

TUNNEL DRILLING

## “Not-a-boring” competition

Elon Musk’s Boring company has scheduled a competition to drill a tunnel faster than a snail. One of the pre-selected teams, Dirt-Torpedo, uses CANopen drives sponsored by Thomson.



*The Dirt-Torpedo uses CANopen drives from Thomson Industries in three propulsion systems (Source: Dirt-Torpedo Project)*

Thomson sponsors the DHBW Baden-Wuerttemberg Cooperative State University in Mosbach, Germany, which developed the Dirt-Torpedo, one of the 12 finalists shortlisted for the competition. Their boring machine’s design/functionality is similar to that of an earthworm, and the Thomson Electrak HD actuators are required for three propulsion units that are the key factor in the boring machine’s movement. The 20 sponsored Electrak HD electric actuators are tested on CANopen conformity by CiA. Another of the many other sponsors is Syslogic supplying its AI (artificial intelligence) host controller.

Thomson launched its line of heavy-duty Electrak HD electric actuators coming with CANopen interfaces last year. CANopen is an open CAN-based application layer. Originally designed for

industrial systems, it is used in factory automation systems, particularly AGVs (automated guiding vehicles) and PLC-controlled material handling systems.

“We are proud to be supporting the creative and motivated Dirt-Torpedo team in this competition, and providing them our line of Electrak HD actuators,” said Håkan Persson, product line manager for actuators at Thomson. “These smart actuators are powerful and eliminate the need for standalone controls. They are designed to perform in the most extreme conditions and tested to meet and exceed the toughest OEM mechanical and electronic component acceptance tests available today. We are confident they will be an integral contribution to the team’s machine design.”

“We are really excited to be one of the finalists in this competition,” said Adrian Fleck, team Dirt-Torpedo. “We needed a reliable and efficient partner to ensure that the tunnel boring machine construction process runs smoothly. The Electrak HD CANopen actuators are incredibly compact and robust, and the CAN network technology makes them even more flexible and offers a more precise control of the machine.”



*Electrak HD electric CANopen actuators are available for powers up to 16 kN (Source: Thomson Industries)*

### The challenge: Faster than a snail

In fall 2020, Elon Musk’s Boring Company announced the competition with an aim to build a tunnel infrastructure required for quick, safe and comfortable transit at a low cost. Teams are competing to build a tunnel boring machine (TBM) to drill a tunnel in the Mojave Desert with a 0,5-m diameter and a 30-m length.

The bored tunnels will be judged in three categories: Time to drill the tunnel, time to drill the tunnel and to complete the tunnel wall as well as accuracy to reach the end of the tunnel. According to the principle of “Can you beat the snail?”, the focus of the competition is on speed and precisely on developing technologies that make the TBM faster than an ordinary garden snail, which is roughly 14 times the speed of today’s TBMs.

There are 12 teams pre-selected from 400 applicants. Two of them are located in Germany. Besides the team from DHBW Mosbach, the team of the Technical University of Munich (TUM) participates in the competition. The other teams are from Switzerland (1), UK (2), USA (5), and mixed teams from USA and Canada, respectively India.

The Dirt-Torpedo team consists of 10 students studying at DHBW Mosbach, DHBW Ravensburg Campus Friedrichshafen, and TU Darmstadt. Among the team members are students of mechanical engineering, virtual engineering, electrical engineering, and computational engineering. Professor Gangolf Kohnen and lecturer Klaus Juengling from DHBW Mosbach are supporting the team.

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