KISTLER
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Trend Article ASC Race

Faster, safer, more sustainable

How measurement technology is advancing vehicle development around the world

With highly precise and robust sensors, customized systems, and software and complete solutions, the measurement technology specialists at Kistler support innovative vehicle developers around the world – from young racing teams that drive electric or hydrogen-powered cars to global vehicle manufacturers looking to optimize their processes and data usage.

Successful vehicle development requires accurate measurement data. In order to understand how a vehicle will perform in the real world, engineers and developers perform an array of special tests to optimize the behavior of tires, steering systems, engines and driver assistance systems. The focus is on measurands like torque, velocity, acceleration, wheel loads, dynamic camber angles, and many more. These values must be precisely recorded over time in order to draw conclusions about vehicle behavior. Measurement solutions from sensors to software help racing teams, drivers and developers to optimize their vehicles – both on the test track and on the test stand.

Innovation requires accurate measurement technology

Thanks to our decades of experience, the Kistler Group is able to deliver measurement technology that is customized to a wide range of development tasks. Kistler partners with universities, motorsport teams and OEMs in the automotive industry to support trends such as alternative drives, new vehicle designs and, not least, autonomous driving. After all, when it comes to vehicle development, motorsport tends to be a pioneer: the Forze Hydrogen Racing Team from the Delft University of Technology (the Netherlands), for example, used pressure sensors and other systems from Kistler to achieve top performance with its hydrogen-powered Forze IX racecars. The fully electric racecars from the Augsburg University of Applied Sciences and the GreenTeam from the University of Stuttgart (world acceleration record and 2022 world champions) have also broken records in the Formula Student race that were achieved and measured with the help of Correvit sensors from Kistler.

Not just spinning your wheels, but measuring them

In March 2023, Kistler introduced its new RoaDyn Racing wheel force transducer at the Tire Technology Expo in Hannover. The wireless wheel force transducer is mounted directly onto the rim and measures all the forces and moments that impact the wheel and – in particular – the tire during travel. This allows tire manufacturers and motorsport teams to precisely analyze and optimize their

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tire performance in terms of the course, vehicle dynamics, weather, and other influencing factors. These measurements provide information not only about traction, but also about wear. Whereas the focus is mainly on short-term performance in motorsports – minutes for the best lap or hours for victory in the race – longevity and reliability over the years play a bigger role for production vehicles. In terms of durability as well, RoaDyn wheel force transducers from Kistler have been raising the bar for decades, both in test travel on the street – such as for innovative subcompact cars in Japan – as well as during test cycles on the test stand.

Big data: maintaining an overview and making development more efficient

The long-term tests required to determine durability inherently generate large volumes of data. New software from Kistler offers perspective: jBEAM Durability is an application-specific edition of the successful jBEAM analysis and visualization platform. jBEAM Durability was developed in cooperation with a leading OEM from the automotive industry and offers development engineers the flexibility, speed and efficiency they need in order to get the best out of their measurement data. For the successful validation of vehicle components and systems, contact sales-software@kistler.com to purchase a test version.

Vehicle safety: everything from one single source

A lot has changed since the first viable crash-test dummies were developed in the 1950s: thanks to improved vehicle safety technology, the number of car crash fatalities decreases every year. With its crash walls, in-dummy sensors, airbag test systems and the THOR dummy (test device for human occupant restraint) that was developed in-house in 2017, the Kistler Group has become a one-stop provider for passive vehicle safety tests. Regardless of the type of safety test (pre-crash, crash or post-crash) or the protocol used (NHTSA, Euro NCAP, etc.), Kistler has the right solution: various structures for impact tests (frontal, side, pole), completely instrumented dummies depending on the body parts to be measured, or special systems for testing airbags and driver assistance systems (e.g. steering or pedal robots).

You can find more information about vehicle testing and vehicle safety testing on the Kistler Group website.

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Powered by two fuel cells, the Forze IX racecar from Forze Hydrogen Racing was developed with pressure sensors and further measurement technology for vehicle dynamics – both from Kistler.

With the new wireless RoaDyn Racing wheel force transducer, Kistler is expanding its leading RoaDyn range of wheel force transducers to include motorsport applications.

jBEAM software and the new jBEAM Durability edition make it possible to efficiently perform series durability and vehicle dynamics tests – and to master big data both in the vehicle and on the test stand.

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About the Kistler Group

Kistler is the global market leader for dynamic pressure, force, torque and acceleration measurement technology. Cutting-edge technologies provide the basis for Kistler's modular solutions. Customers in industry and scientific research benefit from Kistler's experience as a development partner, enabling them to optimize their products and processes so as to secure sustainable competitive edge. Unique sensor technology from this owner-managed Swiss corporation helps to shape future innovations not only in automotive development and industrial automation but also in many newly emerging sectors. Drawing on our extensive application expertise, and always with an absolute commitment to quality, Kistler plays a key part in the ongoing development of the latest megatrends. The focus is on issues such as electrified drive technology, autonomous driving, emission reduction and Industry 4.0. Some 2,000 employees at more than 60 facilities across the globe are dedicated to the development of new solutions, and they offer application-specific services at the local level. Ever since it was founded in 1959, the Kistler Group has grown hand-in-hand with its customers and posted sales of CHF 434 million in 2022. About 8% of this figure is reinvested in research and technology – with the aim of delivering better results for every customer.