

Gentlemen, start your chargers

Westfield will star in an EV-only race series next year, with an incredible new electric track car called the iRacer. **Mike Duff** drives it

U lton Park is bathed in late summer sun as the buzz from the pack of testing Caterham racers fades. It's lunchtime and the chequered flag is out, meaning we've got just 30 minutes for our own private session. But there's a problem. In the dingy pit garage Paul Faithfull, Westfield's technical director, and is jabbing keys on the laptop that's plugged into the back of the alien form of the iRacer. There are no oily spanners here; rather, the electric motor controllers need to be reflashed with revised code. As we wait for the car to reboot – Faithfull really does turn it off and on again – he lets slip that this is the first time the iRacer has turned a wheel in its 'production' specification, and our session will be its first-ever shakedown.

Fortunately the upgrade works, the display on the centre of the steering wheel announcing the good news. The iRacer whirrs out of the garage and down the pitlane, sounding like a cross between a tube train and a sci-fi warp-speed effect. Britain's first purpose-built electric racer is on track for the first time.

ELECTRIC PIONEER

New automotive technologies have always been honed on the circuit, and as manufacturers rush to develop their road-going EVs it's no surprise that we're entering the era of the electric racer. More surprising is the fact that a relative minnow like Westfield is leading the way, but for an explanation of the company's pioneering spirit you need look no further than →



Steering wheel display suggests a reboot. No pitlane mechanics, just the IT department





Present and future? Electric Westfield waits for Caterhams to finish up



← Faithfull himself. Originally an engineer for Rover's electric research group, he worked on Land Rover's all-electric Defender, but the department was canned after the BMW takeover. Faithfull set up Potenza, a company that developed many of the same technologies, and then took control of Westfield a couple of years ago. It's therefore no surprise that two of the new technical director's first projects were an electric road model and a racing sister car.

But while the road-legal Westfield Sport-E will share its aesthetics with its petrol-powered siblings, the iRacer gets futuristic bodywork and aerodynamic wheel covers. The original plan was to use lycra to create the 'panels' over the alloy frame; the car shown at this year's Geneva show featured the fabric. But it proved impractical for real-world use and has been replaced by heat-shrunk plastic film similar to that used to cover hang-gliders.

Westfield's initial idea was to create its own one-make series for the iRacer, but when the company discovered plans for the EV Cup it opted to join forces. "It made perfect sense," says Faithfull. "They need something to race and we need somewhere to race. They're creating the platform, we're creating the content."

power-to-weight ratio of 335bhp per tonne and reckons that the battery pack will give between 25 and 30 miles at racing speeds. Recharging takes about an hour, but the quickest way to get an iRacer back on track is to change its entire battery pack, which is held in place with just six bolts; Faithfull reckons it's a 15-minute job. Nor does the mass of the battery pack compromise performance, the iRacer's centre of gravity is lower than that of a Formula One car.

Developing the iRacer has given Westfield a speeded-up education in the challenges of creating a high-performance electric car, the biggest being controlling battery temperatures. Drawing current so quickly creates serious heat, with the car shutting itself down if the cells get too warm. Faithfull felt reassured when he read that major players such as BMW are suffering the same problem. "At least I knew we're in the same ballpark," he says. And the frantic pace of development is helping to overcome problems as they're discovered. The iRacer's original battery cells had a 50 milliohm resistance – responsible for the overheating. The most recent ones have just 4 milliohms, despite costing the same.

One of the big risks for the EV Cup is high voltages. In 2008 a BMW F1 mechanic was



Plug and play: racer takes an hour to charge for 30-mile range



Electric Westfield will compete in three races in the UK and three in Europe next year as part of new EV Cup series

The Cup itself is the brainchild of former automotive consultants Andrew Lee and Sylvain Filippi. The plan is to hold six race meetings next year; each will have several sprint races and three classes – two of which will be one-make championships in the first season, with only Think and Westfield having signed up for 2011. One-offs and prototypes will also be able to compete in a time-trial championship, with the idea being that this will show off new tech.

But the highlight of next year should be the sight of up to 20 iRacers rubbing shoulders. Based around Westfield's existing chassis, the iRacer uses two 400-volt, 100bhp YASA electric motors driving the rear wheels and powered by a 60Ah lithium iron phosphate battery pack mounted underneath the car. It weighs just 598kg – pretty much the same as a petrol version would do. Westfield claims a

electrocuted by a defective KERS system. Each of the iRacer's eight battery cells has a voltage of 48 volts – enough to be painful, but non-lethal – with the full voltage of 400 volts supplied to the motor by a contactor system that links all these together. In the event of a crash an inertia switch will trip, limiting the circuitry to a 'safe' voltage.

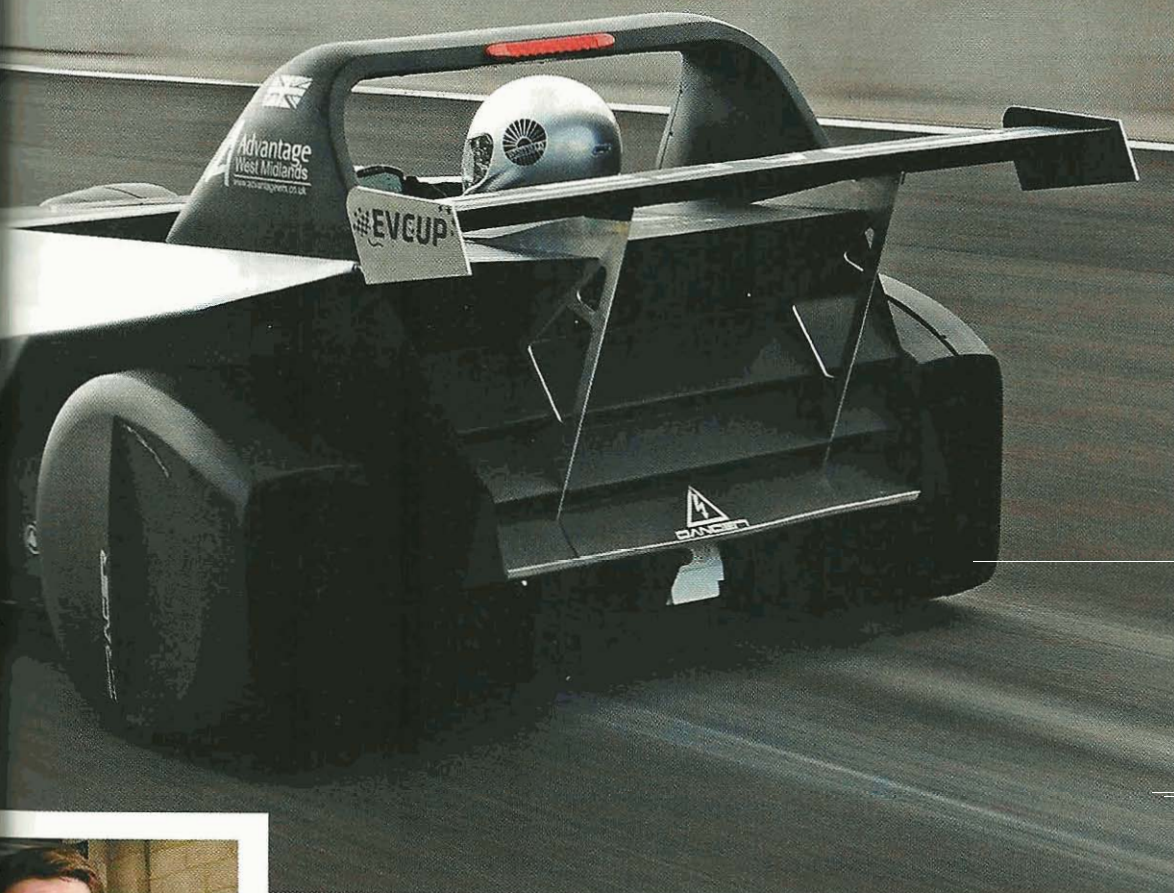
The iRacer survives half an hour of gentle lapping around Oulton and a couple of full-bore starts for the camera. The new motor controller software is working, the battery temperatures are good. The question, when it comes, is put with the hesitation you'd expect before offering a one-off prototype to an unwashed journo: do I want a go?

Of course I do. It turns out there's no proper seat at the moment, just a rough plastic moulding. Faithfull is also keen to point out that there's no roll bar inside the plastic roll-bar cover, meaning that



Paul Faithfull, technical director at Westfield, explains his main components

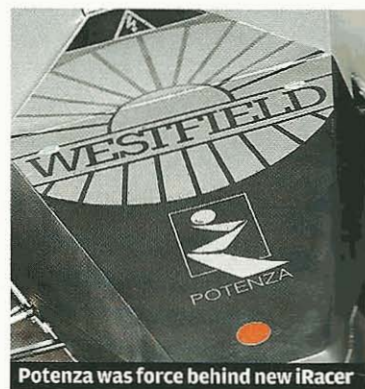
'iRacer launches as well as its power-to-weight ratio suggests. With no gears or noise, there's little impression of speed'



pit dangers consist of electric shock



Aerodynamic wheel covers cut drag



Potenza was force behind new iRacer

FACTFILE

WESTFIELD IRACER

Engine	Permanent magnet brushless DC YASA motors
Installation	Rear, two motors with direct rear-wheel drive
Power	200bhp at 400-1200rpm
Torque	1032lb ft at 0-500rpm
Battery pack	400V, 60Ah lithium iron phosphate
Range	25-30 miles (race)
Weight	598kg
Cd	0.41



in the event of a capsize my head will be the highest structural component, but I'm welcome to get a feel for the car's acceleration and low-speed responses.

It's certainly easy to drive. With 'forward' selected, the control interface is as simple as go, stop and steer. The iRacer launches as well as its power-to-weight ratio suggests it should, rear tyres chirping as they deal with the torque from a standing start. It's properly quick, but with no gears and no engine note there's very little impression of speed apart from that delivered by frontal airflow and the accelerative g-force. I reckon anyone coming to the electric Westfield straight out of a petrol-powered racer is likely to head into the first corner at least 20mph quicker than they were expecting to.

And for that reason alone it's going to be worth watching the racing next year. ☑

THINK ABOUT THE COMPETITION

Now meet the distinctly improbable sight of the other challenger in the EV Cup – and a car that could well earn the distinction of being one of the slowest things that's ever been seen on a track. The Think EV has been knocking around since the 1990s, and now the company has decided to ramp up its brand – as having the only cross-European homologated plug-in currently on sale – by effectively turning the EV Cup's 'City' class into a one-make series next year.

The racing Think gets a more powerful battery than the road version, plus a roll cage. Losing all trim has also removed 100kg from its kerb weight. Think estimates a top speed of around 87mph – which will make longer straights feel very long – although from behind the wheel of this demonstrator



the 0-50mph acceleration actually felt fairly keen. The EV Cup organisers are planning to ensure interest with lots of celebrity drivers, and the combination of the Think's limited performance, two-pedal simplicity and predictable handling should give even those new to racing a sporting chance. Its easy-to-replace plastic body panels could come in handy, too.