LOOK, NO

A BMW that drives itself? Between panic attacks on fast bends and prayers to the god of technology, **Bill Thomas** ponders whether he should expect his P45 in the post

Photography by Alex P

BMW TrackTrainer

HANDS!

Bill Thomas,
not driving the
3-Series, and
sweating. A lot

PICKING LITTLE BITS OF RUBBER OFF the pitwall walkway at Valencia circuit, sitting under a BMW Fahrer-Training banner, I'm wondering how so many little bits of rubber got there. Some little bits are quite big, about a quarter of an inch wide, melted into the concrete by the hot Spanish sun; they must have flown off cars in the pitlane as they sped away from their boxes during the last race meeting here and – oh my God – I'm about to be driven around this circuit at massive speed by a car with no driver!

Picking little bits of rubber off the pitwall walkway wasn't working. Nothing was. My mind was well and truly fixed on the upcoming driverless car adventure, and how safe the system might not be. There was talk of Valencia's metal bridges interfering with satellite signals, of the car wanting to be *over there*, three metres perpendicularly left of where it was, in an instant, and turning to get there instantly at high speed on the straight. But no, no problem, it seemed fine.

Photographer Alex P didn't help, as he watched the 330i I'd be not driving whoosh past once again, BMW's chief driving instructor Claudia Hürtgen at the wheel, checking the systems at maximum velocity.

"How are you going to do *that*, in a car with no driver, without touching the steering wheel?" asked Alex, grinning. The car hurtled around Valencia's first corner, a fast left-hander at the end of a long straight. Why don't you just go back to pressing the button on top of that camera of yours and leave me alone?

Driverless? Yes indeed. The car is completely autonomous. It knows where it is, knows the perfect line, knows when to brake and turn in and accelerate out of corners and work its way round this fast and technical track at a very high rate of knots – up to 90 per cent of the fastest possible human lap time – and it will do it all day until it runs out of fuel. And it can learn any track, as long as it has a clear view of a few satellites. Seven is sufficient.

This extraordinary machine, called the Track Trainer, has been developed as a learning tool for the BMW Driver Training programme, probably the best driver instruction operation of its kind in the world: pay the money and you can have a go in it yourself. It's a bog standard 330i with automatic transmission and about £40,000-worth of kit in the boot. The car's Dynamic Stability Control (DSC) system, which includes active steer, remember, works with information fed by extra computers and an accurate GPS signal, then simply does what it's told. No actuators or servos here: the 3-Series has

Three lights mean Bill's way off the target line set by BM

what's necessary to drive itself fast – it just needs to be given the right signal. What about the M3, I hear you ask? They're working on it…

The GPS receiver is the expensive bit, accurate to within three centimetres, where a standard satnav unit gets no more accurate than a couple of metres. It's a high-powered aerial, which reads signals from all satellites in view, then compares them and computes a more accurate position.

A driver – in this case, Claudia – will go out and lap the circuit fast, and the

car will 'record' the laps, taking readings from the GPS, throttle, brakes, steering and a suite of other sensors including a powerful gyroscope. It is then able to replicate the lap the engineers choose. It can drive itself not only at full speed, on the 'schnell' setting as it appears on the readout in the centre console, but at two slower speed settings as well.

For my first run, around a track I'd never seen, I asked the engineers to turn the bastard up to 'schnell' and let me sit in the back, alone. That was too dangerous for them to contemplate, so I reluctantly agreed to sit in the driver's seat with an engineer, Peter Waldmann, alongside me – then fold my arms and put my feet on the firewall.

We drove out of the pitlane and found the racing line. It wasn't hard to do, because the Track Trainer is set up with six LED lights on the dash, three on either side of the instrument binnacle, which reflect into the windscreen. No lights means you're on the correct line, then one, two or three lights on either side tell you which way to go – and how far – to find the line again. So, one light showing on the left means you should go left slightly, two lights on the left means go left some more, and so on. The 'corridor' the car works in can be changed

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by the operator, too – so a driver can start with a wider margin for error, then work in tighter to hone the line. A buzzer also goes off inside the steering wheel, left or right side in combination with the lights, to make it even more obvious what a clutz you're being.
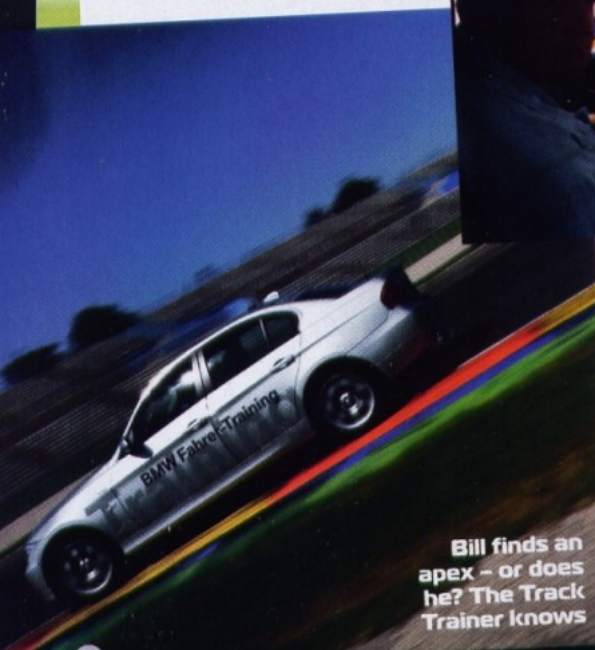
So, wonder where this track goes? Now a car would drive me round it. Turn on the system with a switch on the steering wheel… and, er…

"OK," said Peter, "take your hands off."

Weird. The car accelerated briskly up to the second corner, a long tightish left, braked

Bill finds an apex – or does he? The Track Trainer knows

smoothly (if agonisingly late — my feet twitched at this) and the steering wheel swung round a quarter of a turn to the left. I'll never forget seeing that wheel move by itself for the first time. The car clipped a late apex, then accelerated hard out of the bend, unwinding the lock smoothly. Peter has the system set to about 70 per cent speed now, but it's fast enough to get the full effect, especially at the end of the back straight, where I begin to wonder whether the car will brake at all. You've probably pumped an imaginary brake pedal as a passenger in your time. This car takes the sensation to a whole new level. It's like you need to pump both feet, both hands and your head all at once.

We did five laps, Peter gradually increasing the speed until we were on 'schnell'. This is quick indeed, around 80 per cent of Claudia's fastest time. But, after a while, it seemed natural, like a phenomenal cruise control. Ever used cruise? Remember that strange feeling of detachment when you first turned it on? The machine's doing it, but you can't quite believe it, or quite trust it. But it works. Well, multiply that feeling by a factor of 10 and that's how the Track Trainer feels. It was even more weird when I did some laps of the tight infield track, sitting in the passenger seat.

How many times have you watched sport and wondered how it must feel to do the most incredible stuff — how does a Roger Federer forehand feel, exactly? How does an Adam Gilchrist straight drive for six feel? Or a Tiger Woods five iron? That's the great thing about this system — you can get a proper, accurate idea about how a brilliant racing driver steers a car and works a track. Hands resting lightly on the wheel, you feel the car turning in smoothly, with no sawing or correction. It is one, decisive movement,

Big Bill wonders whether his gut weight will be a disadvantage

Right. I really, really want you to brake before this next corner

Fahrer-Training
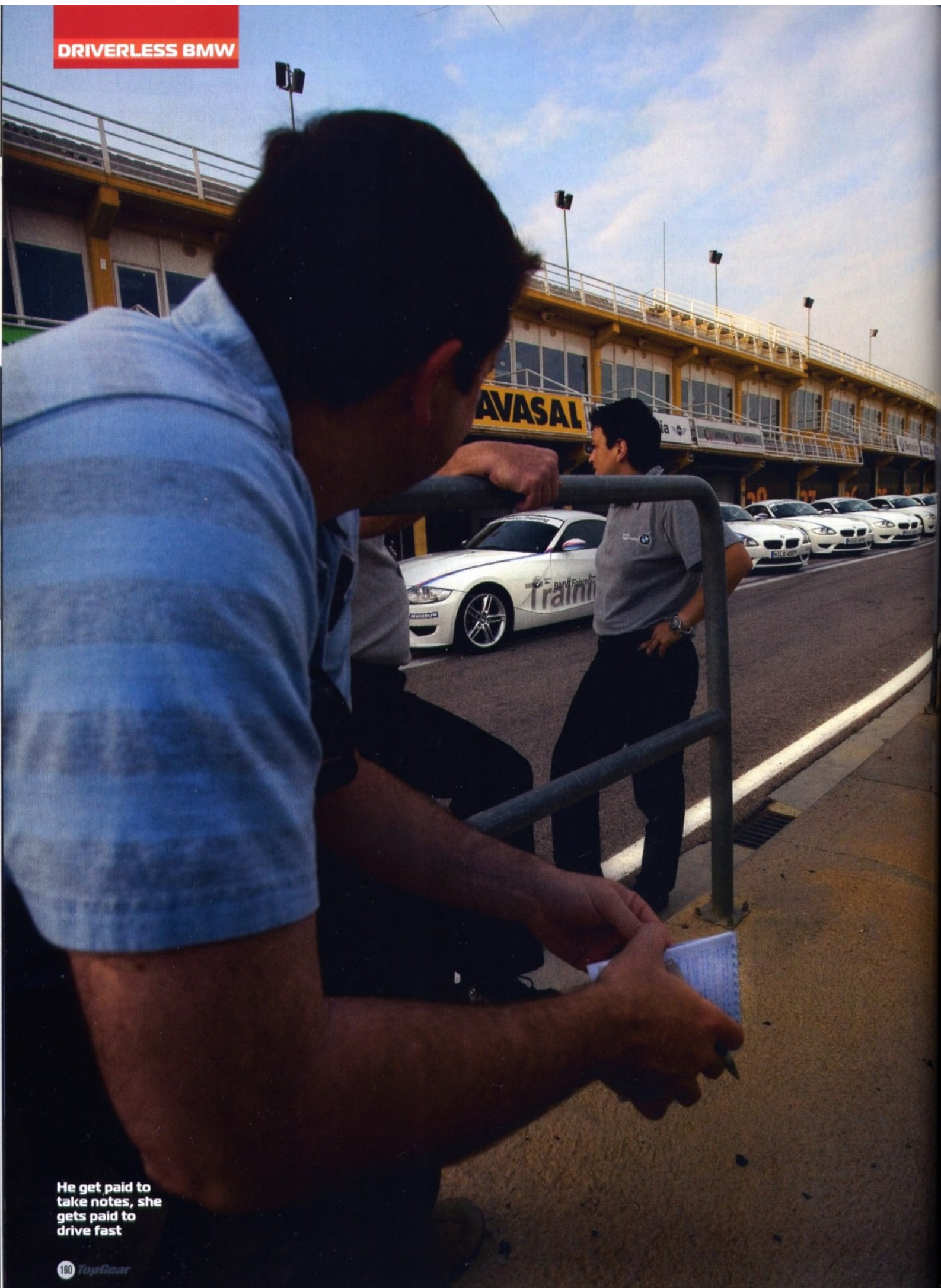
He get paid to take notes, she gets paid to drive fast

held through the corner to carve a perfect arc. We play with the system some more. Peter switches off the automatic braking and throttle, but leaves on the automatic steering. This isn't something students get to do, but I think they should. Now, I can relax and pick my own braking points and cornering speeds, apply throttle smoothly at the exit, and let the car steer itself on a perfect line. This is truly brilliant, and I'm learning the lines of this new track at a massively accelerated rate.

"What happens if I go in too fast?" I ask Peter. A key question, because I was starting to get close to the limit of the tyres.

"It will try to correct itself using DSC," he replies, "but once it gets more than 30cm beyond the racing line corridor, the

nearly five seconds in arrears. She could have stopped her car and smoked a large cigar by the time I got to the finish line. Humbling.

My god, here's a fast driver. Claudia Hürtgen, 36, races a Schubert Motorsport BMW Z4 M with Hans Stuck in the Nürburgring endurance series. She was a karting champion, Ford Fiesta Cup champion and raced with Jos Verstappen in the WTS Opel Dallara German F3 team in 1993, the same team that Michael Schumacher raced for three years earlier, before an accident at Monaco slowed her progress. Now she's a star of endurance racing and has won the Daytona 24hrs, among others. Who knows whether she'd have made it all the way if things had been different – many had her marked as an F1 champion.

More importantly than that, perhaps, she's a great teacher. Frank Isenberg, the boss of BMW
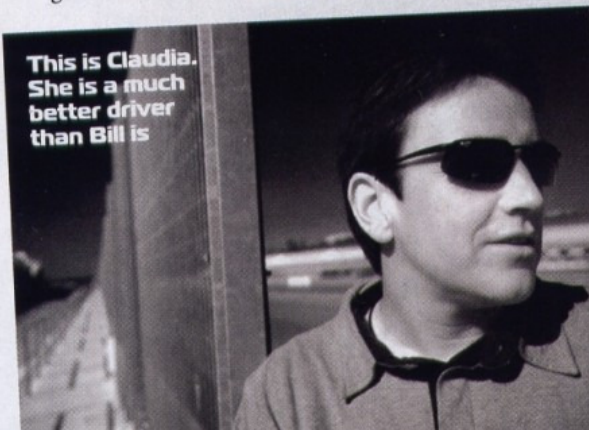
Driver Training, points out that while the Track Trainer self-driving car is a nice tool to have, it will never replace human instructors. Frank's a mean driver himself, as you'd expect of a man in his position, but he couldn't match his chief pilot. I wish I'd had more time to learn.

Now, on a map of the track, with our lines drawn in and telemetry data showing throttle and braking inputs, steering input and g-forces, we were able to see precisely where I was losing the time to Ms Hürtgen. Oops, too late to turn in there. Argh, not carrying enough exit speed there. Much too slow there, braking too much, apex way too early there, argh, useless line through there, you're wide on the way in and tight on the way out. Look at the steering movements – choppy where Claudia's are solid. Look at the g forces, pushing beyond the limit of the tyres. Over-driving. It's all over the shop!

Claudia's little car shot away from mine on every corner, and her g-force indicator went straight to what the tyres could handle, and stayed there as the arc was traced. Her line, through every corner and series of corners, was perfect.

Suddenly, the driverless car became a little less special. Clever though the technology is, machines will never be as interesting as people. The true magic of the day, the magic that will live with me the longest, is not the magic of being driven by a clever machine. It's the magic of Claudia.

'I was given a memory card to plug into the car, then did five laps at what I thought was a good pace. My laps were downloaded and analysed. Jesus, I'm slow'

automatic system will switch itself off." I tried this and it works perfectly, bleeping madly to let me know I should steer myself for a change.

There were four 330i Track Trainer cars present at Valencia this day – the red-liveried fully auto car, and three other silver-strip cars fitted with the GPS system and the warning lights, but without a fully automatic interface. These 'mule' cars had full telemetry recording, too. Now the real fun began, as I drove myself around the track, using the Track Trainer lights to try to get an idea of the perfect line. I was given a memory card to plug into the system box in the centre console before I went out, then did five laps at what I thought was a decent pace, then took the card back to the engineers with a brace of laptops in the pits. They downloaded my laps, and we analysed them on the telemetry screen.

Jesus, I'm slow. Earlier that morning, Claudia had done a 1:39, and my fastest now was eight seconds slower on a 1:47 dead. Eight seconds! In my defence, I'm desperate to point out the fastest Claudia could go in the hotter temperatures I was driving in was a 1:42, but still, that left me