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THE MAKING OF A McDRIVER: Meet the new, improved Sergio Pérez



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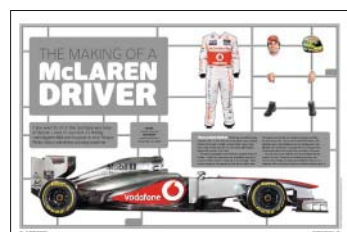




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Ignition / Anthony Rowlinson / 04.13

We take you behind the scenes at Ferrari and Lotus

Well, he knew what he was doing. What a start for Kimi Räikkönen and Lotus and what an opening to the 2013 world championship. It always seemed likely that this season would pick up where the last one left off, such was the 'light touch' nature of the changes to this year's technical regulations – and so it has proved.

Again we have a tyre-friendly black-and-gold car capable of bagging major points as others wilt around it; again we have a Red Bull machine capable of more speed than anything else. And again we have Fernando Alonso proving he'll be a major contender in this year's title chase. Our cover star is capable of replicating his flawless 2012 performance, according to team boss Stefano Domenicali, whose thoughts you can read on page 38. *F1 Racing* was granted exclusive access to the Scuderia just before the start of the season and we saw for ourselves how committed Ferrari are to pushing Alonso over the line this year, after such near misses in 2010 and 2012. "If you are second, there is always something wrong," says Domenicali. "So full commitment and full throttle. That's for sure."

We'll discover over the next nine months of pressure whose 'full throttle' brings the best result, but one thing is certain: we're in for another titanic struggle – thanks in no small part to the Iceman, who's rubbed off any last spots of F1 ring-rust after a two-season sojourn in WRC.

We travelled with Kimi to Moscow, to ride shotgun around the Russian ice track where he and Charles Pic

were doing wheel-to-wheel battle. It gave a fascinating insight into the competitive intensity Räikkönen brings even to a zero-stakes race and if you thought he was popular on the F1 tour, the passion for his ice-cool ways among Russian fans knows no bounds. How did it go out on track, you ask? We'll refrain from revealing the winner here; for that, you'll have to slip-slide to page 92.

The story might make interesting reading for Räikkönen's team-mate, Romain Grosjean, who we've also interviewed this month. Aware of the challenge he faces at Lotus, he's a driver who has acknowledged his occasional excesses of 2012 and addressed them over the winter. "[Last year was] difficult to explain," he tells us, "but in your first year you're always blocked: later on, when you're a favourite, everyone gives you more space. Clearly I made mistakes but perhaps there were other factors involved." He's a quietly impressive character is Grosjean – and a seriously quick driver.

The same could be said of this month's 'Lunch With' guest (p100): none other than Mika Häkkinen, double world champion and the only driver fast enough to earn the respect of Michael Schumacher in his Ferrari pomp. Never a man of many words during his active F1 years, Mika's now happy to open up about a career that took him from death's door to the very heights. Want to know what it's really like to take on and beat Schumi at his peak? Let's just say he knew what he was doing...

Anthony Rowlinson, editor

Contributors



Malcolm Griffiths

Gets the shots when time is of the essence



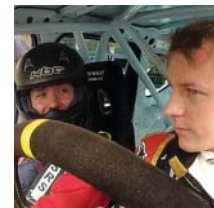
Xevi Pujolar

Chief race engineer at Williams F1



Dieter Rencken

Political expert and master of the memory stick



Stuart Codling

Award-winning star of stage and screen

Our man on the ground at the final Barcelona test had the smallest of windows to shoot Marussia's last-minute signing Jules Bianchi. The (excellent) results are on p90

Xevi race-engineered Pastor Maldonado in 2012 and now oversees Williams F1's entire race engineering setup – as well as lending insight to our race previews (p116)

Nobody gets to the bottom of F1's political and economic business as diligently as Dieter. Turn to page p74 for his exclusive look behind the scenes with Pirelli

Seasoned *F1R* readers will have spotted a familiar name in the credits recently – SC is back, and this month he went ice racing with Oz GP winner Kimi Räikkönen (p92)



Thanks to Russell Day, Renato Bisignani, Danielle Breen, Isobel Camier, Didier Coton, Sophie Eden, Lucy Genon, Stefano Lai, Laurence Letresor, Caroline Macpherson, Marielise Mammitsch, Alastair Moffitt, Tracy Novak, Anthony Peacock, Alex Schieren, Eric Silbermann, Andy Stobart, Lynden Swainston, Thomas Webb, Claire Williams.

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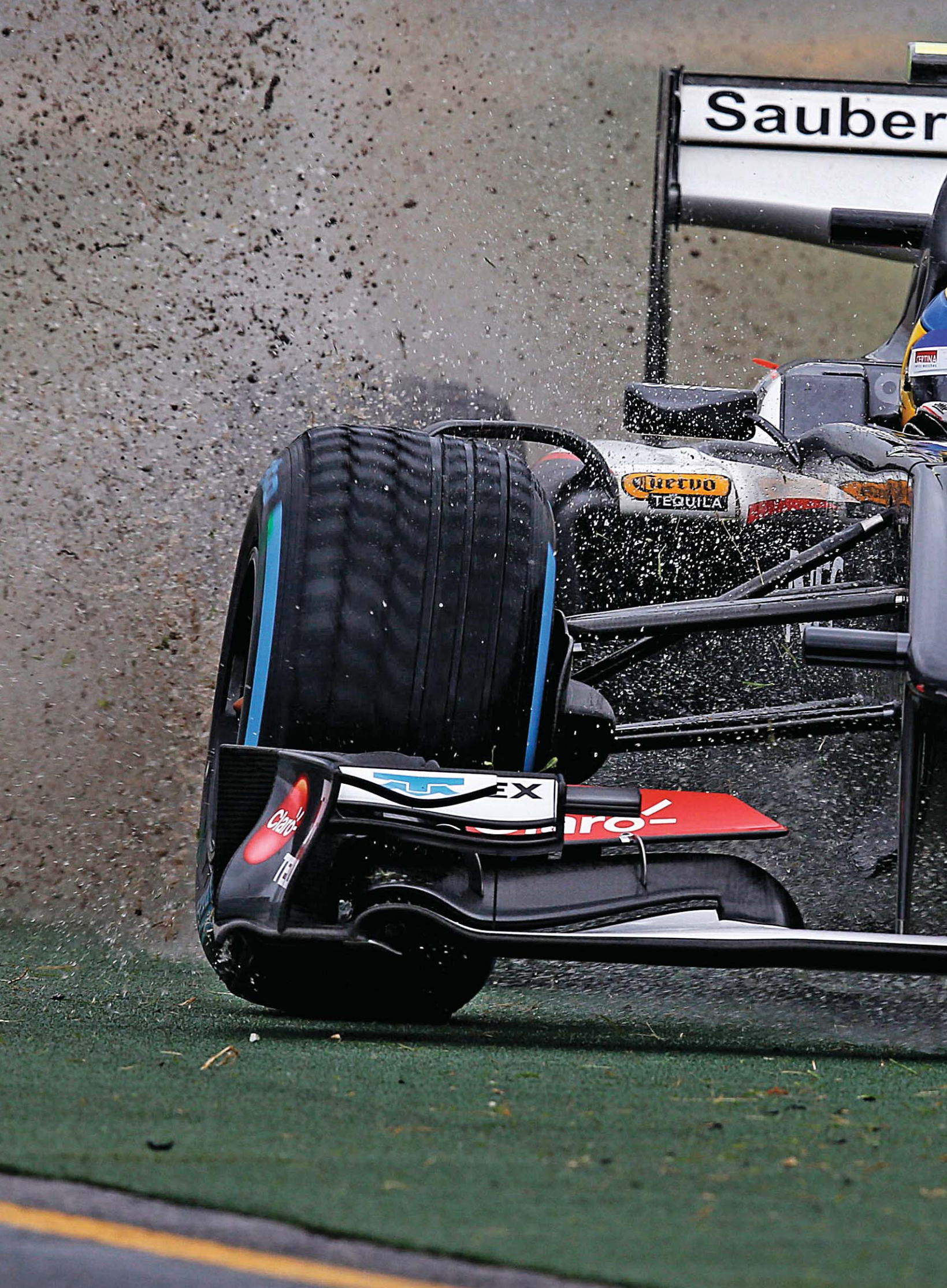
*Model shown is an RCZ GT THP 156 with pearlescent paint, matt black roof arches and vision pack at £25,645. Prices quoted are on the road and include delivery to dealership, number plates, 12 months' government vehicle duty and £55 first registration fee. Information correct at time of going to print. Visit peugeot.co.uk for full terms and conditions.

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MOTION & EMOTION



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Parade

Sink or swim Esteban Gutiérrez was hoping for a trouble-free start to his F1 career, but when the rain began to fall on the Saturday of the Australian GP, the Mexican rookie found his Sauber to be rather a handful. A trip through the mud and a meeting with the tyre wall left him a lowly 18th on the grid
Where Albert Park, Australia **When** 5.41pm, Saturday 16 March 2013

Photographer Steven Tee/LAT

Details Canon EOS-1DX, 600mm lens, 1/640th at F5.3





Parade

The corridor of uncertainty The Australian GP finally put an end to speculation over who had done the best job over the winter. Or did it? As Fernando Alonso passes between the winning Lotus and the third-placed Red Bull, is he musing on 2013 being a three-way fight for the title?

Where Albert Park, Australia **When** 6.37pm,
Sunday 17 March 2013

Photographer Steven Tee/LAT

Details Canon EOS-1DX,
50mm lens, 1/500th
at F4.5





Parade

Looking on the bright side On his Merc debut, third on the grid and a P5 finish for Lewis Hamilton was a result he said "exceeded expectations".

Perhaps he could afford himself a little smile as his former McLaren team-mate, Jenson Button, suffered a dismal weekend, finishing ninth

Where Albert Park, Australia **When** 5.45pm, Friday 15 March 2013

Photographer Glenn Dunbar/LAT

Details Canon EOS-1DX, 600mm lens, 1/1000th at F8





NEWS

Honda set for F1 return

McLaren will revive their successful late-1980s partnership with Honda power for 2015

One of the most evocative partnerships in F1 history will be revived in 2015 when Japanese giant Honda return to the sport as engine partner to McLaren.

McLaren's contract with current supplier Mercedes includes an option to continue that partnership in 2014 and 2015, but they will take up only the first of those before switching to Honda, who are currently developing their own engine.

Honda pulled out of F1 at the end of 2008 after several unsuccessful seasons running their own team. They have been attracted back by next year's new engine regulations, which will introduce 1.6-litre V6 turbo engines with extensive energy recovery systems.

The new rules, which are designed around efficiency, mean

cars will have to complete races on just 100kg of fuel – about a third of the current level.

The technology being developed for them will have a direct transfer back to the road-car industry and, F1's lawmakers hope, shield the sport from accusations of irrelevance, outdatedness and profligacy while attracting new investors.

Honda will also have to supply other teams on a customer basis, so their return should ease the problem of there currently being only three manufacturers building 2014 motors – none of whom want to supply more than three teams – compared with 11 teams needing engines.

The McLaren-Honda link-up will revive memories of one of the most fruitful technical partnerships in F1 history – the

pair won four consecutive drivers' and constructors' championships together between 1988 and 1991.

McLaren and Honda enjoyed the most successful season in Formula 1 history in 1988, when Ayrton Senna and Alain Prost won 15 of the 16 races. Honda also dominated F1 from 1986 to 1987 with Williams, winning one drivers' championship and two constructors' titles.

The deal will result in an awkward situation between Mercedes and McLaren in 2014. McLaren will be racing with one engine supplier while working hard on a 2015 car with another – who will inevitably have access to some Mercedes information.

McLaren's decision to jump ship to another manufacturer was inevitable – they are too big and ambitious a team to simply



Senna at Hockenheim 1991, on his way to a double title win for McLaren-Honda

McLaren to ditch Merc in favour of Honda power / F1 snakes & ladders



All McLaren machines have been powered by Merc since 1995

remain a 'customer' of an engine supplier. And the current situation is the culmination of an increasingly difficult few years in the relationship between the team and their former partner and shareholder.

The partnership between the two began to break down in 2009, when McLaren boss Ron Dennis made clear his intention to build a supercar – the MP4-12C. Mercedes were displeased, as they felt the car would be in direct competition with their own forthcoming SLS.

Whether the two supercars will attract similar customers remains open to debate. Despite both being capable of speeds of 200mph, there are a number of differences between the two, but Dennis's decision created discontent at Mercedes.

At the same time, McLaren team principal Martin Whitmarsh created an exit route for Mercedes when, following Honda's withdrawal from F1, he intervened with the Mercedes board to save the team by ensuring they had a supply of engines.

What was Honda became Brawn, the team who won the championship double in 2009. Before the end of the year, Mercedes had bought the team as a way out of their uncomfortable situation with McLaren.

Brawn became Mercedes' works F1 team, and the German manufacturer duly set about disentangling themselves from McLaren, who began to buy back Mercedes' 40 per cent shareholding in the team.

The settlement ensured McLaren would still receive free engines and financial backing through 2011-2012, but in 2013 they had to start paying for them. Even before they had written the first cheque, Whitmarsh and Dennis had already managed to secure a new engine partner.

Disquiet continued over the winter as McLaren lost both Lewis Hamilton and technical director Paddy Lowe to Mercedes, and there is clearly no love lost between the two companies.

Whichever former partner – now rivals – ends up doing best out of the situation remains to be seen, but Honda's return certainly creates a formidable new force within Formula 1.

For their part, Honda will surely be determined to bury memories of their unsuccessful excursion as a team owner – which culminated in a decision to quit just as they finally had a championship-winning car on their hands – and ensure that they come to be seen as a success in Formula 1 rather than as a failure.

WINNERS + SPINNERS

UPS AND DOWNS ON THE F1 ROLLER COASTER

GOOD MONTH FOR

Chinese/US relations

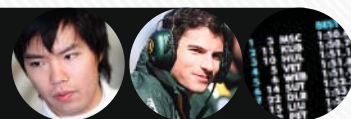
An American and a Chinese driver have been confirmed as Caterham's reserve drivers for 2013 and both drivers will get FP1 outings this year: Ma Qing Hua's first run will be in China and Alexander Rossi gets his first outing in Spain.

The technologically minded

McLaren have relaunched their website to offer an updated section called 'McLaren LIVE', featuring live telemetry streams and radio conversation straight from the garage. In addition to this, the new official 2013 F1 timing app is out now, featuring live sector and lap times from every session for your mobile or tablet.

Four-legged friends

Lewis Hamilton has revealed that Bernie Ecclestone has granted his pet bulldog, Roscoe, a 2013 paddock pass. The Mercedes driver duly supplied FOM with a picture of said pooch wearing headphones.



Brand awareness

Renault have announced they are "frustrated by the lack of recognition we get for beating the likes of Ferrari and Mercedes" in three consecutive world championship years with Red Bull. In which case, why allow the car to be plastered with logos for Infiniti, a luxury brand that is part of their own alliance with Nissan?

Continuity in Brackley

It's all change in Brackley: Toto Wolff's arrival at Mercedes as an executive director is about to be followed by the departure of the team's CEO, Nick Fry – a stalwart since the BAR-Honda days...

Collectors of Air Miles

The proposed 20th race of the 2013 season has finally been cancelled, freeing Formula 1 of two intense back-to-back race weekends this summer. A race had originally been scheduled for 21 July, one week before Hungary.

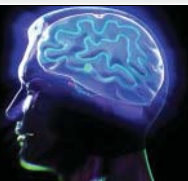


BAD MONTH FOR

Answers: **1** Ralph Firman Jr **2** Hart **3** Elio de Angelis **4** Chris Amon **5** TI Circuit Aida
6 Yūji Ide **7** Ligier **8** Onyx **9** Jacarepaguá **10** Brazil, 1981

F1 Mastermind

Your chosen specialised subject:
the world's greatest sport



- 1 Who partnered Giancarlo Fisichella at Jordan in 2003?
- 2 Which engines did Minardi use during the 1997 season?
- 3 When Alain Prost (below left) was disqualified at Imola in 1985, who inherited the win?
- 4 Who drove a third Tyrrell at the 1973 Canadian GP?
- 5 Which circuit has corners named after British racers Hobbs, Attwood and Redman and includes the 'Moss S'?
- 6 Which Japanese driver (below right) raced for Super Aguri in 2006?
- 7 With which team did Frenchman Franck Lagorce drive the last two races of the 1994 season?
- 8 Which car did Stefan Johansson drive to third place at the 1989 Portuguese GP?
- 9 What former F1 circuit was demolished in November to make way for the 2016 Olympic Games?
- 10 Where did Marc Surer score the only fastest lap of his career?



THIS BOY CAN DRIVE

Keeping an eye out for the stars of tomorrow



Davide Valsecchi

Who is he?

A 26-year-old Italian who is the reigning GP2 Series champion and the current third driver at Lotus.

How good is he?

He took four wins and six other podium finishes with DAMS to claim the GP2 Series title last year. Before that he raced for the Caterham team in GP2 and completed a day's testing for Tony Fernandes' Lotus F1 team in 2011. He spent a number of years in GP2 after making his debut in 2008 and has competed in World Series by Renault and at Le Mans.

Anything else we need to know about him?

Valsecchi was called up to replace an unwell Kimi Räikkönen at the second pre-season test in Barcelona. He completed 16 laps before Romain Grosjean returned to take over. He also topped the times at Lotus's 2012 Young Driver test in Abu Dhabi, completing 86 laps.

F1 chances

As Lotus's third driver he could be called up at any time – as Jérôme d'Ambrosio found in 2012 when Grosjean had a one-race ban.

ANALYSIS

How Venezuelan politics could affect Formula 1

Williams hope that the death of President Hugo Chávez won't lead to a withdrawal of state funding for Pastor Maldonado

The death of Venezuelan president Hugo Chávez has led to uncertainty about the long-term future in F1 of Pastor Maldonado and the Venezuelan oil money he brings to Williams.

Maldonado comes with sponsorship to the tune of £30m a year, which comes from the country's national oil supplier PDVSA as part of a five-year deal that was overseen by Chávez himself. The political opposition in Venezuela have long claimed that the sponsorship money would be better used elsewhere in the country.

Following Chávez's death from cancer on 5 March 2013, a presidential election has been set to take place on 14 April.

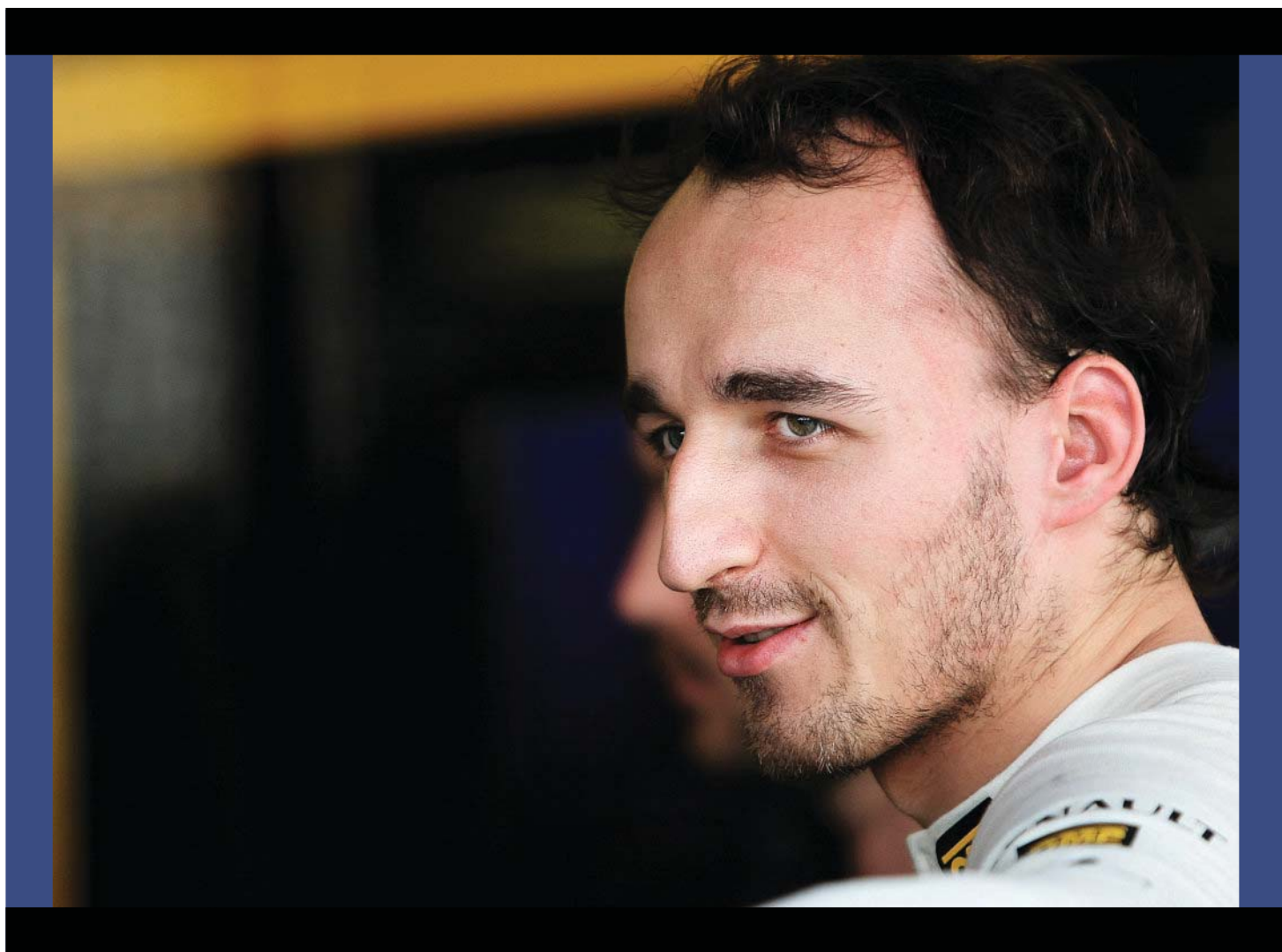
Maldonado has become a huge star in Venezuela and if Chávez's vice-president Nicolás Maduro prevails in the forthcoming election, it is highly likely that the Williams deal will continue.

At a media lunch, held earlier in the day on which Chávez's death was announced, Sir Frank Williams said of the Venezuelan government: "They've been very, very supportive and those who are next in line follow F1 and Pastor very closely. I'm hopeful everything will be okay."

In the event of a change of government, there will be some nervous faces in Grove. After all, if a new government chooses not to continue the deal, there's not much Williams can do about it.

Pastor will be keeping a close eye on events back at home





NEWS

Kubica returns to competitive action

The Pole continues along the road to recovery, entering world rallying with a specially modified car

Robert Kubica, who recently told *F1 Racing* that he still believes he could make a return to Formula 1, has chosen the FIA World Rally Championship for the next stage of his recovery from the terrible injuries he suffered at the Ronde di Andora rally in 2011.

The 28-year-old Pole will contest seven rounds in the second division WRC 2 category, and has been given dispensation to drive a car modified to use a paddle-shift gearbox because of his continuing disabilities.

Kubica still has limited mobility in his right arm, which was partially severed in the rally crash in February 2011 that also left him with multiple fractures. He needs to drive with his right elbow sticking out to the side to generate the force he needs to turn the steering wheel,



Kubica with his friend Fernando Alonso, who once described him as the best driver in Formula 1

which means he is currently unable to drive in the restricted confines of an F1 cockpit. However, he remains convinced that it is only a matter of time before he recovers sufficient mobility in his hand and arm to allow him to

drive a single-seater and make his return to Formula 1.

Kubica has already set some incredibly impressive times in tests for World Rally teams, comfortably beating those of regular top-line drivers on closed special stages.

The latent ability that previously led Fernando Alonso to describe him as the best driver in F1 is clearly still present. The only question is whether Kubica will be able to

display it again in F1.

While the Pole remains well regarded in the motorsport community, the sad fact is that the longer he is out of competitive action in F1, the less likely it is he'll be able to return.



Lowe (main) and Wolff (below right) move to Brackley, leaving a question mark over current Mercedes team principal Ross Brawn (below left)

NEWS

McLaren reshuffle their tech staff after Lowe's defection

Paddy Lowe has a new role lined up at Mercedes for 2014, but what will that mean for the future of Ross Brawn?

McLaren have put their former technical director Paddy Lowe on gardening leave after he announced his decision to join Mercedes for the 2014 season.

Lowe's position has been taken up by Tim Goss, McLaren's former engineering director and the man who was responsible for leading the design on last year's pace-setting, if unreliable, MP4-27.

McLaren have put a brave face on Lowe's departure, emphasising their engineering strength in depth. They point out that in Goss, managing director Jonathan Neale, sporting director Sam Michael and engineering director Neil Oatley, they have

a number of people who could be given the title of technical director in any other team.

But there is no doubt Lowe's departure, so close to the start of a new season, will be unsettling. While the 50-year-old might be quietly spoken, he is extremely well regarded in the paddock – as underlined by two separate teams wanting to sign him up.

As early as last summer, Lowe had agreed to join Williams as team principal, a deal put together by the team's former executive chairman Toto Wolff, but when Wolff moved to Mercedes as head of motorsport, he persuaded Lowe to join him there. It is understood that Lowe has been given



a hefty pay rise, but that is not the only reason behind his move. He recognises this is his last chance to take on a new role – one more influential than that of technical director. Mercedes have recruited him to run the sporting and technical aspects of their team, with Wolff alongside him and assuming responsibility for other areas, such as commercial and political matters.

While Lowe may not have been given the title of team principal, this is effectively what he will be. This raises questions over the future of current team principal, Ross Brawn, with one source close to Mercedes insisting Brawn won't stay.

NEWS

Adrian Sutil handed a reprieve by Force India

German Sutil pips Jules Bianchi to the second seat at Force India – but the Frenchman gets an 11th hour seat at Marussia



The long-running saga of who would fill the second seat at Force India was finally settled just before the start of the season when the team's former driver Adrian Sutil was chosen over Jules Bianchi.

The decision caused widespread ripples of surprise. Sutil had been dropped by Force India at the end of 2011 while awaiting

trial on charges of assault arising from an incident in a Shanghai nightclub after the 2011 Chinese Grand Prix. In January 2012 Sutil was found guilty of grievous bodily harm and was given a fine and a suspended sentence after Renault (now Lotus) executive Eric Lux required stitches after a champagne glass cut his neck.

Force India, who at the time said the incident was not related to their decision to replace Sutil with Nico Hülkenberg, staged what some billed as a 'showdown' between Sutil and Bianchi at the second pre-season test. They announced Sutil as their 'new' driver at the third test.

Ferrari protégé Bianchi subsequently found a seat at Marussia, who terminated the contract of Brazil's Luiz Razia after one of his sponsorship payments did not turn up on time. When Bianchi immediately started producing impressive lap times in the Marussia despite a lack of experience in the car, the mystery over why Force India chose Sutil deepened – particularly since it was known that Bianchi's presence in the team could have led to a favourable deal on Ferrari engines for 2014.

There is a simple explanation. Mercedes, who supply Force India's engines, pushed for Sutil. The German giant wants a bigger presence in the rapidly emerging Indian market, so a partnership with Force India is particularly valuable to them. And having a happy Mercedes on board will help Force India when they come to negotiating a price for their engine deal in 2014.

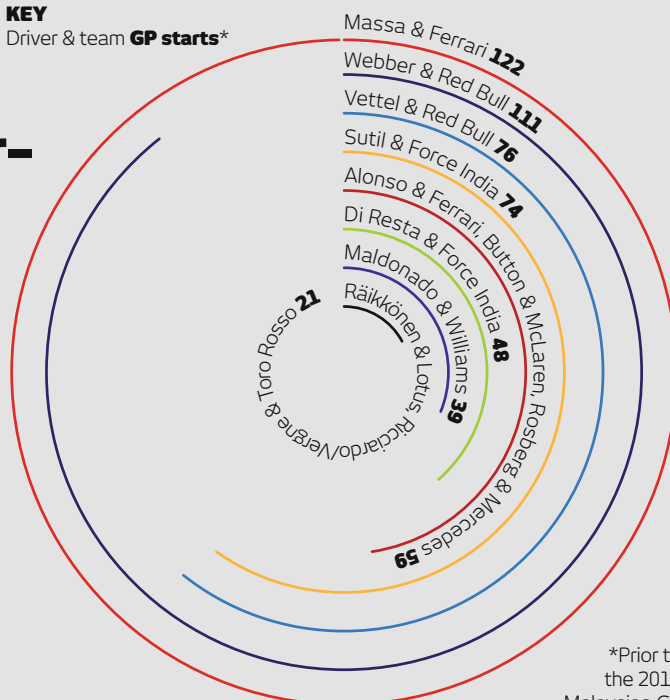
STATS

The longest-standing driver-and-team partnerships in Formula 1

With Adrian Sutil returning to his former F1 outfit Force India, we compare him with other drivers who've stayed loyal to their current teams

KEY

Driver & team GP starts*



Sutil returns to his old workplace



Season eight at Ferrari for Felipe



Di Resta: 48 starts and counting

*Prior to the 2013 Malaysian GP

TECH

Teams seek advantage with 'passive' DRS systems

Stalling rear wings that reduce drag and boost straightline speed set to be 2013's key feature

Every Formula 1 season has its key technical battleground, and it seems that in 2013 it may well be over a system that has come to be known as 'passive DRS'.

This technology employs a system of ducts in the car to automatically stall the rear wing above a certain car velocity, reducing drag

and increasing straightline speed. It works independently of the DRS (drag reduction system) that is fitted to all cars to boost overtaking – in fact it has to, since this year it is illegal to link the DRS to any other part of the car, as Mercedes and Red Bull both did back in 2012.



Red Bull kept their passive DRS under wraps in winter testing

'Passive DRS' was pioneered by Lotus last season. It works by means of what is known as a 'fluidic switch', whereby the airflow travels in a different direction once the car reaches a certain speed. But it is difficult to achieve and a major problem is trying to ensure that the air re-attaches as the car slows down at the same speed as it detaches when the car speeds up. This was the area with which Lotus struggled most in 2012 – and they're still struggling now. They chose a system that ducted air from above the driver's head down tubing in the engine cover and up a pipe that blows onto the underside of the upper rear wing.

Red Bull are among the teams who are now pursuing the idea and they have come up with a different and potentially more predictable solution. Their duct starts in front of the lower rear-beam wing, and uses the low pressure beneath it to trigger the system.

According to former Jordan technical director Gary Anderson, this is probably the best way to ensure consistent air pressures and is, therefore, a more robust way of operating the system.

As Anderson points out, it's no surprise that it is Red Bull who have come up with the most elegant and effective solution to a tricky technical problem.

OBITUARY



Ginny Williams 1946-2013

Williams team and family mourn the passing of Sir Frank's wife, Lady Virginia, who died aged 66

Sir Frank Williams' wife Lady Virginia – known to everyone at the team and in Formula 1 simply as 'Ginny' – has died following a long battle with cancer.

According to a statement that was released by the Williams team on 8 March, Lady Virginia "died peacefully at the family home last night surrounded by Frank and the rest of the Williams family... Ginny had been bravely battling cancer for the past two

and a half years. Ginny will always be an integral part of Williams' history and success, and today we pay tribute to a much loved member of the Williams family who will be sorely missed."

Lady Williams, as she became after her husband was knighted in 1999, was widely respected for her strength of character and the stoicism with which she faced life alongside such an ambitious man.

The early years of their marriage were a financial struggle, with Frank at one point famously doing business out of a phone box because he could not afford an office. Later, after the Williams team had achieved some success, Ginny had to cope with Frank's paralysis following a road accident in 1986.

Her book *A Different Kind Of Life* chronicled their struggles and offered a remarkable insight into her life with a sometimes difficult man. In it she related how Frank would barely speak to her in the weeks following his accident, as he slowly came to terms with what had happened to him.

She describes how one day, when she had plucked up the courage to ask him what they would do, he simply remarked that they had several good years of one kind of life together and now they would just have to get used to a different one.



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PORSCHE

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Pat Symonds

F1PASS TECH

Explaining the hidden brilliance that drives Formula 1 forward

THE SCIENCE BEHIND...

On-track testing

Why is current F1 track testing so strictly regulated?

Back in the days when testing was unregulated, each team ran a specific 'test team', which would have had two cars available, as well as trucks and a full suite of equipment that replicated every aspect of the race team.

In those days, testing took place between races, often at the circuits that would be hosting GPs in a few weeks' time. Testing would also take place outside Europe at the start of the season and, if you go back far enough to when the season started in Rio de Janeiro, there would be two weeks of testing there before the grand prix.

As time went on and costs continued to rise beyond potential income, it became necessary to rein in some of these excesses and gradually rules and agreements emerged that restricted testing activities. The biggest change came for the 2009 season when the Formula One Teams Association (FOTA) agreed that restrictions made real sense only if they were Draconian enough to make the use of test teams illogical. This heralded an agreement that restricted testing to just four sessions pre-season and no in-season testing at all.

The unfortunate consequence of this was that many of those employed on the test teams were

made redundant, but the savings to the teams ran into many millions. While the agreements have changed slightly from year to year, the current arrangement restricts testing to just three tests of four days' duration pre-season and one test, solely for young drivers, in-season.

In recent years, these agreements have been embodied in the Sporting Regulations and so are no longer voluntary.

How is legality policed during testing sessions?

Testing essentially falls outside the rules, although there is now a requirement that cars must have passed all their crash tests before being allowed to test. There is, however, no obligation to comply with every letter of the technical regulations, which is why cars can be seen in testing carrying instrumentation such as



Team members shield Alonso's Ferrari at the 2013 test in Barcelona



COULD OTHER KINDS OF TESTING RETURN?

Testing is restricted to European circuits, but a clause allows a test outside Europe if most teams and the FIA agree. Some see the extra expense of going

The 2012 Mugello test: a good experiment, but too much to handle in-season

to Bahrain as justified since there is a close-to-zero chance of rain – plus when the first race was in Bahrain, some equipment could be left there to offset costs.

Last year, Formula 1 experimented with an in-season test at Mugello. The consensus

afterwards was that it had been more trouble than it was worth. Race teams now do the testing themselves and adding a mid-season test to an intense race schedule was a step too far. So, for now, mid-season testing has been abandoned.

aerodynamic wake-measuring rakes that would not meet all the bodywork rules.

Also teams are allowed to carry out four days of straightline aerodynamic testing, but this must be carried out at an approved aerodynamic testing venue. One day of filming during the season is also permitted so that teams can produce footage for their sponsors, and demonstration events may be held in external locations. But for all the demonstration and filming, special tyres must be used that are produced for this purpose only. They are totally dissimilar to race tyres, so sponsor events cannot be used for surreptitious car tuning.

Why do F1 teams run at Jerez, a circuit that hasn't hosted a grand prix since 1997?

Winter testing is restricted to February and the first few days of March. Since testing is allowed only in Europe these days, teams need to seek out the best weather, which is not easy at that time of the year. Jerez is chosen by common agreement as, statistically, it is one of the driest places in Europe in February. It also has a good selection of corners on which to exercise the car but, unfortunately, the macro-roughness of the Tarmac is more extreme than any other circuit F1 visits, which makes testing and understanding the tyres extremely difficult.

With no in-season testing, how does that affect how teams use Friday practice sessions?

Fridays have become very much test days and the cars often carry increased instrumentation to assist with this. If a new part is to be introduced that requires it to cover some distance on the car prior to being race-approved, then teams may run it for a few consecutive Friday practice sessions before taking it into a race.

More importantly, restrictions have driven the need for simulation. Everyone will be aware that driver-in-the-loop simulation is an area in which teams have invested heavily in recent years, but teams also spend a lot on test rigs to simulate race conditions. For many years engine builders have been using



transient dynamometers to let them run full race simulations on their engines. Some years ago, these were hooked up to gearboxes so that the complete powertrain could be exercised in this way. And on the chassis side, the teams have many different types of rigs that are designed to simulate the loading patterns that lead to fatigue failures before a particular component ever sees action on a car or a race track.

It is this technology that has led to the ever-improving reliability record of Formula 1 at a time when you might have expected restrictions on circuit testing to have had a negative impact.

When a new car runs for the first time, what are the main areas that a team will be looking out for?

When shaking down a new car, the testing procedures are highly regimented and very much focused on reliability. The first test is always used to check fundamentals such as cooling and operation of all the electrical systems.

The cars will gradually build up to full race simulations with every area of the car coming under intense scrutiny at every stop. A new-car check list will be used to ensure that every aspect of operation is simulated. This will include such items as ensuring the car doesn't overheat when sitting on the grid waiting for the start.

As testing progresses, the focus will shift in a seamless way from reliability to performance although neither factor is ever ignored at the expense of the other. With most teams first showing their definitive first-race aero package

at the last test, it is only then that completely relevant set-up work can be done.

One of the more important aspects that teams scrutinise is aerodynamic performance. Many measurements are made to try to correlate the performance of the car with that predicted by the windtunnel and CFD simulations.

Finally, why is it that we can't read too much into the times? Can we get more of a clue in long runs at the final test – and is that any guide to who's done the best job?

Reading true form from testing seems to get harder every year, but certainly it is only at the last test that cars really stretch their legs in something approaching the configuration we will get to see in Melbourne.

Logically, knowing the true form is irrelevant as the teams always work as hard as they possibly can to improve performance whether they're clearly the fastest or bringing up the tail. Given the competitive nature of the people found in a race team, everyone pushes to try to estimate their position in the pecking order. They attempt to estimate competitors' fuel loads and take account of the tyres used and the circuit conditions when a time is set to try to normalise things.

Although considerable effort is expended on this, it is not always accurate and one of the major attractions of Formula 1 is that everyone still turns up in Melbourne not quite sure of where they stand... **F1**



Peter Windsor RACER'S EDGE

Authority, wit and intelligence from the voice of *F1 Racing*

HOW DO F1 RACERS ACTUALLY DRIVE? IT BOILS DOWN TO TWO MAIN METHODS, AND ONE IN BETWEEN...

I've been intrigued all my life by how racing drivers *drive*. At Warwick Farm Racecourse, in the dazzling Australian sun, I'd stand tautly at my marshals' post, desperate to distinguish Jim Clark's style from that of Graham Hill, or Jackie Stewart's from Jack Brabham's. Later, when I was working within F1, I'd tap the brains of Carlos Reutemann and Nigel Mansell, or Ayrton Senna and Rubens Barrichello. I was in search of the key.

Now I know at least this: it isn't "all chaos out there", as one current observer recently remarked. It isn't about one driver being 'a racer' or another being 'smooth'. There are forms and there are patterns to the way they drive. And I know now that Bruce McLaren was correct when he said back in 1965 that: "It's only a question of mathematics."

In 2013, I believe Bruce's words will never seem more accurate. Pirelli's new range of tyres – designed at the behest of the F1 teams and the FIA – has 'degradation' as its catchword. And, as we have seen already, some drivers do seem to be able to let the tyres perform well for longer. Why?

'Smooth', as I say, is, to my mind, a cliché that explains nothing. I mean, my mother is a 'smooth' driver. She isn't particularly quick, however. For the same reason, I sympathised with Juan Pablo Montoya's irritation when BMW's Mario Thiessen once took him to one side and said: "I can see via the on-board that you're moving the steering wheel too much in the corners." The difference between Juan Pablo and Ralf Schumacher in those Williams days was nothing to do with the way Juan corrected the car through the steering: it was something much more profound. And it was something that Juan –

like Rubens Barrichello, a classic late-entry driver – was never going to change.

Let's look at some extremes: if the lap wasn't a lap but a straight line, tyre degradation wouldn't be a problem. Next step: if only one per cent of the lap involved corners, there would be less degradation than the lap in which 40 per cent of the distance involves corners. In other

words, the less time a car spends going around corners, the less the thermal tyre degradation. That may sound obvious, but it's something that's not always taken into account during F1 team debriefs.

Now let's consider what the drivers can actually do with a car. In very broad, general terms there are two distinct branches of input. Always have been – and probably always will be, given human nature. On one hand is the driver who starts on the extreme outside, tries to form a perfect arc down to a geometrical apex and then again runs out to the track edge; on the other is the driver who divides the corner into two or sometimes three separate blocks, keeping the car as straight as possible within these blocks before turning it towards the next one. Let's call these two approaches 'classic' and 'vee'. I would nominate Jenson Button and Nico Hülkenberg as typically 'classic' drivers and Lewis Hamilton and Kimi Räikkönen as typically 'vee' drivers. Fernando Alonso, I think, sits squarely between the two – as does Mark Webber. Sometimes they vee, sometimes they seem to forget about it.

So which will be the better approach in 2013? It will be the method, I think, that ensures the car spends less time carrying lateral load; the less the lateral load, the less the time in the corners. The less time in corners, the less the tyre degradation.

Enter Lewis, Kimi and co.

Of course, it isn't as simple as that. In cold conditions (such as those seen in the second Barcelona pre-season test) tyre temperatures may come into play, and 'classic' drivers who make the corners go on longer could, in that case, be more able to generate tyre temperatures than the 'vee-

"'Smooth' is a cliché. My mother is a 'smooth' driver. She isn't particularly quick, however"

drivers'. And, within each group, certain disciplines must be achieved: braking should be modulated as steering load is increased. As power is re-applied, it should be perfectly balanced against the decreasing load on the outside rear tyre. Jenson Button is able to perform both actions almost to perfection.

Equally, some drivers within the 'vee' genre may have different approaches to the 'perfect moment'

Jenson is an oversteer-hating 'classic' driver, who takes each corner as a perfect arc





Lewis is a 'vee-driver', attacking a corner as two to three separate blocks

in which to rotate the car mid-corner. This is related to a driver's ability to feel numerous dynamic variables and to distinguish between the right moment to rotate the car and the relative importance of a high minimum speed. This, in turn, is allied to his touch in the approach to the corner – to his braking (and subsequent release of brake-pedal pressure), to his steering increase (whether he applies the steering in increments, like, say, Pastor Maldonado, or progressively, like Kimi) and the time he spends doing both simultaneously. Lewis Hamilton is, to my eye, the epitome of the vee-driver who consistently (and usually perfectly) adjusts his rotation point according to track conditions, but I suspect that Valtteri

Bottas won't be too far behind him in the short-term – differences in cars aside.

Given neutral variables a great vee-driver will perform better over a season than a great classic driver; the former is by definition more manipulative of the car and so better able to deal with the unexpected. Beyond that, he will use shorter corners. Jenson, for example, finds it hard to deal with a wayward back end so looks for a little understeer: Kimi's style is far less affected by oversteer.

Drivers can change their style and methods (as Fernando Alonso has done over the past three years); and even as I write, some engineers will be urging their drivers not to let the corners go on for too long. Whether they


will be distinguishing between taking a corner faster, smoother or with different dynamics depends upon the team, their understanding of the forces involved and their belief (or not) that drivers are unique athletes who can approach a corner in various ways.

From what we've noted so far, however, I'd put Jenson Button, Felipe Massa, Romain Grosjean, Nico Rosberg, Paul Di Resta, Sergio Pérez, Nico Hülkenberg, Jean-Eric Vergne, Esteban Gutiérrez, Charles Pic, Jules Bianchi and Max Chilton, along with Pirelli testers Jaime Alguersuari and Lucas di Grassi, in the classic category. Lewis Hamilton, Kimi Räikkönen, Sebastian Vettel, Pastor Maldonado, Valtteri Bottas, Daniel Ricciardo and Adrian Sutil are vee-drivers while Fernando Alonso and Mark Webber represent an intersection of sorts between the two.

The categories, even back in those Warwick Farm days, quickly fell into place: Jim Clark and Jackie Stewart were vee-men, Graham Hill and Jack Brabham classicists. Bruce, true to his word, was of the Jim Clark variety.

Alonso's flexible driving style straddles the two approaches



For Racer's Edge updates, follow Peter Windsor on Twitter (@PeterDWindsor), on Facebook (www.facebook.com/peterdwindsor) and our YouTube channel ([peterwindsor](https://www.youtube.com/peterwindsor)) 

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Dieter Rencken

POWERPLAY

The stories F1's bigwigs would rather you didn't know...

WITH THE DEADLINE FOR A NEW CONCORDE AGREEMENT NOW GONE, FORMULA 1 ENTERS 2013 WITHOUT STRUCTURE

"According to sources, Ecclestone has announced that a replacement Concorde is 'just weeks away'"



The late author Douglas Adams once remarked that he loved deadlines, particularly the whooshing sound they make as they go past. The most recent Concorde Agreement, which outlines the commercial, technical and governance obligations of the sport's three factions (governing body FIA, commercial rights holder FOM, and the teams collectively) was finally sealed in ink in August 2009 after several years of acrimony. All parties involved knew it had a use-by date of 31 December 2012. More than enough time to negotiate a replacement, surely?

Obviously not: being Formula 1, the sport headed for Melbourne and onwards, seemingly without a rudder. Certain clear-cut regulatory structures no longer exist without this vital contract in place. Without a Concorde Agreement there are no Sporting or Technical Working Groups and no Formula 1 Commission – all vital facets of governance that progressively escalate regulatory issues to the FIA World Motorsport Council (WMSC) for ratification.

The situation is not novel, for F1 spluttered along until 2010 after the 1998-2007 Concorde expired; all the parties could agree to was a continuation of that covenant until they could negotiate a successor. No such deal presently exists – nor is one likely after Ecclestone signed separate commercial agreements with ten of the 11 teams – all except Marussia.

FIA president Jean Todt, who has consistently called for a replacement Concorde to be implemented, had no choice but to act, for various clauses in the sporting and technical regulations required urgent attention, leaving the governing body open to massive criticism had it remained passive.

Thus he directed, with agreement from the teams, that meetings of committees (as opposed to the Working Groups) be convened by the FIA, with decisions taken as per previous procedures – albeit bypassing the F1 Commission phase. Instead matters are escalated directly to the WMSC for approval, in this case during its 8 March meeting. The net effect is that FOM, which had a seat on the F1 Commission – it also sits on the WMSC, where it holds less sway – has less influence. The decisions taken hardly affected the strategic direction of Formula 1, but...

This represented just one of four tipping points in a rather drawn-out negotiating process; in fact it changed FOM's entire game plan, for Ecclestone had until that point taken the line that F1 could function perfectly well without Concorde. He suggested to the more compliant members of the press that commercial agreements held with teams in effect doubled as mini-Concordes – which they most certainly do not, for they cover but a single facet (of three).

Within days he was forced to backtrack, mainly through team pressure – after all, 11 team principals wrote (collectively in the case of FOTA members) to Todt, expressing their reservations about the governance procedures thus forced upon them, in turn requesting a return to the unwieldy but effective previous system. Tipping point two.

The next was pressure from CVC Capital Partners, the investment fund of which FOM is ultimately a subsidiary. CVC is determined to float the sport and, after aborting plans last year, has rekindled the project. If the concept found little traction then despite a Concorde and implicit FIA administration in situ, imagine how the markets would rate F1 plc without checks and balances. So, it seems, Ecclestone was overruled from above.

It is no secret that the FIA is strapped for cash. Todt planned to leverage around £30m per annum via a combination of Concorde negotiations and increased entry/licence fees, funding both the body's running costs and a new, wholly owned FIA headquarters (its current Paris and Geneva buildings are leased).

Ecclestone thus believed he held the whip hand; however, according to sources, the FIA Senate blocked Todt's plans pending presidential elections due in October this year. The increased fees paid by the teams and drivers now more than cover the body's annual costs. The FIA's bolstered negotiating position was tipping point number four.

What happens next? According to sources, Ecclestone has announced that a replacement Concorde, which will last until 2020, is 'just weeks away' and all will be sorted by the June WMSC session. The good news is that the sport should be spared this charade for eight years; the bad news is that the teams, who last time around negotiated as a FOTA block, will now be called upon to sign individually – with any one of their number theoretically able to scupper the process...

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VALTTERI BOTTAS ROOKIE YEAR

Williams' new signing is also our new driver columnist

A HELPING HAND FROM A FELLOW FINN

"In Finland, many, many people watch F1, and in the late 1990s, everyone was supporting Mika"

We've been very fortunate, given the size of our country, to have had a number of Formula 1 world champions come from Finland. And there's no doubt that one of them – Mika Häkkinen – was a hero of mine when I was growing up.

When I was young, I remember getting up in the middle of the night with my dad to watch those dramatic showdown races at Suzuka in the late 1990s. In Finland, many, many people watch Formula 1 and at the time everyone was supporting Mika.

I recall watching him take his first grand prix win at Jerez in 1997 around the same time that I started karting, when I was about eight or nine years old. What I appreciated about Mika was how he fought for his place in Formula 1, as it didn't come that easily for him. He really had to work for it, as you might recall he was in Formula 1 for a long time before he actually won a race. Plus he had his accident at the end of 1995 after which he battled hard with recovery then returned to the sport even stronger than before. Because he was a real fighter, he was someone I really looked up to when I was younger.

So you can imagine my amazement when I suddenly received a call on my mobile from an unknown number and the voice on the other end said: "Hi, it's Mika Häkkinen here and I'd like to help you..."

In 2007 I had just finished my first year in Formula Renault and had finished third overall in the Northern European Cup. The following spring I was trying to decide what the best thing for the next stage of my career would be and that's when I got that phone call out of the blue, with Mika asking if we could meet to discuss how he could help me. That's when I pinched myself: I couldn't believe it.

A month later I was on a flight to Nice in southern France where Mika was living. I met him and Didier Coton, who owns the Aces Management Group, which

has a roster of drivers including Mika himself. I went to meet them and we discussed everything from racing to life outside the sport and how we would proceed in the next step of my career. I should mention that one of Williams's shareholders, Toto Wolff, had also enquired about helping me with my career and so we decided that, between them, they would all get involved.

All three of them have been great with every aspect of my career, particularly in terms of helping with finance. Where I would have a few sponsors from Finland, I would be short of a full budget for a full F3 or GP3 season and that's where all three of them would help out. They have a lot of experience in the business and I found that someone like Mika is very good at opening doors. Everyone knows him and if he goes to speak with sponsors then everyone listens to him. He's been

Imagine my amazement when I received a call from an unknown number and a voice said 'Hi, it's Mika Häkkinen here and I'd like to help you...'"

a great help and he's also good at giving me tips and being supportive. With him I feel that I can talk about anything, be it the smallest of details of driving or just general every day living.

In fact, between them, Mika, Toto and Didier, are a great source of experience. I can talk to them and get advice about everything, on the driving side, race preparation or everyday life.

But I suppose the best piece of advice Mika has given me is not to worry too much and just let my driving do the work. He says I should focus on that above all else; and if I do, then ultimately everything else will be fine. He tells me that I need to be confident in what I do, because if I don't trust myself, then who will?

Mika's really looking forward to the year ahead and he's planning on coming to quite a few races over the coming season. He was even phoning me up during pre-season testing while I was trying to debrief with the engineers; he always wants to know how the driving is going, how the updates are... and he's really excited about seeing me in the car this year.

I have a good feeling about 2013. I'm really happy with Williams: the car has a different feel, in a positive way, to last year and now we have to fine-tune and start bringing updates. And with one of my childhood heroes helping me, I feel that everything is heading in the right direction for my first full season in F1.





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STAR LETTER

Alonso & Vettel
 – could they be the
 new Prost & Senna?



Why can't they work together?

It was interesting to read that Ferrari have distanced themselves from the idea of bringing in Sebastian Vettel to partner Fernando Alonso in 2014. It does look like a 'dream team', but in reality it may be a pressure cooker scenario not unlike the period at McLaren in which Alain Prost and Ayrton Senna were team-mates.

However, it seems strange that a different mentality can't be instilled in F1 drivers to make them work harder at working together to achieve their team's goals. Currently, from a driver's perspective, points earned in the constructors' championship appear very much an afterthought. Each driver wants to win and if he makes it to the podium and his team-mate spins out, then the smile on his face as he celebrates won't be any smaller.

Ferrari's president Luca di Montezemolo used the analogy 'two roosters in a henhouse' to describe the idea of Vettel and Alonso driving for the same team, and he is right. As a neutral supporter, the promise of fireworks would be very exciting. Let's hope Ferrari change their mind.

Laura Bayntun

By email



STAR PRIZE

Laura Bayntun wins a pair of
 three-day admission tickets
 to the 2013 British GP at
 Silverstone. For more details,
 call the hotline on 0844 372 8300
 or visit www.silverstone.co.uk



Friday should be for testing

Two of the things teams complain about most are a lack of in-season testing and the lack of opportunity for new talent to drive the cars. I'd add to this a lack of accessibility for fans at circuits, where there is a noticeable lack of autograph sessions or live driver interviews.

So how about making Friday at every race a test day with unlimited tyres? The big change would be that only the team's reserve drivers can drive and each 'test driver' must be somebody who has, for example, completed fewer than 20 races.

The race drivers would then have less idea about track conditions so would rely on the feedback of the test drivers, which could mean more competition from teams for these future stars. The added benefit is that it would free up race drivers to go out and meet the fans.

Steve Webster

Kent, UK

Support for Prost

It was sad to read in *F1 Racing* (February, 2013) that Alain Prost regretted the way his relationship with Ayrton Senna was depicted in the documentary *Senna*. Prost presents himself as an honest man and if he says "that's not how it happened" then I'm inclined to believe him.

There's no question that Senna was a racing legend, but the trouble with legendary status is that good is often remembered over bad.

Perhaps when Alain Prost – also a legend – moves on from this mortal coil, a documentary casting him in a more favourable light will be made and his reconciliation with Ayrton Senna will be permanently 'documented'.

Steve Drummond

Aberdeen, UK

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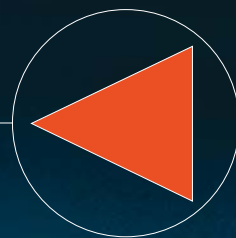
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**MAY ISSUE
 ON SALE
 25 APRIL**

Now that was a car



No 14: The Alfa Romeo 179

The 179's fitful performance barred a return to Alfa's 1950s glory days



WORDS JAMES ROBERTS PICTURES TIM KENT

Although Alfa Romeo took two world titles – with Giuseppe Farina and Juan Manuel Fangio – in the first two years of the Formula 1 world championship in 1950 and 1951, the famous Italian marque never again attained the highs of those early years.

During the 1960s and '70s, Alfa Romeo appeared in F1 as engine manufacturers, supplying several minor teams until they ramped up their operation to produce engines for Bernie Ecclestone's Brabham organisation in 1976. This ultimately led to a fully fledged works effort and Alfa's competition department, Autodelta, built a chassis for a factory team that entered F1 in 1979. In 1980, Alfa Romeo ran rookie Bruno Giacomelli (amusingly referred to in his F3 days as 'Jack O'Malley') alongside Patrick Depailler, who had just recovered from breaking both legs in a hang-gliding accident the previous season.

Alfa had signed a three-year sponsorship deal with Marlboro and were planning a V8 turbo to replace their V12 unit, but problems keeping the high-revving unit cool meant that the Tipo 1260 V12 continued until 1982. This was despite the team adding a *quadrifoglio* – a four-leaf clover – to the side of the chassis for good luck.

At the first two outings of 1980, in Argentina and Brazil, the car was a huge disappointment, with Depailler qualifying 23rd and then 21st. With a one-month gap until the third race in Kyalami, the 179 was significantly updated, with remodelled sidepods and skirts, new suspension, a new rear wing and, overall, a weight loss of 30kg.

"The car was simply unrecognisable compared with the one I drove in the two South American races," said Depailler at the time. "The work that was done by Autodelta was extraordinary."

Having qualified the updated car seventh at Kyalami, Depailler did a great job of hauling his Alfa to third on the grid at the fourth race at Long Beach, but ultimately retired with suspension failure. The 179 was showing further potential until the team were hit by tragedy. Depailler suffered a failure while testing at Hockenheim and crashed at the dauntingly quick Ostkurve. He was killed instantly.

Ermanno Cuoghi was one of Alfa's race engineers who had moved from Brabham to join the Italian team in 1980: "With Patrick gone, Giacomelli was too young and inexperienced to give us the information that we needed to develop the car further," said Cuoghi. "It would suit him at one race, but then not at another and if he can't explain to the engineers what is happening to the car on track, then it will only function at 80 per cent of its true potential."

The highlight of their tough season was Giacomelli's pole position at Watkins Glen, until electrical failure forced him to retire.

Further iterations of the car appeared, including the 179C in 1981, with Mario Andretti joining Giacomelli. But again the team with the famous badge (incorporating the man-eating serpent from the heraldic arms of the Dukes of Milan and the cross of St George) failed to score any meaningful results over their next four years in F1. **F1**

ALFA ROMEO 179 TECH SPEC

Engine	3-litre Alfa Romeo 1260
Layout	V12 (60 degrees)
Power	520bhp
Maximum revs	12,000rpm
Transmission	6-speed Alfa-Hewland
Wheelbase	2,740mm
Weight	595kg
Fuel and oil	Agip
Fuel tank capacity	200 litres / 44 gallons
Tyres	Goodyear
Notable drivers	Patrick Depailler, Bruno Giacomelli, Mario Andretti



Stefano Domenicali
stands in front of Enzo
Ferrari's old farmhouse
overlooking the team's
Fiorano race track







Bless this house



The burden of expectation lies heavy on the shoulders of Ferrari's team boss. In this exclusive interview, Stefano Domenicali reveals to *F1 Racing* what it means to run the Scuderia

WORDS ANTHONY ROWLINSON **PORTRAITS** FERRARI

'Sono un agitatore di uomini' was Enzo Ferrari's description of himself – 'I am an agitator of men.' It was as true when he ruled his scarlet empire with a combination of fear, self-mythologising and ruthlessness as it is today in the courtyards of the Maranello factories where his vision and legend hang heavy in the air. There's a picture of Enzo on the wall of a large office on a corner of the *Gestione Sportiva*, Ferrari's sporting division, which sits a couple of hundred metres from the original factory gates. Black and white, near life-size, it depicts Enzo in shirt sleeves and slacks, obsidian sunglasses locked in place, standing behind one of his racing cars. He is pointing, *commanding*... he is unquestionably in control.

It is this image that hangs at the shoulder of the man whose job it is to ensure that the *commendatore's* orders – *Victory for the Scuderia!* – are carried out to this day. Stefano Domenicali, Ferrari team principal, offers a thin, rueful smile as he wheels back from his desk, momentarily detached from the legions of paperwork that daily advance across its surface, to contemplate the stern master he has sworn to obey. "You can see here that he is always watching me," says Domenicali. "It is quite a severe picture over me, with the right finger pointed. And when I look at it, what does it make me think? 'R and R' – a great respect and responsibility." →



He pauses to point at the similarly imposing picture hung alongside the portrait of Enzo. This second portrait is a shot of Ferrari chairman, Luca di Montezemolo, celebrating a victory at Monza, circa 1975.

“So respect for what he did – don’t forget that Mr Ferrari started from nothing – and then Mr Montezemolo was able to keep the flow in the right direction with a very different situation. My responsibility now is to make sure that with my humble work I can keep feeding the value of this company. It’s on a daily basis that you build something and this is really what I feel.”

That Domenicali breathes this sense of duty is obvious from the urgency of his conversation. As with any team boss, his time is precious, the myriad of conflicting demands always just a meeting, a phone call, an email away. Every sentence is spoken fast and with precision to maximise efficiency of dialogue. Early small talk about his passion for aviation (he earned his pilot’s licence at 17 and an office bookcase is topped with model helicopters) is engaged with only briefly: “I am still passionate about aeronautics. That’s it. As a kid, I wanted to play basketball and I wanted to be a military pilot. I did the first but not the second,” he laughs.

He also did something else: he rose through the team he joined in 1991 with a business administration degree, from finance department to team boss by 2008. Domenicali, 47, says he never had designs on the top job – “I would never have thought to become what I am, to be honest with you” – but now, following the likes of Jean Todt, Claudio Lombardi, and Cesare Fiorio, he occupies a position that demands he carry the expectations of Italy on his shoulders. He describes the burden as “so heavy you have to not think about it”, adding: “The first moment that you do, you feel the weight of the responsibility is very high. It’s enormous.”

Two years ago, it almost became too much: the poor strategy call that scuppered Fernando Alonso’s race in Abu Dhabi, costing him a title as Vettel charged through to win the championship, came very close to prompting Domenicali’s resignation. But he endured (unlike former head

of race track engineering Chris Dyer, who was scapegoated for the blunder), absorbing the subsequent slings and arrows as a necessary part of his role: "The most important thing you have to be able to manage is the pressure," he says. "I try to put aside all the negativity that is around, try to put it on my shoulders, try to protect the team from this, because this is the day-by-day job that unfortunately, when you are in Ferrari, you have to live with."

It's not easy to be head of a team that's a country's unofficial state religion. Even less so when, after a first constructors' success on his watch in 2008, a Ferrari driver has three times finished an extremely close second in the championship over the past five seasons (Felipe Massa in 2008, Alonso in 2010 and 2012). "But," Domenicali notes, "we need to learn how to lose. Our world is not mature enough to understand that. When you do the maximum, you have to respect the fact that you may lose or win. But always with the approach that the day after, you have concentrated yourself to make sure that you improve. That's the right thing to do. We, as Italians, have too much emotion and there are always these kind of situations where it's 'dead or alive'. Either you are a hero or a zero. Thanks to God that's not really the way I behave or think, and I'm normally very good at trying to stay disconnected from this approach."

A pragmatist is speaking here, a man who, although imbued with the sporting essence of his team and the region in which he grew up (he was born in Imola and volunteered as a track marshal there in his teenage years), nevertheless understands that success in F1 is a complicated business, with glory or defeat separated by the narrowest of margins. "It's not like football," he asserts, "when you change a defender or – how do you call it? – the goalkeeper and suddenly you are the best team. Here, when you make some changes in terms of methodology, or in terms of organisation, you will not see the benefit for a year or maybe more. In a situation like now, where the regulations are stable, to improve you have to improve everything, every little detail, otherwise you will never win."

"Believe me,
to be second
hurts more
than being
fourth or fifth"



During this conversation, Domenicali has eased himself away from his demanding desk and relaxed back into his chair, successfully tearing himself away from the incessant flow of 'READ ME NOW' emails. He becomes animated as talk turns inevitably to the 2012 season, a year of epic struggle capped by failure to win ('losing' seems too stark a measure of Alonso's and Ferrari's campaign). Shortly after the final race, the entire team were gathered at HQ for an address by Domenicali and di Montezemolo, during which the troops were urged to regroup and refocus for another battle ahead.

Taking positives from that defeat and understanding both where and why the failure occurred has become a central tenet of Domenicali's leadership gospel. "Because if you do not mature from your loss," he says, "you fall into the trap of having only the bad feeling of being the loser or being second. And, believe me, to be second hurts more than being fourth or

fifth. Unfortunately we had a lot of experience of that, but that's the way it is." If his words appear resigned, they belie the nature of the man, for Domenicali fizzles with energy, humanity and focus. You sense he would be an excellent dinner companion, were he ever able to release himself from the pressing concerns of testing times, windtunnel numbers, contract negotiations, budget pressures, results, results, results...

His common touch is evident as he recounts telling his team "always to keep their heads up" and of being able to accept that, despite the burden of expectation, despite the legacy of history, it is not possible always to win. Not that defeat ever tastes any sweeter: "I *hate* to lose the championship in the last race and I remember that unfortunately it has happened to us on several occasions since 1999. It is always tough to digest." All the more so when, in many respects, Ferrari's 2012 challenge was standard-setting. Domenicali reckons that in "four of the five" elements needed to win a championship, Ferrari were "the best". The performance of the F2012, however, was initially so poor that even herculean development and driving efforts were not enough to overcome the handicap.

"Remember," he says, "we started last year 1.6secs behind and by July we had the best car. But it's normal that you cannot keep that gradient of development. So the objective of this year is, for sure, to try to be more competitive. But the season will not finish on Saturday in Melbourne, so I don't want to see the kind of approach, where that's the final moment of being either the loser of the championship or the winner. The key point of this year will be that we need to be consistent with the results. That was the case with Fernando at the beginning of the season and, for me, that will be the principal point of the championship in 2013."

He can take heart from the early showings of this year's F138, which indicated it's a car with none of the fundamental vices that so hampered the F2012 – principally its lack of aerodynamic efficiency. That can be attributed, in part, to some intensive sessions in Toyota's Cologne windtunnel, where most of the F138's aero →

development has been conducted while Ferrari work to upgrade their own troublesome in-house facilities. There is also the return to F1 action of one Rory Byrne, technical architect of Ferrari's noughties domination. The party line is that he has been drafted in to help guide development of the 2014 F1 programme, while also leading the Enzo supercar project. A handy pair of eyes to have in-house though, and another nod to the continuity and stability Ferrari are uniquely able to channel into their road and racing activities.

There's continuity in the cockpit, too, with Fernando Alonso confirmed until 2016 and another season for wingman Felipe Massa, now Ferrari's second longest-serving driver after Michael Schumacher. Domenicali is in no doubt that, as regards driving strength, Ferrari are giving nothing away. "Would it be fair to describe Alonso as your strongest attribute in 2012?" *F1R* asks. "Yes" is the whip-crack response. "And what's he like to work with?" "He's a great driver. Not a lot of talk. He has a lot of trust in the team and he always relies on teamwork and from that he is able to take the maximum. So our objective is to make sure that he is able to take the maximum from a very good product, otherwise it is very difficult, for sure."

He dismisses the notion that Alonso's 2012 was so near-perfect it's not repeatable. "Why not? he asks. "Absolutely he can do it again – maybe better. The great thing in sport is that you believe you will reach more than what you thought was possible and then you realise that you are doing better the year after. It's a matter of maturity. It's a matter of tools, it's a matter of the equilibrium that you reach when you're growing, so I'm positive that he's going to do a great season again. No doubt."

The suggestion that Alonso should have been at the first Jerez test, rather than prepping himself to Ironman-standard fitness levels, is similarly batted away. Better, Domenicali reckons, for a driver to be fit in mind and body, brimming with energy, punch and self-belief, than to have notched up three days lapping a track known to produce inconclusive data. "Don't forget," he says, "that last year was a very



Is Alonso capable of bettering the incredible efforts of his 2012 campaign? Domenicali certainly believes so...



tense season from the emotional point of view. If you lose a championship you don't deserve to lose – because honestly, without two accidents at the first corner he would have been champion – then from the mental point of view you need to have the right time to recover, to be ready

from the first to the end. There is more performance in the head of a driver than in a week in a windtunnel."

A rested, combative Alonso in a car even a whisker more competitive than last year's is surely a competitive proposition that will focus the attentions of Vettel-RBR, Button-McLaren, Lewis-Merc and Kimi-Lotus. But what of those who also serve? From comms assistant to rookie bolter, those who endure even more punishing, bucket-class travel schedules, late nights, weekend shifts, Mondays back at the coalface straight after a race? Where is their down time? It is, Domenicali admits, "the biggest problem. It's so intense that you don't have the time to stay home, to take the right moment of recharging, apart from the break in August. And then between Christmas and New Year there aren't really any days off. But this is our life and we cannot complain. There are



Todt vs Domenicali

When he started his new job as Ferrari team principal on 1 January 2008, Stefano Domenicali had the unenviable task of following in the footsteps of Jean Todt. During his time in the role, Todt, who had taken over from Claudio Lombardi in July 1993, helped the Scuderia and Michael Schumacher to an unprecedented five consecutive drivers' titles between 2000 and 2004. However, his record over his first five full seasons as team principal is remarkably similar to Domenicali's, who has at least managed a constructors' title...

	Jean Todt 1994-1998	Stefano Domenicali 2008-2012
Races	82	93
Wins	16	18
Other podiums	46	48
Poles	14	12
Fastest laps	14	22
Races led	39	47
Laps led	915/5253 (17.4%)	1052/5559 (18.9%)
Drivers used	5	5
Drivers' titles	0	0
Constructors' titles	0	1

people worse off than us." There would be little sympathy, you suspect, from the solemn-faced agitator of men at his shoulder, were Domenicali or any of his cadre ever even to contemplate – let alone articulate – the notion that working in F1 can sometimes be quite tough.

"Yes," Domenicali reflects, "it's a big challenge that you have to take with the right approach and the right professionalism, knowing that this has to be seen as a privilege. I am very proud of it and I feel that responsibility in a way you could only fully understand from this chair. If you are second there is always something wrong. Unfortunately, this is our destiny. You cannot change that. And it may be a good thing about this job, because you know exactly what to do. Sometimes you would like to have a much more relaxed approach to the results, but you cannot. Full commitment and full throttle. That's what you need when you are seated here." 🏎️

🏁

"If you
lose when
you don't
deserve to
lose, you
need time
to recover"



TRACK TO THE FUTURE

Ferrari's in-house test track, Fiorano, is unused by the team's Formula 1 cars under current test restrictions. But that could be about to change...

WORDS ANTHONY ROWLINSON **PHOTOS** FERRARI



Schumi pounds the track at Fiorano, back in the early '00s testing heyday

INSET: LAT ARCHIVE

They called it Ferrari's 'unfair advantage': a bespoke test track next to the F1 machine shop from which that year's scarlet racer could emerge, paint barely dry, and begin the time-honoured process of 'drive-it-break-it-make-it-better'. In a digital age, this was the analogue approach – Ferrari's deep-cut vinyl to the Wi-Fi downloads of a McLaren or a Red Bull. NASA-spec simulators and a windtunnel developed to prove the aerodynamics of Cold War missiles (as Red Bull's was) are all very well, but when you've got Schumi, Barrichello, bubble-gum Bridgestones and all the time you can eat at your own private raceway, they're not strictly necessary.

Ferrari's analogue method reached its zenith in the Todt-Schumacher era, when Michael and Rubens would test from dawn till dusk, using Enzo Ferrari's converted farmhouse beside the track as their elite billet. It had been like this since 1972, when Fiorano was constructed – much to the delight of the fevered-up local *tifosi*, who would gather on a nearby road bridge that afforded a view of the track and watch their beloved scarlet racers pounding round till discomfort defeated passion. A decade ago, *F1 Racing* paid a visit to a live Fiorano test and learned from Schumacher that the team would think nothing of extending their programme by a day to trial a new development. This was at 10pm, over dinner, when Schumi had finally satisfied himself that his day's work was complete. Barrichello's report was similar: "My record? Coming out onto the track at 9.26pm. We had one last detail that needed checking."

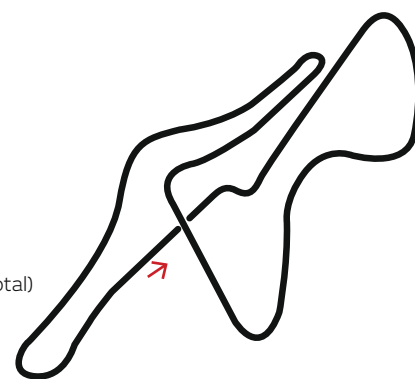
Fiorano's tight confines meant its usefulness in preparing for specific grands prix was limited: its configuration was comparable only to that of Monaco or the Hungaroring. But its handiness in ensuring general race readiness was boundless. Need to sharpen up the start procedure? How about an afternoon of burnouts on the back straight? Compare that with today's money- and time-limited test schedules: three giddy winter weeks in Spain, plus a still-to-be-confirmed young driver test. That makes a maximum of 16 days as against the 100 or more Ferrari might have logged in the early noughties. It might very reasonably be argued that money-no-object testing has no place in austerity-age, eco-nervous F1. And when smaller teams have to unplug a driver from his scheduled Barcelona test programme because his cheques haven't arrived, the costs involved in prepping F1 cars for track action are laid bare. →

TRACK FACTS

Built	1972
Designer	Ugo Cavazuti
Length (1972-92)	3,000m
Length (1992-96):	3,021m
Length (1996-)	2,997m
Min width	8.4 metres
Corners	15
Straights	0.832 miles (total)
Average speed	112 mph
Max speed	180 mph

Fiorano's five fastest laps

55.999secs	2004	M Schumacher	Ferrari F2004
56.33secs	2003	M Schumacher	Ferrari F2003-GA
57.099secs	2006	F Massa	Ferrari 248 F1
57.146secs	2005	M Schumacher	Ferrari F2005
57.476secs	2002	M Schumacher	Ferrari F2002





Schumacher (behind) alongside long-term Ferrari test driver Luca Badoer in 2001

But is there a middle way? Extra days for teams who want and can afford them? Benefits to the minnows from knowledge gained by the grandees, whose technology they're sharing? Ferrari, unsurprisingly, believe more F1 testing is a no-brainer, but there's logic there, too. Standing alongside a Fiorano frozen silent by an overnight snowfall, more effective than any regulatory testing restriction, team manager Massimo Rivola outlines the

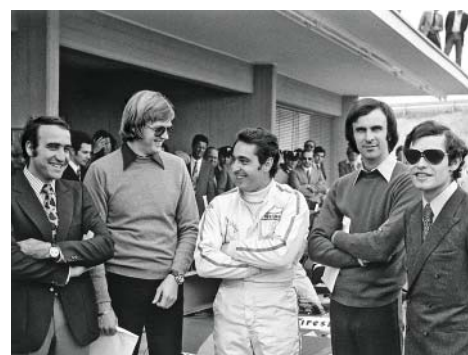
Scuderia's position: "What we are talking about is a team established with a proper track culture, one that has always used the track to test its racing and GT cars. In that way, Ferrari are unique among the F1 teams.

"The know-how we gain from testing engines and gearboxes in F1," he continues, "goes into all our products. And while it's important to have good knowledge of aerodynamics, it does not give you so much know-how as research into the engine and electronics." Team principal Stefano Domenicali is even more trenchant. "The testing situation is ridiculous," he asserts. "You can write that down: 'Rrrri-DI-culous!'" and he goes on to bemoan 'PlayStation' simulators that attract little media attention and which are, by their nature, secret, hidden from fans' view. "At the end of the day it is ridiculous – I use this word again – that we are not able to use this track. I use the example to my chairman [Luca di Montezemolo]: it's like going to play a football match after just watching the simulation on the computer. We were too far a couple of years ago and we are now too far on the other hand. So now, with the other teams, we try to convince them that we need to find another balance. And I am positive we can find a solution."

Ideally, he reckons, six or seven test sessions per season would be a more realistic figure and implicit in his suggestion is the idea that Ferrari should be allowed to use their own facility. He and Rivola are happy to let it be known that Ferrari's views are being expressed vociferously through formal channels such as the F1 Sporting Working Group and, informally, through paddock conversation with their peers. They're confident, too, of winning the regulatory changes they seek and beginning a process of de-restricting testing. With a somewhat rueful smile Rivola adds: "When the others see how much work there is to do for the 2014 regulations, I think they will also be happy to have more time on the track." **F1**

"It is ridiculous that we are not able to use this track"

Stefano Domenicali



From top: Ferrari team manager Massimo Rivola; Michael Schumacher; (L-R) Ferrari F1 and sportscar drivers Clay Regazzoni, Ronnie Peterson, Peter Schetty, Tim Schenken and Jacky Ickx at the opening of Fiorano

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EYES ON THE PRIZE

A lesser man and team than Fernando Alonso and Ferrari might have been crushed by the disappointment of losing the 2012 world drivers' title by just three points. But as *F1 Racing* learned, a wounded animal is the most dangerous...

WORDS ANTHONY ROWLINSON

PICTURES LORENZO BELLANCA

Lap after lap after lap, the beat goes on. Under Spanish skies, pre-season Thursday in Catalunya and with competition almost upon us. But today, at least, there's still time to prepare.

"*Mas Rapido!*" comes the shout from the sidelines, and sinews are stiffened, exertions redoubled. Faster, always faster.

Fernando Alonso can't hear this exhortation, as he's a couple of miles away, pounding his Ferrari F138 around the →

Circuit de Catalunya, honing the car on which his and his team's championships hopes rest.

Down here though, at the 50m open-air pool in nearby Granollers – a facility Alonso would relish, given his intense commitment to physical fitness – the sense of urgency at the swimming coach's commands is immediate. His words are carried on a wailing V8 backdrop, the rise and fall of multi-cylinder race engines echoing for miles across the hills of Montmeló on which F1's favourite winter test venue sits.

Zoom in: Alonso is hammering down the back straight at the Circuit de Catalunya, between Turns 9 and 10 – a fifth-gear exit at around 160mph, from which the car will briefly sneak into top and approach 190mph, before the heavy braking required for the second-gear T10. It's a challenging left-hand hairpin, with an uphill exit that'll drag a car across the track and over the kerbs without a firm, controlling hand. It's ready to catch the unwary in their still-box-fresh chassis, not yet tweaked to harmonious malleability. In cool and unpredictable conditions, who knows how much grip to expect from the new-generation soft and supersoft Pirellis?

Giedo van der Garde, in a Caterham CTO3 whose front and rear ends appear to be barely on speaking terms, makes an early fumble, missing his braking point, locking up and scratching into the run-off. Jean-Eric Vergne, in the far less unruly Toro Rosso STR8, is another to misjudge, overcook and drag around.

Then comes Alonso, all hustle and limit-living aggression. He carves into T10 to an accompaniment of exhaust tears as the back end squabbles with itself, attempting to resolve that old battle of grip versus traction. Alonso's already ahead of the argument, pushing the car toward the red-and-white exit kerbs, visibly leaning on the right-rear, demanding that it catapult him up the hill and provide the pivot around which he'll make the chassis go left. It does; so does he; and the F138 steams round through T11

and T12, heading 'over the top' for T13 – once a sixth-gear 150-160mph right with a plunging exit; these days an emasculated short-shift shuffle into a tricky chicane (T14/

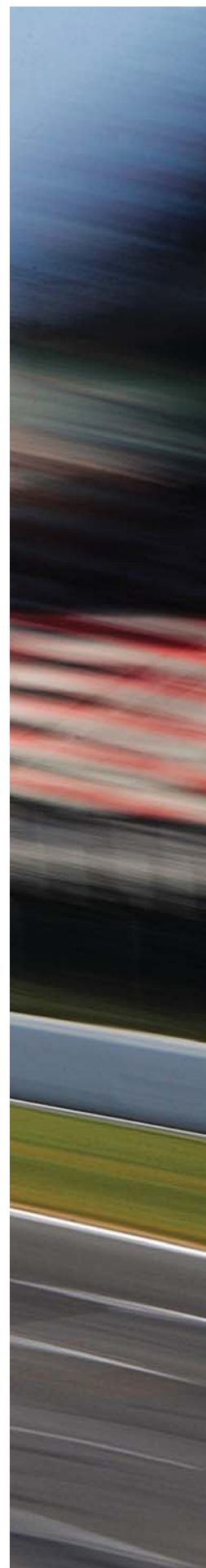
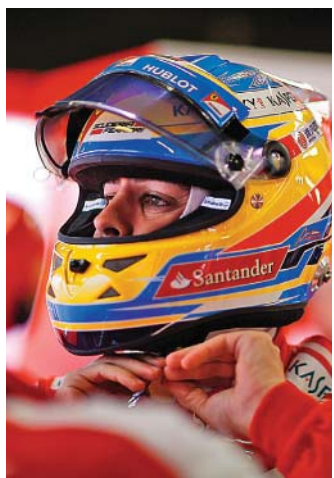
T15). Except that Alonso – thrillingly – ignores the 'new' circuit and blasts through the old T13 at full whack and with unhesitating commitment. Blink. Reset. Did you just see that? Yes. Next time around he does it again, then again, before reverting to the more conventionally prescribed tour.

It's likely (sources won't confirm) that Alonso is harvesting high-speed corner data for his engineers. But there's no doubt that this relentless competitor is also getting a feel for his steed in the really quick stuff and seeking an advantage where it's not apparent. For the best part of an hour he's the only driver to explore the original circuit layout – although later on, Romain Grosjean and Nico Rosberg also venture to the edge.

Two thoughts occur: the first is that Alonso's hunger for the fight is manifest in his entire comportment both inside and outside the cockpit. When driving, the body language of the F138 is that of a car being pushed, *driven*, as opposed to coaxed or cosseted. Out of the car, but still on Ferrari duty, Alonso's aura radiates intensity. He is not a man for small talk.

The second is how much more biddable this year's Ferrari looks compared with its predecessor. Where the F2012 was an awkward child, developed to grudging respectability, the F138 seems more likely to flourish. Alonso acknowledges as much, although cautiously: "The feeling of the car is similar to last year," he says, "as there haven't been big changes [to the technical regulations], but I didn't say anything about the range of things that we've found on our route to improve the car. I am sure we will be strong in Australia. We need to improve from where we were last year because it was not enough – we finished second and we want to finish first. So our immediate goal, to improve in the first half of the year, shouldn't be that difficult. We are relatively confident."

Zoom in again, this time to the Ferrari garage, to which *F1 Racing* has been granted →



ALONSO'S HUNGER FOR THE
FIGHT IS MANIFEST IN HIS ENTIRE
COMPORTMENT BOTH INSIDE
AND OUTSIDE THE COCKPIT





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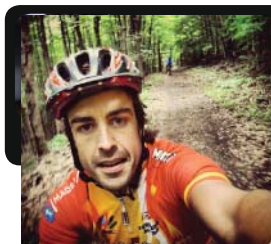
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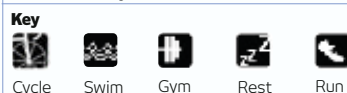
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The (not at all) secret diary of FERNANDO ALONSO aged 31-and-a-half

Through his Twitter account, @alo_oficial, Fernando has shared many of the most gruelling moments of his pre-season physical preparation

16 Dec 2012 <i>It's been a long season:</i> "Today I finish my commitments for 2012. Have a Merry Christmas and see you in January with I hope big smile. Thank you all."	30 Jan "Relax.."
20 Dec <i>His last tweet of the year to his 1.5m followers:</i> "Have a Merry Christmas. Tengan unas felices fiestas."	31 Jan "Pizza with the people working on my car this 2013! Time to start working!"
1 Jan 2013 <i>And then:</i> "Feliz 2013 !! Salud y felicidad para todos!!!! Happy new year!! Best wishes to all of you!!!"	2 Feb "Gimnasio.."
2 Jan <i>Still in the winter break and before all the hard work begins again:</i> "Fantastic days of holidays & training with my friends in @scuola2000! They are the best !! Follow them, are starting here on Twitter ..!"	3 Feb "Bicycles in the car, going for training in a special place.. 4:10h bici - 116km. Very windy. Now time for lunch!!!"
2 Jan "Another good day in the snow..."	4 Feb "2:45h bike followed by 35 minutes running. Lunch, rest and gym this afternoon. Energy needed ... :)))" "Gym"
4 Jan "Nice Italian road for bicycle..."	5 Feb "Another good workout this morning in bike at high intensity. Rest and gym this afternoon."
6 Jan "Sauna day..."	6 Feb "108km - 3:52h. Low intensity. Gym this afternoon."
7 Jan <i>Training in Russia:</i> "The year has started discovering new routes..."	7 Feb "3:20h - 88 km bike this morning. Run in the afternoon." "1:18h running - 15,4km. We continue tomorrow." "Tomorrow gym, bike, running. We are training hard! The healthy body and mind are essential to perform at your best when arrives the races ..."
14 Jan "This week will be relaxing between the events, trying to recover energy in the body. From next Sunday, intense physical training .."	8 Feb "1h bike warm up, follow by running 1:39h - 19km."
20 Jan "Tomorrow begins three weeks of intense physical training. Here in Italy the first part. I'll keep inform ..."	9 Feb "Today the toughest day of training. 3:38h Bike - 100km, followed by 1:18h - 16km run. Rest and gym later"
22 Jan "Gym session and 15km run this morning..."	11 Feb "Third and final week of intensive preparation. Specific training for driving (reflexes, neck, etc)! In 8 days we are in the F1" "Last exercises in the gym for today. At 21h I'll be here answering your questions ...if you have... :)"
23 Jan "Good morning! It keeps raining a lot...!! Gym session and swim 2h." "Finished gym and pool sessions. Some rest before more training this afternoon." "At 19:00 I'll be around if you have questions... :)" "In answer to 'Do you have a strict diet while you prepare for the season?' 'Not too strict, just healthy.'"	14 Feb "Getting ready for another day on the mountain. Important protect feet for possible chafing! Ready!" "3:45 h this morning skying up to top of the mountains, and now finished at the gym. Tired but good feelings."
24 Jan "Again rain hard...!! Keep training in gym."	15 Feb "Easy day today with 55 min running. Last days of preparation."
25 Jan "Good morning! Ready for another training day."	16 Feb "Summary of the last 3 weeks of preparation. -936 Km bike -91 Km run -Swim 8h -Gym 7h -14h various (ski, tennis, soccer, etc.)"
26 Jan "Rest day well spent...!"	18 Feb "First day at school..."
28 Jan "Finally sunny!! Good bike session today."	
29 Jan "Swim and bicycle until lunch time. Have a good day." "45 min swimming and just over 3 hours of bike this morning. Lunch and rest this afternoon." "3 weeks ahead of physical preparation. 3 different goals each week. Target: arrive at 19th February at 100%."	



access. Alonso is taking a break from extended lapping and as the scarlet screens are pulled tight behind us, shielding activity from view, there's an inescapable feeling of watching a lion at rest in the shade. Helmet off, drinks bottle to lips, his head tipped momentarily back on the headrest, Fernando closes his eyes, visualising, resting. His hot car, still for the first time in an hour, also appears to be drawing breath as its crew attend to its multiple needs: fluids, fuel, pads, tyres.

The garage mood is light but intense, with a twist of nervous excitement not unlike the pre-exam tummy-flutter familiar to any student. "The day passes by very quickly," says one team member and given the expression of focused concentration on the face of technical director Pat Fry as he looks over the latest prototype to emerge from Maranello, it's obvious that full mental energy is being expended on the task in hand.

Engine boss Luca Marmorini offers an insight into the types of technical challenge being wrestled with, as he discusses the balance to be sought between enhanced rear aero efficiency from Coandă-style exhausts and ultimate power output: "At the moment, all engine people are a little bit unhappy that we have to compromise engine performance," he says. "We can afford to lose some horsepower if the car is quicker but, on the other side, there is a lot of work from engine departments to recover some performance. We have worked on this. Our customer teams have worked on this. Everyone is working the

same to reduce the impact of the Coandă exhaust."

He goes on to explain how an exhaust system is as "critical" a component as a piston or a gearbox – one, therefore, that needs extensive testing before it can be declared race fit. "We have a lot of concern about introducing the latest exhaust solution without the correct number of tests," he adds, "but in the end we have to push... and the more you push this,



Alonso reloaded: fitter and even more focused for 2013

the more of a worry the reliability can be. That is why... we tried to test the exhaust to the very end of its life because we definitely need to know what the limit of the exhaust's life is."

This year, Ferrari have pushed as hard as they ever have. While the F2012 marked a technical departure from previous seasons, with its pull-rod front suspension, the F138 is evolutionary in mechanical terms, although aerodynamically rigorous. Forced to employ Toyota's windtunnel (for more on that, see p60) due to correlation problems with their own, Ferrari hope they now have a powerful weapon: namely aero info as accurate as that used by leading rivals.

The evidence of their endeavours is in the detail: that bullish nose treatment incorporating turning vanes into the front wing mounts; a tighter sidepod and exhaust area, cleaning airflow to rear wing and floor; a raised lower rear wishbone that clears the diffuser; a tiny DRS mechanism and intricate turning vanes across the rear.

"The car is on another planet compared to the one we began with on the first day of testing last year," says Alonso.

The proof will be in the times – lap after lap after lap.

THE MAKING OF A McLAREN DRIVER

If you want to sit at the top table you have to deliver – race in, race out. *F1 Racing* investigates McLaren's plans to turn Sergio Pérez into a relentless winning machine

WORDS

STUART CODLING

PORTRAITS

PATRICK GOSLING/
VODAFONE, McLAREN



MP4-28



2013



Three podium finishes. Fastest lap around the streets of Monte Carlo. A 2012 haul that would please many mid-grid drivers, but it wasn't enough to shield Sergio 'Checo' Pérez from a hail of small arms fire over the winter following his high-profile transfer to McLaren.

The general perception in the Formula 1 paddock is that on his day – helped last season by a car sympathetic enough to its tyres to allow Sauber to think big on tyre strategy – Pérez is quick enough to win grands prix, but that he wasn't quite

fit enough, and certainly not consistent enough, to get the job done every time. Like so much established wisdom, this particular piece of groupthink is ripe for picking apart. Sam Michael, who as McLaren's sporting director is charged with extracting the best from young Pérez, gets right to the point:

"It's very easy to say whatever you want, looking from the outside," he says, "but once you get hold of someone and work on them, things are always quite different. Checo is no exception. There are areas in which he needed to improve and →



he did a lot of work on them over the winter – but they weren't necessarily areas people on the outside thought he needed to improve."

Michael resists going into specifics – in the interests of retaining McLaren's "competitive advantage" – but he explains the philosophy behind what Ron Dennis would no doubt refer to as the team's 'driver optimisation programme'.

"In this business, it's all about eliminating variables. It doesn't matter whether that's engineering or the drivers themselves, or sporting issues. Preparation is all about saying, 'I've done all I can in that area.' So then if you struggle or you have problems, you don't have to question it. You can say that person has done their preparation properly.

"What we've done with Checo is to get him fit, make sure he's at the level we require – and he's definitely got there, which is impressive in such a short space of time – and then get him used to the way we work. That means everything from the engineers here, to how we test at the circuit, to how we debrief, and so on."

It should come as no surprise that McLaren are a very process-driven and discipline-focused organisation. But not every bright driving talent to pass through the gates has prospered there. Juan Pablo Montoya, you might say, was a classic example of a gutsy driver, whose natural gifts far exceeded his motivation to knuckle down to such matters as mental application, fitness – and, indeed, due process. Could such accusations fairly be levelled at McLaren's new man? After all, didn't Pérez fail to score a single point in 2012 after signing for his new team? In most photographs, had his face not settled into a frown? And hasn't he always been less whippet-lean than many of his peers?

Early this year, though, McLaren wheeled out Sergio 2.0. Trim but not gaunt, willing to acknowledge on the record that he has a tough job ahead of him, and seemingly bursting with enthusiasm to get down to it. Perhaps most significantly, he looked happy to be there, even beaming in unguarded moments when the cameras had ceased clicking.

"It was a very special day to go there [the McLaren Technology Centre]," he says, "to visit the team as a driver, to be wearing the kit. It's a day I will not forget. For me, this is a great opportunity and as a driver you're always looking for this kind of target. I'm looking forward to making the maximum out of it."

Consistency is also a subject he's prepared to revisit: "It's not easy at all. It's tough to maintain your maximum level across the whole season and all of the races. Here the motivation is even higher because when you're fighting for the world championship, for you to be winning races every weekend, your level has to be right at the top for every single race."

To come around to a subject beloved of three-time world champion Sir Jackie Stewart, one of the key pillars of McLaren's approach is mind management: a process of mental decluttering that works in harmony with increased physical fitness, because fatigue is the great enemy of concentration. At McLaren, their Human High Performance Programme is managed by Clayton Green, who used to be one of Lewis Hamilton's trainers. Green uses a combination of training methodologies drawn from Olympic sports with measurement rigour provided by McLaren's own experience in monitoring and processing the reams of performance data generated while their cars are on track.

"He's been in contact with the Human High Performance team pretty much every day," says Michael de Pérez. "They set out a programme for him and he followed it religiously; they, of course, regularly measure him and plot his progress. They can monitor all sorts of different parameters and he has a trainer, Antti Vierula, who pushes him all the time." So there's nowhere to hide.

"Mind management is all about focus, about eliminating other variables that can affect your performance on race day," continues Michael. "If your mind's cluttered with things that aren't relevant to what's happening then it reduces your performance, because you're using up bandwidth in your brain. It reduces your ability to drive the car fast or set up the car correctly. Mind management is not especially complicated, but it's an essential part of driver preparation in F1 now and we concentrate very hard on it.

"Pressure can come from so many different areas: if you gave a bad interview or had something bad written about you in the press, or felt you'd let the team down because you got sick or you didn't train properly or you made a bad setup call, for instance. But if you've done your preparation then you don't deal with mistakes and issues in a race weekend the same way you would during testing or training. In a race weekend you're into drill. It's like athletics or





any other top-level sport. If you've made a mistake you're not going to correct it, from a mental point of view, over a race weekend."

As Martin Whitmarsh told *F1 Racing* at the end of last year: "When you're a McLaren driver, if you're not on the first two rows, there's one hell of an inquest. It's a different level of pressure." Sergio subscribes to that methodology. "My expectations are very big," he says, "and I'm sure the team have very big expectations of me. We both have the same target – to win the championship, to win races – and that's why I joined the team. I think in that respect I have to give my very best at every single race, to be consistent, to be able to extract the maximum from the car – to bring it home and bring the points home."

"I never thought McLaren would have a place for me, even though they are the kind of team I wanted to drive for. Then, towards the end →

"I have to give my best... bring the car home and bring the points home"

of last year everything came closer for me to be here. It's the best place to be. I think this team could give me everything I ever wanted."

Expectation and pressure are external forces that Pérez will have to mind-manage away once he sits in the cockpit. But not all of those expectations come from the media or his legion of fans back in Mexico. His new paymasters clearly have goals, chief of which is to add to the trophy cabinet – having not won the constructors' title since 1998. Surely – no pressure, of course – there must at least be some sort of 'road map' laying out their expectations for their new equal-number-one?

"That's something we discussed with Sergio when we first sat down with him, before he was even a contracted McLaren driver," says Michael. "He knows exactly what we expect from him and how he needs to go about that. We'll do everything we can to help him achieve that. Those targets aren't just numbers – you must finish in 'x' position and so on. Some performance indicators we set aren't necessarily physical ones – they are quite subjective and difficult to measure, but we try to measure them anyway because if you don't measure you don't have much chance of improving."

What he's alluding to here are those essential but intangible elements that you won't see when watching the races on television: the everyday human interactions that make a garage an

"I don't need anyone to carry my bags... that's no problem"



effective workplace. Sergio will have to slot into an existing setup recently vacated by Lewis Hamilton – he inherits Vierula and race engineer Mark Temple from Lewis – and you hope he isn't tempted to follow Hamilton's example and introduce the potentially divisive element of a celebrity entourage. That seems unlikely since he often travels alone, and at races his inner circle consists of close family and his manager, Adrian Fernandez.

"I don't need anyone to carry my bags for me," Pérez says. "Sometimes I'll be alone and that's no problem for me." Legacy, no doubt, of leaving Mexico at the age of 14 to ply his trade in Europe.

Impressively independent he may be, but 'The McLaren Way' will still take some acclimatisation. "There's a lot of things we do differently and that's something Checo has had to get used to," says Michael. "He's fitted in with the team really quickly and he's got a great character. He's

got a good sense of humour and a human side – he communicates well with people. But at the same time he's also very competitive. Ultimately, what you're asking a driver to do is something pretty exceptional. He has to have complete trust in all the people around him."


In testing, Sergio got to grips with the McLaren MP4-28 quickly and there were no questions about his pace. But as Sam Michael points out, the races themselves will be the biggest test of whether he has the makings of a successful McLaren driver: "We want Checo to have a long career with McLaren... but we'll have to see how things go over a full season of grands prix."

That Sergio has grasped the opportunities offered to him, and dutifully applied himself to the course of preparation McLaren have prescribed, is not in question – but, like any other driver, or any athlete for that matter, when the race starts... he's on his own. **F1**

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Why Toyota's F1 windtunnel holds the key to the 2013 world championship



PICTURES: TOYOTA LEAD IMAGES
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Toyota never managed to design a race winner in their cutting-edge windtunnel in Cologne, but now teams including McLaren and Ferrari are queuing up to use it. We reveal why

WORDS JAMES ROBERTS

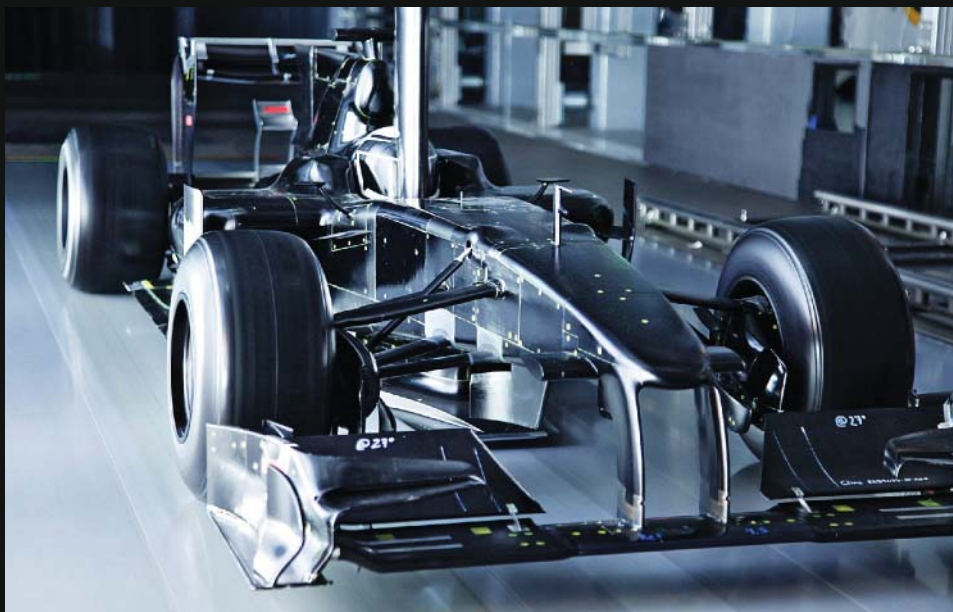
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ack in 2002 when Toyota entered Formula 1, the F1 community heaped scorn upon them for basing themselves on the outskirts of

Cologne in the west of Germany. Being so remote from the 'motorsport valley' of F1 teams – somewhere between Brackley and Woking in the UK – would surely leave them out on a limb. But in the three years since they departed F1, the situation has been reversed. Now Cologne's hi-tech facilities, which include a simulator available for hire, a seven-post rig and two windtunnels, have become an international F1 hub – attracting regular visits from the likes of McLaren, Toro Rosso and Ferrari (who are using Toyota's windtunnel while their own tunnel in Maranello is being upgraded). Indeed, it could play a pivotal role in the outcome of the 2013 world championship.

Toyota built their first full-scale windtunnel in 2001 and decided to invest a further £40million to build a second model in 2007. At a time when spending in F1 was largely unregulated, the team were using both of their tunnels incessantly for 24 hours a day, seven days a week. They were top-spec, with continuous steel-belt rolling roads and a maximum speed of 70 metres per second. One of them can take full-scale F1 models.

Windtunnels' importance in the study of aerodynamics has grown as the FIA has attempted to reduce costs in Formula 1 by limiting track testing. Aerodynamics, of course, is one of the key performance differentiators on a modern F1 car, along with tyres and engines. There are two types of simulation for testing aero: one is in the virtual world of computational fluid dynamics (CFD) and the other is the artificial track in a windtunnel. Neither simulation is an exact science, as small things, such as tyre deformation in a scale model, won't have the same characteristics as a tyre in real life. But



F1 regulations state that most windtunnel testing must be done with 60 per cent models

by linking windtunnel work with CFD, teams get a better understanding as they develop performance into their cars.

All well and good, but windtunnel use and CFD capability, like track testing time has also been limited by the Resource Restriction Agreement (RRA). Article 22.4(h)(ii) of the 2013 Formula 1 Sporting Regulations

states that teams can have four days of straightline aerodynamic testing a year, or substitute each day for four hours of full-scale windtunnel testing. For all other testing, use of a scale model greater than 60 per cent is prohibited, and no testing can be done at a speed greater than 50 metres per second.

This is where Toyota's windtunnel plays its trump card. Back in 2009, Toyota's second tunnel was upgraded to feature a Continuous Motion System with High-Speed Data Acquisition (HSDA), which ensured the team had one of the most advanced windtunnels in the world. Its benefits became clear as F1 tightened its rules on spending. Since the RRA has dictated that windtunnel time must be reduced, F1 teams have discovered that what Toyota's windtunnel offers is more beneficial than their own. To guard client confidentiality, Toyota will not reveal the identities of the teams using their facilities or how much time they are spending in there, but they can provide some insight into why teams that have their own in-house facilities are willing to travel elsewhere to do research.

Toyota's head of aerodynamics, Chris Herbert, explains the reasons behind this: "Our windtunnel is a very efficient place to come and do testing. You get more data per minute per hour than you would in an equivalent facility. The reasons for that stem from the Continuous Motion System. Traditional windtunnel testing involves roughly four phases of analysis per data point, meaning that a lot of time is spent on sampling areas of a model. What we are able to do is move the model continuously, and simultaneously measure front ride height, rear ride height, yaw, steer and roll, →

"You get more data per hour here than in an equivalent facility"



Swiss movement, English heart



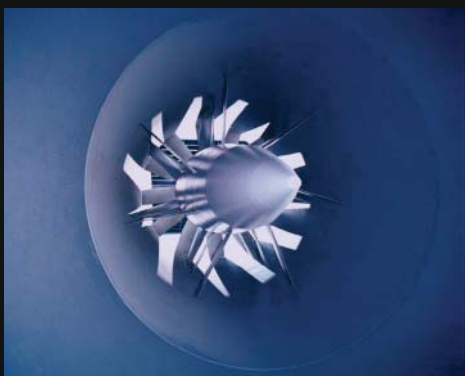
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"If teams use our systems, we destroy the data afterwards"



so using our system means that you can capture a lot of data very quickly."

Toyota's next-generation windtunnel means that teams get more detailed data and a better understanding of the aerodynamic forces at work on their models and can achieve that more quickly than in older windtunnels. One example of its increased level of sophistication is that it allows analysis of a 'steer-sweep' and can continuously obtain data during that process. "If you go from a low-steer angle that you might have on corner turn-in to a high-steer angle that you have in mid-corner, you might notice from the data that at a certain angle you lose front downforce," explains Herbert. "If a driver has said he's had huge mid-corner understeer, you can use the windtunnel to correlate what he has been saying. This is the sort of data that is very useful in allowing the aerodynamicist to better understand how their vehicle is performing."

A further key strength of the Toyota facility is analysis of data by particle image velocimetry (PIV). This is a technique where the air of the windtunnel is seeded with tiny oil bubbles that behave in a similar way to air. Their movement can be studied by shining a laser on them and filming the motion. Chris Herbert explains how it works: "Firstly, we seed the tunnel with an oil that creates bubbles with neutral buoyancy; we

Toyota's windtunnel specifications

Dimensions 63 x 26 x 13 metres
Test section 15 x 4.1 x 3.7 metres
Max wind speed 70 metres per sec
Fan diameter 6.3 metres
Fan power 2.3MW
Accuracy +/-0.04%
Rolling road speed 157mph
Rolling road width 2.4 metres
Rolling road length 7 metres
Vertical wheel force measurement (model) 30-300N
Vertical wheel force measurement (full size, front) 50-500kg
Vertical wheel force measurement (full size, rear) 70-700kg
Overhead balance, drag 1,800N



Rigorous procedures ensure that all teams' data is kept separate

then take two freeze-frame photographs in very quick succession (under laser light) and you can then tell the

velocity of the air in any given parts of the frame – so these micro-sized bubbles give very fine detail of the airflow.

"This is particularly important in the y250 vortex, around the centre line of the front wing. The middle section of the front wing within 250mm is mandated by the FIA, but the outboards are where you see different solutions by different teams – this is where you have multiple vanes on

the edges. In the transition between these two sections there is a huge pressure discrepancy, so that creates a massive vortex. This is really important to understand as it affects the airflow under the floor and the downstream across the rest of the car. We have PIV integrated into the windtunnel and it will provide a reasonably large amount of data in quite a short space of time. This is the best example of a flow feature that you can capture with a PIV and ensure your CFD is dialled in to what the windtunnel is saying."

Toyota's in-demand tunnel is used for their own LMP sportscar programme and they have had to develop rigorous secrecy systems to ensure the identity of external clients is protected, and that there is no risk of leakage. "We work very hard on our confidentiality systems, as it's critical that we have the faith of any client so they can work in total secrecy," says Herbert. "We ensure virtual separation: some clients choose to bring their own server network so that we never even see the data or, if they do use our systems, we destroy the data at the end of the session. And we have physical separation, too. We have two tunnels and two model shops and each shop is split into three separate areas. We have separate storage facilities as well. The only thing we haven't got two of is canteens – so clients from two different teams might bump into each other there, but what they talk about is their own business..."

Research has proved that the data from Toyota's windtunnel gives a very good representation when correlated with the track, demonstrating that teams who visit Cologne are benefiting from the size of the tunnel, the control systems, the PIV and the experience of the staff. "Our clients wouldn't keep coming back if we offered a terrible service," Herbert clarifies. "The windtunnel operators, the electronic support and the model makers are all professional experts who have been at Toyota for a long time and it's in our interest to keep them happy and coming back for more."

Quite a turnaround for a facility that was once regarded sniffily in some F1 quarters, yet which these days has become a familiar commuting destination for many of its fraternity. **F1**

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GLADIAT

Romain

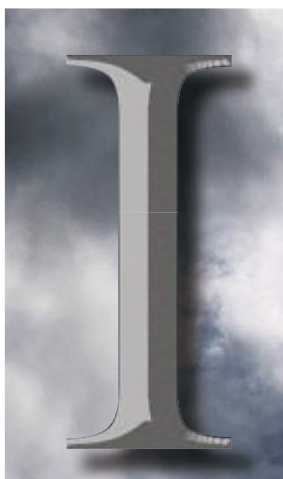


OR

He's no stranger to a fight but he's also earmarked himself as a potential winner. Can Romain Grosjean shake off his reputation for getting a little too physical?

WORDS MATT YOUSON

PICTURES ANDREW FERRARO/LAT



In the normal course of events, Romain Grosjean should be a relaxed man. To all intents and purposes he's done the hard bit. In fact he's done *all* the hard bits: after being dropped by Renault following a traumatic half-season in 2009, he went out and won his junior categories in 2010 and 2011. He got a second bite at the F1 cherry in 2012 and wasn't outgunned by a world champion team-mate. An unfortunate mechanical failure denied him a decent chance of victory in Valencia but, nevertheless, Grosjean made it on to the podium three times; he helped his team advance to fourth in the constructors' championship, and he demonstrated that he has the speed to do great things in the future. Lotus duly renewed his contract, and for 2013 he's coming back as an established driver taking a good car to circuits he's now familiar with. Life should be good. But is it?

The perception of Romain Grosjean is one of a driver on probation. For every good 2012 result the Swiss-French *pilote* had, there was a neatly corresponding calamity, frequently in traffic, at the start. For a comparative newcomer, events such as these acquire a certain momentum: questions are asked; the kangaroo court of public opinion sits in session; and then other drivers forget professional courtesies and mouth off. Thus the wrong sort of reputation is born.

Team-mate Kimi Räikkönen seems to have spawned a whole new genre of sportswear and, with cruel irony, Grosjean has a T-shirt legend too – and while you won't see anyone in the Lotus garage wearing one, there'll certainly be a few 'First-lap Nutcase' tees in the grandstands. Mark Webber coined the phrase in Japan, after being collected in the first-lap melee. It went viral. →

As insults go it's fairly innocuous, but at that time it was the last thing Grosjean needed.

While not the most frequent offender in 2012, Grosjean seemed to be the one who spent the most time saying sorry. The amount of public contrition he demonstrated in the second half of the year was... unusual. Such unrestricted *mea culpa* is not generally to be found within the racing drivers' phrasebook, but that's the line Grosjean took. No bluster, no anger, no

thinly veiled criticism of arbitrary stewarding. He apologised, accepted the situation and vowed to move on.

His apologists were not so meek. They point to the fact that only twice did the stewards hand him penalties, treating the other collisions as racing incidents. They rage against such apparent inconsistencies as Michael Schumacher escaping with grid

penalties after causing two huge crashes, while their man got to cool his heels for a weekend after causing the first-corner crash in Belgium that put Alonso out of the race. They argue that his transgression at Spa should have been judged on *what* he did, rather than to *whom* he did it (the stewards reasoned his offence was amplified by its effect on the championship). Today, Grosjean could use any of these arguments for cover. But he isn't one for hiding.

"I'm the first one to blame myself when I do something bad – and I did a few times,"

he reflects. "The best I can do is try to solve that.

Sometimes it was my fault, sometimes it was circumstance, sometimes bad luck. But it's a cycle: when it starts to go bad it seems like everything goes bad further on."

If Grosjean was often too eager to get a flyer off the grid, the technical reasons for that are compelling. The E20

tended to save its performance for Sundays. Less effective over one lap, it didn't qualify as well as it raced. It often demonstrated it could make up ground and finish well in the race, but rarely did so after a first stint boxed-in behind slower cars. While Räikkönen was more prepared to bide his time, Grosjean just wanted to get on with it.

"It wasn't the quickest in qualifying, and that is not just some ill chance or a reflection on our drivers' skills," says technical director James Allison. "It's a reflection on the characteristics

of the car. I think the thing that makes it good in racing [looking after its tyres] is making it a tenth or two shy of where it needs to be in qualifying."

Grosjean offers an interesting slant on this, suggesting reputation plays a role in the first-lap pecking order. "It is difficult to explain, but I've been through a lot of categories in my career and in your first

"I'm the first to blame myself when I do something bad – the best I can do is try to solve that"



year you're always blocked: later on, when you're a favourite, everyone gives you more space and things turn out different. There *may* have been just a touch of that: it was my first year and I was fighting at the front. Clearly I made mistakes, but perhaps there were other factors involved."

Two races are good examples of why Grosjean needed to roll the dice when the lights went out. Second place in Canada could have been better. Losing a place at the start to Paul Di Resta and following the Force India through the opening stint cost Grosjean time. Once

Di Resta pitted, Grosjean was released and showed the race pace of the Lotus by pegging then reducing the gap to the leaders. In a rare example of everyone pushing from lights to flag, Grosjean got the gap to under five seconds at the end of the race: the missed chance to stretch the E20's legs early on denied a victory challenge.



He spent 2012 apologising. Now he's got the speed and the experience to spend 2013 winning

The next race bore that out, until he retired with an alternator failure. Grosjean had a good start in Valencia, jumping Pastor Maldonado for third. He stayed comfortably near second-placed Lewis Hamilton, making his move only when the McLaren's tyres started to go away. Being stuck behind the Williams in the early stages would have robbed him of track position and the ability to exploit the pace of the E20 as others fell away.

Eventual winner Fernando Alonso passed Grosjean on the restart following a Safety Car but, given the formidable pace of the Lotus mid-stint, there's nothing to suggest he wouldn't have been able to do to the Ferrari what he'd

earlier done to the McLaren. As yet without an F1 victory to his name, Grosjean will count the 2012 European Grand Prix as the one that got away. He admits it played on his mind.

"It took me longer to digest than I thought. If we look at the shape of my performance, it



was getting better and better. We had a bit of a problem at the start of Monaco, then to Canada, then to Valencia and again we're fighting for the top two – or maybe better. It was getting there. When you miss out... it's like you're running after something you could have had. It affected my ability to get clear and clean performances after that – but it's part of the learning curve and just something you have to deal with in F1."

Ultimately, the person who suffered most from Grosjean's misadventures was Grosjean himself. He and team-mate Kimi Räikkönen were inseparable in terms of performance through the year – but the experienced Finn finished all

20 races and scored in 19 of them, ending the year with double the points of his team-mate, who finished only ten times.

What happens next is fascinating. Grosjean has an extra year of experience but Räikkönen enters 2013 without the ring-rust he had at the start →





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ROMAIN'S ROAD

How Grosjean navigated his way through last season's opening laps

Race	Start position	Position end of lap 1	What happened?	Position at end of race
Australia	3	6		DNF (Shoved off by Maldonado – 50:50)
Malaysia	6	21	Fast start then collision with Michael Schumacher on run up the hill	DNF (Spin, unrelated)
China	10	11		6
Bahrain	7	4		3
Spain	3	5	Collision with Pérez (Pérez gets puncture)	4
Monaco	4	DNF L1	Collision with Schumacher (forced left by Alonso)	DNF
Canada	7	8		2
Europe	4	3		DNF (alternator failure)
Great Britain	9	12	Collision with Di Resta (who retires)	6
Germany	19	24	Collision with Massa	18
Hungary	2	2		3
Belgium	8	DNF L1	First-lap collision with Hamilton/Alonso/Pérez	DNF
Italy	DNS	DNS	Serving a one-race ban	DNS
Singapore	8	8		7
Japan	4	12	First-lap collision with Webber	19
Korea	7	8		7
India	11	12		9
Abu Dhabi	9	22		DNF (not-at-fault collision when running fifth, mid-race)
USA	8	8		7 (despite early spin and pitstop)
Brazil	18	16		DNF (Spin)

of 2012. Grosjean acknowledges that Kimi, like his previous world champion team-mate Alonso, is an excellent benchmark – although he says there's little similarity in these experiences.

"They're very different characters but it was a very different time," he recalls. "When I had my first experience of F1 I was trying to learn everything from Fernando and do what he did. Last year was different. I had more experience and the benefit of winter testing and could improve from there. That changes the relationship.

"Kimi doesn't say much, but he's okay to work with and we share data. I don't know him well outside the track, but in engineering terms everything is open. I think that's why we saw the two cars very, very close last year."

He insists there isn't much difference in how the drivers approach

their racing, but the engineers disagree. Simon Rennie was the voice in Kimi Räikkönen's ear for 2012, but in practice sessions, when Kimi was engineered by Mark Slade, Rennie kept watch over both cars. "They have different styles, which means we had to balance the car differently," recalls Rennie, now Mark Webber's engineer at Red Bull. "Kimi hates understeer and really likes a car with a strong front end so he doesn't have to wait for it to turn. He drives it into the corner really on the nose, which a lot of drivers can't deal with because they find it too sharp.

Romain is a bit more of a classic. He liked the car balanced normally with a bit more understeer on the way in, to be aggressive and attack the entry without the car being unstable."

Whatever the reality, Grosjean goes into 2013 with a decent car and a prospect of going toe-to-toe in the title race this time round with his champion team-mate. Away from the subject of 2012, he speaks with conviction about the season ahead: "I realised quite a lot of things over the winter

and that will help me. I have a good relationship with my engineer and I know more about F1 than I did. It's a new year and we start from zero like everyone else, with the chance to score a lot of points and have a good, clean season."

Penitent Grosjean may have been, but there's a hint of finality in the tone with which that last statement is delivered. And that's good: the time for Romain to be apologising is over. **F1**



GO FIGURE

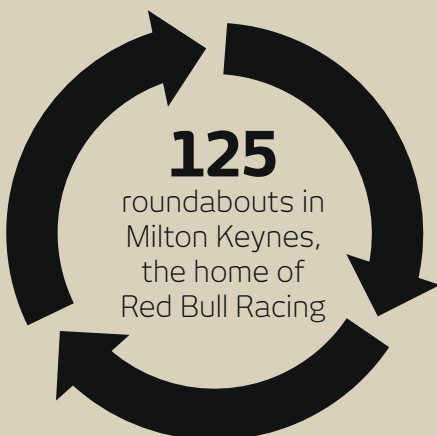
The numbers that drive
the triple world champions*



25
GPs before
David Coulthard
scored Red Bull's
first podium at
Monaco in **2006**.
Cue cape...

TWO

other F1 teams have operated
from Red Bull's current premises:
Stewart GP and **Jaguar Racing**



0 wins at
the Canadian
Grand Prix – the
only race on
the F1 calendar
that Red Bull
have yet to win



5.226 billion

cans of Red Bull sold worldwide in 2012

8

The number of grand chelems (win, pole, fastest lap and every race lap led) Red Bull have scored



David Coulthard



Christian Klien



Vitantonio Liuzzi

6 DRIVERS HAVE RACED FOR RED BULL IN F1



Robert Doornbos



Mark Webber



Sebastian Vettel

59

races have been led by Red Bull, of which

34

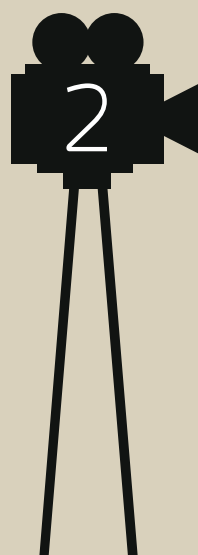
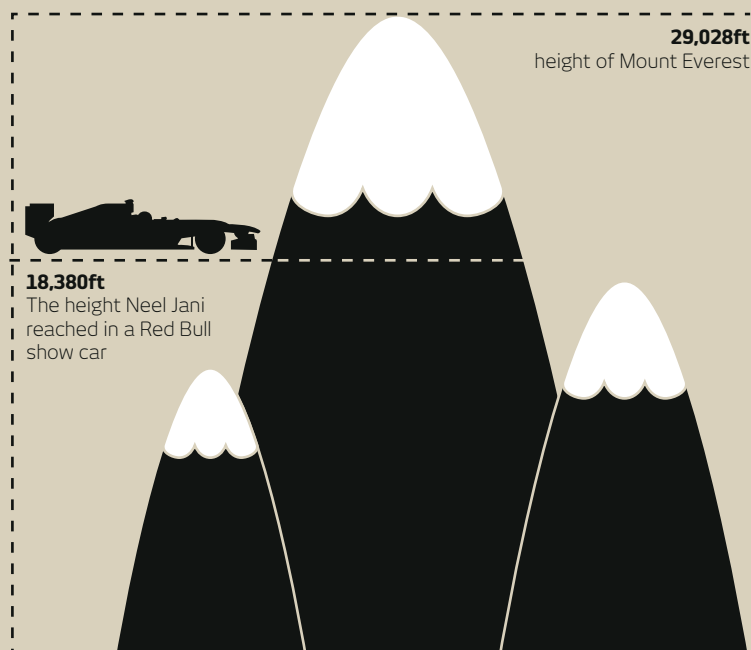
have resulted in race wins, an amazing

57%

conversion rate

18,380

The height in feet reached by Neel Jani, driving a Red Bull show car in the Himalayas in 2011



Hollywood collaborations worked on by the team at the Monaco GP: **Star Wars: Episode III – Revenge of the Sith** in 2005 and **Superman Returns** in 2006

X2010

The fictional prototype designed by **Adrian Newey** and **Kazunori Yamauchi** for the computer game **Gran Turismo 5**





**Ever
wondered
where this
came from? So did we...**

F1 Racing goes behind the scenes with Pirelli to track a pair of tyres from development to mould to grand prix – and then beyond

WORDS DIETER RENCKEN **PICTURES** LORENZO BELLANCA & ANDREW FERRARO/LAT



When long-time tyre supplier
Bridgestone gave a year's notice
that they would be pulling out

of Formula 1 at the end of 2010, the news sent
shivers down the spines of the sport's players.
Finding a worthy replacement would surely not
be the work of moments.

Even so, the sport managed to procrastinate
for several months until very few realistic
options remained. There was nonsensical talk

of a return to open competition between tyre
companies and even of Bridgestone supplying
unbranded tyres. And then, in the Montréal
paddock in June 2010, the deal was done:
Italian tyre company Pirelli signed a three-year
contract, giving them just six months to prepare
for this very public challenge.

Pirelli had dipped in and out of Formula 1
over the years with mixed results. They took
a clean sweep in the 1950 and 1951 seasons –

discounting the Indy 500, which none of the
F1 teams entered – but then shod just three
race-winners after making a return in the 1980s.
Would they be able to develop constructions and
compounds that could conquer the automotive
world's hardest working environment? And
could they produce them in sufficient quantities
and get them to all the races on time?

At the very heart of Pirelli's Formula 1
operation lies the 150-year-old company's →

research and development department in Milan's industrial area. A historic building incorporating sub-ground indoor testing areas and many security checks – cameras and recording devices are forbidden – situated at Viale Sarca 222 houses Pirelli's primary laboratory, where scores of white-coated chemists fuse natural and synthetic products in search of the perfect mix.

It is on the sixth floor (and in eight further labs across the globe) that 1,200 scientists tirelessly

Did the customer get what the customer wanted? Over the past two years, grands prix have featured an average of 50 overtakes and two pitstops per driver – approximately four times and double the previous going rates.

So, what is the 'perfect mix'? By the nature of Pirelli's philosophy, 'perfect' is a term as elastic as the polymers contained within the company's full product spectrum. The perfect chemical composition for a 38-tonne road train's boots

"Consider that in the 39 races contested over 2011 and 2012, not a single Pirelli tyre suffered an inherent structural failure"

research compounds and constructions capable of fulfilling a singular brief. The fundamental element of that brief is that the company's range of products must faultlessly transmit 800bhp for two hours (or around 200 miles) in wet or dry conditions, in desert, parkland or metropolis, with track temperatures ranging from 10°C to 55°C, in full public view, 20 times a year.

That element has been a success – consider that in the 39 races contested over 2011 and 2012, not a single tyre suffered an inherent structural failure. But the brief was more sophisticated than that, as Pirelli's motorsport director Paul Hembery – an arch-enthusiast in this increasingly corporate era – explains: "We were asked to come up with a certain approach, and that was agreed with the teams. The leader for the teams' views was actually Ross Brawn [then technical vice-chairman of the Formula One Teams Association], and he told us that Canada 2010 [a mixed-weather race with position changes galore] was the model they wanted. That is what we worked to."

By implication, Pirelli were essentially being requested to deliver rapidly degrading tyres – the very antithesis of products such manufacturers strive endlessly for, which is to deliver maximum durability within specified applications. Only an exceptionally courageous company would consider such a challenge; Pirelli did so in the full knowledge that this strategy left them open to negative perceptions.

hardly provides optimum characteristics for the streets of Monaco. Yet there may be synergies in their microscopic fibre strands, carbon-black characteristics or, indeed, the actual chemical structures used in two utterly different products developed for unrelated applications.

Hence R&D is a centralised function on which Pirelli spent over £100m (7.2 per cent of sales turnover) in 2011, with the F1 project enjoying high priority because of its trickle-down effect, road-car relevance and rapid response times.

Indoor testing of structural integrity falls within the remit of Andrea Vergani, whose team works in the basement of Sarca 222. Pirelli has installed some of the most sophisticated test equipment in the industry, enabling Vergani's team to laterally, vertically, rotationally and acoustically load experimental and production tyres way beyond the stresses of F1 at speeds of over 185mph. Stroboscopes 'freeze' operations to enable destruction to be closely monitored.

Also housed in here are the tread cutters, whose handy skills enable prototype tread patterns – etched by laser to designs devised for purpose by development engineers – to be cut into tyres for testing purposes. Once cut, the tyres are simulator and track-tested by Pirelli's F1 test team, which consists of former F1 drivers Lucas di Grassi and Jaime Alguersuari.

During Pirelli's 2013 F1 tyre launch, Hembery told *F1 Racing* that restrictions on testing, and reluctance by teams to provide test beds, had



forced the company into substantially upgrading their simulation and modelling tools, particularly since no 2014 cars will be available until testing starts in the new year. Pirelli will be – assuming they retain their sole-supply contract – required to develop and supply tyres to entirely different specifications still to be finalised.

Once developed, the comparatively simple task of manufacturing the tyres begins at Pirelli's 15,000m² motorsport facility in Izmit, on the eastern tip of Turkey's Sea of Marmara, some 37 miles from the country's GP circuit in Istanbul. The factory forms part of a larger (340,000m²) Pirelli complex, which has been totally replicated in Slatina, Romania, lest the Turkish facility be hit by natural – or other – disaster.

"It's what we have to do as a company in order to be involved. Producing a back-up factory in Romania is not a 'nice-to-have'; it's what you do as a professional company," explains Hembery.

"If you have breakdowns or major issues in one factory, at least you can keep F1 going. These are things we did as a business after our risk assessment of our involvement in F1. Nobody asked us to do it; we did it because we want to be professional. So the costs are significant."

As always in F1, nothing is as simple as it first appears; for safety, performance and quality are equally paramount. Although the manufacturing process follows the standardised procedure of assembling various components – bead, liner, belts and plies – on tyre-building drums, a 100



The warehouse in Izmit, where tyres are stored prior to despatch



The tyre-building process includes a total visual inspection of the whole tyre casing (right); the process is finalised with X-rays, which check the tyres in detail for integrity and porosity (below)



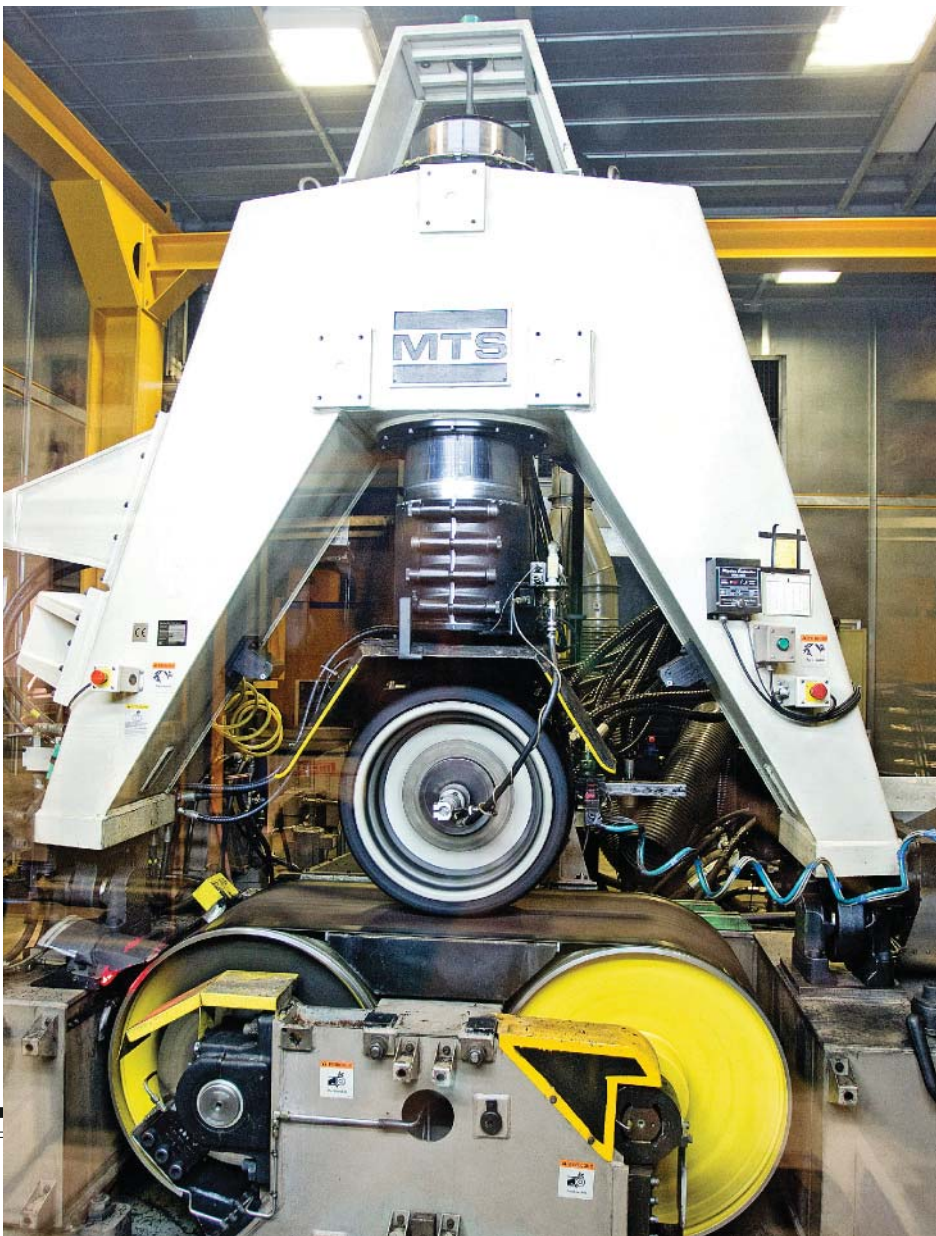
The MTS flat-track tyre dynamics machine measures lateral, vertical and torsion forces at speeds of over 185mph

per cent test and inspection regime is in place in a tightly controlled area.

During manufacturing, Pirelli rely primarily on their Modular Integrated Robotised System (MIRS) – one of over 4,500 patents in the catalogue – amid incredibly tight security. Although *F1 Racing's* exclusive visit was pre-arranged and cleared at the highest level, the security manager – a retired Turkish Air Force colonel – granted entry to the F1 production area only after a flurry of phone calls.

The exact composition of the tyres is, as you'd expect with this level of security, a closely guarded secret. Each hoop – 270/55 R13 at the front, 325/45 R13 at the rear – consists of around 120 ingredients and components, including 18 structural elements such as beads, plies and belts. The key ingredients are natural and synthetic rubber, steel and alloy, plus various artificial fibres and, of course, the specific rubber composition varies depending on whether the final tyre is to be a soft, supersoft, medium, hard or wet compound.

During the 2012 season, Pirelli provided almost 40,000 Formula 1 tyres, including 7,000 for testing purposes. Of these, six per cent were supersoft; 25 per cent were soft; 21 per cent were medium; 17 per cent were hard; 18 per cent were intermediates; and wets accounted for 11 per cent. The remaining two per cent were development tyres, created to evaluate 2013 compounds and used by the teams during →





The show is hosted by the ever-popular Peter Windsor, senior columnist and feature writer at *F1 Racing* magazine and founding partner of *The Racer's Edge*.

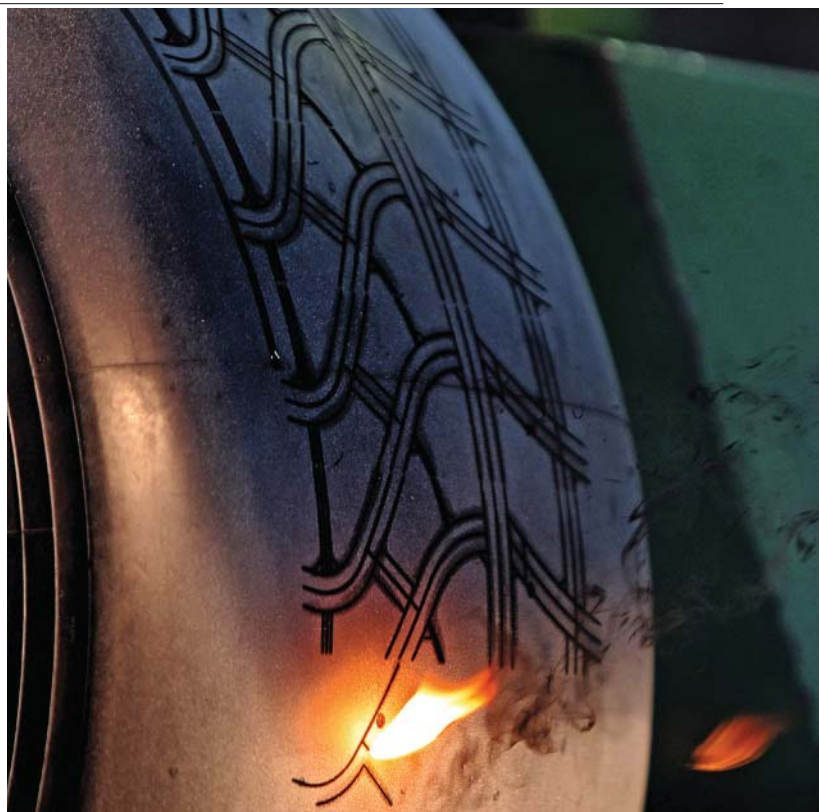
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Skilled tread-cutters etch prototype patterns into the tyres using lasers. These are then trialled by Pirelli testers, Jaime Alguersuari and Lucas di Grassi



Friday practice in Brazil. Izmit's total production capacity is 270,000 units, of which 50,000 will be Formula 1 tyres in 2013.

Before the tyre carcasses are vulcanised, each one has a barcode sealed onto its side to give it a unique identity. Following the curing process, during which 'green' carcasses are placed in moulds and subjected to temperatures of around 200°C at pressures of 20 bar for 15 minutes, they are X-rayed for porosity and blisters. They are then stored in a warehouse, pending shipment by road, air or sea ahead of allocation by the FIA for use by a specific driver during a specific grand prix. The barcode acts as a 'passport' throughout each tyre's life.

During *F1 Racing's* visit to Izmit, tyres allocated for the Brazilian Grand Prix were in production. We tracked two – an intermediate and a medium – to their final destination. Having been produced in Izmit on 12 September 2012, the tyres were stored in the warehouse until 4 October, before being shipped by DHL (F1's official logistics partner) from Istanbul to Santos in Brazil, arriving on 15 November. Following customs clearance, they were driven by truck to Interlagos and arrived on 20 November. Two days later, they were fitted onto their respective wheel rims, having been allocated to a specific driver and team: the intermediate (marked green) to Toro Rosso's Jean-Eric Vergne and the medium (white) to Lotus's Kimi Räikkönen.

On race day, both tyres saw action, although for the intermediate, only briefly: from 17th on the grid, Vergne got as high as fifth by staying out in the wet, but he was running in 13th when he pitted for intermediates on lap 15. Using 'our' tyre, he emerged in 15th and quickly overtook Vitaly Petrov's Caterham. Other drivers pitting ahead elevated him to tenth by the time he pitted again on lap 20 to take on slicks.

Kimi first used 'our' medium-compound tyre in a six-lap run during Q2 on Saturday. After a



Brazil 2012: Kimi heads up an escape road, is blocked by a gate, hits reverse and goes over the grass to rejoin the field.



Hence new rubber on lap 53...



topsy-turvy start to the race, when he went off track to avoid Sebastian Vettel's spin, he had worked his way back up to eighth when he pitted for medium slicks on lap 19. 'Our' tyre went on the front left. Over the course of a 34-lap stint, Kimi went from 11th to tenth – when Vergne pitted on lap 20 – then lost places when Mark Webber and Michael Schumacher passed him.

He nailed Schumacher on lap 39 and was still using the same set of tyres when he made his infamous off-track excursion on lap 52, dropping to 14th. He stopped for new tyres on the next lap.

Following each event, all tyres – used or unused – are returned to Pirelli's F1 base in Didcot, Oxfordshire, to await shredding either for use as a binding additive in concrete or road construction, or as furnace heating fuel. After the Brazilian GP, 'our' tyres were demounted along with the others, and packed up for return shipment. They left on 27 November and arrived in the UK on 4 January 2013. By 8 January, they had been accounted for at the base and prepared for disposal at a recycling plant, where two days later they were shredded and burned at extreme temperature (so as not to produce toxic fumes) for eventual use as fuel in a cement factory.

So whether fitted to a winning Red Bull, Lotus, Ferrari, or McLaren, or unused by Marussia, all Pirelli P Zero F1 tyres ultimately suffer the same anonymous fate despite the enormous, high-profile commitment (estimated at upwards of £50m per year) made by Pirelli to Formula 1. **F1**

Jean-Eric Vergne

Between the threat from behind, the big prize in front and the sideways glances across the garage, it'll be tough for either Toro Rosso driver to keep their eyes on the road this year. For Jean-Eric Vergne, the key is to stay focused

WORDS MATT YOUSON PORTRAITS ANDREW FERRARO/LAT

Formula 1 offers up many interesting sub-plots, and in 2013 one of the most compelling will be the battle between Toro Rosso's Daniel Ricciardo and Jean-Eric Vergne. At Red Bull's Faenza 'finishing school', the bright young things employed there are driving along a tightrope: the rewards are tantalising, but a single slip could result in expulsion. Naturally, Vergne insists his eyes are on the former, with no consideration given to the latter.

A studied contrast to the effervescent Ricciardo, he's the Toro driver more given to introspection – but that's Race JEV. Test JEV is an altogether more relaxed individual, bounding into his motorhome at the pre-season Barcelona session with a grin and a wave. "Questions?" he says. "Let's get going!"

Do you think that you'll be the driver who replaces Mark Webber at Red Bull when he eventually leaves?

James David, UK

I'd love to be that guy – and I'll do everything I can to get there.

How were you selected for the Red Bull Young Junior Team?

Tomasz Zwolinski, Poland

I sent Dr Marko one or two emails when I was in Fórmula Campus. I didn't have the money to get into F1, so I had to find a programme that would accept me. I don't know if the emails helped – I don't even know if he saw them – but I had a meeting with him when I won that championship and got invited to a test at Estoril. There were 20

drivers there over two days, he signed the best two: myself and Ricciardo.

Do you fear Dr Marko?

Jakub Kurowski, Poland

I'll fear him if I'm not doing a good job – otherwise, absolutely not. Bear in mind that he's the one who thinks I deserve a chance in F1. I'd rather thank him than fear him.

Is it better to be friendly with your team-mate or is the rivalry good for your motivation?

Daniel Vickers, Australia

Doesn't matter. I'm happy to have a friend as a team-mate, but not bothered if I have an enemy. It isn't the sort of thing that changes your life. →



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Who is better – you or Ricciardo?

Darren Pearson, UK

Me. If I thought any different, I wouldn't be a Formula 1 driver.

Robin Frijns was recently very critical of the Red Bull Junior Team. How would you answer his criticisms?

Connor Wilson-Archer, UK

There are probably people who agree with him and also plenty who don't. Personally, I don't care what he says: I proved myself going through the programme. Maybe not being in it means he's not good enough to be in Formula 1? I think

sure he'll get an F1 seat – but not at my expense. I know how he feels. You feel you're really close to doing what you've always wanted to do but you're not quite there yet. Of course, when you get here you change your targets. I'm not here for the sake of being here. My target is to succeed and to be the best. And to do that you have to be in a top team. That was a very long answer!

If you don't beat Ricciardo in 2013, is that your place in F1 finished, as was the case for Alguersuari and Buemi?

Carlos Jalife, Mexico

I'm choosing not to think about that yet.

I don't remember it, but I've seen the pictures. My first kart was when I was four or five – basically as soon as I could touch the pedals. I literally grew up at the circuit – we had an apartment upstairs. Every day I'd get home from school and scramble to finish my homework so I could go down and get into the kart. The circuit has developed over the years. It's now the biggest karting centre in Europe. It's the best, too!

Would you race in Indycar if Formula 1 doesn't work for you?

Dessislava Jeleva, Holland

That's another one of those questions I'm choosing not to think about.

What did Schumacher say to you after he hit you in Singapore?

Tom Siegner, Canada

"Sorry, my mistake."

Out of ten, how would you rate your first season at Toro Rosso?

Liam Higgs, UK

Hmm... six or seven? Seven or eight? It's hard – I mean, who knows what Alonso or Vettel would have done with my car? Probably better, but nobody knows. I didn't make many mistakes – certainly not as many as other rookies – and I scored more points than my team-mate. Qualifying was a weakness, but I think I was getting better by the end of the season, so overall I was

pretty happy with what I did. But it's never good enough – you always want to do more.

In 2012 you showed a great race pace but a weakness in qualifying. Have you identified what you need to improve to get better in qualifying?

Frederic Bancel, France

As I say, I think I was getting better. Maybe people didn't see it because I was always behind Ricciardo but, by the end of the year, the gap came down to maybe less than 0.1secs. What do I think I need to do? I think I just need to do more qualifying sessions. Driving with 10kg in the car and new tyres isn't something you do in FP1, FP2 or FP3, and it isn't something you really practise in the winter – you only learn it by doing it. But I've had 20 laps of practice now, plus the few I did in Q2. That's not an excuse – there are no excuses. Last year was a learning year; this year I want to perform better. I have to improve. →



"Last year was a learning year; this year I want to perform better. I have to improve"

Red Bull have the only programme that regularly brings young drivers into F1: Jaime Alguersuari; Sébastien Buemi; Sebastian Vettel; myself; Ricciardo... in the past, Scott Speed and Tonio Liuzzi. Elsewhere I see young drivers coming through because they've got good personal sponsors. From rival programmes, I don't see any. Yeah, I think the programme does very well.

Everybody knows the rules of the Red Bull Junior Team, and António Felix da Costa is having a lot of success. Are you afraid that he will replace you?

Jamie Simmonite, UK

If I perform well then maybe I will get a Red Bull seat. If I am not good enough, they will replace me and I'll lose my place – but I'm here now, I deserve my seat and I have to prove that to everybody by getting good results. So I'm not afraid. If António continues to drive well and gets good results in Renault World Series, I'm

Tell us about your Dad's karting circuit. Is that where you first drove a kart?

Sergio Blanco Carbo, Spain

When I was a few days old, my mum didn't have a baby seat, so she put me in a karting seat. A little later I got the steering wheel to hang on to, so I was 'driving' a kart before I was walking.

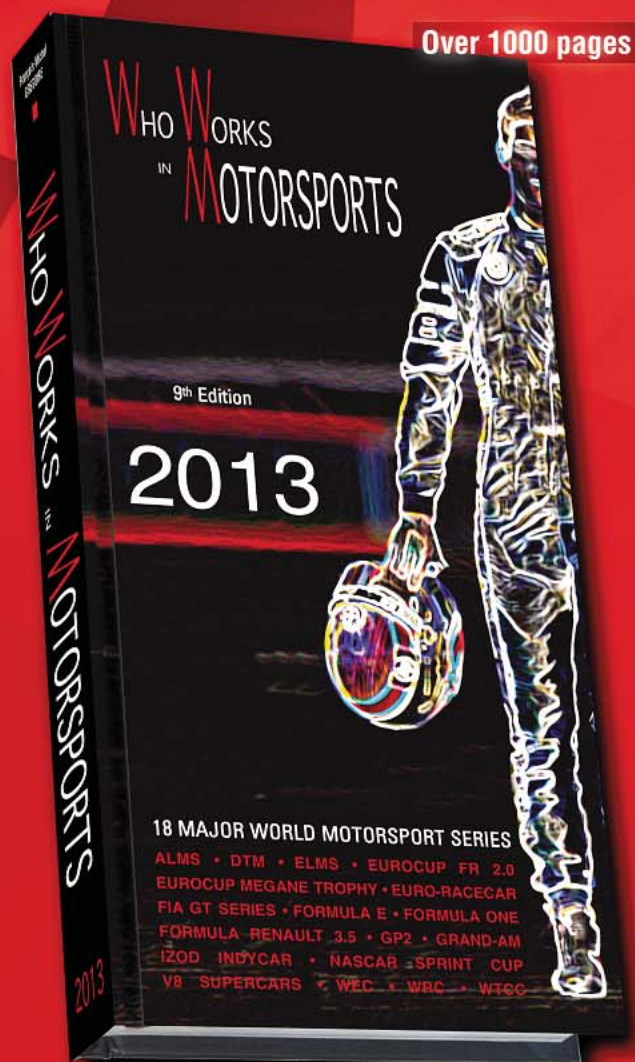




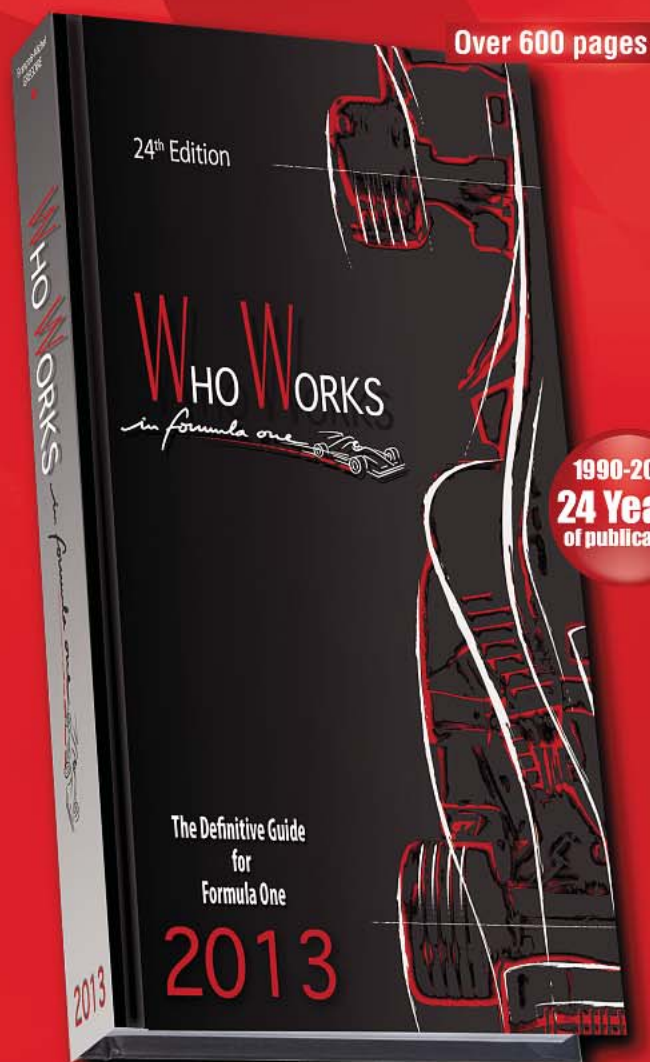
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YOU ASK THE QUESTIONS

Are 'pay drivers' taking up valuable space on the grid and stopping talent like you from coming through?

Christopher Annear, UK

Well, I'm here, so I guess not.

Which animal do you think best represents you and your character?

Andrew Roberts, UK

Me? A tiger. Or maybe a lion. An animal that's always looking for something to eat and goes after it.

What Aussie sayings has Daniel Ricciardo been teaching you?

Rian Hoskins, UK

Actually my knowledge of Aussie-English goes back a bit further than that. I had an Australian engineer in Formula 3 and WSR and picked up quite a lot there – much of which isn't really repeatable. "Hey mate, got a cold one in the fridge?" featured quite a lot.

Have you ever been scared in a racing car?

Nicolas Houillet, Belgium

Not really. I don't remember being scared. If you are scared, you shouldn't be in there.

You had Jean Alesi's helmet design in Monaco last year. Has Jean given you any advice about F1?

Ilinca Cristinel Madalin, Romania

I first met Jean when I was five or six and had just started out in karting. He came to visit our circuit. Since then he's followed my career a bit. When I got into single-seaters we'd speak most months: I'd call him for advice and we have a really good relationship. He gives me lots of great advice, but he isn't a guy to force his opinions on you: he'll offer advice, but only if I ask. His son Giuliano is karting now, so maybe one day I can return the favour.

Do you have any rituals you like to do in order to get psyched up for qualifying or the race?

Shenai Kotecha, UK

I'm pretty superstitious – and if I did have something like that, I wouldn't be telling anybody about it.

You were a guest at the Verva Street Racing event in Warsaw. What was that like and do you think Poland is a good place to have an F1 race?

Dawid Muc, Poland

I was surprised by how many people were there to watch the event. It's held in a tiny space, with just the one F1 car and a few other racing



How hard was that landing at Monza last year, after the suspension broke?

Sunil Swamy, India

Ooof, pretty bad! Yeah, that really hurt. What you maybe can't see from the outside is that we don't have any foam in an F1 seat: the carbon is fitted to your bum and the seat rests directly on the carbon chassis. The impact at Monza was so heavy it broke the chassis and it broke the seat. I guess they did their job because it didn't break me – but it was pretty painful.

cars, but the number of people who turned up was amazing. I guess a lot of the popularity of motorsport in Poland is down to Robert Kubica. I think an F1 race would be a massive success in Poland – and it'll be a great story if Robert is back in an F1 car for it.

Would you like to see the return of the French Grand Prix to the calendar and, if so, at which circuit?

Ronald Fillis, South Africa

I'd really love to see Formula 1 come back to France, but which circuit? I don't know. Frankly, it seems so difficult to get the grand prix back in France that the circuit almost doesn't matter. There are a few tracks that could host it and I don't mind which.

If you were to have a sausage sandwich, would you have red sauce, brown sauce or no sauce at all?

Laurent Esteve, France

And this is a question from France? French people are crazy...

Last year you were a rookie. In your second year in Formula 1 what do you expect to achieve?

Anestis Arabatzi, Greece

I think everything depends on the car. I think that if we'd have had a better car last year, we would have scored more points. This year, if we

have a better car we can expect to do better – but it's quite tough to say what we expect. I know the team would like to finish the season in sixth place, and while that might sound difficult, anything is possible. From a personal point of view, regardless of the car we get, we just have to do our best in every situation.

What's in your garage at home?

Paul Jones, UK

I have a Golf.

Are you single? As I'm a big fan...

Mike McLarin, Australia

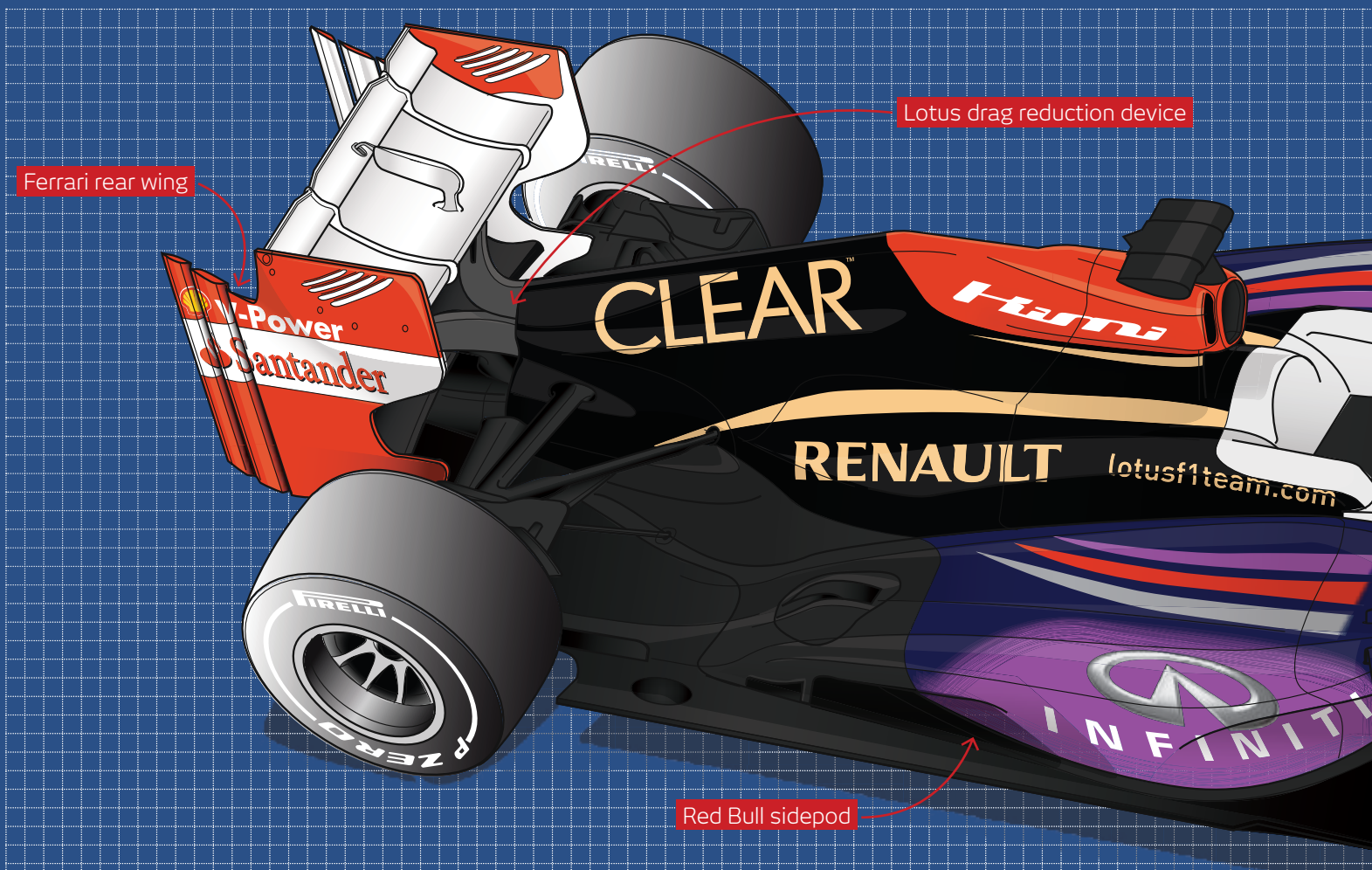
Ha! What's the English phrase? No comment... 

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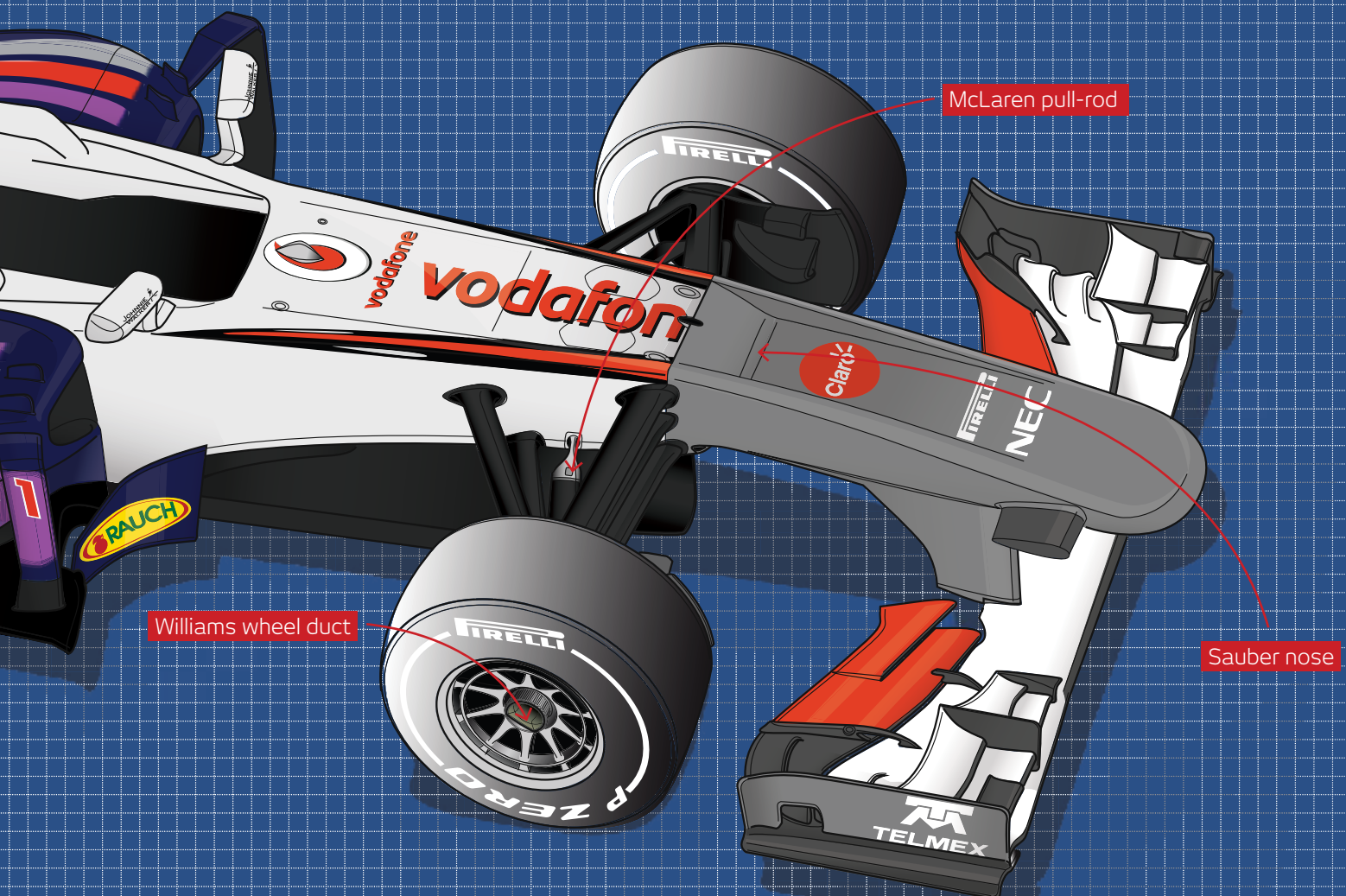
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THE PERFECT 2013



RACER?

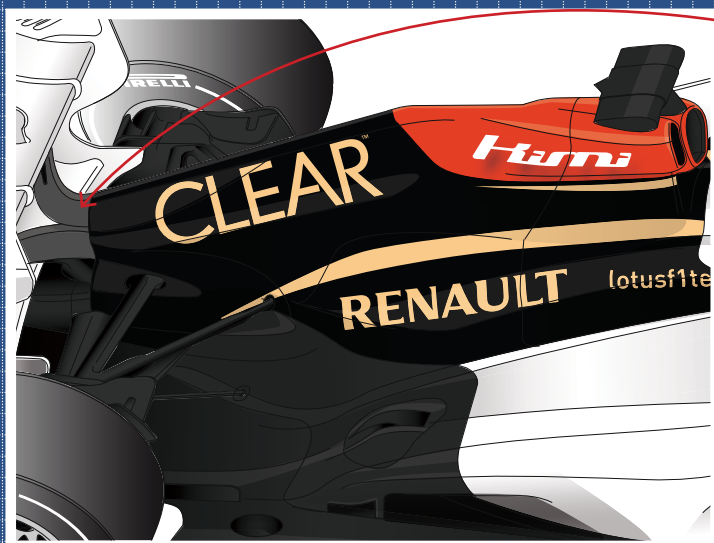
Every year, Formula 1's leading designers push the rules to the limits – and sometimes beyond. We pick six of the best ideas to create a theoretically 'perfect' F1 car

WORDS & ILLUSTRATIONS CRAIG SCARBOROUGH

Although this is the final season for a set of technical regulations that have been in place since 2009 – give or take an official FIA 'clarification' or several – Formula 1's designers are still finding ways to refine existing ideas and exploit loopholes. This year the double-DRS has been banned, but several teams are continuing to experiment with passive solutions that achieve similar ends while remaining within the letter of the law. At the front of the cars, the FIA has provided some freedom to create a more aesthetically pleasing solution to the 'stepped nose', but not everyone has taken this opportunity. For our 'virtual' car we've assembled six of the current big ideas that offer a significant performance benefit. →

FERRARI REAR WING

The regulations governing the rear wing are so tight that coaxing any more performance from it is incredibly hard. The rules demand large, flat endplates, and these hinder the airflow expanding behind the wing. Ferrari, however, have cleverly made the trailing edge of the wing into a series of vertical vanes that meet the maximum width and minimum surface area rules, but allow the wing to be more three-dimensional. The air passing through the wing can now expand by passing through the vanes. If more air is able to pass through the wing, then it can create more downforce.

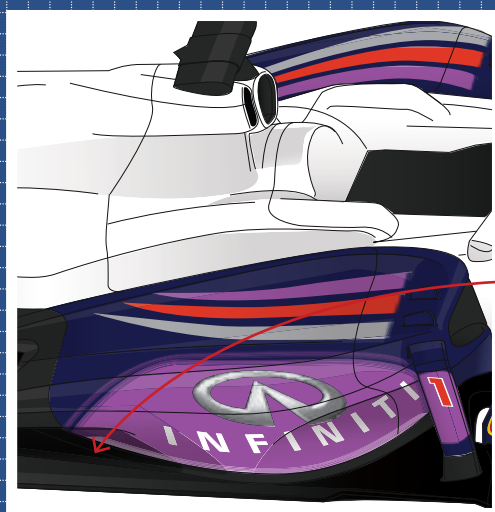


LOTUS DRAG REDUCTION DEVICE

Every F1 car now features the drag reduction system (DRS), which enables a driver to stall his rear wing to achieve a higher top speed on a given part of the circuit. The idea – an overtaking aid – was inspired by the F-duct system that was pioneered by McLaren in 2010 and subsequently banned.

Last year Mercedes were the first to introduce the 'double DRS', which used the activation of the DRS on the top plane of the rear wing to feed another, passive device that stalled the lower plane. This has since been banned, but Lotus also came up with a passive F-duct-like device that has yet to be challenged. It never raced, since it proved hard to develop, but their drag reduction device (DRD) also stalls the rear wing at high speed.

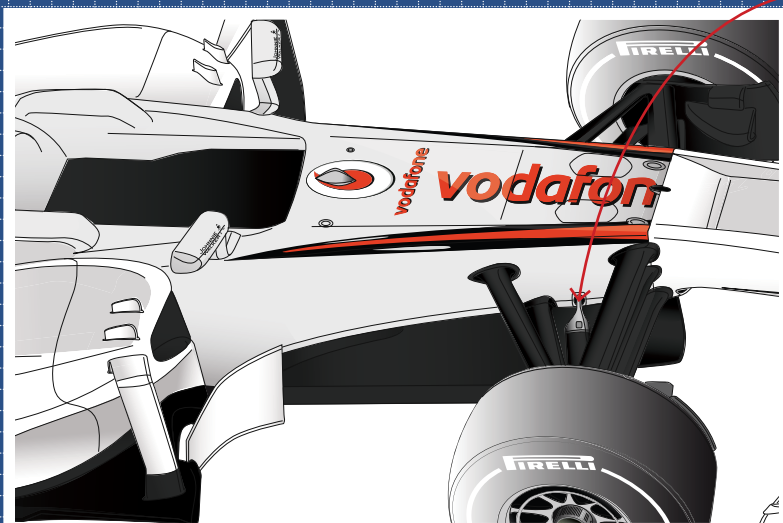
The key to the DRD's legality is that it is not activated by the driver, either directly (through a switch in the cockpit) or indirectly (through the DRS opening). It is completely passive. This system will therefore work to reduce drag and increase top speed any time the car goes fast enough to activate it – so it is beneficial in both qualifying and the race itself. What is more, it works on every lap and on every straight, rather than only in the FIA-mandated DRS zones. Lotus have since refined the system and it should now be ready to race – it's already being hastily copied by Mercedes, Red Bull and Sauber.



RED BULL SIDEPOD

Last year, the rules governing the exhausts were changed so as to prevent the exhausts from directly blowing the diffusers. Red Bull initially had another idea in mind and began the season with a periscope-style system, but the coandă concept they ultimately moved to, proved to be the most efficient method of blowing the diffuser within the rewritten rules – even McLaren's much-copied coandă sidepod doesn't offer such a clean path for the exhaust flow.

Adrian Newey's solution was to create a ramped bodywork section to which the exhaust gases 'stick' because of the coandă effect. In theory, the coandă layout necessitates longer sidepods that could block the air passing around the car. Newey's tunnel idea, after half a season of development, is now the class of the field. However, since its effect on the diffuser is so direct it is sensitive to the throttle; clever engine mapping helps to stabilise the car off-throttle. Both Lotus and Williams have copied Red Bull's solution this year.

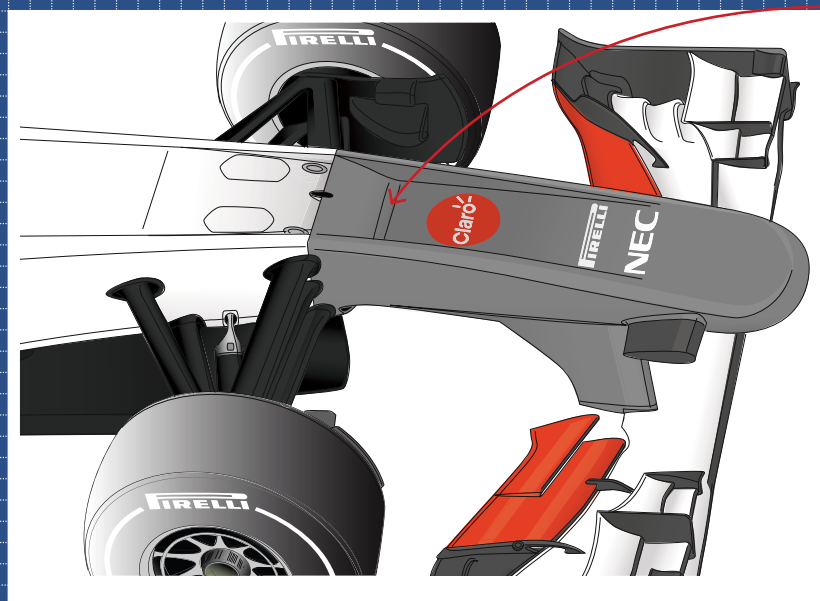


McLAREN PULL-ROD

The current regulations governing the shape and angle of the wishbones have, in effect, put a cap on the aerodynamic benefits the teams can find from them. But another way of influencing and tidying the flow is to change the rod that connects the wheel to the springs and dampers.

Most teams use push-rod front suspension, where the rod goes from low down on the wheel and angles up to the top of the chassis, where it pushes against the spring/damper mechanism. An idea Pat Fry brought to last year's Ferrari was to actuate the dampers via a pull-rod system, which enables the rod to be almost horizontal. In this position, it is in a much better position to influence the airflow along the car.

McLaren have adopted a front pull-rod this year, and have raised their chassis as high as possible to boost aerodynamic gain. With this layout, McLaren are extracting the greatest potential performance from the front of the chassis.



SAUBER NOSE

Changes to the nose-height regulations – brought in to improve safety – meant most cars in the field ran an ugly 'step' in the nose throughout last year. The reasons were simple: for optimal airflow beneath the car to feed the diffuser, most teams locate their drivers' legs as high up as possible – but the FIA want noses to be lower in the event of side impacts.

Although the aerodynamic effect of the step is less pronounced than you might expect, there are ways of improving performance without having to add the weight of a 'modesty panel'. Willem Toet, Sauber's head of aero, developed a cunning system that takes the airflow building up under the nose and ducts it to the rear-facing slot above the nose. This cleans up the airflow both above and below it. So good is this solution that Red Bull have copied it on their car. This year, Sauber have added some ridged sides to optimise the direction of the flow. **F1**

WILLIAMS WHEEL DUCT

A spinning tyre creates an aerodynamic blockage and the resulting wake upsets the airflow all the way back along the car. Teams tried to calm this effect by fitting the so-called 'spinners' to the wheels in 2008; these static fairings did not spin with the wheel and had a profound effect on the cars' aero. Of course, these were banned and little has been done since to regain the benefit they had.

Williams have created a clever system that routes air picked up by the brake ducts through a hollow axle to blow out through the middle of the wheel nut. The airflow exiting this small duct inside the axle cleans up the tyres' wake and improves the aerodynamic performance of the back of the car. Red Bull had this idea last year, but its design solution contravened the same rules that had outlawed spinners. Williams' solution has the duct ending just inside the wheel nut, which is legal.



In
conversation
with

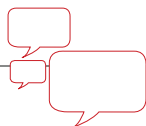
Jules Bianchi

Marussia's last-minute driver
signing on making the most
of his Formula 1 break

INTERVIEW KEVIN TURNER

PORTRAIT MALCOLM GRIFFITHS/LAT





For most of the winter, the talk was of you joining Force India this season. How close do you think you actually came to doing the deal?

I think we were really close to doing it. I was really positive about that. But in the end they made another choice and I completely respect that. It's part of the job and I had a great opportunity to be with Marussia. I really want to thank them for that because now I am doing my first season in Formula 1. This is great for me because I was waiting for a long time.

Did you see the second test at Barcelona in February as a shoot-out between you and Adrian Sutil for the second Force India seat?

Not really. I don't think they knew who they would take and they wanted to make sure both drivers had experience with the car in case one of us became the second driver. It was just further experience with the car and not a proper shoot-out. We ran on different days anyway: I was in the wet and he was in the dry, so it was difficult to compare.

The Marussia deal happened late, with just two days of pre-season testing left. How did it come about, were you ready for it, and were you disadvantaged by so little testing in the MR02?

I think [manager] Nicolas [Todt] worked a lot on this, even if it was quick. We didn't know anything about it two days before, so it was a big surprise for me. I'm just really happy and it's great news for me and my future.

I was working over the winter to be ready to race. I was prepared already. For sure it's not an advantage to not drive the car... but I did well in testing. I would have liked to have had more time because everything was new in the car. It's tough and we have to concentrate to do a good job, but I'm ready.

How have you found settling into the team and working with the engineers – have you been able to get comfortable in the car?

Yes, I really like the team. They are so friendly and very welcoming. That's important. Even if you are here to compete and do a good job, it's really nice to have good people with you in the team.



We took a lot of time to do the seat fitting before the first test and I felt pretty good after a few laps in the car. Obviously, I had to go into it and try to learn everything, so it wasn't easy. The braking points were a bit different and I had to learn the car, but I think we did a good job. We improved a bit even on the first day.

How does the Marussia compare with the Ferrari and Force India F1 cars you've driven?

It's difficult to compare because even if I drove many laps in F1 last year with Ferrari and Force India it was not on the same tracks. Even at Barcelona I drove the Force India in the wet and the Marussia in the dry. So it's pretty hard to say, but I really like the Marussia. Of course we will have to improve, but the balance feels good. We maybe need a bit more downforce, but we will see what we can achieve. We are motivated and we want to improve, so that's important.

What are your main targets for 2013?

It's very difficult to set myself a target. I think the main target will be to improve all the time; every time we bring a part to the car we will want to see an improvement. For my side, I will just try to do my best, to get the experience, and learn how to compete in Formula 1. Even if I think it's not much different to previous categories, now I am with the best drivers in the world, so it's not the same. I will just try to do my best and improve all the time.

Do you see 2013 as a potential springboard to getting into a bigger team for 2014?

It's a bit too early to say. I just want to work with the team now. I don't know about 2014 yet. I just want to do a good season with Marussia and then we will see what happens.

How well did you know your new team-mate Max Chilton before Formula 1?

I knew him from our time in GP2, but more from on track than personally. It's difficult to speak to drivers much when you are racing in GP2. But he is a really good driver. He did a good season last year, and I think we will push ourselves to the limit. **F1**

Factfile

Date of birth

3 August 1989

Birthplace

Nice, France

Team

Marussia

Role

Driver

2006

Secures the French Formula A (100cc) karting title and finishes second in the World Cup at Suzuka

podium. Gets a first taste of F1 at Jerez with Ferrari, which leads to a role on their young driver programme

2007

Graduates to French Formula Renault 2.0 with SG Formula and wins the title on his first attempt, taking five poles and five wins

2010

Four podiums and a third place finish overall in GP2 with ART. Enters the Abu Dhabi Young Driver Test for Ferrari

2008

Takes two wins in the F3 Euroseries with ART Grand Prix to finish third overall. Also wins the blue-riband F3 Masters race at Zolder

2011

Comes third overall in GP2 with the re-named Lotus-ART, taking his first win in the main category at Silverstone

2009

Secures the F3 Euroseries title with nine wins, six poles and seven fastest laps. He then enters the GP2 Asia Series with ART, scoring one

2012

Nine practice sessions for Force India in F1. Also enters World Series by Renault for Tech 1 Racing, finishing second overall. Tests for Ferrari and Force India at Magny-Cours mid-season

THE ICEMAN ON ICE

If any Formula 1 driver was going to be at home racing on ice, surely it would be the Iceman himself, Kimi Räikkönen. Wouldn't it?

WORDS STUART CODLING
PICTURES DPPI



Seldom has the headline of a magazine story suggested itself so perfectly. The mercury is hovering somewhere around minus seven; positively balmy for Moscow at this time of year. A few miles to the south-east, the Moskva river, which bisects the city, is crusted with ice chunks that have broken and refrozen into a continuous sheet. From our view on the terraces, the Moscow Hippodrome is a long oval blanketed in white. In summer, this course resounds with the clatter of hooves and the rumble of traps, while in winter it swaps horses for horsepower, give or take

the occasional sledge race. Hands thrust into pockets, hat pulled firmly down to his ears, big dark sunglasses completing the picture of enigmatic impassivity, Kimi Räikkönen studies the scene without uttering a word. The Iceman is in his element.

Every winter, the leading Russian motoring magazine *Za Rulem* ('Behind the steering wheel') hosts its 'Race of the Stars', inviting two members of racing royalty to face off against the cream of local ice racing talent. Last year it was Alain Prost and David Coulthard; this year it's Kimi Räikkönen →





Kimi checks over the hardware before taking F1 Racing's very own Stuart Codling for a spin



and Charles Pic, the common denominator being Renault, who sponsor the event as a marketing vehicle for their Duster and Logan value models, built in Romania by their Dacia subsidiary.

Horse racing remains a big draw in Russia – it's enshrined in popular culture by the toast '*Vyp'em za krasivyyh loshadej i shustryh zhenshhin!*' ('Here's to beautiful horses and frisky women') – but it is very much an everyman sport and not, regardless of the faded grandeur of the 10,000-seater Hippodrome building, the playground of the oligarchs. My contact in Moscow tells me there were ugly scenes when the minimum bet was raised from one ruble to ten. And it's the same crowd here today: there aren't many expensive (genuine) fur coats, even among the privileged few enjoying corporate hospitality in an upstairs hall garlanded with chandeliers and friezes of trap races as they lay siege to the 'green room' wherein the F1 drivers await their call to action.

Charles Pic is sporting some ragged stubble and his weary-looking eyes bear testament to his overnight flight from the Barcelona test. Clad in his Caterham race overalls, he slips his feet into a pair of felt-lined, Renault-branded wellies and strides onto the course to be photographed and filmed, eagerly donning a thick jacket in

between takes. Beneath our feet, and a couple of inches of ice, the course is sand. It stretches for around a mile, with two long straights of perhaps 500 metres running parallel and a long constant-radius turn at each end, bounded by some solid-looking trees. Has Charles ever raced on ice before?

"Er, never," he says, prodding the studded tyre of a Renault Duster with his foot. "First time for everything, I suppose..."

Kimi has plenty of experience on ice, from karts and above. Enormo-shades still in place, ungloved hands still residing in pockets, he stands completely still as something approaching a brief is decanted into his ears: "First corner there, second corner there, third corner there, fourth corner there. Braking – not so much."

Kimi's response is a barely perceptible nod of the head. Seasoned Formula 1 viewers might interpret it to mean: 'Leave me alone – I know what I'm doing.' Then he speaks.

"And we'll be racing, yes?"

A flick through the press pack's list of entrants reveals a group of people not to be trifled with. There's a recognisable name – Kirill Ladygin, sometime FIA World Touring Car driver with Lada – as well as a rallycross champion and several others who, to judge by their mugshots,

would make a passable second row in a rugby scrum. Over four heats and a series of finals they will whittle one another down until one of them remains, and he will go on to race against Charles in a Duster and Kimi in a Logan. Their own machinery ranges from decade-old Honda Civics to more modern VWs, Seats and Ladas.

The spectators are already filing in and jostling for the best spots as the two Formula 1 drivers prepare for practice. We get an even better view of the action because we've booked a slot with Kimi himself.

Kimi greets *F1 Racing's* arrival in the Duster's passenger seat with silence. The car has been race-prepped with spiked ice tyres, a stripped interior, roll cage and six-point harness, but apart from the addition of an electrical kill-switch, the dashboard is standard. Kimi fires up the engine, selects first gear and we're away: ice pellets pounding against the underside of the car as the front wheels scabble for purchase, engine screaming. At the first corner he stamps on the brakes and then gets back on the throttle, setting up a classic Scandinavian flick, hands soft on the steering wheel as he dials it this way and that.

The wheels are still spinning as the track opens out onto the back straight and we see 100mph on the clock before Kimi relents on



Kimi and Charles Pic get down to business, going head to head along the slippery track surface of the Moscow Hippodrome



the throttle – there’s a big bump on the run-in to Turn 3 where gates on either side lead to paddocks and stables – then waits for the Duster’s quaking suspension to settle before he pitches it into the next bend. First he aims the nose somewhere before the apex, then he lets it drift, now holding the wheel with just the finger and thumb of his right hand and letting his right foot dictate the car’s angle of attack. His eyes are expressionless, as if this activity is no more taxing than deciding what’s for lunch.

We’re into our second lap when Kimi brings the car to a halt on the inside of the track just off the exit of Turn 2.

“Something’s broken,” he mutters. “It’s only doing two-wheel drive. It’s not fast enough.”

He fiddles with the button on the dashboard that switches between two- and four-wheel mode, setting off again just as Pic blasts by.

“He’s overtaken us,” I cry. “Sort him out!”

The Caterham man is more circumspect over the bump, so we’re close as Kimi pitches into Turn 3. Both cars are sideways. Ours is screeching for mercy. As Turn 3 becomes Turn 4

we’re both still sideways, but now Kimi has his head turned my way and with one finger and thumb still maintaining a casual grip on the wheel he’s gesticulating irritably in Pic’s direction with his other hand.

“We’re on full throttle,” he mutters, still looking at me rather than the direction of travel, words almost drowned by the engine din. “We’ll stop and try something.”

“Maybe we should kick it,” I suggest as he twiddles the switch again.

“Yeah, probably.”

He restarts the engine.

“Turn it off and on again,” I say. “Good move.”

This idea finds traction and he gives the red kill-switch a turn, then fires the engine again. We’re in business. The assembled photographers, cameramen and officials at the finishing line look on in bemusement as we go past again. Kimi is enjoying himself in the humble hatch, throwing it around, taking the occasional liberty with the track boundaries without actually hitting anything. My co-driver role is but four laps old when the engine begins

to sound strained once more as we scramble around the first couple of bends.

“Again...” complains Kimi. “Bah!”

A gesticulation with the free hand, a shake of the head. As we round the final turn he assists the Duster’s rotation with a yank on the handbrake and we both have a chuckle.

“I think I need another car,” he says.

While the tortured machinery is repaired, both drivers decamp to the media enclosure for a press conference. Here matters take a turn for the weird as the first interlocutor asks: “Mika, is it true that your first car was a Lada?”

A smile plays over Kimi’s lips. “Well, first of all, my name is Kimi...” The scribe looks mortified. Kimi laughs. “Yes, my first car was a Lada. It worked very well...”

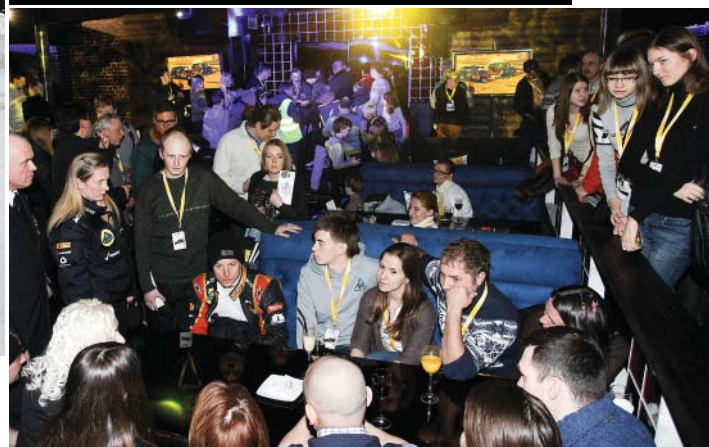
The first race on the bill is the one between Charles and Kimi. I repair to the inside of the course and climb up a bank of long-frozen snow to get the perfect view of the duel. The two F1 drivers are just slithering away on full throttle, Kimi already a nose ahead, when a stern-looking security guard ejects me from my perch. →

At the final turn, Kimi yanks on the handbrake. “I think we need another car,” he says

Wheelspin off the line costs Kimi time he can't claw back against experienced ice racer Kirill Ladygin



A meet and greet for fans and competition winners between sessions. No one looks too cheery here – they must still be defrosting



"Nyet!" he barks. "Nelzya!" My guidebook lists the latter phrase on an otherwise blank page entitled 'Introduction to Russian bureaucracy'. It translates as: "It is forbidden."

At the end of the first lap, Kimi has a full car length in hand over his rival as they flash past and disappear from view into the first corner. Along the back straight, the twin plumes of snow dust and chopped ice suggest a similar margin. The security guard is now engrossed in the race, so I climb back up the snow bank... just in time to see the cars cross the starting line for their last lap almost together, Kimi now only half a car length in front. Pic goes for the inside line and they're side-by-side through the first two turns. Kimi has to back off so as not to be sucked into the wall at the exit of Turn 2. Pic has it. The track announcer is beside himself: "SHARLIPEEEEEKAAA!!"

"I found some places where there was snow rather than ice and it was just enough to get more grip," says Charles as he steps from the car. "I'm very happy with that."

Kimi is enveloped by a sea of autograph hunters and, caught without his sunglasses, the last expression that can be seen is one of surprise with a hint of panic as his personal

space is invaded. His response to being defeated therefore goes unrecorded.

The races between the locals vary wildly from the brutal to the rather processional. During one heat, three cars go into the first corner side by side and one ends up on its roof, only to be clouted a lap later by another driver who has failed to note the presence of yellow flags. In another race, one car leads from start to finish with impressive ease.

With time ticking away at the end of the day – the light is going, and Kimi has a flight to catch – there's a delay. The winner, rallycross champion Dimitri Bragin, is disqualified for having run without lights during the finals, handing victory to former WTCC man Kirill Ladygin.

Experience tells in the first of the celebrity run-offs as Ladygin makes an excellent start. By the end of the first lap, Pic is some 100m behind. It's not looking good for young Charles, but he closes the gap and, on their final loop, is trailing by perhaps 20m as they vanish behind the snow bank at Turn 3. They emerge in the same order and Ladygin takes the chequered flag.

It takes three burly security guards to convey Kimi from 'green room' to track, such is the crush of autograph hunters, and even then it's

a struggle to get on the ice. The crowd chants: "Kimi! Kimi! Kimi!"

The change of car from Duster to Logan doesn't blunt Ladygin's edge and he gets off the line smartly. Kimi's machine spins its wheels fruitlessly for precious seconds and he trails through the first lap, but by the end of the second he's in Ladygin's wheeltracks. Crowd and PA announcer match each other shriek for shriek as the cars round the bend, Kimi backing off a bit so as not to smite the wall on Turn 2. They're together all the way along the back straight and once again Ladygin makes Kimi go the long way round the final two turns. They disappear from sight and when they reappear, Ladygin is ahead.

Post-podium, Kimi and his three-man security entourage stagger hither and thither like flotsam on an Atlantic swell, carried by the weight of a crowd that is chanting Kimi's name with even greater fervour than before. It's touch and go whether he'll reach the sanctuary of the VIP enclosure or be lost in the crush.

He may occasionally be shaken, the Iceman, but he's seldom stirred. Reaching his steps, he jogs up, pauses to look over the balcony, and gives the crowd a cheery wave. And then, without a backwards glance, he's gone. **F1**

Enveloped by a sea of autograph hunters, Kimi's expression is surprise with a hint of panic

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GOING DUTCH

It's taken Giedo van der Garde longer than most to land a full-time drive in Formula 1. And as he explains to *F1 Racing*, he's more than ready for it

WORDS MATT YOUSON
PORTRAIT GLENN DUNBAR/LAT



CV

GIEDO VAN DER GARDE

Giedo van der Garde looks... lean. It isn't unusual to see an F1 driver return from his winter break thinner than when he left, but even by usual standards it's a minimal Dutchman who's turned up for pre-season testing with Caterham. "I was training hard last month," he admits. "I'm the lightest I've been, the lowest fat ever, and I feel strong – physically and mentally. I'm in the best shape of my life. I'm ready for this."

The 'this' in question is van der Garde's F1 race debut – a remarkable thing in itself. For every rookie who gets his chance, five or six contenders slip by the wayside; names with currency in the paddock for a year or two, eventually displaced by newer, hotter properties, rarely to be heard from again. Van der Garde is a rarity, hovering around the fringes since 2006, biding his time for longer than most; eventually getting his shot aged 27.

"In Holland there's a special phrase for it: *Laat Bloeien*," says Giedo. "I was always a bit late with everything: with girls, with going out... all my life I've been a bit late. But I get there in the end."

Van der Garde's biography ticks all the right boxes. Dutch karting champion in 1998, world karting champion in 2002. Decent results in Formula Renault saw him signed to Renault's F1 driver development programme, only to be dropped after lacklustre results in the Formula 3 Euroseries. By 2006 he was part of McLaren's young driver development programme, still in F3, where he fought a credible campaign against ASM team-mates Paul Di Resta, Sebastian Vettel and Kamui Kobayashi. Off the back of that he signed as Super Aguri's test and reserve driver for 2007 – but ditched Leaffield for Silverstone to appear as Spyker's test and reserve driver that year.

When the relationship with Spyker/Force India stalled (later resulting in a court case from which van der Garde won substantial damages), he got on with things and won the World Series by Renault title in 2008 with a couple of races to spare. With nothing opening up on the top table, and with little else to prove in one feeder series, he switched to the other, racing in GP2 and GP2 Asia between 2009-2012. His performances were respectable without ever being incendiary and last year he took two poles and two victories for Caterham's own junior team, while also enjoying a semi-regular Friday drive in F1. This year he gets to take the next step.

"We've been close, but somehow it never happened," he notes. "The route we've taken with Caterham is the best one, but it wasn't easy. I had

to take the GP2 team up front and I think I did that well. Friday practices went better and I was more consistent each time I jumped in, and by the last one I was faster than the two race drivers."

Described thus, van der Garde's 2012 apprenticeship with Caterham sounds like part of a long-term plan, designed to firmly embed the driver with his new team. It isn't precisely the impression given by most commentary over the winter, the tendency of which has been to mutter darkly about the chequebook racing being done and the injustice of Heikki Kovalainen, Timo Glock, Kamui Kobayashi *et al*, finding themselves without a drive. Nobody likes being described as a pay-driver. However gently broached, the subject invariably leads to anger, bluster or a denial of reality the likes of which would make a politician blush. Giedo van der Garde does none of those things – he states quite simply that, whatever the means by which he arrived, he deserves this seat.

"The reality these days is that you have to bring in some money – so thank you to my sponsors for that – but I've always had a good record, I've always been fast, often against some very good team-mates. I used to beat Vettel when we were team-mates and it's tough that people don't remember."

It's a point of view not lacking in merit: shorn of his sponsors, van der Garde would be the sort of driver portrayed as having been cruelly denied his rightful opportunity in F1. Certainly the reaction at home doesn't suggest Dutch F1 fans perceive him as just tagging along for the ride.

While nothing else seems to faze Giedo, expectation management among a vociferous army of fans does the trick: not for the Dutch the blind loyalty that some drivers enjoy from their domestic supporters. "For the moment I think everyone is just happy that I'm here but I don't want expectations to be too high," he says. "With Dutch fans, if you don't deliver... well, you know what happens."

"It's a small country with a good history and a real passion for racing. The years with Verstappen were

great: he's one of the reasons I went karting – everyone was into it and dads taking their kids to the kart circuit became one of those things. People ask me what would be a successful season, and it's impossible to say right now – but if I can be an ambassador for racing in Holland, and maybe do what Jos did and get some parents to take their kids to the karting circuit, then that would be a pretty good start." **F1**

- 1985** Born April 25 in Rhenen, Netherlands
- 2001** Formula Super A Karting – 5th in championship
- 2002** Formula Super A Karting – world champion
- 2003** Formula Renault 2.0 Eurocup – 5th in championship, 1 win
- 2004** Formula 3 Euroseries – 9th in championship
- 2005** Formula 3 Euroseries – Team Rosberg, 9th in championship
- 2006** Formula 3 Euroseries – 6th in championship, 1 win
- 2007** World Series by Renault – 6th in championship F1 – Spyker test driver
- 2008** World Series by Renault – champion, 5 wins F1 – Test for Renault
- 2009** GP2 – 7th in championship, 3 wins
- 2010** GP2 Series – 7th in championship
- 2011** GP2 Series – 5th in championship GP2 Asia – 3rd in championship
- 2012** GP2 Series – Caterham, 6th in championship, 2 wins F1 – Caterham F1 test driver

"I was in such pain that I didn't even think about motor racing. All I wanted was for the nurses to keep bringing me painkiller tablets"

Mika Häkkinen is a fighter – something he proved both before and after that life-threatening accident in qualifying for the 1995 Australian Grand Prix. Now the double world champion tells Maurice Hamilton all about the hell he experienced on his road to recovery – and those two titles

PORTRAITS STEVEN TEE/LAT

Given that he could have chosen anywhere for our lunch in Monaco, it was something of a surprise that Mika Häkkinen should choose Stars'N'Bars. If you've ever been to the grand prix, you'll know this is a favourite watering hole, not simply because of its loud music and a ready supply of beer and burgers, but mainly because it is right by the paddock fence. It's also the very last place you'd want to conduct an interview.

But that's just for five days in the month of May. For the rest of the year, this is a popular choice across the wide social divides in this unique part of the world. When you step inside, you see it is almost unrecognisable from the bear pit of grand prix week. And you have an immediate clue to Mika's surprising choice.

There, mounted vertically on one wall, is his McLaren MP4/15 from 2000. He didn't win the championship that year, but he came close after



another series of relentless encounters with archrival Michael Schumacher. And it serves as an aide-memoire of his back-to-back titles over the two previous seasons.

Mika walks in, bang on time, at midday. He is instantly recognised and well received by staff who are clearly glad to see him – as you would be when a racing driver lends you an F1 car to stick on your wall (in truth, he has nowhere else to put it). We are shown to our table upstairs.

When he was racing, Mika was always polite and smiley, but a man of few words and sometimes a little tense. Now he is completely relaxed and ready to talk. I've been looking forward to this opportunity for a very long time...

Maurice Hamilton: Really good to see you.

Mika Häkkinen: Yeah, it's been a long time. Welcome to Monaco!

Maurice: I have to say, living here is such a huge difference from when you started racing and travelled around Europe in a converted bus. Were you living hand-to-mouth? How do you remember those early days?

Mika: It was challenging, yes. Financing karting or Formula Ford was really, really tough but we always found a way. We never did think that money was the issue; it was more about the passion that was taking us forward all the time. We saved here and spent more there – but we were still racing. It was really important to →



get the right connections; the right people in the programme. I had certain powerful companies helping, but that didn't mean they were throwing money at our project... it was calculated and finely tuned. But it gave me a lot of confidence in the programme. It felt strong.

Maurice: From what I've read, you had a lot of inner confidence. Where did that come from? Was it always within you?

Mika: It's not just me. I've learned with my son, Hugo – he's 12 years old now – when we go testing and racing. I have come to understand that kids need confidence, but that it isn't something that comes automatically. It's all about giving them security; if you can do that, the confidence comes up. It's not just saying, "Oh, you drive really well." They need to learn to trust you. That's what my parents gave me when I was a kid. I felt I could survive; I can do this. And that means you can try extreme things when you are driving.

"Ayrton was not pleased when I outqualified him. He said 'You want to play a game with me? Okay...'"

Maurice: You're saying that if you saw a gap, you had the confidence to go for it?

Mika: Yes, but that didn't happen automatically. It was the push from my father. He taught me: "When you see a gap, just go for it. Go for it!" Once you have the confidence, you do aggressive overtaking – and it works. You feel: "Oh, I did it!" My son is experiencing the same thing. When he doesn't believe it will work out, I tell him: "Just do it. Trust me." For a young boy, there are a lot of reasons in his mind why he can't do this. But once he does, he comes out and thinks: "Whoa, this is easy." But nothing is automatic.

Maurice: But you were naturally quick, too.

Mika: Yes, you need a gift for driving – but more comes from learning. If you are good at writing, that's fantastic. But if you want to be really good, you have to practise and polish your talent to make it perfect. You need someone to tell you: "Why did you do it like that? Try it this way." You need someone to give direction.

Maurice: It's nice that you remember this from your childhood and can pass it on to Hugo.

Mika: I enjoy it, but it's a long process. It doesn't happen overnight. When you work with a young kid, they change all the time. It's fine-tuning.

Maurice: During your early days in Europe, a key moment was a Marlboro test at Donington Park in late 1987. How did that come about?

Mika: I was not yet managed by Keke Rosberg. I don't know who they contacted. It was an invitation for drivers like me who had won in Formula Ford, but also winners from F3 and F3000. We were on a sort of European tour with this bus; we had already been on the road for four weeks, just having a shower where we could – not many places! So when Philip Morris said they had organised a hotel, it was great. Wow! A warm room and you could have a hot shower. It was a great experience, brilliant to go there; I'd never in my life seen something like that.

Of course, I was nervous, but I had this inner confidence that when I sit in a car, I'm gonna go for it. I didn't care who was there. I didn't have

worries about who was going to kick my ass because I knew I was just going to go faster than anybody else. It worked out really brilliantly. Of course, it was a bit complicated because my English wasn't so good. So the communication with the likes of James Hunt wasn't so brilliant. But I think James saw something in me. At the end of the day, what mattered was the clock. Good lap times, lap after lap. They said: 'we'll take this guy. Even if his English is not so good, he will learn. But the driving we don't have to teach him; he can do that well.'

Maurice: Had you been to Donington Park before? It's a tricky track and I guess it was cold...

Mika: I hadn't and yes, it's a really tricky circuit. And yes, bloody cold! But when I went to the test I said: "Come on. Four weeks in a bus." I was so happy to be there. I was just so proud to be doing that and showing them what I could do.

Maurice: Okay, so this gets you into F3. I want to ask about your first meeting with Michael Schumacher, which was at Hockenheim in 1990 – and you beat him.

Mika: It was German F3. We were coming from England and they underestimated us. In free practice, we had a misfire, and I was halfway down the list of times. But they didn't know we had a misfire and didn't pay any attention to us. We fixed the problem for qualifying.

As you know, Hockenheim then had massive straights that in an F3 car seemed to last forever. At the start of a lap, I came round the first corner flat-out and there was a car not far away, so I got a tow for the first straight. I knew that was an improvement of maybe two-tenths on that bit alone. I was about to overtake this car before the first chicane, but then I thought, 'I'm not going to do that. It may cost me a tiny bit of time but I'm going to follow this car on the next straight.' So I gained maybe half a second on those two straights and I banged in a time that was one second quicker than anybody else's; it was an incredible time.

You could see mechanics dropping their tools on the floor and thinking: 'What! Where are these guys coming from?' They didn't know I was just so lucky to get the tow. We would have got the pole position anyway, but that margin just made the German F3 teams and drivers look really crappy. And when the race happened, I just went flat-out. I led the race from the start.

On the podium afterwards, there was a mixture of feelings. Michael was standing there and, of course, he was disappointed. I was spraying the champagne everywhere.

Maurice: But at the end of the year, in Macau...

Mika: Next question!

Maurice: Yes, well, you win the first heat then...

Mika: When you go back in time and something negative happens, you don't really want to talk about it. But, of course, fans are reading about it and people like you remember what happened. It was an awful, awful situation for me because we had really great preparation for this race. We qualified one second quicker than anybody else. I got a perfect lap in qualifying; the car was just flying. Michael was improving his car all the way through the weekend, so he was closing the gap. I won the first heat, by maybe four or five seconds, so a comfortable victory.

Maurice: Because it's on aggregate, isn't it?

Mika: Yeah, the two races together. At the second start, okay, I made a slight mistake and Michael was able to overtake. I thought, 'No stress. I just have to follow him.' I did that, lap after lap. And then he was slowing down. The performance was going down in his car and I was



Battling Schumacher (fourth place, blue car) at Macau 1990 (main); explaining the subsequent crash (below left); and with his McLaren team-mate Senna in 1993 (below centre)

trying to stay behind him. Of course, when I had to slow down, my tyre temperatures dropped and my car became difficult to drive. It was not the same car any more and I started struggling.

At the start of the last lap we were coming past the start/finish line and Michael missed the apex of the next fast right-hander. With the speed and the sort of power we had in F3, a mistake like that means you slow down in a big way. I knew I had to overtake him. I started to do that – and he moved across at the same time. Of course, that's it. I recall thinking, 'I don't believe this.'

So, who to blame? Myself. Afterwards, you think, 'Racing is racing and it's always tough.' But when you look in your mirror or you know somebody is moving so quickly behind you, and you move across – well, you don't have to think twice about what's going to happen. But, as I say, this is motor racing; no point being negative. But, obviously, the team weren't very happy. They lost a lot of money because the prize money was big. For me, it was a massive learning curve.

Maurice: If you're going to talk about massive learning curves, let's jump to 1993 when you were a test driver for McLaren. Michael Andretti goes home for good after the Italian Grand Prix in September and, suddenly, there you are, race driver and number two to Ayrton Senna.

Mika: Yeah. That was nice...

Maurice: Um, well Senna didn't think it was nice when you outqualified him at your first race in Estoril. Is it true he hadn't really talked to you much during the weekend? And after qualifying when he asked how you did it, you simply smiled and said, "Big balls." Is that true?

Mika: Yes, that's true.

Maurice: He wasn't pleased about it, was he?

Mika: Ayrton was not very pleased. At all. The thing about Ayrton in 1993 was that when he started the season, he was already somewhere else. He knew the performance of the car was not matching the Williams and he was definitely not happy because Alain Prost was winning. When I came to Estoril, Ayrton knew the performance

of the McLaren was okay, but he never expected me to beat him in qualifying. Okay, the time difference was hardly anything but, you know, I don't think anyone had beaten him in qualifying in his whole career. I mean, he was a god. It was a real shock for him. But when he kindly asked how I did it, I cracked a joke and said: "Big balls."

At first, he did not get it; he didn't understand. When he realised, he said: "Okay, I'll give you a lesson. You want to play a game with me? Okay, let's do it that way." So, he didn't give any information; no sharing, nothing. It made my life difficult. Of course, there were things I could see, things I knew he was doing. But little things make the difference when you're on the edge of performance, and some of the things he didn't share basically helped him perform better.

I don't think it was only because of what I said in that joke. I think he realised I was a big threat. So he put all his experience and all his power into kicking my ass and showing the world that, hold on, this young bloke is not going to beat →



INSETS: LAT ARCHIVE; GETTY IMAGES



me. And he did that. He kicked my ass, definitely in Adelaide. But Suzuka wasn't so clear. I could have been quicker than him in qualifying in Japan, but I had a problem with the brakes and I spun off on the chicane. But, hey, that's if-if-if...

Maurice: You always seemed to have a very good relationship with Ron [Dennis]. How much of an impact did your accident at Adelaide in 1995 have on him, because that was a shocking thing for you, and for him, too? *[Three laps into qualifying on the street circuit, Mika suffered a left-rear puncture just as he approached a 110mph fourth-gear right-hander. The McLaren snapped out of control and launched over a kerb before slamming sideways into a one-layer tyre barrier in front of a concrete wall. Häkkinen hit his head on the steering wheel after the safety belts stretched. Had it not been for an emergency tracheotomy performed on the spot by the medical team led by Professor Sid Watkins, Mika would not have survived.]*

Mika: I had a good relationship with Ron from the day we met. Did the accident make the relationship stronger? I don't think so. But it changed the way he saw me – that I don't give up and that I'm a fighter. I was loyal to the team and that helped Ron fight harder, to make sure that we had a car with which we could win.

"It was tough racing Michael in 1998, but really, for me, it was more about David Coulthard"

Maurice: Tell me a bit about your actual recovery from the accident. I didn't realise, until reading about it just recently, that you went through a very bad time. I mean, really terrible.

Mika: If you look at the accident, it looks nasty – but it doesn't look like, 'Wow. That's really bad.' But when you hurt your head, it's always dangerous; it's always painful. I cracked my skull and that gave me huge headaches, which are not fun at all. The doctors had to check everything because we have a lot of elements in our head that make us operate. I went through hell.

I went through so many tests to understand that everything was functioning correctly in my body. After the accident the doctors fixed things not completely, but the best they could. And, of course, the nerves got a little bit damaged, so my face was not operating exactly as it should.

In the first month, I was in such pain that I didn't even think about motor racing. All I wanted was for the nurses to keep bringing me painkiller tablets. Everything was calculated. Whatever I was doing, it was written down as well as the measure of this and that. To let me sleep at night, they had to put tape on my eyes because the nerves didn't work and the eyes wouldn't close. It was horrible, but when I thought about it all and that terrible moment, it really made me realise: "Okay, this is what life is actually all about. I don't just live for motor racing. There is something more important than that. I can live. I can take care of myself."

I was in Australia for five weeks or something and I wanted to come back home. I didn't want to stay there any more. So they did all kinds of tests to find out if I could fly, because there were



That win at Spa 1998, after the famous dual pass on Zonta (main); discussing the matter afterwards with archrival Schumacher (right) and with good friend and McLaren team principal Ron Dennis (far right)



worries about the effect of the pressure in the aeroplane. Finally, yeah, Ron and Mansour Ojje organised a private plane and I was able to come back. I was so happy.

Straight away, I went to Sid Watkins' hospital in London, and thought they were just going to do a check-up. But no; I was there for, I don't know, a week or two, going through the same tests again, just like in Australia. I went crazy. When I saw the nurse coming with the needle, I said, "Get out of here!" I was so fed up with the hospitals and the needles and the tablets.

Finally, I went back to Monaco. After a few days, I realised everything was a bit different. I think it was because the headaches and pain didn't really let me enjoy life. I flew to Finland, where I had a good Christmas. I was enjoying it and getting rid of racing and the accident.

Maurice: So when did you start thinking about driving again? You had a test pretty soon after that, didn't you?

Mika: It was when I went back to Monaco. That's when I felt it was time to start talking about motor racing. McLaren organised a test at Ricard. One side of my head was shaved because they put some bloody things through my head in hospital. When I went to the test, the mechanics looked at me and I could see them thinking,

'Okay, what's going to happen now? What's this guy going to do?'

But when I jumped in the car, I immediately felt, "This is it. I'm back home." Everything was good and I experienced again the quality of the McLaren, how fantastic it was. It was so comfortable; the car was made for me and I remember thinking, 'This is amazing.' I went flat-out immediately and I didn't think about this corner or that corner or what if something happens. I wanted to show the mechanics: 'Okay guys, let's get back to business.'

And then I started training, but that was very difficult to get back into. I had lost a lot of weight – I wish I could do that now – but the problem was that my general fitness had dropped in a big way, which made it challenging to come back. But I did it in the end.

Maurice: You had to wait a while, though, before the results started to come through. You didn't score your first win until the end of 1997. But then it really took off.

Mika: Yeah, Adrian Newey, Neil Oatley and the whole team designed a brilliant car in 1998. It was just perfect. We were 1.5-2 seconds ahead, which, as you know, is light years in F1.

Maurice: And all the time you're racing against your old friend Michael Schumacher.

Mika: I have to say, it was a pleasure to race against him. He already had great confidence and a good knowledge of winning races and championships. In 1998 it was tough racing against him, but really, for me in 1998, it was more about David Coulthard. He also had great confidence and he was really quick. But I knew his weaknesses and strengths, which was just as well because I knew that unless I put myself on the super edge, he was going to beat me. When we had a car like this, it was easy to make a great lap time. But if I didn't do the super lap, David would beat me. So it was hard because I was more or less racing against my own team-mate.

Maurice: I'm sure DC would be pleased to hear you say that. But I have to return to Schumacher and ask you about that incredible moment at Spa as the pair of you went either side of Ricardo Zonta at the top of the hill. Actually, can I start with the lap before when Michael edged you onto the grass at the same place. You had a chat with him afterwards in parc fermé, I remember...

Mika: Yeah... but the race was over – and I had won. I said, "Hey, come on, this is not correct," and tried to make him realise this. The team were really upset; they took the wing endplate (damaged by the rear wheel of the Ferrari) to let the stewards have a look at it. Martin →



"I hit a bump and the wheel came off. I'm doing 200mph with the steering wheel in my hand!"

Whitmarsh was not happy and tried to make the stewards accept that you can't continue like this.

Maurice: When you pulled the move past Zonta, can you remember how you felt?

Mika: Yeah, absolutely I remember. When you follow an F1 car at that speed, it is an incredible experience because you have no air. The steering is light and when braking the whole car feels light and like it's going to explode. When Michael moved on the left and I moved on the right, I got the tow from Zonta. So, even though we were going very fast, I suddenly had extra speed. Of course, there has to be a little bit of luck there. There is no one saying to Zonta: "Slow down so that Mika can overtake." Michael went to the left

because the circuit was still a bit wet on the right, so he knew if he went on the right and I went left, I was going to have the drier line. So he took the safe option. I went on the right. It was wet but I knew he would not have a chance. After what had happened before, he knew that now he had to give up because of what he had done to me. Otherwise both of us would go off. It was a great experience. A really great victory.

Maurice: I want to move on towards the end of your F1 career. You had a couple of failures. You'd had an accident...

Mika: I've had quite a few of those!

Maurice: Mmm, yes. But there was one in particular, during testing at Monza, that had

quite an effect. Was that the one where you thought, 'Sod this. I'm off'?

Mika: When my steering wheel came off?

Maurice: That would be the one.

Mika: On the straight there is this little bump, just by the start/finish line. You're flat-out, but you know it's coming. It's very unpleasant, actually. For once I was a bit more relaxed; sixth gear, 200mph or whatever. I hit the bump, my left leg bounced up – and it touched the steering wheel's quick-release. The wheel came off. I'm doing 200mph with the steering wheel in my hand. Oh shit! I couldn't believe it. I'm there thinking: 'What can I do?'

The car started pulling slightly on the left. The only thing I could do was to slam on the brakes; all four wheels locked. The car was sliding halfway down the straight all the way to the first corner. I touched the barrier a bit on the left side. Then I saw the marker boards coming but luckily they were made of light material. I finally came to a stop. Then that accident in 1995 came to mind. I thought: 'This could have been a big one.'

I walked back to the pits and explained what had happened. I said, "Guys, give me the rest of the day off." I went back to the hotel and had a think. I probably should have got back in the car and continued driving. But things started going through my mind: at these speeds, anything can happen. It's too much.

Maurice: I remember here in Monaco – actually, a few metres from the front door of this building, where the McLaren motorhome was situated in the paddock – there was talk of you maybe coming back to Formula 1. We all had a chat with you. Was this a bit of publicity exercise or were you really interested?

Mika: I was very much interested, actually. I was fit and I was feeling energetic. I could see the mistakes other people – the drivers and the teams – were making and I had time to think about all the mistakes I had made. I was thinking: 'I'm going to fix all these mistakes. I'm smarter now. I can do this.' I contacted Didier [Coton, Mika's manager] and said: "Let's go back and start talking to teams about how we could do this." But all the meetings about coming back were actually very complicated. I was expecting people to say, 'Yeah! Welcome back! Let's go for it!' I knew how ready I was, but I realised that this is F1 and I didn't want to go through all that pain again to get the success. If people are not ready to make decisions and move, I'm not going to wait another seven years



until I win again. It came to the point where I said, "Okay, let's stop this." But my passion for racing was still there, and I did DTM.

Maurice: Which you enjoyed?

Mika: I did. It's not club racing. It's proper cars and young guys who are serious and want to be F1 drivers. They'd do anything to try to beat me.

Maurice: Which brings us up to date. You seem really happy and contented. How are you filling your time these days?

Mika: I've been an ambassador for a logistics company, Hermes, in Germany since 2008. And, of course, I've been working with Johnnie Walker: I've got a long-term contract with them, which we announced in Monza last year. They're doing great work globally to make people aware of the dangers of drinking and driving.

Maurice: Do you find that satisfying?


Mika: I do. It's been a great journey. Such motivating work because racing and driving are my business; so, for me to enter new areas of work in my life is brilliant. It's very challenging. You cannot live in the past. You have to move forward and get new things that motivate you.

I'm also an ambassador for Mercedes-Benz, and I do a lot of work in China for AMG; they are very successful over there. I have seen a lot of changes in the market; the potential in China is just incredible because of the way it's moving forward in business.

I watch all the grands prix, of course, but especially because I'm writing a column for a Finnish newspaper. And also because I'm taking part with Didier in the management of drivers. That's also really challenging for me because I'm having to learn about how to write contracts; about how do I explain this and that; about putting everything together and being in the right place at the right time.

This became important, especially when Valtteri Bottas signed for Williams. We've had a multi-year programme with Valtteri which has worked out – but it's been a very difficult road. Luckily, Valtteri is a brilliant racing driver – a great talent. He works really well with people. It doesn't mean you have to like him, but you can communicate with him and build up the relationship with him to do something good. That's why the people at Williams, the mechanics and so on, like him a lot.

Maurice: Well, from what you've told me today, you've plenty of fantastic experience to draw on. Thanks for your time.

Mika: Not at all. It's been a long time... 

Häkkinen racing McLaren team-mate David Coulthard at Jerez in 1997





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A polished victory

Smart strategy and a flawless drive see Kimi sail elegantly from P7 to an effortless win as F1 makes its first stop of the year at Melbourne's Albert Park

OPINION



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TC remembers a powerhouse of Formula 1: Sir Frank Williams' devoted wife, Lady Virginia



122 MURRAY WALKER

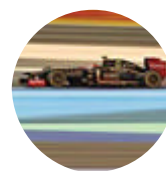
Murray recalls a memorable trip to Maranello at the start of the Schumi-Ferrari partnership



PREVIEWS

116 CHINESE GP PREVIEW

By the third race of the season, we should be getting a clearer idea of 2013's main contenders



118 BAHRAIN GP PREVIEW

Hot, dry and abrasive, this is one of the biggest tests of the tyres that the calendar has to offer

RACE DEBRIEF by Anthony Rowlinson

Australian Grand Prix

17.03.2013 / Albert Park, Melbourne



Sutil's ode to joy

It's all smiles both for Force India's prodigal son Adrian Sutil, who enjoyed a multi-lap early lead, and the effortless winner Kimi Räikkönen. Meanwhile, over at McLaren, there's only despair...

There was no disguising the look of restrained delight on the face of Adrian Sutil as he sat back in the Force India team unit, neon-lit against Melbourne's evening skies.

A couple of hours earlier, he'd been leading an F1 grand prix for the first time – convincingly, too, even if his position owed almost everything to a decision to start from P11 on mediums, when the ten ahead of him were on supersofts.

But lead he did, taking a moment in the sun after a year in the shadows to remind the world, as much as himself, of a fine talent shut away by circumstance. "You can never give up," he told a clutch of reporters attracted by his performance. "Today that meant fighting for seventh place, which was okay for my first race back. But it also showed that you always have to believe. That's something I really had to learn when I was away from F1. It's such a stressful sport that you have

no time for learning when you are in it and I believe that I learned a little more, coming back."

There's learning still to do, he admitted. Such as how to get the best from supersofts that grained late in the race, costing him four seconds per lap and allowing first Hamilton, then a KERS-troubled Webber past easily on lap 46, before coming back and permitting a pick-up in pace. Inexperience with these characteristics cost him a likely fifth place, but Sutil's reward was more than six points at the flag; this was vindication.

His drive was a cameo, no more, in a race slugged out by heavyweights Räikkönen, Alonso, Vettel, Hamilton and Massa, yet its human qualities shone brightly on a weekend made occasionally gloomy by the infamous infidelities of Melbourne's weather (so turbulent that qualifying was abandoned after Q1 on Saturday, to be completed at 11am Sunday).

They were elsewhere, too. Down at Lotus, for example, where the joy on the face of tech boss James Allison was rather less reserved. "It feels superb," he grinned, after watching Kimi Räikkönen cruise effortlessly away from the pack to bag 25 points from a P7 start, making one stop fewer (two) than those behind down to Mark Webber in sixth. Had it been as easy as it looked? "We had laps to spare on the final set of tyres, yes," said Allison, mastermind of the elegant E21. "We were pretty confident going into the race that we would be okay, after a 25-lap run on Friday afternoon on full tanks. The tyres weren't worn out after that, so we knew we would be fine."

They were: Kimi drove his first nine laps on supersofts from qualifying; 25 on his first set of mediums; laps 34 to 58 on set two. No wonder the Iceman appeared almost beatific post-race. Kimi doesn't do smiles, we know

that, so the lopsided grin that accompanied his acknowledgement that this had been the easiest of his 20 F1 wins might have been evidence of a profound inner rapture. Or maybe just the satisfaction that comes with leading the world championship from race one. The last time that happened (2007) he took the title.

"I could set the times and I could go fast whenever I needed," he said. "I hope I can win many more races like this." On this evidence (drawn from an atypical circuit) he will.

So, too, will Fernando Alonso and Seb Vettel, Kimi's podium partners. Alonso's drive was one of typical venom, from a start that launched him straight into third from P5, to the inevitable victory challenge. He *did* in fact win the race: that being the race of the triple-stoppers. Trouble was, Kimi was in a race of his own.

Lotus and Kimi's mugging of their rivals with a combination of sublime driver-car efficiency was laid bare by the comments of third-place finisher (and dominant pole-sitter) Vettel: "As I worked through the calculations during the race, I could see that everyone was more or less where they should be. But then there was Kimi up ahead. I never had him in my calculations."

Vettel's comments were offered with humour and good spirit, for it's still early in the year and late-season championship tension is a world away. There's also affection for Kimi among his peers, for they recognise a true racer whose skills remain so pure, whose talent is still so undimmed, they know that every so often there will be no answer to his speed. That Sunday in Melbourne was one of those days. Yes, the victory owed much to a Lotus technical philosophy that accentuates tyre preservation over outright qualifying speed (caution, Red Bull: this may be your 2013 Achilles' heel), but no amount of technical smarts will win grands prix without drivers delicate enough to maximise any advantage. In Australia that man was Räikkönen; later this year, there will be chances for Romain, compromised in Albert Park by a bad start and traffic. "There was no problem with his race pace," noted team boss Eric Boullier.

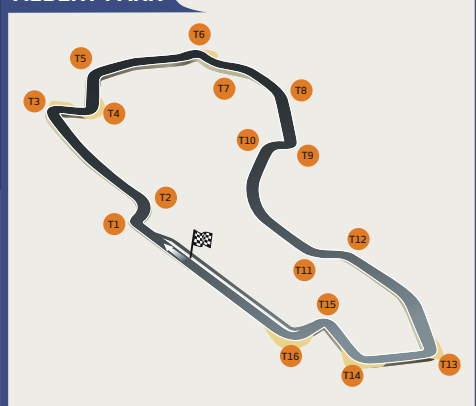
That, sadly, could not be said of McLaren, whose gloomy pre-weekend predictions were borne out by miserable, invisible weekends for Button and Pérez (P10 to ninth for Jenson; P15 to 11th for Checo). The talk already is of dusting off last year's MP4-27, crash-testing it to 2013 regs and making it similarly aero-compliant. Not the work of a moment and not one with the promise of guaranteed success, but team boss Martin Whitmarsh wouldn't deny such radical action was being discussed. For McLaren, at a circuit that has brought the team such happiness (six wins), there was no joy to disguise. →

The story of the race

V
Vettel makes an untroubled start, but team-mate Webber is engulfed by Hamilton and the two Ferraris



ALBERT PARK



>
It all seems to be going to plan for Vettel in the early stages as he begins to pull away



^
Vettel's first stop, like most front-runners', came early to minimise time spent on supersofts

>
By starting on the mediums, Sutil was able to stay out and take over the lead until his first stop



<
Alonso pits earlier than Vettel second time around on lap 20, taking the lead when Räikkönen stops...



^
...but this would be Kimi's second and final stop, thanks to superb tyre management, and the strategy pays off

>
So first blood to Kimi, who, if you include his 2012 Abu Dhabi win, has now won two of the last four races



MAIN PHOTO: STEVEN TEE/LAT; ILLUSTRATION: ALAN ELDORGE; INSET: STEVEN TEE/LAT; CHARLES COATES/LAT; ANDY HONE/LAT; ALASTAIR STALEY/LAT; CLIVE MASON/GETTY IMAGES

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Australian Grand Prix stats

The lowdown on everything you need to know from the weekend at Albert Park...

THE GRID

 1. VETTEL RED BULL 1min 27.407secs Q3	 2. WEBBER RED BULL 1min 27.827secs Q3
 3. HAMILTON MERCEDES 1min 28.087secs Q3	 4. MASSA FERRARI 1min 28.490secs Q3
 5. ALONSO FERRARI 1min 28.493secs Q3	 6. ROSBERG MERCEDES 1min 28.523secs Q3
 7. RÄIKKÖNEN LOTUS 1min 28.738secs Q3	 8. GROSJEAN LOTUS 1min 29.013secs Q3
 9. DI RESTA FORCE INDIA 1min 29.305secs Q3	 10. BUTTON McLAREN 1min 30.357secs Q3
 11. HÜLKENBERG SAUBER 1min 38.067secs Q2	 12. SUTIL FORCE INDIA 1min 38.134secs Q2
 13. VERGNE TORO ROSSO 1min 38.778secs Q2	 14. RICCIARDO TORO ROSSO 1min 39.042secs Q2
 15. PÉREZ McLAREN 1min 39.900secs Q2	 16. BOTTAS WILLIAMS 1min 40.290secs Q2
 17. MALDONADO WILLIAMS 1min 47.614secs Q1	 18. GUTIÉRREZ SAUBER 1min 47.776secs Q1
 19. BIANCHI MARUSSIA 1min 48.147secs Q1	 20. CHILTON MARUSSIA 1min 48.909secs Q1
 21. VAN DER GARDE CATERHAM 1min 49.519secs Q1	 22. PIC* CATERHAM 1min 50.626secs Q1

THE RACE



THE RESULTS (58 LAPS)

1st	Kimi Räikkönen Lotus	1h30m03.225s
2nd	Fernando Alonso Ferrari	+12.451s
3rd	Sebastian Vettel Red Bull	+22.346s
4th	Felipe Massa Ferrari	+33.577s
5th	Lewis Hamilton Mercedes	+45.561s
6th	Mark Webber Red Bull	+46.800s
7th	Adrian Sutil Force India	+65.068s
8th	Paul Di Resta Force India	+68.449s
9th	Jenson Button McLaren	+81.630s
10th	Romain Grosjean Lotus	+82.759s
11th	Sergio Pérez McLaren	+83.367s
12th	Jean-Eric Vergne Toro Rosso	+83.857s
13th	Esteban Gutiérrez Sauber	+1 lap
14th	Valterri Bottas Williams	+1 lap
15th	Jules Bianchi Marussia	+1 lap
16th	Charles Pic Caterham	+2 laps
17th	Max Chilton Marussia	+2 laps
18th	Giedo van der Garde Caterham	+2 laps

Retirements

Daniel Ricciardo Toro Rosso	39 laps – exhaust
Nico Rosberg Mercedes	26 laps – electrics
Pastor Maldonado Williams	24 laps – spin
Nico Hülkenberg Sauber	DNS – fuel system

THROUGH SPEED TRAP



Fastest: Jean-Eric Vergne, 193.04mph



Slowest: Nico Rosberg, 183.28mph

TYRE COMPOUNDS USED



Supersoft



Medium



Intermediate



Wet

CLIMATE

Overcast

18°C

TRACK TEMP

24°C



FASTEST LAP

Kimi Räikkönen, lap 56, 1min 29.274secs



FASTEST PITSTOP

Felipe Massa, 21.509secs (entry to exit)

DRIVERS' STANDINGS

1st	Kimi Räikkönen Lotus	25pts
2nd	Fernando Alonso Ferrari	18pts
3rd	Sebastian Vettel Red Bull	15pts
4th	Felipe Massa Ferrari	12pts
5th	Lewis Hamilton Mercedes	10pts
6th	Mark Webber Red Bull	8pts
7th	Adrian Sutil Force India	6pts
8th	Paul Di Resta Force India	4pts
9th	Jenson Button McLaren	2pts
10th	Romain Grosjean Lotus	1pt
11th	Sergio Pérez McLaren	0pts
12th	Jean-Eric Vergne Toro Rosso	0pts
13th	Esteban Gutiérrez Sauber	0pts
14th	Valterri Bottas Williams	0pts
15th	Jules Bianchi Marussia	0pts
16th	Charles Pic Caterham	0pts
17th	Max Chilton Marussia	0pts
18th	Giedo van der Garde Caterham	0pts
19th	Pastor Maldonado Williams	0pts
20th	Daniel Ricciardo Toro Rosso	0pts
21st	Nico Rosberg Mercedes	0pts
22nd	Nico Hülkenberg Force India	0pts

CONSTRUCTORS' STANDINGS

1	Ferrari	30pts	9	Williams	0pts
2	Lotus	26pts	10	Marussia	0pts
3	Red Bull	23pts	11	Caterham	0pts
4	Mercedes	10pts			
5	Force India	10pts			
6	McLaren	2pts			
7	Toro Rosso	0pts			
8	Sauber	0pts			



For comprehensive F1 statistics visit www.forix.com

*Allowed to start by stewards (1min 50.616secs = 107% time)

The Chinese GP preview



12-14.04.2013 / Shanghai International Circuit, Shanghai

F1 stays in the Far East where a true picture of this year's competitive order starts to emerge, despite the unpredictable effects of weather on rubber



THE ENGINEER'S VIEW

Xevi Pujolar,
Williams' chief race engineer

Shanghai is a much more conventional circuit than the first two tracks of the year and this is where we start to get a clearer picture of the competitive order of the teams.

The circuit has mostly medium to high-speed corners, but there are two unusual features that can cause havoc with the left-hand side of the car. The first is the heavy braking and sharp turn into the long, tightening right-hander at the start of the lap and the second is Turns 12-13 where drivers accelerate onto the long back straight.

Because we race here in early April, very low temperatures are quite common and this can cause problems with the tyres. In particular, it's hard to get the left front working on the opening lap of qualifying in both of these turns without damaging the compounds. If we struggle with

one axle, we can shift the stress we put into it by adjusting the cambers, weight and mechanical balance. We can also manage downforce levels to try to counter the wear on the left hand side of the car, too, but if there are problems with both axles, it's much harder to manage.

Another solution involves the driver: he can be more or less aggressive in his style and particularly on high fuel, he needs to be as smooth as possible to look after the tyres.

Overall, tyre energy is not extreme at this track, but what we saw last year is that the condition of the tyres can be much worse than you think it is as a number of teams struggled at the end of their stints when their tyres suddenly gave up all of their grip. This year Pirelli are again bringing the soft and medium compounds, but we'll have to wait and see how the new rubber will work.

The other factor to consider here is optimising the DRS for the long back straight. I'm not sure why the DRS zone is so late on the straight, it's quite short and if the guy in front uses maximum KERS it's hard to get past him into the tight Turn 14 hairpin. That's one to look out for this year.

SHANGHAI STATS AND FACTS

15 seconds
The longest time spent on full throttle between Turns 13 and 14

1,170 metres is the length of the long back straight

3.6G The highest G-force experienced for 3.4 seconds at Turn 7

81,000m/s²
Acceleration of engine pistons on the back straight

42mph
The lap's lowest apex speed



CHINA GP RACE DATA

Circuit Shanghai

International Circuit

F1 debut 2004

Length 3.387 miles

Distance 189.559 miles

Laps 56

Direction Clockwise

Lap record 1min 32.238secs,

M Schumacher, 2004

Full throttle 62%

Gear changes per lap 55

Winners from pole 5

Tyre compounds

Soft and medium

TV TIMETABLE (UK TIME)

Friday 12 April

Practice 1 03:00-04:30

Practice 2 07:00-08:30

Saturday 13 April

Practice 3 04:00-05:00

Qualifying 07:00

Sunday 14 April

Race 08:00

Live coverage

Sky Sports F1 (available in HD)

BBC One (available in HD)

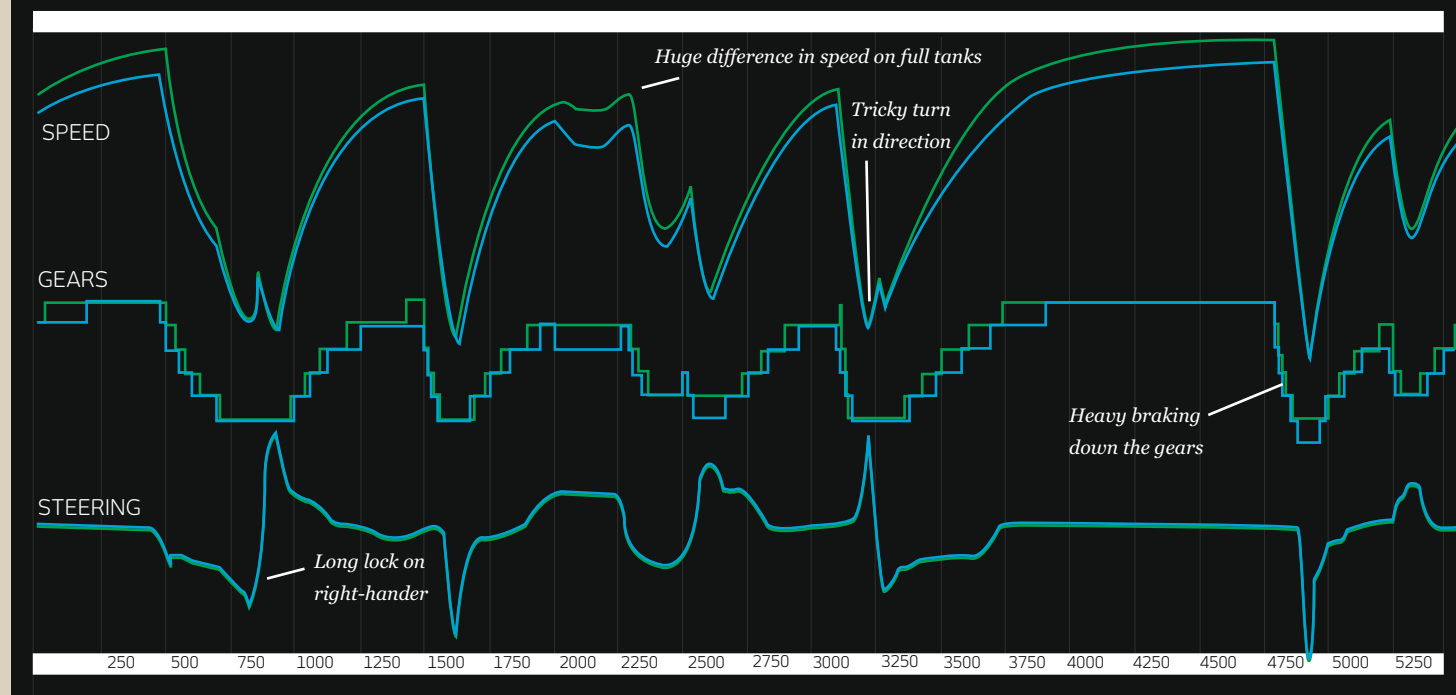
DO YOU REMEMBER...

...when in wet conditions Sebastian Vettel took a sensational fourth place for Toro Rosso in his debut season in 2007? It made up for his misdemeanour just a week earlier in Fuji when he crashed into the back of Red Bull's Mark Webber while running behind the Safety Car.



SHANGHAI TELEMETRY

QUALIFYING ■ RACE ■



Turns 1-2

From Friday until Sunday the track grip levels build, enabling drivers to brake a lot later in a number of corners, particularly Turn 1. Initially it looks like two corners, but it becomes one corner once the driver is able to start braking later.

Turns 12 & 13

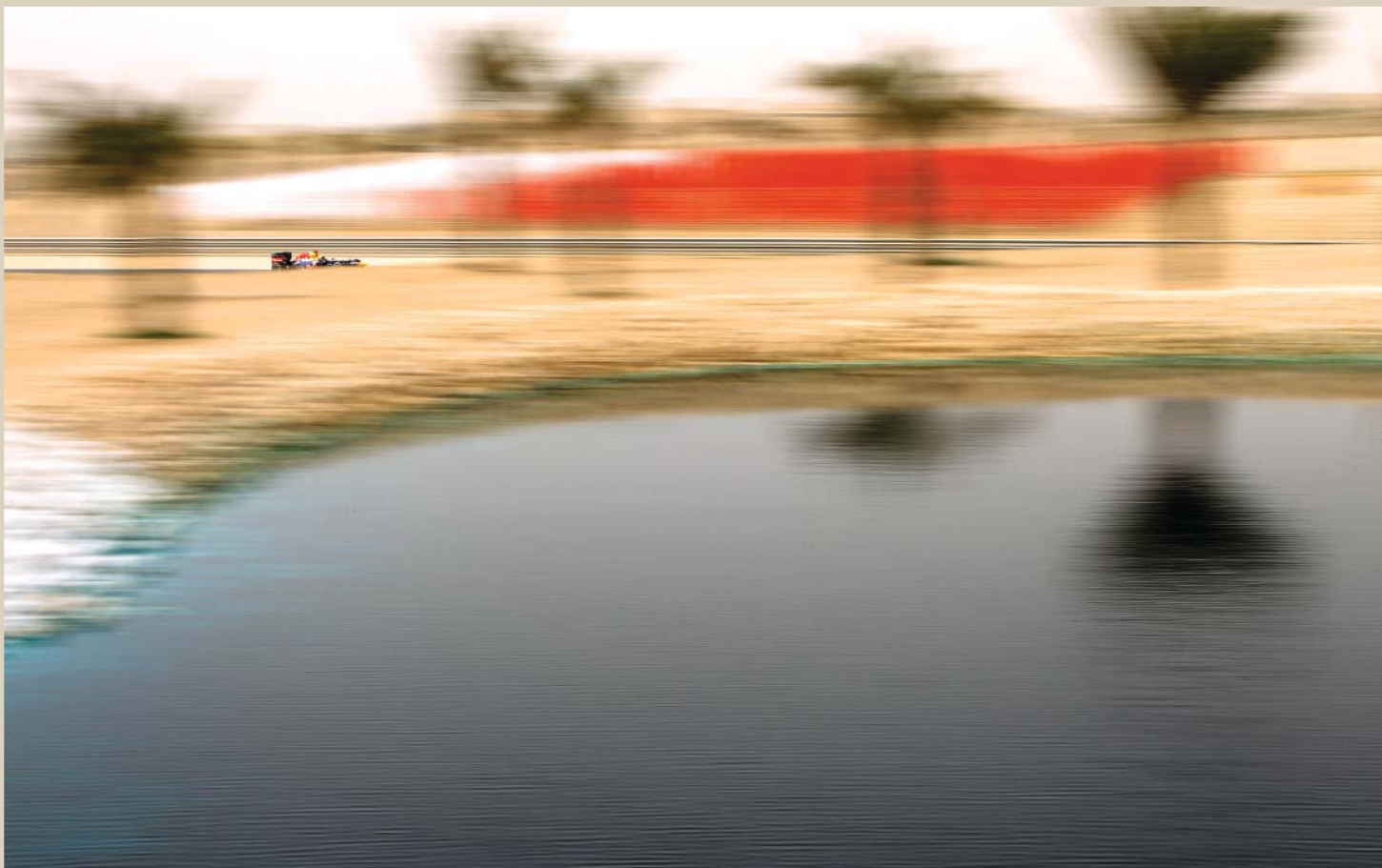
There is a sudden change of direction heading into Turn 12, which is a very difficult point of the lap and critically important as you need to be perfectly positioned for Turn 13 so as to build up maximum speed for the long straight.

Turn 14

This slow, tight turn requires heavy braking and you need a lot of steering lock to get it just right.

ILLUSTRATION: ALAN ELDREDGE. PHOTOS: STEVE ETHERINGTON/LAT, ANDY HONE/LAT

The Bahrain GP preview



19-21.04.2013 / Bahrain International Circuit, Sakhir

With such an abrasive track surface and extremely high ambient temperatures, tyre management is critical in the Bahraini desert



THE ENGINEER'S VIEW

Xevi Pujolar,
Williams' chief race engineer

We've been fortunate so far, in that whenever we've been to Bahrain, there has never been a bad sandstorm. I remember Ferrari visiting Sakhir one winter and being unable to test because there was such an extreme sandstorm, but thankfully we haven't experienced that at a grand prix weekend yet.

Given its desert location, we experience some of the most extreme temperatures of the year in Bahrain. Ambient temperature can often exceed 41°C, so we concentrate on keeping the car cool.

Another challenge is posed by the abrasive track surface, which makes it tough on the tyres, especially in the acceleration zones on this lap.

The average turn angle of the corners at Sakhir is not long, but the main problem is the demanding traction allied to the high

temperatures. Those concerns drive the engineering programme all weekend. At many tracks we go to we are front-limited, so we suffer understeer, but in Bahrain it's the opposite. You stress the rear so much that under braking you feel as if the rear of the car is going light the whole time. So we need to set the car up to give the rears an easy time – it's how we do it that poses the biggest challenge.

We need to adjust both the mechanical and aero balance to try to make things easier on the tyres. And, crucially, the driver has to concentrate on protecting the rear tyres, particularly during the race itself. Any time he is breaking traction it's game over, particularly at Turn 2, Turn 4 and Turn 10.

The other area of the car that suffers a hard time is the brakes and this is the first circuit of the year when you really test your brake cooling and also the material you use. There are four long straights and each one leads into a tight corner at the end, so each one requires hard braking from high speed. In recent years we've seen a number of different drivers and teams suffer from brake problems in the race.

SAKHIR STATS AND FACTS

480 metres – The length of the pitlane under speed-limit control



12.5 seconds spent on full throttle on the start/finish straight

The distance in metres from the startline to the first-corner apex **600**

15% of the lap here is spent on the brakes





BAHRAIN GP RACE DATA

Circuit Bahrain International Circuit
F1 debut 2004
Length 3.363 miles
Distance 191.53 miles
Laps 57
Direction Clockwise
Lap record 1min 30.252secs, M Schumacher, 2004
Full throttle 67%
Gear changes per lap 58
Winners from pole 4
Tyre compounds Soft and hard

TV TIMETABLE (UK TIME)

Friday 19 April
Practice 1 08:00-09:30
Practice 2 12:00-13:30
Saturday 20 April
Practice 3 09:00-10:00
Qualifying 12:00
Sunday 21 April
Race 13:00
Live coverage
 Sky Sports F1 (available in HD)
Highlights BBC One (available in HD)

LAST YEAR

Winner Sebastian Vettel
Retirements 2
Overtaking moves 58
DRS overtakes 14
Weather Sunny, 29°C

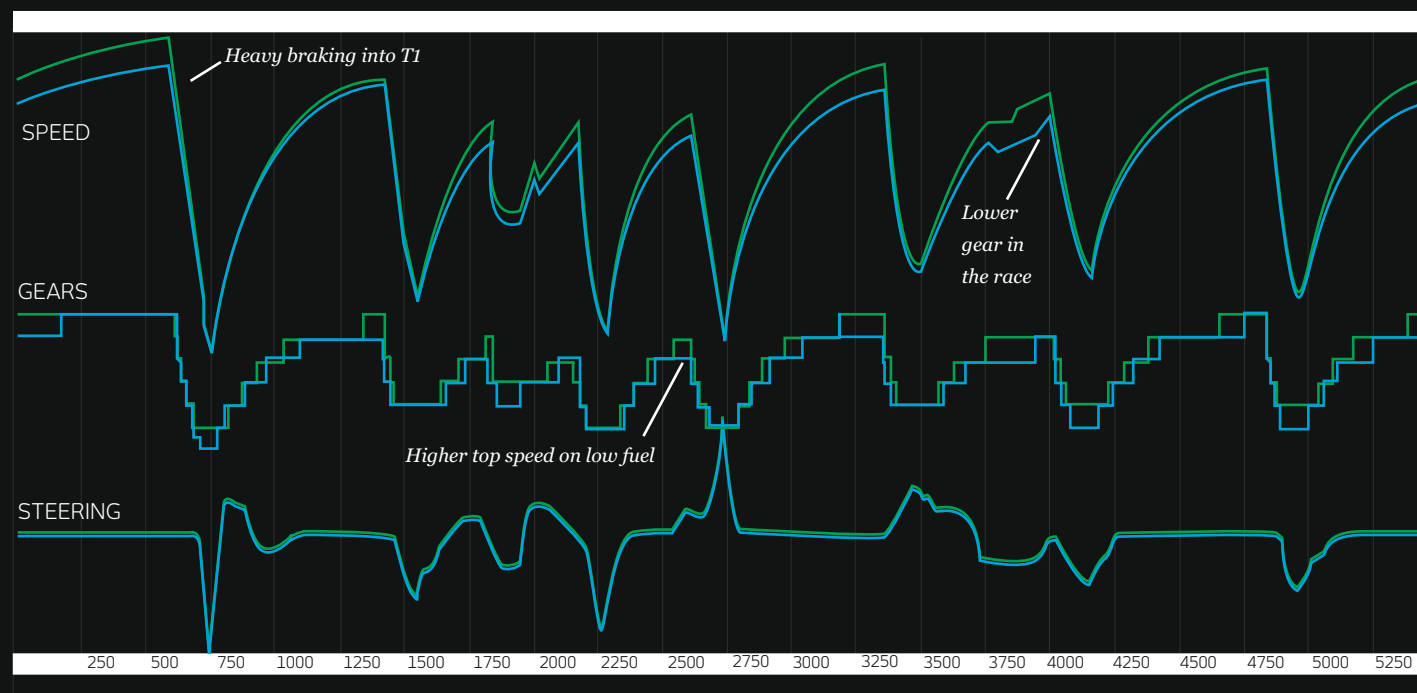
DO YOU REMEMBER...

...when the car in front was a Toyota? During Toyota's eight years in F1, they scored just three pole positions. Two were in 2005, at 'Indygate' and Suzuka and the third was Jarno Trulli's Bahrain pole in 2009. He failed to convert it into a win, however, and could only manage third place in the race



BAHRAIN TELEMETRY

QUALIFYING ■ RACE ■



Turns 7-8

Because of the stress on the rear tyres, the oversteer can make positioning the car between Turns 7 and 8 very difficult, mainly because the car slides around so much.

Turns 9-10

Even though it's hard to brake under lateral load the driver needs to keep the car straight to make things easier.

Turn 12

The traces show that race speed is quite a lot slower than qualifying pace: in the race there is more fuel and the rear tyres tend to struggle.

ILLUSTRATION: ALAN ELDREDGE. PHOTOS: STEVE ETHERINGTON/LAT, GLENN DUNBAR/LAT, ANDY HONE/LAT

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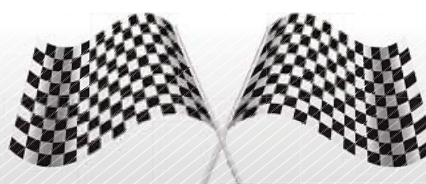
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TOM CLARKSON

Inside the paddock from our man on the road

A sad start to the season

It's 7.30am and already the mercury is nudging 26°C. The temperature will peak at 37°C later on – 'hotter than Satan's toenails', according to Lewis Hamilton, and 30 degrees warmer than in London. A wry smile sweeps across your face: yes, this is one of the reasons why the Australian Grand Prix is such a popular season-opener.

Twenty-four hours locked inside a plane is a small price to pay for glorious sunshine. In fact, it's barely a hardship; when else do you get so much free time? No mobile phone reception means no emails, and you don't even have to cook. You can do whatever you want for an entire day, which, in my case, results in *Two Brothers* by Ben Elton, and unexpected enjoyment from the movie *Flight*.

The desire to watch Denzel Washington's latest flick follows an invitation to look around the cockpit of the Airbus A380 that's transporting us from London to Melbourne. It's an extraordinary working environment, all fly-by-wire with a joystick like that of a PlayStation. There isn't even enough room for two of the plane's four pilots, which makes the space seem impossibly small for a plane that's so big.

"So who's going to win on Sunday?" is the parting question from the captain.

"Impossible to say."

"Thanks for the insight, TC. Gold dust. Let us tell you something: this plane's got 440,000 litres of fuel on board. That's a lot of weight."

A one-stop strategy to Australia, via Singapore, is on the cards. Marketing bods and engineers fill most of Business Class, with mechanics – the guys who put in the *really* long hours over a race weekend – travelling at the back of the plane. Such are the injustices of Formula 1 team hierarchies.

Pastor Maldonado is the only driver on board. He sits in Business Class with his new wife, Gabby, and can't help looking jaded. Last week he returned to Venezuela for just 24 hours to attend the funeral of President Hugo Chavez. "It was amazing," says Pastor. "There was so much passion for the president."

The unexpected call back home means that Pastor is the last of the 22 drivers to arrive down under. Jet lag, that most wretched of travel companions, will no doubt give him a rough build-up to the race, but his late arrival into the Melbourne paddock is the least of Williams' problems. Alongside the usual pre-season stresses, the team are



PHOTO: MARK THOMPSON/GETTY IMAGES

A Williams win in one of the early races would honour Ginny Williams

mourning the sad loss of Ginny Williams, Sir Frank's devoted wife of 39 years.

Ginny passed away on 7 March, aged just 66. She was the rock upon which Frank built

his entire life: she offered unwavering support during the early years, when Frank tottered on the fringes of bankruptcy, yet remained equally unimpressed by success. She raised their three children almost single-handedly, the result of her husband's frenetic travel schedule, and she helped Frank rebuild his life following his road accident in 1986. Her love for him was unconditional.

In her latter years, even before she became ill, Ginny rarely travelled to races, but her omnipresence at Grove remained real. She will be sorely missed and no greater tribute could be paid to Ginny than for her daughter, Claire, to increase her own role within the family business, perhaps first as deputy team principal and then as team principal in the fullness of time.

To hell with impartiality: a Williams victory in one of these early races would be a fitting tribute to a truly inspirational woman. RIP Ginny.

Irrespective of Formula 1's on-track winners this year, TV viewers in the UK are set for a bonanza because the spirit of competition has spread from the track to the TV compound. Sky and the BBC will go head-to-head during all on-track sessions from Friday through to Sunday at each of Auntie's nine live races. The move will provide viewers (and F1) with an extra 40 hours of terrestrial TV coverage in the UK.

The Beeb launched its plans at London's Institute of Contemporary Arts, ten days before Melbourne. Allan McNish was the big addition to the team; the two-time Le Mans winner will impart his experience from the start of the European F1 season, and there'll be a guy called Clarkson reporting from the pitlane as well. Not that Clarkson – this one: slimmer, younger and a lover of hamsters.

"No greater tribute could be paid to Ginny Williams than for her daughter, Claire, to increase her role at the team"

MURRAY WALKER



UNLESS I'M VERY MUCH MISTAKEN...

"In a country where Ferrari are practically a religion, Maranello is awash with passion and personalities..."

Monza 2000. "Come to Maranello the Monday after the race and I'll give you the Heineken tour – the parts others don't reach," said Ross Brawn. Was I excited? Yes, indeed I was. I'd been there before, back in 1988, to interview the great Enzo Ferrari in his daunting office, but there'd been a lot of water under the bridge since then. Ferrari were on a roll, at the beginning of five years of total dominance created by the formidable quintet of Jean Todt, Ross, Rory Byrne, Paolo Martinelli and Michael Schumacher.

So, past the famous Il Cavallino restaurant opposite the factory, through the arch with its proud 'FERRARI' lettering, and into the stuff of dreams. Because, in a country where Ferrari are practically a religion, the place is awash with

passion, politics and personalities. As we went through department after department, from the design section and the factory to the windtunnel and the race shop, with all the workers smilingly nodding their respect to Ross, I was reminded of the unique record of the Prancing Horse.

They're the only ones to have competed in every Formula 1 world championship from 1950 onwards and have always made the whole car – chassis and drivetrain – enabling Enzo Ferrari to refer contemptuously to his British rivals as 'garagistes'. Not just in F1 either, because in the days when sportscar racing was every bit as important, Ferrari ruled, with victories in the legendary Le Mans, Mille Miglia and Targa Florio events and just about everywhere else.

I don't want to deluge you with statistics, but Ferrari have won 31 championships and 37 drivers have won races in the team's scarlet cars. It's wrong, though, to assume that they've always been a winning team. They've been in the top three of the constructors' championship for 41 of its 55 years, but there have been years of comparative failure, too (notably from 1965-1974 and 1984-1998), with not a title to their name.

Just as Ferrari have fielded legendary drivers from Ascari to Alonso, Surtees to Scheckter, Mansell to Massa, Reutemann to Räikkönen and Fangio to Schumacher, so, too, have they employed some great designers. Notably Gioacchino Colombo, Aurelio Lampredi, Vittorio Jano, Mauro Forghieri, John Barnard and Rory Byrne, who, between them, masterminded dominant Ferraris from the brutal 4.5-litre 375, which was capable of humbling the then all-conquering Alfa Romeo 158 in 1951, to Michael Schumacher's succession of titles from 2000 to 2004. Enzo Ferrari, arguably the greatest man in the history of motorsport, was a skilful politician and notoriously demanding to work for, with a tendency to pit his drivers against each other and dominate his employees. But he got results.

Enzo was succeeded by Luca di Montezemolo, who rules to this day. I first met Luca at Monza 1977 when he was team manager, working with Niki Lauda during one of Ferrari's golden periods, prior to the ground-effect era that made things so tough for the Italian team on account of their downforce-inhibiting flat-12 engines. Montezemolo is a born leader and a natural successor to the great Enzo. He oozes charisma and is clearly in charge, cracking the whip as team principal Stefano Domenicali and technical director Pat Fry fight to return Ferrari to the top.

"Join us for dinner at the Montana" said Ross as we finished a memorable tour. If the day had been magic for me, the evening was even more so. The Montana restaurant, close to Ferrari's Fiorano test track, is the team's social hub. The walls are decorated with drivers' autographed photos and memorabilia, including the nosecone from Gilles Villeneuve's famous number 27 turbocar, and we were joined by Jean Todt, Rory Byrne and their partners. The food was superb and the conversation fascinating. A great day with a truly great team. Lucky me! 



"Enzo Ferrari was notoriously demanding to work for and tended to pit his drivers against each other. But he got results"





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