

From Combustion to Clean Energy: Aixtreme Racing's Shift to Electric Power with the Expertise of ATI

Aixtreme Racing is a student project at the University of Applied Sciences Aachen, Germany, focused on designing and constructing prototype cars. The Team competes in the international Formula Student competition, where university teams from around the world develop, build, and race Formula-style single seater cars. Thanks to the interdisciplinary students in the team, they have a wide range of expertise that supports in design and development and allows to approach the events with confidence.

So far, Aixtreme Racing's race car has been powered by an internal combustion engine which has demonstrated remarkable performance in previous competitions. Most notably, it helped to secure a second-place overall finish in the 2024 Formula Student Italy Combustion Event.



Pioneering Sustainable Mobility with ATI's Support

Considering current trends and the growing focus on sustainability, Aixtreme Racing is planning to the drivetrain to an electric system.

This decision reflects a commitment to building a sustainable future. By transitioning to electric propulsion, the team aims to enhance their car's performance while aligning with their responsibility toward the global community. They believe this transition will drive technological innovation while also emphasizing the team's values and vision for sustainable mobility.

How Accurate Technologies makes it possible to achieve this goal:

With a switch to an electric powertrain, the use of a Controller Area Network (CAN) in a race car becomes essential. This network enables efficient communication between different components of the vehicle, which is crucial for the smooth functioning of the electric drive system.

The implementation of a CAN Network poses a challenge since it requires the integration of many new, custom bus participants. These specifically designed components require careful planning and configuration to ensure that they interact seamlessly with the overall system. To achieve this, Aixtreme Racing relies on robust tools to monitor, debug, and optimize the devices on the CAN bus.

Accurate Technologies (ATI), a leader in vehicle network solutions and diagnostic tools, has been instrumental in enabling this transition. Their products empower the team to efficiently monitor the vehicle's CAN network, identify and resolve faults, and optimize the performance of the various components.

Products of ATI

As part of the sponsorship, Aixtreme Racing received several ATI CANary FD interfaces, the DLX Data Logger and ATI's CANLab Network Analysis software supplied via the firm's German office, based in Hallbergmoos, near Munich.

The tools provided by ATI have become indispensable in the development of Aixtreme Racings electric vehicle. Their robust and reliable hardware performs exceptionally well in the demanding environments of motorsport, ensuring consistent functionality even under rugged conditions. These tools also streamline the integration process by enabling them to monitor and analyze the communication between critical systems such as the Vehicle Control Unit, Battery Management System (BMS), Inverter and Charging Cart.

The CANLab software environment has been vital in establishing and validating communication across the vehicle's components. Its advanced features, like the DBC file translation, simplify signal identification and transmission, making it possible to manage data flow quickly and efficiently. Additionally, the ability to simulate bus participants makes it possible to evaluate individual devices in isolation, ensuring each component performs as expected. The user-friendly interface further enhances workflow by providing clear and efficient options for monitoring, debugging, and configuring the system. Together, these tools have significantly accelerated Aixtreme Racing's development process, allowing them to overcome complex challenges with precision and efficiency.



Special attention was paid to the trace functionality and the sending of CAN messages to the bus participants. The DBC file translation proved to be extremely useful as it facilitated the reading and recognition of signals, which in turn enabled the quick and easy creation and sending of required messages. The periodic and manual sending of messages allowed simulation of bus participants to check devices separately from each other. The user interfaces for Trace and Send are clearly structured with CANLab and are easy to use.

The CANary FD in combination with CANLab have been in use since the initial stages of the development of the car as without it the calibration and configuration of the motor and inverter would not have been possible. This four-channel CAN interface It has proven itself indispensable in developing and testing the in-House Battery Management System.

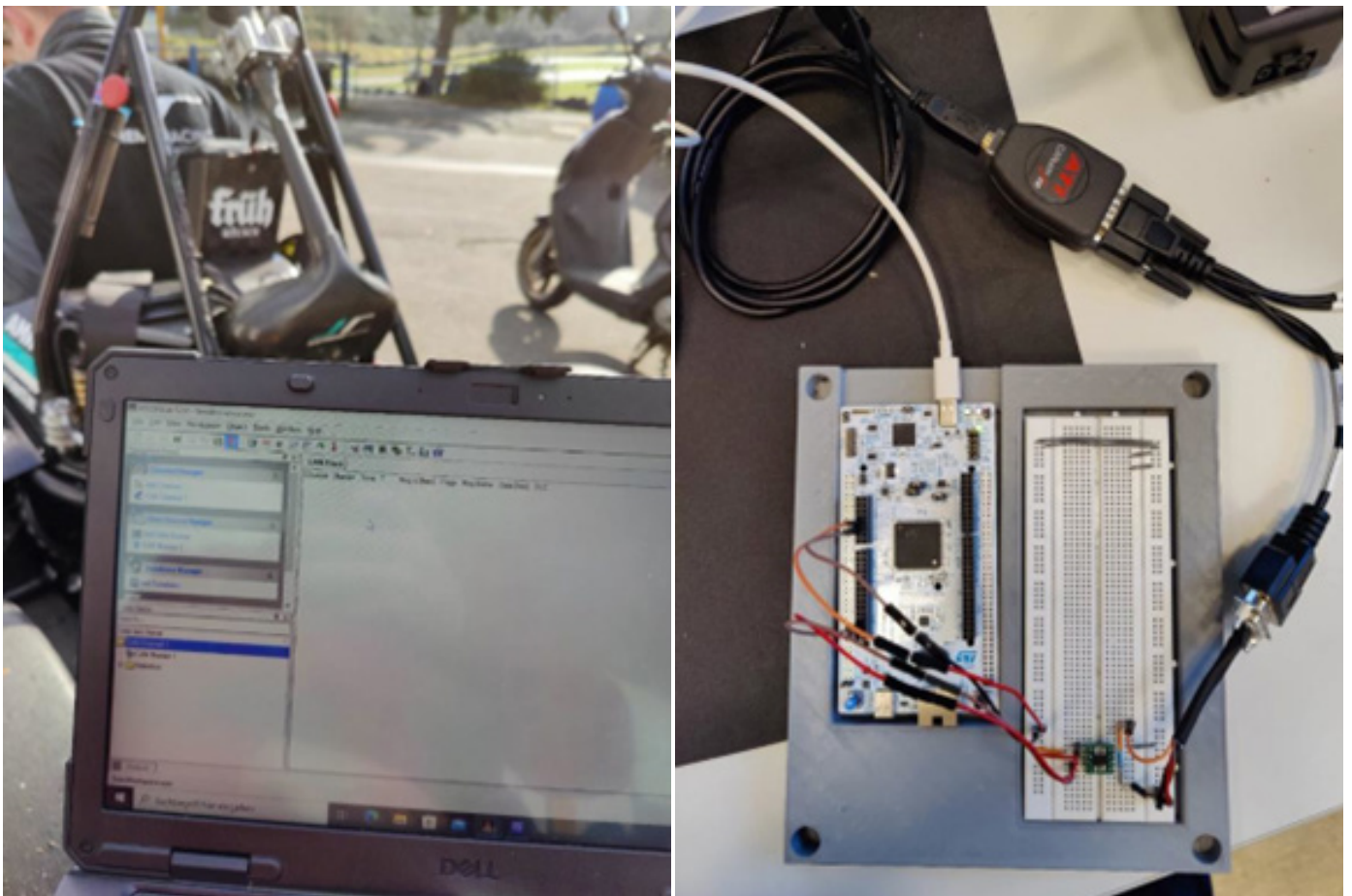


Next Steps

These ATI tools will continue to play a crucial role as Aixtreme Racing is finalizing their car. On the racetrack, they will enable rapid setup adjustments and provide valuable post-run performance insights.

The team is looking forward to using ATI's DLX Data Logger to track battery cell capacities and temperatures, logging charging cycles to identify trends and potential issues early.

Aixtreme Racing is thrilled to collaborate with ATI and is looking forward to leveraging their solutions throughout the testing, development, and racing phases of their electric car. ATI's support makes it possible to tackle the challenges of developing an electric drivetrain effectively, with their tools playing a vital role in driving the team's ambitions forward into 2025.



For further information on Team Solarium or ATI visit their respective websites:

<https://www.fh-aachen.de/studium/studieren/mitmachen-und-engagieren/studentische-projekte/laengerfristige-projekte/aixtreme-racing>

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