

Newsletter - High-Voltage Motorsports e.V.



Dear sponsors, dear friends of our club,

The first quarter of the year is behind us and we can look back on some eventful weeks. We have worked on our vehicles with a great deal of commitment and passion in order to get the new season off to the best possible start. The first test drives, countless hours in the workshop and strategic planning for upcoming races have welded our team together and helped us move forward.

In addition to the intensive work on and off the track, club life was not neglected either. Joint training sessions, team events and exchanges with our supporters have given us additional motivation. Preparations for the next challenges are already in full swing and we look forward to giving you an insight into our past months.

Teamupdates

In recent months, we have restructured our team to work more efficiently. While we previously had separate teams for Electronics, Management, Aerodynamics, Suspension, Chassis, Powertrain, and Driverless, we now have a new structure. From now on, our main areas consist of Electronics, Management, Composites – which combines Aerodynamics, Suspension, Chassis, and Powertrain – and Driverless. This restructuring allows us to allocate our resources more effectively and work more efficiently on our projects.

Electronics

After ordering and receiving all the components and ordering the circuit boards, the assembly could begin. Within a week, all the boards were fitted with their components - we were able to use the placement machines at Fraunhofer IISB for this. The remaining assembly work was carried out in the workshop. Now that many members have written their exams and have more time to spend in the workshop again, many boards have been put into operation. Here we show the new members how which circuit board works and how to work on one. Faults are identified and rectified.

In addition, we are also planning the wiring harness. This will be produced in the next few weeks. This year, our wiring harness will again consist of two parts, which are connected at the center of the firewall (wall between driver and battery). The designs are now being created for the remaining circuit boards for this season. This includes above all the active chassis, which has been redesigned to simplify many steps in commissioning and use.

Management

A lot is happening in our team right now! We are working flat out on a brand new polo - and it will not only be stylish, but also a real statement for High-Voltage Motorsports. You'll soon be able to see it live (and wear it, of course)!

But that's not all: planning for the rollout is in full swing! We are in the middle of preparations to finally get our latest vehicle out on the track. It's going to be an absolute highlight and we can't wait to have you all there. Stay tuned - we'll have more information on the date and procedure soon!

Composites

In recent months, aerodynamic studies have been conducted using last year's vehicle, FAUmax Rho, to evaluate how accurately our simulations represent the airflow over the real car. Currently, the final versions of the aerodynamic components are being completed. The most significant change compared to the previous model will be the underfloor, with its molds already in production.

For our cooling system, new carbon components have been manufactured and successfully tested, enabling further weight savings. Meanwhile, the chassis production is in full swing. The outer shell of our carbon monocoque has already been laminated and cured in the autoclave. In the coming weeks, the inner structures will be produced, and in early April, the so-called "Mono-Plop" will mark the demolding of our next monocoque.



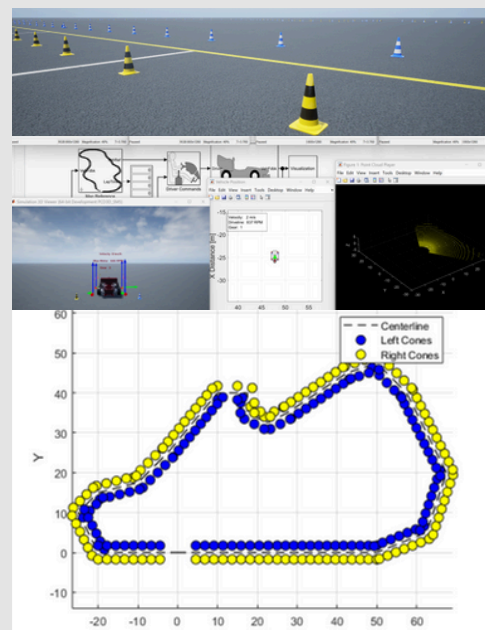
Driverless

We have implemented a vehicle dynamics model using do-mpc and are now testing it in a simulation based on MATLAB Skidpad tests. Additional sensors such as LiDAR and cameras are being integrated, track maps with automated cone placement are being created, and ROS nodes for SLAM and MPC are utilized.

An algorithm for automatic pylon placement along the track centerline has been developed, though the start and finish line cones are still missing. Additionally, a new LiDAR sensor has been configured, and its SDK has been set up. The SLAM system was established by installing the LiDAR driver, publishing the point cloud, optimizing FLOAM, and visualizing the results.

In parallel, a rule quiz platform is being developed as an open-source solution with API integration for mathematical equations. The goal is to create a prototype for an alpha test by the end of the season.

From a technical perspective, the focus is on optimizing the A-LOAM parameters for the new LiDAR and merging LiDAR-SLAM with camera-based FastSLAM to enhance sensor fusion. These developments will improve the autonomous driving system and enable more realistic testing.



Final Words

After an intensive first quarter, we are looking forward to the coming months with great anticipation. Planning for the next races is in full swing and our team is working flat out to start the season as well prepared as possible. In addition to technical developments, the focus is also on joint events and communication with our sponsors and supporters.

We would like to take this opportunity to thank you for your fantastic support. Without you, our work would not be possible in this form. With a lot of motivation and team spirit, we are looking forward to the challenges that lie ahead and are excited about the coming months!

