

Field Report

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“Nothing Is Impossible“ – A Field Report from the WARR Hyperloop Winning Team

Is a speed of 1000 kilometers per hour significantly faster and environmentally friendlier than traveling by plane, as well as being considerably cheaper than by train? Or is it virtually impossible? Not for Elon Musk and many highly talented students, such as those of the WARR Hyperloop Team at Munich Technical University (TUM).

The Hyperloop Pod Challenge has been a regular event since its inception in 2015, launched and backed by Tesla and Space-X founder Elon Musk. The objective of the competition is to support the development of functional prototypes of high-speed transportation systems and to facilitate innovation.

The concept has been named “Hyperloop” and consists of a magnetic levitation vehicle that travels along a tube at sub-atmospheric air pressure. Hyperloop has some similarity with “Transrapid”, Germany’s maglev train, differing in that it does not use an evacuated tube. The competition challenges teams of students to design and build the best high-speed Hyperloop pod. To date, three such competitions have been held. As in previous years, and again in this year too, the WARR Hyperloop team was the winner of this prestigious challenge. A significant contribution to this success was the provision of extremely reliable components, especially those delivered by TRACO POWER. Here follows the team’s field report.

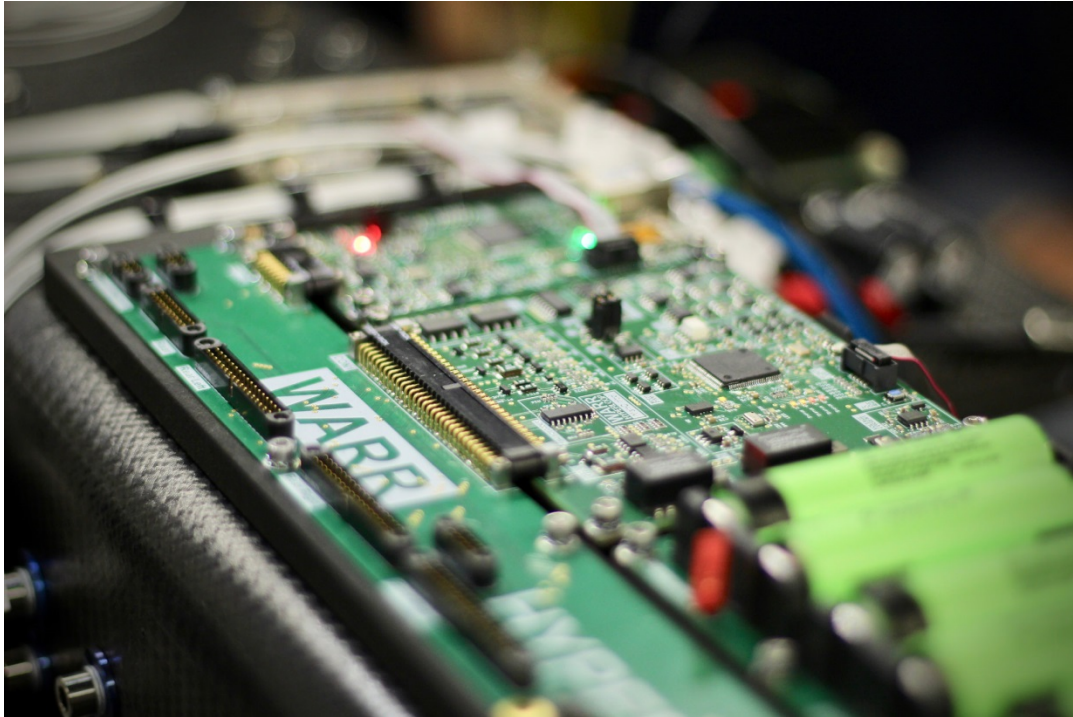


Traco Power's DC/DC converters in the WARR Hyperloop Pod

Traco Power is widely known for its extremely compact and reliable DC/DC converters. As in previous years, the WARR Hyperloop Team relied on the expertise of Traco Power in the development of our prototype for the "SpaceX Hyperloop Pod Competition".

By using integrated DC/DC converter modules the team was able to save a significant amount of time compared to discrete solutions, since component selection, circuit design and PCB design were eliminated. It was possible to exclude secondary issues, such as high electro-magnetic interference (EMI), early in the design process thanks to the close interaction with Traco Power.

For our competition vehicle the WARR Hyperloop Team relied on the TSRN 1SM series to reduce the battery voltage (18V to 25V) down to 5V to suit the control electronics. The high efficiency of close to 90 percent helped maximize the operation time. The module's compact form factor, fitting inside an SMD package, on/off input, and variable output voltage fulfilled all the application demands of the team.



“In retrospect, the converters consistently yielded a remarkable level of functional safety. They withstood the vacuum effects over the length of the competition route, the significant vibration loads encountered during the ride, and the vehicle's braking acceleration of 10g over 2 seconds at the maximum speed” explained the team, commenting on the behavior of the Traco Power converters.

In addition to the TSRN and TEN Series DC/DC converters installed in the vehicle, a reliable switch-mode power supply was needed for the battery heater system during the preparation of the vehicle. The search for a suitable 600-watt power supply delivering more than 60V of output voltage lead to selection of the TIS 600-172, also made by Traco Power. Via an output potentiometer the voltage could be adjusted exactly according to the heater resistance. Another decisive consideration was the selectable input operation of 110VAC and 230VAC, enabling the power supply to additionally operate at the U.S. site of the competition.

We wish to thank Traco Power for their proactive cooperation and we hope that this strong partner in matters of “Power” will continue to stand at our side!

About the WARR Hyperloop Team

WARR Hyperloop is a student team from Munich Technical University (TUM) who are pursuing innovative solutions for future transportation systems. The team took part for the third time in the annual international “SpaceX Hyperloop Pod Competition”, demonstrating a prototype. And for the third time in succession the team prevailed against 20 international teams to win the competition. After this year's competition, the team currently holds the speed record for a Hyperloop prototype at 467 km/h.



More information on the TRACO POWER converters deployed in the WARR Hyperloop Pod can be found here:

- [TEQ200 Series](#)
- [TEN40 Series](#)
- [TSRN Series](#)
- [TIS Series](#)

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Florian Haas has worked more than 10 years in the medical device industry. In various Product Management roles he helps “translate” the requirements (and wishes) of both engineering & health care professionals to his engineering department for product development. At [TRACO Power](http://www.tracopower.com) (a leading company for power conversion products), Florian and his team are responsible for product management, marketing and communication. Prior to his marketing role at TRACO Power, Florian had been leading the Product Management team at Belimed (Switzerland and Charleston, North Carolina), a leading MedTech company for hospital equipment specializing in endoscopy reprocessing and sterilization.

Florian also was the Global Product Manager at Ziemer Ophthalmic Systems (Switzerland) and was responsible for the development and market introduction of two femtosecond laser systems for eye surgery.

Florian holds two degrees, one in Business Administration with an emphasis in Marketing/Communication and also a degree in Information Technology from the Lucerne University (Switzerland).