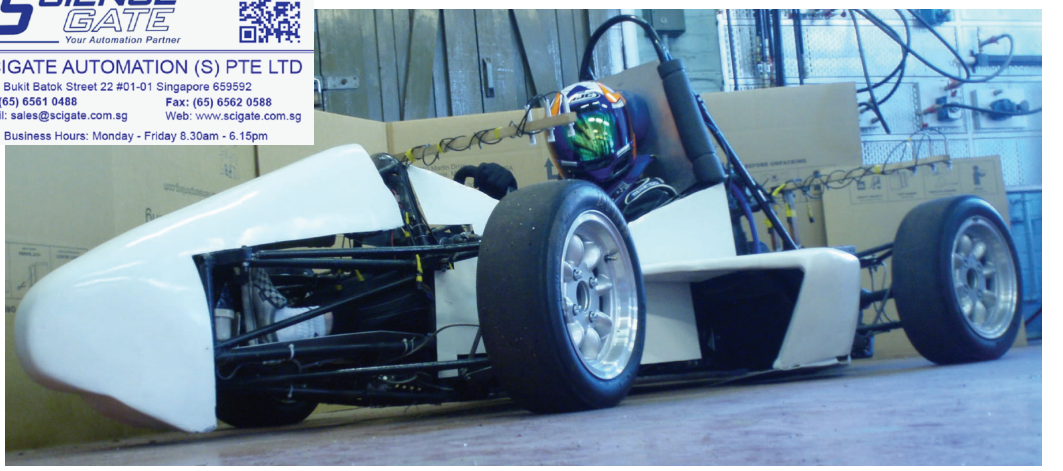
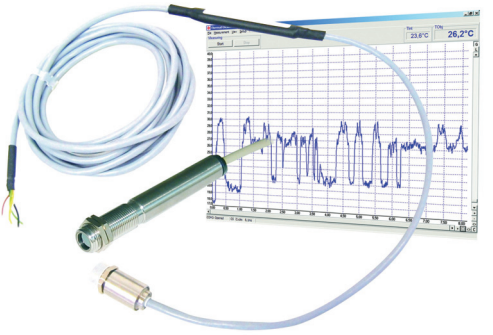


Monitoring tyre temperature to improve racecar performance

A team of researchers is using infrared sensors from **Micro-Epsilon** to monitor the temperature of tyres on racing cars in real time around the racing track, enabling set-up changes to be made on the car that lead to improved performance on the track



The research project, at the School of Science and Engineering at University Campus Hamilton (formerly Bell College Glasgow), involves the use of 12 CS series infrared temperature sensors from Micro-Epsilon, three on each wheel of the racing car: on the inside edge, outside edge and centre line. Each sensor is positioned directly above the surface of the tyre, relaying temperature data back to a data logging system for further analysis.

One of the features of the CS sensor is its ability to be positioned a significant distance from the tyre, due to its high resolution 10:1 optics. In this case, the sensors are positioned 150mm from the tyre but still measure over a small (15mm) diameter surface area. The CS series sensor can also be easily integrated into existing racecar bodywork.

David Kennedy, senior lecturer at Bell College Glasgow and head of the research project, said: "The research is part of the Product Design with Motorsport course here at the college. We have been working on racecar chassis set up for some years now, as part of the Formula Student Competition. The sensors will enable us to improve the performance of the development car, by looking at the temperature of the tyres in real time as an indication of how hard they are working. We are using set-piece manoeuvres as well as laps of the circuit to minimise variability due to the driver."

Monitoring the temperature of tyres is clearly beneficial for race teams, particularly F1 and other motorsport engineering teams, as it enables the performance of the car to be improved. Traditionally, engineers would measure the temperature of the tyres after the race or test lap is completed, but this means only average rather than real time temperature readings can be analysed.

Kennedy said: "Micro-Epsilon demonstrated its CS sensor to us on its stand at the Autosport Engineering Show. We were impressed by the very fast, almost instantaneous feedback of the infrared CS sensor. We have used the sensors connected to a Pi Research data acquisition system, on a car that was driven on a local race track. By analysing the results, we were able to make set-up changes to the car to improve the performance. For example, we noticed that the temperature of the outside edge of the right hand front tyre was low during a particular manoeuvre. Therefore, we made a change to the camber in order to make more efficient use of the tyre and improve the total grip available, increasing the cornering speed."

Micro-Epsilon's optris CS and optris CSmicro sensors are said to combine high quality and high accuracy with a rugged, high-grade stainless steel housing. The technology was designed specifically for OEM customers. The optris CS is, therefore, compact, with an M12 thread and a diameter of 14mm and a length of 87mm. The sensor also comes with integrated electronics, an LED display and a smart sighting support. The optris CS is a rugged device, benefiting from coated silicon optics, and so can be used in ambient temperatures of up to 75°C, without cooling.

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