In the spring of 1997, Bjarne Riis emphatically won the Amstel Gold Race in Holland. Despite all that has since tarnished the then-Danish champion's name, it was still the first race victory that could be directly credited to using power output monitoring — and using it masterfully.

The race's unique course profile is made up of more than 30 short, sharp hills. The cumulative effect of these, combined with the 260-kilometre race distance, is such that few riders can survive in good shape. The data was ideal for judging Bjarne's effort that day and limiting the damage that the early kickers would have on him.

He timed his attack to perfection and soloed home in the pouring rain with almost a minute to spare. Riis was an early adopter of power meter testing and, specifically, SRM cranks. At the time, the computer mounted on his handlebars was a mystery to most of us, yet the information it deciphered meant that bike racing would never be the same again.

“If I had trained with an SRM sooner, I would have won more races.” Greg LeMond
The town of Jülich is 50 kilometres to the west of Cologne, Germany. It is built on technology: the local university is a hub of engineering excellence and is also home to Schoberer Rad Messtechnik (SRM) and numerous similarly hi-tech engineering companies, plus one of the biggest quarries in Europe.

Its engineering bent means that Jülich is a pretty functional town. I make an off-the-cuff comment about the ugliness of its 1950s architecture and Markus Biewer, head of quality at SRM and one of my German companions for the evening, hits straight back at me, laughing: “Yes, we have the Royal Air Force to thank for that.”

Before I go on, let’s get the first sweeping generalisation out of the way: Germans are very direct. My friends from there are always very happy to tell me exactly like it is, and stare quizzically when I do that very English act of prevarication, going around the houses apologetically, even when giving directions to lost strangers, and generally sounding like Hugh Grant (I don’t, but this is hypothetical).

“Ah, yes, of course,” I shuffle on, uncomfortably. “So, um, Markus... Is the pizza good in Jülich?”

It was here that company founder Ulrich Schoberer studied biomechanical medicine, and we are heading to his favourite Italian restaurant in town.

Uli is a cyclist and an engineer. He had the idea that it was possible to measure the power of cyclists — not the physiological stuff, like heart rate and VO2, just the raw power put into the pedals. Having worked out how to do it, SRM applied for the patent for measuring power through the drivetrain in 1986. Since then, the SRM crank has become the hallmark of a serious bike rider, and they’re built right in the heart of European racing too.

“It’s not a bad place, close to Belgium and the Netherlands. We’re only 30 kilometres from the Amstel Gold Race,” Markus explained. “And André Greipel lives in Cologne.”

The second sweeping generalisation, and I hope he’ll forgive me for this, is that Markus has a slightly nerdy, factual way of saying things, as technology-orientated people often do. Perhaps it’s due to a life spent in environments where clarity and accuracy are paramount: they just have a way of disseminating the information and giving it to you straight. Take his reply when asked about the science behind power measuring, for instance.

“It’s more accurate, because you’re measuring in the muscle. Normally it starts when you do an ergometer test. You take the blood and get a lactate, and you
know that for this power, I put up this lactate. You can measure immediately where the power starts. With the heart rate, you’ll start to go faster, your muscles need more oxygen, then you need to breathe more and your heart starts to beat more. So we have this correlation which is much smaller, slower and harder to measure.”

So, to generalisation number three. Germans love to measure things. I’ve seen it first-hand at bike launches. Long after the rest of us have retired to the bar, our colleagues from Tour magazine, the German market-leading product testing tome, are sizing up, weighing and stripping down the bikes. They carry portable scales, a host of tape measures, rulers, angle-finders and protractors. It’s like a school geometry lesson in a bike shed.

That’s our conversation starting point over dinner. I put it to my hosts that measuring stiffness and strength in bicycles seems a strange approach to a dynamic and varied activity like cycling, that we have product testing in the media that has now become too scientific.

They looked puzzled and I already feared I had gone too far. I explained that this was why we don’t do product testing in our magazine, because we can’t do it as well as when specialist, exact equipment is available — without that, it’s arbitrary, not scientific.

But in Germany, it is different. Tour magazine, specifically, has as much testing equipment as most big bicycle companies do. Traditional framebuilders get really annoyed with the publication’s testing, because if the technology in their bicycles is old, they tend to perform badly in Tour’s bicycle torture chamber, but they will say that their bikes would ride well.

Markus smiled. I bumbled on.

It may sound churlish, but all this testing can really take the fun out of bikes. Having said that, the German technical journalists at Tour have proved that 28mm tyres roll fastest, the lightest bikes are not necessarily the most aerodynamic, and aero wheels aren’t really aero at all, so we definitely have something to thank them for.

Ulrich’s brother and SRM marketing man, Rudolf Schoberer, enters the debate and agrees that facts aren’t always interpreted in a positive way.

“Tour ran a crank test, and they looked at a limited range. It really had an impact on the cranks that came out at the bottom of the test, because sales went down. The readers didn’t look beyond the numbers: how stiff the crank is, the impact on them as a normal rider, could they see or feel it? Maybe Greipel could say, okay, maybe
“
Originally it looked like a sandwich box school electronics project, but in some respects that was no bad thing: the technology was proven and the electronics would improve.”

this crank is not the stiffest. But they look at the range and say this crank is not the top one; they look at the first three and that’s it. That doesn’t mean that they shouldn’t test...

Test information is now so readily available too. In 1986, when Ulrich launched his first crank, the biggest development in years had been heart rate monitors. Probably the only things that had really changed before that point were clipless pedals and clothing fabrics. It wasn’t until the late ’80s that things started to really speed up, with aluminium and then carbon fibre frames.

But that’s the thing. I don’t fear for the future; I look back and think we’ve come such a long way since 1986. In five years’ time, is it going to have changed a great deal more?

My hosts ate, whilst I went around the houses with my theories. The steak and spinach were excellent.

The following day in the canteen, Rudolfo emptied the samples cabinet onto the table and presented me with the history of SRM. It was clear that Uli was no brand designer, as he had no idea how to package his invention. We sat looking at a collection of bits that resembled a stall at a cycle jumble.
All SRM cranks are hand assembled.

Internal battery life is exceptional. Replacement and recalibration are both done in-house.
In the beginning it was just a function. Then later it became a design — so we had very long decals that were just red and yellow,” he says.

So it took Uli 14 years to realise he should do something about the design? Originally it looked like a sandwich box school electronics project, but in some respects that was no bad thing: the technology was proven and the electronics would improve.

“You must [understand] the technical possibilities you had at that time and now,” Rudolf explained. “It was ten, maybe 15 times bigger then. So, we could get smaller. In the beginning you had a cable on a frame. Now they’ve developed the ANT protocol, and now we have wireless power meters. And that was only possible because the ANT protocol was developed by the Canadian tech company Dynastream Innovations, who are now owned by Garmin.

“But we make all the designs here. We make the plans for the spider, but we have no machines for this. We have a company nearby who we have been working with since day one. We also make plans for the electronics in the development department. We don’t produce them ourselves, but we do produce in Germany, along with all of the spiders. It’s the sum of many parts and a lot of handiwork to assemble a crank.”

“Stickers are added with care and precision

One time the box fell off my bars in a race: I had to stop and go back to get it because there was only one in existence. My opponents wondered what the hell I was doing!”
So originally your brother set up the company on his own?

“Yes, he did everything,” Rudolf replies. “He also had a programmer in the beginning, but all of the hard stuff was developed by him. He made the plans for the electronics. With the first software there was no graph, it was just a line of numbers. For each second you had numbers, and you had to read the lines. It took a while to interpret the results and the first crank was seriously heavy,” Rudolf says.

“The data was collected in a huge box. I was an early tester in my racing days. One time the box fell off my bars in a race: I had to stop and go back to get it because there was only one in existence. My opponents wondered what the hell I was doing!”

As I’ve never ridden with this sort of technology, I’m struggling to interpret the information. Is the fact that consumers do not know how to use what they’ve bought still the biggest problem with power meters?

“We’ve always, since day one, just sold the tool. It’s like when you go into a shop to buy a hammer: you should know how to use it. You have to learn by yourself or ask somebody, or else somebody uses the hammer for you. You have to train by yourself, but you can go to your trainer who will show you how to work with this tool. Or you can read books: there are so many about this subject on the market.”

Which do you think is the most informative?

“I remember Training and Racing with a Power Meter by Hunter Allen and Andrew Coggan. I don’t read many of these books now, because I’m in contact with so many dealers, and a lot of our ones are also coaches, so we talk with them to get all the information, and most of the pros have coaches.

“I know in some cases, maybe five or six years ago, some pros didn’t want to use SRM because they didn’t want to be controlled; because they had a coach who said ‘Send me your training data every week’. And when he saw it, it would be like ‘Okay, I told you to do this and you do that’, something completely different!

“Some pros didn’t like this kind of control. But now, normally it ought to work, because the coach wants the best for the athlete. So why should the athlete work against the coach? If the coach gives him a plan, he should follow it. When the athlete has his own opinion about how to train, I think he will be in conflict with the coach anyway.”

I was with a team last year that was considering making all their data available online and many of the riders were against the idea. It is an interesting
concept, but of limited use to the amateur, according to Rudolf.

“We also have such data on our webpage. You can see the graphs of some professionals, but it is just information, which doesn't help you, because you don't know what he's really doing. And when we show the graphs of some races, you just see the race. You notice, okay, André Greipel is doing 1700 watts in the sprint, but could he do more? You don't know.”

So where does Rudolf see this going in, say, five years time?

“I think many more people will have some kind of power meter for their bike. When the first heart rate monitor came out, scientists and coaches advocated training with your heart rate. Now we know this is a better way, for training and racing.

“For example, on mountain stages in the Tour last year, when there was an attack, the riders were following but not closing the whole way, always looking at their computers and checking their power. They go to their limit, but not over it. Okay, so the race is more planned, not as spontaneous.”

But is that the fault of riders interpreting the technology? Television cameras are now being mounted in team cars. Power output would be another interesting
Final checks before shipping: they all go out spotless.

The engineers have years of experience with SRM.

The Powermeter is checked and calibrated before dispatch.
aspect for the broadcasters to add to their coverage. Will SRM work with television in the future?

“I don't know about TV, it depends. You never know about the plans of the UCI, it's been difficult to say what they want. For example, the weight limit on bikes was set at 6.8kgs ten years ago. When they made the rule, it was okay because the frames were not as [strong] as they are now. But today, they could think about it: the same quality of frame could weigh a kilo less, something like that.”

Technology moves quickly. If we returned in another five years, would we see a radically different SRM unit to the current design?

“There are still changes. The biggest change comes in the beginning, when you have the idea. Then you build something and get the patent. Then we had the change from cable to wireless, which was a big step.

“We’re thinking about rechargeable power meters, for example. We currently have the ANT protocol, but maybe the data could be transmitted through Bluetooth. So maybe that is the next step.”

Do you think that the crank spider is still the best place to measure?

“We will stay in the spider, because you can replace everything. You can replace the chainrings and cranks,
but with the pedal you can only use one system. A pedal is a part that is destroyed by time. The pros don’t ride them longer than a year. Sometimes the pedal will ground on a corner, but you don’t hit the crank and, certainly, never the spider.

“The funny thing is that we now have more competitors in the market, but on the training bikes of professional riders, you will still see SRM. On race day, of course, they have to use another power meter. I think there are now 11 different power meters on the market, because in 2006, the patent ended, so other companies could use the technology.”

Even a crank-based system like SRM must be subject to wear and tear. Do the pros look after their equipment?

“There are big differences. Erik Zabel always brought everything back clean and in great shape. We make sure that working with a high-pressure cleaner is forbidden. Now the mechanics know that and we don’t have any problems.

“We also have staff going around the teams. Andreas Kappesw is responsible for the team contacts. He goes to the training camps and talks with riders because he’s the right type of person — people can’t tell him shit, because he used to be a professional!”

Maybe I’m not SRM’s ideal customer. Cycling is an experience — if I go out for two hours, I really don’t want to be bothered by technology. Their approach is that everything is measured and I don’t really need to know precisely how shit I am going.

“But using a power meter doesn’t mean that you can’t have fun. We have customers now who send us their power meter or power control for service and call us every day, saying ‘please repair mine [quickly] because I don’t have any fun when I don’t see the numbers: I’m naked on the bike’.”

Is it a certain type of person who has that mentality?

“Not necessarily. I think the power meter helps you, because it gives you an insight into yourself. You know you can go for three, four, five hours at 200 watts with no problem. When you’re riding by feel, you don’t get the same information that a power meter gives you.

“I see it when I go for training camps to Majorca. Maybe you go up the mountain at 300 watts and after three hours you can’t ride anymore; you started too fast because you felt good. This is something a power meter can help you with.

“Heart rate is not bad, but it depends on so many things. When you haven’t drunk enough or have too
much coffee, your heart rate is higher, but that doesn’t mean that the power changes. Watts are more accurate because you’re measuring in the muscle.”

Since Greg LeMond, all Tour de France winners and major race winners have used SRM cranks for training. That is some testimony.

“Philippe Gilbert was using one at the 2012 Worlds. It’s interesting he’s using something like that in a race that is mostly based on instinct and tactics. But when they go for a solo attack, they need the power data.”

Gilbert is a great example—a very attacking rider, apparently spontaneous. I am trying to say that measuring the effort takes the beauty out of bike racing. If a rider thinks ‘I have to stop there because I can't go any more...’ Rudolf interrupts me mid-flow.

“No, it doesn’t necessarily mean you have to stop there. For example, Jens Voigt also uses a power meter and he’s someone who is attacking all the time. But his attack is not as random as it looks: he really knows how to regulate his power.”

And are you always intrigued to know what his data is after a race?

“I like to see it, or to watch Greipel’s sprint at the finish when I know he can go for 30 seconds at 1000 watts. And you know, at his peak, it is more than 1700...”

Is he the most powerful sprinter?

“The most powerful ones are the track sprinters. I know they can go up to 2500 watts. But road sprinters ride 200km first, and then do their sprint. A track sprinter has a few rounds and then it’s over, but they have an incredible amount of power. When you see their legs, you know there’s a lot inside.”

From your connections with teams, is it possible to do any marketing using the data from some of the top riders?

“We get the data and files of the races. But we are only allowed to use it on our webpage or for a presentation. I always get requests from the press: could you please send me the data you have on your webpage, the original files, and it’s not possible. We have a contract which states we don't give out original SRM data. You can download it from our webpage, you can view it and look at it, but we won't give you the original files.”

So it’s a bit like hospital records and privacy?

“Yes, people are very sensitive about their data. This is the interesting thing: how do you have to train before you can go for half an hour at 500 watts? And you see their training plan is following this idea, and it seems that this idea is successful.
“But when you’re talking to ten different coaches, you get ten different theories about how to train correctly. Just because it works for one person doesn’t mean that it works for sure with another.”

But if they’ve got enough time to spend analysing other people, perhaps they are not training hard enough themselves?

“Yeah, maybe. But it’s more than that. Mark Cavendish, for example. His advantage is not just his power: he needs to have a good eye so he can see where to go. Of course, a sprinter is not just about power. It’s also how you sit on the bike — aerodynamics. At the top, the differences are so small, and nobody can afford to lose ten watts, anywhere. We’ve reached a high level now, where they’re really thinking a lot about these aerodynamics, how to sit on a bike, which tyres and wheels to use.”

So with all the teams doing their own testing and no central pool for all that information, SRM are in a very powerful position as the lynchpin. Skinsuits, aero helmets, wheels: all can be tested for efficiency in conjunction with a power meter.

“Yes, we have a lot of experience now. Immediately we can work on position on the bike. Look at how Miguel Indurain was sitting for the Hour record, compared to Boardman. I don’t think Boardman needed, or had, the power of Indurain, but he was faster.

“I don’t believe it will become standard though. I think the good stuff will replace the bad. There are small gains which can work with tyre selection, for instance. We found a difference of 10 watts between race tyres.”

And the best was?

“Conti 4000, the 28mm version.”

Well at least I have my tyre choice right. That night, before we travelled to Cologne to eat sushi, Markus rounded up four eager colleagues from the shop floor and we sat in the car chatting electronics and soldering irons. It was reassuring that they all spoke peculiar, nerdy English perfectly.

I was starting to feel at home, although the story has only just begun. As we go to press, a set of SRM cranks landed on my desk, so I can accurately learn just how shit I am. I suppose that means there will need to be a part two. In the package, there was a note enclosed from Rudolf:

“You need to try them and learn to love them.”

I’ll do my best.

Guy Andrews is Editor of *Rouleur*