

CASE STUDY A WINNING FORMULA

THE APPLICATION

The world of motor racing is highly competitive and one of the keys to success is to have effective methods of optimising a car's settings to achieve optimal performance.

Mantracourt's French business partner, Wallace have been working with the Sébastien Loeb Racing (SLR) team for a number of years to supply a wireless system that would give their cars a competitive advantage in the FIA World Touring Car World Cup.

This season they wanted to maximise the traction in the turns whilst not losing stability on the straights. The T24 wireless telemetry system provided the ideal technology to achieve this, with high precision measurement and graphical representation via the logging software, which resulted in time saving benefits and a fully optimised car.

KEY BENEFITS

- Simple to use wireless system provides fast, accurate measurement and time saving benefits
- Wireless acquisition modules combine all sensor data to the powerful and intuitive data logging software for graphical representation and precise testing of the car's weight distribution, during incline of the wheel





THE PROJECT: **T24 TAKES POLE POSITION IN RACING CAR OPTIMISATION**

THE APPLICATION

Knowing the exact angle that the wheels are at allows racing teams to diagnose issues and achieve a trade-off between grip when cornering and stability of the car on a straight line.

Applying positive or negative camber to a wheel means that the tyre will be at an angle whilst the vehicle is going straight. As a result, when the car goes into a corner the forces will push the weight of the vehicle onto the whole tyre, giving it more grip and allowing it to go into the corner at a higher speed without losing traction.

The Sebastian Loeb Racing Team (SLR) wanted to maximise traction in the turns whilst not losing stability on the straights.

THE CHALLENGE

The SLR team needed to be able to measure and set up their cars quickly between sessions. Previously SLR mechanics were measuring the camber with separate tools, by hand. This caused various issues. Firstly the tools were not precise and the measurements were inaccurate due to human error. Logging was also done by hand and was very time consuming.

Another factor the team had to bear in mind was that on race day, pits can have high levels of radio noise due to the numerous electronic devices operating in the proximity. These can reduce the bandwidth of wireless devices and limit the maximum speed of transmission.

The driving need for a solution was to provide technology that could connect all sensors to the same piece of software to provide fast, precise testing of weight and incline.

THE SOLUTION

The team used inclinometer sensors with voltage output and Mantracourt's T24-ACMi-VA voltage transmission modules (designed to take 0-10V), to measure the incline at various angles.

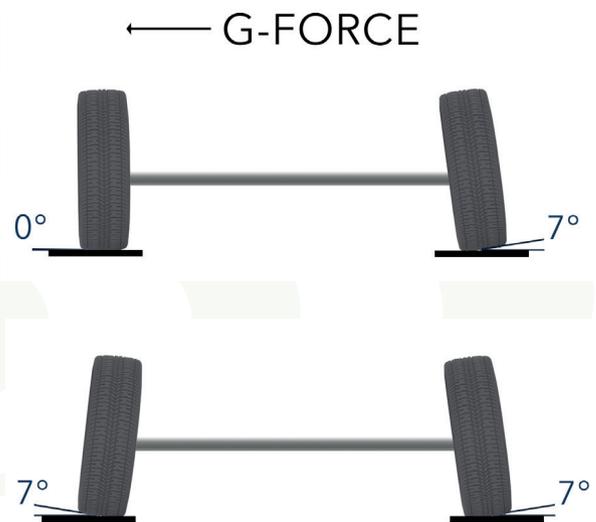
In addition to incline, they used T24-ACMi-SA strain modules to find out the precise weight at each wheel.

Using T24LOG100 (Mantracourt's logging and viewing software), they were able to check the car's centre of gravity. This ensured that the weight of the car is distributed to optimise dynamics.

The ride height of the car was also adjusted, to get the weight distribution that they required for optimisation.

The weight distribution is an important factor on a racing car, especially when breaking into a corner. The team adjust the weight to get more or less turning (entry, middle, and exit) and to find the best compromise for the driver.

The diagram below shows an example of angle adjustment on a tyre, taking into account the effects of G-Forces when entering a corner.



The T24 system provided high measurement resolution (up to .01°). This allowed the team to test track performance and make fine adjustments based on the driver's feedback.

"Small adjustments to a system can make huge differences on the track. The T24 system was ideal in providing this level of detail which enabled this" said Richard Monin, WTCR Data Engineer at Sebastien Loeb Racing.

Last year the Sebastien Loeb team switched to the upgraded version of T24. This has provided a huge improvement for the team. They are now able to switch all transmission modules that use the same group key to a different channel instantly as well as being able to switch all transmitter modules on and off independently and spend more time on the important task in hand.

This is another area where the T24 system proved beneficial for the team. The T24 toolkit allowed the SLR team to find the most suitable channel to transmit on with its channel monitor feature.

THE RESULTS: T24 TAKES POLE POSITION IN RACING CAR OPTIMISATION

THE RESULTS

The T24 wireless system and software provided visualisation tools that would accommodate both incline and weight measurements in one user-friendly interface.

It enabled the SLR team the ability to convert voltage readings from the sensor to engineering values (degrees of incline) within the LOG100 logging software and the measurement data output provided high resolution and high precision readings to allow the technical team to make fine adjustments to the angle and weight distribution of the race cars.

“The updated T24 system has provided a huge improvement on the system from previous years. The group keys have proved to be invaluable in distinguishing between measurement types on the same car and setting up various measurements at different variables. The system has worked seamlessly and the products have met our expectation in terms of time saving and optimisation of the car for the season ahead”, said Richard.



PRODUCTS USED



T24-ACMI-VA
2.4 GHz Voltage
Acquisition Module



T24-ACMI-SA
2.4 GHz Strain
Acquisition Module



T24-BSd
Dongle Base Station



T24LOG100
Logging and visualisation software

“The Mantracourt system was just what was required in terms of accuracy, reliability and repeatability. The service we received was excellent, with all engineers knowledgeable and helpful. We are delighted and the system has become a vital part of our race to success.”

**Richard Monin, WTCR Data Engineer,
Sebastien Loeb Racing**