Smooth delivery

automotive testing expo 2018 ★ NOVI ★ ★ MICHIGAN ★ EXHIBITOR

Breakthrough measurement technology is enabling seamless transfer, processing and analysis of data in today's challenging vehicle test environment

WORDS BY **RACHEL EVANS**

Traveling to Novi this year, data acquisition and control system developer imc will be showcasing the latest breakthroughs in its suite of measurement tools.

Specializing in a variety of hardware and software products, the company's range includes data capture tools, configuration and analysis software, as well as complementary packages designed to enhance the testing experience – from the configuration of a test, to a turnkey solution for evaluation of metrics, including the reporting elements needed in an ongoing test.

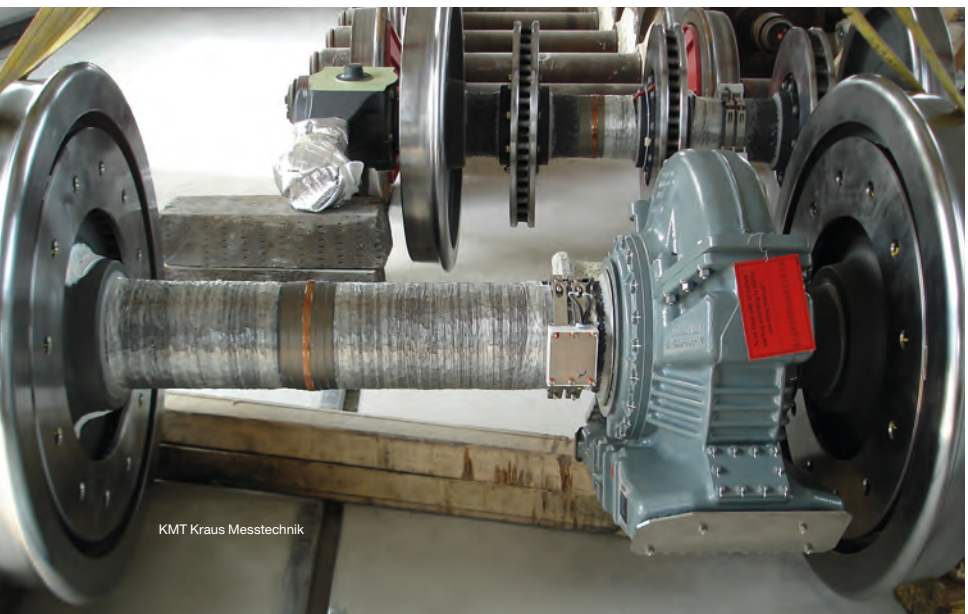
At the expo, imc will turn a spotlight on a completely new offering in its Cansas line-up. These powerful modules are equipped with high-precision measurement amplifiers and can be connected to various types of sensors and signals. The digitized measurement signals are output as CAN messages and can be read and recorded by any data acquisition, automation or control system with a CAN interface.

For testing the next-generation of electric vehicles, the imc Cansas-FBG-T8 module is designed for conducting measurements in the high-voltage environments found in these vehicles. "The common application will be measurements within high-voltage areas, in the battery pack and various other areas where there are high potentials, abundant electromagnetic noise, static discharge or EMI," says Andrew Jesudowich, application sales and operations manager at imc.

The module is said to be the only fiber-optic-based system of its kind worldwide that is able to digitize the processed results of the optical signal and output it as a CAN message.

ABOVE: According to imc, the Cansas-FBG-T8 eliminates the typical issues associated with fiber-optic-based systems

BELOW: Measurement of temperature on a train brake disk with the latest robust, space-saving telemetry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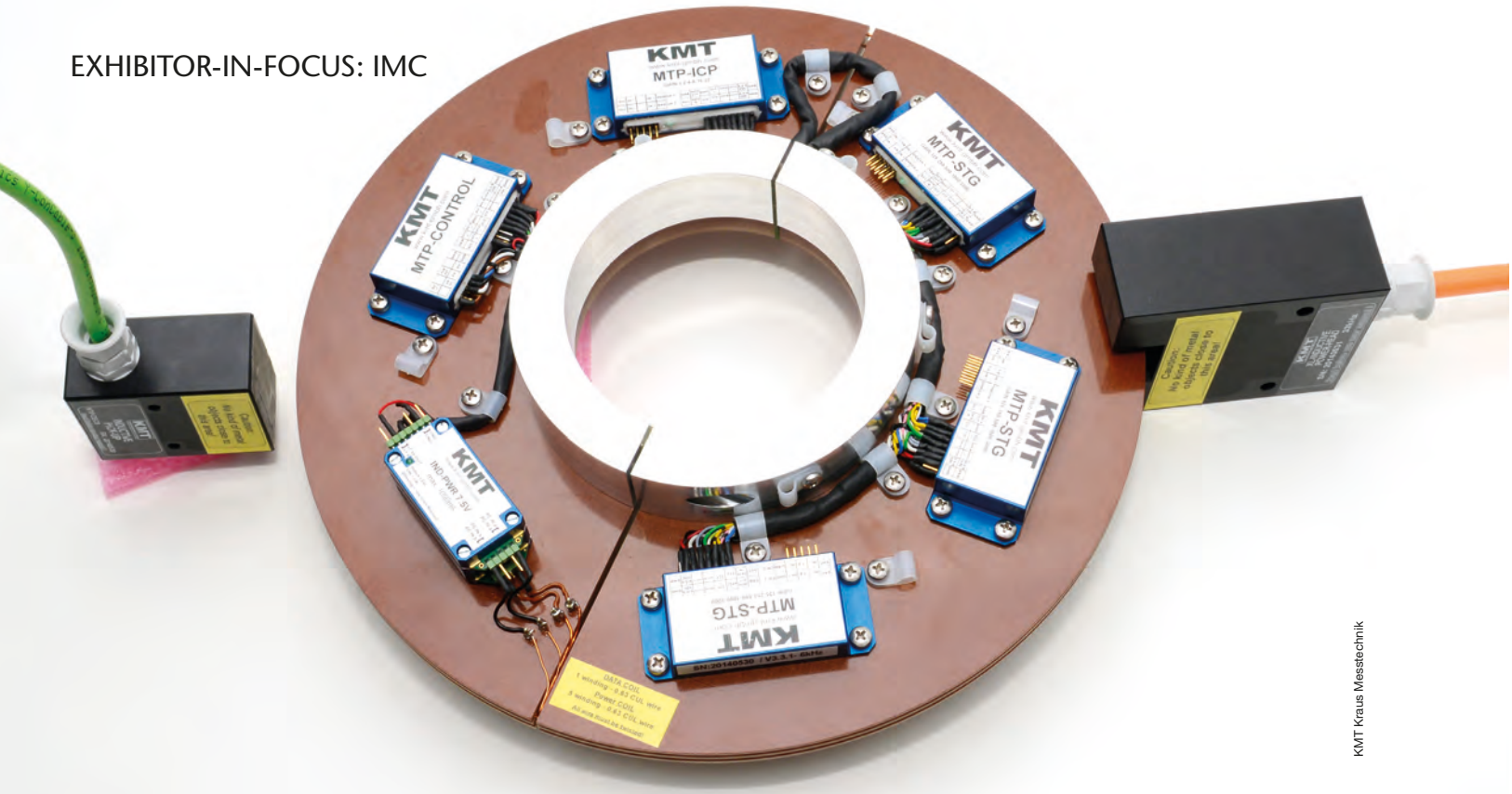
"Fiber-optic technology has historically been very expensive, difficult to operate, and there's a lack of integration possibilities," Jesudowich explains. "Ultimately what we're doing is providing a very easily configurable system, which takes this fiber-optic temperature measurement and converts it to a digitized CANbus message output, which can then be logged on any CANbus interface or data capture device."

According to the engineer, the system addresses some of the critical safety concerns associated with using conventional thermocouples or temperature sensors in high-voltage vehicle environments. "These testing applications would typically have been tackled with high-isolation modules and cables. Our objective was to radically eliminate these safety issues and high-grade isolation cables altogether: the fiber-optic-based sensors have no electrical conductivity whatsoever. Moreover, they are also immune to any electrostatic and electromagnetic disturbance or interference."

When developing the imc Cansas-FBG-T8, imc engineers had to ensure that sensors do not respond to any parasitic strain during temperature measurement – a common issue with fiber-optic solutions.

It uses a white light source and a specially developed processing scheme based on the response of a fixed cut-off filter, as opposed to the traditional spectrometer processors found in other fiber-optic measuring systems. "This innovative approach allowed a very compact, robust, low-power and economical



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solution that is well suited to industrial environments and even mobile testing applications."

According to Jesudowich, customer response to the new unit, which was launched in Europe in June, has been tremendous. "Vehicle developers have welcomed the fact that they do not need to worry about EMI disturbance, mitigate the personnel safety issues, and that they can simply feed the standard CAN-based data stream into their data recorder," he says.

EMBRACING CHANGE

A series of investments has seen the company's telemetry solutions expanded to cover a wider range of applications. The portfolio now includes modular systems for measuring voltage, thermocouples, PT100/1000, and IEPE/ICP-based vibration accelerometers with up to 256 channels. Such solutions can be perfectly tailored, expanded and reused as they are based on a modular design that supports both inductive and radio transmission, various power supply options, as well as very high data rates.

Also, the housing sizes of the transmitters, which are typically used to measure strain, torque or other forces on rotating shafts, such as a vehicle driveshaft, have been reduced. Protection ratings have also been increased to enable testing in harsh environments where there is high vibration, shock and oil, for example. High signal bandwidth and data rates enable multichannel solutions that can seamlessly interface to all of imc's data acquisition systems via an Ethernet link to the telemetry receivers.

Alongside this, imc has introduced new CAN FD interfaces and integrated CAN FD capability into all six of its main measurement and control systems. "With increasing traffic, involving thousands of messages controlling a vehicle, traditional CANbus is reaching its limits, so CAN FD is about to become the new standard protocol. Traditional CAN carries 8 bytes of data, while CAN FD supports up to 64 bytes of 'payload', transmitted at an increased rate. This enables higher traffic in terms of both the number of messages and transfer speed," comments Jesudowich.

Updates to imc's telemetry line of products have enabled high dynamic data and sample rates

Made in Berlin

imc Meßsysteme was founded in 1988 in Berlin by four experts with a vision of developing the PC-driven data acquisition systems commonplace at the time into more expansive tools. In Germany, imc has around 250 employees. The company also has subsidiaries in France, China, the Netherlands, Hungary, Switzerland and the USA, as well as 25 distributors or partners in 28 countries worldwide.

He adds that digitization, the Internet of Things, and networking of platforms using standard digital vehicle bus protocols, combined with connectivity to the cloud, remote monitoring of data, controlling of a vehicle or its buses remotely, automatic data transfer and ultimately analysis, are major influences on the company's R&D.

"It is clear that IoT and increasingly distributed system topologies are driving the trend toward more autonomous operation of measurement and control systems," he says.

At the show in North America, imc will also have details of a cutting-edge measurement and control system that is currently in development. Based on the technology of imc's standard CronosFlex system, which is modular or decentralized in nature, the imc Cronos-XT will also consist of a base and clickable analog front-end modules and will additionally be very robust. "We learned that customers who make measurements in harsh environments wanted the flexibility, modularity and performance of the imc CronosFlex in combination with robust and sealed housing technology. We take this into account with the new imc Cronos-XT," reveals Jesudowich.

"It's highly dynamic, with 100kHz/channel sampling rates and a 2MHz aggregate system sampling rate, while allowing operation in wet and dirty outdoor environments, thanks to its ruggedized mechanical design with IP67 rating, suitable for use in the most extreme conditions of shock and vibration."

Furthermore, the Cronos-XT accommodates almost any type of analog, digital or fieldbus signals and can precisely synchronize sampling and absolute time between its multiple channels and also among multiple systems. ❮