Did you *really* brake? Let's see…

British Touring Car Championship clerks of the course and stewards have a new ally in their eternal battle to improve driving standards. **Scotty Whitelaw** reports

THE British Touring Car Championship has forged its popularity with spectacular wheel-to-wheel racing. For the fans, it's fantastic, keeping us on the edge of our seats. For the championship organisers, though, that uncompromising battle on the racetrack can cause headaches in the stewards' room afterwards as they seek to determine whether contact was intentional or not.

"We never really used the data provided by the teams before, because of how unreliable it could have been," says Jeff Allam, the BTCC Driving Standards Advisor. "We're not saying the teams were altering their data, but they have the resources to do so if they wanted to. Sometimes there would be an indication of the data being wrong, but we had no method to prove it." With this in mind, the BTCC needed a way to police what each team was doing during the race.

This has been a recurring problem for the series organisers. The first solution attempted in 2005 utilised Fuji cameras, installed inside every car's driver cabin and footwell, to monitor the driver input. Initially this worked really well. As technology made the cameras more foolproof, though, the auto focus meant the area in focus depended on the light levels and hence they were unable to stay in focus for the entirety of a track session.

Subsequently the BTCC replaced the Fuji cameras with GoPros. They were able to stay in focus but suffered their own issues, such as poor battery life, meaning the system had to be constantly monitored and batteries replaced when required. This increased operating logistics and time. Another problem revolved around the GoPros' sensitivity to light. Because of the camera setups and their positioning within the cabin, images were sometimes unclear due to the glare of the sunlight.

In the meantime, well away from racing, Cosworth had been developing its 'aliveDRIVE' system for a major road car manufacturer, specifically for high performance sports cars. Designed to enable post-driving analysis, it had proved a big success. Perhaps this was the answer the BTCC had been looking for?

BTCC Technical Director Peter Riches was soon alerted to it and set in motion a process to look at the system to see whether it was applicable for racing. It seemed to tick the boxes: the cameras remained in focus; there were no lighting issues; and no battery.

The setup is very similar to that of the cameras tested before, but now addresses all of the issues previously encountered. They are connected up to the vehicle's own battery, along with the rest of the Cosworth data system. With the Cosworth aliveDRIVE, stewards have reliable video footage to view. ▶

ABOVE & BELOW The use of aliveDRIVE means the BTCC's spy in the cockpit is better than ever before. Here the stewards can see Gordon Shedden at full throttle (above) and on the brakes (below)

Nowhere to hide with aliveDRIVE

THE success of Cosworth's aliveDRIVE in the BTCC demonstrates how video data systems that were once the preserve of elite motorsport championships could soon become commonplace amongst every series.

"aliveDRIVE pushed the boundaries when we first conceived it as an affordable video data system that could be tailored for mainstream automotive or motorsport applications," says Pio Szyjanowicz, head of communications and partnerships at Cosworth. "We're delighted that it's proving a success with the teams, drivers and stewards in the BTCC.

"We're seeing interest from championships around the world and working on an extensive programme to develop new features that will bring high-res video data logging to a much wider market." As well as the BTCC, the system already features in Porsche Carrera Cup GB and its brother series Down Under.

Cosworth's electronics division has been involved in video data systems for almost 20 years, dating back to projects for teams racing in Formula 1 and NASCAR. To achieve the level of accuracy required, the hardware has always been expensive. However in the last two years Cosworth has focused on creating a data acquisition platform for the high-performance OEM market which was drastically lower in cost to the end customer.

General Motors installed it in Corvettes so that post-driving analysis could be conducted, be it for track days or improved customer safety. The system included HD video cameras, car analysis data (similar to that found in Pi Toolbox), GPS data and accelerometer sensors. Such was its success that GM added it to a selection of its other models, including the Cadillac.

The electronics team at Cosworth has also been heavily involved with the BTCC for many years, delivering a range of different chassis and engine control systems. It was therefore a natural partner to turn to when the BTCC encountered issues implementing successive cockpit camera systems in its bid to aid stewards.

Cosworth's motorsport version of its aliveDRIVE solution is based on the same technology that underpins the GM system, but with significant alterations to adapt it for the needs of a motorsport championship.

One of the major adjustments to the system has been to ensure that the BTCC teams cannot access any of the data sent to the stewards – but are still able to access the data that they log to understand and improve vehicle and driver performance. Video footage and track data are synced and displayed side by side to allow the stewards to easily visualise what occurred. One of the main features that make this setup stand out is the inclusion of custom wide angle lenses in the HD cameras used in the motorsport system. With the driver's view through the wing mirrors and rear view mirror both displayed in the same image, miscreants now have nowhere to hide. **RT**

ABOVE & BELOW Video footage and track data can now be synced and displayed side by side

HOW DO THEY WORK?

This ingenious process records the onboard camera footage on a Fuji memory stick that the stewards can review after every practice session and race, allowing them to visually analyse the drivers' control of the vehicle. The system also creates a video map of the incident, presenting all of the camera angles in question at the same time, from all of the cars. To rule on incidents, the stewards now have direct access to the vehicles' performance data, recorded via PI Toolbox – with a live streaming arrangement being fitted from the previous two systems. This ensured that teams could no longer cover up their actions and play excuses such as 'a higher rev count accrued because of an engine misfire' or 'there was an incorrect gear change'. Instead the drivers must now face the consequences of their actions.

Using Pi Toolbox the stewards can also run synced footage from two cars on the screen at the same time. This enables them to get both drivers' views of the incident and their reactions during it.

RELIABLE AND ACCURATE

"This new system is simpler and more consistent," enthuses Allam. "It gives us reliable and accurate information." He also notes that having the car data directly streamed to the stewards gives them reassurance, knowing that there are no discrepancies with the data acquired. This new setup also produces a much faster response time, as data can be accessed almost instantaneously.

As a former champion himself, Allam is effectively a poacher turned gamekeeper. He reveals that when investigating contact incidents in the past, the stewards encountered a familiar problem: if the driver claimed they had braked going into a corner, the unreliability of the previous systems made it difficult to prove to the contrary. With the Cosworth aliveDRIVE in place, the game has changed.

Now the stewards are free to analyse the actions of every driver. If one of the protagonists claims he was braking but the data shows otherwise, it's possible to retort: "No, you didn't! You clearly kept your foot planted in the corner."

"In previous seasons teams would argue cases like this," says Allam. "With the Cosworth aliveDRIVE now being used, these disagreements are a thing of the past. The stewards can now see clearly what the driver's actions were. I wish we had this setup years ago. Getting to the bottom of these skirmishes between the drivers now takes mere minutes, with data we know we can trust." **RT**

LEFT & RIGHT The cameras installed in the BTCC cockpit