with actual military tactics, and provides everything you can think of to re-create wartime environments with hyper-realistic scenarios. This includes props ranging from full-out villages, buildings and vehicles to live actors and realistic dummies with all the fake blood, guts and weaponry," said Kit Lavell, Executive Vice-President of STOPS.

For example, to simulate the horror of combat wounds, the company has employed amputee actors who will wear prosthetic limbs designed to fly off with "blood" spurting when they are shot or blown-up.

"Participants (trainees) so willingly suspend disbelief that they become totally immersed and, eventually, stress inoculated," Lavell adds.

Adding to this realism is STOPS' Ballistic Unmanned Ground Vehicle (BUGV) used for preparing soldiers for live-fire vehicle check point/entry control point scenarios, for sniper training, and for dealing with vehicles that have been converted into mobile bombs. Its ballistic steel frame is capable of holding up against .50 caliber bullets.

Of course, no live driver sits in the BUGV; just hyper realistic foam mannequins. Real people operate the vehicle via a sophisticated remote control device. Key driving functions are managed by a DMC-4080 8-axis Ethernet motion controller from Galil Motion Control, Rocklin, CA. The controller also incorporates two Galil D3040 4-axis, 500 W drives with each capable of operating at voltages between 20 V and 80 V.

Three of the axes of the Galil controller control the steering, shifting and throttle actions, while a fourth axis is used for additional steering requirements. Another axis is used for controlling a machine gun mounted inside the vehicle and which fires blanks at the trainees. The remaining three axes are reserved for testing and other features. STOPS uses some of the controller input/output (I/O) to operate relays that energize such functions as the ignition or turn signals. A key factor why STOPS specified the Galil controller is its ability to function with utmost reliability inside a vehicle subject to extremely harsh conditions, like wide-ranging temperatures of -10° C to 65° C; dusty, loose and uneven terrain; real ammunition and explosives; and chemicals.

For STOPS, failure is not an option with the controller.

"The overall robustness of the Galil controller is impressive," said Lavell, who liked how the Tell Torque feature of the DMC-4080 takes readings from the motor of the BUG-V to determine the harshness of the terrain it is on, and then delivers its findings to the remote control "driver" so he can either ease down or rev up the engine accordingly.

Other Galil features play significant roles in operating the BUGV, such as the Homing Routine and Limits feature which allows for safe power-up of the vehicle and re-centering of the wheels for each training session.

"We also use Galil's Position Tracking Mode to send position data streams from the host to the four axes used for driving the BUGV. The data throughput is excellent, with no issues, no latency," said Lavell.

STOPS engineers found the native Galil programming language easy-to-use, which helped enable them to incorporate several safety routines into the operating system. For example, whenever the controller does not receive a data stream, it goes into a fail-safe routine that brings the vehicle to a stop. ■

Strategic Operations, Inc.
San Diego, CA
www.strategic-operations.com