



F1

RACING

REVEALED... The making of a *MERC BEATER*

Why the FW37 could take Williams back to the big time

FORMULA 1 2015
WORLD EXCLUSIVE
FIRST PICTURES!



PLUS

McLAREN AND HONDA

We're in the garage
as new dream team
hits the track

BAKU TO THE FUTURE

We visit F1's
NEWEST track

TURBO-NUTTERS

Flash back to the crazy days of '80s
turbos: 1,500bhp and counting...

PICTURES OF THE YEAR

World's most photogenic sport: captured

No 228
UK £4.99
February
2015



haymarket

DOM  REILLY
ENGLAND

MICHAEL JOHNSON
PERFORMANCE

THE NEW LIMITED EDITION BAG
FROM DOM REILLY



Michael Johnson, a legendary athlete.
During his career he won 13 Olympic and World Championship medals.

All of which were gold.

The world's greatest choose Dom Reilly.



Sold exclusively at
WWW.DOMREILLY.COM

Speed. Courage. Glory.

C70 D-TYPE – LIMITED EDITION

Sir William Lyons designed Jaguar's legendary D-Type Long Nose racing car with one purpose in mind – to win at Le Mans. In 1957 the non-works Ecurie Ecosse team's resplendent Flag Metal Blue D-Type, driven by Ron Flockhart and Ivor Bueb, completed a stunning hat-trick of victories for the marque.

This 500 piece limited edition is a tribute to one of the finest cars and greatest achievements in British motorsport history.

EXCLUSIVELY AVAILABLE AT
christopherward.co.uk

CHR. WARD
L O N D O N





TWISTED™ RED EDITION

Like your life, there is nothing standard about a Twisted Editions Defender. Whatever you do, wherever you go, when you're in a vehicle that has been meticulously designed around every detail of your lifestyle, your journey is enhanced beyond measure. Experience the definitive collection of customised-to-order Land Rovers, and change the way you think about driving forever. Visit www.twistedperformance.co.uk or call +44 (0)1845 574 990.





COVER STORIES

32



46
70
88
58



46 **McLAREN-HONDA** Their development car gets a shake-down at Abu Dhabi



58 **PICTURES OF THE YEAR** The very best F1 photography from 2014



70 **BAKU** We explore the city that's set to host the 2016 European Grand Prix



88 **TURBOS** The new-breed of V6 turbos give power at its most sophisticated

FIRST SECTOR: THE REGULARS

- 10 **IGNITION** PRE-SEASON CONTROVERSY
- 12 **F1 INSIDER** NEWS, OPINION AND ANALYSIS
- 22 **INSIDE TECH** THE SCIENCE BEHIND TESTING TECHNOLOGY
- 24 **PETER WINDSOR** FREEZE THE ENGINES, SPOIL THE SPORT
- 27 **EMERSON FITTIPALDI** ANYTHING COULD HAPPEN IN 2015
- 29 **DIETER RENCKEN** FIA PLUNGE INTO SELF-MADE CRISIS
- 30 **NOW THAT WAS A CAR** THE WILLIAMS FW06
- 102 **SUBSCRIBE** AND GET AN ADIDAS RUCKSACK

SECOND SECTOR: THE FEATURES

- 32 **THE WILLIAMS FW37 REVEALED**
An exclusive first glimpse of the 2015 Williams, with behind-the-scenes analysis from chief technical officer Pat Symonds
- 44 **GO FIGURE**
A statistical look at the Williams Formula 1 team
- 46 **McLAREN AND HONDA REUNITED**
A classic partnership returns to F1, and we're there to witness the first outing of the McLaren-Honda MP4-29H/1X1
- 54 **YOU ASK THE QUESTIONS**
Daniil Kvyat answers your questions as he prepares to step up to the top team after just one year with Toro Rosso
- 58 **PICTURES OF THE YEAR 2014**
Classic Formula 1 photography encapsulating a thrilling season, from the talented team at picture agency LAT
- 70 **A FIRST LOOK AT BAKU**
Azerbaijan's capital city will host the European GP in 2016 – we pay a visit to a street circuit in the making
- 76 **A CHAT WITH GENE HAAS**
We catch up with the boss of the US-based Haas F1, who are due to make their Formula 1 debut next season
- 78 **DC ON RED BULL**
When Red Bull launched in 2005, they needed a big-name driver to give them credibility: David Coulthard was that man
- 84 **CYBER SAFETY IN F1**
We talk to the staff of Kaspersky Lab, the firm who have been handling Ferrari's data security since 2010
- 88 **THE RETURN OF THE TURBO**
A far cry from the flame-throwers of the 1980s, modern fuel-flow-limited turbos offer a more refined experience
- 94 **LUNCH WITH STEFAN JOHANSSON**
Maurice Hamilton talks to the talented Swedish racer, who kept finding himself in the right team at the wrong time

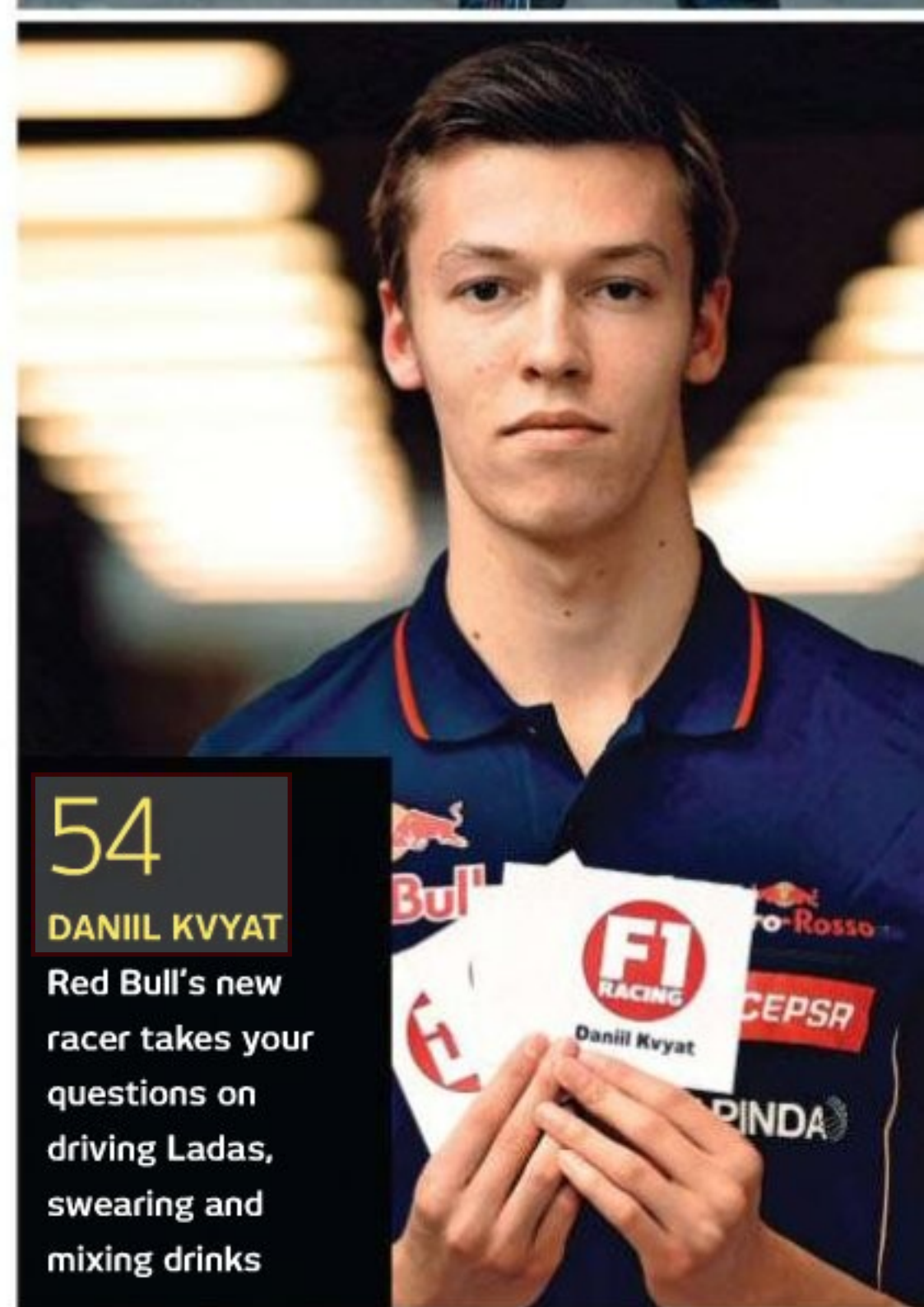
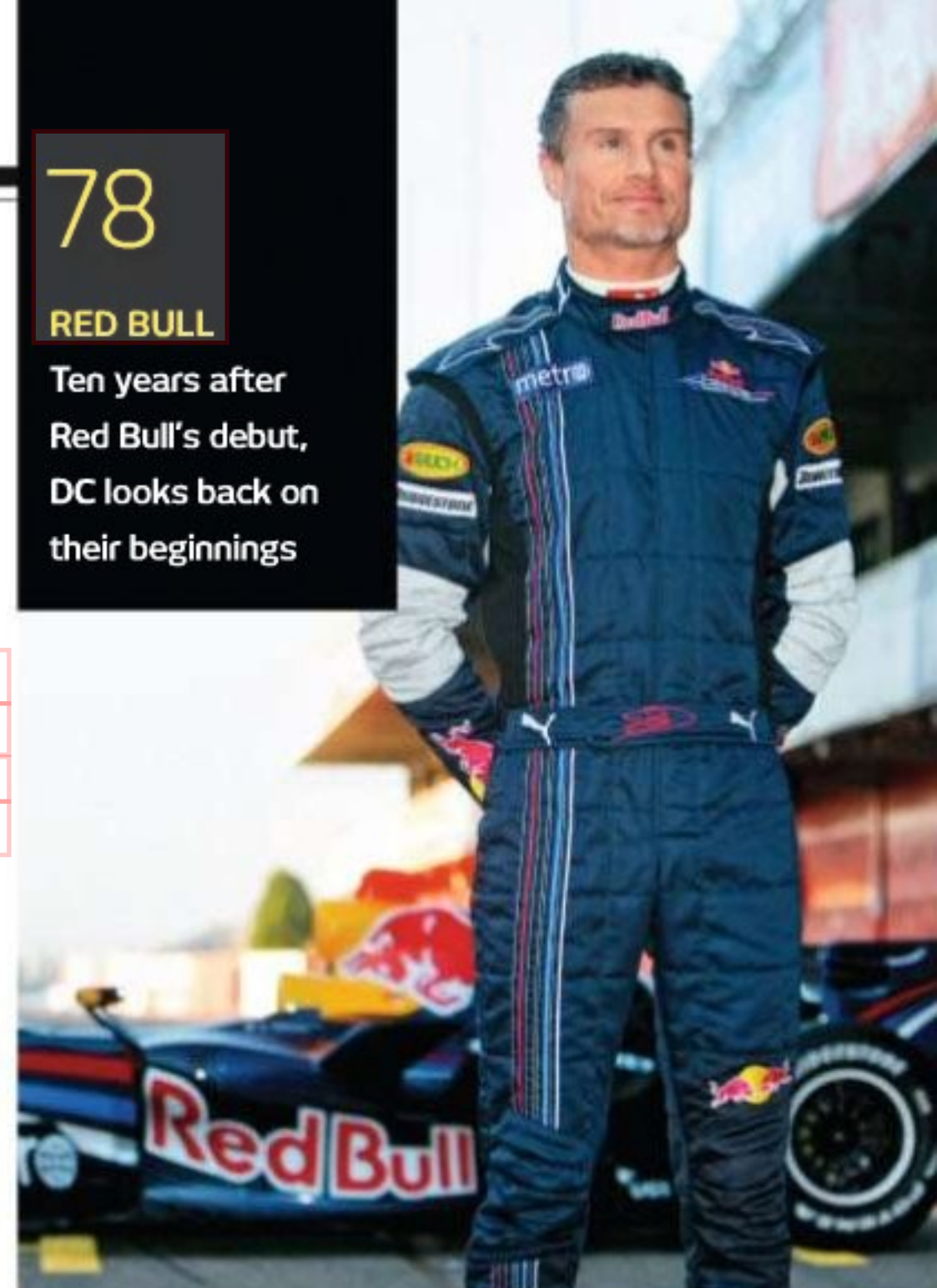
THIRD SECTOR: FINISHING STRAIGHT

- 104 **INBOX** READERS SHARE THEIR OPINIONS
- 106 **MURRAY WALKER** WHAT WILL THIS SEASON BRING?

78

RED BULL

Ten years after Red Bull's debut, DC looks back on their beginnings



54

DANIIL KVIAT

Red Bull's new racer takes your questions on driving Ladas, swearing and mixing drinks



WORLD EXCLUSIVE

32

THE MAKING OF THE FW37

The latest challenger from the Williams stable is revealed



94

STEFAN JOHANSSON

The former Ferrari racer lunches with Maurice Hamilton at Bibendum, Michelin's old HQ



70

BAKU

We check out the Tilke-designed street circuit running through Azerbaijan's capital city



46

HONDA TEST

McLaren revive their relationship with Honda – and we witness their first outing





Ignition / Anthony Rowlinson / 02.15

The first rules row of the year

What would the F1 winter be without a juicy rules spat to keep

the fires stoked as we await the first roar of 2015 cars on track? And this year the 'makers' (of engines, of rules) have done us proud. To boil the argument down, Ferrari and Renault found a way to keep developing their engines through 2015 to help them get on a power par with the dominant Mercs, while newbies Honda, returning with McLaren, will have to freeze the spec of their engine at 'V1' on 28 February. Thus, at a stroke, a bold and proud new competitor, not to mention one prepared to invest hundreds of millions of dollars into a sport that's still navigating choppy financial waters, is being roughed up even before it has started fighting.

It smacks of nothing more than old-school bullies ganging up against an ambitious and wealthy new boy from a respected family, and, truly, F1's power-brokers should be ashamed at their actions for once again failing to grasp the bigger picture.

It's not that Honda aren't big enough to take the snub, nor that they won't fight back (there is already talk of legal action against the FIA for erecting an anti-competitive barrier to entry). No, it's that F1 shouldn't find itself in such a tedious debate about engine credits and development windows, when all the fans want to see is star drivers racing hard in cars of comparable competitiveness. Instead, we have the prospect *before the season has started* of Fernando and Jenson driving McLaren-Hondas less powerful than they might be, and suffering from a lack of competitiveness as a result.

But surely Renault and Ferrari need development to catch Mercedes? Yes, of course, but so will Honda, so why not one rule for all? Hobbled Honda? No thanks.

It's never possible, in such a dog-eat-dog sport, to keep all the major players happy, but this issue has forged unholy alliances. *F1 Racing* understands that it was a Ferrari man who first spotted the regulatory nuance that might allow continued engine development (for some) beyond 28 February and quickly, we gather, a call was put through to the Christian Horner batphone, to enlist the support of politically powerful Red Bull, on behalf of engine partners Renault.

Now some might contend that we should expect nothing more than skullduggery and vicious piranha-on-piranha action, when it comes to finding an advantage that might eke out a tenth (or more) per lap. Indeed, isn't F1's hunger to feast on the carcass of weaker rivals part of its 'red-in-tooth-and-claw' appeal?

Maybe so, but this smacks more of desperation than of necessity, and when Honda do ride out the storm, as they surely will, they'll not be quick to forgive or forget.

Only a month ago it was Ferrari chairman Sergio Marchionne, ironically enough, who derided F1's regulatory structure when quizzed during a press briefing as to progress on 2015 engine negotiations. "It's a real labyrinth," he said. "The rules appear to have been written by a drunk at a bar. We have to simplify them so that even normal people can understand."

And to that sentiment, as we prepare to toast the birth of a new F1 season, we raise a glass.



HAYMARKET CONSUMER MEDIA, TEDDINGTON STUDIOS,
BROOM ROAD, TEDDINGTON, MIDDLESEX, TW11 9BE, UK

THE TEAM

Group editor
Anthony Rowlinson
Group
Managing Editor
Stewart Williams
Deputy Editor
James Attwood
Associate Editor
James Roberts
Executive Editor
Stuart Codling
Chief Sub-Editor
Vanessa Longworth
Art Editor
Frank Foster
Designer
Jack Woolrich
Principal
Photographer
Steven Tee
Office Manager
Joanne Grove
Editorial Tel
+44 (0)20 8267 5806

ADVERTISING

Advertising Director
Matthew Witham
Head of Global
Partnerships
Chris Gowland
Partnerships
Manager
Leanne Foley
UK Sales Manager
Ben Fullick
Advertising tel
+44 (0)20 8267
5179/5916

MANAGEMENT

Haymarket
Specialist Media
Group Director
Tim Bulley
Group Commercial
Director
Ben Guynan

LICENSING

Licensing Director
Alastair Lewis
Licensing Manager
David Ryan
PRODUCTION
Production &
Publishing Manager
Sunita Davies

SUBSCRIPTIONS

Email F1racing@servicehelpline.co.uk
Servicehelpline.co.uk
Fax 01795 414 555
Customer Hotline
0844 848 8826
Subscriptions
Marketing Executive
Kadie Chanter

CONTRIBUTORS

Columnists
Peter Windsor
Dieter Rencken
Emerson Fittipaldi
Murray Walker
Technical Consultant
Pat Symonds
Photo agencies
LAT Photographic
Getty Images

PUBLISHING

Group publisher
Stuart Williams
Missed an issue?
Back issues hotline:
08456 777 818

Editorial director Mark Payton

Creative director Paul Harpin

Strategy and planning director Bob McDowell

Managing director David Prasher

Chairman and managing director Kevin Costello

F1 Racing published monthly in Australia, China, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Japan, Korea, Malaysia, Mexico, Middle East, Philippines, Poland, South Africa, UK, USA, Formula One, Formula 1 and F1 (trademarks of Formula One Licensing BV, a Formula One Group company) are used under licence.

Circulation queries

Frontline, Park House, 117 Park Road, Peterborough, Cambs PE1 2TR.
Tel: +44 (0)1733 555161. ISSN 1361-4487. EAN 07713614480012.
Printed by Wyndeham Heron, The Bental Complex, Colchester Road, Heybridge, Maldon, Essex CN9 4NW. Covers printed by Wyndeham Group. Colour by Boin Group, 90-92 Pentonville Road, London N1 9HS.
Reproduction in whole or in part of any photograph, text or illustration without written permission from the publisher is prohibited. Due care is taken to ensure that the content of *F1 Racing* is fully accurate, but the publisher and printer cannot accept liability for errors and omissions. *F1 Racing* is a member of the Audit Bureau of Circulations.

F1 Racing Subscriptions

PO Box 326, Sittingbourne, Kent ME9 8FA. Tel: 0844 848 8826.
Fax: 01795 414 555. Overseas: +44 (0)1795 592 990.
Email F1racing@servicehelpline.co.uk.
F1 Racing (ISSN number 74597X) is published monthly by Haymarket Media Group, Teddington Studios, Broom Road, Teddington TW11 9BE, United Kingdom. Airfreight and mailing in the USA by agent named Air Business Ltd, c/o Worldnet Shipping Inc., 156-15, 146th Avenue, 2nd Floor, Jamaica, NY 11434 USA. Periodicals postage paid at Jamaica NY 11431. Subscription records are maintained at Haymarket Media Group, Teddington Studios, Broom Road, Teddington TW11 9BE.
Air Business Ltd is acting as our mailing agent.
F1 Racing is published 12 times a year by Haymarket Consumer Media, © 1996 Haymarket Media Group Ltd

Contributors



Pat Symonds

Williams tech guru hopes they've built a '15 winner

Our technical consultant has had a busy winter creating Williams's new FW37, but still found time to pen an exclusive insight (p32) into the car for us.



Maurice Hamilton

Dining with an '80s F1 star – and the Michelin man

Bibendum Restaurant, based in Michelin's first UK factory, was a fitting venue for Maurice Hamilton to dine with Stefan Johansson (p94)



Stuart Codling

Our Executive Ed samples the delights of Azerbaijan

Codders made a rare foray to watch some roofed racing cars in order to get a feel for Baku, the future home of the European Grand Prix (p70)



David Coulthard

The BBC Sport pundit was Red Bull's first F1 racer

The 13-time grand prix winner's move to Red Bull for 2005 gave the new team instant credibility. Ten years on, the Scot recalls those early days (p78)



Thanks to Matt Bishop, Max Constanduros, Steve Cooper, Glenn Dunbar, Fiona Fallon, Malcom Griffiths, Silvia Hoffer, Akiko Itoga, Samantha Knight, James Mann, Fiona McFall at Bibendum, Chris Murray, Kate Nicholls, Sophie Ogg, Fernando Paiva, Eric Silbermann, Pat Symonds, Fabiana Valenti, Williams Martini Racing, Claire Williams, Kevin Wood, Tim Wright
Special thanks to the amazing Ross Gregory for all of his hard work and patience over the past eight years

haymarket

2015 FORMULA 1 GULF AIR BAHRAIN GRAND PRIX

EARLY BIRD TICKETS NOW ON SALE GET UP TO 20% DISCOUNT*

TAKE ADVANTAGE OF THIS AMAZING OFFER & ENJOY
A SPECTACULAR GRAND PRIX UNDER THE STARS

Grandstand	Full Price	20% Discount Price
------------	------------	--------------------

Main Grandstand	260 £ / 330 €	210 £ / 265 €
-----------------	---------------	---------------

Turn 1 Grandstand	175 £ / 220 €	140 £ / 176 €
-------------------	---------------	---------------

* This offer is valid from 6th December 2014 till 6th January 2015.

FOR MORE INFORMATION AND BOOKING

PROMOTION CODE: EBBAHGP15

CALL: +973 1745 0000

BOOK ONLINE: BAHRAINGP.COM





McLAREN LINE-UP 15



THE DRIVER'S WIFE 18



MARUSSIA AUCTION 20

INSIDER

NEWS ■ OPINION ■ ANALYSIS

NEWS

Ferrari aim to match Merc by end of 2015

Having replaced most senior staff, Ferrari are confident they can reverse their decline

Ferrari have undergone a shake-up as the team's new bosses seek to stop the slump in performance that convinced Fernando Alonso he had to leave at the end of 2014.

Following on from their replacement of president Luca Di Montezemolo and two team principals last season, Ferrari also sacked three senior technical figures.

Shortly before Christmas, they announced that engineering director Pat Fry and chief designer Nikolas Tombazis were leaving – and less than 24 hours later came another release announcing the departure of tyre analysis chief Hirohide Hamashima.

Tombazis's former number two, Simone Resta, has moved into his ex-boss's role. Fry's position heading up trackside engineering will now be fulfilled by technical director James Allison until the arrival of Jock Clear, who has been recruited from Mercedes, where he was Lewis Hamilton's senior performance engineer.

Clear resigned after the Abu Dhabi Grand Prix but has to work a 12-month notice period, which Ferrari are hoping they will be able to reduce following negotiations.

Former Ferrari engine boss Luca Marmorini departed last summer after it emerged that Ferrari had built the least competitive of the





Ferrari's most recent high-profile departures include, from left to right: engineering director Pat Fry, chief designer Nikolas Tombazis and head of tyre performance analysis Hirohide Hamashima

three turbo hybrid engines used in 2014. With the exception of Allison, this means that the entire top tier of Ferrari's design and engineering team were sacked in 2014.

Fry and Tombazis have paid the price for years of sub-standard cars – Tombazis headed up design during the team's decline over recent years. Fry, too, was held responsible. Hired from McLaren in 2010, he became technical director (chassis) after Aldo Costa was sacked in 2011.

But the cars produced under his leadership – in 2012, 2013 and, to a large part, 2014 because

new technical director James Allison did not start at Ferrari until September 2013 – did not live up to expectations.

There was more to Fry's exit than this alone. Ferrari felt that he had not integrated into the team effectively – failing to learn Italian did him no favours – and did not become a good leader of an engineering team comprising a mix of many nationalities. Insiders have spoken of personality clashes and unhappy people within the technical department as a result of his leadership style.

Further hints of the dissatisfaction at the heart of Ferrari's management came from new president Sergio Marchionne at the team's traditional Christmas media lunch. "We started late with the 2015 car, certain choices and strategies that were made by others and that, in retrospect, I don't necessarily share," said Marchionne. "So 2015 will be a difficult year that will put the team to a real test."

Further changes at Ferrari include the hiring of a new test driver roster. Former Sauber driver Esteban Gutiérrez has been taken on as a reserve driver, thanks in large part to the substantial sponsorship he brings from Mexico, while Toro Rosso outcast Jean-Eric Vergne becomes test driver in the simulator. Vergne replaces former development driver Pedro de la Rosa. The Spaniard, who was close to his compatriot Fernando Alonso, has left Ferrari altogether.

Ferrari said in a statement that the restructure was the work of new team principal Maurizio Arrivabene and had resulted in "a flatter structure and clear assignment of responsibilities". Yet the structure looks pretty much identical to what was there before, except with different personalities in almost every senior role.

Marchionne was insistent that Sebastian Vettel, the driver Ferrari signed once Alonso had made clear his desire to leave, was on board with the changes. "Vettel is not naive; he knows what is happening at Ferrari," Marchionne said. "He is making a big gamble; we have to move quickly to reconstruct."

NEWS DIGEST

The month's big stories at a glance

9.12.14 Nico Hülkenberg has his first test in the Porsche 919 Hybrid that he will use in the Le Mans 24 Hours, completing 155 laps at the Motorland Aragón circuit in Spain

14.12.14 Lewis Hamilton wins the BBC Sports Personality of the Year Award

15.12.14 Steve Nielsen quits as sporting director of Toro Rosso to join Williams as sporting manager

16.12.14 Trophies stolen from the Red Bull Racing factory are found in a lake near Sandhurst. More than 60 trophies were taken in the smash-and-grab raid



31.12.14 Ferrari protégé Raffaele Marciello is named Sauber's test and reserve driver **5.1.15** Jean-Pierre Beltoise, who took BRM's final win in the 1972 Monaco GP, dies aged 77

5.1.15 Dave Robson, formerly Jenson Button's race engineer at McLaren, becomes Felipe Massa's race engineer at Williams. He replaces Andrew Murdoch, who is promoted to senior performance engineer as part of a tech department reshuffle

But Marchionne, who is also Fiat chief executive officer, insisted that by the end of 2015 he and Arrivabene will have turned things around to the extent that Ferrari could be in a position to challenge Mercedes. "I think 2015 is going to be a reconstitution year," he said. "It will be Maurizio's first full year with the team."

"Hopefully within the next 12 months we will remove all the baggage of uncertainty that is going to plague at least the initial phase of 2015."

"Not to underestimate the significance or the magnitude of the task, I think Ferrari can probably get to the same place [as Mercedes] by the end of 2015. Some work has already started. We need to be able to emulate their success."

After Alonso and Räikkönen were unable to pull the team any higher than fourth in the standings in 2014, Ferrari made drastic staff changes



Engine upgrades to be allowed throughout 2015

The engine freeze, aimed at reducing costs, has been overridden by the F1 Strategy Group – which will please Mercedes' rivals no end

Renault and Ferrari have won their fight to be allowed to develop their engines during the 2015 season of F1. Both teams have been arguing that in-season development should be permitted to give them chance to catch up with Mercedes. Ferrari also feel that there is an element of principle involved, in that all teams should be allowed to “innovate”.

The rules stipulate that a certain proportion of the engine is open for development from 2014 to 2015. This amounts to 92 per cent of the engine, of which 48 per cent can be developed in the form of 32 ‘tokens’, allocated to various parts depending on their impact on performance.

The FIA had been sticking to its view that the rules allowed only for updates in the winter, something the rules had originally intended as an attempt to keep costs under control.

But a loophole was discovered, and Renault and Ferrari used it to successfully argue that there was no requirement for the definitive engine to be homologated by a specific date. The issue was discussed at a meeting of the rule-making Strategy Group (which consists of six leading teams, Bernie Ecclestone and the FIA) in the run-up to Christmas. The

group proposed that the 32 tokens could be used throughout the season, and not just ahead of it.

The result is that limited in-season engine development will be allowed. Manufacturers can now start the season with their 2014 designs and introduce their 32 tokens over the course

of the season. Ferrari and Renault will certainly take advantage of this. They had run out of time to modify their engines in the way they wanted ahead of 2015, and will now do so by late spring or early summer. Mercedes' position is unclear.

Honda have been told that they cannot develop their engine through the season. As 2015 is their first season, their engine will be frozen. This is “sporting and fair”, the FIA says, as Honda's rivals were in the same situation last year.

Honda have been told to submit their new design to the FIA on 28 February, but McLaren and Honda have questioned the fairness of the ruling as they will now be competing with a ‘frozen’ engine while their rivals can develop theirs during the season.



Renault and Ferrari were keen for engines to be updated in-season to let them challenge Mercedes

QUIZ

F1 Mastermind

Your chosen specialised subject: the world's greatest sport

WILLIAMS GRAND PRIX

- Q1** How many Formula 1 constructors' championships have Williams won in total?
- Q2** Who drove Williams Grand Prix Engineering's sole car during its debut season in 1977?
- Q3** Which Canadian oil drilling equipment magnate purchased Frank Williams's first team, Frank Williams Racing?
- Q4** Where did Williams driver Valtteri Bottas score his first F1 podium this year?

- Q5** Which driver has scored the most grand prix victories while racing a Williams?
- Q6** What was so unusual about the FW08B machine that Williams tested (but never actually raced) in 1982?
- Q7** In which year did Williams run Renault engines for the first time?
- Q8** At which race in 1997 did Jacques Villeneuve score the team's 100th win?

- Q9** How many different drivers have taken a race victory for Williams?
- Q10** Which of the following racers claimed the most pole positions while driving a Williams: Riccardo Patrese, Keke Rosberg or Ralf Schumacher?
- Q11** Which American driver made a one-off outing with Williams in the 1982 United States Grand Prix West?

- Q12** Who scored the team's first ever race win in the 1979 British Grand Prix?
- Q13** In which year did Williams take a team-best 12 race wins?
- Q14** Which Group B rally car did Williams help to develop in 1984?
- Q15** Four of the seven drivers to win the world championship in a Williams didn't defend their title with the team the following season. Can you name them?

Answers: Q1 9 Q2 Patrick Nève Q3 Walter Wolf Q4 Austria Q5 Nigel Mansell Q6 It had six wheels Q7 1989 Q8 British GP Q9 16 Q10 Patrese Q11 Mario Andretti Q12 Clay Regazzoni Q13 1996 Q14 MG Metro 6R4 Q15 Nelson Piquet, Nigel Mansell, Alain Prost, Damon Hill

Button retained as Ron fights for control

McLaren finally opt to keep Jenson Button on a two-year contract, leaving Kevin Magnussen without a race seat

McLaren settled on their driver line-up in mid-December, choosing Jenson Button to partner Fernando Alonso. The decision comes as team chief Ron Dennis pushes to take control of the newly named McLaren Technology Group.

Alonso's arrival from Ferrari was known long before the official announcement, but McLaren decided to keep 2009 world champion Button ahead of his 2014 teammate Kevin Magnussen at the last minute. Magnussen has been retained as 'third, reserve and test driver'.

Team boss Ron Dennis said that the delay in choosing Button was due to some "causes of concern" about the 2009 world champion. He did not go into detail about what these were but they seem to surround Dennis's uncertainty about whether Button had the appetite for another season in F1.

"I gave Jenson some ideas on solutions," said Dennis, "and he said: 'No problem.' Then it was very easy. We settled all the things between us that concerned me and what we all have to do is deliver against the commitments and promises we have made to each other."

Button will drive for McLaren in 2015 with the option of a second year in 2016.

Dennis is believed to have been leaning towards retaining Magnussen, and had been trying to raise money in Denmark to

make the choice easier, while his former friend and fellow shareholder Mansour Ojeh preferred Button.

According to insiders, Dennis is trying to regain control of the McLaren Group, and felt the driver choice was a battle he did not need to fight. Dennis, who owns 25 per cent of the company's shares, has struck an agreement with fellow shareholders Ojeh and Mumtalakat, the investment arm of the Kingdom of Bahrain, to let him buy enough shares to take his holding over 50 per cent.

The deal struck is not an agreement to sell – it is an agreement that Ojeh and Mumtalakat can sell at a given price, if they wish to do so, should Dennis raise required funds within a specified time.

The time limit is the first major obstacle for Dennis, who has been trying to raise money to fund a buy-out for at least two years. Another obstacle is that it is not clear whether Ojeh, and perhaps even Mumtalakat, actually want to sell.

A McLaren spokesman said: "No transaction has taken place, but the shareholders have discussed how to best facilitate and enhance the future growth of the McLaren Group. When and if a transaction takes place, it is not envisioned that the current shareholders will exit McLaren completely, and announcements would be made at the appropriate time."



YOUNG GUNS



Finding the stars of tomorrow, today

Born in Miami, Florida, 18-year-old Brazilian Pietro Fittipaldi won the 2014 Protyre Formula Renault Championship.

Who is he?

The grandson of double world champion Emerson Fittipaldi, Pietro started his career in the lower levels of NASCAR stock-car racing in America, before making a successful switch to single-seater racing in Britain.

What's he been doing recently?

The Brazilian began his journey towards F1 in an unlikely place: the historic 0.363-mile Hickory Motor Speedway oval, deep in rural North Carolina. Contesting the NASCAR Whelen All-American Series Limited Late Model division, he won the circuit's track championship in 2011. But instead of moving up in stock-car racing, Fittipaldi switched to the British single-seater ladder his grandfather once successfully scaled, with a twin attack on the Protyre Formula Renault and BRDC F4 championships.

How good is he?

Now that he's settled into single-seaters, the signs are that he has the talent to match the publicity his famous surname will generate. In 2014, Fittipaldi focused his efforts on Protyre Formula Renault, easily taking the title with ten wins from 15 races. He also gained experience with selected outings in European Formula Renault.

Will we see him in F1?

Fittipaldi tested Formula 3 and Renault 3.5 machines towards the end of last year, and he is primed to climb the ranks over the coming seasons. And if his career falters then fret not – there's another Fittipaldi on the way: Pietro's younger brother Enzo, 12, is currently racing karts and Legends cars in the USA.

Rival teams fear huge Mercedes power boost

Non-Merc teams pushed for the in-season engine freeze to be lifted, but now worry it will let Mercedes get even further ahead

Mercedes' rivals have disclosed their growing concern that they may be unable to close the gap to the world champions for 2015.

The 2014 Mercedes F1 W05 Hybrid owed its success to the remarkable integration of the best of the new breed of turbo hybrid V6 engines with a chassis that was at least as good as the best produced by any other team.

But their rivals' main concerns focus on the progress Mercedes may make with their power unit. Mercedes' engine is already at least 40bhp more powerful and fuel efficient than rival units from Renault and Ferrari, and sources say Mercedes have found at least another 50bhp on their 2015 engine package.

And even with the recently won freedom to develop engines during the season rather than only over the winter, rivals are concerned that the gap to Mercedes is now too big to close.

As one senior figure put it: "If Mercedes bolt on another 60bhp, we're fucked. We might find that amount over the winter, but we're not going to find 120bhp, that's for sure."

McLaren have been quietly optimistic that their new Honda engine might be able

to compete with the Mercedes, but that was before they realised Mercedes could potentially take such a significant step forward.

Insiders say the Honda power unit – which has yet to run for more than few laps – is almost as powerful as the 2014 Mercedes engine. But that still leaves them 50bhp down on the 2015 Mercedes at a time when McLaren have a major chassis deficit to make up.

Part of the problem faced by Renault and Ferrari is that they have run out of time to produce the full-on redesign they had wanted to have ready for 2015. Both companies were designing their own version of the Mercedes engine, the key feature of which is the separation of the compressor from the turbo and its relocation at the front of the engine.

The advantages of this include: less inherent turbo lag, reduced cooling requirements for the inlet air, less packaging, and improved aerodynamics and weight distribution.

Honda have designed their engine this way, but Renault and Ferrari need until at least April, which is why they were agitating for a relaxation of the in-season engine freeze.

Mercedes' engine was dominant in 2014, and they're thought to have found another 50bhp over the winter, with more power on its way



PHOTOS: STEVEN TEE/LAT; GLENN DUNBAR/LAT

F1 BANTER

PASSNOTES

Your essential F1 briefing
#11 Korean Grand Prix



Name Korea
International Circuit
Age 5
Appearance
Unfinished

Oh goody, I do love it when new races appear on the calendar. Travel broadens the mind, no?

Well, not quite. We've been here before – Korea, that is – but we're not going back there after all. So we'll be spared the Formula 1 press pack bleating on Twitter about hard mattresses, courtesy buses with doilies in the windows, and hotel foyers that smell of cabbage.

Perhaps they should seek Korea advice!

Very droll. Anyhow, it's another nail in the coffin of the circuit that hosted the Korean Grand Prix between 2010 and 2013.

Oh yes, I remember now. Supposed to be a Monaco-style street circuit in the middle of an exciting new city development, with a marina and skyscrapers and stuff.

That's it. Trouble is, none of the 'stuff' was ever built, so it's still in the middle of a swamp, and the nearest city is still a three-hour train ride from the capital and not exactly geared up to welcoming tourists – unless they're the sort of tourists who like to rent rooms by the hour.

Sounds like some Seoul-searching is in order!

Well there's always the possibility of a street race in Seoul and it has been discussed in the past. But everybody in South Korea – including the circuit's owners – were very confused by the race's brief reappearance on this year's calendar.

Perhaps some pernicious prank by perfidious Pyongyang! Was the F1 calendar hacked?

Maybe, but if so it was low-grade mischief compared with, say, exposing the aliases Hollywood's A-list celebs use to check in to hotels incognito. Let's hope none of the F1 teams booked cheap nonrefundable flight tickets...

Korean Air will breathe a sigh of relief. I'll bet those demanding F1 types are the sort of people who like their pre-flight nibbles served on a plate rather than out of a packet.

I can visualise the Twitter tantrum already.

Do say: Good Korea move.

Don't say: How were we supposed to get the cars from there to Spain in two days, anyway?

YOUR MISSION, SHOULD YOU CHOOSE TO ACCEPT IT



IS TO DRIVE 2,500 MILES ACROSS EUROPE IN 6 DAYS
RISE TO THE CHALLENGE OF THE CANNONBALL RUN, HARD BUT NOT IMPOSSIBLE
EXPERIENCE WINDING ROADS, LONG STRAIGHTS, WORLD CLASS TRACKS, 5 STAR DESTINATIONS
PREPARE TO EXPECT THE UNEXPECTED AND BE DRIVEN BY ADVENTURE

SHOULD YOU CHOOSE TO ACCEPT THIS MISSION
VISIT CANNONBALLRUNEUROPE.COM AND REGISTER TODAY



THIS AD WILL NOT SELF-DESTRUCT IN FIVE SECONDS



COLUMN

THE
DRIVER'S
WIFE

Testing times

The first rule of being a celebrity is never to read social media feedback or comments.

I'm not good with rules. So I spent an angry weekend writing draft replies to @PetrolLover @Lew4evaaa and @F1babelicious defending myself from accusations of marrying *Amor* to sell my perfume, my album and my underwear line (which isn't released until next year, so where's your logic now @TractionTerry??).

But as my *vovò* always says 'Don't fight with words, fight with actions, Adri', so to make them eat their words and show @PeteyPanda where he could stick his Silverstone souvenir mug as a dedicated motorsport lover, I'm clearly a big fan of aerodynamics, and I decided to join *Amor* for an aero test.

"You want to come to Elvington, Adri? Are you feeling okay?"

Compose tweet: Off to support *Amor* aero testing at the Space Shuttle Emergency Landing Strip. Might spot an astronaut?! #Aerorocks

Unfortunately *Amor* was in a terrible mood on the drive up, which was a shame as my supportive presence was lost on him. He kept saying he couldn't believe the team made him do this, how it should be a job for the 17-year-old test driver. He said even I could drive there, which I got quite excited about, but it turned out he didn't mean it as a good thing.

Then we arrived. Not only was there was no hi-tech NASA HQ, rocket or astronauts, there was nothing. A strip of Tarmac, a field and ten long hours ahead. Team facilities consisted of a truck, a tent for the engineers and one of those flappy canvas roofs over the car. "I'll wait in the..." trying to retain my positive supportive smile I scanned the empty field "...hire car."

Straightline testing, it turns out, is not a euphemism. I watched *Amor* drive up and down and up and down and 45 minutes later I was ready to accept defeat. I had no mobile signal, a rapidly descending phone battery from live tweeting the journey and a stiff 'Wimbledon' neck from watching the car.

By 9.30am I'd counted my eyelashes. At 10am, I did a sandwich run to the garage, which was surprisingly fun. At 10.45 Gaz, the truckie, and I became BFFs.

What I learnt today: 1) Egg mayo sandwiches taste much better than they look. 2) I can get inside and close the zip on a standard suitcase in under 30 seconds – Gaz needs 36. 3) There's a trick to winning arm wrestling, something to do with twisting the wrist. 4) I know the difference between a spanner and a socket. 5) It is *just* possible to survive a day without a single selfie. And according to Gaz, that means that I qualify as one of the hardcore motorsport elite.

God bless you, especially those of us with fuel in our veins.

Adriana

NEWS

Ecclestone returns
as head of F1 Group

The 84-year-old is reappointed chief executive as CVC favourite Paul Walsh withdraws his candidacy

Bernie Ecclestone has fended off another threat to his stewardship of F1 and been reappointed to the board of the company that runs the commercial side of the sport.

The announcement that Ecclestone will continue as chief executive of the F1 Group came shortly after Paul Walsh, the man who had been lined up by major shareholder CVC Capital Partners to be the new chairman, withdrew his candidacy.

But CVC have succeeded in getting Walsh, a former boss of the Diageo drinks giant, involved in the F1 Group. He has been made a non-executive chairman, along with former Ferrari president Luca Di Montezemolo. Peter Brabeck Letmathe remains as chairman, following a period of ill health.

Walsh ruled himself out of the running for the chairmanship after a meeting with Ecclestone, which took place on the same day that Ecclestone met a group of F1 reporters. They asked about reports that Walsh would want to "rein in" the 84-year-old, to which Ecclestone replied: "He would

be unique if he could do that. First he's got to be appointed, hasn't he?"

Ecclestone has seen off various challenges. He survived two court cases related to the accusation that he bribed a German banker to sell the F1 Group to his preferred bidder back in 2005, and there have been rumblings that CVC were unhappy with his role.

They were seeking a successor, partly due to Ecclestone's age and partly because his running of F1 is coming under increasing scrutiny. But Ecclestone described the need for a successor as "a little bit of nonsense" and suggested long-time ally Sacha Woodward-Hill, the group's chief legal officer, could do the job.

"If I died now, there are enough people in the company who could continue running the company the way we've set things up," said Ecclestone. "I think if I was controlling the board... I would say it wouldn't be a bad idea to have a woman as the chief executive."

Ecclestone said he could do with hiring someone who "could help when it comes to chasing for sponsors and things. Really we need to have someone who's actually been successful at doing that."

Ecclestone has seen off various legal challenges to make a full comeback



PHOTO: CHARLES COATES/LAT



GREAT CARS DESERVE GREAT GARAGES

Have you ever looked at the garage and wanted to make more of the space available? To create somewhere that's ideally suited to your lifestyle, but still provide the perfect home for your car? If so then Dura can help.

Dura offer a unique range of modular cabinets, flooring and wall-mounted storage to transform your space. Our cabinets are used by professional workshops worldwide and we have received the coveted RedDot International Design Award, and the prestigious Queen's Award for Enterprise – so you can be assured of exceptional quality for your home.



MODULAR CABINETS • WALL-MOUNTED STORAGE • FLOORING & CEILINGS • DESIGN & INSTALLATION



For a FREE colour brochure, call **0845 371 0045** or visit **www.duragarages.com**

DURA®

Fitted Garage & Workshop Systems
Europe's leading garage interiors

Alternatively, return this slip in an envelope (no stamp required) to:
Freepost RSLX-YXCA-GUTJ, Dura Ltd, St James Road, Brackley NN13 7XY

Name

Address

Tel

Email



The Marussia auction

featured most of the items you'd expect to find in an F1 factory, but there were some oddities.

The nose and front wing assembly from Max Chilton's car sold for £15,000, while a steering wheel from Timo Glock's 2010 machine reached £2,200. Much of the merchandise, including Max Chilton caps, officials T-Shirts and team umbrellas, was sold off in bulk, and rapidly reappeared for individual sale on auction sites such as eBay.

Among the more unusual items, a display mannequin fitted with a set of Timo Glock overalls sold for £700. More bizarrely, the auction included a range of boxing and football memorabilia, including a pair of signed Sugar Ray Leonard shorts, and framed Frank Bruno and Mike Tyson gloves.

NEWS

Caterham and Marussia unlikely to race in 2015

Hopes are fading for the perennial backmarkers as Marussia have their assets stripped and Caterham fail to find a buyer

The chances of the Marussia and Caterham teams making it onto the Formula 1 grid in 2015 are reducing by the day. As *F1 Racing* went to press, both were expressing hope that they would be able to compete, but obstacles to their return are mounting rapidly.

The assets of the Marussia team have been sold by administrators in a series of auctions. The first two webcast auctions included car parts, wheels and memorabilia, while the third included computers and infrastructure equipment. However, the 2014 cars were left out

of those auctions, to give the team longer to try to put together a rescue package. Both cars were due to be sold shortly after this issue of *F1 Racing* closed for press.

Caterham's administrators say they are still in talks with three interested buyers, but the longer the situation drags on without a deal being completed, the less likely it is to happen.

To join the grid at the first race of the year in Melbourne on 15 March, Caterham and Marussia need the other teams to agree to let them run 2014 cars and engines – no design or building

work has been done at either team since October, when the employees were all laid off. Caterham's were hired back on a one-off basis for the final race of 2014 in Abu Dhabi.

In theory, a team cannot run a 2014 car in 2015 because of the new nose regulations. However, an exemption for Caterham and Marussia was proposed and raised no objections at a meeting of the rule-making Strategy Group after the end of last season.

It was not voted on at the subsequent meeting of the sport's legislative body, the World Motor Sport Council. However, since there were no objections from the Strategy Group, it could be passed by a fax vote at a later date.

Meanwhile, the surviving teams have been debating what could happen to the £37.5million prize money owed to Marussia and Caterham should they not survive. There was a proposal that this should be split between the bottom three teams in the 2014 championship, but no agreement was reached.

Korean Grand Prix is off – but why was it ever on?

The brief reappearance of the unpopular race on the schedule may have been arranged to trigger change in the technical rules

The Korean Grand Prix, which appeared on an official 2015 Formula 1 calendar despite nobody expecting it actually to take place, has now officially been removed from the schedule.

There was widespread surprise when the 2015 calendar published by the FIA World Motor Sport Council before Christmas included the race on 3 May – a week before the Spanish GP. Going from a long-haul ‘flyaway’, where everything is in crates, to a European race, complete with motorhomes and trucks, in that time would have been a logistical nightmare greater than anything the teams have had to manage before.

The Koreans expressed surprise about the race, saying they knew nothing about it, that the original organising committee of the race in Yeongam had no money and that a long-hoped-for street race in Seoul could not possibly be made ready for 2015.

It all added up to a race that could never happen. So why did it appear on the calendar in the first place?

The answer is that 2015 technical rules dictate that teams can use only four power units throughout the year – one fewer than in 2014. Renault, worried about the poor reliability of their engine last year, campaigned for manufacturers to be allowed to use five again, but changes to the technical regulations requires unanimous agreement from all teams.

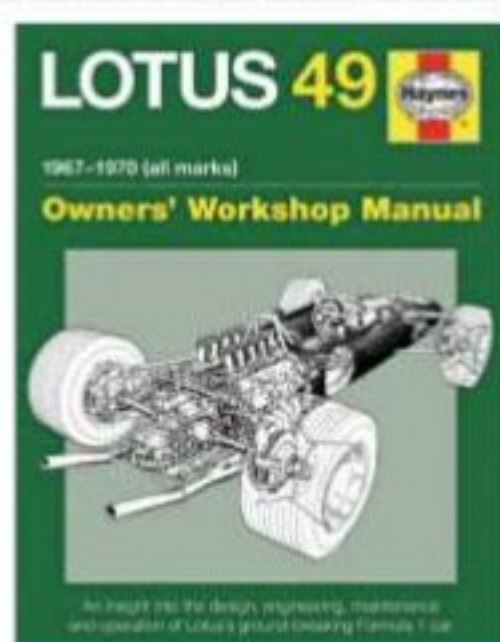
The rules dictate that if there are more than 20 races “as originally scheduled” then teams can use five engines. The calendar published by the FIA in December could be argued to be ‘the original schedule’. Thus, with Korea added, teams would be allowed to use five engines next year – even if the race never takes place.

The problem is that some teams have contracts with Formula 1 that dictate a maximum of 20 races, and some have argued that the ‘original schedule’ was the one published last September that did not include Korea. As *F1 Racing* closed for press, it was unclear which interpretation of the regulations would stand.



The Korean Grand Prix, which last took place in 2013, is unlikely to held again any time soon

F1 STUFF

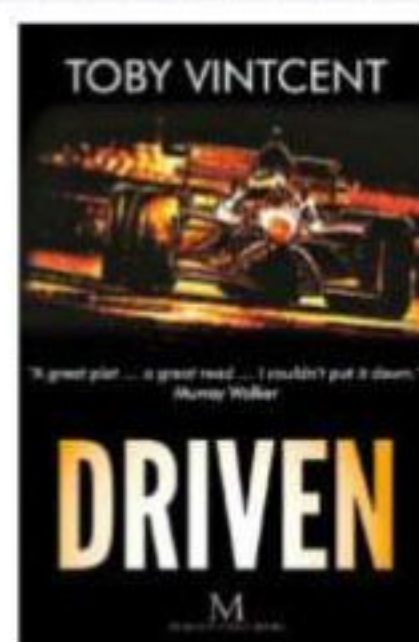


LOTUS 49 OWNERS' MANUAL

Even if you don't own a Lotus 49 – and you most probably don't – this *Haynes Owners' Manual* (£22.99) offers plenty of insight into a truly revolutionary F1 car, mixing technical insight with memories from former drivers. www.haynes.co.uk

DOM REILLY FOR MJ BAG

Dom Reilly, the official suppliers to Williams, have partnered with Olympic sprinter Michael Johnson to create this luxury multi compartment holdall (£1,250), made with technology inspired by Formula 1. www.domreilly.com



DRIVEN: A NOVEL

Author Toby Vintcent takes inspiration from F1's on track action and off track paddock politics in weaving together a page turning conspiracy thriller (£9.58). His attention to detail captures the spirit of current F1. www.amazon.co.uk

LINES CIRCUIT CARVINGS

Laser cut from Baltic birch ply, these custom made carvings are available in single (£58) and three circuit frames (£140). Take your pick from any circuits you like – whether it's a current or retro layout. www.grahamandleigh.co.uk





Pat Symonds explains **THE SCIENCE BEHIND...** **Testing technology**

F1 TECH

During post-season testing in Abu Dhabi, we saw many strange appendages on the cars that we don't see at race weekends. What were they?

On a race weekend, we can run extra instruments and sensors on the Friday, but they must keep within the regulated bounds of bodywork height, width and overhang. These restrictions don't apply in testing and so we can use transducers that would otherwise be illegal.

The most visible bits of testing kit you see are the aerodynamic rakes, which are used to understand the airflow as it sheds off the bodywork and forms the complex wake structures that surround the car. These devices consist of an array of sensors called Kiel tubes, which are attached in a matrix fashion to a large assembly mounted on the car. These measure the total pressure of the air that they encounter. Measurement of the total pressure is a means of deriving the airspeed, and by understanding the speed and direction of the air around the car, we can understand the contorted vortices that are fundamental to performance.

How precise are these measurements?

The very act of measuring anything actually changes the state of whatever you are trying to measure, something known as 'The Observer Effect'. These sensors are no exception. Their presence affects the airflow because the air has to deflect around them. Hence we need to balance the desire for accuracy with the need to have low interference, which is achieved by having a minimum number of sensors.

Surely this is what the windtunnel is for?

Yes it is, and a large part of what we do is to correlate the flow structures between the windtunnel and computational fluid dynamics (CFD) to measurements made at the track. In the windtunnel we will mount scale versions of these sensor arrays and see if we get similar results to those measured on the car.

What other unusual sensors are used?

At the end of 2014, we tested the 2015 tyres and, as well as assessing the drivers' subjective view of the effect of the tyres on handling, we need to understand the true operating shape of the tyres. We do this by running a laser scanning device mounted to the upright, which shines a laser line across the tyre sidewall. A camera mounted alongside it films the laser line over a lap so we can measure the deflected shape of the tyre sidewall under true loaded conditions.

Why is the tyre shape so important?

If we were able to seal the gap between the tyre and the diffuser, we could find enormous performance. This is what the pre-2014 exhaust-blown diffusers were about. We were trying to use the high-energy exhaust flow to produce an air curtain that separated the dirty air emanating from the side of the tyre from the clean diffuser flow. They say you can never invent something, and we still spend a lot of time trying to understand the flow fields in this region. Fundamental to this understanding is the ever-changing shape of the tyre sidewall. Laser scanning shows us how this shape changes and lets us choose various shapes to simulate in windtunnel and CFD testing.

Does the single ECU compromise your tests?

It can do, in that it has a finite amount of sensor inputs and memory, but during testing we often run with an additional data logging device that lets us record additional inputs and sample them at much higher frequency.

Does running all this extra instrumentation present any danger?

No. While we may not be subjected to FIA scrutineering during testing, we are all responsible engineers and will use our best endeavours to ensure that anything we put on the car, no matter how temporary, is safe.

So is all this instrumentation about correlation?

Correlation of on-track results with experimental techniques is vital. Testing gives us a rare chance to compare our results with real life.

Do these devices replace the flow-viz fluid and even the wool tufts of days gone by?

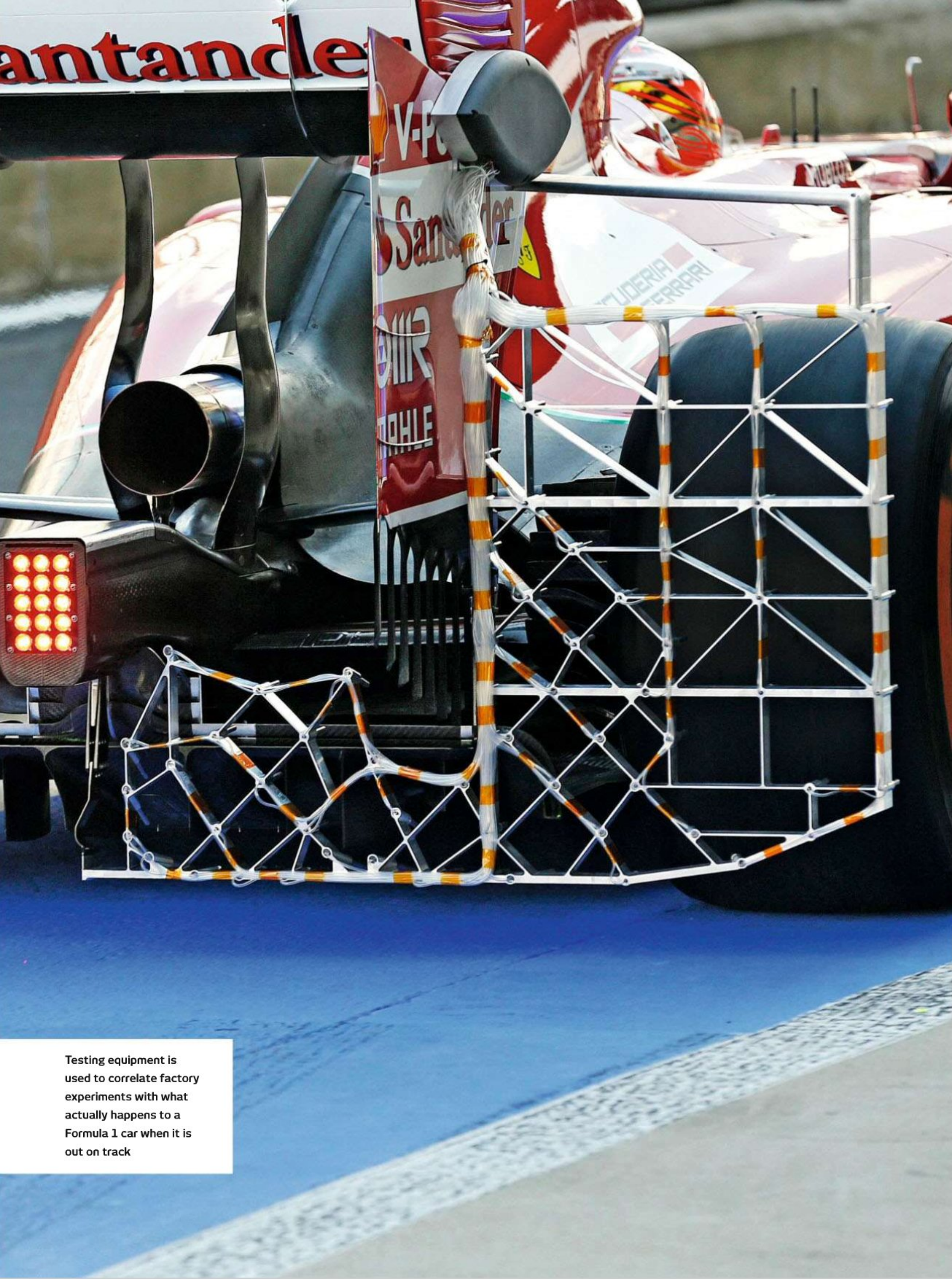
Largely, but there is a difference in that rakes measure and visualise the flow once it has separated from the surface, whereas flow-viz paint lets us picture the flow while it is attached. Both are necessary to understand the full picture.

Is there anything you can't measure?

The hardest things to measure are downforce and drag. We have no direct means of measuring drag at all, so derive it from measuring engine torque at constant speed while trying to account for the non-aerodynamic resistances, or by letting the vehicle coast from a given speed and then trying to work out the contribution of aerodynamic drag to the resultant deceleration.

It is equally hard to measure downforce. We have load cells in the push and pullrods, but these don't just measure the downforce, which constantly increases with speed; they also measure the weight transfer associated with cornering, braking and acceleration. We try to separate these but it is not easy. The other problem of measuring downforce via chassis-mounted sensors is that a large amount of our total load is generated by the multiple winglets on the brake ducts. These produce load directly on the upright and tyre and hence are not seen by a load cell mounted on the pushrod. **F1**





Testing equipment is used to correlate factory experiments with what actually happens to a Formula 1 car when it is out on track



PETER WINDSOR

RACER'S EDGE

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

This month, I begin with a confession: the current F1 engine rules still pass me by. I know I've always been more intrigued by the drivers and the chassis and not with the other critical piece of the performance cake. There was a time, though, when I kind of understood the difference between a DFV and a Ferrari V12. KERS? ERS? They're a mystery to me.

When I first slumbered through the 2014 F1 engine regulations, the only paragraphs that jumped out at me concerned the return to turbochargers and to the lovely little V6 blocks that looked so nice in the Dino Ferraris. Twelve months on, the effect of the turbos has been nonexistent, and of the V6 we've seen nothing. Security guards have sealed garage doors; the turbos haven't done their thing by exploding or igniting the way they used to; and none of the drivers have complained of throttle lag or sudden, uncontrollable power.

Instead, in ways I can't begin to understand, the Merc engine somehow seems to have an 80bhp advantage. It doesn't rev more than the rest: it isn't allowed to by the regulations. Nor is it lighter nor more structurally sound – again, the regulations have eliminated such cleverness. It's just faster, allowing the Merc teams to play with wing settings in ways the Ferrari and Renault teams can only dream of.



There's little or no difference, as I now understand it, between the internal combustion engines produced by Mercedes, Ferrari and Renault. Strangle them with fuel capacity and fuel-flow restrictions and they all produce about the same amount of power and torque. The problems – the differences – all lie with the electric motors. The Merc produces about another 200bhp through

its efficient re-use of heat and energy; the two laggards at most produce 120bhp. Hence the 80bhp difference between Merc and the rest.

The big question is how this has happened. Mercedes AMG High Performance Powertrains (born of Ilmor) logically commissioned two specialist British companies to produce their electrical power – and brilliant they have been too. No compromises.

Over at Maranello, as I now understand it, Luca Badoer found himself squeezed by the aero division: cram this in here. Squeeze that down there. Aero rules – right? Wrong. Not in the world of F1 ERS and KERS; not this

"Where is the sense in not allowing changes once a title has been won? Why insist on more of the same?"



time. Merc found exactly the right balance between space and heat, and the W05 aero package was moulded around it. At Ferrari, and to some extent Renault, the cars were sleeker and smaller... and much less efficient in terms of available power.

Now all of this is pretty standard stuff. Engineers, like the rest of us, often get it wrong. Look at Ferrari in 1978, when Colin Chapman was in his second year of ground effect. A monkey could have told you that a slim engine was going to be more useful than a wide one – but what did Ferrari do? Persist with their ultra-spacious flat-12.

It's a little bit that way now, except that Ferrari and Renault need to free-up their engine architecture, not compress it. The problem is, the engine-freeze won't allow it.

Now I need to make another confession: in my first reading of the F1 engine regulations, and in later chats with experts, I never realised that major changes to the engines wouldn't be permitted at the end of 2014. I can only assume it never occurred to me that change *wouldn't* be permitted. I mean, we're talking F1 here. The pinnacle of technology, correct? And the subject is engines – a fundamental part of the show. I understand the logic of an

The Merc engine was dominant in 2014, not due to the power of the engine itself, which was regulated across the grid, but due to the efficiency of its energy recovery systems


engine regulation freeze – but where is the sense in only allowing limited changes once a title has been won? Why insist on more of the same for another 12 months? I never imagined they'd be stupid enough to be so restrictive.

Now I know otherwise. I'm reminded, yet again, that we have a democratic process in F1 now. By unanimous agreement, only limited changes will be allowed during 2015, by which time another year of Merc dominance will be virtually complete. I also now know that turbos aren't on these engines because they're spectacular but because they are just a very efficient way of generating heat for the ultra-efficient electric motors. All very boring.

Nothing will change. Mercedes want to keep on winning, so they'll never agree to re-write the regs. Renault and Ferrari have pushed them hard to do so but the Merc rejoinder is simple: they say further changes would greatly add to the cost of their engine and this wouldn't be fair on their customers.

Yeah, right. For one thing, Merc don't need to make big changes. For another, in the big picture it's a simple choice between a closer, healthier championship and controlling rising costs. Right now, the need for the former far outweighs the latter. Put another way, if we don't do something to allow Renault and Ferrari to improve their engine performance there won't be any money to pay the customer engine costs, let alone the rising ones. Make the show good enough to attract the money... and then reduce costs where feasible.

I'm not sure about a brand new engine for 2016, but we should thaw the freeze and get rid of the superfluous, overcomplicated ERS. Keep a small, hybrid KERS element but make the most of the power with normally aspirated, ultra-spectacular, ultra-noisy internal combustion. And call them "hybrids", as specified by this column nearly a year ago. Forget the KERS nomenclature. It's F1 fluff.

I wish we could do this sooner than 2016, but that would have required a despot – preferably a benevolent despot – to have told the Strategy Group, the World Motor Sport Council and every other water-cooler democracy within shouting distance of Paris and London to keep quiet and get a life. 

PHOTOS: STEVEN TEE/LAT

WIN 325 HORSES. WITH A MOUSE.



WIN YOUR DREAM CAR!
FREE £5 WHEN YOU SIGN UP.
JOIN OUR 250 WINNERS!



MATTHEW ROBERTS
PORSCHE CARRERA
GTS + £10K CASH



STEVE WORTLEY
PORSCHE CAYMAN S
+ £10K CASH



STEVEN MCLOUGHLIN
JAGUAR F-TYPE V6
+ £10K CASH



ARVINDER SINGH
PORSCHE CAYMAN S
+ £10K CASH

CLICK TO WIN AT **BOTB.COM/F1**



best of the best
botb.com
est. 1999

Tel: +44 (0)20 7371 8866
Email: info@botb.com



EMERSON FITTIPALDI

SPEED KING

The double world champion writes exclusively for *F1 Racing*

One of the many joys of Formula 1 is its ability to take you by surprise, and this is bound to hold true in 2015 even though we have an element of technical continuity. In F1 there's always something new to grab your attention; this is a sport that never stands still.

At this time of year, everybody in F1 is eagerly looking forward to their first glimpse of the new cars. That's why I was very excited to learn about the behind-the-scenes story at Williams in this month's *F1 Racing* (p32). During my F1 career I always looked forward to visiting the factory, or arriving at the circuit, and seeing for the first time what my engineers had been working on. I'm sure the current generation of drivers are just as excited.

With Williams it is even more interesting to see what they've been working on, because they ended last season in the top three, behind Mercedes and Red Bull. They might not have won any races, but in terms of speed over the final races they were definitely in that position – even though they were 0.4secs off the Mercedes. That's a lot of lap time to find, but if they can create more downforce without adding drag, they will make a big step. Will it be enough? That depends on what Mercedes and all their other rivals have been doing...

This season is sure to surprise us all

I like to see Sir Frank Williams and his team succeed because he is one of the major figures of the Bernie Ecclestone era of F1. I remember well when he entered his own car under his own name for the first time in 1977. He had been fighting for years just to get there and you see the same combative spirit running through the team's history, whether they've been at the front of the grid or not.

The combination of Felipe Massa and Valtteri Bottas has really helped to push the team on. Felipe is still quick and competitive, and was ready for a change after many years with Ferrari – he also brought a great deal of experience with him that has helped improve the car. Bottas is a young and exciting talent, very fast, and a potential winner.

This is one of the best driver combinations in F1.

McLaren are another team with a lot of talent on their hands. You could almost say they have too much. The partnership of Fernando Alonso with Jenson Button will be fascinating, because Fernando is very demanding and comes with an incredible ability to outperform the car. Jenson is fast and motivated, a stabilising figure within the team, good with sponsors and popular with the fans. I wasn't surprised by the supportive reaction on social media to the December cover of *F1 Racing* that stated: 'Jenson, don't go!'

It's disappointing to see a young driver of Kevin Magnussen's ability sidelined, but he has proved himself and will be ready for any vacancy that arises. McLaren also have Stoffel Vandoorne on their young driver programme, and after another year learning the Pirelli tyre characteristics in GP2, he will be ready for F1. Ron Dennis will have some tough choices to make at the end of the year, more so if Nyck de Vries goes well in Formula Renault 3.5.

He shouldn't worry about the performance of Honda. Sure, they had a few problems in their first test run, but Honda have vast engineering resources and are driven to succeed. Their main challenge is to learn fast, because their rivals have had a year to develop their software and gain experience of running the hybrid power units in race conditions.


All great F1 engineers thrive on a challenge, though. Fortunes can change, as Williams proved in 2014 when they stepped up after several years in the doldrums. I hope Sauber can achieve something similar because Felipe Nasr is set to make his F1 debut with them, backed by sponsorship from Banco do Brasil. This venerable institution has sponsored other



With Felipe Massa's experience and Valtteri Bottas's speed, Williams have one of the best driver pairings in Formula 1

sports, such as volleyball, in the past, and has recently taken an interest in F1.

It's good to see a big company with a long history put its weight behind young talent – and it's another positive story that got a bit lost in all the negative headlines of late. Some teams might be struggling, but F1 is a business as well as a sport and if we put on a good show and give sponsors value for their investment, they will stay on board. Everybody wins.

So, yes, while Mercedes dominated in 2014, we saw great racing between Lewis and Nico and all through the field. And now here we are again, with new faces, new stories and new challenges ahead. This is going to be a season to remember. 

"Here we are again, with new faces, new stories and new challenges ahead"

DRIVING INNOVATION FORWARD IN WORKSHOP DESIGN & STORAGE SOLUTIONS

- ✓ New race bays
- ✓ Machine shops
- ✓ Stand-alone workstations
- ✓ Mobile storage units
- ✓ Workbenches, trolleys & racking for workshops

System Store Solutions are pioneering the latest design and installation of motorsport workshops and transporters to teams in classic/historic racing right through to Formula One.



Providing a total design, layout and installation of storage products from the FAMI range including project management, consultation, technical advice and no obligation site surveys.



**SYSTEM
STORE
SOLUTIONS LTD**

Ham Lane, Lenham, Maidstone,
Kent ME17 2LH
Telephone: 01622 859522



01622 859522 | sales@systemstoresolutions.com | www.system-store.com



DIETER RENCKEN

POWER PLAY

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

Remember the infamous 'Bernie Bung'? Not the Munich Millions, but the one paid by Bernie Ecclestone to Tony Blair back in 1997? Prior to that year's general election, the F1 tsar donated £1m to the then-opposition leader, ostensibly in support of Blair's promise to peg tax for the super-wealthy.

Shortly after Labour came into power, a meeting was called at 10 Downing Street. It was attended by Blair, Ecclestone, then-FIA President Max Mosley – under whose watch F1's 113-year rights were sold to his friend of 30 years for an estimated three per cent of their intrinsic value – and strategist David Ward, FIA lobbyist and later (unsuccessful) 2013 FIA presidential opponent to Jean Todt.

The agenda for that 16 October 1997 meeting was rudimentary: exemption from tobacco restrictions for Formula 1 on the basis that these could cripple Britain's F1 industry. Two weeks later, reprieve was granted.

When news of the donation hit Fleet Street, the national press shifted into overdrive – colloquially a million quid is now known as a 'Bernie'. The "pretty straight kind of guy", as Blair then styled himself, bumbled about until, eventually, the party returned the donation in full; the exemption, though, stayed in force

The FIA has put its own future at risk

to 2005, when EU-wide legislation banned tobacco livery in all member states.

However, the 113-year deal left the FIA seriously cash-strapped after the governing body vested the one-off proceeds (£250m-odd) in the ring-fenced FIA Foundation, a charity of its own making, which Ward headed until presidential aspirations intervened.

With the FIA obliged to administer what is, after all, its own championship, but with no means of combatting ever-rising costs, by the time Mosley left office in 2009 gallons of red ink were washing about 8 place de la Concorde, Paris. Worse, when approving the sale, the EU had demanded a separation of administrative/commercial powers, leaving the FIA unable to plug the hole.

Thus, as Todt headed towards his second term in office, the FIA stared eventual ruin in the face, forcing the Frenchman to turn to Formula One Management for modest compensation, which the billion-dollar company – now owned by investment fund CVC Capital Partners after a series of convoluted deals – could easily afford.

An annual fee, thought to be in the region of \$40million, was agreed through to 2020,

Caught between Bernie and the EU, FIA president Jean Todt is caught in a crisis not of his own making



with the caveat that the FIA accept a revised governance procedure, splitting ultimate power three ways in an 18-vote cabinet – the governing body and FOM with six votes each, and six teams with a voice each – charged with formulating the future direction of the sport. Decisions taken are by simple majority.


In terms of EU requirements, the body, known as the Strategy Group, would (allegedly) have no executive powers, being deemed a forum to devise regulations for consideration by the F1 Commission (on which all teams are represented) prior to ratification by the FIA's World Motor Sport Council.

On that basis, Todt and his senate in August 2013 signed up to what is known as the Concorde Implementation Agreement – a sort of heads of agreement in the absence of a continuation of the historic pact that determined F1's sporting, commercial and regulatory framework – in turn enabling the former Ferrari team boss and championship-winning rallyist to 'save' the FIA.

According to sources, the Strategy Group operates in contravention of original EU directives, which call for all teams to have an equal say in governance. This is not the case, as evidenced by the cost-control debacle: in January 2014 Todt pushed for regulatory cost control, but was overruled in March by the Ecclestone/team faction – thus such issues fail to make F1 Commission agendas.

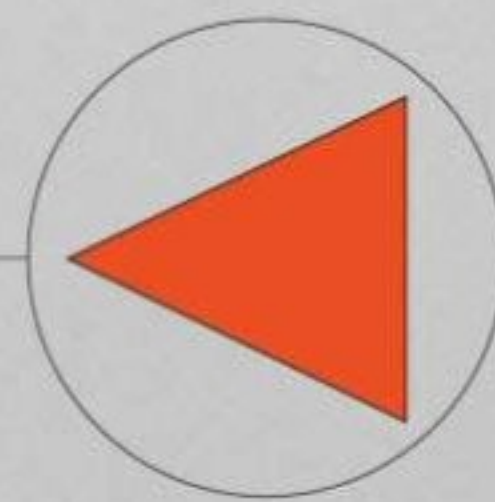
Equally, there are claims that the FIA's annual payments are a breach as these imply the FIA relinquished its regulatory powers in return for financial gain, with Ecclestone reported as saying: "We made a contribution of \$40 million a year to buy that [power.]"

The EU is said to be investigating F1's various covenants, in which case the FIA may have to return any monies paid and forego future revenues: jeopardising its own future and global programmes as an indirect result of a transaction sealed before Todt's presidency.

Ironically, Mosley has been mentioned as possible mediator. However, the burning question is whether the Strategy Group will simultaneously be dismantled. If not, it would be 1997 revisited, with millions returned to Ecclestone while policy remains unaltered. 

"The FIA stared ruin in the face, forcing Todt to turn to FOM for modest compensation"

Now that was a car



No. 35 The Williams FW06

It was no match for the Lotus 79, but it delivered almost immediate results

Though it's unthinkable today, Frank Williams was often derided in the 1970s as a makeweight F1 entrant. And then, just when his days of doing deals from telephone boxes seemed to be behind him, he was ousted from his own team by Walter Wolf, the Canadian entrepreneur who had bought a 60 per cent share of it at the beginning of 1976.

The indefatigable Williams dusted himself down and went back into duck-and-dive mode, convincing ambitious young engineer Patrick Head to leave Wolf and join him to form a new team, Williams Grand Prix Engineering. Time and resources being short, they set up in a rented unit in Didcot and contested the 1977 season with a March 761 raced by Belgian pay driver Patrick Nève. Results were modest; Nève failed to qualify for three of the 11 races the team entered but finished in the top ten four times.


Head, meanwhile, was working on the design of the first Williams GPE car, the FW06. It would be an utterly conventional but incredibly neat chassis: a slim aluminium monocoque clothed in tightly packaged bodywork, with inboard front springs and dampers at the front mounted behind the flat oil cooler, while the faired-in water radiators sat vertically in front of the rear wheels.

While Head was solidly engineering a conventional car, Lotus were thinking outside the box and the 1978 season would be dominated by the 'ground effect' Lotus 79, which won six of the 11 races it entered (they also won two of the first five races with the 78, their first

ground-effect car). Still, the combination of the FW06 and Alan Jones, a race winner for Shadow in 1977, immediately delivered results.

Jones failed to finish the first race of the year, retiring with a fuel system failure, but got up to fourth in South Africa – round three – from 18th on the grid. As the season progressed, he became a regular top-ten qualifier, and although he failed to finish several races, everything came together at the penultimate round.

Lotus, rocked by the death of Ronnie Peterson at Monza, were off form at Watkins Glen; stand-in Jean-Pierre Jarier qualified eighth, and even though Mario Andretti was on pole he crashed during Sunday's warm-up and took over Jarier's car, which was not set up to his liking. Jones qualified third and ran fourth for the early laps of the race, passing Andretti for third shortly before half-distance. When the engine of Gilles Villeneuve's Ferrari failed a lap later, Jones found himself in second place, which he held until the chequered flag.

Chassis number four, photographed here, was built new for 1979 and raced by Alan Jones in Argentina, Brazil, South Africa and at Long Beach (where he finished third), while Head and his team completed work on the new FW07 in time for its debut at Jarama. The FW07 was, in essence, a clever imitation of the Lotus 79 with a greater emphasis on aero efficiency rather than outright downforce; with it, Jones would win four races in 1979 and set Williams on the road to the legendary status the team enjoys today. 



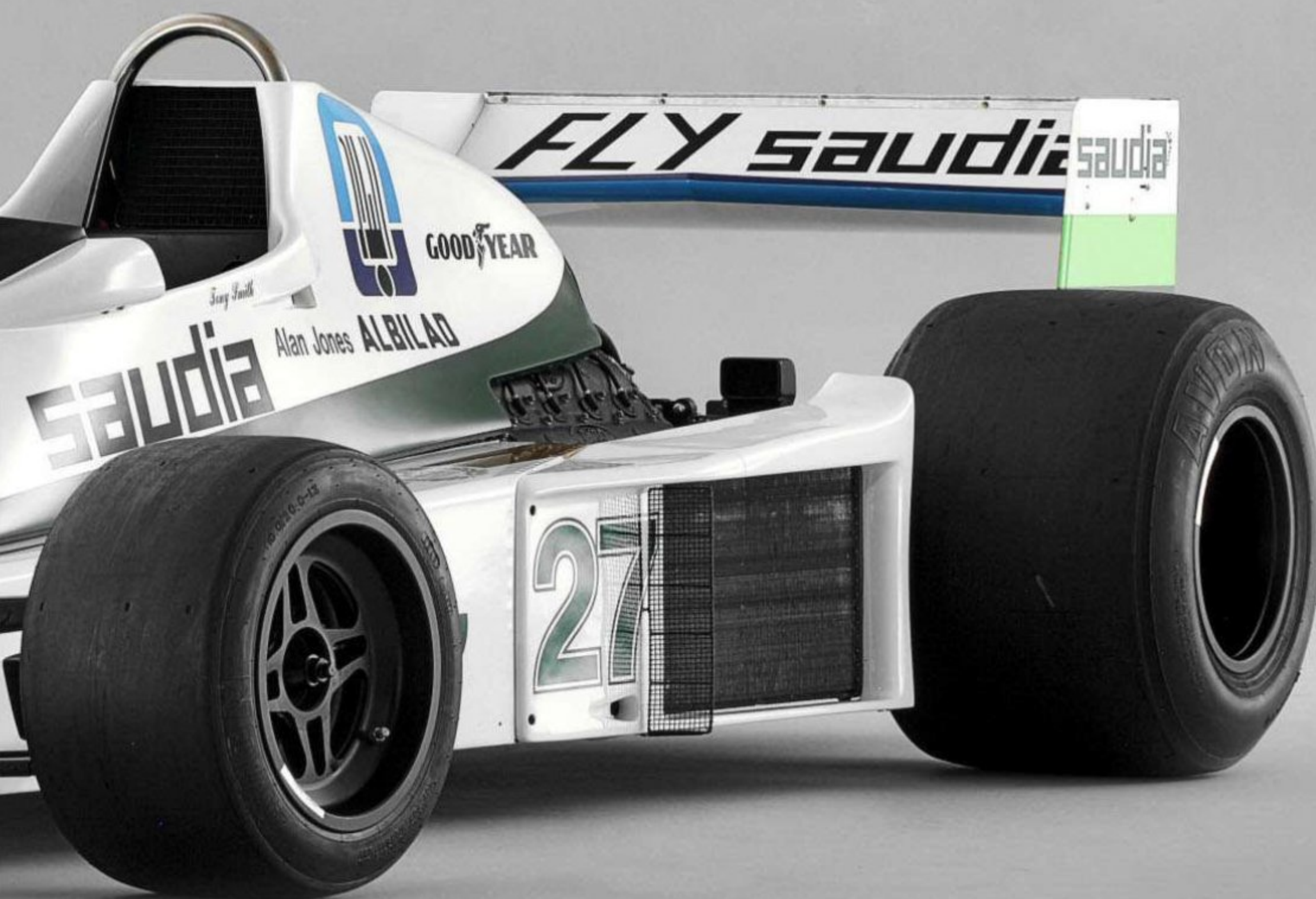
WORDS STUART CODLING PICTURES JAMES MANN



WILLIAMS FW06 TECH SPEC



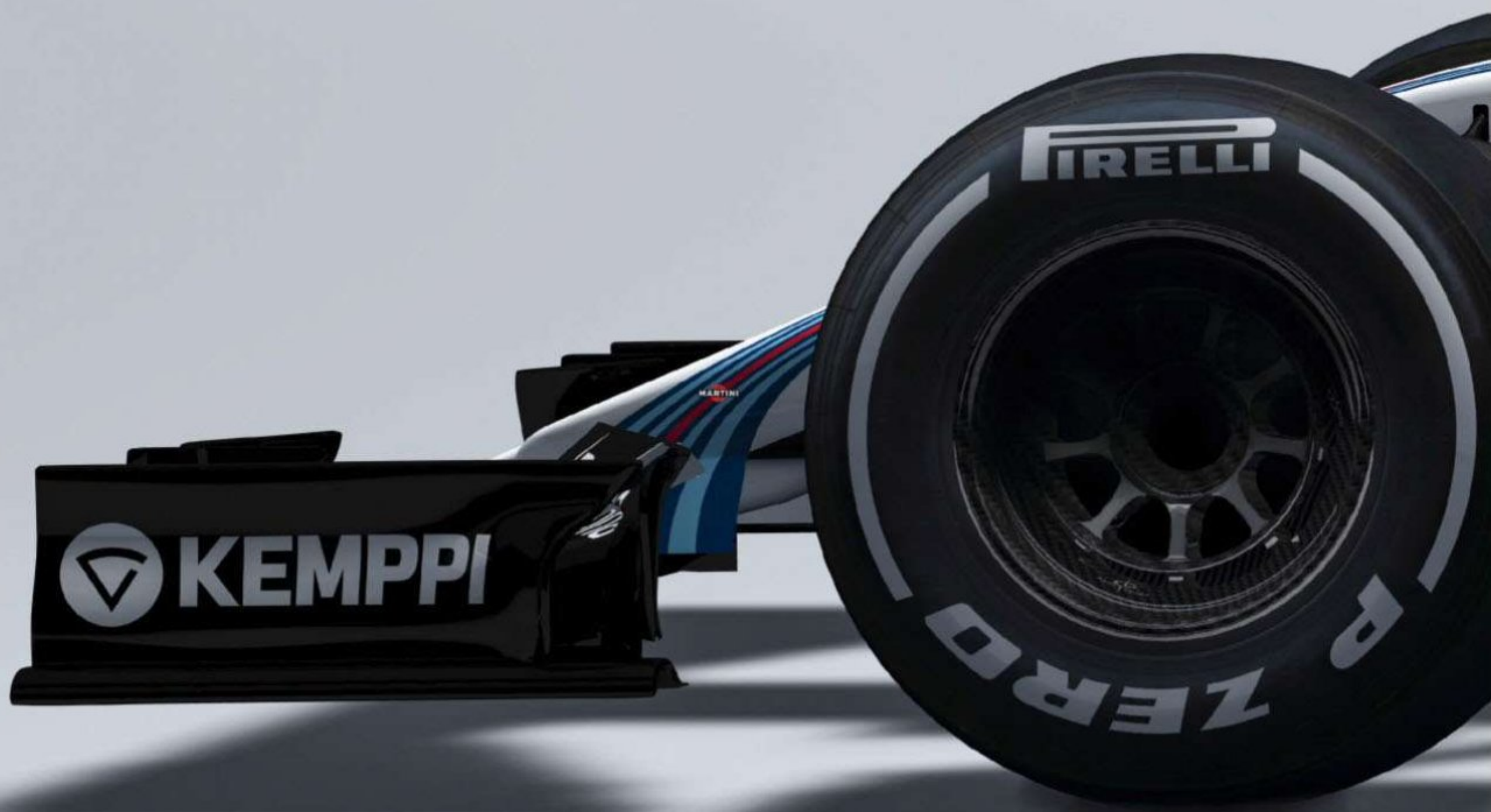
Engine	Ford Cosworth DFV
Layout	3.0-litre V8
Brakes	Girling
Fuel	Lucas fuel injection
Gearbox	6-speed Hewland manual
Weight	590kg
Tyres	Goodyear
Notable drivers	Alan Jones, Clay Regazzoni



WORLD

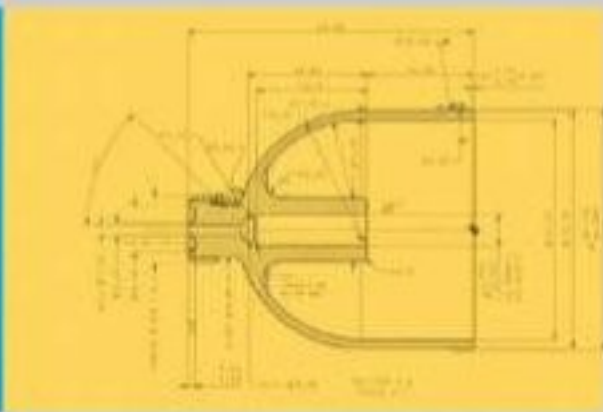
EXCLUS

THE NEXT GREAT WILLIAMS?



EXCLUSIVE

Williams chief technical officer **Pat Symonds** reckons the car he is most proud of is always "the next one". And here, at the launch of the 2015 FW37, he has revealed exclusively to *F1 Racing* the design secrets behind his new favourite Formula 1 machine



T

he English winter of 2013-2014 may have been mild in meteorological terms but within the rarefied atmosphere of Formula 1 the maelstroms were not confined to the teams' windtunnels. After five years of relative stability in the technical regulations, the rule book was ripped up and F1 entered a new era in which engines became known as power units and aerodynamic acumen was no longer the king of the performance jungle.

For everyone at Williams it presented a chance to restore the team to a position many felt was its rightful place at the sharp end of the competitive F1 hierarchy. The record shows it was an opportunity seized with both hands by the new management team led so ably by deputy team principal Claire Williams and group CEO Mike O'Driscoll. They precipitated change in an organisation rich in talent but confused in direction. The elevation from the lower echelon of the constructors' championship to a hard-fought third place is testament to the skill of the workforce and the vision of the management.

The improvement could, though, only ever be thought of as a means to an end rather than an end in itself. And, while the difficulty of moving the team up the rankings should never be

underestimated, it is probably somewhat easier than the task that lies ahead. That mission is one of consolidation and incremental improvement. It is an undertaking where every one of the seven ingredients that form the recipe for accomplishment in F1 needs to be simultaneously edged forward towards the apex of excellence that ultimately brings success.

THE ELEMENTS OF DESIGN

So what are these seven factors? In no particular order: tyres, power unit, drivers, teamwork, budget, chassis and aerodynamics. Now you

"ALL OF US HOPE WE HAVE IDENTIFIED THE AREAS OF THE FW36 THAT, IF IMPROVED, WILL YIELD THE MOST EFFECTIVE STEP IN PERFORMANCE"



could argue that the Pirelli tyres are the same for everyone and that Williams already have the best hybrid power unit from Mercedes... but that belittles the intense effort that goes into exploiting these common factors to eke out the final fractions of performance that are indicative of the difference between success and failure. The ability to get each tyre compound into its narrow working range of temperature, the ability to make most efficient use of the 43 megajoules of chemical energy locked into each kilogram of fuel, and the capability to enhance the power units by means of tactical harvesting

and subsequent deployment of energy in both qualifying and race situations; these are the factors that differentiate what may otherwise be regarded as commonality.

As we consider the other factors, Williams are now reaping the benefits of strategic decisions made some time ago concerning drivers. Valtteri Bottas is one of the most exciting prospects on the grid today and he is perfectly complemented by the affable yet extremely fast Felipe Massa, a driver who has flourished in the family atmosphere of Williams. They are part of a race team that is undergoing a rejuvenation probably

best exemplified by their transformation from a squad who last year trembled at the thought of a pitstop, to a coherent and disciplined team who regularly achieve pitstops in the highest percentile of performance.

Budgets are a means to an end, and in this area Claire Williams and Mike O'Driscoll, together with their commercial team, have provided the means that have allowed the engineers to move forward in their relentless pursuit of excellence.

With these elements accounted for we must now consider the final two: the chassis (in its broadest sense), and aerodynamics – still, ➔

SAMANTHA KNIGHT/WILLIAMS MARTINI RACING



even in this fuel-efficient world, the foundation of track performance. It is these elements that fall under the umbrella term 'design'.

The 2014 rules brought revolution to the design of Formula 1 cars. The highly hybridised power units were a step beyond anything seen before and the challenge of racing for 187 miles on just 100 kilograms of fuel was not just a trial for the engine suppliers: it caused chassis designers to re-evaluate many of the design rules they had held dear for years. The cooling requirements of the turbocharged engines and high-powered electrical machines meant going back to square one in the evaluation of design compromises. This was something the Williams design team, led by Ed Wood on the design side and Jason Somerville in the aerodynamics department, were able to exploit in an extremely efficient manner. With input from the many talented engineers employed at Williams, the FW36 was, in its entirety, arguably the second most effective car of the 2014 season.

A HARD ACT TO FOLLOW

Making the next step has not been easy. The team are under no illusions as to the magnitude of the undertaking, and are extremely pragmatic about those areas that are likely to yield the sought-after improvements, while remaining within the constrained budget of an independent team.

So how do you go about making that final step? While the pure mechanics of continual improvement may be easy to define, I believe that the philosophical elements are arguably more important in achieving the ultimate goal. These days, through the science of simulation, it is relatively easy, if not exact, to determine performance deficit. Competitor analysis is a discipline well practiced within all the teams and the availability of GPS data for all the cars, together with sophisticated techniques such as video and acoustic analysis, allows us to reverse-engineer our competitors' performance

and determine the areas in which we may be deficient. While that knowledge provides targets it does not suggest how those aims will be met.

The design specification for a new F1 car can take many forms. In certain areas it precisely defines objectives such as toe stiffness or the ability of a component to operate under certain loading conditions. These goals are generally set by reference to what has been deemed acceptable in previous designs and, unfortunately, also by what has been found to be deficient in the past. More important, in my mind, is the philosophy of design. Part of my role is to determine that philosophy, but it is a role that I undertake in full consultation with the many talented engineers with whom I have the pleasure to work.

There are many examples of the embodiment of that philosophy, but nothing drives it harder than the search for aerodynamic improvement. To this end, challenging aerodynamic targets have been set for the FW37, not just for the first race incarnation of the design but for its development throughout the season. Aggressive goals have been determined that will provide a continual challenge to the development team, but which should, with effort, be attainable. In order to give the aerodynamicists a chance to fulfil these requirements the design space needed to be opened up to allow them the freedom to investigate new ideas. This meant that compromises had to be made and that the aerodynamic and mechanical design teams were required to work in a collaborative manner.

THE COMPROMISE OF DESIGN

To exemplify this, in 2014 many teams suffered with the difficulty of running cars to the weight limit. It is a measure of the excellence of the Williams team that the FW36 ran with a considerable amount of ballast even with a relatively heavy driver like Valtteri. With the minimum weight increasing for 2015 we were in danger of actually having too much ballast.

You may question if this is even possible, but the only performance-improving aspect of carrying ballast is the ability to lower the centre of gravity of the car by placing that ballast low in the chassis. This is a quantifiable effect and a rule of thumb is that lowering the centre of gravity by 10mm will improve lap times by one tenth of a second. This may sound a lot, but it is extremely difficult to lower the centre of gravity of a 700kg car significantly by moving a few kilograms of ballast to a lower position. Instead we chose to adopt a philosophy of turning the ballast into performance. You might ask what this means, but it is a truism that all engineering design is a compromise: the best design is the one that balances any compromises to achieve the most favourable outcome.

As an example, we decided to revisit areas of the car where we had favoured designs with a high value on mass reduction and question whether, for a small weight penalty, we might improve the aerodynamics, suspension characteristics or handling. This is perhaps best illustrated by the rear suspension of the FW37. While the FW36, somewhat unfashionably, retained a lower rear wishbone that was mounted relatively low on the upright and gearbox, for the FW37 we have lifted it.

This simple decision has many implications, not least of which is that the loads in the wishbone are increased significantly. To retain the required stiffness, this necessitated increasing the mass of the suspension itself as well as the gearbox to which it is mounted. A decision like this is not taken lightly and the reasoning behind it was based on that original philosophy of accepting some mass increase to explore new avenues of performance. In this particular case the reasoning was that although the new design was heavier, we could still remain comfortably below the minimum weight limit and therefore our downside was just the increase in centre of gravity height discussed earlier.

FIRST STAGE

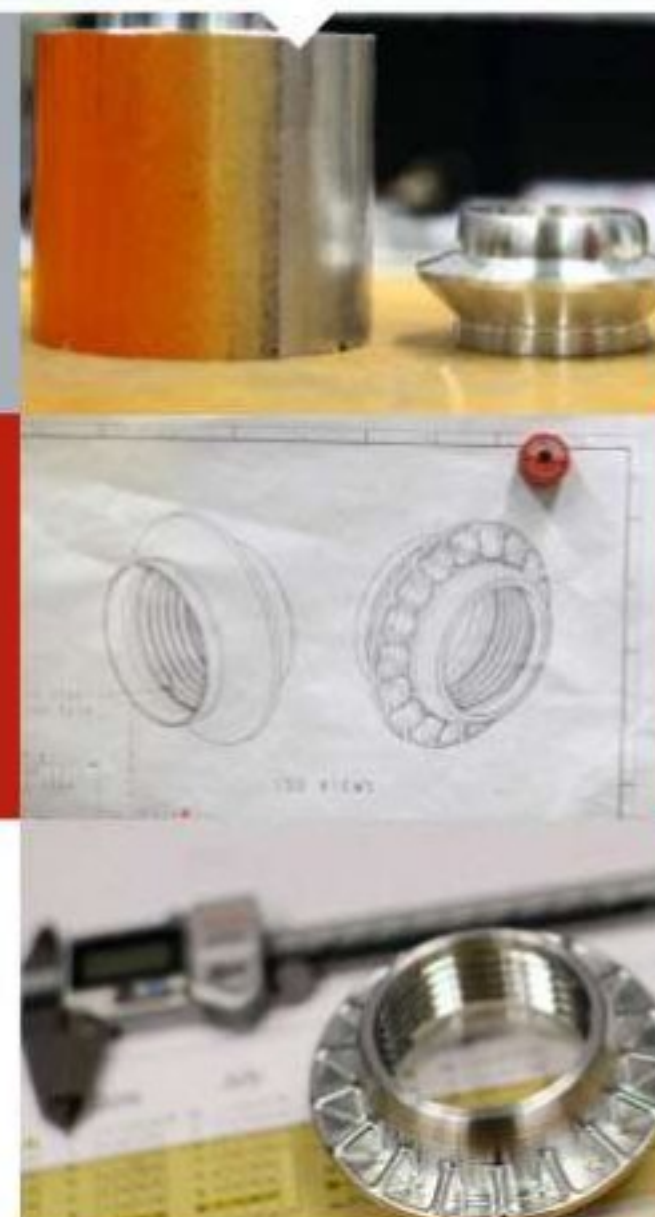
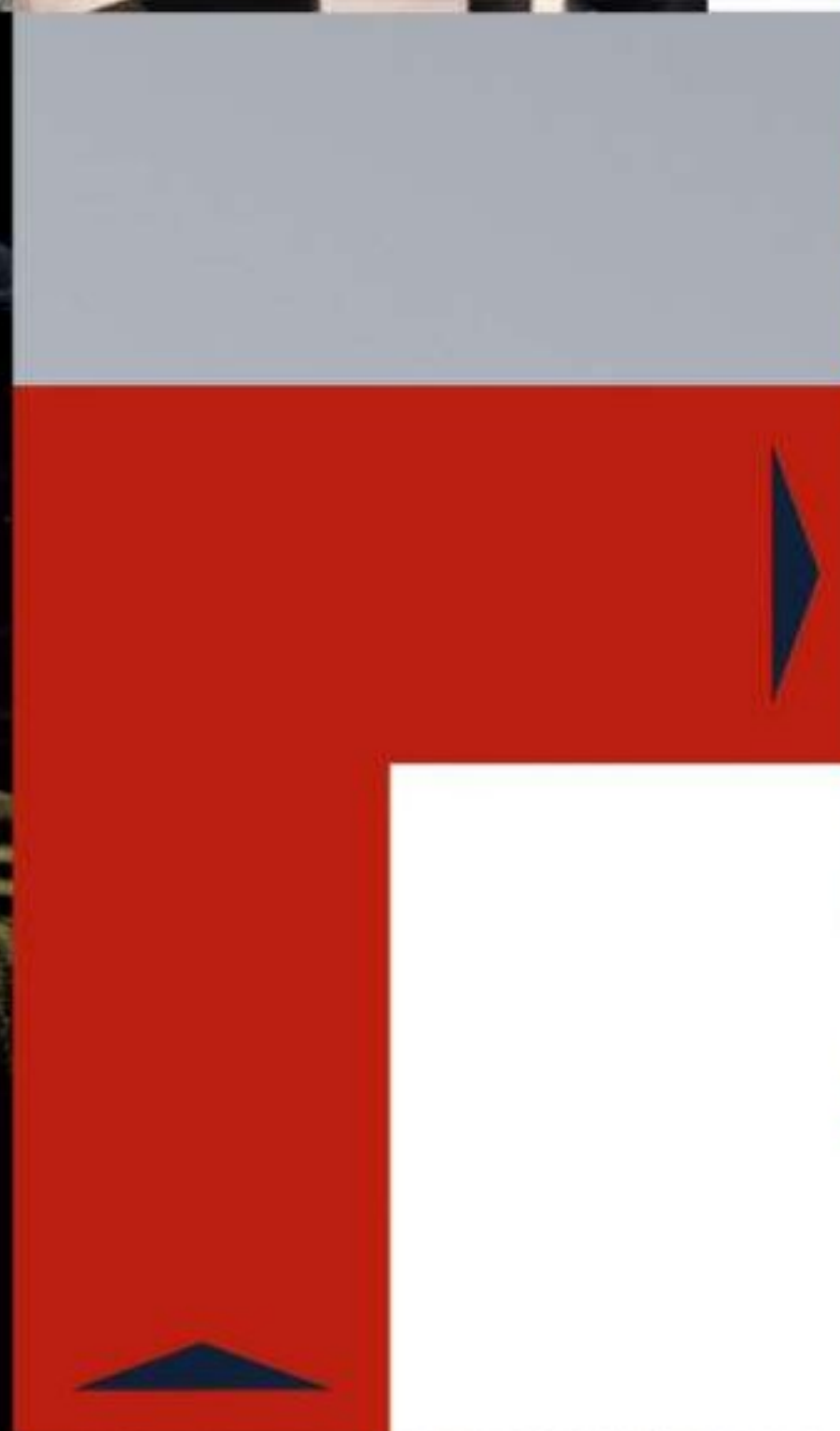
DESIGN OFFICE THE DRAWING BOARD



It takes lengthy discussion and investigation to work out how a part like this radiator will interact with the other parts. Once its layout has been optimised it takes hours of effort to put together



It takes painstaking effort to produce even the smallest and most disposable parts. The FW37 will use four of these wheel nuts on every wheel change, and they are discarded after use



The positive aspects were aerodynamic. With the lower wishbone moved upwards the design allowed much greater flexibility for the aerodynamicists to exploit the area on the brake ducts where multi-element winglets are positioned as well as cleaning up the all-important flow over the top of the diffuser.

DRIVEN BY RULE CHANGE

Another important aspect of the 2015 design is a subtle yet far-reaching change to the rules regarding the front of the monocoque and nose.



NEXT STOP MACHINE SHOP



The 2014 rules were written with the intention of lowering the nose, thereby reducing the propensity of a car to launch high into the air if it impacted the rear of another car. The designs that emanated were, to put it mildly, not what the FIA had envisioned. While F1 design is not driven by aesthetics, we would rather have an elegant car than one that exemplified a contrived design driven solely by geometric constraints. For 2015 this oversight has been addressed, calling a halt to the ugly-nosed designs of 2014.

What was, at first sight, an innocuous change to the rules governing the nose geometry has →



All the aluminium and titanium used on the FW37 is aircraft grade. Every component made using these high-spec materials is coded so that the batch can be traced back to source in the event of a failure



NEXT STAGE
COMPOSITES

in fact had a significant effect. The reason nose height has increased since the mid-90s is that the improved airflow under the front of the car enhanced aerodynamic efficiency. It is therefore no surprise that lowering the nose has detracted from performance, but the magnitude of the deficit was a surprise to many.

The solution arrived at on the FW37 to regain this shortfall of downforce may be typical of the class of 2015. But there again it may not. It's common at this time of the year to lie awake at night wondering if one of your rivals has found a better interpretation of the rules than you have...

As we approach the false dawn of winter testing we can reflect on the path that led to the birth of the FW37. I am often asked when a new design is started. This is a surprisingly difficult question to answer. The truth is that any designer worth his salt will never be satisfied with his latest creation. The act of creation inevitably takes longer than the process of conception. In engineering design, the task of conception is never ending. When asked which car I am most proud of, my inevitable answer is "the next one". While the bystanders admire the latest creation in the weeks before the start of the season, my only thoughts are for what we could have done better. The ground-breaking design seen by the world on a cold February morning in Jerez is a child of thoughts fertilised many months previously. With this in mind it is hard to put a date on the start of the design process. The notions born of frustration of time constraints can date back to the previous pre-season period, but the process is largely, 2014 excepted, evolutionary.

FROM REVOLUTION COMES EVOLUTION

The Williams FW36 was a very effective car. It was a car that exploited the efficiency demands of the new Formula 1 rules in a very particular way. Ultimately it lacked in areas that could be identified and excelled in others that were equally discernible. The conceptual brief for the FW37 was to improve the former while losing nothing from the latter, a task that is far easier to stipulate than it is to enact. The design team have risen to the task in admirable fashion.

Certain aspects of the design have arisen out of necessity. The new regulations governing the nose and front bulkhead area have driven changes to the front suspension and steering layout. Other aspects are the logical conclusion of development areas that came up against hard limits during the development of the FW36. The nature of some of these limits is such that only a change of local architecture will free the design space once again. The ever-present quest for improved safety drives other design decisions, the higher strength upper cockpit sides being an example of this.

Other aspects of the design are far more esoteric. They usually arise from the eternal quest for continuous improvement, which must be based on a thorough understanding of those aspects that contributed to the relative success of 2014. They are based on the engineering integrity that is the cornerstone of the Williams technical renaissance.

It would be logical to assume that these features are founded in the musings of the aerodynamicists, and indeed many of them are.

But we should not forget that vehicle dynamics, tyre management and reliability are also key drivers in the development arena. Each of these is considered very carefully and our chief designer, Ed Wood, needs to establish how best he can balance the sometimes conflicting requirements that these multifarious disciplines demand. At the same time, he has to bear in mind the requirements of his customer, the race team. It is they who will constantly remind him of the practical constraints that need to be imposed on nebulous ideas.

With the first seeds of the design sown as early as March 2014, the detailed timeline that will culminate in the rollout of the FW37 was accurately determined by operations director Simon Wells and his team. They have to rein in the dreams, ambitions and procrastinations of the design group to provide a coherent logistic solution, while allowing maximum time for the creative activities that ultimately determine the performance capability of the vehicle.

In common with most design offices, the work is divided across various departments. These departments must all integrate with one another if the whole is to be greater than the sum of the parts, and this has to be orchestrated as one cohesive effort. Work on long-lead items such as the transmission has to be started first, but the transmission design group cannot complete their task unless they have an intimate knowledge of the requirements of those designers who are trying to compress an ever more complex rear-suspension system into an ever-decreasing volume. Equally, the composite design group need to have a ➔



Composite materials have a shelf life of just 30 days if left out in the open, but are kept refrigerated in the factory to increase this to a year



To make the FW37 nosecone a male pattern is made into a female mould. The nosecone itself is made in the mould using thermo-stable carbon fibre



A suit of carbon fibre is layered over a mould of the FW37's outer skin. Each section is cut to size – even overlapping areas are precisely defined



AND ON TO...
FABRICATION
DEPARTMENT



The car's 'tub' is moulded with its metal pipework and assembly attachment points already fitted. Here, the bolt threads are being drilled



basic layout of the chassis completed by the time the enforced August break rolls round. This in turn dictates the release from aerodynamics of the definition of the wetted surfaces at an even earlier date. Each activity is interdependent and it is bringing these together in a logical manner that achieves the impressive timescales of Formula 1 production schedules, while maximising performance enhancement is the key to design success.

For 2015, the detail design task is somewhat easier than it was last year. With rule stability and the use of the same power-unit supplier, a larger number of designs can be carried over from 2014 to 2015. An early decision on these components can greatly assist the production department as they can start making these parts during the so called 'quiet period' in the latter stages of the 2014 season. That reserves capacity for the new design elements that will flow out of the design office thick and fast during the period from October to February.

Certain key dates will be driven by the production process and while it is now common practice to run the first two winter tests in a 'launch car' configuration, it would be wrong to think that the design and production process is focused solely on defining the ultimate performance specification for the final test.

Far more often, the milestone is set by having enough components to operate effectively at the first race. With a complex component such as a front wing, for example, →

MORE MACHINING CREATING MOULDS

From bottom to top: the final cut male pattern is followed by the rough cut female mould and finally the finished carbon brake shroud. Machining the mould can take as long as 36 hours



ED WOOD CHIEF DESIGNER FW37

In conversation with *F1 Racing*

Was there pressure to finish designing the FW37 by a certain point?

The pressure point changes through the year. In mid-December it was getting through the impact tests with the nose and the rear structure. A few weeks later it was the build of the car and the management of the production resource in the factory to ensure we had enough parts of the right quality to put it together. Next the pressure moves to de-bugging and fault resolution of the early tests, and then it's all about adding performance in time for race one. After that, the pressure shifts to making key decisions for car layout for the next year. There's always a new focal point.

As chief designer, how do you manage all the areas of the car?

The design office is split into six groups. The first comprises composite structures (who turn the aero shape into a real car), composite design suspension, tub, and safety structures. The next group is transmissions. Another group deals with steering, suspension and brakes, and another is an advanced development group. Engine systems is next, covering engine installation, hydraulic and fluid systems, and the control systems that make the engine work in the car. Finally we have a stress office, which supports all of those activities.

A lot of integration is needed between aerodynamic design and structures and we have weekly review meetings between each area in the design office, combined with the appropriate engineers from the other relevant areas of the car.

My role is to be the integrator and to make decisions about where the balance of performance is between optimising in one area and where there might be conflict in another. It runs fairly seamlessly as we have a strong engineering team with a lot of experience. All key decisions

are made inside those formalised meetings so all the stakeholders have visibility in what's going on.

Do you ever have sleepless nights about something you might have missed in the regs?

No – I think you can be drawn into looking at what other people do too much. This business is about really good engineering and really good science and that's got to come from your own team. You've got to have genuine physical understanding of what you want to achieve and apply that to your engineering and design practices to do the best job you can.

Of course it will be disappointing if we've overlooked a loophole that gives a big area of performance but to be distracted by that is wrong. You obviously watch what other people are doing and take interest. For example when McLaren launched their mushroom suspension shrouds. Last season, every F1 team on the grid would have looked at that extensively and aggressively. You can draw your own conclusions about whether it was beneficial or not as we all could have adapted it by now.

It's good to see there is still a lot of solid engineering in the sport, because people are often very cynical about modern F1...

It's a generational thing. If you're Gordon Murray and you've come from an era that was virtually unregulated then you'll be pretty frustrated by what you can do in the sport now.

There is always room for optimisation, and if there's more constraint from the regulation side, then it requires you to be more detailed in exploiting the car. The important thing to recognise is that the regulations have shifted to be more in favour of technologies that are more beneficial to efficiency and to engineering in society in general. Racing has always been about efficiency, the best cars have always been the most efficient machines.



VIP HOSPITALITY PACKAGES FOR
2015 FORMULA 1 BRITISH GRAND PRIX | 3-5 JULY



TWYNHAMS
HOSPITALITY

THE PREMIER MOTORSPORT EVENT COMPANY

Image courtesy of www.stephenenglishphotography.com

FI RACING READER DISCOUNT CODE: **BGPI65**
SAVE 5% ON GRAND PRIX RACE DAY VIP PACKAGES

EXPERIENCE ONE OF THE HIGHLIGHTS OF THE BRITISH SPORTING SUMMER WITH TWYNHAMS HOSPITALITY FOR A WEEKEND YOU'LL NEVER FORGET! OUR OFFICIAL VIP PACKAGES START AT JUST £199 AND OFFER SPECTACULAR VIEWING, AMAZING HOSPITALITY AND AN UNFORGETTABLE DAY OUT.

OUR WEBSITE ALLOWS YOU TO BUY ONLINE 24 HOURS PER DAY WITH REAL-TIME TICKET AVAILABILITY UPDATES, OUR FREEPHONE NUMBER IS OPEN FROM 8AM - 8PM SO DON'T MISS OUT AND BOOK YOUR BRITISH GRAND PRIX VIP EXPERIENCE NOW!

WWW.TWYNHAMSHOSPITALITY.CO.UK



0800 5999 077

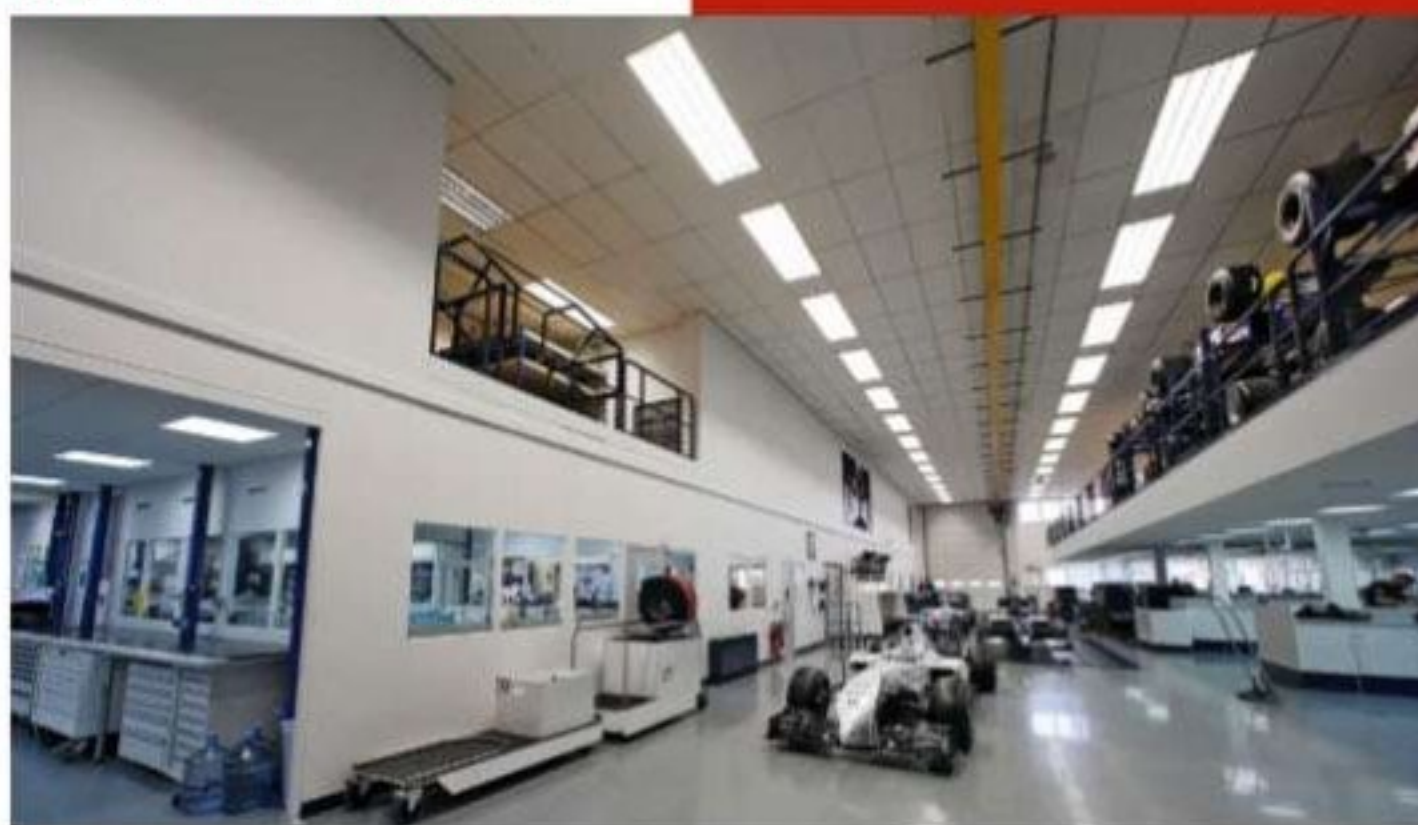


@twynhamsevents



facebook.com/twynhamshospitality

LAST STAGE ASSEMBLY IN THE RACE BAY



JASON SOMERVILLE HEAD OF AERO FW37

In conversation with *F1 Racing*

Where did you start with designing the FW37?

We have inputs from a number of sources: the regulation changes for 2015, the revised engine from Mercedes and ongoing aero developments specifically aimed at addressing the weaknesses of the FW36. The goal is obviously to make the FW37 a step faster, and we have teams working across all areas of the car to achieve this.

What is an aerodynamicist's main role?

It varies, but as an example, one person might have a front-wing package they are working on, initially in Computer Aided Design (CAD), which they refine and iterate using our virtual windtunnel (CFD). The most promising aerodynamic surfaces might then be considered from a structural perspective, and, if successful, will be manufactured for windtunnel testing and possible race release. Our processes are relatively efficient, but only a handful of the many components we test make it to the car.

You must have a long schedule for every part involved in the construction of the FW37?

We work to a set of deadlines – aerodynamicists are specialists in refining and perfecting their work, but there is a target date for release of each component. We know the car has to be on the grid for the first race of the year, and that doesn't change. Everything flows back from there.

What do you make of the new challenges posed by 2015 and the changes in the regs?

The biggest change is another revision to the nose regulations; people can judge for themselves whether they look any more attractive – they

certainly look different. The nose change has had knock-on effects to the front wing, front suspension and chassis devices. A less visible change has been the evolution of the Mercedes engine, which has required significant changes to the car's design. We've also spent time exploiting the design freedom from the FW37 rear corner, which is an important area for car performance.

The new nose is more like the FW36 rather than the Mercedes or Ferrari solutions of 2014. Why?

We knew we had a reasonably strong base to work from and we wanted to keep the positive aspects of the previous car. You could decide to adopt a competitor's nose solution, but you'd need to do that for a very good reason, rather than simply, 'It's on car X – let's go for that.'

Weren't the new regulations applied to remove the appendages?

The principle was to force the cars to have a low nose via an exclusion box with dimensional limitations, including minimum areas a few millimetres back from the nose tip. Unless the FIA is willing to prescribe the nose and say, 'race with that' there'll always be some freedom. And if you give engineers some freedom, they'll exploit it to try to find an advantage that suits their car.


Are you ever satisfied? Or does it always feel like a compromise?

It's hard to be satisfied and one measure of that is how quickly we focus on the next update, and even the next car. We are already starting to put down initial ideas for our 2016 car and that programme kicks off soon. So even before the car has run this year, we are looking at next year's.

The final stage of the process happens in the race bay, where a complete FW37 is built up for the first time before being dismantled again for testing



to achieve a sufficient quantity to race with at Melbourne in mid-March, the first components need to be available for that final test. While the need to assess the performance and reliability of a component before the first race is not diminished, it is not that objective in itself that drives the design schedule. Rather, it is the need to have sufficient quantities to race in Melbourne with adequate spares that will set the milestones.

All of us at Williams hope we have identified the areas of the FW36 that, if improved, will yield the most effective step in performance. We are fully aware that we enjoyed a power unit advantage in 2014 that may be eroded in 2015, but equally we respect the ability of our partners at Mercedes HPP to try as hard as we do to increase performance beyond the capabilities of our competitors. Only time will tell as to the effectiveness of our efforts, but we will approach winter testing with a determination to improve, and with our sights set firmly on the ultimate targets of future years. 



emmo

A Racer's Soul

TALES FROM THE RACING CAREER OF EMERSON
FITTIPALDI – TWO-TIME WINNER OF THE
BRITISH GRAND PRIX (1972 AND 1975)

Available from 19 September 2014, from amazon.co.uk

GO FIGURE

Find out the facts and figures behind perennial favourites Williams F1



SIXTEEN

The number of championships won by the team – split nine-seven in favour of the constructors' title

43

GPs in which the FW07 competed over four seasons – winning 15 times

6

The number of cooling towers at Didcot Power Station, which used to overlook Williams' old HQ



95 & 94



Nigel Mansell and Ralf Schumacher competed in the most grands prix for Williams, with Mansell just shading Schumacher's record, 95-94

SIX THOUSAND THREE HUNDRED PER CENT

The percentage increase in points scored by the team in 2014 from 2013 (320 up from five)

2



The number of extra wheels used on 1982's six-wheeler FW08B. It never raced and six-wheel cars are now banned

EIGHTH

The lowest slot on the grid from which Williams have ever won races (Keke Rosberg: 1982 Swiss GP and 1984 US GP)



podiums for Valtteri Bottas in 2014, in Austria, Britain, Germany, Belgium, Russia and Abu Dhabi

1969

The year Frank Williams first entered F1, running Piers Courage in a privateer Brabham BT26A. Courage finished second at Monaco in what was only the team's second race

Metro 6R4

The car, based on an MG Metro, which Williams built for Rover to enter the World Rally Championship

411,000



The number of people with the surname Williams in the UK

8.3 MILES

from Williams' old factory in Basil Hill Road to their current Grove HQ

1



Clay Regazzoni, David Coulthard, Heinz-Harald Frentzen and Pastor Maldonado all won just a single race for Williams

30



The number of laps led by Felipe Massa in 2014 – fifth best behind Hamilton, Rosberg, Ricciardo and Alonso

4

Williams' last four pole positions have been achieved with different engines: BMW (2005), Cosworth (2010), Renault (2012) and Mercedes (2014)

McLaren & Honda

THE REBIRTH



Twenty-two years after they last ran together, the fabled works partnership is back. We were trackside on the day McLaren-Honda returned to Formula 1

OF A LEGEND



WORDS JAMES ROBERTS
PICTURES STEVEN TEE/LAT

Two days after the fanfare and intensity of the world championship showdown, the Abu Dhabi pitlane is tranquil once again. The crowds have drifted away, the hangers-on have jetted out and the raucous, party-fuelled yachts are now silent. All that remains is a skeleton crew; a Formula 1 paddock whittled down to the hardcore few, the ceaseless mechanics, hungry young racers and 24/7 F1 folk who cannot say farewell to the 2014 season. Truth be told, this is no longer 2014. This is the first day of the 2015 campaign.

Today marks a new era for two of the most iconic teams in F1. At one end of the pitlane, Sebastian Vettel is meeting and greeting his new Ferrari mechanics.

Surrounded by red, the four-time world champion is making friends and getting used to his new home.

From the centre of the pitlane comes the sound of intense fettling. Two screens shield a car surrounded by yellow high-voltage Tensabarriers. A McLaren chassis, elevated on stands, its floor off, is having its electrics re-wired. Significantly, everyone in the garage is wearing brand new, ice-white T-shirts. The Mercedes three-pointed-star is no longer visible and the 'H' logo of Honda is now proudly displayed instead. Today marks the return of an iconic partnership; the reunification of Honda and McLaren. The Japanese motor giant is back in F1, but on this historic first day, all is not well... →

Prior to this first public appearance of the new motor, McLaren completed a shakedown test at Silverstone in early November for a 'filming day' to give the Honda its first run-out, with Oliver Turvey at the wheel. The 2014 chassis needed only small tweaks to accept the Honda power unit, since the regulations have standardised the mounting points for any engine. The interim development car, the MP4-29H/1X1, now sits silently in garage number 21 as the first day of the Abu Dhabi Young Driver Test commences.

There is no sign that it will emerge in the first hour of running, as chief engineer Phil Prew emerges from behind the black screens to confirm this disappointing news. Those waiting to see the Honda run in anger for the first time will have to be patient.

GP2 Series runner-up and McLaren test driver Stoffel Vandoorne has been tasked with driving the interim machine, but he's not in his racing overalls yet. Another sign the car's nowhere near ready. Team boss Eric Boullier enters the garage and chats with Prew and Kevin Magnussen and they look on at the work being done to the wiring loom – the root of all the problems.

"When you have an electrical problem it's very difficult to understand, because it moves around the car. Fix it and then something further down the wiring loom breaks"

It's a long wait for McLaren-Honda test driver Stoffel Vandoorne (bottom) as the mechanics work hard to resolve a problem with the car's wiring loom



"When you have an electrical problem, it's a nightmare," says Boullier shortly afterwards. "It's very difficult to understand, because it moves around the car. Overnight things went well; there were a couple of issues but we fired up the car at 6am and were ready to go at 8.30am. Then something *else* went wrong, which forced us to take the battery pack off the car again. It's not like this is a 12V battery. Electricity is a difficult thing. You plug it in, you get a problem. Fix it and then something further down the wiring loom breaks. But that part was working when the other part wasn't. You're always chasing the problem and, given the high voltage, it's a sensitive area: these things take time."

Time is pressing, unlike the first time McLaren and Honda ran together at the end of 1987 (see panel opposite) when testing was virtually unlimited. Now, it's highly restricted. If there is no running in these two test days, the next opportunity to drive the car won't be until the Jerez test at the beginning of February, five weeks before the 2015 Australian GP.

The lunch hour comes and goes and there is still no indication that the 29H/1X1 is ready to run. Overhead clouds start are starting to gather over the pitlane: a portent perhaps of the troubles ahead.

The genesis for this day came during 2009 when Mercedes decided to go it alone and start their →





BACK TO THE FUTURE



Alain Prost did the bulk of the testing work in a modified 1987 MP4/2C McLaren monocoque (above) that ran the all-new turbo Honda ahead of 1988. In December '87 he gave the McLaren-Honda its first public outing at Silverstone and completed around 30 laps before suffering gearbox failure.

Then it was off to Estoril for a five-day test, hampered by rain and fog. Reports said the Honda was "buried under a 'spaghetti' of wiring to log its performance and fuel consumption". After Christmas, the interim car went to Jerez and then to Rio, with Ayrton Senna running in hot weather. Performance was still nothing to write home about.

At the final test at Imola, the all-new Steve Nichols and Gordon Murray-designed MP4/4 ran for the first time. An all-nighter at Woking meant the car just made it for the final day of the last test. Former McLaren test team manager Indy Lall takes up the story: "We'd had a horrendous time with this [interim] car during tests and when we got to Imola the MP4/4 arrived and it just looked the bollocks. We were knackered and were sort of shovelled into the corner because Ayrton and Alain didn't want to know about the old car any more – you can't blame them.

"But it gives me goose bumps to this day when I think about what happened next. The MP4/4 went on track and the lap times just got quicker and quicker and quicker. It was getting dark – and Ayrton didn't want to stop. It was an absolutely amazing experience."

Top times at Imola were 1m 29secs, but Senna soon found he was doing 1m 27secs, lapping two seconds a lap quicker than anyone else. That first year of the McLaren-Honda union has gone down in legend: 15 wins from 16 races. From such an inauspicious start, it didn't turn out too bad, did it?

own F1 team. After uniting with McLaren in 1995, the partnership went on to accrue 78 race wins, one constructors' championship and two drivers' world titles. But the decision to buy out Brawn GP and become a works entity meant McLaren had to chase other engine partners. Finally, the works partnership with Honda came to fruition and after pulling their own team out in 2008 (which ironically led to the formation of double-title-winners Brawn GP), Honda are back.

"If you have a works deal, you have more chance of succeeding in F1 than if you were a customer," reaffirms Boullier. "When the relationship with Mercedes changed and they went on their own, there was the plan for McLaren to be just a customer. From that point McLaren had to chase another works team solution.

"The good thing is that we have benefited from past experience between both companies. McLaren

formula. A sentiment with which Honda motorsport chief Yasuhisa Arai agrees: "These regulations are more suitable to our line of work. Honda has already developed a hybrid system and we have a lot of experience in this field. We learnt about running with a downsized turbo with direct injection with our own mass production car," says Arai. "These environmentally friendly regulations are the reason for our comeback."

The hope in Sakura is that this time round, the return on investment will be better than it was for the Japanese manufacturer's last foray into Formula 1. The various guises of the BAR-Honda team that year after year produced poor machinery for Jenson Button to grow increasingly frustrated with are still fresh in the memory. A solitary grand prix victory at the wet Hungarian GP in 2006 was their only success in a number of barren seasons.

Staff from both sides of the partnership have learnt from the mistakes of the past and know that the key to success lies in good communication



HONDA STATS

Honda (as a constructor)

Years entered	1964 8
	2006 08
Races started	88
Wins	3
Poles	2
Fastest laps	2
Win/start ratio	3.4%

Honda (as an engine supplier)

Years entered	1964 68
	1983 92
	2000 08
Races started	340
Wins	72
Poles	77
Fastest laps	57
Win/start ratio	21.2%

is used to having a works team relationship and we can understand, we can listen, we can support Honda's requests and vice versa. Over the past year this committee and organisation model has been in place and it is working very well. Communication is transparent. Everyone knows what they have to do and everyone is aware of what everyone else is doing."

Honda's research and development plant is based in Sakura, Japan, but they have also established a small assembly facility in Milton Keynes to create more of a seamless shift into working with the UK-based McLaren team. Part of this test is to triangulate real-time data links between Woking and Milton Keynes and the Abu Dhabi track (once the car is running).

Honda's return coincides with the original wishes of the sport's regulators that switching to direct-injection turbo-charged V6 hybrid power plants would attract more manufacturers to the fuel-efficient, road-relevant

Rivals Toyota proved no better as their F1 aspirations were also plagued by bureaucracy. One example of the level of red-tape involved back then was the story of the senior engineer who spent an entire weekend involved in an email chain with Japan about why the European engineers were staying on a higher floor of his hotel – in his belief, a more senior level. Henceforth, the email concluded, engineers from both Japan and Europe would in future have to stay in rooms on the same floor.

Today, there is a clear delineation between roles; McLaren build the chassis. Honda the engine. So Boullier believes there won't be a repeat of Honda's poor performance. "They have gone back to their roots," he says. "They are an engine manufacturer; we are not. We know how to build a chassis and we just make sure both companies click and work together."

It's one job to ensure Honda and McLaren click, but it's another to keep McLaren together. Internally, →

"Honda are an engine manufacturer; we are not. We know how to build a chassis and we just make sure both companies click"

MOTORSPORT TOURS 2015

GREAT VALUE PACKAGES AVAILABLE NOW



**OVER 40 YEARS'
EXPERIENCE IN
SPORTS TRAVEL**

BOOK ONLINE NOW
gulliverstravel.co.uk

OR CALL
01684 878867

Stoffel Vandoorne climbs into the MP4-29H/1X1 and takes it out for its first lap of the Yas Marina circuit



Peter Prodromou. Oh, and there's the small matter of Fernando Alonso joining the team, too, on a three-year deal, and the rather belated decision to retain Jenson Button in a race seat with Kevin Magnussen kept on as test and reserve driver.

As the clock ticks towards three in the afternoon, there is a flurry of activity at the front of garage 21. A mechanic crosses the pitlane with a pitboard that reads 'Stoffel'. A stack of tyres is wheeled inside and sidepods are attached to the car. Vandoorne sits in the cockpit and the Honda 1X1 fires into life.

Finally the screens part and the signal is given for Stoffel to exit the pits. The development car bursts out of the garage and into the pitlane for an installation lap. It's only one lap, but it's enough. For those patient



"I think there is some trust to be rebuilt by some board members. But whatever way people operate, the common ground is the interest of the company"

all is not well at boardroom level, with a bitter fight raging between the returning Ron Dennis and fellow shareholder Mansour Ojeh.

When Boullier arrived at the beginning of the year, his priorities were to streamline the organisation, bring about efficiencies (ie redundancies), re-introduce leadership and set about acquiring the best drivers to take the team forward. He acknowledges that the acquisition of a title sponsor would help fund the next stage of development, but he also knows that there needs to be a resolution to the problems upstairs.

"Nothing is rosy and I think there is some trust to be rebuilt by some board members," he says, choosing his words carefully. "But whatever way people operate, the common ground is the interest of the company."

This year is a new dawn for McLaren-Honda. A new works partnership, a streamlined workforce, the MP4-30 designed with aero expertise from former Red Bull man

few, they have witnessed the rebirth of an F1 dynasty: McLaren and Honda reunited. And despite limited running over the following day, this project is only mirroring the disastrous start Red Bull and Renault had at the Jerez test last February. And they managed to take three grand prix wins before the season was over.

"This is a starting point, even if we have not done much in terms of data," says Boullier. "But we are two and a half months in advance of where everyone was at the start of 2014. And at least we have run. We all want to go to Melbourne thinking that we could win the race... I know we can dream."

There will be long nights in Woking, Milton Keynes and Sakura where engineers won't get the chance to sleep, let alone dream. But if micro problems in the wiring loom and macro issues in the boardroom can be resolved, keep an eye on what Alonso can achieve in the Honda-powered McLaren MP4-30 in 2015. **F1**



10nts From
£1399 pp

MONACO GRAND PRIX™ & THE MEDITERRANEAN EXCLUSIVE OFFERS

ADORE CRUISES

Join Adore Cruises on a choice of 2 Fantastic voyages featuring one of Formula 1's most revered events in 2015; the Monaco Grand Prix™. Each year, the picture-perfect Principality of Monaco transforms into a formidable racing circuit, where the world's driving elite take battle on its notorious hairpin turns, chicanes and corners which are negotiated at breakneck speeds. This renowned spectacle ensures the crowd are on the edge of their seats at all times. And what better way to round off the Grand Prix™ than with a flutter at the world famous casino? Depending on which voyage you opt for, the thrilling F1™ proceedings are coupled with many beautiful stops in the Mediterranean, ranging from the cool city of Valencia and living museum of Rome, to picturesque Pisa and historic Dubrovnik. Included in both holidays are full board cruises with MSC Preziosa or P&O Oceana respectively - 2 charming vessels which will act as your home-from-home during your time spent shore-hopping. You'll also enjoy a hotel stay in San Remo on each voyage, thus further enhancing these truly memorable cruise experiences. Call one of our friendly specialists to discover more today.

BENEFITS YOU WILL SIMPLY ADORE:

- Choice of 2 spectacular F1 Grand Prix™ trips
- Includes full board cruises to the glorious Mediterranean
- Includes hotel stays in San Remo
- Includes return flights
- Grand Prix™ ticket upgrades available on request

ADORE EXCLUSIVE: MSC MONACO GRAND PRIX™



COSTA GRAND PRIX
OPTIONS ALSO
AVAILABLE

MSC Preziosa

10nts From
£1399 pp

Fly London to Genoa and spend 1 night in this Italian city before you embark MSC Preziosa for your 7 night cruise visiting Civitavecchia (Rome), Italy - Palermo, Sicily - La Goulette, Tunisia - Palma de Mallorca, Spain - Valencia, Spain - Marseille, France & Genoa. Transfer to picturesque San Remo for a 2 night hotel stay in this pretty and tranquil Riviera city. Enjoy the thrill of the Monaco Grand Prix™ with Rocher Secteur tickets included plus scenic coastal transfers to/from Monaco. The next day transfer to Genoa Airport for your flight back to London (regional air on request)

UPGRADE YOUR MONACO GRAND PRIX™ EXPERIENCE WITH
FANTASTIC VALUE FOR MONEY Z1 TICKETS FROM JUST £100PP

Departure Date	Inside	Outside	Balcony
15 May 2015	fr £1399	fr £1499	fr £1699

ADORE EXCLUSIVE: P&O MONACO GRAND PRIX™



COSTA GRAND PRIX
OPTIONS ALSO
AVAILABLE

Oceana

11nts From
£1599 pp

Fly to Genoa where you will then be transferred to picturesque and historic San Remo on the Italian Riviera for your 4 night hotel stay. This beautiful Italian town is on the coast and is only 25 miles away from Monaco and the most famous Grand Prix of all time which you will enjoy to the full on race day with scenic transfers included! After your 4 night stay you will then transfer to Genoa to embark P&O Oceana to spend 7 nights full board cruising around the beautiful Mediterranean and visiting Florence/Pisa, Italy - Naples, Italy & Dubrovnik, Croatia before arriving into Venice, Italy for an overnight stay in port aboard your ship. You will then disembark and fly back to London (Regional air on request)

UPGRADE YOUR MONACO GRAND PRIX™ EXPERIENCE WITH
FANTASTIC VALUE FOR MONEY Z1 TICKETS FROM JUST £100PP

Departure Date	Inside	Outside	Balcony
23 May 2015	fr £1599	fr £1799	fr £1899



0800 840 1447

www.adorecruises.uk

ADORE CRUISES

Prices are pp, based on 2 sharing, correct at time of print & subject to availability/change. Prices applicable to selected departures & to new bookings only. Credit card charge 2.5%. Customers responsible for any visas/inoculations that may be required. Transfers not included unless stated. Flights based on London unless otherwise stated & may be indirect/overnight. Regional air available at a supplement. If Monaco Grand Prix™ does not go ahead or date is changed due to unforeseen circumstances, the rest of the holiday will still operate without the Grand Prix™. F1™, FORMULA ONE™, FORMULA 1™, FIA FORMULA ONE WORLD CHAMPIONSHIP™, GRAND PRIX™ and related marks are trademarks of Formula One Licensing B.V. All rights reserved. Tips not included on ships and are at your own expense. Further Ts&Cs online. E&OE

YOU ASK THE QUESTIONS

Daniil Kvyat

He's shot up the ranks from Toro Rosso to Red Bull in the space of a year, which hasn't left much time for ice hockey... or bear hunting

WORDS JAMES ROBERTS PORTRAITS GLENN DUNBAR/LAT

Spend even a little time in the company of Daniil Kvyat and you come to realise that practically nothing fazes this tall, confident young Russian. An impressive debut year at Toro Rosso has led to his immediate promotion to Red Bull for 2015. Yet discussing the appointment, he acts as if it's the most natural thing in the world and that he *should* be winning races. It's easy to forget he's just 20 years old.

Fluent in four languages and with a studious interest in the history of his sport, Daniil doesn't seem the least bit stressed about taking on Daniel Ricciardo in 2015. The chance to shine is there for him to grab with both hands – as he does with the stack of readers' question cards in front of him on the table in a quiet corner of the Abu Dhabi paddock. And the first one is about that recent promotion.

You scored 14 fewer points than your team-mate Jean-Eric Vergne in 2014, so why did Red Bull choose you over him?

Brendan Stead, Australia

Well, I think that's an easy question to answer. The points are irrelevant for me, unless I'm

fighting for a championship. I don't care at all about the points. I'm lucky enough to have people around me at Red Bull who look at all the details very deeply and take everything into consideration and analyse the situation – that's why they have chosen me instead.

**What do you like with your Red Bull?
Or do you drink it straight?**

Laurence Zumpo, Australia

Ah Laurence, you guys know how to mix it up in Australia, don't you? Well, obviously in a party sometimes you might mix it with beer...

FIR: With beer?

DK: No, no. I'm joking. Most of the time I drink it straight. And sometimes you might mix it with... I know that you want me to say that I mix it with vodka. So I'll say vodka.

What do you miss most about Russia when you are away?

Duncan Hodgson, United Kingdom

[At this point, *F1 Racing's* photographer Glenn Dunbar interjects with: 'say the women'] Okay – the women! No, if I'm honest on the

race weekends it's kinda hard for me to think about this. But every time I go to Russia I have this feeling of home and in my soul I can feel it's where I am from. It is the country where I grew up and my parents and grandparents are still there and I don't see them often. So it's a soulful feeling – but the first thing I said is also true!

Is it true you're a fan of bear hunting?

Rob McAlees, United Kingdom

Bear hunting? I'm sorry, I'm not a big fan of the bear hunting. That's something new to me...

What are your opinions on the FIA's plan to make Formula 1 safer following Jules Bianchi's accident?

Indradjid Sofwan, Indonesia

There is always room for improvement and like I said after the accident, you have to make decisions that haven't been rushed through and which do make sense and are not exaggerated. We must not forget that it's been a very unlucky set of circumstances and that's why we shouldn't rush into any decision. We need sensible modifications – fine-tuning if you like. This is →



Daniil Kvyat



RENAULT





"Daniel and I know each other quite well. I think we should be able to build a good team atmosphere around us, which is important"



my point of view and I do think that the FIA will take everything into consideration and make the right decision based on that.

Who was the first person you told when you were offered the Red Bull seat?

Garry Robinson, United Kingdom

I didn't get to speak to anyone because I was told 30 minutes before FP3 in Japan and usually I don't have my phone on me at that time of the weekend. I mentioned it to my trainer and my engineer, the people who I have a close relationship with.

FIR: Did you manage to at least speak to your family that night?

DK: I sent a few texts. I'm normally busy on a Saturday night, and with the time difference it was difficult. I made a quick call to my dad, but that was about it.

You speak many languages but which do you prefer to talk in? And swear in?

Stuart Burton, United Kingdom

I speak English, Russian, Italian, Spanish and some Finnish, but I haven't analysed which language I swear in. I think for me English is the language I speak in the most because of the sport I'm involved with.

FIR: And which language do you swear in?

DK: Russian has the best swear words.

FIR: Can you say one for us?

DK: No.

Is motorsport developing in Russia and is there some sort of talent programme available that supports young drivers?

Arjen Falter, Holland

Yes, motorsport is definitely growing in Russia. It's been growing over the past four or five years, ever since Vitaly Petrov came to Formula 1 [in 2010] – that was what caused the big jump in interest. More so now that we have the Russian Grand Prix. Also I think it helps that many Russians go and race in international series, so it's looking good for the development of the sport in Russia. And I think there are some programmes that try to help young drivers and it's very good to see that.

Congratulations on landing the Red Bull seat. What's your target for this year? Beating Ricciardo or scoring points?

Elton Lam, United Kingdom

Thanks. I'm not setting myself any big targets or any big goals. Obviously you have to aim high always, but I'm not fixing anything into my head. That will not help me. The thing that will help me will be to work as hard as possible at weekends to try to achieve the best result. And also to try

to extract the natural speed that I think I have, because that's why I'm here and that should be enough for a good result. How good am I? Only time will tell.

FIR: Do you get on well with Daniel?

DK: Yeah, we know each other quite well. Since I was 15 years old, since I joined the Red Bull programme, we've been in touch and exchanged a few jokes. I think we should be able to build a good team atmosphere around us, which is important. I understand this and I think he understands it as well, because when you have strong rivals it's important to be united at some point. You always want to be the one in front and we'll see who will be that one...

What do you make of Milton Keynes?

Mathew Grove, United Kingdom

I've been living there and spending most of my time there the past few years. In the beginning it was quite tough to adapt to a new place, but that is always the case. It's a special place. It's not real England, I would say. It's a little more commercial, with a lot of buildings. But it's nice. I've found everything I need there and I basically managed to have some good times there...

Fancy coming to a Cardiff Devils EIHL ice hockey game when the F1 season is over? My treat.

Gerald Davies, United Kingdom

Well, let me see. My trainer, Pyry Salmela, is a huge ice hockey fan and we've been talking about the sport together quite a lot. I imagine he'll want to go more than me. But I wouldn't mind, thanks. I follow the national hockey team and I watch it sometimes, but not so much.

Who is your hero in motorsport and why?

Marta Konarska, Poland

Ever since I started my career it's been Michael Schumacher, and it still is in a way. It's hard to see what he's going through now. It's a big shame as he's someone I've followed closely; I really liked his style of racing.

Are F1 cars too easy to drive?

Alan Harrison, United Kingdom

Well, you can have a go yourself to see if you find it too easy or not. It depends if you're driving at 60mph – then they might be too easy. But in Formula 1 you are pushing very close to the limit all the time – you are even over the limit sometimes. And when you are doing this, it is very, very hard. Many people know how to play tennis, or how to play football. Many people know how to drive a road car. But not many people know how to take an F1 car to the absolute limit. So my answer would be no.

Are you afraid of Dr Helmut Marko (the head of Red Bull's Young Driver Programme)?

Piotr Źwik, Poland

Well, that would be the wrong approach. In the beginning you feel some pressure from his side because he demands a lot. But once you get to know him and deliver what he is asking from you – which isn't always easy, because he's asking for wins and top results – and once you understand how he is, I found that I got on well with him and I had a lot of respect for him. Definitely I'm not afraid of him. We have a good working relationship and now we'll be collaborating more closely.

FIR: Can you remember when he last shouted at you?

DK: When I was in Formula BMW.

FIR: What did you do?

DK: I was driving like shit! Like I said, he is fair with you. If you are doing a shit job, he will point it out to you.



Kvyat with the notoriously hard-to-please Dr Helmut Marko: "He is fair with you. If you are doing a shit job, he will point it out to you"

Have you ever driven any Russian cars?

Klaudia Kowalczyk, Poland

Well in every Russian family, although I'm not sure about modern families, there was always a Lada in the family. I think it was one of the first cars that I drove.

FIR: A good handling car?

DK: Not really. There is some room for improvement.

FIR: Power?

DK: No. Big room for improvement.

Are you friends with President Putin?

Andrew Gair, United Kingdom

I didn't have the chance to meet him personally, but I think that as the president of his own country he has to be popular and he is.

Where does your middle name – Vyacheslavovich – come from?

Brian Broad, Australia

It comes from my father. In Russia, your middle name comes from the name of your father. My father's name is Vyacheslav. His middle name is Yakobovich because his father's name is Yakob. This is how it goes. If I had a son his middle name would be Daniilovich.

Are you ready to win races next year?

Dave Hall, USA

Yes, as a driver I am always pushing as hard as possible to win. This is why I am here and I'm willing to do everything to achieve that. So absolutely, yes.

Which driver in the history of Formula 1 would you most like to have been able to race against?

Shaun Matthews, United Kingdom

Well there are drivers like Michael Schumacher and he was a good example to me when I was young. He retired in 2012, so I just missed racing him by a couple of years. I think there are maybe drivers that would have been cool to have raced against. Like Senna, Schumacher, Prost, Mansell – maybe someone from earlier like Jackie Stewart. I know a little bit of the history of the sport.

FIR: A lot of young drivers don't.

DK: Well, I think it's an important part. I didn't study history at school, I didn't really like it because I found it boring but some clever people say it gets repeated sometimes and I think it's important to understand the history of what you are doing.

FIR: Do you read books about motor racing in the past?

DK: There are a few ways. I've watched videos, there's the film *1* and the film *Senna* – both are very interesting. I've been reading a few books, too. And YouTube videos. I've always liked the history and I used to have a collection of *F1 Racing* magazine in Russian from 2004 to 2006. I've been reading those since the early days to learn about the sport and its history. 

JOIN OUR FAN COMMUNITY

Want to put a question to a big name in Formula 1? Visit www.f1racing.co.uk and join our Global Fan Community, where you'll get to do just that. We'll let you know which interviews are coming up.



Scan this code with your smart phone and you'll be taken straight to our reader panel page

PICTURES OF THE YEAR 2014

to Abu Dhabi

Come rain or shine, LAT's elite team of photographers are seizing the moments that make history – *this* is how you'll remember an epic 2014

In a sport defined by the relentless pursuit of speed, it's almost counterintuitive that a static image has the power to perfectly encapsulate the emotion, drama, intensity and passion that underpins the ultimate form of motor racing. But that's exactly what great photographs do: capture and preserve the moment forever.

Like stealth predators waiting patiently for their prey, elite Formula 1 snappers know the importance of being in the right place at the right time.

That's why you'll find LAT Photographic's work in every single issue of *F1 Racing*. Whether it was the on- and off-track incidents that defined the title battle between Lewis Hamilton and Nico Rosberg, the uncontained excitement of Daniel Ricciardo winning his first race, or the absolute commitment displayed by all the drivers on the grid, LAT's snappers captured all the key moments of 2014. Anticipation, focus, elation, heartbreak – it's what F1 is all about.



Steven Tee

LAT's ultra-committed managing director and chief photographer hasn't missed a single Formula 1 grand prix since 1984



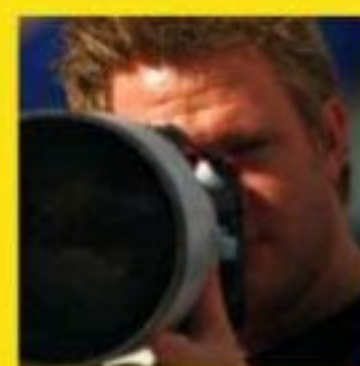
Glenn Dunbar

Glenn joined LAT as a darkroom assistant in 2002, before moving over to photography. Since 2006 his shots have been lighting up F1



Charles Coates

A seasoned adventurer as well as a gifted snapper, Charles rowed around Koh Samui between grands prix this year



Alastair Staley

Working for LAT since 2003, Al covered F3, BTCC, GP2 and GP3 before moving into full-time Formula 1 photography





ON TOP OF THE WORLD DOWN UNDER

Australia's Daniel Ricciardo had a breakthrough season, eclipsing world champion Red Bull team-mate Sebastian Vettel with three wins. His first success came in Canada, where he overhauled Nico Rosberg

Where Montréal, Canada **When** 8 June **Photographer** Steven Tee/LAT

Image details Canon EOS-1D X, 200mm lens, 1/1600th at F4.0







BRIEF ENCOUNTER

After collecting a five-second penalty for speeding on his first pitstop, Felipe Massa pays a flying visit to the McLaren box for his third

Where São Paulo, Brazil

When 9 November

Photographer

Glenn Dunbar/LAT

Image details Canon EOS-1D X, 200mm lens, 1/15th at F13



TOO HOT TO HANDLE

Daniil Kvyat leaps from his Toro Rosso after an oil leak catches fire in Germany. It was a rare low point in an impressive season for the Red Bull-bound rookie

Where Hockenheim, Germany **When** 20 July **Photographer** Alastair Staley/LAT

Image details Canon EOS-1D X, 200mm lens, 1/640th at F8





ARABIAN NIGHTS

The Bahrain GP switched to a night-race format for 2014, providing some stunning shots of the desert sunset as practice drew to a close on Saturday

Where Sakhir, Bahrain **When** 5 April **Photographer** Steven Tee/LAT

Image details Canon EOS-1D X, 200mm lens, 1/250th at F8





CLASH OF THE TITANS

Bahrain was the scene of the first real conflict between the dominant Mercedes duo of Lewis Hamilton and Nico Rosberg, Lewis eventually winning a thrilling wheel-to-wheel duel. Fuelled by adrenaline, the drivers playfully tackled each other afterwards, with Nico conceding it was his most exciting race to date

Where Sakhir, Bahrain **When** 6 April

Photographer Steven Tee/LAT

Image details Canon EOS-1D X, 200mm lens, 1/320th at F4



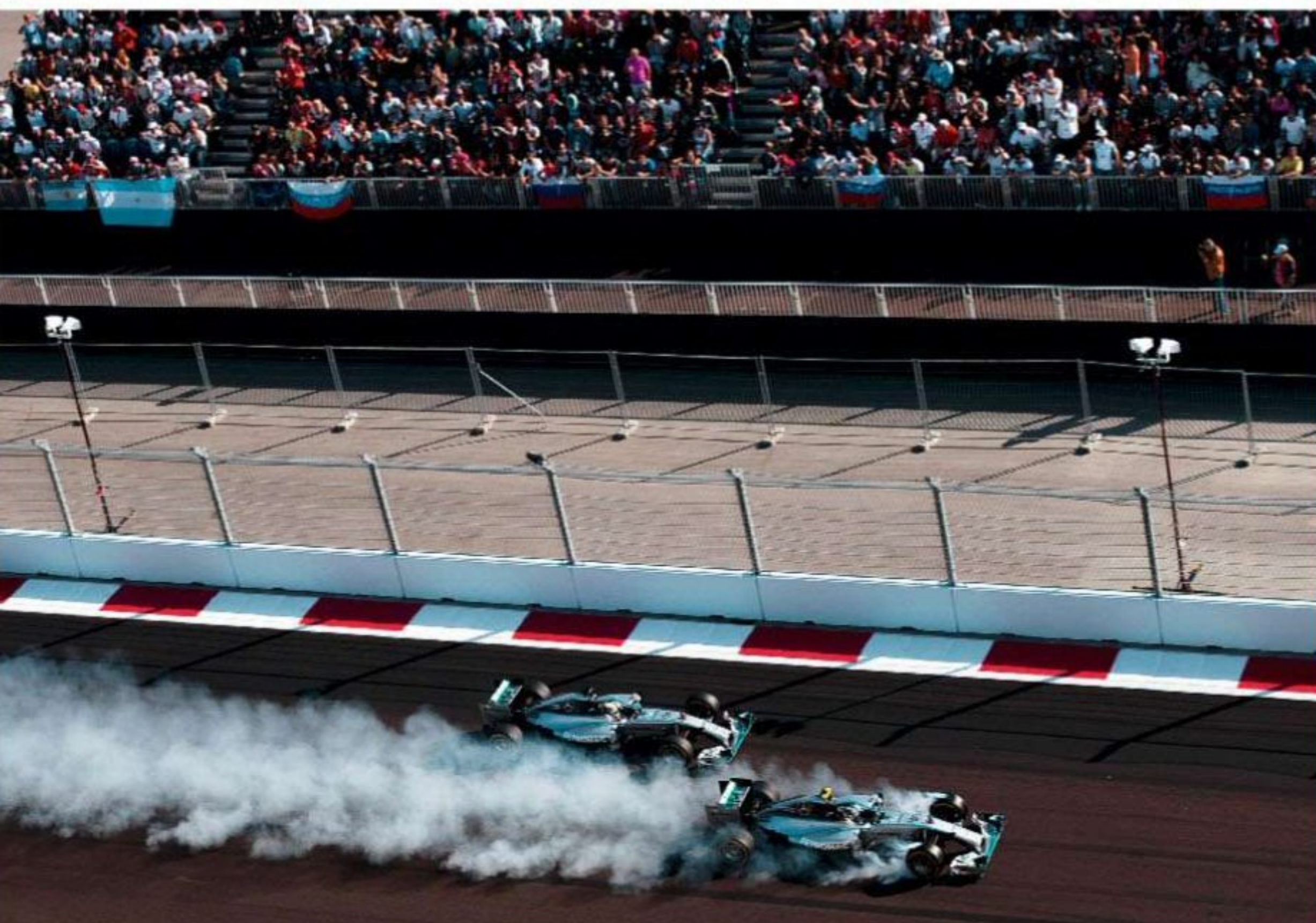
LACKS CASH, NOT COMMITMENT

Max Chilton pushes his Marussia to the limit in qualifying for the Canadian Grand Prix, highlighting the fact that those drivers fighting to escape the back of the grid are just as dedicated as those at the sharp end

Where Montréal, Canada **When** 7 June

Photographer Glenn Dunbar/LAT

Image details Canon EOS-1D X, 600mm lens, 1/1000th at F6.3



SMOKE AND MIRRORS

Nico Rosberg had the inside line on Lewis Hamilton heading into Turn 2 at Sochi, but braked just a little bit too late, leaving Lewis free to storm through to another victory

Where Sochi, Russia **When** 12 October

Photographer Glenn Dunbar/LAT

Image details Canon EOS-1D X, 50mm lens, 1/1000th at F6.3



SIDELINED... FOR NOW

Felipe Massa sat out much of qualifying in Monaco, having been taken out by Marcus Ericsson in Q1. He was forced to start from P16, but clawed his way back to seventh

Where Monte Carlo, Monaco

When 24 May **Photographer** Charles Coates/LAT **Image details** Canon EOS-1D X, 300mm lens, 1/400th at F3.2





FROM OUT OF THE SHADOWS

Having trailed Nico Rosberg in the points for much of the season, Lewis Hamilton took a decisive lead in the standings with his dominant victory in Singapore **Where** Marina Bay, Singapore **When** 19 September **Photographer** Glenn Dunbar/LAT **Image details** Canon EOS-1D X, 140mm lens, 1/8th at F9



THE REAL DEAL

Lewis Hamilton was disgruntled to be handed a sponsor-friendly trophy on the podium after his British Grand Prix win. He finally got his hands on the real thing in the press conference afterwards

Where Silverstone, Britain **When** 6 July

Photographer Steven Tee/LAT

Image details Canon EOS-1D X, 600mm lens, 1/250th at F4



CELEBRATIONS ON ICE

Red Bull's Christian Horner and Adrian Newey take the Ice Bucket Challenge for charity before qualifying at Spa. The next day the ice-water was replaced by champagne following Daniel Ricciardo's unlikely win

Where Spa, Belgium **When** 23 August

Photographer Alastair Staley/LAT

Image details Canon EOS-1D X, 30mm lens, 1/1600th at F4.9







THE FUTURE'S FINNISH

Valtteri Bottas locks up exiting the Monaco tunnel in practice. Having put in a string of mighty drives across the season, his only retirement happening here in Monte Carlo, he stands out as a future champion

Where Monte Carlo, Monaco **When** 22 May **Photographer** Glenn Dunbar/
LAT **Image details** Canon EOS-1D X, 30mm lens, 1/1600th at F4.0



WNRSHO



BAK





your
first
look

he windows of Baku's Emporio Armani shop rattle as a McLaren roars past towards the finishing line... But this isn't a premonition of 2016, when Azerbaijan will host the European Grand Prix on the streets of its capital city. It's *now*.

Azerbaijan isn't an obvious tourist destination – they're trying to change that – so the chances are that you know very little of this young republic, save that it was once under Soviet control; it is oil-rich, courtesy of the vast reserves lying below the Caspian Sea; and it hosted the Eurovision Song Contest in 2012. By way of fact-finding, *F1 Racing* is moonlighting in the world of roofed racing cars, observing an annual event

that's whetted the government's appetite for motor racing here: the Baku World Challenge GT race.

Hence the McLaren blasting down what will

Transcontinental Azerbaijan will host the European Grand Prix next year along the streets of its capital city, Baku. And we've been there already...

WORDS

STUART CODLING

PICTURES

HERMANN TILKE

become the start/finish straight of the F1 circuit isn't an MP4-29 but a noisy GT3 version of the MP4-12C, travelling in convoy with a multitude of other hotted-up exotica. Racing along these particular streets won't happen until 2016; the GT circuit is in a different part of town, but they're making the short commute to the city centre in an organised parade to drum up business. But the early signs are all good: there's a sizeable crowd, and they haven't come to hurl rocks at the racers for having the streets closed off.

The area of Baku where the grand prix will be held has been extensively redeveloped in recent years, although it abuts the older, well-preserved walled city that the track will orbit in the final sector. First impressions are that when F1 rolls into town it will look great on camera, in contrast with, say, the former home of the European GP, the unlamented Valencia circuit. The tree-lined main straight presents a vista of modern architecture and designer boutiques on one side, with a leafy pedestrianised seafront boulevard on the other. Even with concrete barriers in place, only the most unimaginative photographers could fail to conjure distinctive imagery.

The architect of the circuit that will host the European Grand Prix from 2016 is, naturally, Hermann Tilke, but the man who laid the foundation for top-level racing here will be

equally familiar to long-term racing fans: Thierry Boutsen. It's 21 years since he left F1, but the three-time grand prix winner has barely changed: the wrinkles on his face might be etched a little deeper but the bouffant hair is still immaculately arranged, even as he removes that distinctive Stefan Bellof-inspired crash helmet from his head after giving VIPs a ride in a Lotus-branded two-seater formula car.

"I've visited Azerbaijan a lot on business," he says. "It's a beautiful and interesting place. Baku has some fantastic modern architecture as well as a historic centre; it feels like a very dynamic city. I realised it would make a very good venue for a street race." →

BAKU

You may wonder what a former Formula 1 driver was doing here on business. The reason is inextricably linked with the process that's driving this country into a more prominent position on the international stage: oil and gas wealth. Boutsen founded an aviation brokerage company in 1997, selling private planes to the rich and famous, and it has been his principal line of business since 1999, when he stopped racing altogether after injuring his back in an accident at the Le Mans 24 Hours. As you can imagine, there are plenty of movers and shakers in the oil-prospecting trade in this part of the world, all eager to acquire private jets either as transport or as an asset that can be managed tax-efficiently.

Boutsen's Baku light-bulb moment came at the end of 2012 when he witnessed a small-scale GT race being held on the streets around Government House, the imposing building that will also be a feature of the coming Formula 1 circuit. Organised by City Challenge, a multi-event company that had also organised street races in Bucharest, the race attracted quite a few frontrunning teams from the FIA GT championship. But the track itself, which packed 16 corners – mostly first-gear right-angles or chicanes – into not much more than a mile, didn't find favour with drivers. Neither were the locals happy about the traffic chaos wrought by the road closures.

Back in Monaco, Boutsen flicked through his Rolodex and got on the phone to Spa 24 Hours impresario Jean-François

Chaumont and Belgian race promoter

Impressions of the wide Baku pitlane (right) and Turns 9-10 (far right), which runs through the ancient walled city and is described by circuit designer Tilke as "extremely narrow"

Renaud Jeanfils. Both admit that at the time, neither of them could even have located Azerbaijan on a map. But with financial backing from local businesses and the approval of the government, they found a better location and put together a package that would attract a decent grid.

Teams granted entry would have their transport costs greatly subsidised and their equipment not unduly delayed

by customs – this latter point being a recurrent bugbear in parts of the world where motor racing has yet to take root.

Boutsen, who won the 1989 Australian Grand Prix for Williams on the streets of Adelaide, deployed his street-racing nous to help create a circuit that would be large and fast enough to challenge drivers, close enough to the city centre to attract spectators, but not so in the thick of things that it would paralyse the city's traffic. The result would not pass muster for Formula 1 because the road surface and run-off merit only FIA Grade 2 status, plus some parts are very narrow. However, the two events held on it since 2013 have successfully laid the ground for more top-level motorsport in Baku and acted as a debugging exercise. In 2013, for instance, the event fell drastically behind schedule when the local authorities had the roads jet-washed overnight because they thought the rubber

laid down on the track surface in the braking areas looked ugly. This would only have been a minor inconvenience had the track not then iced over in places where it was shaded by buildings. Hopefully these lessons will be retained in the memory of officialdom when Formula 1 rolls in to town...

"Last year [2013] was difficult – very difficult," says Stéphane Ratel, whose eponymous company runs various tin-top and single-seater championships, including the Blancpain Sprint Series that races at Baku. "But they adapted very quickly and this year there have been no problems. Last year it was complicated because they didn't have the experience of constructing the circuit, so they didn't actually close the roads until Friday night – okay, the concrete for the walls was there, but the kerbs hadn't been laid down. We couldn't convince them that it was impossible.

"This year, the roads were closed on Wednesday. Big difference! You have the time to prepare your track and to be ready, to get your evacuation procedures in place. It's a learning curve. We hope to race here again in 2015, and by then, for sure, they'll be ready for F1. The track will be in a different place, but they will have the experience of the organisation – and, just as importantly, the marshals will have experience as well.

"It's definitely brought racing to the attention of the public here; there's greater awareness of the sport. I think if

the grand prix is successful, maybe after one or two years they might build a permanent circuit outside the city. Who knows?"

Visiting Azerbaijan is a fascinating two-tone experience because for all its manifest wealth and enthusiasm for attracting visitors, many aspects of its shuttered Soviet past – it declared independence from the USSR in 1991 – remain. Entry entails an unholy level of bureaucratic faff – invitation letters, proof of employment and so on – and you'll have to pay £160 to get your passport back with a visa in place within ten working days. Expect a minor Twitter storm as the noisier

elements of the F1 media set furious finger to keypad on the bus back from the consulate. There may be some chafing over the financial arrangements, too: Azerbaijan's currency, the manat, can be obtained only once inside the country.

Red tape aside, Azerbaijan is easy to get to from the UK; British Airways runs a daily direct service to Baku from Heathrow, but there are less costly options such as Turkish Airlines, connecting in Istanbul. From Baku's airport it's a short run into the city itself, and from *F1 Racing's* experience of the roads – Parisian traffic density, Milanese etiquette – this city is best explored on foot. This is easy thanks to the broad, tree-lined seafront boulevard that stretches from the Crystal Hall (venue of the 2012 Eurovision Song Contest) and National Flag Square (home to the second largest flagpole in the world and the 70m x 35m national flag that ripples atop it) all the way to Freedom Square, where the F1 paddock will be situated. →





“Last year was very difficult. This year there were no problems. We hope to race here again in 2015, and by then, for sure, they’ll be ready for F1”

Stéphane Ratel



Sectors 1 and 3 are fast and take in Baku's modern centre; sector 2 (top) runs through the narrow historic quarter

"Central Asia is a massive growing market; we can't ignore it" *Alex Wurz*



We're told it's possible to experience three seasons in one day in Baku, thanks to the interaction of the steep hills in its westerly parts with the prevailing winds – the cold Khazri from the north and the warm Gilavar from the south – that blow in off the Caspian Sea. The peninsula itself offers little protection from the year-round breeze, and the residents of Baku are clearly accustomed to it: joggers and cyclists on the boulevard just lean in to the wind and get on with the job.

The dumbbell-shaped, anticlockwise Formula 1 circuit layout has a dual character. The eastern side, which is concentrated around modern streets with big-name hotels and retail emporia, is largely flat and has a predominance of right-angle bends. Sector 2, where it meets the ancient walled settlement, is where we find the area described by


Hermann Tilke as "extremely narrow". It's also exceedingly steep, perhaps more so than the run from Ste Devote to Massenet in Monaco, with a challenging jiggle between historic buildings that would give UNESCO observers a heart attack.

Having run along the top edge of the walled city,

the circuit then dives left, past the ancient baths and Juma Mosque, sharply downhill. At present this section is cobbled and traffic negotiates it at not much more than jogging pace. Once back at sea level it turns left for a largely flat-out blast back to Government House and the pitlane.

"It's going to be great," says Grand Prix Drivers' Association chairman Alex Wurz, a frequent visitor to Baku since his Test & Training International company is training all the drivers for the inaugural European Games, which will be held here in June 2015. "They're trying hard to get everything right. Central Asia is a massive, growing market; we can't ignore it.

"My first experience here was of positive surprise. It's definitely the most advanced of the breakaway Soviet states – there's a growing middle class and a sort of Cannes vibe to Baku itself. They've been good to deal with; we should give them a chance to present themselves."

Many fans bemoan the expansion of the F1 calendar to far-flung locations where there's little motor-racing culture and little atmosphere. Baku feels like it's nearly ready to prove a lot of people wrong. 

WIN A Casio Edifice EQB-500 watch



Casio are official suppliers to the Red Bull Racing team, and produce a range of high-tech watches that are perfect for Formula 1 fans. Their EQB-500 watch features Global Time Sync technology, which links the watch with your smartphone via a downloadable app to automatically adjust to the correct local time. In addition to displaying local time, it can also simultaneously show the time in any one of 300 cities worldwide. Meanwhile, Casio's Tough Solar Technology lets the EQB-500 convert light into power to continuously drive its functions. We're giving away five of these hi-tech watches. For your chance to win, see the panel opposite.

HOW TO WIN

For your chance to win this great prize, visit www.f1racing.co.uk, enter your name and details and answer the following question:

Q: How many Formula 1 grands prix have Red Bull Racing won in total?

a) 40 **b)** 45 **c)** 50

Terms and conditions: 1. To enter, visit www.f1racing.co.uk. 2. Competition closes at 11.59pm on Sunday 22 February 2015. 3. This competition is open to UK residents aged 18 or over. 4. There is no cash alternative. 5. Prizes are non-transferable. 6. Only one entry per person. 7. Winners will be selected at random. 8. The prize is to win one of five Casio EQB-500 watches worth £250 each. 9. For full terms and conditions visit <http://surveys.haymarket.com/s3/Terms-and-Conditions>.



In conversation with

Gene Haas

As if launching an F1 team wasn't tough enough, Gene Haas's new squad will be part-based in the USA

INTERVIEW ANTHONY ROWLINSON **PORTRAIT** CHARLES COATES/LAT

Why are you setting up an F1 team for 2016?

In the United States I have combined my primary business – machine tools – with race cars, and I've used NASCAR to promote my machine tools. A lot of teams use machine tools to produce their car parts, so I see synergy between the two. I'm extending that to F1 in the same way Red Bull promotes energy drinks through their sponsorship.

Is it a good or a bad time for a new team to enter F1, given what's happened with Caterham and Marussia?

It makes me nervous, but if you go back 20 or 30 years there were always issues like rules, cars, horsepower, aerodynamics. It's a fast-evolving sport, but it's been like this for 30 years, so we are just seeing another variation on that. As much as people say that those teams were weak, they did survive for four years. There have been worse scenarios in the past and F1 has survived and done well.

How will your relationship with Ferrari evolve?

It's a dynamic relationship. When we first started out, Ferrari were mainly just engine and transmission suppliers. But then the FIA came out with the rules package and we found out there were more things we could purchase from them. We're going to take as much as we can because we feel that learning from someone like Ferrari isn't something we could get anywhere else. You can't build in a year what someone has spent 20 years developing.

How much of the car will you be making yourselves?

Initially we will be responsible for CFD and design work, but we'll use sub-contractors to build the first chassis. We've got facilities at the factory in Kannapolis, North Carolina, to manufacture parts, but, at the moment, we will just make scale model parts for the windtunnel. Once we know what we're doing, we'll start doing more of the engineering in Kannapolis.

What are your aims?

First year, just no DNFs – or a minimal number of DNFs. Showing up at the race track prepared, going to the first test session prepared. Having the car before we go to the test sessions, so we can understand how the parts fit together, and so when we go to the first test we roll off the transporter ready to go. The first year, basically, is going to be learning the logistics, going to the races, getting people to the races, making sure the people are properly trained, that parts don't fall off and that we can finish.

FACTFILE

Date of birth 12 November 1952

Place of birth Youngstown, Ohio, USA

Team Haas F1

Role Team owner

2014 Establishes Haas F1 Team, with plan to enter F1 for 2016 season

2008 Hands half-share in NASCAR team to driver Tony Stewart. Stewart-Haas Racing wins two Sprint Cup titles, in 2011 (with Tony Stewart) and 2014 (with Kevin Harvick)

2002 Founds Haas CNC Racing team to race in NASCAR Sprint Cup

1983 Founds Haas Automation machine tool building firm

Is it correct that you'll also have a European operations base for the season?

We'll have a small operation in the UK for logistics, with transporters, cars and personnel there, but the main intellectual part of it will be in Kannapolis.

Would you like to have an American driver in your team?

Having an American driver would be great for F1. It would raise awareness of the sport here in the States. If that were possible, that's what we would do. We want to have some current drivers that are familiar with the turbocharged ERS package because there is a learning curve there. That is probably our primary focus, to get experienced drivers to sit in the car and help us sort it out. Later it might be possible to bring up an American development driver.

The Circuit of The Americas has been a big hit. Do you think F1 finally has a launch pad in the States?


Absolutely. I'm convinced F1 could be a real big hit with American fans. Americans like racing cars and car culture, we've got millions of cars. Basically in the States, racing has come down to two main menus: NASCAR and IndyCar and then a lot of regional things like drag racing, but I think Americans would

like to have more racing. F1 is interesting because it's a different flavour, it's more international, the cars are not stock cars but exotic, magical aeroplane cars that stick to the road. Americans are fascinated by this kind of technology, it just needs to be presented in a format they'll watch.

Has running a successful NASCAR team (Stewart-Haas Racing, which won the 2014 Sprint Cup title with Kevin Harvick), helped you step up into F1?

Yes – racing is racing, and you have to understand how that whole sport works. Sometimes business people will try to start an F1 team. They don't understand the intricacies, they get lost and listen to other people and end up spending a fortune and it accomplishes nothing.

You're about a year away from being ready to go. Is this an exciting time?

I think it's going to be the best year ever, because we're going to learn how to build a car and that's going to be the fun part, really starting to understand aero. Aero in Sprint Cup cars is very important, but aero in F1 is the lifeblood. These cars are so fascinating: you take the covers off and look inside and they're not like anything I've ever seen before. Seeing how the parts are fitted, how they work together, and how they keep track of stuff – it's all new to me and I find that fascinating. 



RED BULL BEFORE THE BIG TIME

As the four-time champions celebrate their tenth year in F1, former Red Bull racer **David Coulthard** remembers driving for them back in the early days





In the middle of 2003 I knew that I wouldn't be staying at McLaren beyond 2004, so I started having conversations with Jaguar Racing about my future in Formula 1. During the Monaco Grand Prix weekend that year, I remember having a meeting with my manager, Martin Brundle, and Jaguar bosses Dave Pitchforth and Mark Gillan. Red Bull's acquisition of the team came through very late in the day and,

to be honest, I had quite a lot of doubts about the team's new setup.

Martin went to speak with Helmut Marko and it was agreed that I would do a test for the team. At that stage I didn't have a contract, but they were keen for me to sign.

I'll never forget that first test. I was slowly getting ready to get into the car, at which point Mark Gillan came over and was furious that

I wasn't in the cockpit already. He was shouting at me, saying that people's jobs depended on this test. I replied that I didn't need to be here and that, frankly, you never go out first on a test day. The track is so green, it's for someone else to hit that branch that hasn't been cleared up yet. I got out of the car after the installation lap, phoned Martin and said, 'get me out of here'. I didn't want to do the second day. →

"CHRISTIAN HORNER'S MANTRA WAS FIRST TO ESTABLISH CREDIBILITY AND THEN TO CONCENTRATE ON PERFORMANCE"

Then it all changed. Christian Horner came in and he was a breath of fresh air. I also went to see Red Bull owner Dietrich Mateschitz in Salzburg to find out what his investment would be.

During that time, a lot of people were talking about 'the boss' in Austria as if he was some sort of mystical figure. But I didn't have any preconceived ideas: as far as I was concerned, I was just going to visit the owner of a big company who was going to buy a grand prix team. I found him surprisingly down to earth.

I decided to get involved because I believed in Dietrich's commitment. I remember sitting with Martin in my apartment and going through a very simple list of pros and cons of what we knew and what we believed might happen – and in the end we decided to go with it.

I also remember Christian Horner's mantra at the time to the media. It was first to establish credibility and then secondly to concentrate on performance. I think the legacy of Red Bull in the fullness of time will not be solely because they have dominated a period of Formula 1: there is enough depth of talent and experience to be able to handle the lean days too.

Back in 2005 the paddock was a fairly cold and unwelcoming place. What Red Bull did was to open it up and that is one thing they will be remembered for. They have a motorhome dubbed 'The Energy Station' and the policy is

'everyone's welcome'. The team also showed that they didn't take themselves too seriously by producing a fun daily magazine for the paddock, *The Red Bulletin*. They proved they could accept competition in a fierce way on the race track, but there was also a paddock camaraderie.



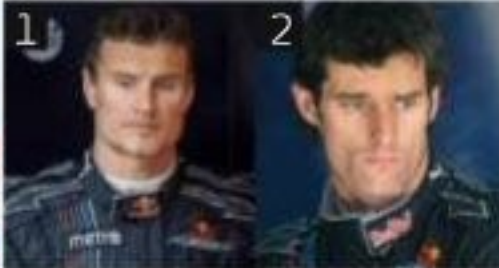


What I enjoyed most about the end of my F1 career was that it wasn't overcomplicated. Okay, there was an element of frustration because the gearboxes kept breaking, the pace wasn't there and we had a Renault engine at a time when Ferrari's was better – as proved by Toro Rosso's 2008 victory at Monza in the talented hands of Sebastian Vettel.

We were also starting to understand how difficult it was to win in Formula 1, because, initially, there was a diluting of resources with Toro Rosso using a Red-Bull-designed car. But in more recent seasons, in the hands of Sebastian Vettel, Mark Webber and Daniel Ricciardo, it has grown to a level that I couldn't have taken it to.

But there was some success in our debut year. I finished fourth in the first race of 2005 in Melbourne. I thought that was okay, as I wasn't expecting fourth place. I'll never forget the hug Christian gave me. He hugged me in a way that could only have come from a man who was having his first race as principal of a team who had managed to score points when they weren't expecting it. →



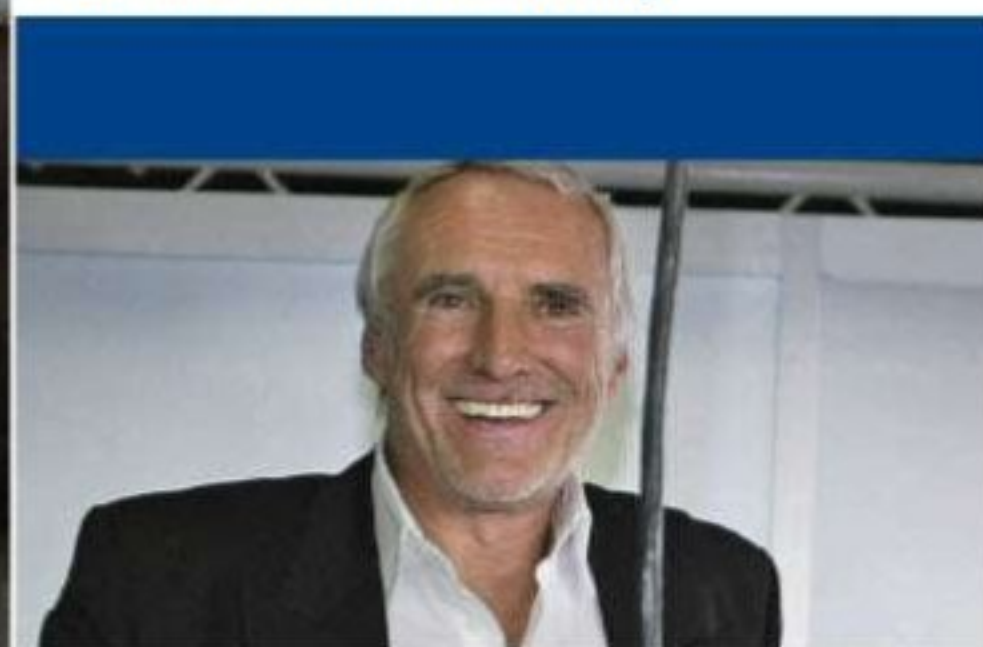
RED BULL'S TEN-YEAR CAMPAIGN IN F1

				
1 David Coulthard 2 Christian Klien 3 Vitantonio Liuzzi	1 David Coulthard 2 Christian Klien 3 Robert Doornbos	1 David Coulthard 2 Mark Webber	1 David Coulthard 2 Mark Webber	1 Sebastian Vettel 2 Mark Webber

STATS	2005	2006	2007	2008	2009
Championship position	7	7	5	7	2
Points	34	16	24	29	153.5
Wins	0	0	0	0	6
Other podium finishes	0	1	1	1	10
Poles	0	0	0	0	5
Fastest laps	0	0	0	0	6



The key people who built up Red Bull Racing. From top: team owner Dietrich Mateschitz; team principal Christian Horner; and chief technical officer Adrian Newey



1 Sebastian Vettel
2 Mark Webber



1 Sebastian Vettel
2 Mark Webber



1 Sebastian Vettel
2 Mark Webber



1 Sebastian Vettel
2 Mark Webber



1 Sebastian Vettel
2 Daniel Ricciardo



1 Daniel Ricciardo
2 Daniil Kvyat

2010
1
498
9
11
15
6

2011
1
650
12
15
18
10

2012
1
460
7
7
8
7

2013
1
596
13
11
11
12

2014
2
405
3
9
0
3

2015



PHOTOS: GLENN DUNBAR/LAT; STEVEN TEE/LAT;
CHARLES COATES/LAT; ANDY HONE/LAT; LAT ARCHIVE



HOW JAGUAR RACING ALMOST BECAME FORD TEAM CHINA

Mark Gallagher, Jaguar's head of sponsorship, was tasked with finding a buyer...

"In the summer of 2004, Ford gave senior managers at Jaguar Racing three months to find a buyer, otherwise they were going to close down the team. Former team principal Tony Purnell spoke to driver Christian Klien's sponsor Red Bull, while I was despatched to China and spent two months living in the Intercontinental Hotel in Shanghai.

"I was working on selling the team to a group of Chinese individuals with whom Ford had a good relationship. The working title of the project was 'Ford Team China' and somewhere in Shanghai there is still a 40 per cent scale F1 car branded in Ford Team China colours. That project was never going to succeed because Ford and China didn't have the hunger to get behind it. But then the deal was concluded with Red Bull.

"We employed 600 full-time staff and it would have cost Ford £15million to make everyone redundant. We sold it to Dietrich Mateschitz for a pound. There was a great deal of scepticism at Milton Keynes, because they wondered how an energy-drink firm could succeed where the might of Ford hadn't.

"Shortly after the deal was done, Mateschitz flew over to Milton Keynes to address us. He stood up in front of the 600 people and outlined why he had bought the team and his vision for it, explaining that this was the realisation of his lifetime's ambition.

"He said we were here to win and reiterated that he had made a success out of everything he had been involved in before, adding that it would be a lot of fun getting there. Everything that Red Bull did in F1 was borne out by that first speech – and he ticked every box of what he wanted to achieve in F1."



The future: Daniel Ricciardo, interviewed by Coulthard (top) and with his team (above) after his win at Spa

That really helped me to adjust my sights, not because my expectation of the team at that time was of victories, but previously a good day was winning and anything other than that was a bad day. That's what I had been preconditioned to deal with over the past ten seasons. So it made me realise that I could enjoy a small success.

As Red Bull began to improve in the sport, I don't think there was a conscious decision to say 'let's not have fun now', but it's a natural process. When you have a lot to lose, that focuses minds. As the car got better and better, the expectation changed, too: this could be a winning car. Then comes the expectation this could be a *championship*-winning car, and then comes the expectation of winning multiple championships. It just keeps changing.

So not having the 'Formula Una' girls and the parties isn't because they can't, it's because that's not the focus now. At the start it was get noticed, get established, get credibility and show off the Red Bull way. Then it was recruitment. Who do we need? How do we get them? It's all a process. It's not by accident... it has been well managed.

Success is about having the right people in the right roles and you need them to be motivated and empowered. There is a natural period in life where the honeymoon period passes and then you get on with the business of being married. It doesn't mean that it's not a long-lasting

marriage, but you can't replicate all the nervous energy and excitement of the early days. Nobody can. But with good management you can keep moving people forwards, empowering them, and giving them responsibilities that allow them lots of personal challenges – because in this business, people like to be challenged.

Irrespective of whether you know him or like him, the way Christian has managed the team – when he was recruited, he was the youngest team principal ever – and the way he has kept them together for so long is down to his management skills. He has a firm way of working – few other people can be more aggressive in the way they say, "Let me tell you everything I know and then reiterate what you don't know."

What Red Bull have gone on to achieve in the sport has been incredible, and along the way they have carried out some brilliant publicity stunts around the world, too – some of which I've been lucky enough to be a part of. To have 100,000 people turn out on the main avenue in a city in Argentina, or to drive an F1 car through the Lincoln Tunnel in New York at 190mph, or to teach Tom Cruise how to drive an F1 car... well, Formula 1 has been very good to me. That's why I am here to promote it, to say thank you and to leave it in good hands for the next young drivers who will hopefully get their chance. **F1**

David Coulthard was talking to James Roberts

PHOTOS: JED LEICESTER/LAT, LAT ARCHIVE



Ever thought about the morning after?

If you drank 4 pints between 9pm and midnight, you could still be over the limit until 11am the following day*. That's why almost 1 in 5 drink drive accidents happen the "morning after"**.

AlcoSense quickly and accurately shows your alcohol level, so you know when you're clear. Keep you and your loved ones safe this season, order yours today.

AlcoSense Single Use Only £2.99

Single use, disposable breathalyser
Works with all UK limits including the new Scottish limit
Results in 2 minutes
Blow bag for greater accuracy



AlcoSense Lite Only £39.99

Reliable
Intermediate level sensor for good accuracy, blow tubes for improved sample quality.
Clear
Results in seconds. Alerts you when close to or over the drink drive limit.

WHATCAR?

BEST BREATHALYSER UNDER £40



AlcoSense Elite Only £59.99

Accurate
Premium semi-conductor sensor for high accuracy, blow tubes improve sample quality.
Consistent
Blow Pressure Sensor and self cleaning increases accuracy and consistency.
Clear & Future Proof
Results in seconds. Alerts you when you when close to or over the limit. Recalibratable for many years of use.

WHATCAR?

BEST BREATHALYSER UNDER £100

Available nationwide at Halfords & in selected Boots Stores.
Find your local outlet at alcosense.co.uk/dealer-location/



that's helpful that's
halfords

alcoSense
ALCOHOL BREATHALYSER

Order at www.alcosense.co.uk or call 0800 195 0088

** 17.1% of drink drive accidents are between hours of 5am and 1pm (Source: Dept. for Transport, Road Accidents and Safety Annual Report 2010)

* 4 Pints of Abbot Reserve contain 14.8 units of alcohol (Source: Greene King) and each unit takes 1 hour to leave the body (Source: NHS). Therefore 14.8 hours after 9pm the alcohol will have passed from the body.



TACK OF THE CYBERMEN

Whether the agenda is mischief or espionage, Formula 1 teams are coming under repeated attack from outsiders determined to steal or disrupt their precious data. F1 Racing investigates

Words Stuart Codling

Formula 1 represents the cutting edge of automotive technology. So it's ironic, perhaps, that its last high-profile espionage case was so old-fashioned: in 2007 a sheaf of blueprints made its way from Ferrari to a senior McLaren

designer in hard copy form via a clandestine meeting in a restaurant. So far so John le Carré. The deception was only discovered when the designer's wife handed the documents in to a high street copy shop to be duplicated.



Reboot **Formula 1 represents** the cutting edge of automotive technology. So it's ironic, perhaps, that its last high-profile espionage case was so old-fashioned: in 2007, a sheaf of blueprints made its way from Ferrari to a senior McLaren designer in hard-copy form via a clandestine meeting in a restaurant. So far so John le Carré. The deception was only discovered when the designer's wife handed the documents in to a high-street copy shop to be duplicated. →

be done. It was proof of concept – ‘Here, I can break in to this system and this is how I did it.’ Now it’s a big business for criminals, because they can use a virus to steal data or, in a more creative way, to sabotage and blackmail. It’s a technological war – us against them.

both in the factory and out in the field. On track, the sensors on the cars generate 25MB per lap – data that is transmitted in a stream to the garage and pitwall, and back to the factory, creating two significant opportunities for interception.

PHOTO: KASPERSKY LAB

A third – albeit related – threat comes from a source that arrives with no specific theft agenda: ‘worms’ and other malicious software programs that are out there replicating themselves and spreading via connected devices or accidental downloads. The most famous of these is Stuxnet, a virus widely reported to have been created by Mossad to disrupt Iran’s nuclear enrichment programme, and which self-replicates so effectively that it now inhabits systems all over the world. Stuxnet spreads via computers running Microsoft Windows and targets a particular type of Siemens software used to manage industrial processes, which it disrupts while sending normal feedback to the operators.

“As well as securing the critical infrastructure, a challenge for us was to combine all the devices into one perimeter that was fully controlled without any impact on performance or the speed of data transfer,” says Moiseev. “You cannot have all the doors closed all the time. People have to knock and come in – it’s the way we work together today, we have to be connected.”

“Attacks have become more innovative and sophisticated to compromise our computers”

giveaways, such as regularly communicating with remote servers and making changes to the host computer's setup. Once Kaspersky's lab has classified the malware it can update its subscribers immediately.

But where there's a door there's always a vulnerability, especially given our reliance on technology as a labour-saving aid. In the 1990s, word went around that the central locking system of a particular car could be defeated by placing half a tennis ball over the keyhole and striking it. In-car systems based on off-the-shelf architecture have created new vulnerabilities.

In F1, data transmission from pit to car is banned, but the car still receives signals from outside – such as those that activate track signal information display. With yellow-flag speed limits on the table after Jules Bianchi's accident – limits that will be administered by the car's ECU – are we creating a new potential 'hack'? 

June 13/14	LE MANS 24 HOURS Self-Drive Packages with Hotel or Camping Coach Tours & Paris Stop-Overs	Indianapolis - 24 May	INDY 500 "The Greatest Race in the World" 4 Nights in Indianapolis		
Melbourne - 15 March	AUSTRALIAN GRAND PRIX 5 Nights Melbourne Melbourne & Sydney 2 Centre Holiday	Montreal - 7 June	CANADIAN GRAND PRIX 4 Nights in Montreal Niagara Falls Extension		
Sepang - 29 March	MALAYSIAN GRAND PRIX 5 Nights in Kuala Lumpur Penang & KL 2 Centre Holiday				
Sakhir - 19 April	BAHRAIN GRAND PRIX Direct Flights 5 Nights in Manama				
Barcelona - 10 May	SPANISH GRAND PRIX Selection of Weekend & Longer Tours by Air				
Monte Carlo - 24 May	MONACO GRAND PRIX Full Programme of Arrangements including Flights & Hotels				
		Spielberg - 21 June	AUSTRIAN GRAND PRIX Weekend in Graz Vienna & Graz 2 Centre Holiday		
				Silverstone - 5 July	BRITISH GRAND PRIX Tickets, Hospitality & Hotels
				Spa - 23 August	BELGIAN GRAND PRIX Selection of Tours by Coach, Air or Eurostar Self Drive Packages
				Monza - 6 September	ITALIAN GRAND PRIX Weekends & Longer Tours Based in Como
				Austin - 25 October	UNITED STATES GRAND PRIX Texas Hosts F1's Instant Classic
				Mexico City - 1 November	MEXICAN GRAND PRIX 5 Nights in Mexico City F1 Returns to the Autodromo Hermanos Rodriguez

www.motorracinginternational.uk.com

The 23rd edition of the MRI Tour Collection is now available. Visit our website for full details. As ever, we will be featuring the F1 World Championship the Indy 500 and the Le Mans 24 Hour Race. A small selection of our vast choice of travel arrangements is outlined above.

Put your trust in the UK's only fully bonded, independent motorsport travel specialist.



Apply NOW for your FREE brochure. Ring our 24 hour dial-a-brochure service quoting reference: F1
01304 612424 info@motorracinginternational.uk.com





THE RETURN OF THE **TURBO**



To many, turbocharged F1 engines conjure images of outrageous 1980s excess. But the new-for-2014 units are an altogether more sophisticated breed

WORDS MATT YOUSON

Four years ago, just after Sebastian Vettel won his first title, F1 announced that engine regulations were changing – not with a tweak, but with a wholesale trashing of the established order. There was talk of direct injection and bigger, better KERS. But what stood out was a blast from F1's past. F1 was going turbo.

The deadline slipped back a year and the engine sprouted two extra cylinders, but the new power units finally arrived for 2014. New words and phrases entered paddock parlance: energy store, power electronics, MGUs H and K. Oddly, there's been little discussion of the turbo. It has

slipped out of public perception – never an allegation levelled at its 1980s predecessor.

"If they had the turbo car with the blown exhaust, nothing would have changed," reflects Lotus's Romain Grosjean. "You don't really feel it's a turbo car unless, when you make your start, you hear the turbo going up in rpm. The torque delivery is nice – but there are no real changes."

Red Bull driver Daniel Ricciardo adds: "The way the power comes in is different to 2013. Obviously the car has lost downforce, but the biggest difference is what it does on the throttle. It's got more torque and you're able to have wheelspin later on. With the V8s it was power from the get-go. You could have wheelspin very early in the corner, whereas it seems you can



So much work has gone into boost control and fuel system management, that lag is not a problem in modern turbo-powered F1 cars



have wheelspin with the turbo halfway through fourth gear and longer through the gear ratios.

“Whether that’s the turbo engine or ERS, I have no idea. It’s a bit confusing – I just drive it!”

That last comment alone is enough to delineate the respective eras: no driver from the 1980s ever expressed doubt about what their turbo was – or was not – doing. Turbochargers dominated the landscape. They were all-consuming monsters supplying brutal amounts of barely controllable power that pushed drivers and cars to their limits. The memory of that turbo era is what fired enthusiasm for the sequel.

“You got put into this missile that had 1,350bhp, and you just couldn’t change gear fast enough,” recalls Derek Warwick of his

adventures with a BMW qualifying-spec M12 turbo engine in the back of his 1986 Brabham BT55. “Anything you’d learnt in practice, you threw out the window. It wasn’t about handling, it was about power. I recall watching Riccardo Patrese, my team-mate, with clouds of black soot coming out of the back of his car because we were feeding so much fuel into the turbo.”

The modern turbo exists on a diet rather more Spartan than that of its red-meat predecessor. These powerplants don’t have the pop-off valves of yore – they’re constrained by the 100kg maximum race fuel limit and, more pertinently, the 100kg/h maximum fuel-flow rate. The target of the modern turbo is to improve efficiency rather than increase power. “We’ll never run

at 5bar because, at 12,000rpm, it’s going to bring far too much air into the engine for the maximum fuel flow,” explains Renault Sport F1’s head of track operations, Rémi Taffin.

The other big difference between then and now is the issue of lag – the modern cars have the MGU-H device to sidestep the issue by spinning up the turbocharger on demand.

“The turbine wheel has been designed to be exceptionally efficient at recovering energy out of the exhaust stream, whereas previously it was just spinning up the compressor,” says Andy Cowell, managing director of Mercedes AMG High Performance Powertrains. “Today we’re driving the compressor but we’re also driving the MGU-H and the more energy there is from the



The qualifying BMW engine of Derek Warwick's Brabham blows due to an excess of power before the 1986 Australian Grand Prix



With the single-turbo BMW, we had 1,350bhp for qualifying, one-lap qualifying tyres and an engine that was good for maybe 24 miles... You had masses of power. After qualifying, you'd throw the engine in the bin"

Derek Warwick,
Former F1 driver

turbine to drive that, the better your electrical compound load is, and therefore the better the total thermal efficiency of the power unit is and the faster your race car will be. There's a huge amount of effort in the efficiency of that wheel and not so much effort gone into the inertia of the assembly. Large inertia turbo assemblies mean high lag, but we've got an electric machine and that just means speed control is not a problem with F1 turbochargers today."

This makes Warwick laugh. "When modern drivers discuss their cars, it's amazing how much the technology has advanced – they don't talk about throttle-lag. We used to define lag with the minute hand, not with the second hand. They were all-or-nothing, no progression whatsoever.

There were tracks where you'd have to be flat on the throttle as you turned into a chicane. You'd go right, then a bit left and – *bang!* – the power would kick in. It was horrendous. You could judge it, but with one foot on the clutch pedal and the other on the brake you couldn't get back on the throttle until your braking was completed. It would have been dead easy with three feet..."

Over the course of eight seasons, Warwick's turbo education took him from the Toleman-Hart I4 turbo to the Renault V6 twin turbo and, finally, the daddy of them all, the BMW M12/13 in both its factory and Megatron spec. All turbos, he says, were not the same.

"With Brian Hart, we had one great massive Garrett turbo stuck almost on the gearbox.

Renault had more money: it was almost a pleasure to drive. We had good horsepower and qualifying engines – but it wasn't until 1986, that I really experienced the power of the turbocharger, driving the four-cylinder single turbo BMW," he says. "We had 1,350hp for qualifying, one-lap qualifying tyres and an engine that was good for maybe 24 miles. BMW would strip off the wastegate and replace it with a blanking plate. You had masses of power. After qualifying, you'd throw the engine in the bin."

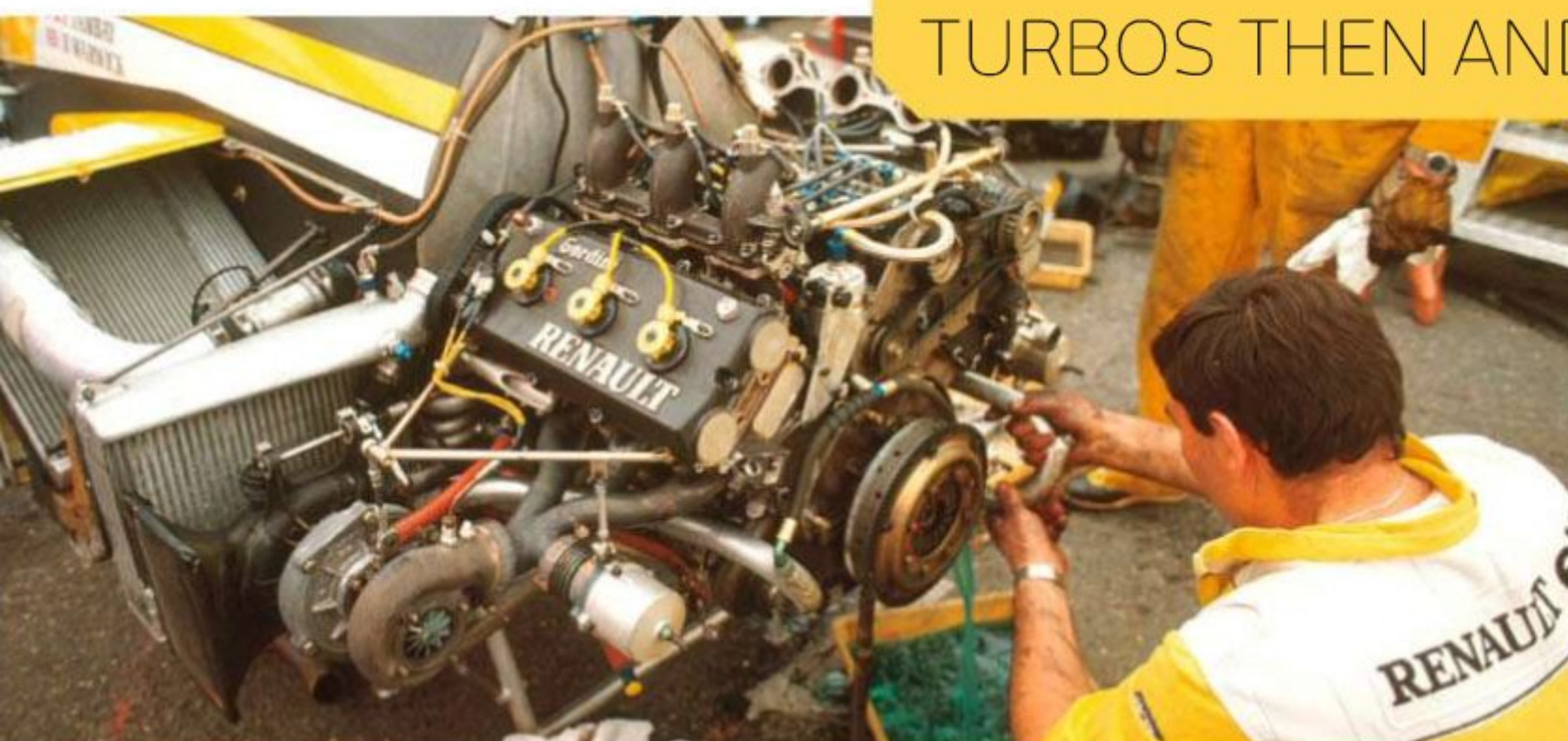
"It was a trial and error," recalls Jean-Pierre Menrath, Renault Sport F1 director of testing and development, formerly a member of the Renault trackside team in the pioneering days of turbo. "For a normally aspirated engine, the lines and pipes must be neat, the flow of liquids must be optimum. With a turbo, it just has to work!"

"You have to bear in mind that we went from 520-530bhp in 1979 to more than 1,000bhp in the space of five years. At the end of 1986, we even had a test engine that was capable of developing up to 1,200bhp thanks to the use of new turbochargers, with a new design. They produced exceptional performances – unfortunately, the engine lasted only three laps."

While modern F1 takes a regular kicking for its extravagances, it's worth noting the above. Overspending is nothing new; indeed, part of F1's allure has always been an obstinate insistence on technological excess. The throwaway attitude of the turbo era is a prime example. In contrast, the focus now is on extending engine life and squeezing development.

Those qualifying-spec turbos required an exclusive set of skills from the drivers. Having practised in race spec they would, in effect, go into qualifying cold, learning new braking points, coping with new gear ratios and handling characteristics on the fly. It was a ferociously physical experience. →

TURBOS THEN AND NOW



"They were tough cars to drive, *very* physical," recalls Warwick. "You had the downforce and needed to make a lot of gear changes, but it was really tough because the power you had in the car was enormous. I liked that aspect of it – but I was always one of the stronger guys out there."

"I remember qualifying at Monza. It was just phenomenal. We had a seven-speed gearbox. We went up 1,500 revs on every gear ratio and we still ran out of revs at the end of the pitlane. I remember doing that qualifying lap with the most silly grin on my face the whole time."

"The difference between the cars I drove and the cars of today is that physical aspect: the steering was more physical because you were driving one-handed and using the gearshift all the time. There was much more downforce than they have today. I'm not saying driving the modern cars isn't difficult but it is different. Modern drivers would have coped because great drivers are great drivers in any era and they adapt – though I don't know that a Max Verstappen-type driver would have jumped into our cars and gone quick straight away."

While the new turbos are much more drivable than the '80 turbos, opinion is divided as to whether they're as drivable as the normally aspirated V8 engines used from 2006 to 2013. Unsurprisingly, given their success, Mercedes are convinced there is an improvement.

"Our job as a group of engineers is to deliver torque to the rear wheels precisely and in a timely manner," says Cowell. "The electrical machine that recovers energy also enables us to control the speed of that assembly and thus control the boost pressure. Before the start of 2014, there were all those fears of turbo lag and 'what's it going to be like to drive?' but the drivability is better than the aspirated engine because we've put a lot of effort into boost

Renault EF4B (1984)	vs	Renault Energy F1-2104
1.5 litres	Displacement	1,600cc
6	Number of cylinders	6
4 per cylinder	Number of valves	4 per cylinder
86mm / 42.8mm	Bore/Stroke	80mm / 53mm
Twin mechanical Garrett turbos	Number of turbos	Single centre mounted Renault turbo with MGU H to control turbo speed
3.8bar	Maximum boost	Unlimited boost pressure – approx max 3.5bar due to fuel flow limit
180kg	Weight	145kg for complete power unit including ICE, MGU H, MGU KPE and TC (excludes energy store)
V	Type	V
90°	Angle	90°
750bhp / 560kW @ 11,000 rpm	Power	805bhp / 600kW (ICE + K) @ 15,000rpm
11,500rpm	Max engine speed	limited to 15,000rpm
480Nm @ 8,500rpm	Torque	450Nm
Max 220 litres	Race fuel	Max 100kg
Unregulated	Fuel flow	100kg/hr
Indirect	Fuel injection	Direct

control, into fuel system management and therefore the creation of torque on demand."

Taffin, in contrast, is not so convinced by the current performance of the Renault powerplant. "We haven't yet reached the level of drivability we had before. It's a newer engine and it's more complex. It wasn't easy before, but we worked for 25 years on the atmospheric engine, so were more on the case. I don't think there is a long way to go because drivers aren't complaining about lag. It's more the consistency of the torque delivery and the different ways of producing that torque that we continue to work on."

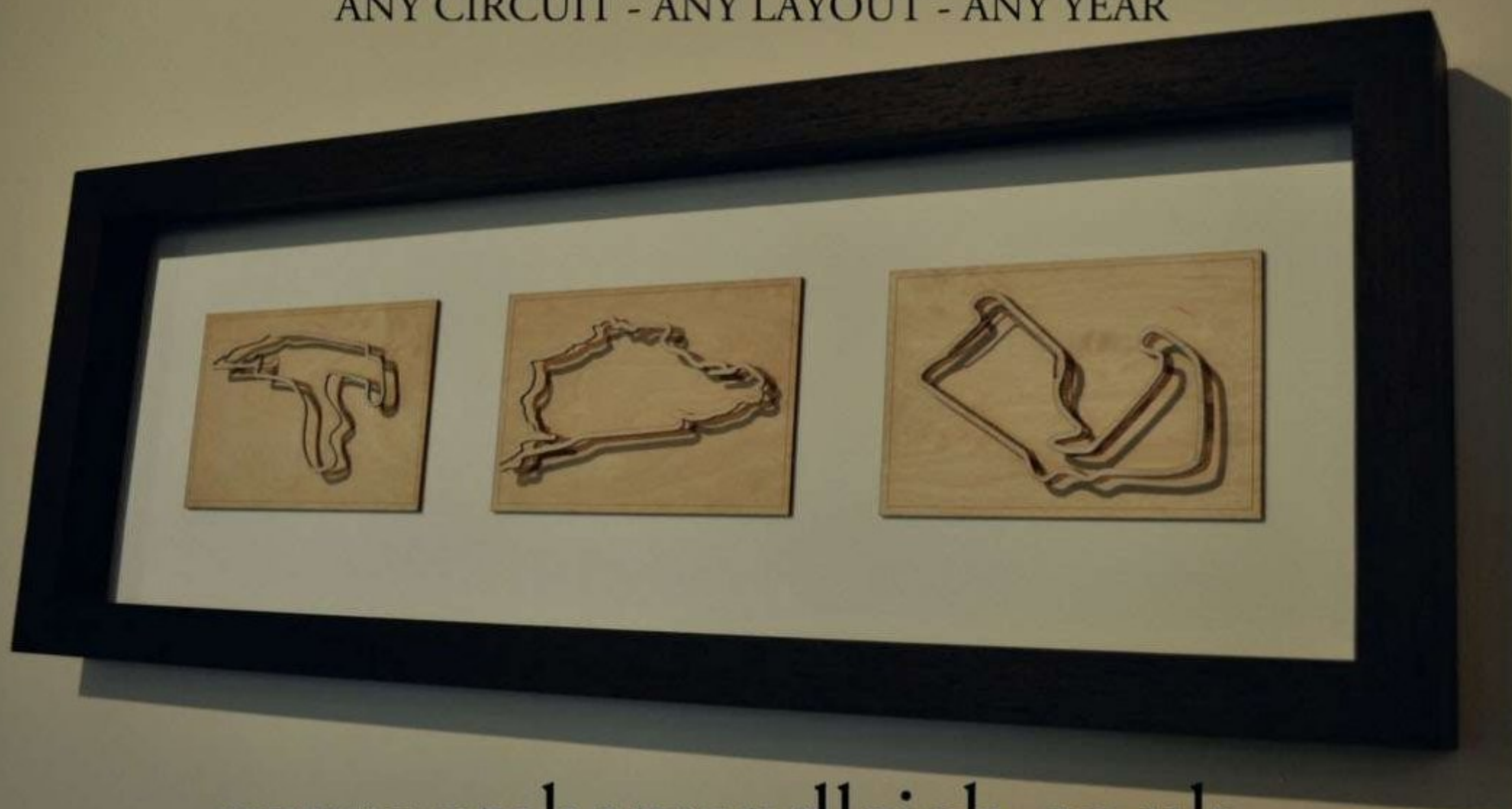
It's a question of degree, quite different to the brutality of the 1980s equivalent. Warwick preferred the normally aspirated cars he drove

once turbos were phased out. "To be honest, I wasn't disappointed to see the back of them. After Arrows with the Megatron we had the lovely little Arrows V8. It was predictable and a pleasure to drive. All of a sudden you knew when you pressed the throttle, you had the punch."

For the modern driver, old-school turbos are the stuff of legend, at best experienced by trying a restored classic. "I haven't driven a turbo race car," confesses Ricciardo. "The nearest I got is a Ferrari F40 and when I drove it, the amount of lag was the sort of thing you remember reading about as a kid: it winds up and up and then it kicks in. What we have is much more progressive – but I'd love to try an '80s F1 turbo. Although I'd bring a few spare pairs of underwear..." **F1**

Graham & Leigh

ANY CIRCUIT - ANY LAYOUT - ANY YEAR



www.grahamandleigh.co.uk



Racing Car Simulator Hire / Sales

Corporate Events | Product Launches | Trade Shows | Team Building | Driver Training | and more



Start your engines!

Radical Simulation literally puts you, your employees, colleagues and clients in the driving seat for the most exhilarating and enjoyable car racing simulation you'll ever experience.

Bringing the action to you!



www.radicalsimulation.com

Email: info@radicalsimulation.com

Phone: +44 (0)7891 235475

"There's not a day I don't rue the fact I never won a race. But you could win the title and it would depend how you did it. Questionable tactics leave a scar in your mind. That must grind on you every day. I don't have that."

In an eight-year F1 career taking in 79 starts and stints at Ferrari and McLaren, **Stefan Johansson** never won a GP. But he came away with his integrity intact

PORTRAITS GLENN DUNBAR/LAT

Stefan Johansson lived on London's Fulham Road for several years and yet he'd never set foot inside the magnificent Michelin House across the road. It's a strange omission – one that *F1 Racing* is happy to put right with lunch in the building's excellent Bibendum restaurant – because the Art Nouveau style appeals to a former racing driver with a taste for classical architecture, fine art and the business of manufacturing his own wrist watches.

Time has never stood still for this cheerful Swede who struck the perfect balance between driving quickly and enjoying life in and out of the cockpit. It's one of the travesties of the sport that he never managed to win a grand prix in 11 years. But you don't get to drive for McLaren and Ferrari if you are short on talent. These days, Johansson puts experience gained across a broad motor-racing spectrum to good use when managing drivers, competing in a fierce commercial market in top-of-the-range watches and racing sportscars whenever he gets the chance. He turned 58 in September. You'd never know it to see him; only his wonderful stock of racing stories gives the game away.



Maurice Hamilton: I was thinking as we came in that you used to live in this area.

Stefan Johansson: Right across the road. I had a two-bedroom apartment on the fifth floor. Jacqueline Bisset was my upstairs neighbour back in the days when she was a famous movie star. She was going out with some Russian ballet dancer and the fights they used to have were absolutely legendary in this neighbourhood.

MH: You must have been doing well because this is a very smart area.

SJ: We're talking 1984 and, back then, this area was crap! There was absolutely nothing here, but then Conran moved in, followed by other

high-end stores, and the place just took off. Chanel, which you can see over there, used to be a raggedy old carpet store.

MH: My first memory of you was driving like a crazy man at Monaco in 1977. Everyone was talking about this kid with the black helmet in the Argo F3 car. You were sideways everywhere.

SJ: Yeah, I finished fourth and got banned.

MH: What, from Monaco? I mean, you weren't dangerous – just very spectacular.

SJ: I'd qualified really well and everyone was tripping over themselves trying to get by. There's me, fresh from Sweden with no experience whatsoever; my first time in Monaco. I got a letter from the Automobile Club saying I was not welcome back. I can't remember what happened afterwards, but it was sorted out pretty quickly.

MH: It was a private entry, if I remember rightly; you were very much on your own.

SJ: It was crazy. I left Sweden in my Mercedes van, which everybody had in those days, to drive down there. I'd been working night and day the whole week to get the car ready. I had to leave for Monaco on my own because my dad – who helped out at the races – and my mechanic had to work at their day jobs. →



I was so tired, I could barely keep my eyes open. Driving through Denmark, I was literally fighting to get to the port. I could see the ferry about a mile down the road and I guess I must have relaxed because I fell asleep. Luckily, I didn't hit anything. I got on the ferry thinking there was no way I was going to be able to drive the two days or whatever to get to France.

About an hour into Germany, there's this guy hitchhiking at the side of the road. I said: "Do you know how to drive these things?" "Yeah, mate. No worries." Turns out he's a Kiwi and a racing fan who wants to get to Monaco. So he jumped in and started driving. I got in the back and slept for about five or six hours. His name was John Goodwin, a really good guy, and he ended up being my mechanic for the whole year.

MH: I also remember the final of the UK F3 championship in '79 because, being from Northern Ireland, I was supporting Kenny Acheson. He'd led the championship all year and you were suddenly on a roll and nicked it from him in the last race at Thruxton.

SJ: I remember it well. We switched from a March with four races to go and Ralt were way superior. But I had to win every race and get fastest lap to win it by one point. That's exactly what happened.

MH: It's an interesting example of how you can dominate all year, lose by one point and yet still be a good driver, even if people overlook you for not winning the title.

SJ: Exactly. Kenny was fantastic but, on the day, the circumstances weren't right. You get to a certain level and there's so little between everybody that it comes down to nuances. It's particularly evident in F1 today, because of how the cars are. Certain cars suit certain driving styles. Fernando Alonso, for example, is able to adapt. But Sebastian Vettel and Kimi Räikkönen had a real hard time in 2014. It's about feel; that last little thing to give the confidence on entry to corners. That leads to overdriving and then you go even slower. It's a fine balance.

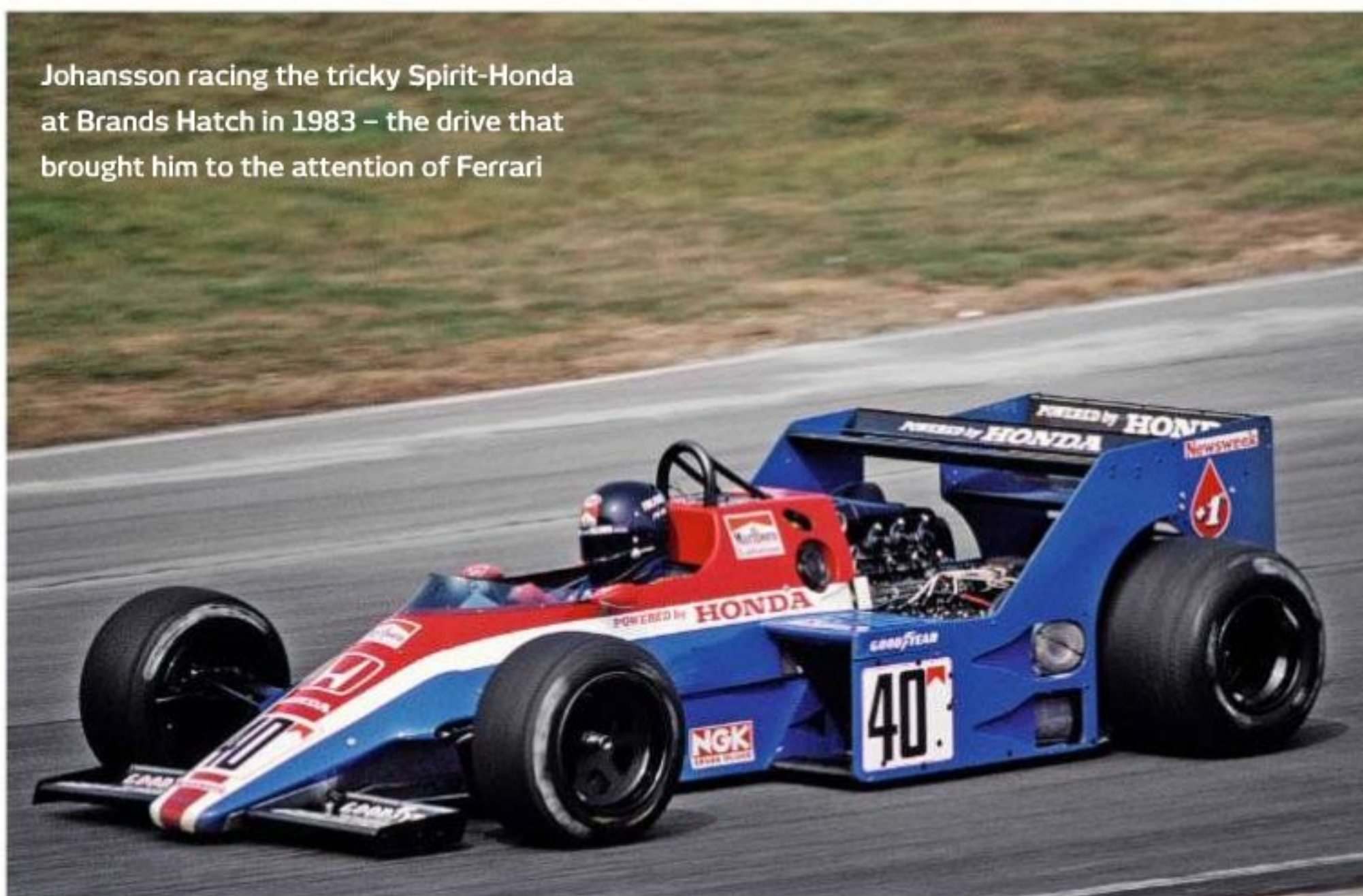
MH: I hear what you say but, going back to Kenny, would you say he was too nice a guy?

SJ: Yeah – but I've accused myself of that, too. I think I was too nice because, to be world champion, you have to be a bit of a bastard.

MH: Saying that, do you think perhaps Ayrton Senna went too far the other way in his completely single-minded approach?

SJ: I do, insofar as he was obsessed with Alain Prost. I wonder what would happen today if a

Johansson racing the tricky Spirit-Honda at Brands Hatch in 1983 – the drive that brought him to the attention of Ferrari



"It was freezing cold, but the Spirit was blistering the hardest tyre. We had more grip than we could ask for"

driver suddenly took it upon himself to be judge and jury and take another driver off with the whole field behind him [as famously happened between Prost and Senna at the 1990 Japanese GP]. They'd ban you for life – and rightly so. Can you imagine if Prost's rear wing had landed on the track? It would have hit somebody, caused a chain reaction and taken the whole field out as they went into the corner, flat in fifth. And they did nothing about it. I'm often asked who's the best driver. For that reason, Senna's not even in my top five. He's probably the fastest. But you can never consider him the best.

MH: Okay, you're not single-minded to that extent. Perhaps I should say you're more of an opportunist, always looking for the deal. Your attitude would appear to be: it ain't gonna come to you, you've got to get out there.

SJ: Definitely. Whatever you're talking about in life, you've got to work for it. If you sit and wait, it'll be a long wait.

MH: Saying that, was jumping into the Shadow for your F1 debut in 1979 perhaps a step too far? Talk about getting thrown in the deep end.

SJ: There I was in Argentina, I'd never tested the car and the seat was being made in the pitlane. F3 was the fastest series I'd ever driven before first practice. All my heroes were there: Jonesy [Alan Jones], Carlos Reutemann, Mario Andretti; every one of them. I spent more time looking in the mirrors than I did at the road. The car was a handful: it was an education, for sure.

MH: After that, I take it the deal with Ron Dennis for F3 in 1979 made a lot more sense?

SJ: Absolutely. I'd been talking to Ron over the winter. It was an easy decision to make.

MH: As, I'm sure, was being asked to drive for Spirit-Honda in F1 in 1983. This was Honda using a small team to dip their toe in F1 water.

SJ: It was. The first race was the Race of Champions at Brands Hatch. We were quick all weekend and then the engine blew up after about three laps. No one could get heat into the tyres – it was freezing cold – but the Spirit weighed a ton and was blistering the hardest tyre we had while everyone else was on the softest. We had more grip than we could ask for. It had looked good... and Ferrari took notice. ➔

The one that got away: Johansson finished sixth for Ferrari at Imola in 1985, having lost the lead when he ran out of fuel with less than three laps to go



MH: We'll come back to Ferrari. Before that, you and Spirit were left in the lurch for 1984 when Honda went off to Williams. How did you cope?

SJ: I drove anything I could get my hands on, which is the advice I still give to every driver I work with. You learn something every time you sit in a car. More than anything, you learn racecraft. I think that's lacking with the young kids today because they don't get enough driving. They're in formulae where there's no real hard racing. I did F2 in Japan, I did Group C with Joest, touring cars – whatever.

MH: I take it you wouldn't necessarily agree with a 17-year-old going straight into F1?

SJ: I really don't know what to say because it's connected with how the whole of F1 has changed. The cars are so... weird, if that's the right word. I don't think they're challenging enough. A proper race car should be a beast to drive. These guys arrive in Abu Dhabi for their first test and

wrong. A re-routed flight, engine problems... we landed at Miami and had to drive through the night on Friday, arriving at Sebring at about 9am – and the race started at 11am. I'd never been to the track, never seen this car before, and, once again, I'm having a seat fitting in the pits.

The Colombian guy qualified about 40th out of around 80 cars. He did the first stint and then Hans started motoring, picking up a few places. Then it was my turn – and all I knew of the track was the first left-hander, because I could see it from the pits. That's when I discovered this car was a monster; a beast. It had almost 1,000bhp, no aero, big fat tyres and a flexing chassis. But the worst part is the diff was 100 per cent locked.

At the time, Sebring was an incredibly wide airfield track with no reference points at all. I was trying to follow some of the cars, but I wasn't up to speed. When you lift completely and turn to the right, the car will basically straighten up

MH: And your patience was rewarded when Ken Tyrrell asked you to deputise for Martin Brundle, who had been injured in Dallas. But that was a Cosworth car, right?

SJ: It was the only normally aspirated car in the field, but it was another chance for me to make my mark. Once again, thrown in at the deep end, no testing, straight into the first session at Brands Hatch – and I outqualified Stefan Bellof.

MH: That was quite something because he was recognised as a huge prospect.

SJ: I outraced him too; in fact, I did at every race. That's all you can do, beat your team-mate, who, in this case, was a phenomenal driver. Ken was fantastic to drive for. There was no pressure and he made you feel good. That was important because it builds your confidence. It was such a family team. Nora [Ken's wife] used to make sandwiches in the hotel before we went to the track in the morning. Imagine that now!

"The Old Man asks: 'Are you hungry?'
I say: 'I've never been more hungry in my
life.' Mr Ferrari nods. Marco says: 'You're in'"

they're a couple of tenths off Alonso's or Vettel's qualifying time. That just shouldn't happen.

MH: You mean, referring to the cars, you need to stand at the edge of the track and go: "Wow!"?

SJ: That's what I mean. Like watching Senna qualifying; you've got to take your hat off and say it was just magic to watch. Senna's steering was not pointing straight for one second around Monaco. Now you watch the on-board camera and the car is hardly out of shape. The only thing that seems to happen is they'll lock up and miss the apex if they go a little bit too deep.

MH: Going back to '84, I came across a story about you driving a Porsche 935 at Sebring. Can you repeat it because I couldn't quite believe what I was reading?

SJ: Reinhold Joest called me, last minute, and said he'd got this Colombian driver [Mauricio de Narváez] who was paying a lot of money to do Sebring and would I be part of the team with Hans Heyer? Hans and I were on the same flight leaving Frankfurt on the Monday because practice started on Wednesday with the race on Saturday. Everything that could go wrong did go

because of the locked diff, which feels like you're turning left. I had Minis passing me; I was all over the place; it was an hour of absolute torture.

Hans had to tell me how to drive these things and this track. After five or six laps of the next stint, I was getting the hang of it to the point where I was doing the same lap time as the leaders. Sometimes you get an incredible rhythm and I ended up doing the last four stints. Little by little, I picked them off. With 15 minutes to go, I passed Hans Stuck for the lead, and we won.

Everyone on the team was over the moon. I go from parc fermé to the podium and they say: "Er, who are you?" We hadn't had time to sign in and they didn't have a clue who I was. The other two were on the podium but the officials wouldn't let me join them. I had to fight my way up there!

MH: The line in the story that really struck me was that you'd gone through all this, you'd won the race – and yet all you could think about was the first F1 race of the season which was taking place on the same weekend in Rio.

SJ: It's true. That result mattered and yet it didn't matter because all I wanted was to be in F1.

Johansson in his first race for Ferrari, the 1985 Brazilian Grand Prix in Rio de Janeiro



MH: Then you had that fantastic drive in the Toleman at Monza when Ayrton was benched because of a contractual row. Next thing, in '85, you're at Ferrari. Tell us how that came about.

SJ: That drive in the Spirit at Brands Hatch had put me on their radar. But what really got Ferrari interested was a great result with the Toleman in Portugal. I was dicing with Niki Lauda the whole race, and outqualified Ayrton on the first day.

I had a two-year contract with Toleman but, it's amazing when you think about it now, they couldn't get tyres and couldn't take part in the first race of 1985. So, I'm back in the Tyrrell again, thanks to always being ready. Ken had benched Bellof for some reason and I was in Brazil as a spectator. At something like 8am on the Saturday morning, Ken asked if I had my gear with me. "Of course!" "Right – you're driving!" Next thing, Ferrari and René Arnoux fall out and I get the call.

I met [Ferrari team manager] Marco Piccinini at the Savoy in London and basically agreed all the terms in principle. I called Alex Hawkridge – because I was still contracted to Toleman – and he said: "You've got to take it, I'm not going to hold you back, this is the opportunity of a lifetime." He was very gracious and let me go.

On the Tuesday before the next race in Portugal I'm told I have a secret meeting. I'm picked up at Bologna airport and go not to Maranello but the former Ferrari factory in Modena. It's just an old building with a lot of dust and some old cars. We walk through the corridor. No lights are on, but shafts of afternoon sunlight are coming through the windows. There are pictures of Nuvolari, Ascari, Fangio; all my heroes. I've got goose bumps from walking through there. Then we come to what was the Old Man's office. It's long and narrow and all you can see is this familiar silhouette. It's only Enzo

Ferrari himself! The whole thing is like a Fellini movie: absolutely unbelievable.

Piccinini and Piero Ferrari are also there. Marco is doing the translation and most of the talking. The Old Man asks me one thing: "Are you hungry?" I'm sure what to say. As it happens, I'm absolutely starving after travelling all day, so I think I say: "I've never been more hungry in my life." Mr Ferrari nods. Marco says: "You're in." That was it. We went back to the factory that night and I had to jump in Michele Alboreto's seat and did about ten laps at Fiorano. Then we flew to Portugal and I was straight into first practice as a works Ferrari driver. The whole thing was like a dream.

MH: Did you think: 'finally, after all my hard work, I've arrived'? Or, did you think: 'never mind the sentimental stuff, the pressure is on'?

SJ: I didn't think about the pressure so much then; that came a little later. It's no secret →



that every driver aspires to drive the red car one day. It's the ultimate. But of course, then you arrive into that F1 situation with politics and all the other funny stuff that starts happening.

MH: Which you hadn't really experienced before. You're talking about the Italian media and so on?

SJ: Well, the media was part of it. But this wasn't Ferrari's best period. There were factions within the team and I never figured out a way to navigate through all that. Prost said the same: you make one friend; you make two enemies.

MH: Did you see much of the Old Man?

SJ: All the time. Every day we tested at Fiorano, we had lunch with him. It was brilliant. Of course, you want to be a champion but life goes far beyond what you do on a racetrack. My memories of being with him are outstanding. He's the most extraordinary human being I've ever met.

MH: That's quite a statement. Did you get the feeling he was a real racer?

SJ: Absolutely. One hundred per cent passion, like it is for all of us.

MH: Did you ever feel he was trying to catch you out or play games with his drivers?

SJ: No. He loved his drivers, but we had the sort of dynamic you get when guys are together and talking, not just about racing, but life in general. They were good times with great memories.

MH: And then you had that wonderful race at Imola, your second with Ferrari. Is it fair to ask if winning it would have changed everything?

SJ: Yes, it would. It was so frustrating because, if I ever did everything right in a race, that was the day. I had been super-quick in practice, but then the floor came off in qualifying – which we only discovered later – and I had no downforce. I was all over the place and qualified 15th. But I knew I was quick. Harvey Postlethwaite was my man and we laid up the game plan. I knew what I had with the tyres and we had the data number on

the fuel. I stayed on that the whole time, so I knew I was going to make it to the end – and I was catching everyone. When you race, your mind is like a computer; it's on full alert and you work everything out. I wish I could think like that all the time, because it's amazing. It's the state of mind you're in. It's magic. That's why I still race, because I love it.

MH: But you didn't love it so much one lap after taking the lead...

SJ: There was this little crack on the inlet manifold, which was sucking in air. So, the engine was compensating, pushing more fuel in to have the mixture the right way. Otherwise we would have made it comfortably.

MH: There were just two and a half laps to go when you ran out. Never mind a win in Italy, it would have been a grand prix win, period. How did the rest of the year go?

SJ: It was up and down. The car was difficult to drive and wasn't easy to get right all the time but, overall, it was quick. Michele still had a shot at the title until quite late. In Canada, I had to obey team orders, otherwise I would have won there, for sure. At the Nürburgring, I was on the front row and felt I should have won that race, too. Michele hit me at the start and cut my rear tyre. Then he won it, but I'd been quicker than him all weekend. As the season went on we had more and more problems. Then the engine started to lack performance; we qualified 15th and 16th for the final race in South Africa: it was a disaster.

MH: What led to the move to McLaren?

SJ: The 1986 Ferrari was hopeless. My only objective was to beat Michele in the championship, which I did. I'd been talking a fair bit with Ron Dennis. McLaren won the title in 1986 and when the chance came up, I felt it was the right thing to do. The timing was bad, but I was better off at McLaren than at Ferrari because they remained in the dumps. Saying that, the McLaren was one of the most difficult cars they've ever had – even Prost said it was a bitch to drive. It was very nervous; very edgy. You needed a lot of confidence to go quickly. Ron had already done the deal with Senna, but he had to wait a year. So it was in everybody's best interest that I didn't do too well. I ended up doing about 35 laps of testing the whole year. That was it.

MH: I suppose there must have been massively different cultures between Ferrari and McLaren?

SJ: As different as could possibly be. Ron, let's face it, moved the goal posts for everybody and set the standard every year.

"In 1987 Ron had done the deal with Senna. So it was in everybody's best interests that I didn't do too well"



Racing the "very nervous, very edgy" McLaren MP4/3 in Monaco 1987 as a clear number-two to Prost



Factfile

Date of birth 8 September 1956
Born Växjö, Sweden

F1 starts 79
Best finish 2nd
Points 88

1989 Scores final F1 points with fifth place for Onyx in France
1987 Sixth in world championship for McLaren, taking four podiums
1986 Fifth in world championship for Ferrari, scoring four podiums
1985 Signed by Ferrari to replace René Arnoux
1984 Scores first F1 points with fourth place in Italian GP for Toleman
1980 F1 debut with Shadow

Achievements outside F1

1997 Le Mans 24 Hours winner in Joest-Porsche
1992 CART IndyCar rookie of the year
1980 British Formula 3 champion

MH: Would you say you were at Ferrari towards the end of what you might call the romantic era when the Old Man was still alive?

SJ: Definitely. I'm happy I was there in that era. It's a life experience I've taken with me.

MH: So after McLaren, where do we go? Ah, Ligier! Talk about one extreme to the other

SJ: Oh man! At lunch one day, Michel Tatu [Ligier designer] was thinking out loud and mentioned splitting the fuel tank: one half in front of the engine, the other half behind. Someone said: "Oui." And that was it! Arnoux and I used to joke that the only thing that kept the car on the ground was the chief designer, Newton, because he invented gravity.

MH: And then Onyx.

SJ: That was a great. If you look at what we did with the resources we had, and how late it all came together, I don't think anyone, to this day, has even come close. We finished third in Portugal and came close a couple of other times, too. Don't forget, we had to do pre-qualifying at every race. Talk about pressure, because all the cars in pre-qualifying were quick. If you made

it through, you were just junk for the rest of the day because there had been so much pressure on the first morning. The Onyx was designed by Alan Jenkins: it was a great car and looked fantastic. It was the best feeling I've had in any of the teams in F1 because it was such a tight operation and everybody fought so hard to make it happen. After driving for AGS and Footwork in 1991, I'd sort of had enough, which is why I started looking at America. I loved it there.

MH: What did you like about it?

SJ: The racing is fantastic. To this day I believe that IndyCar is the best racing in the world. It goes right down to the wire in almost every race. But when the split came, everything went sideways and then I started my Indy Lights team.

MH: I bet you saw life from a different angle when running a team.

SJ: It certainly made me appreciate team owners a lot more than before. When you're a driver, you'd knock the front wing off and come in and start shouting at them to hurry up and fit a new one. As a team owner, you see the car coming down the pitlane and think: 'Shit!


There's another 35 grand.' You have a completely different take on it. But the thing that doesn't change is that you always want to win.

MH: How do you look back on your career as a driver? You've had a fantastic time, but is there any sense of frustration?

SJ: I've been blessed. If you can do what you love every day of your life, you can't complain. But we all have big egos, otherwise you won't get far in this business. I can't deny that there's not one day I don't rue the fact that I never won a grand prix or that I didn't become champion. On the other hand, you could win the title and it would depend how you did it. You have a life away from what happens on the race track and questionable tactics will leave a scar in your mind. That must grind on you every single day. I don't have that.

MH: In other words, you've enjoyed a hard career – but it's been fair.

SJ: Exactly. I'm not complaining.

MH: It's been great hearing about it in your usual inimitable style, Stefan. Thank you so much.  Thanks to Fiona McFall at Bibendum. For bookings and enquiries visit www.bibendum.co.uk

FREE

ADIDAS RUCKSACK

WHEN YOU
SUBSCRIBE TO
F1 RACING

Features Include:

Side mesh
pockets and
a padded laptop
compartment



ORDER ONLINE AT

www.themagazineshop.com/tfone-feb15

OR CALL 0844 8488 826

Quoting the promotional code M0215P for print only or M0215B for print and digital access. Offer ends 18 March 2015

Find more issues at
magazinesdownload.com

PICK AN EDITION

PRINT EDITION

Get six issues of *F1 Racing* for only £22.99

● **FREE GIFT**

Adidas rucksack

● **GREAT SAVINGS**

Save 23% on the cover price

● **SPREAD THE COST**

Pay just £22.99 every six issues

● **FREE P&P**

Every issue delivered direct to your door

● **EXCLUSIVE DEALS**

Subscriber-only offers and discounts



PRINT AND DIGITAL EDITIONS

Upgrade to digital for just £2.99 extra

● **FREE GIFT**

Adidas rucksack

● **GREAT SAVINGS**

Save 46% on the cover price

● **SPREAD THE COST**

Pay just £25.98 every six issues

● **UNLIMITED ACCESS**

Read wherever and whenever you like

● **EXCLUSIVE DEALS**

Subscriber-only offers and discounts



SUBSCRIPTION OFFER



YES

I would like to subscribe to *F1 Racing*, paying £22.99 every six issues and saving 23% on the cover price. Please send me my **FREE** Adidas rucksack

This is a
new subscription ☐ renewal ☐

YES

I would like to add digital to my *F1 Racing* subscription for an additional £2.99 and pay £25.98 every six issues. Please send me my **FREE** Adidas rucksack

This is a
new subscription ☐ renewal ☐

YOUR DETAILS BLOCK CAPITALS PLEASE (must be completed)

Mr/Mrs/Ms	First name
Surname	
Address	
Postcode	
Telephone	
Email	
Mobile	

DIRECT DEBIT DETAILS

(Instructions to your bank or building society to pay by Direct Debit)

To the manager	Bank/building society
Address	
Postcode	

Name(s) of account holder(s)
Sort code
Branch/building society account number
Reference number (for office use only)



Originators ID No. 850699

INSTRUCTIONS TO YOUR BANK OR BUILDING SOCIETY

Please pay **Haymarket Media Group** Direct Debits from the account detailed in this instruction, subject to the safeguards assured by the Direct Debit Guarantee.

I understand that this instruction may stay with **Haymarket Media Group** and, if so, details will be passed electronically to my bank/building society.

Signature _____ Date _____

PLEASE RETURN THIS FORM TO:
F1 Racing, FREEPOST RSBUTALE-BXJT,
PO Box 326 Sittingbourne, Kent ME9 8FA

For special international rates:

Please call +44 (0) 1795 592 990 or visit www.themagazineshop.com

Terms and conditions:

This offer is open to UK residents only. Overseas rates are available on +44 (0) 1795 592 990. Please allow 35 days for delivery of your gift and first issue. The gift will be sent under separate cover from the magazine. Should we run out of gifts, you may be offered an alternative gift - there is no cash alternative. If you subscribe to a bundle offer, you will be emailed instructions on how to access your digital subscriptions within 24 hours of your order being processed. Direct Debit rates are valid for one year, after which they are subject to change - should prices change we will inform you in writing. We ask that you enter into a Direct Debit agreement with the intention that your subscription offer will continue for a minimum period of 12 months, even if the frequency of payment is for a shorter period. However, you will still have the right to cancel your Direct Debit in accordance with Direct Debit Guarantee. Should you wish to cancel your subscription it will be cancelled on expiry of the current term, which will not be refundable, other than in exceptional circumstances. If a gift is included as part of the subscription offer we reserve the right to request the return of the gift. Details of the Direct Debit Guarantee are available on request. Savings are based on the standard UK print cover price of £4.99 and the UK digital cover price of £2.99. Offer ends 18 March 2015. If you require any assistance following the purchase of your subscription, you can speak to a member of our customer service team on 01795 592 990. Calls are charged at local rate. **Haymarket Media Group Ltd** uses a best-practice layered privacy policy to provide you with details about how we would like to use your personal information. To read the full privacy policy please visit our website www.haymarket.com/privacy or call us on 0844 8482800. Please ask if you have any questions as submitting your personal information indicates your consent, for the time being, that we and our partners may contact you about products and services that will be of interest to you by post, phone, email and SMS. You can opt out at any time by emailing datacontroller@haymarket.com or by calling 0844 8482800.

M0215P/M0215B



same person wins again and again (especially during the Vettel era) and 'all it is is cars', but the people who make these criticisms are obviously not true fans. The sport isn't just about those who win; it's about watching the back of the field, looking at the smaller teams and seeing what they can do. Reading about team battles and how the teams work with their drivers (thank you for providing such an informative magazine that does all this!) so many things happen behind the scenes that we do not know about unless we actually choose to find out.

Questions are raised about what the sport can do to draw more people in. I say, continue to let the drivers race (as Mercedes did last year), lower the cost of going to races (I went to Silverstone two years ago, wow what an experience!) and continue to talk about every element of the sport – things that happen in the factories and team discussions as well as on-track events.

I really cannot wait for the 2015 season and hope it is just as exciting as it always is.

Gemma Eckley,
Powys, UK

F1 people deserve better

Earlier this year I was fortunate enough to be a guest of the Marussia F1 team at the British Grand Prix. Having followed Formula 1 for the past 20 years, since I was a seven-year-old kid, this was a day that my dad and I will never forget.

Everyone within the team couldn't have treated us better, from the catering staff to the mechanics, security and the drivers: they all wanted to ensure we had a great day – never mind the fact that they also had a race to think about.

It is therefore with great sadness that I have witnessed not only Jules Bianchi's horrific accident, but also the sad decline of the team into administration and then insolvency.

F1 needs to take a long hard look at itself, because while we as fans

Firing staff isn't the answer

Although F1 was great to watch in 2014, I was disappointed by the performance of Ferrari. Fernando Alonso is the best at making the most of a bad car, yet even he managed only sixth place in the drivers' championship, while Ferrari have taken just three podiums in the last 25 races.

The team have responded to this with the sacking of key team members on a regular basis. In my opinion, they have fired talented people. Just look at Williams in 2013: they struggled with their car and it would have been easy for dismissals to be made, but in 2014, with similar designers, they have been transformed. Perhaps Ferrari should have sacked Kimi Räikkönen – he barely picked up one third of Alonso's points tally.

I really do hope that with the arrival of Sebastian Vettel and the first Ferrari fully designed by James Allison, Ferrari will be able to fight higher up the grid next year, maybe even picking up a race win or two.

Thank you for a great year of the magazine.

Iman Hansra
By email

Not just about the winners

My dad has always been a fan of Formula 1 and I can remember watching the cars go round and round when I was small. I too have been a fan of F1 for a good few years now, probably since the time Lewis Hamilton entered the scene.

Last season was truly spectacular, not just seeing my favourite driver win the world championship again, but everything about the sport: the changes, the controversy and competitiveness.

It bugs me when people say that Formula 1 is a boring sport, the

STAR LETTER



Sebastian Vettel will have a tough job in helping restore Ferrari to their former glory

Can Seb succeed where Fernando failed?

Witnessing the series of sackings that has taken place at Ferrari lately has left me questioning their thought processes.

I am 18 years old, and growing up watching Formula 1 in the early 2000s I saw Ferrari as the kings of efficiency and car design. As a dogged Juan Pablo Montoya fan at the time, it would have been a rare pleasure to witness anything less than perfection from the legendary scarlet team.

Some ten years on from the end of that famous period, look at Ferrari now. They're a mess. They seem to think that throwing a new team together every 12 months will eventually amount to success. And then they try to pin the blame on individuals when it doesn't work.

Sebastian Vettel, following in the footsteps of Michael Schumacher, has a task on his hands to pull this team together and inject positive energy and common sense. But if he can achieve what Alonso couldn't, and spearheads Ferrari's return to the front of F1, legendary Scuderia status awaits.

Jamie Carrington
By email



STAR PRIZE

Jamie Carrington wins a pair of three-day general admission tickets to the 2015 Formula 1 Santander British Grand Prix. For more details, visit www.silverstone.co.uk/events. Hotline number: 0844 3728 300

**GET F1 RACING
WHEREVER
YOU ARE**

bemoan the loss of another team, the real tragedy is the idea that those great people that my dad and I were lucky enough to meet in July are now without a job.

The challenges that are currently faced by Marussia, Caterham and others are unacceptable in a sport that is overflowing with wealth. Formula 1 should not just be about the large corporations as it is the smaller teams that add the real human personality to the sport.

Forza Jules!

Matt Barr
Falkirk, UK

Change through continuity

Double points may be gone, but the potential problem of the same driver winning successive championships because they have 'the best car' has yet to be addressed.

If Mercedes and Lewis Hamilton have found the right formula and enjoy a period of success similar to that of Red Bull and Sebastian Vettel, then the tinkering with the rules will begin again very soon.

It's an idea that has yet to be tried, but instead of changing the rules, why not give each team the same engine? The manufacturers could take it in turns to supply the engines and the teams would be left to design their own cars. All fans of the sport would love to see a level playing field and many more drivers would be given the chance to prove their skill.

Peter J B Green
Essex, UK

A formula for everyone

The FIA has now introduced Formula E. It's an electrically powered series that I am sure is greatly appreciated by environmentalists. The racing is rather enjoyable and competitive.

The FIA also has a hybrid series called Formula 1. This formula, which was once the pinnacle of auto racing, has become a series dedicated to making itself relevant to the road car industry.

It has done this by mandating hybrid power units that are massively expensive and boring. Power-unit output has been restricted, as has fuel supply. This has made the racing more of an economy run than an all-out competition.

The FIA has, for years, given lip service to cost reduction. But, in 2014 it mandated the most expensive leap in technology that motor racing has ever experienced. So why not introduce a separate spec hybrid series (Formula Hybrid) that is relevant to road cars, and allow Formula 1 to once again become the pinnacle of auto racing. In this way, environmentalists, the road car industry, and true racing fans could all be happy.

Formula 1, like all sports, should first and foremost be about producing the best possible show for its fans. Social relevance should not be an issue in sports entertainment.

Dennis Kelly
Indianapolis, USA

**Exclusive stories, unrivalled
F1 coverage – wherever you
are in the world**



- Read it on your PC, Mac or iPad
- Identical to print edition
- On sale the same day as the print edition

**FULL
DIGITAL
EDITION
ON SALE
NOW**

GO TO www.f1racing.co.uk/digital-edition/

NEXT MONTH...



MEGA SEASON PREVIEW

All the teams, all the drivers, all the tracks – it's our unmissable guide to the 2015 Formula 1 season!

- > The contenders: the men most likely to dethrone Hamilton
- > Alonso's McLaren return: will it be a dream or a nightmare?
- > Every team analysed in-depth, plus full circuit guide

ISSUE ON SALE 26 FEBRUARY*

**Can anything get in the way of another year
of Hamilton and Mercedes domination?**



MURRAY



WALKER

UNLESS I'M VERY MUCH MISTAKEN...

"I'm looking forward to this forthcoming season of F1 – there are so many questions to be answered!"

The main one, of course, is whether any of Mercedes' rivals can get anywhere near the Silver Arrows. All the main contenders except Williams seem to me to be weaker than they were in 2014, so I'll be amazed if Mercedes aren't on top again. They've got management continuity in Niki Lauda, Toto Wolff and Paddy Lowe, a superb driver pairing in Lewis Hamilton and Nico Rosberg, what should still be the best engine by a country mile, a brilliant car and the mighty clout of the parent company in Stuttgart solidly behind them. They are mighty formidable competitors.

Red Bull, helped by an impressive contribution from Daniel Ricciardo, got closest to Mercedes last year and may well do so again, but team principal Christian Horner has major, potentially weakening, changes to cope with. Less of Adrian Newey's time (although I've no doubt that he'll still be very much a force about the place), the loss to McLaren of star aerodynamicist Peter Prodromou, and the inexperienced Daniil Kvyat taking the place of Sebastian Vettel, to mention but three. Plus the fact that the Renault power unit seems unlikely to be any closer to the Merc.



"I'll be amazed if Mercedes aren't on top again... they've got a brilliant car and they are mighty formidable competitors"



Will Ferrari and McLaren be able to pull their socks up and challenge for wins? I always say that anything can happen in Formula 1 and usually does, but both these great teams have huge mountains to climb. Ferrari's clear-out of key people, from president Luca Di Montezemolo downwards, means their new management has got to produce a much better car in both the power unit and the aero departments with little time to do so. One, moreover, that both newcomer Sebastian Vettel and Kimi Räikkönen can get the best out of.

McLaren seem to me to be in a much stronger position. With "I feel pain whenever we don't win" Ron Dennis back in the driving seat, ably assisted by Eric Boullier, unrivalled premises, rejuvenated staff including Peter Prodromou and two of the best drivers in the business, their main challenge is to get up to speed with Honda power. Honda know which way is up, they know how to work with McLaren and they are devoting massive resources to the partnership. Together they will win... but how long will it take?

Of the main contenders, that just leaves Williams, and it does my heart good to see them back at the sharp end. With a great 2014 behind them, their successful new management face the new season stronger and more confident with Mercedes power, a bigger budget, two highly talented drivers and a hunger to go a rung higher in the constructors' championship – which I believe they could well do.

The rest? I hate to say it but it seems to me that the best that Toro Rosso, Force India, Lotus and Sauber, strapped for cash by the unfair distribution of Formula 1's income, can hope for is to do no worse than they did in 2014.

A gloomy forecast then? Not at all! 2015 is full of interest. After a winter to think about it can Rosberg beat Hamilton? Will Vettel be able to win at Ferrari? Will Räikkönen get the car to exploit his talent? Will Alonso and Ron Dennis really be able to keep the hatchet buried? Can Bottas and Massa win races for Williams? Will Kvyat and Max Verstappen meet their massive challenges at Red Bull and Toro Rosso without cracking? Can Grosjean and Lotus thrive with Mercedes power? And last but by no means least, can Formula 1 weather its financial storm?

We'll soon find out! 🏁

International Motorsport Events • Race Tickets • Hospitality & Travel

SelectMotorRacing.com



Run by Fans for Fans

● Formula One ● Le Mans 24hr ● MotoGP ● Superbikes ● Historic



LE MANS 24 HOUR

- Tickets & Hospitality
- Circuit Camping
- Travel Packages**
- Coach Tours
- By Air options
- Self Drive Packages



FORMULA ONE GRAND PRIX TRAVEL PACKAGES

OUR UK TRAVEL TEAM WILL LOOK AFTER YOU
THROUGHOUT THE TOUR

Coach Tours

- Executive Coach Travel
- Free Excursions
- Circuit Transfers each day

RACE TICKETS

- Grandstands
- Circuit Hospitality
- Paddock Club

Go By Air

- Choice of Hotels
- Airport meet and greet
- Return Hotel Transfers
- Free Excursions
- Circuit Transfers
- Free find a flight service
- Flexible nights stay

HISTORIC TOURS

Escorted Travel Packages - Tickets & Hospitality

- Monaco Historic
- Le Mans Classic
- Mille Miglia
- Goodwood Revival
- Goodwood Festival of Speed

Join us for our **Combined F1 Tours** China-Bahrain | Le Mans 24hr- Austrian | Germany-Hungary | US Austin-Mexico

contact us on **+44 (0) 1451 833 721**
or email **enquiry@selectmotorracing.com**



THE SEAT LEON

Now with **0% APR Representative[^]**
and **£1,930** of free equipment*



NAVIGATION SYSTEM



FULL LED HEADLIGHTS



DAB DIGITAL RADIO

TECHNOLOGY TO ENJOY

With £1,000 towards your deposit.[†] 50% deposit required.

Official fuel consumption for the SEAT Leon in mpg (litres per 100km); urban 32.5 (8.7) - 72.4 (3.9); extra-urban 49.6 (5.7) - 91.1 (3.1); combined 42.8 (6.6) - 85.6 (3.3). CO₂ emissions 154 - 87 g/km.

Standard EU Test figures for comparative purposes and may not reflect real driving results. Model shown is a Leon 5dr 1.4TSI ACT 150PS FR at £20,000 RRP with optional metallic paint at £530 RRP, Titanium Pack at £705 RRP and full LED headlights available free of charge on selected models. Offer may be varied or withdrawn at any time. Retail Sales only. [†]Deposit contribution available to customers who purchase their vehicle with Hire Purchase from SEAT Finance only. Indemnities may be required. Subject to status. Offer available until 31st March 2015. Participating Dealers only. Over 18s. Offer may be varied or withdrawn at any time. T&Cs apply. Freepost SEAT Finance. *£1,930 RRP refers to optional specification if priced individually. [^]Based on 0% APR Representative Hire Purchase with £9,618 deposit for model shown.



SEAT recommends Castrol EDGE Professional

FOLLOW US ON:  

SEAT.CO.UK