

THE LIGHT

Carbon-fibre has adorned high-performance
But now, for the first time, two production
at how Ducati's 1299 Superleggera and

Words Matt Wildee



BRIGADE

motorcycles and racebikes since the 1980s, machines are using it structurally. We look at BMW's HP4 race bike leading the charge...



215BHP

108LB.FT

500 TO BE
MADE, ALL
SOLD OUT!

ALL-NEW
CARBON
MONOCOQUE

167KG

CARBON
SWINGARM
AND WHEELS

DUCATI 1299 SUPERLEGGERA

£72k superbike is the lightest,
most powerful production bike. Ever...

IN A WORLD of extreme performance, there's very little else that has the bragging rights of the new Superleggera. You're looking at a bike that weighs 167kg wet, makes 215bhp at the crank, and has a carbon frame, swingarm, wheels, subframe and bodywork. There's nothing that compares when it comes to power-to-weight ratio. It even makes Honda's £140k RCV seem lame, which in turn makes the Ducati's £72k asking price seem a 'bargain.' And, with its revolutionary use of composites, it marks a step-change in production bikes. We headed to Italy to find out more.

"When we designed the first 1199 Superleggera in 2014,

we thought that was as far as a performance motorcycle could go, but since then we've been able to push it further in a way that just wasn't possible a few years ago," said Christian Gasparri, the Superleggera's project leader.

"This bike, like that one, was about pursuing the limits of technology – we'd looked at carbon solutions when we were doing research and we knew that it was a possibility. We looked at the three main ways to improve performance of the chassis and save weight – the monocoque, the swingarm and the wheels – and thought we could exploit the properties of carbon. But



it's one story making a one-off or a racebike in carbon-fibre; we needed to make sure we could make 500 of each piece for the production bike."

Carbon-fibre has been used by race teams for a long time. Niall Mackenzie took a carbon-framed Silverstone Armstrong 250 to British championship success in the mid-80s, and over the next decade top-line race teams spent a lot of time experimenting with CF. Cagiva's drop-dead gorgeous mid-90s 500GP project exploited it, too, running a carbon swingarm for a number of years and experimenting with a carbon-alloy hybrid

chassis. Bimota also experimented in a similar way.

Most tellingly, Ducati's Desmosedici GP9 MotoGP racer had a carbon monocoque frame, just like the Superleggera. After four decades of carbon being used in racing, making simple structures like the Panigale's monocoque isn't hard – the problem has always been applying the material in the right way to strike the balance between flex and rigidity that riders need at the limit to get the feel they want.

One of carbon-fibre's best-known uses in the chassis of F1 cars, and the Ducati's carbon monocoque is made in the same way. Resin-impregnated carbon-fibre cloth is laid up in moulds, then placed in a giant pressure cooker known as

2017 NEW BIKES

an autoclave, with laminated-in aluminium inserts for the load-bearing bolt-on areas. The stiffness of the monocoque varies according to the number of layers and the direction of the carbon-fibre weave. For example, Gasparri says the chassis is thicker around the main engine mounts, just like the cast aluminium monocoque is on a stock Panigale.

"Each frame takes a day to produce and put together and is laid up as a single piece rather than being manufactured separately then bonded together," says Gasparri. "The swingarm is also made from carbon in a similar way – but this more complex structure takes two days to construct. It's stiffer than magnesium and a completely different shape – you have to exploit the properties of the material."

According to Gasparri, Ducati's test riders can feel the difference: "The first testers say the bike feels stiffer and lighter. The aluminium frame of a Panigale is 4.2kg; we reduced this by 1kg with the first Superleggera in magnesium and now we are about 1.7kg less with his one."

The wheels are carbon, too – but while the frame is manufactured in Europe, the wheels are made in South Africa by specialists BST. They've been making carbon wheels for Panigales since 2012, but these aren't off-the-shelf designs and have been adapted from Ducati's drawings for minimal changes. Just like the frame, they're a monocoque construction with aluminium inserts for disc and hub mounts. In total, they're 1.4kg lighter than the Superleggera's magnesium Marchesinis – a significant reduction in rotational inertia.

With a claimed 215bhp and complete with stringent Euro 4 compliance, the Superleggera promises to be the most powerful road-legal sportsbike money can buy – which is staggering for a V-twin, even with a 1285cc capacity. There's been extensive lightening all over the motor, plus new twin-ring

BRAKES

The new Ducati uses Brembo M50 monoblocks and 330mm discs – as you might expect – but it also uses a Brembo MCS 19.21 master cylinder and track-spec TT29OP1 brake pads. Like it needs it...

SAFETY

The carbon chassis goes through three types of non-destructive testing before it is verified for use. These tests include the use of ultrasonic inspection and 3D X-rays. Every Superleggera owner also gets a free endoscopy at their local dealer...





TRACK KIT

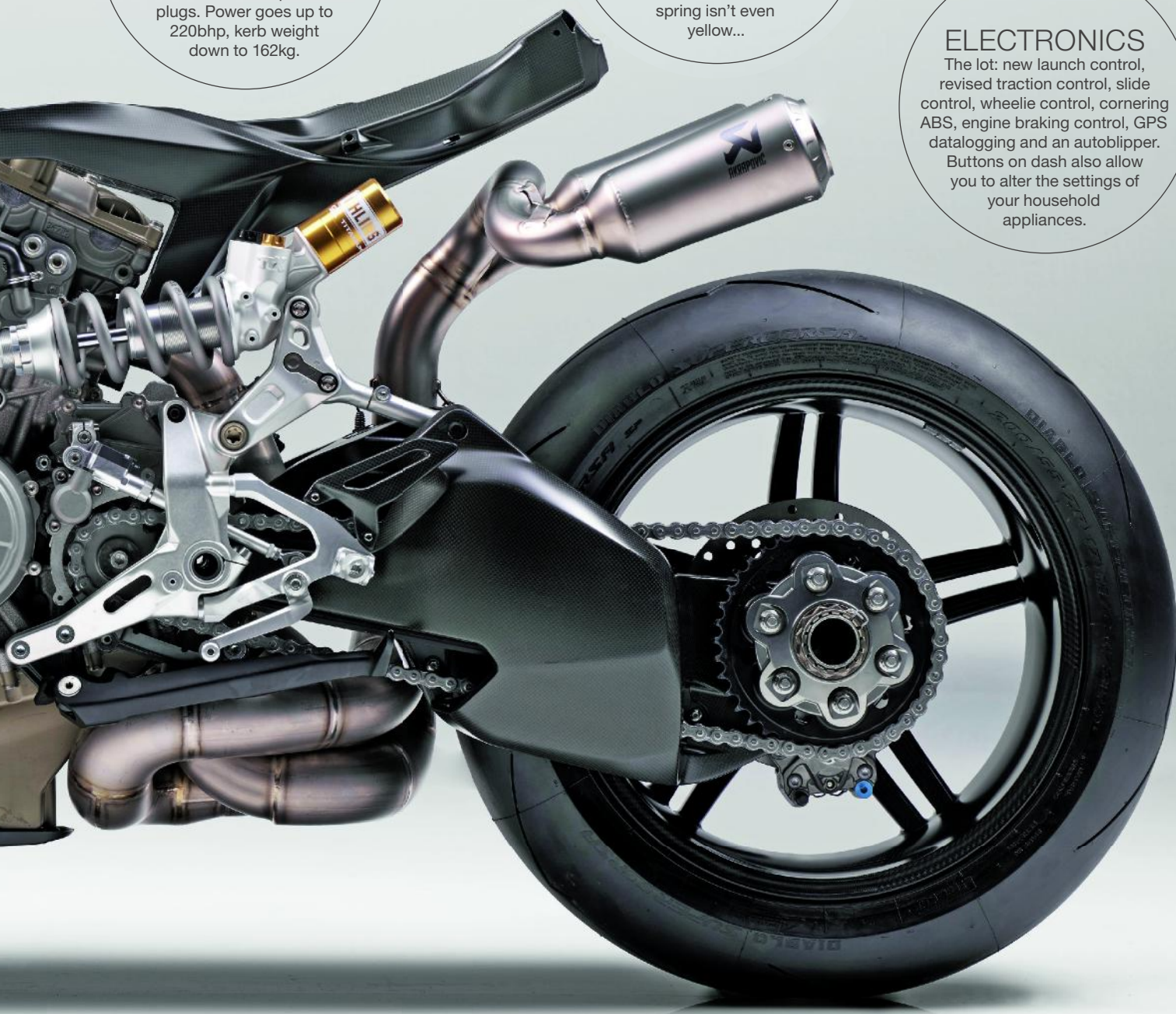
You get the 'wheelbarrow' Akrapovic exhaust you see in these pictures, front and rear paddock stands, sidestand and numberplate removal kit, race screen and mirror replacement plugs. Power goes up to 220bhp, kerb weight down to 162kg.

SUSPENSION

Öhlins FL396 forks have been developed specifically for the Superleggera and are combined with an Öhlins TTX36 shock at the rear which comes complete with a titanium spring. In a first for the Swedish firm, the spring isn't even yellow...

ELECTRONICS

The lot: new launch control, revised traction control, slide control, wheelie control, cornering ABS, engine braking control, GPS datalogging and an autoblipper. Buttons on dash also allow you to alter the settings of your household appliances.



BMW HP4 RACE

BMW's own carbon-fibre frame and wheels point to a mass-produced carbon S1000RR before long...

WHILE THE SUPERLEGGERA was unveiled at the Milan show with fanfare, dry ice and a certain Mr C Stoner riding the bike onstage, the release of the BMW HP4 Race was relatively low-key. But in many ways, it's far more important.

BMW are rightly very proud of their abilities to mass-produce carbon-fibre. They've been doing it for years, from the roof of the M3 CSL back in the early 2000s, right up to the chassis of their i3 hybrid town car and i8 hybrid supercar.

Both of these cars use a carbon-fibre reinforced polymer chassis, and the HP4 Race, which will be available to buy from mid-2017, looks like it uses the same technology. BMW's automated moulding techniques have less wastage than slow, labour-intensive hand production of carbon.

The chassis and the bodywork, including a self-supporting subframe and the wheels, are all carbon-fibre. The wheels are BMW's own design, and have also

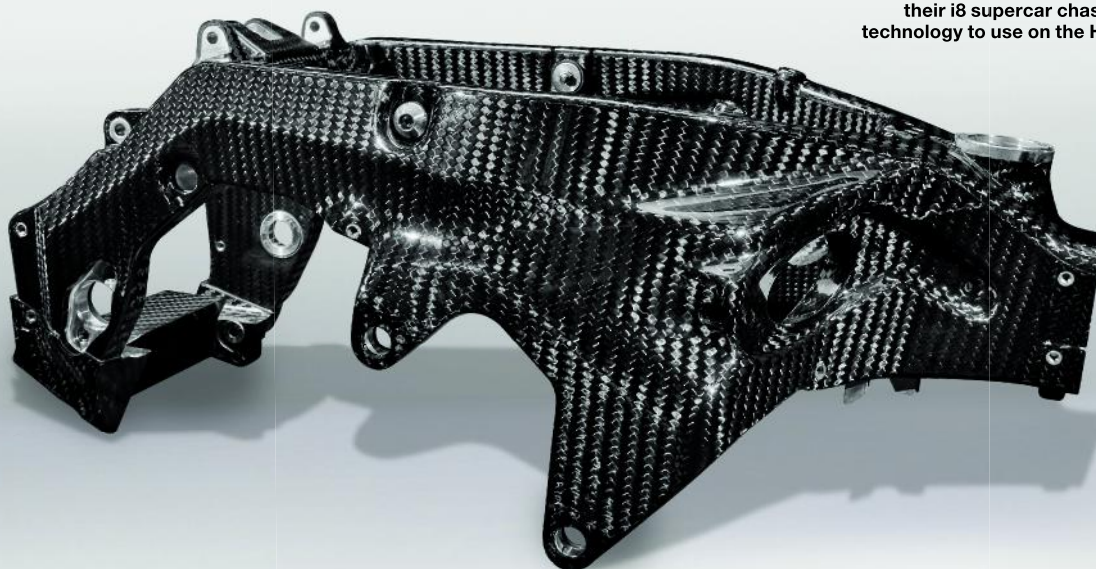
been conceived for mass production, while the Germans say they have many patented ideas for their production. The stretched weave of the rims points to a composite forging, a technique already used by Lamborghini in the making of their carbon chassis.

Last month we caught up with BMW design boss, Dr Schaller, who told us: "The use of carbon is really exciting, carbon-fibre wheels are the next step when it comes to agility and carbon's use in a frame is really exciting, too. The thing you need to overcome is the cost of manufacture. When you understand the material you can alter its properties and do lots of exciting things. It's always a possibility for the future."

Details are still scant and no weight figures have been released, but there's more to the HP4 than just the chassis – this could be the highest-spec trackbike we've ever seen on general sale. As well as the carbon, there are Öhlins FGR forks and a TTX36 shock, what looks like a WSB-spec swingarm, full datalogging and god-knows-what motor. Considering you can buy off-the-shelf 220bhp WSB motors from the Germans, you could end up with something truly mind-blowing...

ÖHLINS
TTX36
REAR
SHOCK

Looks like BMW have put their i8 supercar chassis technology to use on the HP4



MASS-PRODUCED
CARBON FRAME

STATE-OF-THE-ART
DATALOGGING

CARBON-FIBRE
WHEELS

CARBON-FIBRE
SUBFRAME

