Team Mojavaton

Galil Steers Team Mojavaton's
Autonomous Ground Vehicle

The sci-fi vision of robotic, unmanned vehicles is more reality than fantasy. There are remote-controlled mini-subs exploring the deep seas, Mars rovers transmitting stunning images, and pilot-less, flying drones gathering surveillance in hostile territories.

While incredibly advanced, this technology remains tethered, albeit remotely, to a controlling, human source. Now, science wants machines that can operate and think entirely on their own, just like R2D2 of Star Wars fame.

As a result, the US Department of Defense sponsors the DARPA (Defense Advanced Research Projects Agency) Grand Challenge, which encourages the development of autonomous ground based vehicles that can eventually replace manned vehicles used in dangerous missions. A $2 million prize is awarded to the winning team whose vehicle travels the fastest in less than ten hours across 175 miles of treacherous roads and trails.

Rising to the challenge is Jim Crittenden, who formed Team Mojavaton to convert and enter a Nissan Xterra. The team is experienced in custom machine building, design, vision systems, control systems, electronics, programming and project management.

"Since this event will be very hard on every vehicle, we placed a high premium on reliability and survivability," said Crittenden. "Our autonomous systems won't be able to avoid every little rock and rut, so we know that the vehicle will have to take a beating. We'll be happy if we can just avoid the major, race ending obstacles like the tank traps and sheer drop-offs."

To help control the critical steering and throttle functions, the team turned to Galil's DMC-1414 single axis controller and drive combination. It connects to an Ethernet network, and is designed to respond accordingly to the approximately 2,500 GPS way-points that are loaded into the program of the vehicle's computer system. These waypoints define the course for the vehicle to follow.

In addition to being able to follow the waypoints, Crittenden says, "Each vehicle must have the ability to 'see' the terrain ahead and identify the various obstacles that are a part of off-road driving." To accomplish this, the vehicle uses two machine vision camera systems and two laser range finders.

Galil's controller and drive helps steer manless road vehicle for DARPA Grand Challenge race.

Team Mojavaton was drawn to Galil because of its well-established record for controllers that deliver flawless precision, accuracy and unending repeatability. "Galil's controller and drive was very affordable and easy to program. We especially loved the position tracking mode, which is critically important because it has to make about ten decisions per second about which way to go in order to keep the vehicle steering in the right direction. Position changes are truly made on the fly, and the Galil has performed fabulously-bullet proof," adds Crittenden. ■

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