automotive testing technology international

JUNE 2017

automotive testing expo 2017 europe
JUNE 20-22
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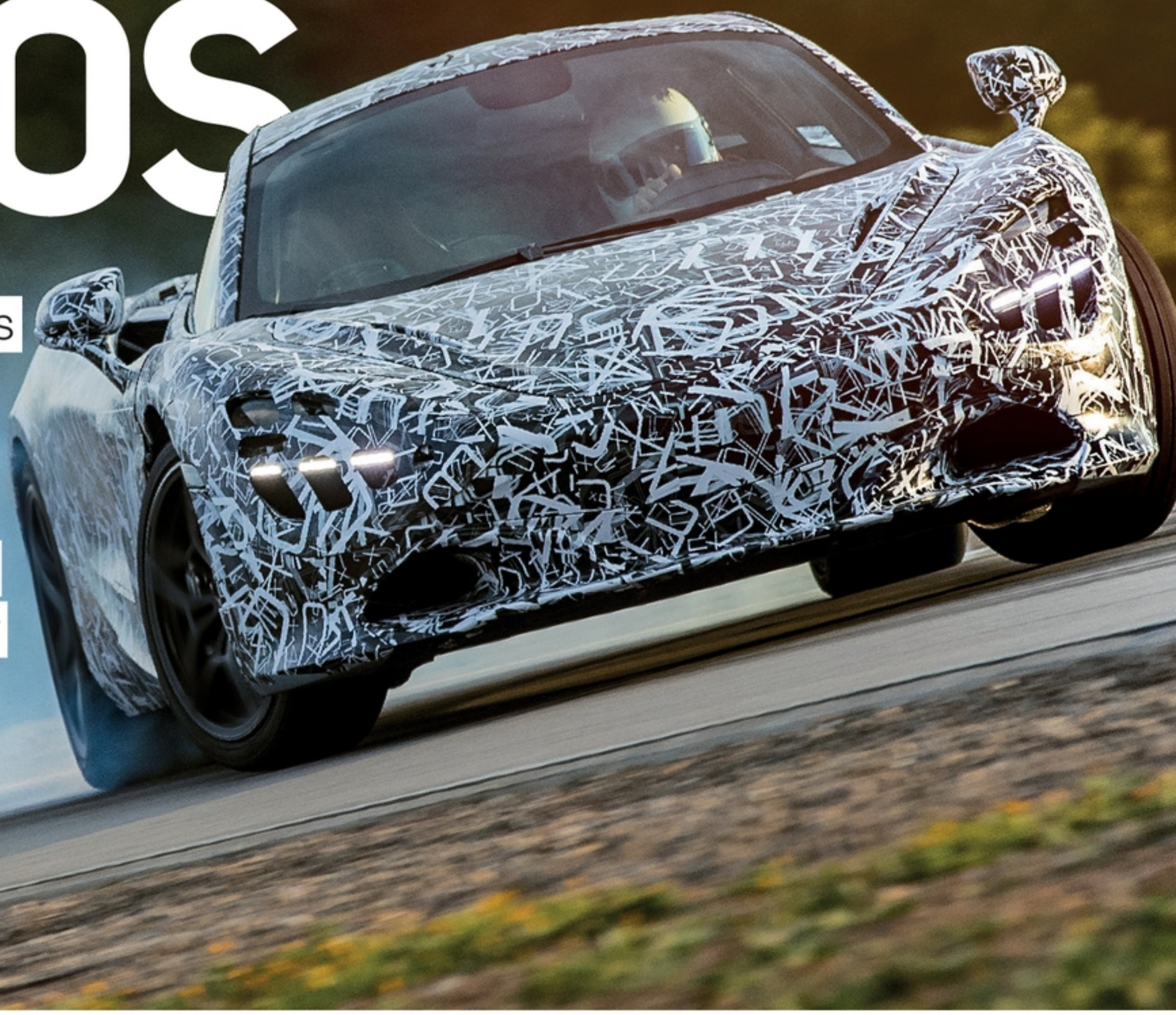
McLaren 720S

New vehicle programs director Mark Vinnels reveals the key development targets and test areas for the second-gen supercar



Building test tracks

OEMs, proving ground operators and architects provide their tips for designing the ultimate test circuits of the future

Vehicle hacking

How the automotive industry is working to improve cybersecurity in next-generation connected cars

OEM interview: PSA

Gilles Le Borgne, executive VP and director of quality and engineering, reveals the car maker's plans following its purchase of Opel/Vauxhall

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Evaluation of fuel efficiency

Accurate, flexible fuel consumption measurement technology provides huge benefits for vehicle developers when testing to new regulations and standards

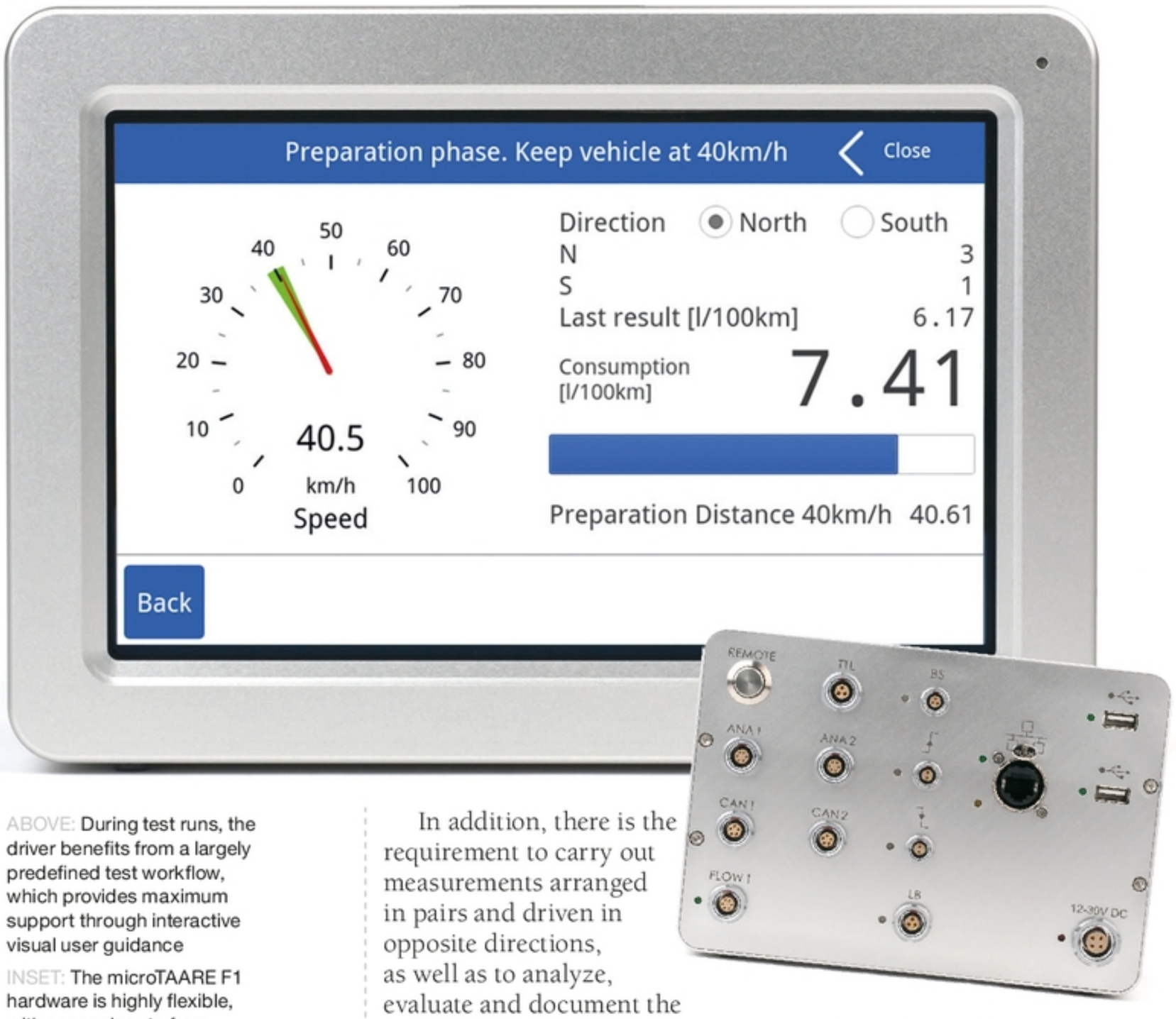
Gregory Technology has presented a solution for how a modern measuring system can meet the complex requirements of current standards and regulations and what optimization is possible with this method. The solution is based on the New Chinese National Standard (JT/T 719-2016 and JT/T 711-2016) for fuel consumption measurement in a mobile driving test.

For these complex testing scenarios a large number of varied measurements are required, which have to be repeated routinely under different conditions. In addition, the requirements of the test procedures and generation of the final report are complex.

These test scenarios also contain complex definitions and conditions, which must be monitored in the pre-test phase of each individual measurement, in real time, for permanent compliance with a defined tolerance band.

In the running test phase, parameters for compliance with defined tolerance must be monitored again. A deviation from this would lead to an automatic abort.

During the subsequent post-test phase, the results of the test are analyzed and rated in a target/actual comparison to reference values defined in the standard.



ABOVE: During test runs, the driver benefits from a largely predefined test workflow, which provides maximum support through interactive visual user guidance

INSET: The microTAARE F1 hardware is highly flexible, with sensor inputs from analog to CAN 2.0A

In addition, there is the requirement to carry out measurements arranged in pairs and driven in opposite directions, as well as to analyze, evaluate and document the results accordingly. In the final report, measurement results have to be analyzed as far as possible automatically and summarized in a standardized document.

Not to be forgotten is the interactive and permanent support required by the test driver while conducting tests. Until now, two employees were required in each car to cover the various tasks. As a consequence, an intelligent, integrated data acquisition and data management system has been necessary, which can map the entire measuring process, from the input of the sensor signals, to the complex data handling, through to the standard-compliant reporting.

At the same time, it should not be ignored that the

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The system has an extra-bright 7in touchscreen color display with easy-to-navigate functions and menus, which guide the user through the entire test analysis process

requirements of the standard cannot be fully fulfilled without a suitable measuring system. This relates to, for example, monitoring and performing the required driving conditions and test criteria during the pre-phases of various measurements.

A measuring system developed especially for complex test scenarios of different kinds offers a number of advantages, which can be seen again and again in the numerous, routine repetitions of measurement drives, evaluations and data analyses. And not just in terms of administrative, time and personnel, but financially as well. This means that the investment in a new, more suitable measuring system can be amortized within a reasonable period of time.

The basic concept is a highly robust system that can be used in mobile and industrial applications with powerful hardware based on a real-time signal processor with compact dimensions, a large touch display, and a huge number of inputs for various sensors and measured variables.

In particular with regard to the overall accuracy of the measurement data required by the standard, the maximum measuring frequency (1kHz) and the system clock (1µs) are of crucial importance. The overall accuracy is always calculated by the sum of the individual measuring accuracies of all relevant sensors, as well as the accuracy of parameters to be specified, such as temperatures and fuel density (unless they are explicitly measured).

The range of inputs is: CAN 2.0A, analog (bipolar, differential), counter (or pulse width measurement, for example for the engine speed), switches (for example for trigger signals), voltage strokes, a system port for flowtronic systems for fuel consumption measurement, Ethernet and USB. This enables connection of the necessary sensors for fuel consumption measurement conforming to standards.

The sensor inputs are not only potential free, but at the same time offer a limited power supply for the respective sensor. This avoids a requirement for additional power supplies for any connected sensors. In addition, there is no risk of the measurement signals being distorted due to different potentials of additional voltage supplies.

Also, the Ethernet interface not only enables operation within test bench areas, but also integration into existing IT infrastructure. This also ensures data security and data export. On board, the USB interface supports the connection of external storage media and thus also provides a possible back-up method.

To meet the specified requirements given by standards in an effective, reliable and reproducible manner, the software system is of central importance, providing the interface between the operator and the measuring system.

The system software provides a comprehensive, modular system solution for parameterization of the measuring system and the signal inputs; data acquisition before, during and after measurements; online and off-line data analysis; and final reporting. Complete software operation, optionally available in the local language, is carried out by means of a touch display.

All signal channels can be individually configured for the connected sensor. The DBC files are used for the CAN inputs. Virtual channels are designed to flexibly expand and combine signal channels.

Measurements are mapped step-by-step in their sequence. Mathematical, logical and statistical functions are available in order to control the procedure of the sequences and to analyze the measurement results of each sequence. This enables test data monitoring during the pre-test phase of a test run. This function module also provides the required real-time support to the test driver.

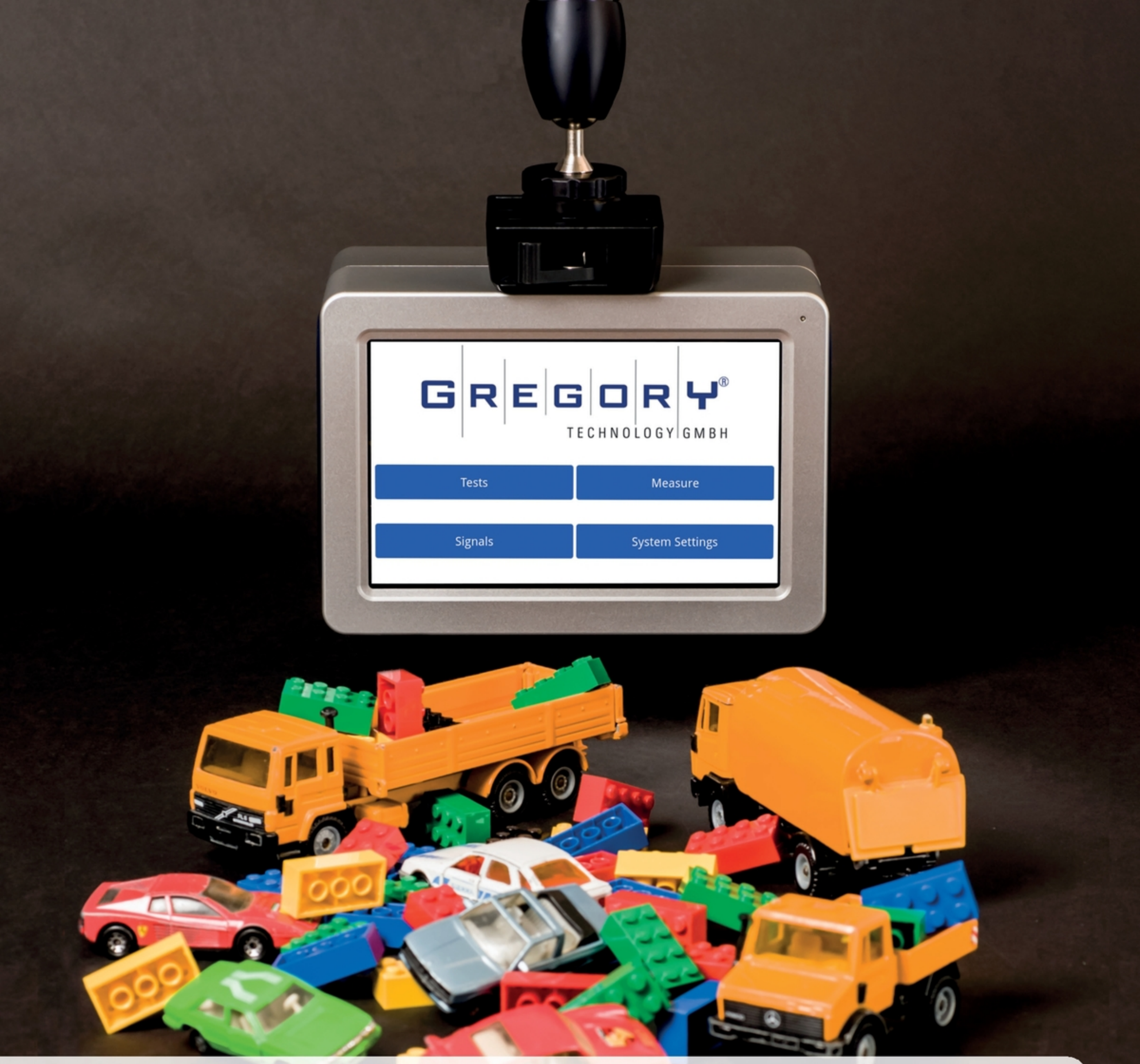
Test data monitoring in real time before, during and immediately after an ongoing measurement – also with mathematical, logical and statistical functionality – provides extensive possibilities for direct evaluation and analysis of the measured values and for control of the entire measuring process.

Furthermore, software provides not only the management of all individual measurements, but also management of the measurements to be driven in two (opposite) directions, as well as the management of all test data.

On the basis of the entire scope of test data, a predominantly automated data analysis is carried out for the required reporting to confirm the standard.

The reporting module compiles the results of the data analysis into a final overall analysis and generates the standard-compliant final report. As with all other modules, it is also possible to parameterize according to existing requirements for content, structure and layout.

As a suitable measuring system designed for complex measuring tasks such as fuel consumption measurement according to the New Chinese National Standard (JT/T 719-2016 and JT/T 711-2016), Gregory Technology offers what is claimed to be the first complete turnkey solution. This is the microTAARE F1 system, which operates perfectly in conjunction with flowtronic fuel consumption measuring systems. ‹



Don't worry about performing complex, time- and personnel-intensive routine measuring tasks including comprehensive data evaluation and reporting.

*micro*TAARE F1 - Complex Testing, Analysis and Reporting made easy.
Presumably the first turn-key system solution for advanced fuel consumption measurement according to the new Chinese National Standard (JT/T 719-2016 and JT/T 711-2016).

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