



Case Study

Unmanned & Autonomous Vehicle Developer Uses EAO for Emergency Stop System

Company Profile

Customer name:

TORC Robotics

Industry name:

Robotics/Unmanned Vehicles

EAO Series:

Series 84 E-Stops

Application:

SafeStop™ Wireless Emergency Stop System for Unmanned Vehicles
www.torcrobotics.com

Business Challenge

TORC enables engineers to rapidly integrate robotic systems through a suite of modular, customizable products and is widely recognized as a leading source of robotic controls and autonomous vehicle kits.

TORC recently worked with Virginia Tech and the National Federation of the Blind (NFB) as part of the NFB Blind Driver Challenge®, an initiative to develop and demonstrate the first ever full size, blind-drivable vehicle. The team integrated advanced perception technologies and navigation software developed by TORC with its ByWire XGV™ robotics research platform, a drive-by-wire controlled Ford Escape Hybrid.

In a typical autonomous vehicle from TORC, driving decisions would be fed back into the vehicle's control systems to carry out the actual driving behaviors. In

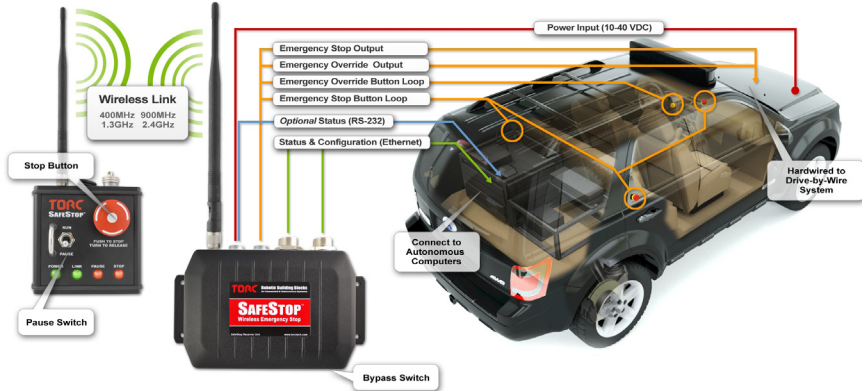
this unique application, data derived from the system was repurposed and used to provide inputs for special tactile devices developed by researchers at Virginia Tech. These non-visual interfaces, which included a set of gloves and a seat pad that sends vibrations across the fingers and along the driver's back and legs, provided instructional cues to the blind driver, for maintaining full control over the vehicle.

Because of the nature of this challenge, a proven emergency stop safety system was critical throughout testing and demonstration.

Solution

The SafeStop™, one of TORC's off-the-shelf products, provides an independent, fail-safe wireless emergency stop system that allows safety operators to immediately pause or disable robotic systems at the push of a button.

EAO – Your Expert Partner for Human Machine Interfaces



The SafeStop provides an independent, fail-safe wireless emergency stop system.



The SafeStop transmitter unit uses EAO's Series 84 E-Stops with a unique low back-of-panel depth ideal for wireless pendants.



The Series 84 E-Stop offers single mono-block construction and a twist-to-release actuator.

The SafeStop transmitter features a handheld design, audible and visual operator feedback, an internal rechargeable battery, and a line of sight operation of up to 6 miles. The receiver unit is integrated into the robotic vehicle and is capable of pausing or disabling the vehicle with hardware contacts or software messages passed over Ethernet or serial interfaces.

The Emergency Stop (E-Stop) switches used on the SafeStop transmitter unit are EAO's Series 84.

The Series 84 E-Stops offer a unique low back-of-panel depth at just 18mm maximum, optional illumination, single mono-block construction, and a twist-to-release actuator. These products allow for great flexibility in many applications including, machinery, medical equipment, rail applications, and autonomous vehicle control. The Series 84 E-Stops are rated at 3A 120VAC and 1.5A 240 VAC, and are protected against oil and water to IP 65 standards. Series 84 E-Stops meet international safety specification ISO 13850 and comply with EN IEC 60947-5-1 and EN IEC 60947-5-5 requirements.

Results

The NFB Blind Driver Challenge vehicle was successfully demonstrated when a blind driver navigated 1.5 miles of the Daytona International Speedway, navigating hairpin turns, avoiding obstacles, passing a moving vehicle and reaching top speeds of 27 mph. The blind driver maintained full control of the vehicle throughout the course. EAO's E-Stops were an important part of the SafeStop system implementation that allowed for safe stopping of the vehicle when necessary. The E-Stops provide:

- Ergonomic design for ease-of-use
- Fingertip control with good tactile feedback
- Rugged construction and reliability
- Easy integration into the SafeStop pendant

EAO is a global manufacturer of high-quality HMI Components and Systems. EAO develops HMI Components and Systems for applications ranging from transit systems to industrial equipment. Working closely with its customers and the appropriate regulatory bodies, EAO meets and exceeds expectations for panel layout and ergonomics, system integration, and electro-mechanical design. EAO's components and systems undergo rigorous testing to assure reliability, repeatability, and long service life. EAO is ISO 9001, ISO 14001, IRIS, and ISO/TS 16949 certified for automotive and other industry requirements.

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