

BUMPER 112-PAGE SPECIAL ISSUE

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DECEMBER 12 2013

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F1 2013 REVIEW





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POLE POSITION

F1 2013: a lot more to it than Vettel domination

IT'S EASY TO WRITE OFF F1 2013 AS A SEBASTIAN

Vettel/Red Bull walkover after his record-breaking sequence of consecutive victories in one season. But think back to the long, hot summer when Mercedes was hogging the poles and taking its fair share of race wins too. Or further back, when Fernando Alonso won two races out of three for Ferrari, and Kimi Raikkonen's stunning Lotus victory in the Australian GP opener.

This week's issue is devoted to peeling back the many layers of what really made this season tick. From the Pirelli tyre (near-) calamity at Silverstone, to Vettel's mastery of his RB9's rear-end aero magic, the political war that raged and how Romain Grosjean went from *enfant terrible* to Lotus golden child – it's all here.

And we also look ahead to next year's rules, when turbo power returns and the form book could be torn apart. And what about that double-points gimmick for the final race? Has it *really* come to this?

- Apologies for last week's printing error that removed the WRC review, Sébastien Ogier Inside Line, WTCC review, Race Centre and Christmas Gift Guide from the magazine. This week's issue includes the Race Centre and Gift Guide opener, and the remainder will appear in next week's bumper Christmas double issue.

CHARLES BRADLEY EDITOR

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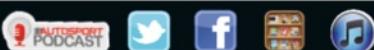
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PRIVATE EAR



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THE BIG PICTURE

The mainstream motorsport year may be coming to an end, but Kenyan duo Asad Anwar/Kashif Sheikh press on in their Datsun 240Z on the East African Safari Rally





This week in F1

DOUBLE POINTS FOR F1 SEASON FINALE

The FIA has announced that next year's season-ending Abu Dhabi Grand Prix will count for double world championship points.

This is the first time since the championship started in 1950 that one race has been made more significant than any other. It has been put in place to increase the chances of a world championship decider. The move has led to widespread criticism from fans, who are almost universally against this decision.

An analysis of the world championship since 1950 shows that the title would have been won by a different driver 10 times under this system (see right).

Perhaps the most interesting example is 1953. Ferrari driver Alberto Ascari spun while dicing with his team-mate Giuseppe Farina and was collected by Onofre Marimon meaning he failed to finish. Under double points, Juan Manuel Fangio and Farina would have outscored him.



HONELAT

HOW IT WOULD CHANGE HISTORY

1953

Real points: 1 Ascari, 34.5; 2 Fangio, 28; 3 Farina, 26
Revised points: 1 Fangio, 37; 2 Farina, 34.5; 3 Ascari, 32

1956

Real points: 1 Fangio, 30; 2 Moss, 27
Revised points: 1 Moss, 36; 2 Fangio, 32

1958

Real points: 1 Hawthorn, 42; 2 Moss, 41
Revised points: 1 Moss, 50; 2 Hawthorn, 48

1970

Real points: 1 Rindt, 45; 2 Ickx, 40
Revised points: 1 Ickx, 49; 2 Rindt, 45

1979

Real points: 1 Scheckter, 51; 2 Villeneuve, 47
Revised points: 1 Villeneuve, 56; 2 Scheckter, 51

1981

Real points: 1 Piquet, 50; 2 Reutemann, 49; 3 Jones, 46
Revised points: 1 Jones, 55; 2 Piquet, 52; 3 Reutemann, 49

1984

Real points: 1 Lauda, 72; 2 Prost, 71.5
Revised points: 1 Prost, 80.5; 2 Lauda, 78

2003

Real points: 1 Schumacher, 93; 2 Raikkonen, 91
Revised points: 1 Raikkonen, 99; 2 Schumacher, 94

2008

Real points: 1 Hamilton, 98; 2 Massa, 97
Revised points: 1 Massa, 107; 2 Hamilton, 102

2012

Real points: 1 Vettel, 281; 2 Alonso, 278
Revised points: 1 Alonso, 296; 2 Vettel, 289

Budget cap commitment

Formula 1 will adopt a cost cap from the start of the 2015 season, according to the FIA. A working group is being created to frame the regulations, with the aim of finalising them before the end of June next year.

BAHRAIN TYRE TEST

Pirelli will conduct a three-day tyre test in Bahrain on December 17-19. All teams were invited to attend with their 2013 cars, but only Red Bull, Mercedes, Ferrari, McLaren, Force India and Toro Rosso accepted.



Five-second penalties for F1

F1 will introduce five-second penalties next season. This will give race stewards a less-harsh option for punishing drivers given that, previously, the smallest in-race penalty that could be issued was a drive-through.

DRIVERS TO GET LONG-TERM NUMBERS

GREAT NUMBERS IN MOTORSPORT

NIGEL MANSELL Red 5

Mansell raced with #5 for his six full seasons at Williams, changing it to red for his first win at Brands Hatch in '85. He also won the '93 Indycar title with it.



GETTY



AJ FOYT 14

The number 14 is now exclusively reserved for Indycars entered by Foyt after he enjoyed much success carrying it during his career as a driver.

GILLES VILLENEUVE 27

The Canadian only carried #27 in 20 GPs, winning two, but he remains indelibly linked to it. Son Jacques also carried the number to the '95 Indycar crown.



GETTY



RICHARD PETTY 43

NASCAR legend Petty ran #43 in 1125 top-flight US stock car races, winning 192 of them and claiming seven drivers' championships as well.

VALENTINO ROSSI 46

The Italian carries the number which was used by his father Graziano when he took his first 250cc grand prix win in Yugoslavia in 1979.



GETTY

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TWO-STOP RULE DITCHED

F1's strategy group voted overwhelmingly against a rule change for 2014 that would force all drivers to make at least two stops during a race. This idea was proposed by Pirelli to ensure two-stop races given its plan to produce conservative tyres.



Todt confirmed as president

Jean Todt has been re-elected as president of the FIA. The Frenchman was unopposed after David Ward withdrew his candidacy.



BERNIE BACKS NEW JERSEY

Bernie Ecclestone insists there is no doubt that the planned Grand Prix of America in New Jersey will go ahead in 2015 despite the event being dropped from the F1 calendar for a second successive season.

Organisers of the race, which was scheduled for June 1 next year before

being axed in the final calendar revealed by the FIA World Motor Sport Council last week, claim that they are working on "restructured financial arrangements for a 2015 race".

Ecclestone said: "There is great demand for a race in New Jersey and I have no doubt we'll be racing at Port

FINALISED 2014 CALENDAR

DATE	COUNTRY	LOCATION
March 16	Australia	Melbourne
March 30	Malaysia	Sepang
April 6	Bahrain	Sakhir
April 20	China	Shanghai
May 11	Spain	Barcelona
May 25	Monaco	Monte Carlo
June 8	Canada	Montreal
June 22	Austria	Spielberg
July 6	Britain	Silverstone
July 20	Germany	Hockenheim
July 27	Hungary	Hungaroring
August 24	Belgium	Spa
September 7	Italy	Monza
September 21	Singapore	Marina Bay
October 5	Japan	Suzuka
October 12	Russia	Sochi
November 2	USA	Austin
November 9	Brazil	Interlagos
November 23	Abu Dhabi	Yas Marina

Imperial in 2015. New races can take many years to get started, but there is significant momentum and we are close to realising a New York City F1 race."

As expected, Korea and Mexico have also been dropped from the schedule, meaning there will again be 19 races next season.



Hulkenberg back at Force India

Nico Hulkenberg will return to Force India next season, a year after leaving the Silverstone-based squad for Sauber.

The German was at the top of the team's hit-list for 2014, but Force India had to wait while Hulkenberg pursued the possibility of a switch to Lotus.

The deal is described as "multi-year". The length of the contract is believed to have been one of the main stumbling blocks, with Hulkenberg keen to be free to move to a top team should a seat become available. Force India was eager to ensure

that he would not be able to walk away after one season, however.

"I think [the team] has taken good future decisions in terms of engine partner, and the team is growing. The structure is getting bigger and bigger," he said.

PEREZ SET FOR SECOND SEAT

Sergio Perez is set to partner Nico Hulkenberg at Force India next year. AUTOSPORT understands a deal expected to bring around €15 million to the team is in place for the McLaren refugee.



THOMPSON/GETTY

Da Costa lands reserve role

Antonio Felix da Costa has been appointed as one of Red Bull's reserve drivers for next season. The Portuguese

driver, who will race for BMW in the DTM in 2014, joins Sébastien Buemi in the reserve role.



Pirelli aims to cut marbles

Pirelli is working to reduce the marbles produced by its 2014 tyres. In particular, development work is focusing on the softer compounds.

"We know that it's clearly wear related," said Pirelli motorsport boss Paul Hembery. "It's basically tearing of the tyres in some cases, certainly the super-soft compound and, to an extent, the soft tyre have not had the strength that we needed."



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Mark Hughes MPH

Our grand prix editor is feeling a little guilty for leaving Paul di Resta and Daniel Ricciardo out of his season top 10 for 2013. Here's why...

It comes the time of year when the AUTOSPORT seasonal review of Formula 1 demands a top 10, and so you nail your colours to the mast and devise a list that you believe represents the merit of what unfolded on the track. But inevitably you end up with 12 or 13 drivers to fit into 10 places.

Turn to page 24 to see who made it in. But I still feel bad for leaving at least two guys out: Paul di Resta and Daniel Ricciardo, the frowner and the smiler.

Because of the complexity and machinery-dependence of F1, decoupling car from driver is a literally impossible task, and sometimes you strongly suspect that a more competitive car would allow more than a proportionate boost in performance – and so it is with di Resta. He starred in the Force India when it was relatively quick in the season's first half, dropped off the radar as it became uncompetitive on the 2012 tyres, and then did a great recovery job in the last few races.

Gary Anderson's supergrid, which takes the best time set during the weekend, shows di Resta to have slightly trailed team-mate Adrian Sutil, but looking only at qualifying Paul was comfortably ahead (12 times to seven), suggesting that when it mattered he was better at delivering. But Sutil's a tough team-mate, and maybe the reason why di Resta is struggling to stay in the game next year. Had he totally annihilated a lesser team-mate – as, say, Nico Hulkenberg did to Esteban Gutierrez – his stock



Ricciardo: smiling as he's guaranteed a top F1 drive next year

impact that driver-sourced budgets are beginning to have. It may no longer be feasible for a driver at a medium-sized squad to be paid by that team. Put di Resta in a top car and he would win grands prix, yet he may not even be on the grid. Little wonder he frowns a lot.

Ricciardo, on the other hand, has plenty of reason to smile, with a Red Bull drive to look forward to. The most eye-opening stat about his season is that in his Toro

“Reputation and timing are everything. It would be a travesty if di Resta isn’t in F1 next year”

would be higher than it is after sharing out honours with a seriously fast team-mate. The problem for drivers looking to get the rock-solid reputation that will make them a valuable commodity is when they have a quick team-mate who doesn't have a big reputation – exactly what di Resta (and Sutil) have suffered.

Many years ago I was chatting with Pedro de la Rosa, then early in his F1 career at Arrows alongside Jos Verstappen, having been there the previous season alongside Toranosuke Takagi. He said something along the lines of: "This is really much better for me than last year, because Takagi had no reputation at all but was really quick, whereas Jos has got a big reputation but isn't actually as quick as his reputation. Takagi was much tougher to outqualify than Jos but I'm getting a lot more credibility this year."

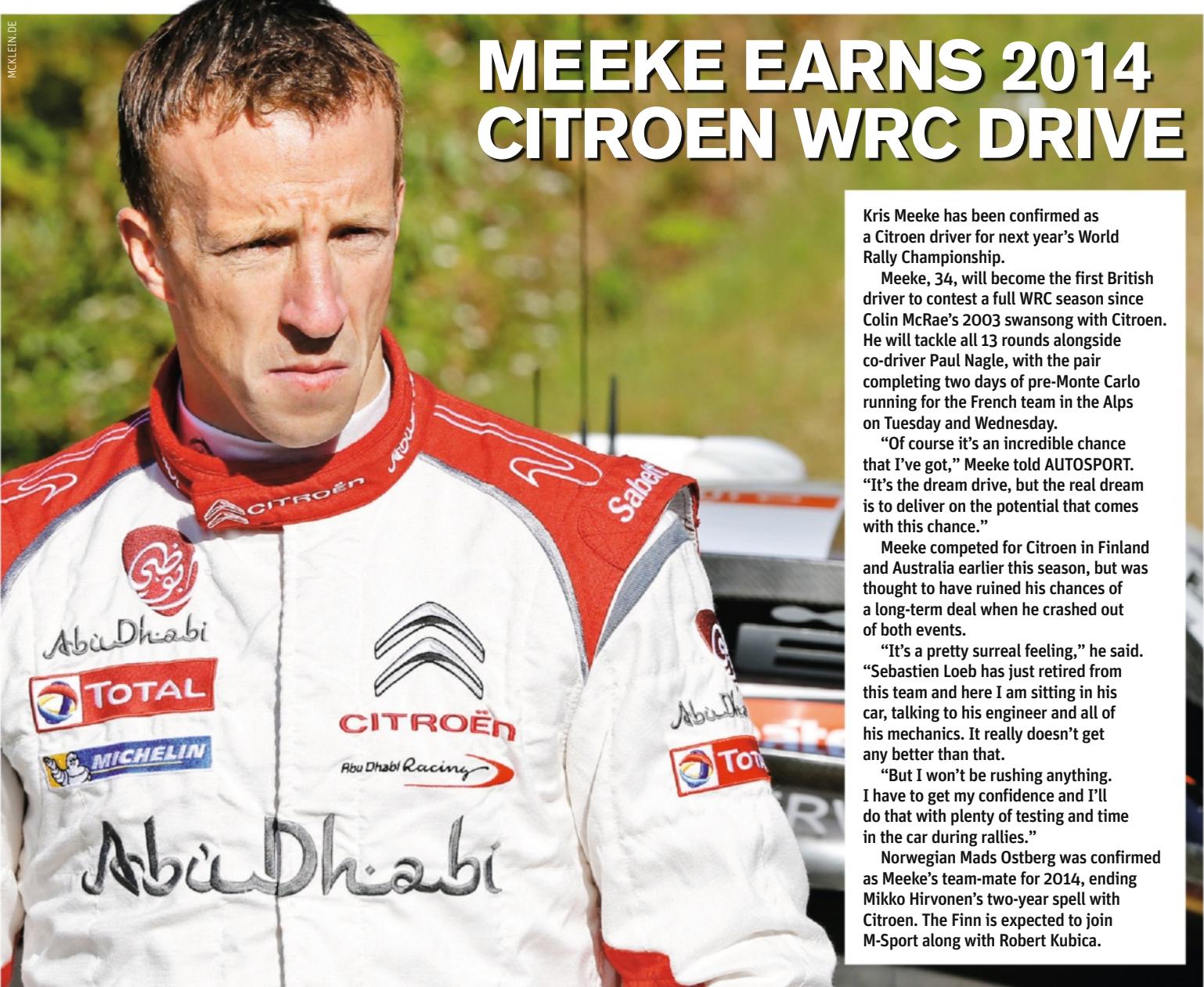
Reputation and timing are everything. It would be a travesty if di Resta were not in F1 next year, but that's the

Rosso he averaged a better fastest time than all the McLaren, Force India and Sauber drivers. That might then prompt the question of why he didn't figure more prominently in the results, and that's probably the reason he hasn't made it automatically into the top 10.

But often when a driver is outperforming the car's natural place in the order in qualifying, it is inevitable he will slide back down to its natural level in the race; the tyres simply won't withstand the abuse of a car being driven faster than its natural level for more than a lap or two. So the question about Ricciardo's 2013 season is: was he over-delivering in qualifying in a mediocre car, or under-delivering in a car better than he was making it look in the races? Danny at least gets the opportunity to answer that question next year. ■

→ P24 MARK HUGHES'S TOP 10 F1 DRIVERS OF 2013

This week in motorsport



MCKEIN.DE

MEEKE EARNS 2014 CITROEN WRC DRIVE

Kris Meeke has been confirmed as a Citroen driver for next year's World Rally Championship.

Meeke, 34, will become the first British driver to contest a full WRC season since Colin McRae's 2003 swansong with Citroen. He will tackle all 13 rounds alongside co-driver Paul Nagle, with the pair completing two days of pre-Monte Carlo running for the French team in the Alps on Tuesday and Wednesday.

"Of course it's an incredible chance that I've got," Meeke told AUTOSPORT. "It's the dream drive, but the real dream is to deliver on the potential that comes with this chance."

Meeke competed for Citroen in Finland and Australia earlier this season, but was thought to have ruined his chances of a long-term deal when he crashed out of both events.

"It's a pretty surreal feeling," he said. "Sebastien Loeb has just retired from this team and here I am sitting in his car, talking to his engineer and all of his mechanics. It really doesn't get any better than that."

"But I won't be rushing anything. I have to get my confidence and I'll do that with plenty of testing and time in the car during rallies."

Norwegian Mads Ostberg was confirmed as Meeke's team-mate for 2014, ending Mikko Hirvonen's two-year spell with Citroen. The Finn is expected to join M-Sport along with Robert Kubica.

Ganassi closing on driver call

Chip Ganassi Racing expects to announce a replacement for Dario Franchitti before Christmas. Managing director Mike Hull told AUTOSPORT that the team has been in contact with "40 to 50" candidates for its #10 seat, and that its new driver will be confirmed in the next few weeks. Ryan Briscoe, who raced for the team at Indy this year, heads the list of favourites.



Da Costa gets BMW DTM ride

Antonio Felix da Costa will switch into DTM in 2014 with BMW, where he will be joined by sportscar ace Maxime Martin.

BMW motorsport chief Jens Marquardt said da Costa earned the seat through his performance in testing last week.

BIG NUMBER
3300

Kilometres completed by Audi during its recent Spanish DTM testing

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AUER MAKES MUCKE JUMP

Austrian Lucas Auer, the nephew of Formula 1 great Gerhard Berger, has switched to Mucke Motorsport for his second season in Formula 3 European.

The Mercedes-backed 19-year-old, who finished fourth in the standings this year with Prema Powerteam, begins his test programme in a Mucke Dallara-Merc this week.



Audi reveals 2014 Le Mans car

Audi released the first image of its 2014 Le Mans 24 Hours challenger in advance of a semi-public test at Sebring. The car retains the R18 e-tron quattro moniker and bears

a close resemblance to its predecessor despite being five per cent narrower. The car has previously tested in secret since hitting the track at the end of September.

In brief



HYUNDAI LAUNCHES

Hyundai unveiled the final livery of its i20 WRC in Frankfurt on Tuesday, and also confirmed that Dani Sordo and Chris Atkinson will form part of its 2014 attack alongside Thierry Neuville and Juho Hanninen.

MOTORBASE EXPANDS

British Touring Car squad Motorbase Performance will expand to run three Ford Focuses next year.

USC GETS 13 ENTRIES

A total of 13 full-season entries have been received for the Prototype class of next year's inaugural United SportsCar Championship. The entry includes the works Deltawing.

BTCC CHAMPS TO ASI

Former British Touring Car champions Gordon Shedden and Matt Neal will appear at AUTOSPORT International on January 9-12 next year. For more information visit [autosportinternational.com](#).

F3 WINNER FAVRE DIES

Philippe Favre, a racewinner in British Formula 3, has died at the age of 51 in a skiing accident. The Swiss spent two years in the category in 1987-88 before graduating to F3000 and going on to become a factory Honda sportscar driver.

ROWLAND TO FR3.5

Former McLaren AUTOSPORT BRDC Award-winner Oliver Rowland will step up to the Formula Renault 3.5 series with Fortec in 2014. The Briton finished runner-up to Pierre Gasly in the Formula Renault 2.0 Eurocup this year. Gasly will graduate into FR3.5 with Arden Caterham.

PENSKE IN OZ V8 LINK

American powerhouse outfit Penske has been linked to an involvement in V8 Supercars after team president Tim Cindric visited last weekend's season finale at Sydney. Cindric was joined on the trip by Ford's director of North American motorsport programmes Jamie Allison.

NEW MERC F3 ENGINE RUNS

Top European Formula 3 team Prema Powerteam gave Mercedes' new engine for the category its first run at Jerez this week. Macau Grand Prix winner Alex Lynn and Formula Renault graduate Esteban Ocon tested the new motor. "It was very impressive straight out of the box," said Lynn, who is talking to Prema about staying with the team for 2014.



VW begins Monte prep

Volkswagen began its preparations for next year's opener in Monte Carlo with Sébastien Ogier, Jari-Matti Latvala and Andreas Mikkelsen all driving the test Polo R WRC in the Alps earlier this week.



DiCaprio heads Formula E entry

Hollywood star Leonardo DiCaprio has entered into a joint venture with Venturi Automobiles to enter a team for the inaugural season of Formula E. Fellow competitor Virgin meanwhile wants drivers with F1 experience for its own campaign.



FIRST BTCC RUN FOR HYNES

Ex-British Formula 3 champion Marc Hynes had his first British Touring Car test at Brands Hatch last week.

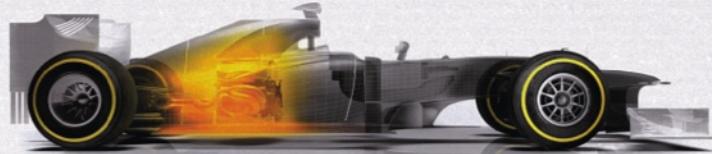
The 35-year-old will make his racing comeback in the BTCC next season, driving a third Triple Eight-run MG6.



Huff conquers Thunderhill

Rob Huff scored a dominant 28-lap victory in California's 25 Hours of Thunderhill endurance event, sharing a Rotek Racing Audi TT RS with Robb Holland, Kevin Gleason, Roland Pritzker and Jeff Altenburg.

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Dieter Rencken

F1's political animal

Jean Todt is re-elected president of the FIA, and his plans target the body's F1 revenue for the benefit of all motorsport

Jean Todt was last Friday returned as president of the FIA uncontested for what will be, barring a change of constitution, the Frenchman's second and final four-year term in office.

Much had been made of challenges from David Ward, who resigned as Director-General of the FIA's (charitable) Foundation in order to run for the quadrennial elections, and Mohammed bin Sulayem, but in the end both campaigns petered out, and Todt was declared president without need for presidential ballot.

Critics suggest the former Ferrari supremo exploited the 'unfair advantage' enjoyed by incumbents, namely unfettered four-year access to the electorate – in this case, senior officials in motor clubs across the globe. But unarguably Todt and his team ran an immaculate and focussed campaign where others dilly-dallied, Ward seemingly flinging mud left, right and centre in the hope that some might stick, and the Emirati rallyist and administrator, poised to stand in 2017, staying low.

Ward's attacks on the federation's governance structures, some framed by the Briton during a 20-year tour of duty with the FIA, failed to resonate with members, leaving the way clear for Todt and his officers to consolidate what was started in 2009: reforming and raising standards of governance, and maximising key assets, in particular its F1 World Championship.

Although the FIA is clearly F1's governing body, its

years, money Todt intends using for the benefit of all motorsport. To this end he established the Resource Allocation Working Group, with representation from all regions, to best define how to distribute the funds.

The remit of the WMSC has been broadened beyond its regulatory function, becoming a forum in which future sporting strategies are discussed and defined, working in conjunction with the recently instituted Motorsport Development Task Force.

A 'Grassroots to Grands Prix' programme is among the planned initiatives, emphasising expenditure reduction and cost rationalisation, while proposals are in place for golf-like handicap systems for leisure karting. Emerging disciplines such as drifting will be granted international recognition, while Formula E, Todt's long-cherished low-emissions category, will make its debut in 2014.

A number of Regional Coordinators will be appointed to work in partnership with ASNs, promoting the growth of grassroots motorsport to attract a youthful segment – all too easily enticed by electronic pursuits – to the sport. The establishment of an international network of certified karting schools conforming to prescribed safety and tuition standards is just one proposal.

Aware of recent tragedies in rallying, Todt has created the Closed Road Commission, responsible for safety of events contested on roads, as opposed to circuits. The 1981 world rally champion Ari Vatanen (Todt's opponent

"Todt has a history of working to four-year cycles, eventually proving ultra-successful"

responsibilities run beyond motorsport's premier category, with virtually every branch of four-wheel (or more) competition falling under FIA control, either directly or via a global network of national sporting associations (ASNs). Thus, what Todt's newly elected World Motorsport Council decides ultimately affects all AUTOSPORT readers, not only F1 fans.

A major milestone – and powerful election fodder – was the September signing between Todt and Bernie Ecclestone, the latter acting for Formula 1 commercial rights-holder FOM, of a framework for a rejuvenated Concorde Agreement, the covenant that outlines the mutual sporting, technical and commercial obligations of all F1's players, running from 2013-2020.

This endows the FIA, left considerably short by the terms of the 113-year commercial rights deal agreed between former FIA president Max Mosley and Ecclestone, with an estimated £25m per annum for seven

in the 2009 elections, but, equally tellingly, a driver who suffered horrific injuries in an accident during Todt's devastatingly successful tenure as director of racing for Peugeot Sport) heads the commission.

Finally, the Single Seater Commission, presided over by GP-winner Gerhard Berger, is charged with simplifying racing's ladder to create a coherent path for young drivers graduating from karting. At present a maze exists, as proved by the variety of paths to stardom chosen by the present Formula 1 grid, and one wonders how many promising youngsters wrong-slotted along the way.

Todt has a history of working to four-year cycles, whether at Peugeot, Ferrari or the FIA, eventually proving ultra-successful even if some starts were slightly rocky for whatever reason. Do not be surprised if youngsters attracted by these laudable plans hit F1 by the time Todt steps down in 2017. If not, motorsport will still be all the richer for the initiatives, mostly paid for by Formula 1. ■

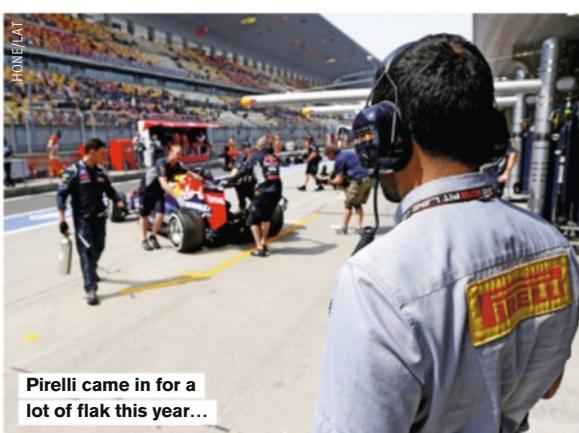
Vettel's dominance can't be stressed enough

Tyre talk dominated the off-track agenda as much as Red Bull's number one

Sebastian Vettel controlled matters at the wheel. **MARK HUGHES** looks back



Tyre woes blighted the British GP. This is Perez



Pirelli came in for a lot of flak this year...



Vettel: 13 wins and a fourth straight title

BARON/GETTY



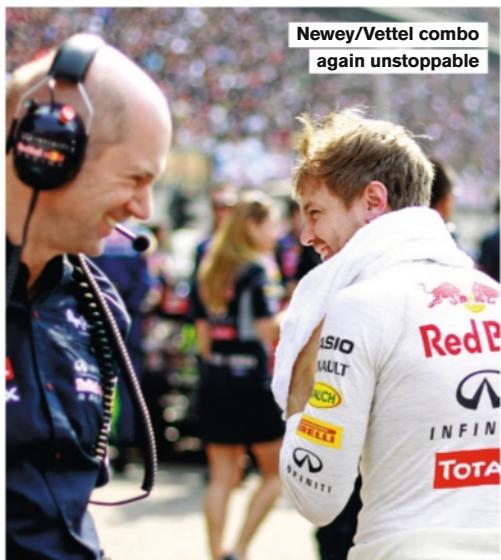
...causing grief for both Mr E and Paul Hembery

Should anyone really be surprised those 2013-spec Pirellis began to go pop? Not only were they structurally inadequate for the high, long-duration loads of Silverstone during the British Grand Prix, but also placed upon those tyres were the heavy hopes of the sport in preventing Red Bull's real underlying superiority from becoming fully apparent. The tyres were not up to such demands and so the second half of the final season of the 2.4-litre V8 formula played out on tougher rubber and total Red Bull annihilation of the field, with Sebastian Vettel recording a nine-race consecutive victory streak that finally equalled the all-time record of Alberto Ascari set back in 1952-53.

Race director Charlie Whiting had looked on in ever-mounting dismay as the tyres began delaminating at Silverstone. Sergio Perez's McLaren had suffered a left-rear failure through Copse the day before, a failure that had been put down to debris damage. But that was already a familiar explanation. It's what had been used to explain away failures on Lewis Hamilton's Mercedes in Bahrain, Felipe Massa's Ferrari there (twice) and Paul di Resta's Force India at Barcelona. Nerves were jangling about the integrity of the new-for-2013 Pirelli constructions in the cockpits, in the race director's office and within Pirelli itself even before the Silverstone event when a total of eight failures had Whiting on the point of red-flagging the race very early into its scheduled distance. That would have been the easy part. What to do next, with over 100,000 paying spectators looking on, would have been the tricky bit, potentially putting the race on a par with the disastrous 2005 US GP at Indianapolis.

Most of the failures were very spectacular and public, the carcass unfolding and throwing itself high in the air, landing back on track like a squashed, lifeless animal. Whichever car it came off would limp back to the pits on its sidewall and its Pirelli lettering, though the casing would often as not keep the tyre inflated even without the carcass. But no way could this be considered safe. Pirelli had wanted to revert to the tougher 2012 constructions a few races earlier but were told by the FIA that the only way this could happen without the unanimous consent of the teams – which it was never going to get, because some teams believed they held a competitive advantage over others in how they used the 2013 tyres and their flexible sidewalls – was under the guise of safety. Not unnaturally, Pirelli did not wish to publicly say that its existing tyre was not safe – that sends all the wrong sorts of messages out and turns F1 participation from a marketing asset into a huge liability – and was rather hoping the governing body would support the change. So it continued with the 2013 tyre and hoped.

Underneath the layer of pick-up, tyre secrets lay



DUNBAR/LAT

Silverstone showed the folly of that decision. And suddenly by the very next race it was perfectly OK with the governing body for Pirelli to revert to the 2012 tyres, exactly what the firm had been asking for all along. Why it waited for drivers' lives to be risked and for Pirelli to be so publicly humiliated remains a mystery.

But that race at Silverstone was the fulcrum upon which the season pivoted. Before then the Red Bull RB9 was competitive and a title contender but not overwhelmingly better than the Mercedes, Ferrari or Lotus. Afterwards, on the tougher tyres, it was almost unbeatable. Were it not for the tiniest of errors from Vettel in qualifying in Budapest it's highly likely he'd have won every single race after Silverstone and we'd have been looking at an 11-race winning streak.

The technical reason for the contrast in form of Adrian Newey's latest evolution of 2009's RB5 before and after the tyre-spec change was highly politically charged. Essentially the car's downforce enabled it to go through fast corners at a speed that overwhelmed the 2013 tyre. If they wanted to get competitive stint lengths its drivers had to use only a fraction of its performance through the fast turns. To an extent this was true of most cars – but much more so with the RB9. Pirelli, which was seeing the loads generated by every car, estimated in Malaysia for the second GP that on proper, all-out performance tyres capable of transferring the aero loads, the Red Bull could be winning races by a lap...

Ostensibly, the reason for the new tyre was to steer the races more towards the two/three stops that Pirelli deemed best for an interesting contest and away from the one-stop races seen at the end of 2012 as the teams had mastered the tyres' demands. But implicit was also an aim to at least rein-in some of the advantage enjoyed ►



"Mercedes pulled out all the stops and reinvested hugely"

► by Red Bull in recent seasons. There wasn't much argument from the other teams or the promoter in pursuing that aim. Some might say that prioritised show over sport, perception over reality, rewarded mediocrity rather than sporting excellence. It's difficult to avoid the conclusion that the Pirelli era has allowed Red Bull's rivals to avoid confronting head-on their own technical weaknesses and deficit to Red Bull, relying on the tyre to smother that difference. But those rivals would counter that they do not believe Red Bull's advantage is derived *wholly* from the mind of Adrian Newey and that some of it is purely a function of spend.



Ferrari and Lotus duelled over P3

The sport remains badly out of kilter financially and that is skewing the whole picture. Red Bull never did fully buy into the sport's attempts at cost control. Its annual spend in excess of £220 million is almost 50 per cent higher than the original target conceived by the resource-restriction agreement – and that buys lap time. Three years ago Mercedes (fifth in 2012 from the fifth highest spend of 2011) was downsizing to the numbers agreed and waiting for the likes of Red Bull and Ferrari to get down to its level, as had been agreed. Upon the realisation this wasn't going to happen, in 2012 Mercedes pulled out all the stops and reinvested hugely, giving it the second highest budget to Red Bull. Lo and behold, in 2013 it finished second (to Red Bull). But the notion of the top teams even pretending to reduce budgets is now bankrupt – just like many of the smaller teams could be very soon, if some restraint is not imposed upon the big spenders.

Ferrari – the third-highest spender – finished third in the constructors' championship. Moving down the table from there was only strife and distress. Lotus was again a race winner and in the season's second half had the only car that could keep the Red Bulls in sight, but was in such severe financial straits that its driver Kimi Raikkonen finally walked – on account of not having been paid "a single Euro of my 2013

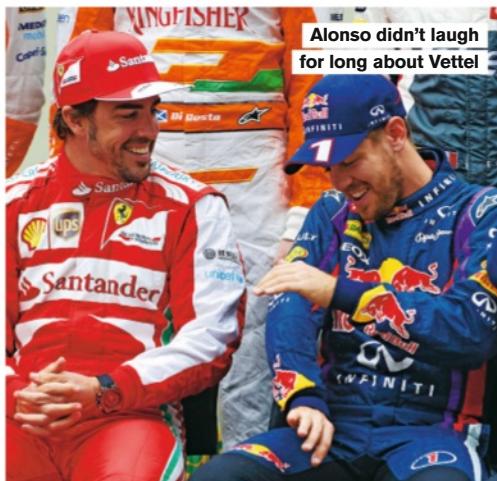


Kimi quit Lotus early over pay dispute

salary". Nico Hulkenberg had been suffering similarly with Sauber and though this was later resolved the cracks F1 had papered over for the past few years were becoming visible now to the outside world.

The costs crisis – and F1's greedy private-equity ownership structure – is colouring everything. It is because costs are out of control that the sport has become ever-less multi-dimensional over the years. Engine freezes, technical prescription, single-supply tyres are all attempts at putting a band-aid on the cost/ownership problem, but each of them further erodes F1's core values. This year's attempt at moving further down that road was customer cars, thankfully headed-off. If less income were removed from the sport and cost controls imposed, every one of those core values could return. Instead CVC continues to reap the financial rewards and the smelly fall-out from that sell-out years ago continues to stain and discredit the sport with several ongoing legal battles.

It wasn't only financial; competitively, a fourth season of Red Bull dominance put pressure on just



COATES/LAT



MASON/GETTY



COATES/LAT

about every other relationship. In the summer break Fernando Alonso, seeing another year pass by with the height of his powers unrewarded by a title, despaired of Ferrari and instructed his agent to begin sounding out other possibilities. This and an ill-advised throwaway line borne of his frustration got him into hot water with Luca di Montezemolo, and so Fernando and Ferrari fell out of love. This only hastened Ferrari's re-signing of Kimi Raikkonen; Ferrari needed to do it just in case Alonso should leave. Ferrari's doing so only disenchanted Alonso further. Two days after Raikkonen finally put pen to paper, post-Monza Monday, Ferrari announced its 2014 Alonso/Raikkonen line-up but for those two days even

Alonso's 2014 participation had been far from certain as both sides stood at the brink.

Alonso then set about trying to repair things but the relationship had taken a bad knock. The years of onslaught from the combination of Red Bull financial horsepower and Adrian Newey neurological firepower had just inflicted further damage to a rival – just as those things had played their part a year before in Lewis Hamilton leaving McLaren for Mercedes.

Competitively, it was difficult to see where the Red Bull's qualities ended and Vettel's began. The car continued to get more from exhaust blowing than any rival, allowing a level of rake no-one else could achieve without either the

diffuser stalling or the tea-tray leading edge of the floor running too hard into the ground. The greater the rake that can be achieved without diffuser-stall becoming a problem, the more underbody downforce can be used. The tougher 2012-spec of tyres used in the second half of the season allowed such levels of downforce to become feasible on the Red Bull once more and hence its advantage increased. But the way Vettel has adapted his driving to the odd demands of a car with a big increase in rear downforce from off-throttle to on has allowed the car to be further developed in this direction. That adaptation continued into 2013 and the repeatability and consistency of his brilliance was quite remarkable.

Previously his total ease with the initial rear instability of the car on corner entry had been a key; this year that was less of an issue especially into the season's second half. Clever vortex creation and control allowed a better airflow along the bottom of the sidepods to the tunnels at the rear and over the top of the diffuser, greatly increasing the car's off-throttle rear grip. The challenge changed to getting as early as possible off the brakes and onto the power – and into slow corners he was doing it visibly earlier than anyone else.

This was one trick too many for the old dog Mark Webber, who remained blisteringly fast through the high-speed sections but could not summon anything like Vettel's dexterity into the more important slow corners. He also tended to be rather harder on the delicate rubber than his team-mate over a race stint. He could still turn it on for qualifying – as a couple of late-season poles demonstrated, but in a season during which his team mate won 13 times, he failed to take a single victory. Malaysia however should have been his – and with a more favourable ➤

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Massa had a mixed final year at Ferrari



CHARNAUX / XPB

“Ferrari looked like a title contender in the first part of the season, then its form dived”

21

► strategy Suzuka might have worked out that way too. But this was now Vettel's team and that played its part in both those races.

On the Thursday before the British GP Webber announced he would retire from F1 at the end of the year in favour of a sportscar ride with Porsche. He bowed out with all the grace and dignity to be expected of him and F1 has lost an important voice that was never afraid to stand up and be counted. His vocalised thoughts over the years on a range of subjects from Max Mosley to Bahrain, Pirelli tyres and Red Bull politics shone

through all the pr-speak, harking back to an earlier era when drivers could be relied upon to tell it how they saw it.

Ferrari looked like title contenders in the first part of the season – Alonso winning two of the first five races – but the car's form dived into the second half, partly because of the switch of tyre construction that allowed Red Bull to properly utilise its superior car, but also partly through a Ferrari development programme that stalled from Canada onwards. Alonso needed just a sliver of the daylight of opportunity and he'd drive the F138 clean through it and he performed magnificently to take a distant runner-up spot to Vettel in the championship. But again Ferrari had flattered only to deceive; four years at the team for Alonso and still no titles, just three runner-up spots.

Before the season was very old the team had recruited from Lotus James Allison (for his second Maranello stint) and his aero chief Dirk de Beer. Felipe Massa completed an eight-year stint at the team, the last four of which have been against the phenomenon of man and competitor that is Alonso. As ever, the peaks of his ultimate speed were very little different to Alonso's; the joining up of them starkly different.

Mercedes had something of a helter-skelter year with Nico Rosberg and Lewis Hamilton taking eight poles and three victories between

Webber bowed out of F1 on his own terms



DUNBAR/LAT

Hamilton won just once – in Hungary



HON/LAT

them. It was always on the cusp of eating its rear tyres in the first part of the season and not quite as quick on the 2012-spec rubber, but it was aerodynamically effective – the first of the team's cars to be conceived in the new 60 per cent windtunnel – and its hydraulically-linked, Lotus-like suspension allowed its drivers to take lots of kerb. Ross Brawn in his final season was laying great foundations for the future but the arrival at the beginning of the year of Toto Wolff as Mercedes' new representative (and team investor) brought a complication. Toto ►



Rookie Gutierrez got it all wrong in China

► brought with him Paddy Lowe from McLaren on the understanding he would take over as team principal in time. Once Toto and fellow new managerial recruit Niki Lauda understood Brawn's value they were left in something of a pickle, with Brawn unwilling to stay on as anything other than the boss, and at the end of the season they parted. The upgrade that Brawn has presided over was only just beginning to bear fruit in 2013 and the extent of the team's jump in competitiveness surprised and impressed new recruit Hamilton, even if he was less satisfied with his personal performance.

There was little between Lewis and Nico, over a season that demanded more than just outright speed from the driver and which did not reward that quality as much as when Hamilton first appeared in F1 in 2007.

Although Hamilton broke Vettel's perfect post-Silverstone run with a smart victory at the Hungaroring, it was more usually Lotus that provided Red Bull's stiffest competition in the season's second half. Its supple-riding E21 continued where last year's car had left off as very easy on its tyres and had a formidable combination of pace and stint duration.

Raikkonen followed up victory in the Melbourne season-opener with his usual relentless harvesting of points but, following the tyre-spec change, it was team-mate Romain Grosjean who came to form the team's cutting edge. After his well-publicised difficulties of last year he still seemed somewhat detuned in the first part of the season but from mid-season onwards developed into the truly magnificent driver he'd always threatened to be with

DUNBAR/LAT



Pat Symonds joined Williams in August

"F1's financial and structural cracks are getting bigger. Something's got to give"



Reformed Grosjean took six podiums

formidable pace, great fighting spirit and able to withstand any pressure applied. Twice – at the Nurburgring and Suzuka – he made Vettel sweat for his victory. It was great to see Lotus's patience with him finally rewarded.

Although Lotus was a top-four team competitively, it was far from that financially. Conversely, well-heeled McLaren struggled badly. Its decision to do an all-new car backfired, the MP4-28 just a step too different from what it had before for the simulation to keep pace with, leaving Jenson Button and Sergio Perez marginal Q3 qualifiers and McLaren its first podium-less season since 1980. Such a season did nothing to aid the cause of team boss Martin Whitmarsh amid continuing political moves in the background from Ron Dennis.

Of the smaller teams, Force India starred in the

first half-season with a car configured carefully around the 2013 tyres and was adversely affected by the later change in construction. Sauber's season was a mirror image of Force India's, struggling in the first half, sparkling in the second once it had reconfigured its car with a Red Bull-style Coanda exhaust arrangement.

Williams suffered an appalling season with a badly conceived exhaust-blowing system. Once this was removed late in the year it became once more the half-decent machine of 2012. In the meantime tech director Mike Coughlan had been replaced by Pat Symonds, whose task it now is to return the team to respectability.

As one technical era came to an end, the underlying financial and structural problems of F1 remained very much in place. The cracks are getting bigger – something's got to give. ■

Texas: Red Bull fans
cheer another Vettel win



THE TOP 10 F1 drivers of 2013

In a season that was dominated by Sebastian Vettel setting new standards, the other drivers often battled each other to make an impression. MARK HUGHES assesses the best on the grid



10th Valtteri Bottas

Bottas had terrible tools with which to work in his rookie year, yet he quietly just got on and maximised what he had, waiting for the opportunity of something better to present itself. When that something came – a wet qualifying session at Montreal – he was stunning.

To those who have worked closely with him, his third fastest time in Canada came as no surprise. "He reminds me a lot of Mika Hakkinen," says one who used to work with the double champion. "He has that same intensity, the self-belief and the talent. He is going to

be huge." Once Williams despaired of ever making its Coanda exhaust work, the FW35 became at least something he could work with. At Austin he got the car through Q2 with the fourth fastest time, and only a bit of over-commitment towards the end of his Q3 lap prevented a similarly high grid slot. That was well beyond the car's natural level.

For all Pastor Maldonado's inconsistency, he is no slouch and has won a grand prix. Bottas in his rookie season, in a difficult car, comfortably shaded him. Stay tuned.

9th Jenson Button

Jenson drove some quietly classy races in the mediocre MP4-28. Nurburgring, Brazil, China, Monaco and Hungary were all absolute top-drawer performances that flattered the car. But he also had that run of very untypical incidents in the latter part of the year and there were several times when his familiar refrain of "the balance has changed" indicated that he'd lost that very narrow sweet spot he needs if he's to do his best stuff. This could be particularly damaging in a car

that was always on the cusp of making it through to Q3 or not. There were also times when a rougher, more scruff-of-the-neck approach might have been needed to get the last couple of tenths from the car, such were its inadequacies.

It's extremely difficult for a driver that has enjoyed the sort of success Jenson has to automatically perform at his peak when given a lemon to drive. But there's no reason to believe that his great days cannot be repeated if given a worthy car.



8th Mark Webber

These cars and tyres were not configured for Mark Webber. He would have been an irresistible force in the active-ride days or in a full-on tyre war in a top car. Through fast corners, where his commitment and sensitivity are rewarded, he remains supreme. Unfortunately this generation of car pays out the big numbers on slow, exhaust-blown corners and he simply cannot do that as well as Vettel. He was also, at 37-years-old, perhaps a couple of tenths and a bit of desire down on the young



gun that used to transcend the Jaguar, sometimes by an outrageous amount. But in Brazil he bowed out of F1 having kept Vettel in sight and set the fastest lap of the race. Malaysia this year should have been his; he'd done all the hard work in the tricky changeover phase and got ahead of his team-mate. He should've been protected at that point, as Seb would have been. Suzuka might have been his too but for getting the slightly less favourable call on strategy. He can leave with head held high.

6th Romain Grosjean

Romain was arguably the star of the season's second half, searingly fast, totally fearless and yet largely free from the sort of errors that had blighted his F1 career up to this point. In the Lotus on the 2012 tyre constructions he was the nearest thing Sebastian Vettel had to a rival between August and November. He stretched Seb at the Nurburgring and Suzuka and kept him in sight at Austin, generally leaving the great Kimi Raikkonen trailing.

It hadn't looked like that in the first half of the year, when he was usually a couple of tenths adrift of Kimi and not looking like the startlingly quick driver he had been for much of 2012 before his accidents made him the centre of attention. If anything, there still seemed to be a hangover of his subdued form when he was racing under threat of

being dropped if he crashed again. Then came Monaco; he was fantastically fast there, but was also hitting everything in sight. After crashing twice on the exit of Ste Devote, it really did look as if this guy couldn't be both quick and error-free.

But the rebuilding started from there. By Silverstone two races later he was on Kimi's pace and after the change of tyre spec he was suddenly two or three tenths faster. At the Nurburgring a fabulous opening stint allowed him to run at the front while making his option tyres last longer than anyone else's. This brought him out neck and neck with Vettel and for the next phase of the race he made Seb fight very hard to stay ahead; this was the F1 driver Grosjean had always looked like he could become. This was the Grosjean we enjoyed for the rest of the year.



5th Nico Rosberg

Rosberg was too smart and too talented for Lewis Hamilton to be able to walk in and take over at Mercedes. Yes, there were days when Lewis was clearly quicker. But there were just as many when Nico held the upper hand. These tended to be at the more technically demanding venues where Rosberg's sharp-minded strengths came into play.

As Hamilton adapted to the car and its systems during the first half of the season Rosberg was usually quicker, as three consecutive poles showed. His victory at Monaco was a triumphant melding of flair and discipline. In a car always prone to overworking its rear tyres, he used his pole to clinical effect in winning at the slowest possible speed.

The combination of a car hard on the tyre and very delicate rubber meant that keeping the Mercedes in the sweet spot was a challenging task and occasionally Nico failed in this. Sometimes if his weekend started off bad, it stayed bad. Whether this was a trait of the car or him is difficult to know.

The 2013 season was unusual in its absence of outright wet races and for Rosberg this was a pity, for in the rain at both Melbourne and Interlagos he book-ended his season with some awe-inspiring wet-weather driving, completely eclipsing Hamilton. Had those races been as wet as the practices it looked as though he'd have had the legs of anyone, Red Bulls included. ▶



7th Kimi Raikkonen

"That was maybe the easiest race I've ever won," said Kimi after victory in the Melbourne season-opener. Even though there were none to follow it up as Red Bull and the others each got their acts together, Raikkonen continued to be a major force.

Because the Lotus wasn't at its best in qualifying, frequently Kimi would have to glide towards the front using the car's superior tyre usage. He couldn't be blamed for this – it was a trait of the car – but inevitably it didn't place Raikkonen in the sort of spellbinding role he used to sometimes play in his McLaren days. Does he still have the last edge of raw pace? We need to wait until next year to find that out.

He retained a beautifully pure style, nudging away at the front tyres' limits,

adapting by the lap to any changes. But with the tougher 2012 construction of tyres into the second half of the season, he was usually trailing Romain Grosjean. This isn't the first time this has happened: in the first half of 2012, before Romain's accidents began to mount, the Franco-Swiss had been establishing himself as the quicker driver – to the extent that the team even began to favour him with development parts. It was only as Grosjean hit his sticky patch that Raikkonen once more became the team's focus.

Was the second half of 2013 simply a continuation of the first half of 2012? In which case, Kimi's greatest days are probably behind him. But even his ordinary days are better than most drivers' best.



EHTERING/LAT



THOMPSON/GETTY

4th Nico Hulkenberg

For the first half of the season, in a Sauber with a serious lack of rear-end grip, Hulkenberg was doing a terrific, if unnoticed job. He was getting a tune from a car with a badly mismatched set of traits that meant there was no set-up that would allow it to both handle well and look after its tyres. Often he was only just missing getting into Q3, whole chunks faster than the car deserved.

But then came the C32's upgrade. Suddenly, armed with a car that was now a lower-order Q3 qualifier on merit, he squeezed more from it, qualifying third at Monza, fifth in Abu Dhabi, fourth in Austin. This was not the car's natural level and it invariably sunk back a couple of places as tyre duration imposed reality

upon the situation. But in defending the places his over-achieving had got him in qualifying he was truly impressive; at Korea he withstood the onslaught of first Lewis Hamilton then Fernando Alonso without ever once over-committing, without ever being tempted to defend the wrong bit of track, knowing always where he needed to be quick to stay out of reach.

With the mentality of a winner, his cajoling sometimes didn't find an appreciative audience in the conservative Sauber team and the relationship wasn't eased by the team's occasional struggle with cash flow. He's done enough now at Williams, Force India and Sauber to make his case for a top team.

3rd Lewis Hamilton

By the end of last year Lewis had despaired of ever stopping the Sebastian Vettel/Red Bull juggernaut and creating an era of his own. He'd have loved nothing more than to have climbed into a Red Bull alongside Seb – and his management did try on at least two occasions to get him in there before finally accepting that it wasn't going to happen. So he was probably going to stick it out at McLaren, despite the very tempting offer from Mercedes.

But then events over the weekend of Singapore 2012 sent him to the three-pointed star. He went there with no great expectations, more resignation over how things had panned out behind the scenes at McLaren.

Yet he got a pleasant surprise. The new W04 was quick – seriously so. It was a bit hard on its tyres, but was clearly a much more competitive

machine than that which Michael Schumacher had driven in 2012. Hamilton began to enjoy his new home and in between getting used to very different systems and, in particular, the braking feel, he was soon setting poles and leading races.

At the Hungaroring – always a happy hunting ground for him – it took just one slip up in qualifying from Vettel and Lewis was on pole again. Around there, that was a great foundation for a flawless victory the following day.

But he wasn't consistently at his brilliant best. For one, this era of tyre preservation has dulled the effectiveness of his searing speed. For another, his fantastic feel for the brakes was being numbed by the pedal feel of the Merc. On days when the circuit layout meant neither of those things were an issue, he was fantastic.



TEELAT



2nd Fernando Alonso

Alonso did what he can be relied upon to do: drag every last ounce of potential from a nearly-there car. Time without number on a weekend, when the Ferrari seemed not to be a factor, there he'd be. There might be a safety car and there he'd be, fourth in the queue, his earlier deficit to the leader wiped and right back in the hunt – and you just knew he'd be making full use of the opportunity. The Nurburgring was one such example.

On those days when it was a good race day car he'd somehow make its poor qualifying pace irrelevant in the opening seconds. At Barcelona, that run around the outside of Lewis Hamilton and Kimi Raikkonen at Turn 3 was ballsy but beautifully executed and became the foundation for his victory there.

If he could get the car into the first three or four rows, he was invariably going to figure. But on those days when the Ferrari had fallen seriously off the pace, there was the occasional and entirely understandable lack of interest. He's been suffering days like this for a long time now and that frustration did get the better of him as he realised mid-season that yet another year was going to slip by without a title.

His reaction to that state of affairs damaged his relationship with Ferrari, perhaps fatally, and played its part in further damaging his prospects. If the team no longer runs with Alonso in the centre of it all, things could get very difficult on those days when Raikkonen is faster.



→ P29 TEAM BOSSES' TOP 10

1st Sebastian Vettel

It's what he did with the best car that marked him out. The ongoing evolution of the Red Bull with its utilisation of exhaust blowing and cylinder cut allowed the ever-adaptive Vettel to find new areas of advantage. Outstanding among his traits is his ease with corner entry instability. That has been apparent for several seasons; what was even more impressive this year was how repeatable he'd made this skill. "You'll see him after Friday practice working out where the biggest area of advantage for him to

work on is," says Christian Horner. "This will vary from track to track, year to year, and you will see him understanding what he needs to do, where the most lap time is, then by Saturday he's ready to just go out and do it. It's quite remarkable."

The routine of winning became just a dance for him in the second part of 2013, variations around a theme. He could do it by keeping just out of reach, eking out the tyres against performance (Austin), he could do it in a flat-out scrap, stretching the elastic coming up

to the pitstops (against Romain Grosjean at the Nurburgring), by disappearing off into the distance (Singapore), by coming up from the back as though the other cars weren't even there (India), all depending on what the car and tyres gave him on a particular day.

There is so much spare capacity within his brain, so much natural gift behind the wheel, that his way of driving in any given moment or the way of running his race on any given afternoon is always under control. The sheer joy

of it plays its part too, keeps the energy and motivation up. The inability to lose when there is a winning opportunity, that savagery beneath the smiles, were all on display at Malaysia. Yes, he went against team orders, but what shouldn't be forgotten is that Webber was trying to back him into Hamilton before the gloves came off – just as at Turkey 2010. He wears his gift so lightly out of the car that it's a surprise when he shows he's as ruthless as any other top champion when necessary. But it hardly ever is. ☐

BREAKING NEWS

Official Gilles Villeneuve

We are thrilled to announce that Retro Formula 1 have been granted a license by the Villeneuve family to design, manufacture and retail a range of Gilles Villeneuve merchandise.

'Miracles' is the first design that we'll be launching. It features a fantastic image taken by F1 photographer Nigel Snowdon of Villeneuve giving it his all during practise at the 1979 Belgian Grand Prix. Also included is Jacques Lafitte's famous quote.

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BUT GILLES MADE YOU WONDER SOMETIMES"
JACQUES LAFITTE



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Team principals' top 10

In what has become an annual end-of-season tradition, JONATHAN NOBLE sought the opinions of Formula 1's biggest movers and shakers to come up with the team principals' top 10 drivers

THE PANEL



**Christian
HORNER**
Red Bull



**Ross
BRAWN**
Mercedes



**Stefano
DOMENICALI**
Ferrari



**Eric
BOULLIER**
Lotus



**Martin
WHITMARSH**
McLaren



**Vijay
MALLYA**
Force India



**Monisha
KALTENBORN**
Sauber



**Franz
TOST**
Toro Rosso



**Frank
WILLIAMS**
Williams



**John
BOOTH**
Marussia



**Cyril
ABITEBOUL**
Caterham

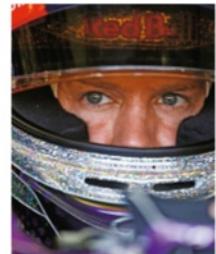
ALL 11 TEAMS BOSSSES have taken part to provide a top-secret list of their best drivers of the season. Points are then awarded on the F1 scoring system basis – 25-18-15-12-10-8-6-4-2-1 – to come up with a winner.

Secrecy of the individual results is imperative so that the team bosses can offer their honest opinion – rather than the one that will cause them fewer political troubles!

After his phenomenal season it's not a surprise to discover that it's Sebastian Vettel who has come out on top this year. And the four-time world champion is humbled at the latest accolade to come his way.

"It means a lot," said Vettel. "Team principals have been around quite a while and see a lot of drivers."

"As much as getting the respect and appreciation from people on the outside, it's very nice to get the same from people on the inside."



1st Sebastian
Vettel
248
▲ UP 1



2nd Fernando
Alonso
213
▼ DOWN 1



3rd Kimi
Raikkonen
158
▲ UP 1



4th Lewis
Hamilton
117
▼ DOWN 1



5th Nico
Rosberg
95
▲ UP 3



6th Romain
Grosjean
76
► NEW ENTRY



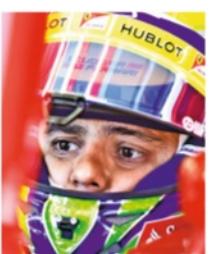
7th Nico
Hulkenberg
68
► NO CHANGE



8th Mark
Webber
66
▼ DOWN 2



9th Jenson
Button
24
▼ DOWN 4



10th Felipe
Massa
14
► NO CHANGE

PREVIOUS SEASONS

* Stefano Domenicali's vote came in too late for our 2010 review, so wasn't included at the time, but this includes his nominations

2009 Results

1 Sebastian Vettel	76
2 Jenson Button	67
3 Lewis Hamilton	65
4 Fernando Alonso	39
5 Rubens Barrichello	35
6 Kimi Raikkonen	30
7 Mark Webber	30
8 Felipe Massa	19
9 Robert Kubica	10
10 Adrian Sutil	8

2010 Results*

1 Fernando Alonso	229
2 Sebastian Vettel	220
3 Lewis Hamilton	196
4 Mark Webber	146
5 Robert Kubica	129
6 Jenson Button	86
7 Nico Rosberg	68
8 Nico Hulkenberg	17
9 Felipe Massa	17
10 Rubens Barrichello	11

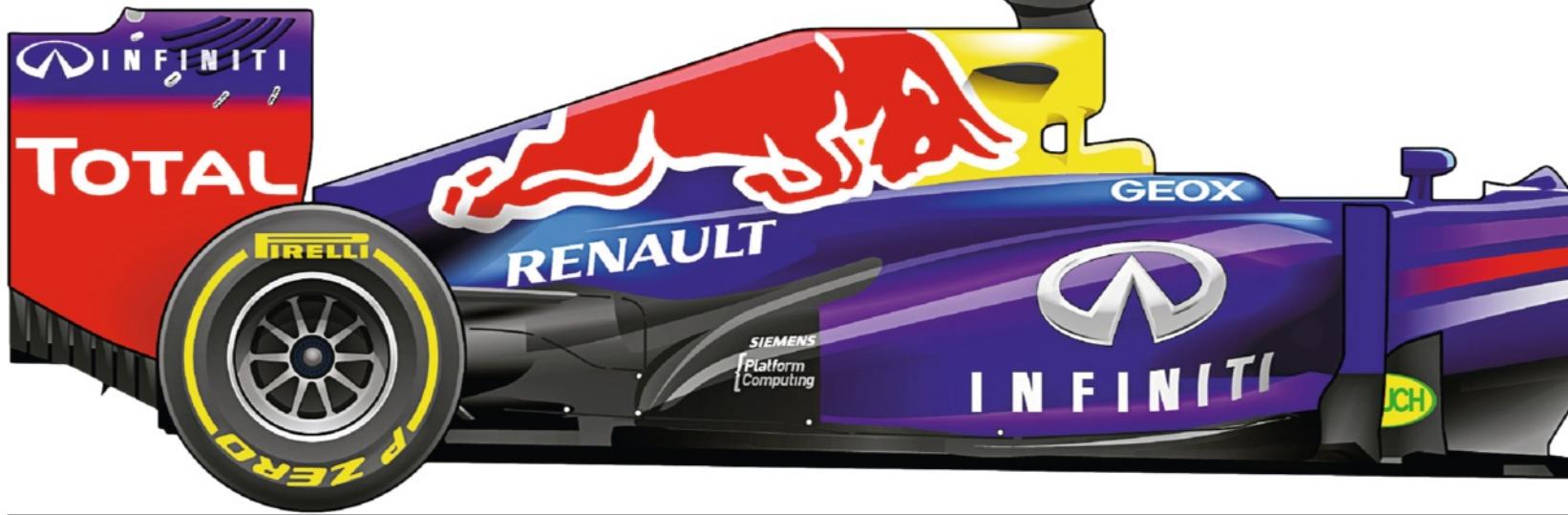
2011 Results

1 Sebastian Vettel	241
2 Jenson Button	200
3 Fernando Alonso	188
4 Lewis Hamilton	122
5 Nico Rosberg	90
6 Mark Webber	70
7 Paul di Resta	44
8 Adrian Sutil	38
9 Heikki Kovalainen	26
10 Michael Schumacher	23

2012 Results

1 Fernando Alonso	269
2 Sebastian Vettel	198
3 Lewis Hamilton	177
4 Kimi Raikkonen	176
5 Jenson Button	104
6 Mark Webber	66
7 Nico Hulkenberg	50
8 Nico Rosberg	30
9 Sergio Perez	30
10 Felipe Massa	27

Red Bull



With a car whose DNA was from the RB5 of 2009, Red Bull remained a step ahead of the opposition, who still couldn't work out its staggering aero superiority. By MARK HUGHES

Only six times in 19 races did Red Bull fail to win, but it was the second half of its season that was truly remarkable. Once Pirelli switched to the tougher 2012-type constructions after Silverstone, Sebastian Vettel was defeated only once – by Lewis Hamilton in Hungary.

The RB9 was the fifth version of the theme initiated by 2009's RB5. The concept's inherent strength was apparent as it again made for a car that could generate more underbody downforce than anything else. In a five-year reign its secret was never decoded. The RB9, just like its recent predecessors, could run visibly more rake than

any other car without the usual pitfalls of the diffuser stalling or the tea-tray leading edge of the floor digging into the track surface. Quite how it achieved these feats was the key mystery to the car's speed.

Enhanced Coanda bulges directing the exhaust gas to the brake ducts and diffuser sides took care of exhaust-enhanced downforce at low speeds on-throttle, while the associated bodywork tunnels took airflow from the bottom of the sidepods over the top of the diffuser and kept it from interfering with the exhaust flow. Moist conditions at both Austin and Interlagos made a crucial part of the car's airflow briefly visible; vortex creation from the interaction of



DUNBAR/LAT

Vettel dominated; Webber departed for sportscars

1

Championship position
2012 position: 1st



SEBASTIAN VETTEL

Starts	19
Wins	13
Poles	9
Fastest laps	7
Points	397

"His peaks have always been incredibly high but what has been so exceptional this year has been his repeatability," says Christian Horner. Totally at ease with the rear instability on corner entry that allows him to maximise the exhaust-blowing downforce, Vettel displayed perfect judgement of tyres throughout a lap for all-important poles.

3

Championship position
2012 position: 6th



MARK WEBBER

Starts	19
Best finish	2nd
Poles	2
Fastest laps	5
Points	199

Into his final year of F1, he retained a formidable turn of speed, especially through high-speed sections. But as the demands of technique to maximise exhaust blowing and cylinder-cut mapping became ever-more intricate, so the deficit to Vettel grew. Thereafter he was relying on opportunism to beat him.

"Moist conditions at both Austin and Interlagos made a crucial part of the car's interaction of airflows briefly visible"

→ P64 HOW VETTEL DOES IT



two different flows coming off the front wing boosted the speed of flow down the lower sidepods, feeding those tunnels and keeping that diffuser from stalling. "Controlling that vortex is key to making the rear aero work properly," allowed Adrian Newey. It is believed that the various vanes on the wing undersides and those ahead of the sidepods are carefully adjusted for each track to keep the vortex from bursting and to give the required traits.

One aerodynamicist has offered the view that vortex simulation is very difficult to achieve with the conventional CFD (RANS) used in F1 and that teraflop restrictions tend to rule out more sophisticated types that could do this accurately. But perhaps Red Bull has found a way around this.

Just as in previous years, it certainly found a way around the limitation of moving the leading edge of the floor upwards to accommodate extreme rake, despite being able to pass the static-load test. The original strut system used within the tea tray (as used by several other teams) was replaced later in the year by a transverse cantilever spring. Both systems allowed the floor to bend asymmetrically without being damaged, with the strut or spring taking the strain. Sophisticated lay-up of the carbonfibre comprising the tea tray is believed to be the key to Red Bull's advantage in having the floor bend upwards by the required degree beyond the static load limit.

Once the tougher 2012 Pirellis were recommissioned for the second half of the season, Red Bull's downforce advantage could be more fully exploited. This allowed such a significant advantage that it could often surrender some of its ultimate lap-time potential in favour of higher, more raceable end-of-straight speeds yet still secure pole. The 2012 Pirellis were by no means an all-out performance tyre as would be used in a tyre war, but they were sufficiently superior to the flexi-sidewall 2013 spec that it allowed a much greater proportion of Red Bull's aero superiority to be accessed. But for the competition the scary thing was that we

were still not seeing the car's ultimate superiority, thanks to the tyres.

Vettel made phenomenal use of the devastating tool at his disposal and could always adapt his technique to what was required. His main advantage over team-mate Mark Webber came in the slow corners where adapting to the demands of the exhaust blowing was key. Further refinement to Renault Sport's engine mapping allowed a very sophisticated sequence of cylinder cut at part-throttle, giving some similarities to traction control. When combined with electronics that informed the engine which direction the steering was being turned this could also be used to enhance the corner-entry phase. Vettel was quickly on top of the new demands brought by this too. His status within the team – and that ruthless streak within the affable exterior – allowed him to prevail in the two races where Webber might otherwise have won: Malaysia and Japan. Everywhere else his margin of superiority was such that he could win regardless.

The combination of a super-funded team using the talents of Adrian Newey and Vettel has set the bar perhaps higher than it has ever been.

1st
Championship position

13
Wins

24
Podiums

11
Poles

12
Fastest laps

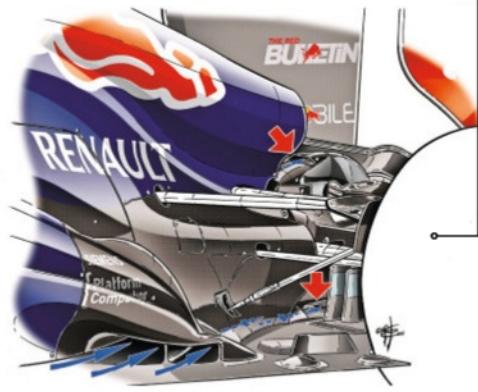
TECHNICAL APPRAISAL

COANDA EXHAUST

GARY ANDERSON: The Red Bull has an inlet that channels air underneath the exhaust exit ramp. While the exhaust gases are channelled towards the brake ducts to generate more rear downforce, the airflow from the undercut in the sidepods is sucked through this duct to feed the centre part of the diffuser.

As the diffuser gets closer to the ground, there is greater low pressure created and this increases the risk of stalling. In Red Bull's case, this low pressure sucks more air through that inlet to prevent, or at least delay, that stall, ensuring consistent downforce at a variety of rideheights.

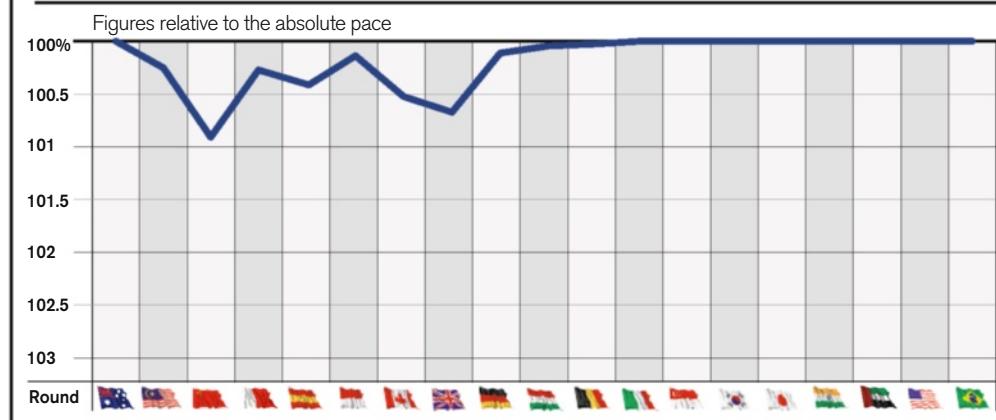
The uppermost red arrow shows an air intake that Red Bull briefly experimented with when it was trying a passive DRS. Airflow emerging from the main cooling exit at the back of the engine cover was channelled into it and diverted to decrease the performance of the beam wing, which in turn reduces the drag.



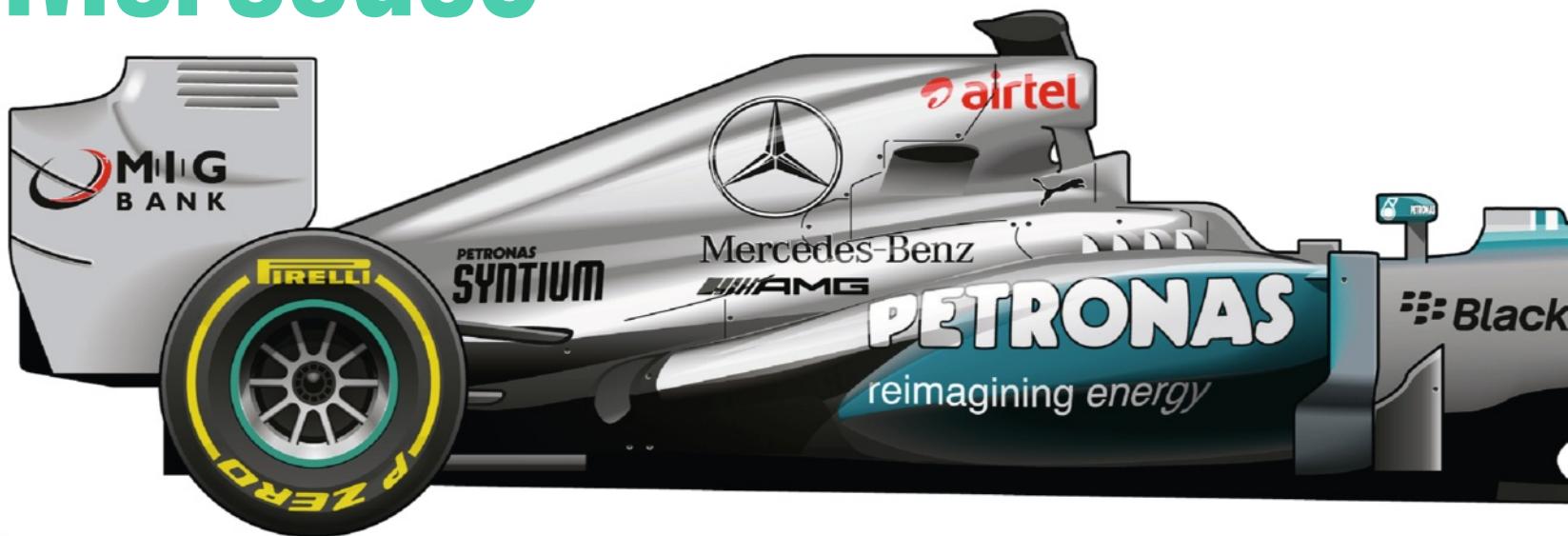
Vettel's India celebrations didn't go down well with FIA



RED BULL'S PERFORMANCE AT EACH RACE



Mercedes



For all the turbulence regarding the team's management, this was an impressive season from a team that leapt three places in the constructors' championship. By MARK HUGHES

Second place in the constructors' championship, with three victories and eight poles, is testimony to the great strides made by Mercedes in 2013. Lewis Hamilton was pleasantly surprised by just how competitive his new team proved to be, and in July there was even talk of a possible title challenge – then reality and Red Bull domination hit. Nonetheless, the upturn in form reflected a major upgrade in investment made the year before, notably the 60 per cent windtunnel.

"It's no coincidence that when we had the fifth-highest budget in 2011 we finished fifth in the 2012 constructors' championship," says Ross Brawn, "and with the second-highest budget in

2012 we finished second in 2013."

There was much else that was new about the team, as Hamilton replaced Michael Schumacher alongside Nico Rosberg. Before the season started, Mercedes stalwart Norbert Haug stood down and the Stuttgart manufacturer replaced him as its director of motorsport with Toto Wolff, who also took a shareholding in the team. At the same time Niki Lauda was appointed as non-executive chairman.

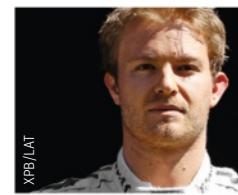
All this brought some complication in that Wolff arrived with a commitment to recruit McLaren's technical director Paddy Lowe on the understanding that he would in time become team principal. Which was news to incumbent team principal Ross Brawn. Lowe arrived in July



TEE/LAT



Championship position
2012 position: 9th



NICO ROSBERG

Starts	19
Wins	2
Poles	3
Fastest laps	0
Points	171



Fresh from seeing off Schumacher, his standing continued to grow as he took on Hamilton on level terms and won two races. His best drives were smart blends of tyre conservation and great pace at appropriate moments, but he could occasionally get lost on set-up early in the weekend and not recover.



Championship position
2012 position: 4th



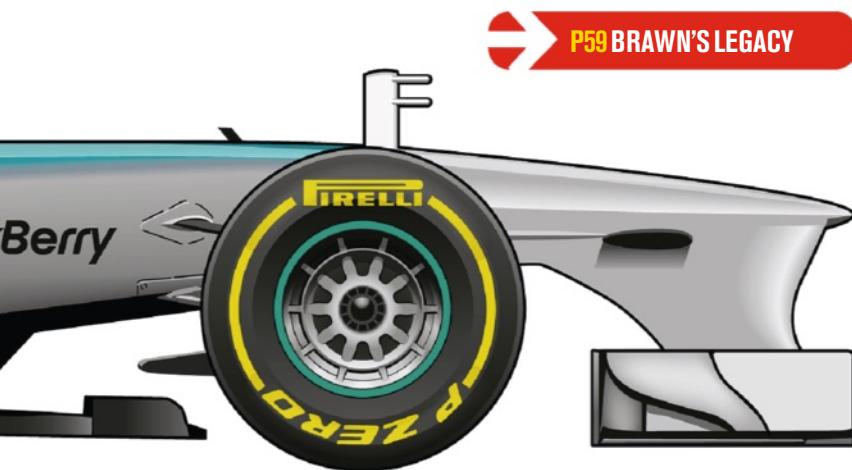
LEWIS HAMILTON

Starts	19
Wins	1
Poles	5
Fastest laps	1
Points	189



Not, by his own standards, a vintage season. Five poles and one win say more about the car's traits than his, but he took a long time to get fully familiar with the Merc's systems. Unavailability of McLaren-exclusive Akebono brake calipers led to him believing that he'd left performance on the table at times.

"Feeling unable to access what has always been one of his key advantages, Hamilton felt he underperformed during 2013"



2nd
Championship position

3
Wins

9
Podiums

8
Poles

1
Fastest laps

TECHNICAL APPRAISAL

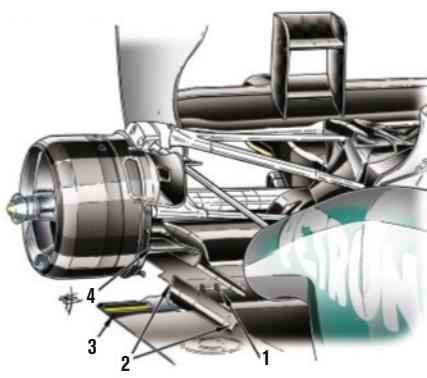
REAR BRAKE DUCTS

GARY ANDERSON: We refer to exhaust-blown diffusers, but it's really about getting the exhaust gases to work with the brake ducts.

In a medium-speed corner, a car is perhaps moving at 40-45m/s, and that air speed is used to create downforce. But the exhaust gases can be travelling at 150m/s at full throttle, so the downforce-generating potential on the rear-brake-duct wing sections is huge.

The brake duct (4) is effectively a wing. It gives downforce directly onto the upright, so has none of the lag you get if you create downforce on the body and it has to go through the suspension. In turn, the brake duct helps to seal the diffuser.

Arrows 1 and 2 are there to realign the flow and to stop the exhaust flow going where you don't want it to. Arrow 3 is a slot most cars have to keep the air on the surface of the floor rather than it going underneath.



as executive technical director and worked well alongside Brawn, and there was much intense negotiation in trying to retain the eight-time title winning principal. But the only terms on which Brawn was prepared to continue were as the boss and he duly stepped down at the end of the season. The foundations he has put in place look very solid.

The W04 was the first Mercedes by ex-Lotus chief designer Mike Elliott and it shared much of the Lotus's smooth-riding, kerb-smothering traits. Incorporated into its hydraulically-linked suspension was a measure of roll control. With the banning of secondary DRS in 2013 there were none of the '12 car's aerodynamic novelties to distract the team, just a straightforward, svelte-looking machine.

There was no attempt at emulating the extreme Coanda layout pioneered by Red Bull the year before, the car's rear-end bodywork instead featuring a conventional McLaren-like, tightly waisted Coke-bottle profile and no tunnels to link the airflow from the end of the sidepods to the rear of the car. The team looked at both systems but could find no advantage to the Red Bull system – which suggests it was missing a trick. "It's quite possible that there were subtleties of mapping on the Renault engine that allowed Red Bull and Lotus to make that layout work," says Brawn, "but for us it just meant that off-throttle it would have been effectively a conventional car but with a compromised Coke-bottle shape. All three Mercedes-engined cars ended up with a conventional layout."

It was good enough for the car to become the pole king of the season's first half, Hamilton and Rosberg starting from the front on four consecutive occasions between China and Monaco. Even as late as mid-season Hamilton took another four poles between Silverstone and Spa, and it was clear the car was very effective at switching on its tyres.

Hamilton wasn't raving about it, however. He was delighted at how competitive it was but reckoned he had difficulty feeling the car, that its feedback to him was not great, especially

under braking. Feeling unable to access what has always been one of his key advantages, he felt he underperformed in 2013. He did however take a great victory with a very smart, measured drive at Hungary, just as in '12. Rosberg relished being able to run on equal terms with Hamilton, generally having the edge on him early-season and taking two polished wins at Monaco and Silverstone.

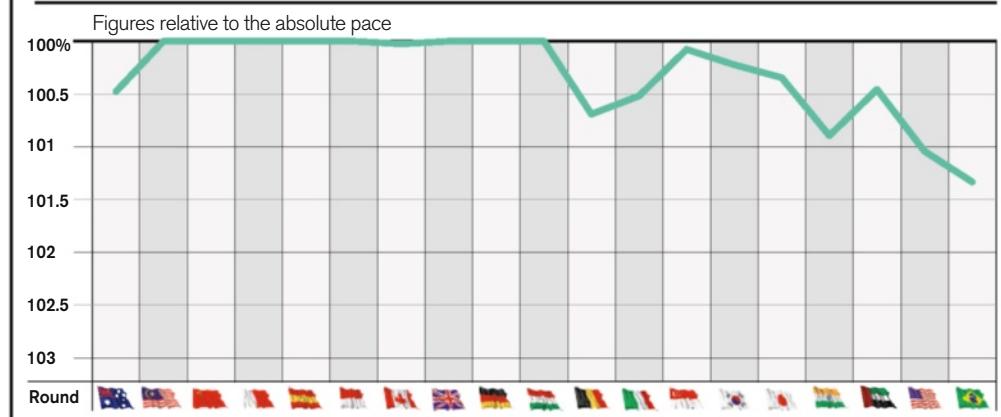
But still within the car's DNA was some of the rear-tyre heat degradation that has so blighted the team. A secret test (or private test as Merc would prefer to call it) was conducted by Pirelli with Mercedes at Barcelona. As the car heaviest on the tyres it was the ideal machine for Pirelli, desperately trying to get to the bottom of the problems with its 2013 construction. But it would be naive to believe that Mercedes didn't derive some benefit too. When the other teams found out there was a certain degree of excitement...

The tyre-degradation issue was under much better control into the second half of the season, but some of the raw pace had disappeared. Relative to the others (not only Red Bull) the W04 lost a couple of tenths on the tyres used in the second half. But with Ferrari in even bigger trouble, second place was secure.

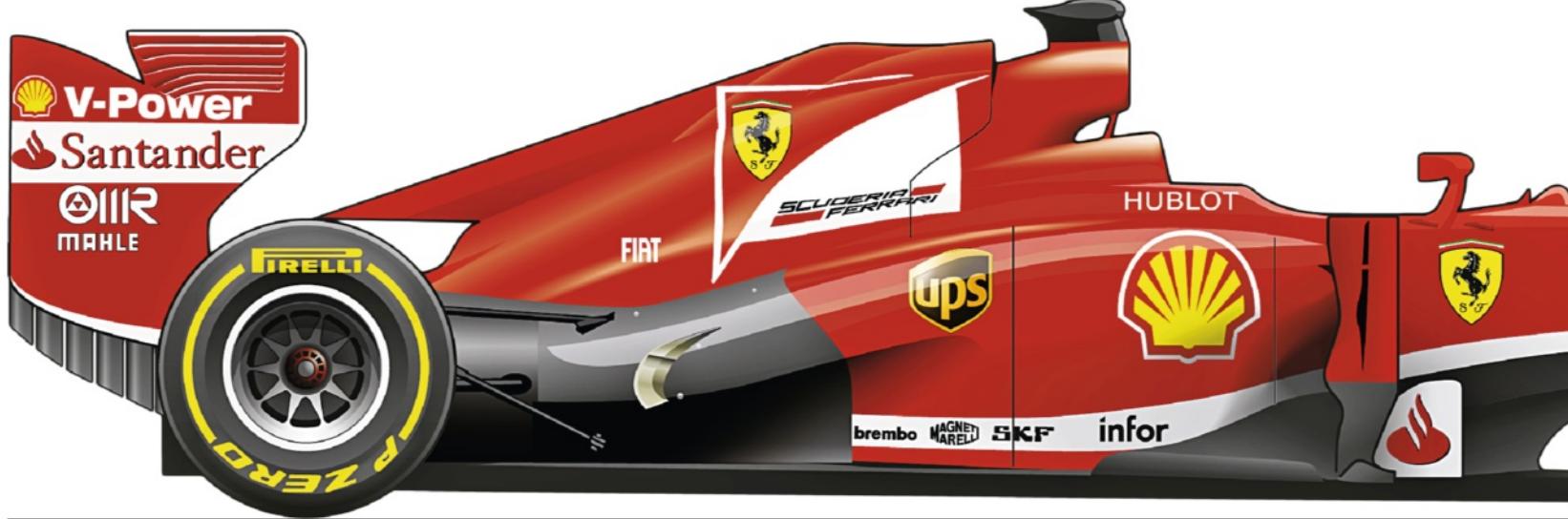


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MERCEDES' PERFORMANCE AT EACH RACE



Ferrari



It wasn't just the mid-season change in tyre spec that turned the Prancing Horse's gallop into an erratic canter. Failed developments played their part too. By MARK HUGHES

34

our seasons together, and all of them blighted by Red Bull dominance. The relationship between Ferrari and Fernando Alonso cracked, and by mid-season even the marriage itself was being called into question. It's repaired for now, but...

It had all started out OK at the beginning of the season. The F138 was a competitive tool, if slightly lacking in rear downforce. A logical evolution of the previous season's car, it retained its front pullrod suspension and conventional exhaust/rear-bodywork arrangement. It wasn't the ultimate qualifier, but on the delicate new Pirellis it was a very effective racecar in Alonso's hands. He took comfortable victories at Shanghai and Barcelona, no one else able to run anything like as efficient a combination of pace and tyre degradation. It was

notable that at both those venues the generic limitation for everyone was front graining; the Ferrari-and-Alonso combination seemed very adept at controlling that, and how much a part each party played was a salient point. Certainly, team-mate Felipe Massa had front-tyre graining as bad as that on any other car.

Although the Ferrari was less convincing when the limitation was rear heat degradation, in this first half of the season it still looked a competitive enough proposition that Alonso could be expected to make a fight of it in the championship, just as he'd done in 2010 and '12. The Red Bull was struggling on the front-limited tracks at which Alonso/Ferrari excelled, the Mercedes was having more serious rear degradation issues than the Ferrari, and the Lotus couldn't qualify well enough. As Alonso took useful podium places in Canada and Britain, it looked like game on.



HONELAT

2

Championship position
2012 position: 2nd

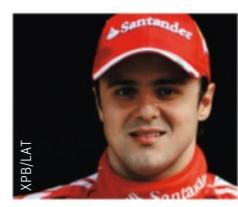


FERNANDO ALONSO
Starts 19
Wins 2
Best qualifying 3rd
Fastest laps 2
Points 242

Two clinical victories at Shanghai and Barcelona, delivering 100 per cent as soon as the tyre-usage opportunity presented itself. His driving continued to be marked by that heady opportunism, although the effect was enhanced by a car that raced better than it qualified. When the car was off the pace, his motivation in qualifying was sometimes questioned.

8

Championship position
2012 position: 7th



FELIPE MASSA
Starts 19
Best finish 3rd
Best qualifying 2nd
Fastest laps 0
Points 112

Massa recovered from the crisis of the first part of 2012 and his qualifying pace was very respectable. But he could never get as efficient a combination of tyre use and pace as Alonso from either spec of Pirelli construction, and his races were often compromised by small errors, his weekends sometimes never recovering from practice mishaps.

"Ferrari was trying to find ways of getting front downforce that didn't hurt the rear, but was not particularly successful in this quest"

P52 DIARY OF DISAPPOINTMENT



Then Pirelli changed the constructions in the wake of Silverstone, Red Bull took a huge competitive leap as a consequence and Ferrari was never even close to race-winning form again. The tougher tyres definitely hurt the team initially, as Alonso observed at the Nurburgring: "On the original tyres we had been almost like the Lotus in how we used them, but here on the 2012 tyres we are abusing them." Just as surely as they hurt Ferrari, so the tyres helped Red Bull and the gap became a chasm – one which was filled by Lotus and occasionally Mercedes.

But it was about more than just the tyre change. The development had stalled. Tech director Pat Fry points to a Montreal upgrade as the turning point: "In Canada we took a new top bodywork to try and the results were not conclusive. Up until then the development gradient was going quite well. Through the winter we had a reasonable development period and the first-race upgrade package worked quite well, some bits actually better than we were expecting. But then came this uncertain period in Canada and that's really when our development rate began to roll over. When you're developing, if you've got one thing that's not 100 per cent, what do you do with it? Because by that time the windtunnel model has progressed on and when you try to back out of something it gives you a load of problems."

A clue as to the nature of the problem came on the low-downforce venues of Spa and Monza, where the car was suddenly much more competitive and its drivers were reporting that the rear end felt more stable than at conventional high-downforce tracks. With that set-up, the front wing seemed to be spoiling the airflow to the rear of the car. With the front wing trimmed back for Spa and Monza, suddenly the rear was receiving a better airflow. For the balance of the season Ferrari was trying to find ways of getting front downforce that did not hurt the rear, but was not particularly successful in this quest.

Alonso had allowed his frustration to boil over in the summer, had made overtures to Red Bull, said something about the car perceived by Luca

di Montezemolo to be disrespectful – and suddenly his very future there was in doubt. As an insurance against his leaving, Ferrari signed Kimi Raikkonen – and Massa was shown the door after eight loyal years.

Alonso and Ferrari continue together into 2014 trying to patch things up, hoping that the recruitment of Lotus tech director James Allison and chief of aero Dirk de Beer can bridge the gap – and that the engine department is on top of the challenges of the new formula.



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FINNEY/GETTY

TECHNICAL APPRAISAL

→ DIFFUSER DETAILING

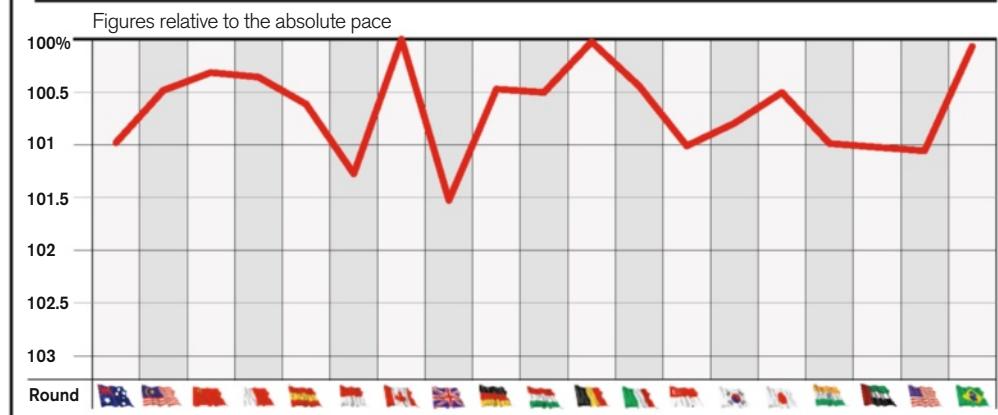
GARY ANDERSON: Back in 2009, Brawn was the first team to start working with this kind of concept, with the detailing of the diffuser outer wall designed to turn the air around as quickly as possible and connect the low-pressure area behind the rotating rear wheels to the low pressure under the diffuser.

To do this, you make the diffuser wall slightly shorter than the regulations allow. The low pressure under the diffuser is used to suck air through the diffuser, creating more downforce from the underfloor. By adding the power of the low pressure behind the rear wheel to that, the effect is increased.

This is a good example of turning a negative into a positive – if the two areas of low pressure are not connected, the one behind the rear wheel just creates drag. Lotus has probably done the most work with this concept, but Ferrari made some progress with it this year.



FERRARI'S PERFORMANCE AT EACH RACE



Lotus



The team currently known as Lotus ended the season as Red Bull's biggest rival – but fighting for its own existence as a result of F1's lopsided commercial situation. By MARK HUGHES

36

The team with one of the fastest cars of all, that was in the battle for second in the constructors' championship, that formed Red Bull's only real competition for most of the second half of the year, was fighting for its very survival. That sums up everything that's wrong about the current F1 economic model.

Kimi Raikkonen won the season opener in Melbourne for the team, but would depart with two races to go, claiming not to have been paid any of his contracted 2013 salary. Post-Monza he signed a '14 contract with Ferrari simply because he doubted Lotus was going to be able to pay him.

Partly this was about the unique way the team is structured through Genii Capital, but it was also about the small share of the vast revenue some teams get. Genii's tricky cashflow to the team simply highlighted the bigger problem. The

Enstone team, four-time title winner in the guise of Benetton and Renault, was effectively written out of the lucrative deals given to other previous championship-winning teams on the technicality of its name. That came home to roost in 2013 even if on-track the team enjoyed a terrific season.

The chief difference in concept of the E21 from its 2012 predecessor was the switch to a Red Bull-type exhaust/rear-bodywork arrangement, with sharply descending sidepods containing enhanced bulges for the Coanda-effect exhausts, and beneath that bodywork tunnels taking the airflow from the bottom of the sidepods to the top of the diffuser, keeping the two flows – exhaust and lower-sidepod airflow – separated. It may be no coincidence that the three Renault-powered cars all began the season with this arrangement as Renault Sport paid intricate attention to the subtleties of mapping that were



COATES/LAT

Raikkonen (centre) won Australian GP from seventh on the grid

5

Championship position
2012 position: 3rd



KIMI RAIKKONEN

Starts	17
Wins	1
Best qualifying	2nd
Fastest laps	2
Points	183



Fantastically efficient points scorer in the first half of the season; slightly more disadvantaged than his team-mate by the change in tyre spec from mid-season onwards. The relationship couldn't survive his not being paid his contracted salary, even though in many ways Enstone was the perfect team for him.

7

Championship position
2012 position: 8th



ROMAIN GROSJEAN

Starts	19
Best position	2nd
Best qualifying	3rd
Fastest laps	0
Points	132



After a fairly quiet opening half-season, partly the hangover of his crash crisis of 2012, partly his dislike of the 2013-spec tyre, he came alive and finally became the great F1 driver he'd always threatened to be. Fantastically fast, wonderfully combative (that stunning pass on Massa at the Hungaroring) and immune to pressure.

"There was little of Raikkonen's outrageous flair of his McLaren days, but he had arguably the safest hands in the business"

P70 MIRACLE OF ENSTONE



21

Championship position
2012 position: 22nd



PENNINGTON/GETTY



HEIKKI KOVALAINEN
Starts 2
Best finish 14th

Best qualifying 8th
Fastest laps 0
Points 0

He stood in for Raikkonen for the last two races. His run at Austin – in line to finish eighth before a technical problem intervened – was about what could reasonably have been expected.

possible within regulations that demanded each team submit three basic maps pre-season, which then had to be used throughout.

This team pioneered hydraulically-linked suspension back in 2008 and its system continued to endow the Lotus with a beautifully compliant ride and stable aero platform. Just as in '12 the car was gentle on its tyres, often able to favour the option at races where other teams had to settle for the slower prime, sometimes even able to contemplate one stop fewer than rivals. Again, its chief limitation was in qualifying, when it often could not generate the instant warm-up required. For similar reasons, cool temperatures or rain were not the car's friend.

At the opening event, where no one was quite sure just what the super-delicate 2013 Pirellis were going to do, Raikkonen was in a serene race of his own once everyone's strategies had all played out. He reckoned this was perhaps the easiest grand prix victory he'd ever earned. That, however, was the last time the car actually won, even though it continued to feature strongly.

Once Red Bull, Ferrari and Mercedes began making sense of the tyres, Lotus's job was made more difficult. But Raikkonen continued to be a points-harvesting machine. There was little of the outrageous flair of his McLaren days but he had arguably the safest pair of hands in the business.

There was relatively little development on the car during this phase, just a bunching forward of the exhaust and sidepod to help the compromised Coke-bottle profile and off-throttle stability.

As the tyre spec changed after June's British GP, Lotus's laptime gap to the front remained much as before, but Ferrari and Mercedes

4th
Championship position

1
Wins

14
Podiums

0
Poles

2
Fastest laps

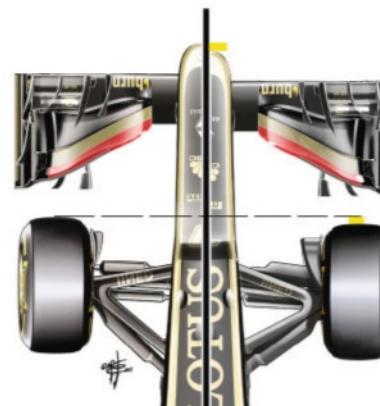
TECHNICAL APPRAISAL

→ LONG WHEELBASE

GARY ANDERSON: Lotus raced its long-wheelbase car for the first time in the Korean GP after first trying it on Kimi Raikkonen's E21 during Friday practice at Monza.

The chassis remained unchanged. The extension of the wheelbase was achieved by angling the front wishbones and pushrods forward, moving the front wheels forward by around 100mm. This necessitated the creation and crash testing of a new, extended nose to ensure the distance to the front wing was sufficient to comply with the regulations.

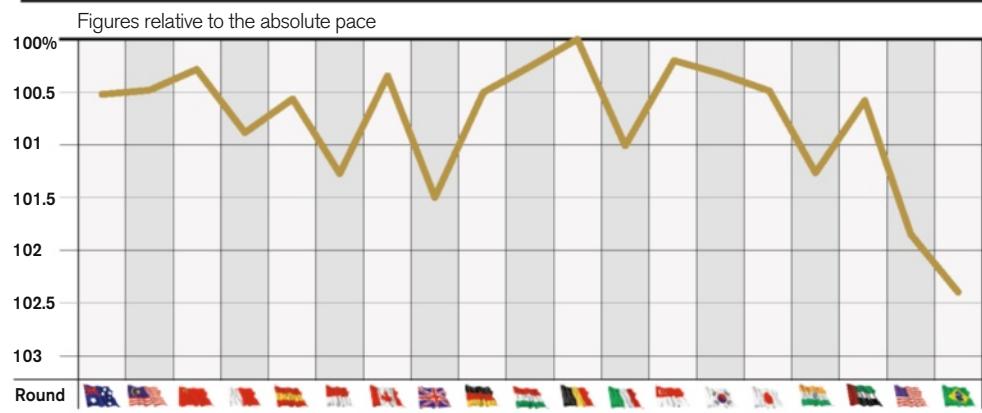
The change was apparently made for vehicle-dynamics reasons, although there is also a marginal aerodynamic advantage by having the front wheels further away from the leading edge of the sidepods. It also had the potential to make the car easier on tyres, not exactly a weakness of the Lotus E21, and also to increase braking stability because the weight transfer is less. It also made the car lazier and less responsive in slow corners.



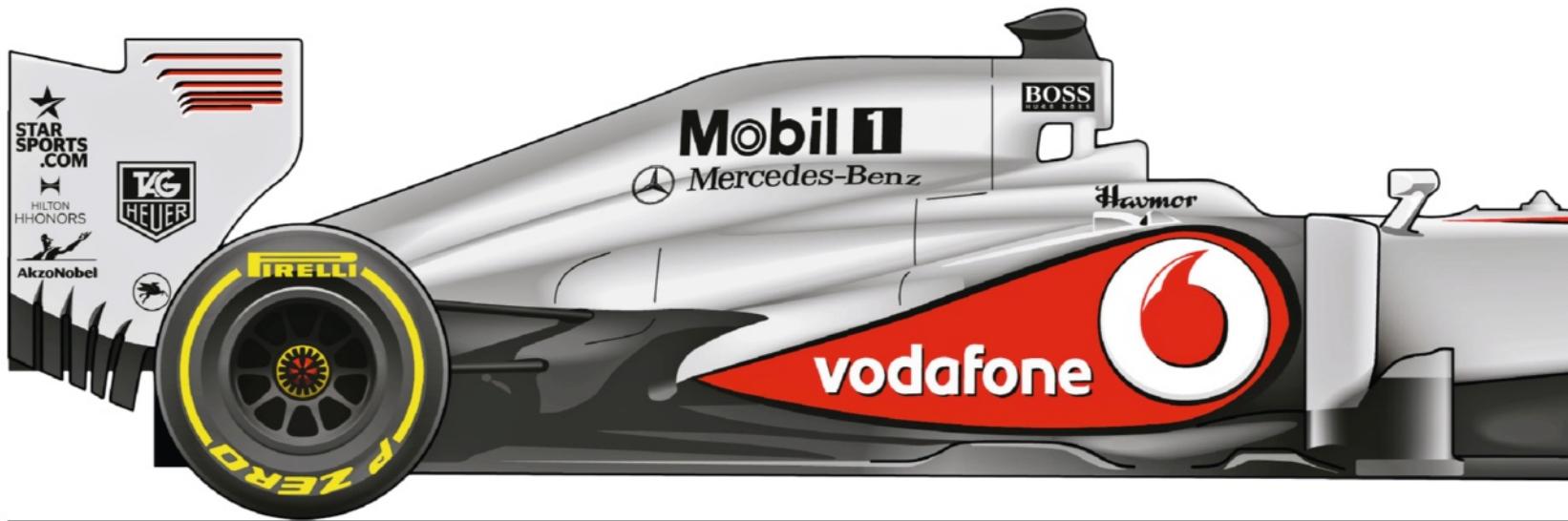
immune to pressure. His drives at the Nurburgring, Suzuka and Austin were fabulous.

In September the team introduced the slightly longer-wheelbase derivative of the car. It was to get around the standard machine's problem of a slight instability on corner entry. This calmed that down a little without having to then induce mid-corner understeer. It also allowed the interlinked FRICS suspension to lift the front of the car higher down the straights without the rear grounding its underbelly in a shower of sparks, helping with drag reduction.

LOTUS'S PERFORMANCE AT EACH RACE



McLaren



Typical McLaren: the team went out on a limb by going all-new for the final year of the rules cycle. The gamble failed, and loss of Hamilton and tech boss Lowe didn't help. By MARK HUGHES

This was a vertiginous drop. From having the fastest car in the field at the end of 2012 to a podium-less season, McLaren dropped the ball in the biggest possible way. The decision to ditch the technical philosophy of the previous three years to move to something quite different in the final season of a formula still seems an odd one. But the reasoning behind it was very typically McLaren: it figured that with everyone else staying with what they had, there was a big advantage to be found by being more aggressive.

With its incredible facilities and resources it could surely use its simulation tools to finesse

even a car almost wholly unrelated to the previous one – or so the team thought. As it turned out, it could not. McLaren lost control of the simulation process and what emerged was an MP4-28 with a major flaw: it could not run to its designed rideheight without the underbody airflow stalling badly.

New features of the car included pullrod front suspension (following Ferrari's lead of 2012), chassis height, different sidepod and rear-end aerodynamics and rear suspension. It retained similar front and rear wings and its exhaust/rear-bodywork arrangement – just like all the other Mercedes-powered cars – favoured Coke-bottle profile over

9

JENSON BUTTON

Starts	19
Best finish	4th
Best qualifying	6th
Fastest laps	0
Points	73

Championship position
2012 position: 5th




The man who won the last race of 2012 barely figured with the disappointing MP4-28. His usual difficulty with changing balance often thwarted him in qualifying, the difference being that it was happening much further down the grid. He could still produce great, silky drives that flattered the car, such as taking fourth in Brazil.

11

SERGIO PEREZ

Starts	19
Best finish	5th
Best qualifying	7th
Fastest laps	1
Points	49

Championship position
2012 position: 10th




Perez didn't have a bad season – it just wasn't the sparkling one McLaren was hoping for. He was generally, but not always, slightly behind Button and his technical understanding was not great. In races he was feisty and combative – too much so for Button in Bahrain. Didn't make a convincing case for his being retained as a McLaren driver.

Button missed podium for first time since Honda days

MASON/GT/GETTY

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"Each area of change was worked upon independently, originally under the direction of Lowe, who resigned before the launch"



the ultimate Coanda exhaust effect.

Each area of change was worked upon independently, originally under the direction of Paddy Lowe. But Lowe resigned his position even before the car was launched and technical directorship then fell to Tim Goss. "Each of the projects was well-researched but you tend to do it in isolation," explained Goss. "And then when we pulled all of that together and ran that version in the tunnel for the first time, it just didn't click."

"It took us until December [2012] to get the performance back up to a reasonable level. But in doing that we ended up with quite a peaky characteristic. In the Barcelona test we could extract some reasonable performance, but by the time we got to a much bumpier track in Melbourne we had to run the car away from its peak performance and really suffered as a result."

Jenson Button and Sergio Perez qualified respectively 10th and 15th there for the opening round. Exacerbating the problems, the car had the usual McLaren designed-in feature of running within a very limited rideheight window, requiring the suspension be equally limited in its travel. Bumps upset it – but that was nothing new. What was new were the low levels of grip at which this would happen.

To prevent underbody stall, that rideheight window was very tame and the aerodynamics did not respond to being run with rake. The

aerodynamics were further detuned for the following Malaysian GP in order to make it more driveable, and only from that low point could the development work begin on trying to close the deficit to the front. As the quick cars became ever-quicker, so the gap to McLaren remained much the same throughout the year; it never did establish itself as a surefire Q3 qualifier, and its rivals were Force Indias, Saubers and Toro Rossos rather than Red Bulls, Mercs and Lotuses.

For a time early-season there was pressure from Ron Dennis to re-introduce the 2012 car, but team principal Martin Whitmarsh decided not to do that, guided by an engineering staff who insisted it could make the MP4-28 work.

This was not the ideal season in which to be losing Lewis Hamilton, a driver capable of taking a recalcitrant car by the scruff of the neck. In Button and Perez it had two drivers who need the car to be balanced to get the best from themselves. Button produced some excellent drives but all too often was caught out by a balance change in qualifying. Perez was generally outperformed by Button and for this reason was released by the team at the end of his first year there.

5th
Championship position

4th
Best finish

0
Podiums

0
Poles

1
Fastest laps

TECHNICAL APPRAISAL

FRONT WING STRUGGLE

GARY ANDERSON: The McLaren front wing is at odds with the philosophy of other big teams. The Red Bull, Ferrari, Lotus and Mercedes main front wings all have six or seven elements on the outboard section in front of the front tyre. McLaren only has three elements, which is a disadvantage.

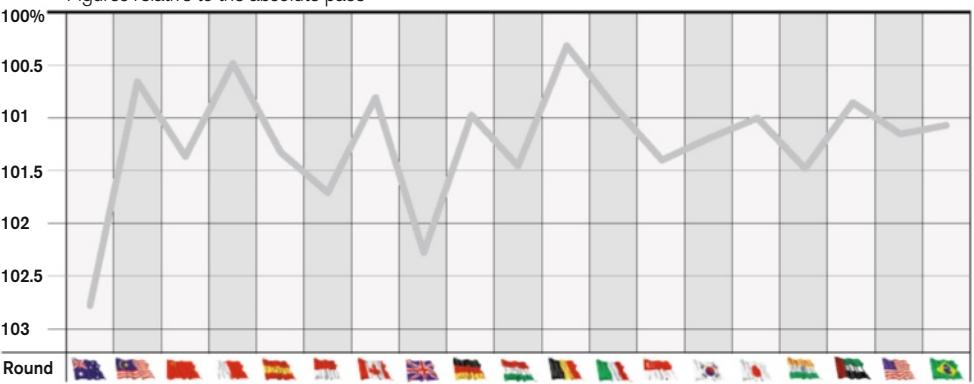
When the front wing gets near the ground, at a certain point it will stall and what McLaren has is far too big a stall. It's like a light switch that goes on and off, whereas Red Bull has more slot gaps, so it's more of a dimmer switch that can be tuned to the amount of stall acceptable.

The inset (top drawing) shows the earlier design compared to the modified one. McLaren's change (1), just outside the FIA-mandated 'neutral' centre section, is designed to generate a vortex to stop air leaking underneath the floor. Arrow 2 shows one of the mounting brackets that was removed, while 3 shows that the pillars holding the wing were moved rearwards.



MCLAREN'S PERFORMANCE AT EACH RACE

Figures relative to the absolute pace



Force India



A nifty trick with the high-degradation Pirellis helped this team to punch above its usual midfield weight. But the mid-season tyre-spec change nipped that in the bud. By MARK HUGHES

40

More than any other team, Force India's campaign was disrupted by the mid-season change of tyre construction. It had configured a car, the VJM06, with particular attention paid to tyre usage in terms of aero and weight distribution, keeping as much load as possible away from the vulnerable rears.

It was otherwise directly related to the 2012 car, still with Mercedes engine/McLaren gearbox and still with a pronounced Coke-bottle layout for the rear bodywork rather than the tunneled Red Bull fashion. It ran a FRICS inter-connected front-rear suspension, the team's first experience of this technology introduced by Renault in 2008. It was not always used.

In the first part of the season Paul di Resta and Adrian Sutil were regular Q3 qualifiers. In fact,

there was at least one Force India in the top-10 shoot-out for seven of the first eight races. At April's Bahrain Grand Prix they started fifth and sixth respectively, with di Resta going on to finish a strong fourth. After a stop to replace a front wing damaged on the first lap, Sutil then kept the gap to the leaders for the rest of the race. In Malaysia in March, a good result had been on the cards until a wheelhub problem at the pitstops meant retirements for both cars.

Had reliability been better in the first part of the season when the cars were at their most competitive, it's feasible that Force India might have challenged McLaren's fifth place in the constructors' championship.

The team was well on top of the tyre demands, something that also became apparent when it was the first to discover that turning the rears to run counter-rotational brought significant



Sutil did a good job after a year out of Formula 1

DUNBAR/LAT

12

Championship position
2012 position: 14th



PAUL DI RESTA

Starts	19
Best finish	4th
Best qualifying	5th
Fastest laps	0
Points	48



Di Resta drove some impeccable races early in the season, notably to fourth in Bahrain. He was also able to use a wet session at Spa to come close to netting pole by getting straight onto inters, and even in the quickly drying conditions was able to line up fifth. He retained a late-season edge over Sutil too and it would be farcical if he were not in F1 in 2014.

13

Championship position
2012 position: n/a



ADRIAN SUTIL

Starts	19
Best finish	5th
Best qualifying	6th
Fastest laps	0
Points	29



On his return to the category Sutil performed to his previous high level, helping ensure that Force India's was a two-pronged attack against the mostly-single-scoring Sauber team. He did give best to his team-mate in both qualifying and race results but generally was very closely matched.

"It was a frequent phenomenon to see a Force India get by on one stop fewer than the rest and rise gently up the order"



Wheelnut issues cost team valuable points, notably at Sepang

benefits to tyre life, as technical director Andy Green explains: "We understood straight away from winter testing that it was the right thing to do. We saw it as soon as we got the data through at the end of last year. Pirelli had got them round the wrong way as far as we were concerned and we couldn't understand why they'd ever want to run them like that. So we swapped them, the second run in winter testing. For us it was clear; not over one-lap performance, but over a run it was huge – 10 to 20 per cent less tyre wear."

Using this trick and the car's easy-wearing traits, it was a frequent phenomenon to see a Force India get by on one stop fewer than the rest and rise gently up the order as the race went on. But even this car suffered one of the dreaded rear delaminations – with di Resta at Barcelona. With the multiple failures at Silverstone and the resultant switch to the tougher 2012 construction, Force India was effectively scuppered.

"We just couldn't get the heat into the tyres after that," relates Green. "We first tried [the 2012] tyres on this car at the young-driver test after the British Grand Prix and actually it wasn't too bad there. We thought we'd got away with it. But it was a very hot day

and combined with the long, fast corners it just disguised the very real problems we were about to have."

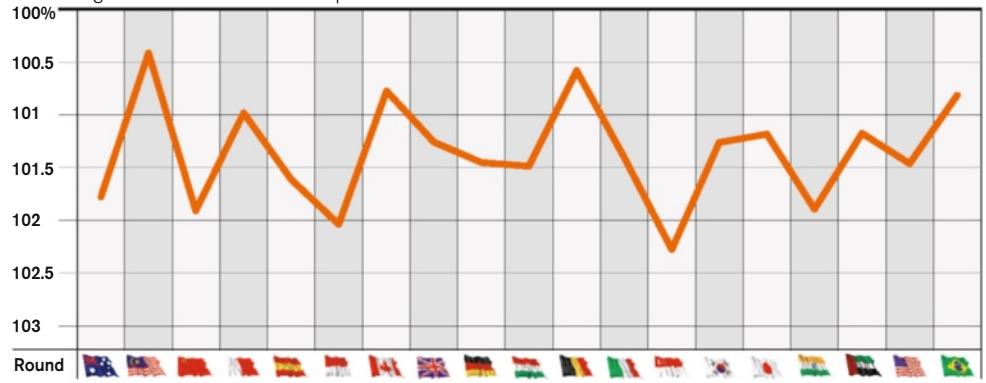
With the little team by now working flat-out on its 2014 car, to re-engineer the VJM06 to suit the '12 rubber was just not feasible. It dropped back to being a mid-Q2 level car and was leapfrogged by Sauber as it struggled for rear grip both laterally and in traction. Because of the situation, the decision was taken to halt all development on the car for the last few months of the season.

"We tried to make up for it with the set-ups," explained Sutil, "but with a package where we just couldn't make it. We tried different set-ups and it almost just slowed us down even more. Then we made driving mistakes because the car was so difficult to handle. So, in India we said, 'We stop it, we take what we've got,' and that was the key for the points we scored there."

A recovery of sorts was made by adapting this approach, and the points scored there and in the Abu Dhabi Grand Prix helped the team pull itself out of reach of Sauber in the constructors' championship.

FORCE INDIA'S PERFORMANCE AT EACH RACE

Figures relative to the absolute pace



6th
Championship position

4th
Best position

0
Podiums

0
Poles

0
Fastest laps

TECHNICAL APPRAISAL

FRONT-WING VORTEX GENERATORS

GARY ANDERSON: Force India had a good run in the first half of the season but then switched focus to 2014 relatively early. So it was not only the tyre change that held the team back.

But there were some small tweaks. One of them was the small vortex generators, about 15mm tall, on the surface of the front wing. These are in line with the splitters on the undersurface of the wing, which mount across the slot gap of the first to second elements of the main wing.

Because the airflow is at very high speed, when it hits the splitters you get airflow separation. For a 3mm splitter that's probably a 15-20mm influence on the wing profile, and these vortex generators partly split the airflow before it gets there. They also deflect bits of rubber that can get wrapped around the splitter leading edges in the slot gaps.



Di Resta starred, but future is uncertain

Sauber



The Swiss team made some great progress up the grid as the season wore on, especially with Nico Hulkenberg, but it came a little too late for its constructors' position. By MARK HUGHES

Sauber's season was a mirror-image of Force India's: weak in the first half, strong in the second. But the reasons had little to do with the tyre change. The turnaround came as Sauber reconfigured its C32 to use Red Bull-like rear aerodynamics. The modified car first appeared in July in Hungary and it completely rescued Sauber's season: the original car scored seven points, the modified version 50. It also allowed Nico Hulkenberg to advertise his talents as he sought to remain in F1 against the prevailing tide of pay drivers.

There was again a lot of change within the technical ranks of this team. Going into the season vehicle performance chief Pierre Wache left for Red Bull to be replaced by his understudy Ben Waterhouse. Tom McCullough joined from Williams as track engineering chief. Chief

designer Matt Morris was recruited mid-season by McLaren, replaced by Eric Gandelin. Willem Toet remained as chief of aero. Toet, McCullough, Waterhouse and Gandelin formed the team's technical committee, with no overall technical director.

The car used Ferrari engine, KERS and gearbox and also made use of a FRICS inter-connected suspension, technology it first tried in 2011. Although Sauber had been among the first in '12 to use an extreme sidepod ramp with exhaust-outlet bodywork bulges to help the exhaust Coanda effect, for the C32 the team opted to revert to a more conventional layout, with a McLaren-like enhanced Coke bottle.

"We thought we could keep the advantages of the Red Bull-type of geometry but with the added gain of reduced drag and other aero benefits," says McCullough, "but it turned out you really



COATES/LAT

10

Championship position
2012 position: 11th



NICO HULKENBERG

Starts	18
Best finish	4th
Best qualifying	3rd
Fastest laps	0
Points	51

Hulkenberg yet again proved that he is a world class driver, ready to win grands prix in a top car. He was able to adapt to the difficult beast that the C32 was early in the season and still churn out the occasional points finish. With the revised car he bounced right back up towards the front, embarrassing some bigger-budget players.

16

Championship position
2012 position: n/a

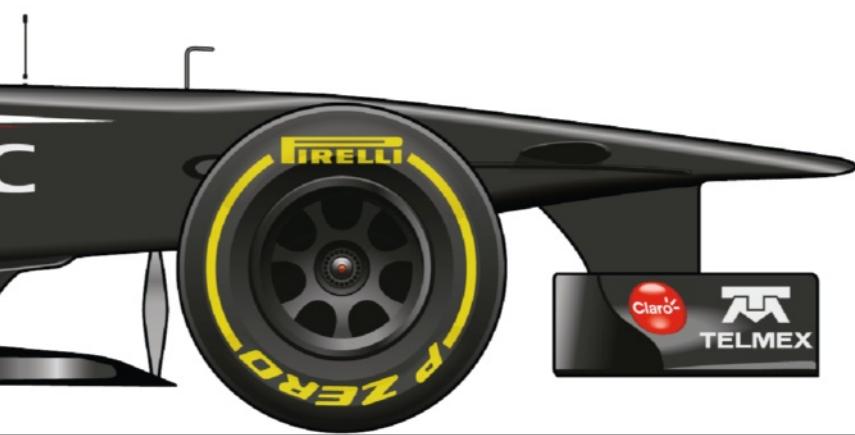


ESTEBAN GUTIERREZ

Starts	19
Best finish	7th
Best qualifying	9th
Fastest laps	1
Points	6

Unfortunate to begin his F1 career with such a difficult car and never approached Hulkenberg's performance. He was regularly very quick in the wet, however. His methodical approach won respect within the team but there is no convincing evidence that he will come to be an F1 driver in demand for anything other than his backing.

"For the last third of the season the Sauber regularly outpaced McLaren and was even threatening Ferrari as fourth-fastest car"



ROSE/GETTY

need quite high exhaust velocities to be able to achieve that and to get the exhaust plume to go where you want it." Sauber failed in this aim and the early-season car lacked rear-end downforce.

It also made for a car with differing traits in different parts of a corner, meaning it could not be resolved into a consistent machine no matter what set-up was used, something that made the car particularly challenging for rookie Esteban Gutierrez.

"We could operate the car well at the track," says McCullough. "This team has a very good understanding of tyres and that was very evident. But we just could not access the aero performance we knew was in the car because of this limitation on stability. It wasn't simply that it was bad in one area, but the root problem limited us in several areas."

"We had to be very protective of the rear tyres in our set-ups, and in general there wasn't a nice sweet spot of set-up where the car worked through all the different speed ranges and all the different phases of a corner."

Hulkenberg managed to score some lower-order points in Malaysia and China, and these were very flattering of the car. Rear-wing

developments gradually eased the rear-end grip problem and Hulkenberg scored a brace of 10ths at Silverstone and the Nurburgring.

But the big step came with the introduction of the redesigned car at the next race. Nico qualified this a terrific third fastest at Monza and finished fifth. While others attributed this to nothing more than the car's prodigious straight-line speed, that theory was debunked as 'Hulk' put the car in Q3 for the last six races of the year, and in the Korean GP was able to hold off both Lewis Hamilton and Fernando Alonso for a strong fourth place.

In Singapore the car was working well enough for Gutierrez to make it through to Q3 for the first time, following this up at Suzuka with seventh in the race for his first points finish. His fastest lap at Barcelona was not representative, but simply a product of a late stop for fresh tyres when on a very light fuel load.

For the last third of the season the Sauber regularly outpaced McLaren and was even threatening Ferrari as the fourth-fastest car. But that barren first half-season – and having effectively only one car scoring – proved costly in the constructors' championship, with the team back in seventh, well behind Force India.

7th
Championship position

4th
Best position

0
Podiums

0
Poles

1
Fastest laps

TECHNICAL APPRAISAL

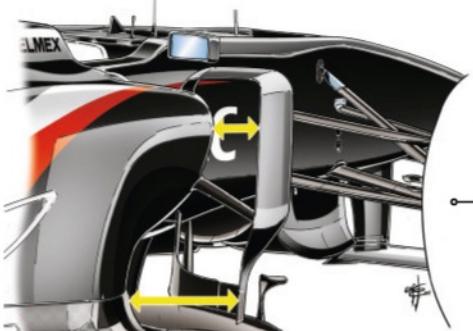
NARROW SIDEPODS

GARY ANDERSON: Sauber's narrow sidepods were the most visually obvious innovation for 2013 but, while well-engineered, it was not a positive for the team.

The idea is that you reduce drag by reducing the cross-section of the car and therefore get better straight-line speed.

The Coke-bottle area inside the rear wheels is accelerating the airflow around the sidepods. This in turn helps scavenge airflow from under the front of the car, helping that area to work more efficiently. With narrow sidepods this is not as effective.

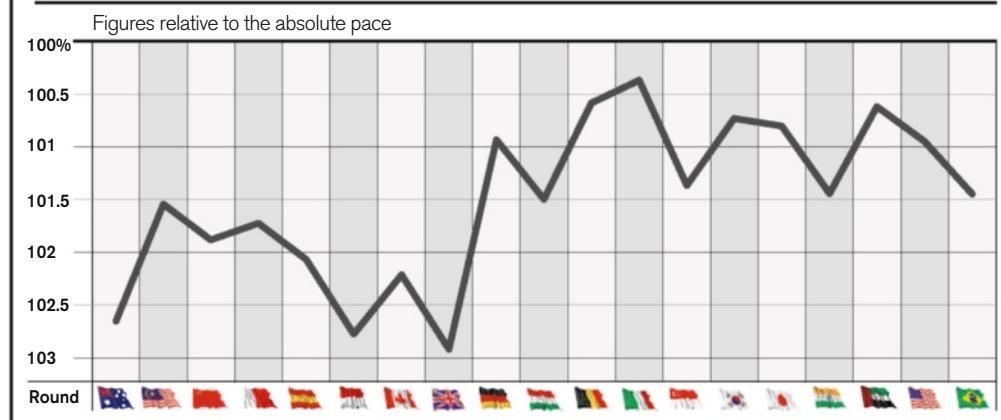
If you have a sidepod and a surface that, unlike the Sauber, is not vertical as the airflow is accelerated around it, you are creating downforce. While Sauber gained straight-line speed, it compromised the ability to produce that downforce. To change it back would have taken up resources and probably only been worth one tenth, two at the most, so it was stuck with the concept all year.



43

DUNBAR/LAT

SAUBER'S PERFORMANCE AT EACH RACE



Toro Rosso



There were a few Ricciardo glory runs in qualifying, but Red Bull's B-team was no closer to – or further away from – the pace this year. Solid midfield, in other words. By MARK HUGHES

44

The struggles at Williams allowed Toro Rosso to jump up a place to eighth in the constructors' championship, although in reality its competitive level was similar to before. The team continued to benefit from progressive upgrading and is now very similar in size to Force India and Sauber.

Technical director James Key oversaw further recruitment to the aerodynamics department, although the integration between the Bicester base and that at Faenza is still a work in progress. The challenge of doing all this while preparing for a major change in formula for 2014 meant that '13 was effectively a holding season in terms of car development, and the team hovered around

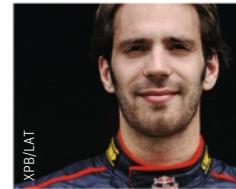
much the same position as in 2012 – in the lower reaches of Q2 usually, with the occasional overreaching Daniel Ricciardo lap getting it into Q3 but then usually falling backwards in the race. Once again Jean-Eric Vergne could not match Ricciardo's one-lap pace, but mixed or changeable conditions allowed him to shine.

The Ferrari-powered STR8 abandoned the double-floor concept of the previous two cars. "We were finding that the severe undercut sidepod arrangement of last year was stalling the development at the back of the car," explains Key, "and it was clear we had to do a similar philosophy to the others." What that meant in this case was a very Red Bull-like arrangement of enhanced Coanda bodywork with inlet tunnels to



15

Championship position
2012 position: 17th



JEAN-ERIC VERGNE
Starts 19
Best finish 6th
Best qualifying 7th
Fastest laps 0
Points 13



Vergne's technical understanding came on in leaps and bounds according to James Key. But his qualifying shortfall to Ricciardo meant he was never in serious contention for the 2014 Red Bull seat. He continued to race strongly from the midfield slot that was the car's natural place and invariably shone whenever conditions were mixed.

14

Championship position
2012 position: 18th



DANIEL RICCIARDO
Starts 19
Best finish 7th
Best qualifying 5th
Fastest laps 0
Points 20



Ricciardo's impressive one-lap pace was regularly evident as he hauled the STR8 to places on the grid it really shouldn't have been. But this was rarely translated in races. Almost certainly this was a trait of the car rather than Danny but still that question marks hangs over him. It will be resolved in 2014 as he steps into a Red Bull.

"Results were a long way behind the teams ahead and begged the question of whether Ricciardo's one-lap pace flattered the car"



Vergne (left) stays on as Ricciardo goes to RB



feed the top of the diffuser from the bottom of the sidepods. A FRICS inter-connected front-rear-suspension system was tried for the first time but was not always used.

The spec of the car for the opening races was frozen relatively early and points were scored in two of the opening four flyaway races, including an excellent seventh by Ricciardo in China. This came after a stellar qualifying performance that had put him seventh on the grid.

The car received a full aero upgrade for the first European race at Barcelona and, as the team came to understand the STR8 more fully over the next few races, it responded well. At Silverstone Ricciardo even managed to qualify it fifth. That rather transcended its true level and it had fallen back to eighth by the end of the race.

Taking every driver's best lap of the weekend over the season, Ricciardo averaged 11th fastest ahead of both Force Indias, both Saubers, and even Perez's McLaren. But in terms of results Toro Rosso was a long way behind any of those teams and it rather begged the question of whether Ricciardo's searing one-lap pace was flattering the car.

The team's best result was actually delivered by Vergne with sixth at Montreal, and the

basis of that was wet qualifying where, as ever in such conditions, he excelled. Most of the team's haul of points, in fact, was scored on the original 2013 tyres used in the first half of the season, even though the qualifying performance was better in the second half on the 2012 constructions.

"We were definitely better off on the 2013 tyres," says Key. "We'd gone to quite a lot of trouble to adapt the car to those tyres. We were suffering less degradation than most other cars on them but it was the opposite way round on the 2012 rubber."

The 2013 front tyre was quite lazy in its response and took a time to fully load up. Toro Rosso had concentrated on sharpening the car's front-end responses to compensate, minimising the 'gripping-up' phenomenon where the front tyre finally grips fully mid-corner with lock already applied, this upsetting the rear into tyre-destroying oversteer. The sharp-responding front end was built into the car and, on the 2012 tyres used in the latter part of the season, it simply made the car unbalanced and typically it would be running out of tyres by the end of the race.

8th
Championship position

6th
Best position

0
Podiums

0
Poles

0
Fastest laps

TECHNICAL APPRAISAL

COANDA EXHAUSTS

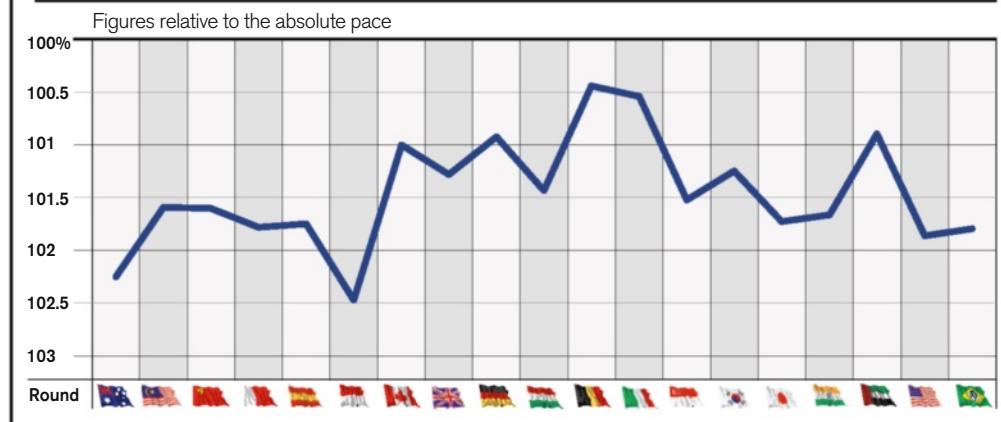
GARY ANDERSON: Scuderia Toro Rosso ran a simpler version of the Red Bull Coanda exhaust. For a true Coanda exhaust (which Red Bull, Lotus, Sauber and Toro Rosso all had), you want bodywork for the airflow to stay attached to. Others shoot the airflow across a gap.

There is a gap between the exhaust-pipe bodywork and the floor. This was an area Red Bull worked very hard to refine, but Toro Rosso has left a gap with the option of adding a panel to enclose it. Given the difficulty of getting the pressures right when you close off the channels, the team seems to have decided to focus on getting the best out of the simpler version. This will allow the exhaust gases to generate more downforce on the brake ducts, as well as helping to seal the diffuser. It's a simple, but effective solution.



Italian team at Monza:
STR8 being ragged

TORO ROSSO'S PERFORMANCE AT EACH RACE



Williams



After its cameo return to the winner's circle in 2012, it was back to brutal reality this year, with a car that was difficult to handle and an increasingly disenchanted driver. By MARK HUGHES

46

This was a year of major changes at the top of the team. Executive director Toto Wolff left to take up a position with Mercedes, and while Frank Williams, 71, remains team principal he appointed daughter Claire as his deputy. She inherited day-to-day control of a very troubled team. On the back of a 2012 season in which it had returned to the top step of the podium for the first time in seven years, it divebombed to mediocrity in 2013, with a car that was neither competitive nor reliable and which scored just five points – less than a sixth of that achieved by the Toro Rosso team.

There was no outward reason why this should have been so. The Renault-powered FW35 was clearly strongly related to the car that had won at Barcelona in 2012, albeit with fully incorporated Coanda exhausts and accompanying

rear-bodywork design that mimicked that of Red Bull in using tunnels to channel the air from the bottom of the sidepod to the top of the diffuser.

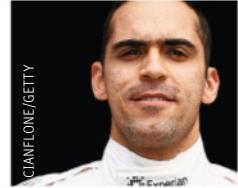
The previous year Williams had been one of the few teams struggling to find any advantage from exhaust blowing, and invariably raced its car without the feature. During the winter, with recently acquired technology in the windtunnel to properly measure exhaust flow, work was devoted to understanding the subtleties of the phenomenon. Technical director Mike Coughlan was confident this had been done. Testing would quickly reveal that it had not. The exhaust blowing was not being adequately controlled, giving the car wildly inconsistent handling traits that the drivers simply could not have any confidence in.

The cars invariably were on the cusp of Q1/Q2 and at their worst not all that much faster than



FERRARIO/LAT

18



Championship position
2012 position: 15th

PASTOR MALDONADO	
Starts	19
Best finish	10th
Best qualifying	13th
Fastest laps	0
Points	1



With a difficult and imbalanced car Maldonado struggled. His high-energy style did not help with FW35's limitations and the winner of the 2012 Spanish GP was often outperformed by his rookie team-mate. He was ultimately unable to hide his frustration with the team and the relationship was damaged beyond repair before the season was over.

17



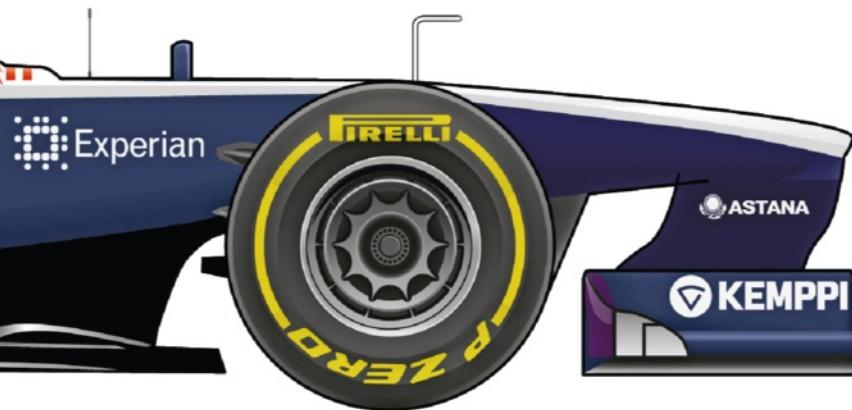
Championship position
2012 position: n/a

VALTTERI BOTTAS	
Starts	19
Best finish	8th
Best qualifying	3rd
Fastest laps	0
Points	4



Many who have worked with him believe Bottas is a world champion in waiting. Certainly he got the best from a very unpromising situation and, on the few occasions where there was an opportunity to shine, suddenly there he was, third quickest in wet qualifying in Montreal or making it through to Q3 with the improved car in Austin.

"Progress was made for the last few races with what was essentially the 2012 Barcelona car; Bottas got it to Q3 at Austin"



the best from Marussia or Caterham. Pastor Maldonado, impressive winner of the Spanish Grand Prix a year earlier, was raggedly unsuited to an unbalanced car. Furthermore, he was complaining of a lack of feel from the front end, meaning he was struggling to accurately gauge how much speed he could take into the corners. He was quite vocal in his criticism as the team failed to make progress and the relationship began to deteriorate.

Rookie Valtteri Bottas just kept his head down and drove to what he had, with nothing like the energy input of his team-mate. This proved to be a more effective solution to the problems created by the car. A wet qualifying session at Montreal allowed a glimpse of his potential as he qualified the car a stunning third fastest. But reality returned in the dry of race day when he faded dramatically.

By mid-season Coughlan had departed and was replaced by Pat Symonds, the former Benetton/Renault technical chief recruited from Marussia. Surprisingly little time had been devoted to getting to the root cause of the difficulty with the exhaust blowing, and instead what little development there was concentrated on the front wing. Each iterative step seemed to give a less powerful front wing than what was there before as attempts were concentrated upon making the rear end less wayward, the car more driveable. It made little difference.

Maldonado went out in Q1 at Singapore, 18th fastest around the track where he'd

qualified on the front row 12 months earlier.

For October's Indian Grand Prix the exhaust-blowing concept was abandoned completely – the exhausts pointing straight out of the back – and a 2012 front wing was put on the car. It was transformed. Though the qualifying results didn't reflect the improvement because of errors in the timing of the drivers' runs, the car was suddenly much like the driveable FW34. Progress was made for the last few races with what was essentially the 2012 Barcelona car, and Bottas got through to Q3 in the dry at Austin and qualified ninth fastest. It might have been even better had he not made a crucial couple of errors at the end of his lap. From there he raced to his first points.

Maldonado by this time had effectively severed his relations with the team and arrangements had been made between the management and his backer PDVSA that he could leave at the end of the season, with appropriate compensation for Williams.

With exhaust blowing effectively outlawed for 2014 the specific source of Williams's '13 troubles has been wiped. More troubling are the questions it has raised over the aero department.

9th
Championship position

8th
Best position

0
Podiums

0
Poles

0
Fastest laps

TECHNICAL APPRAISAL

→ BLOWN FRONT AXLE

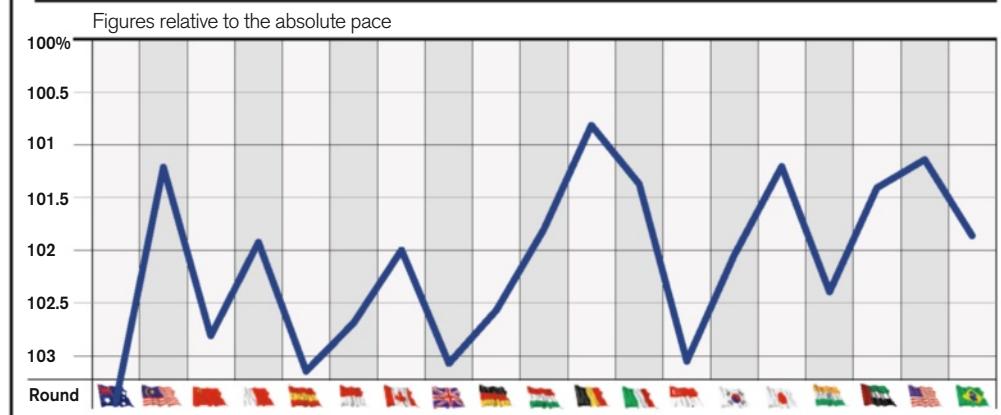
GARY ANDERSON: Red Bull tried this last year, but it was illegal because the hole rotated together with the axle. Williams's version, which ran this for the first half of 2013, was legal because the hole was not moving.

The brake ducts basically work because there is high pressure at the duct inlet and low pressure on the outside of the front wheel. As the air travels from the duct inlet through the wheel spokes it passes through or around the brake discs and caliper, taking away some of the heat generated under braking. This duct through the hollow front axle then fills what would be a 'dead' area of low pressure around the wheelnut on the outside surface on the wheel, reducing disturbance to the airflow.

In theory, it should provide a more consistent flow through the brakes and control the airflow around the wheel better, but the fact that it was dropped suggests it didn't.



WILLIAMS'S PERFORMANCE AT EACH RACE



Marussia

"Performance was modest by the standards of teams spending three times more, but it was a sound machine with good reliability"



There was no hope of beating anyone other than Caterham on this budget – and that's something the team managed to do thanks to a canny early-season strategy. By MARK HUGHES

An early-season tactical decision won Marussia its coveted 10th place in the constructors' championship ahead of rival Caterham. As always in this part of the field, the final position was likely to depend on the highest single place scored rather than any actual points, and so Marussia targeted the opening four flyaway races as its best opportunity.

Team boss John Booth explained: "As everyone is tending to focus on performance from new cars at that stage of the season, we froze our spec early and made sure we were reliable." Jules Bianchi's 13th place in Malaysia turned out to be the highest position any Marussia or Caterham would finish during the season.



TEELAT

The MRO2 was the first Marussia conceived fully in the windtunnel. It was also the team's first KERS-boosted car, using a system supplied by Williams to go with Marussia's Cosworth engine (as last used by Williams in 2011). The car was designed by John McQuilliam and overseen by Pat Symonds. Though Symonds departed mid-season for a position at Williams, in his wake he'd left a technically restructured and strengthened team. The car's performance was quite modest by the standards of those teams spending three times more, but it was a sound, well-balanced machine with good reliability. It had a conventional Coke-bottle rear end without the Red Bull inlet tunnels, and a lot of effort was made in maximising the blown exhaust effect within that constraint.

The last significant upgrade (floor, turning vanes and diffuser) went onto the car at Barcelona in May, and thereafter the budget and engineering effort were concentrated upon the 2014 car, leaving the race team to run the MRO2 as efficiently as possible. Once Caterham introduced its new car five races in, Marussia slipped back to being the slowest in the field, but not by much, and any slip-up from the green cars would invariably be punished.

Wet qualifying at Spa allowed a moment of rare opportunity that was capitalised upon, a tyre-choice gamble with no real downside getting both cars through to Q2.

Ferrari-contracted Jules Bianchi impressed with his speed and consistency, giving less-experienced fellow rookie Max Chilton a tough comparison. Max made progress, but Bianchi invariably retained the upper hand.

10th
Championship position

13th
Best position

0
Podiums

0
Poles

0
Fastest laps

19

Championship position
2012 position: n/a



JULES BIANCHI
Starts 19
Best finish 13th
Best qualifying 15th
Fastest laps 0
Points 0



The ex-Force India and Ferrari tester grabbed the opportunity of a race seat and impressively showed no signs of frustration at losing out on a Force India ride. He hustled the Marussia hard and reliably and his technical feedback was a major asset.

23

Championship position
2012 position: n/a



MAX CHILTON
Starts 19
Best finish 14th
Best qualifying 16th
Fastest laps 0
Points 0



He averaged less than 1s away from Bianchi in qualifying – which has to count as a good effort from a driver of his limited experience. He learned the discipline of F1 and by the end of the year was capable of wringing out a Bianchi-beating time around Suzuka.

Caterham

"On the one hand Caterham was trying to maintain 10th place. On the other it was devoting a lot of effort towards its 2014 car"



The team outfumbled itself in the battle at the back, even though it leapfrogged Marussia once the 2013 car came on stream for the European grands prix. By MARK HUGHES

Caterham got caught between two stools in 2013 and fell through the gap. On the one hand, it was trying to repeat its advantage over Marussia and retain the financially important 10th place in the constructors' championship. On the other, it was devoting a lot of effort towards its 2014 car.

It lost out to Marussia on the first of these aims and, once the advantage of the new Marussia over the rehashed 2012 Caterham was apparent at the start of the season, Caterham felt obliged to divert resource back from the 2014 car to re-engineer this year's CT03. But neither Charles Pic nor Giedo van der Garde was able to match the 13th place scored by Marussia in Malaysia.

Much attention had been devoted during the

winter to improving exhaust-flow modelling in the second Williams windtunnel, a project that chief of aero John Iley was keen to pursue. This was quite fruitful but had an impact upon the development of the car itself, and that played its part in the delayed introduction of the pukka 2013 car until May's Spanish GP.

This featured a different front wing and nose and much improved exhaust blowing from a Red Bull-like tunnelled rear bodywork. The cars remained Renault-powered, with a Red Bull-style split KERS battery pack behind the rear bulkhead, and continued to use a Red Bull gearbox.

Technical director Mark Smith assessed the improvement brought by the new car compared to the 2012 machine that did the first four races as in the order of 0.6s – enough to leapfrog the team back ahead of the Marussia on the grid.

"That improvement came across the whole range of areas," he explained. "The front wing gave a particularly good gain. There was also development around the exhaust blowing. We did an aero test in advance and the correlation was almost 100 per cent at the front. But at the rear, as we went up the speed range it wasn't just that we didn't get the gains we were looking for; we were actually losing relative to the previous package. We worked pulling some of those gains out and succeeded to a decent extent. We ended up with something that was reasonably well-balanced."

"The other thing we did was the hydraulic axle linking, which allowed us to drag out a bit more performance. We went to the Silverstone young-driver test and it worked well straight out of the box. By then, we had to accept that we had what we had, and the focus shifted to 2014."



STALEV/LAT

11th
Championship position

14th
Best position

0
Podiums

0
Poles

0
Fastest laps

20

Championship position
2012 position: 21st



CHARLES PIC

Starts	19
Best finish	14th
Best qualifying	18th
Fastest laps	0
Points	0



In his sophomore season Pic arguably made less of an impression than in his rookie year with Marussia. He just edged out his rookie team-mate over the season in qualifying and there were fewer stand-out performances than in 2012.

22

Championship position
2012 position: n/a



GIEDO VAN DER GARDE

Starts	19
Best finish	14th
Best qualifying	14th
Fastest laps	0
Points	0



A stronger-than-expected rookie performance. It was definitely against expectations that he would get as close as 11-8 to Pic in qualifying. He did a few very solid races too and was excellent in fully exploiting the opportunity of a wet Spa to qualify 14th, his second Q2 appearance of the year.

Between a rock and a hard pace

F1 asked Pirelli to produce fragile tyres. When they blew up, Pirelli got the blame – yet still wasn't allowed to test.

JONATHAN NOBLE looks back at a trying year for the firm

When Pirelli chairman Marco Tronchetti Provera promised last winter a 2013 season of ‘uncertainty’, thanks to the new more-aggressive tyres his company were delivering, he had little idea quite how explosive their impact would be.

The design tweaks and softer compounds didn’t just produce more strategy headaches for teams and drivers; they became a battleground that would

effectively shape the story of the season – even if it was unlikely that Sebastian Vettel was ever going to be beaten to the title.

They also resulted in Pirelli finding itself bang in the centre of a political maelstrom over ‘secret’ testing and future contracts which at times left it teetering on the edge of a withdrawal from Formula 1.

It wasn’t supposed to have been like this. Pirelli’s changes to the construction – with softer sidewalls and stronger shoulders, plus the use of an internal steel belt rather than Kevlar – were delivered amid boasts of improving traction and handling, plus increased thermal degradation.

Add to that the much softer compounds and it was clear that drivers and teams were

going to face a tougher challenge in looking after their tyres in races.

From the start, Red Bull didn’t like it. In the wake of the first race in Australia, which Kimi Raikkonen won in his Lotus by doing one pitstop fewer than others, Red Bull started griping about the Pirellis. It felt that the outright pace of its RB9 was being held back by the need to treat the tyres delicately.

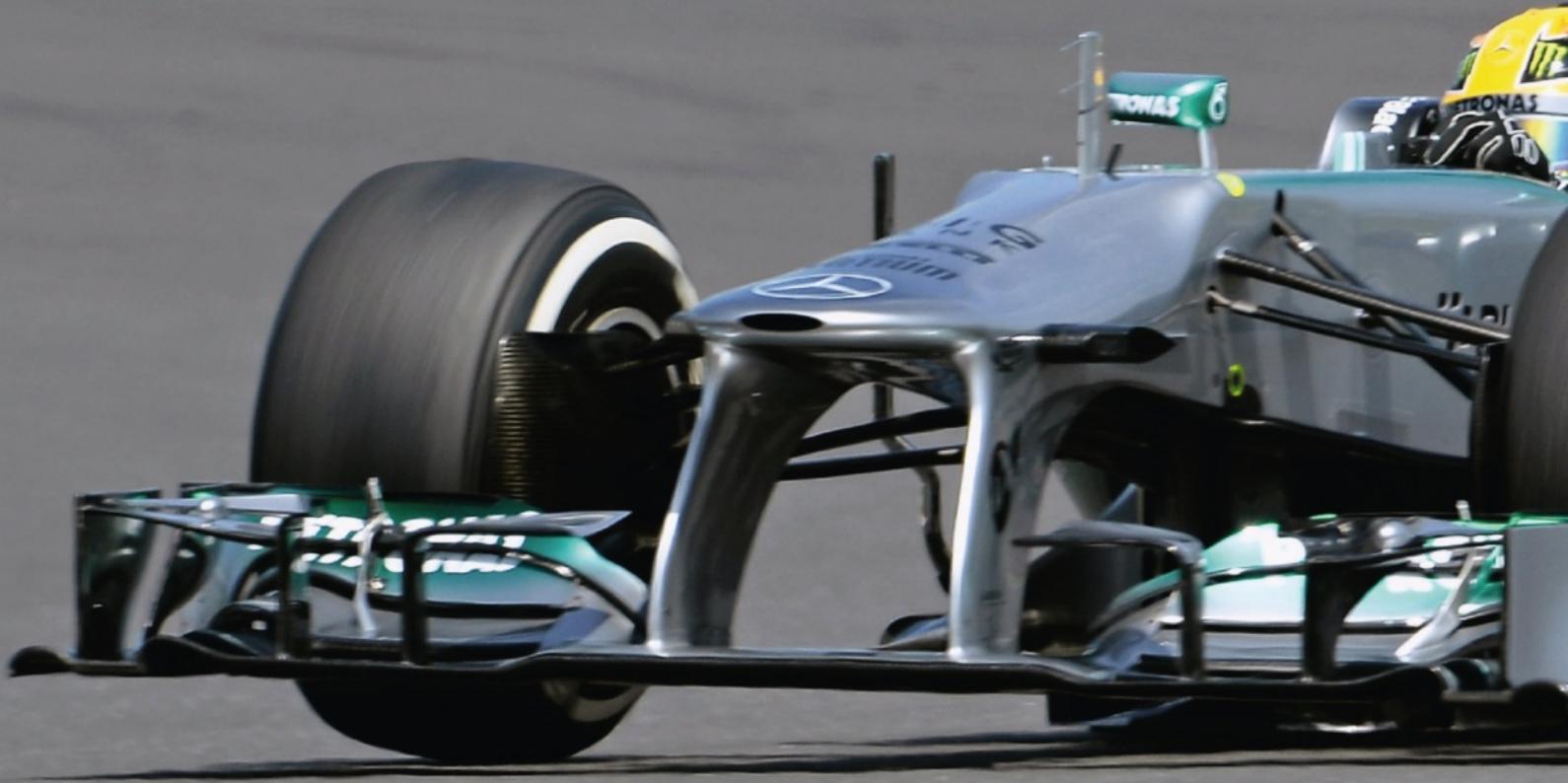
As Red Bull technical chief Adrian Newey said later in the year: “Our car generally gets quite a bit of its benefit in the high-speed corners and the 2013 tyres were much more load-sensitive – it was much easier to damage them if you put too much load into them.”

Red Bull knew it had two options: face an expensive suspension redesign to make its car better on its tyres; or pressure Pirelli to revert to the 2012 construction that it knew would suit its car perfectly.

The team was reluctant to go down the first route, so began some pretty vocal rallying and usage of the media to get its message across that the 2013 tyres were not good for F1. Remember the normally media-shy Dietrich Mateschitz speaking so openly after the Spanish Grand Prix? “This has nothing to do with racing anymore.”

Red Bull also jumped on a safety bandwagon after a series of Pirelli tyre failures early in the campaign. A spate of delaminations prompted some pretty intense investigations back at Pirelli’s Milan HQ, which resulted in the discovery that cuts in the tyres were causing drastic overheating. That in turn was creating a weak spot in the tyre – which then failed at the shoulder.

Keen to stop repeat failures, Pirelli proposed changing the internal belt from steel back to Kevlar, which would reduce the operating temperature. But some of Red Bull’s rivals – especially Lotus, Ferrari and Force India – did not want that to happen as they



fear it would hinder their own chances.

Their lobbying proved successful – Pirelli was refused approval to change the construction for the Canadian Grand Prix. By that stage, however, the company felt that a new bonding process would cure the issues. Which it did seem to do.

But the season effectively turned at Silverstone, when a perfect storm of a demanding circuit, aggressive kerbs, internal shockwaves, low tyre pressures and tyre-swapping at the rear led to a run of spectacular failures that ultimately left Pirelli with no choice but to make changes.

The switch back to the 2012 construction, which came in fully from the following Hungarian Grand Prix, was perfect for Red Bull. The stronger tyres, allied to their different aerodynamic characteristics, were ideal for the RB9. Only a poor set-up choice and traffic at the Hungaroring prevented Sebastian Vettel beating Lewis Hamilton there – but after that he was unstoppable. Nine consecutive victories followed.

The way the tyre situation played out might have been perfect for Red Bull, but Pirelli motorsport director Paul Hembury believed the team should have handled itself differently as it put his own men in the centre of a political battle of wills.

"They opened up of a lot of comment and debate that really shouldn't have



happened," said Hembury. "We are a partner, not a competitor, and we have always said that if all the teams, or the sport itself, tells us to make a change, we will do it. But being put under media pressure was very disappointing."

For Pirelli, the 2013 season undoubtedly left a sour taste in its mouth. And the roots of the tyre issues could all be traced back to a single factor: the lack of testing.

With no testing opportunities outside Europe, the pre-season build-up had taken place in the cold temperatures of Jerez and Barcelona, so it was only when teams arrived in Malaysia and Bahrain that everyone got to experience how the rubber would behave at normal operating temperatures. And once the delamination issues came to light, there was

no opportunity in the regulations for Pirelli to be able to test and react in the way it hoped.

When it did go off and do its own thing, with the Mercedes 'private' test at Barcelona, it ended up before an FIA International Tribunal.

Having been brought in to F1 with the demand to create two-stop races, Pirelli found itself lambasted for producing tyres that needed to be nursed – and then was never given the means to address the complaints.

If lessons need to be learned, it's that F1 has to help Pirelli more – be it through better testing regulations, less restrictive rules and buying in to the concept of racing that high-degrading tyres deliver.

As Hembury said: "Maybe sometimes we have been thinking that people have forgotten the reason why we are doing certain things – and that has been a little bit disappointing."

"Going forward you take note of that. If the sport doesn't protect you from it when you're asked to do something, then you have to do it yourself."

For 2014, Pirelli is making no promises of excitement. Instead, after this year, you can't blame it for wanting to move out of the limelight. ■





Alonso and Ferrari's season of discontent

Hopes were high coming into the 2013 campaign for Fernando Alonso and Ferrari.

EDD STRAW explains how things have turned sour over the past few months

The 2013 Formula 1 season started so promisingly for Fernando Alonso and Ferrari. After last year's near-miss, which owed more to the Spaniard's virtuosity than the qualities of the '12 car, the new F138 was talked up as a bold, aggressive design. This was the car that would drag the struggling Scuderia closer to Red Bull.

But it wasn't. What's more, Ferrari's struggles led to acrimony with its star driver. After two wins in the first five races, things took a turn for the worse. A season that started so well ended with Alonso seriously interested in a return to McLaren in the future, having been publicly dressed down by Ferrari president Luca di Montezemolo in July.

Most tellingly of all, Alonso was out of title contention with three races to go as the Sebastian Vettel/Red Bull steamroller rumbled on.

FEBRUARY 1 – MARCH 3

PRE-SEASON PROMISE

"The main thing is to make available to Fernando and Felipe [Massa] a competitive car. I don't think we can expect a car that is much faster than the others – this would be a fantasy."

Ferrari team principal Stefano Domenicali's



pre-season targets were realistic. Given the resources at Maranello's disposal, there's no reason why Ferrari should not be challenging. But even during testing there were reasons for concern.

For starters, its Maranello windtunnel was still out of commission – with work being done in Toyota's state-of-the-art example in Cologne – and would not reopen until October after upgrades.

Then there was the simulator. Ex-McLaren tester Pedro de la Rosa was recruited at Alonso's recommendation to help improve its driver-in-loop technology and drove on the final day of the first test at Jerez. "We have a lot of work to do," was his summary of the situation.

The car was brisk and caught the eye on long runs, but there were tell-tale signs that the overall level of rear grip wasn't as high as the Red Bull's.

"The target was to reduce the gap we had in Brazil

[at the end of last year], which was seven or eight tenths," said Alonso at the final test. "I hope we have reduced that gap and that we arrive in Australia [for the opening round] in a bit better shape than in Brazil, which means 200 times better than last year."

MARCH 24

MALAYSIAN DISASTER

After finishing second in Australia behind Kimi Raikkonen's Lotus and one place ahead of Vettel's heavily tyre-limited Red Bull, things began to unravel for Alonso in a damp start in Malaysia.

He tapped the back of Vettel's car at the second corner, deranging his front wing. That was Alonso's mistake. But Ferrari opted to leave him out in the hope he could make it to the point where intermediate rubber could be swapped for slicks at the same time as changing the nose. At the start of lap two, the wing collapsed as Mark Webber's Red Bull passed him, plunging Alonso into the gravel.





APRIL 14

CHINA TRIUMPH

At the peak of Red Bull's tyre complaints, Alonso executed an immaculate victory in China, while Vettel finished fourth after deciding against a Q3 run to allow him to start on the medium-compound Pirellis. It left Ferrari's star only nine points behind Vettel. Not that Alonso was counting his chickens.

"It's a little bit too early to say... we need to wait for after the summer break," he said, presciently, of his title hopes.



APRIL 21

IN A FLAP IN BAHRAIN

The Bahrain GP started encouragingly for Alonso, until he suffered a problem with the DRS being stuck open. After a pitstop to fix it, the fault repeated, despite Ferrari's confirmation that he could use the DRS again. After another unscheduled stop, he recovered to finish eighth. More points had gone begging.

"It's a bit unfortunate, because with the performance that Fernando had today we could have done an incredible job," said Domenicali. "I don't want to say that we would have been able to win because it's easy to say, but theoretically it was possible."



MAY 12

SPANISH WIN

Alonso's victory at the Circuit de Catalunya, thanks partly to a superb getaway and then a ballsy pass around the outside of Lewis Hamilton at Turn 3, and partly to an aggressive four-stop strategy, suggested that Ferrari was well and truly in the championship mix. ►





"We had to raise our pace but all we did is hold the gap"

PAT FRY

JUNE 9

DEVELOPMENT DIRECTION GOES AWRY

Up until the Canadian GP, Ferrari's development rate looked perfectly respectable. But a new topbody and rear-end tweaks did not deliver as hoped, and were a major setback in terms of development direction.

The die was cast for months of changes best described as a mixed bag as Ferrari struggled to get the rear end of the car to work well with the rest of it. The pace of the car at low-downforce Spa and Monza with a trimmed-out rear wing suggested that getting the front and the back of the car to 'talk' was a problem, for when the front wing was simplified the rear end worked far better.

JUNE 30

SILVERSTONE TYREAGEDDON

The spate of tyre failures that took the British Grand Prix to the brink of being red-flagged was not good news for Ferrari. It led to the control Pirelli tyres being changed to a hybrid of 2013 compounds and the 2012, Kevlar-belted, construction.

"We won in China, we won in Spain and then we seemed to lose a little bit of performance, especially when the 2012 Pirelli tyres came back," said Alonso after finishing a distant second to Vettel in Singapore. "When they changed the tyres, we said bye-bye."

Some have interpreted this as a grand conspiracy, as Pirelli caving into Red Bull's lobbying to change the tyres. While the tyre change certainly helped Red Bull by removing an inhibiting factor that made it impossible for the RB9 to show its full

potential, it was safety concerns that led to the tyre change, not politics.

Ferrari engineering director Pat Fry refuses to use the tyres as an excuse. He accepts that the car simply wasn't fast enough all season. The early tyres merely narrowed the gap on race pace because Red Bull had to hold back, while the different shape of the tyre actually meant Ferrari gained a very small amount of downforce.

"Obviously, the shape of the tyre has a reasonable effect on the aero, but I don't think it's anything like that," said Fry when asked whether the tyre change had compromised the car's balance or aerodynamics. "In reality, we've needed to raise our pace all year but all we've done is hold the gap."

"On race pace, once the change was made to the tyres it did make us struggle a bit more, but that was for us to engineer out. The bottom line is that our car has not been quick enough in qualifying all year."

The writing was on the wall; the tyre change just made it harder for Alonso and Ferrari to hang onto Vettel's coat tails.

JULY 29

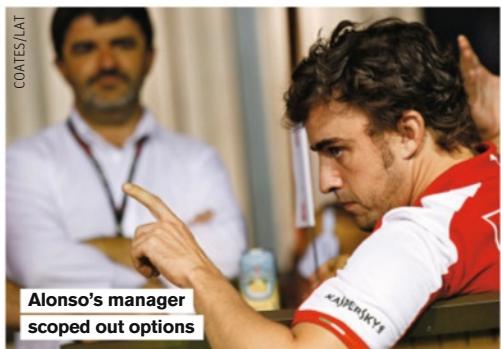
ALONSO PUBLICLY REBUKED

This year's Hungarian GP will be remembered as a watershed in the relationship between Alonso and Ferrari. There, Alonso's manager, Luis Garcia Abad, was glimpsed in conversation with Red Bull team principal Christian Horner. The topic of Alonso's potential availability was discussed.

Di Montezemolo used a throwaway quip from Alonso about wanting his rivals' car for his birthday as the basis for an astonishing public attack. Issued via the Ferrari's website, there was no misinterpreting what this meant.

"All the great champions who have driven for Ferrari have always been asked to put the interests of the team above their own," said di Montezemolo. "This is the moment to stay calm, avoid polemics and show humility and determination in making one's own contribution, standing alongside the team and its people both at the track and outside it."

Just to underline it, Ferrari's statement referred directly to Alonso's comments "which did not go down well with Montezemolo, nor with anyone in the team". Things between team and driver would never be the same again.



SEPTEMBER 11

RAIKKONEN RETURNS

The re-signing of 2007 world champion Kimi Raikkonen from Lotus achieved two things for Ferrari; it strengthened its driver line-up and clipped Alonso's wings. No longer could he see the team as his exclusive domain. While publicly supportive, by reading between the lines of his comments it was clear that he wanted the subordinate Massa to stay on.

"In terms of speed, Felipe is not any slower," Alonso said in Japan. "When they were racing together [in 2007-09], Felipe was as quick as him."

During discussions over their driver line-up, it is understood that the prospect of dropping Alonso altogether was discussed before common sense prevailed.

OCTOBER 27

DOWN AND OUT

Alonso's title hopes had faded long before Vettel's Indian Grand Prix victory. But this was the race where the Spaniard was finally knocked out of mathematical contention.

Speaking two races earlier, in South Korea, Alonso had made it very clear that he felt he had dragged the Ferrari to greater heights than it deserved. Although, characteristically, he phrased it in a way that allowed him to deny doing so!

"If someone had started watching F1 today or yesterday, and you told them that the red car with the blue helmet is fighting for the world championship now and is still in second place, they would say, 'It can't be true – it's a miracle,'" said Alonso.

THE FUTURE

For now, Alonso remains committed to Ferrari. He is contracted until the end of 2016, and under certain circumstances he could break free earlier. If predictions about Ferrari's engine struggles in '14 are on the money, there's no question he could move to McLaren for '15 with Honda support.

It just shows how much can happen in nine months. The idea of the Ferrari/Alonso alliance breaking down and a return to McLaren was unthinkable. Now, it's a strong possibility. ■



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Brawn leaves Mercedes in fine fettle

**After three years of failing to deliver consistent results,
Mercedes finally raised its game in 2013. Departing team
principal Ross Brawn tells EDD STRAW how it turned around**

Remember Mercedes as it was? Heading into 2013, the Brackley-based operation was Formula 1's great underachiever. Since taking over the title-winning Brawn squad at the end of 2009 amid a wave of high expectations, it had finished fourth, fourth and fifth in the constructors' championship and won a grand total of one race. This was, quite simply, not good enough for a marque of such a grand stature.

While the trajectory that threatened to make it a title contender heading into the August break did not continue in 2013 as Red Bull asserted itself and dominated the second half of the season, Mercedes' season was a huge step forward. Three victories, two for Nico Rosberg and one for newcomer Lewis Hamilton, and second in the world championship made Mercedes the biggest improver of this season.

With hopes high that the introduction of the 1.6-litre turbocharged V6 engines next year will allow Mercedes to mount a serious title challenge, the progress made in 2013 was hugely significant.

Team principal Ross Brawn, who sails off into the sunset at the end of this month (see page 61), was the architect of this turnaround. ▶



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Rosberg held on to lead
in Spain, but not for long



► While he was never able to deliver a title to follow up his success at Brackley in 2009, Brawn has built the foundations that should allow Mercedes to hit the ground running at the start of F1's new era. Make no mistake, this was a big step that established Merc as a credible frontrunning force in grand prix racing for the first time since 1955.

"We were two seconds behind at the end of last year, and over this year we were about half a second behind where we wanted to be," says Brawn. "To close that gap is a great achievement."

Naturally, Brawn would talk up his team's achievements, but bear in mind Mercedes managed a pathetic six points in the final six races of last year. A haul of 142 last year became 360 in 2013, a massive leap forward. He credits it to the significant technical strengthening at the team undertaken in late 2011. At the time, Brawn told AUTOSPORT that the changes would start to pay off as early as 2013 and the results have proved him absolutely right.

In the 10 races before the August break, a Mercedes was on pole position for seven of them. Tyre degradation problems meant that the team struggled to convert its lofty grid positions into results. Wins for Rosberg at Monaco and Silverstone, and for Hamilton at the Hungaroring, were the high points, although after the break things got harder.

MERC'S POST-BRAWN POWERPLAY

Next year is win/win for Brawn as far as his contribution to Mercedes is concerned. If the team thrives, it will be credited to the foundations he laid. If it flops, it might just be attributed to his departure. But there is little doubt his departure is a loss, much as some at Mercedes were keen for it to happen.

He is replaced not by a single team principal, but by two executive directors who effectively split the abolished role. Paddy Lowe, who joined Mercedes from McLaren as executive director (technical), is a hugely intelligent, accomplished engineer recruited ahead of last season for this task. Toto Wolff, Lowe's equivalent on the commercial side, is the other half of the new leadership, both working with high-profile non-executive chairman Niki Lauda.

Inevitably, they will be judged by performances on track. In that regard, the die is already cast, with the Mercedes 2014 engine only six weeks away from hitting the track for serious testing and the design

of the car itself long since underway. But what will be fascinating is how well Mercedes conducts itself in off-track political manoeuvrings. That is an area where, on the technical side, Brawn has excelled over the years.

It's almost inevitable that there will be politics. There always are at the start of a rules cycle as teams try to exploit loopholes and clever interpretations of the rules. Even if the engines are relatively evenly matched – no foregone conclusion – there are bound to be battles over car design.

But Lowe is no fool and has been around long enough to know how the game is played. What's more, the structure and personnel Brawn put in place now appear to be paying dividends, meaning that he and Wolff take full control of a team built on solid foundations.

Whatever happens after Brawn's departure, it won't be easy to fill his shoes.



Lowe (l) and Wolff share team-boss role



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"Our improvement is a reflection of the changes we made at the end of 2011 and start of 2012"

"In the second half of the year we saw the true performance of Red Bull," says Brawn. "They got on top of their tyre situation, they found some useful improvements in the car."

"The first half of the year was probably a distorted position because we were performing pretty well and Red Bull were underperforming. For us to find that much time and to have overtaken Red Bull would have been optimistic, but it's pretty encouraging for the future."

"It's a reflection of the changes that we made at the end of 2011 and the beginning of 2012. We brought in a much strong engineering team under Bob Bell. Bob recruited Aldo Costa and Geoff Willis, and we got Mike Elliott in charge of the aero, so we made some fundamental changes, and improved the facilities. Those things have come through now."

"In 2014 we are going to see the next result of that process so 2013 is a very encouraging sign."

One of the good things I have seen this year is that we've been able to consistently improve the car the whole year. Not by enough yet, but it has been improved all year whereas last year we faltered midway and really were quite poor by the end of the season. This year, we haven't dropped the ball, we have kept it going. There have been a lot of encouraging signs."

Brawn stresses that the extra investment made once it was realised F1's resource-restriction agreement was not having the anticipated effect helped the team to realise its potential.

"We ran out of steam last year in terms of ideas, in terms of capacity," he adds. "We had to start the new car. We increased the capacity of the team, we increased the budget of the team, we persuaded our board that we needed to be more committed. We had fallen into that trap that the RRA was going to solve all the problems and everybody was going to come down to a

certain level and we planned around that."

"It wasn't the correct plan because it just didn't happen. So once we woke up to that, we put the resources in that we needed to have a chance of competing. In 2012 we had the fourth or fifth biggest budget in F1 and we finished fifth so it's no big surprise."

While the car was quick, the big challenge was tyre management. In both Bahrain and Spain, Rosberg's pole positions prefaced a race battling degradation and he finished ninth and sixth respectively. Things improved after that and victories at Monaco and Silverstone for Rosberg, then Hamilton's maiden Mercedes triumph in Hungary meant Mercedes went into the August break with three wins in five races. Talk was of having to dial back single-lap performance to improve race pace, but, as Brawn explains, it wasn't that simple.

"The reality was we didn't know what to do ►



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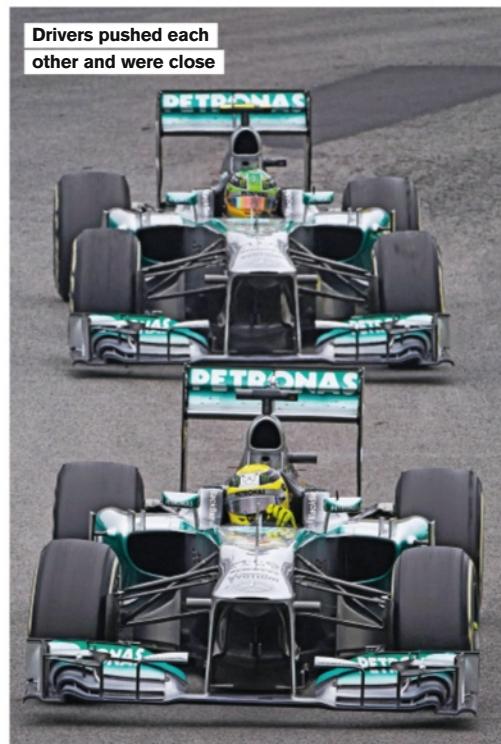
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"We've got some things we want to do with the car over the winter to try to take another step"

► to improve the race performance," he says. "It wasn't as though we were focussing on qualifying and compromising the races, that was just the way the car was. It did produce very good performance over one lap, less so over distance.

"Barcelona was one of the worst examples. We were on pole and disappeared down the field as the tyres degraded. We had to discover what needed to be done. I'm not sure we sacrificed one-lap performance for that. There is maybe a slight element of that but, over one lap, Red Bull also improved. But we were still able to fight for pole positions – in Abu Dhabi Lewis, without his [suspension] problem, would have given Vettel a run for pole position."

Inevitably, the tyres played a big part in the Mercedes story. Not only was there the controversial Pirelli test at Barcelona using a 2013 car that contravened the test ban, which led to the team being banned from July's young-driver test at Silverstone, but there was the change in rubber after the British GP that removed a limiting factor from Red Bull. Brawn says he has an "open mind" on whether Mercedes would have been in better shape had the tyres not changed and certainly would have preferred things to stay the same. Whatever happened, it seems unlikely the Red Bull juggernaut could have been slowed.

Nonetheless, the performance of Mercedes was still good enough after the break to beat Ferrari and Lotus to runner-up spot, even if challenging Vettel proved difficult.

"We were a little bit disappointed and questioned whether we had taken the right direction," says Brawn of what happened after the break. "But when I look now at analysis of the season, our performance compared with Lotus, Ferrari and other references has been pretty good. We managed to keep pace with those

teams and, if anything, pull away slightly. What we haven't been able to do is match Red Bull."

"We did improve the car, but not as much as they did. They seemed to find some significant improvements, perhaps relating to the tyres."

Aside from the performance of the team itself, that of its drivers was also a major talking point. Rosberg shaded it in terms of wins, with two, although Hamilton scored 18 more points. The battle was a fascinating one, with Rosberg arguably more consistent but Hamilton enjoying greater highs and lows.

"It's a great fight," says Brawn. "The battle is good for the team. They desperately want to beat each other and they desperately want the team to do well so you have got to marry those two things and that's not always easy. I'd say they both go about it in the right spirit."

"The great thing is Nico has demonstrated – and we already knew it – that he is a top-class driver. That means we have two of the top drivers in F1, which is a great situation for the team."

"Lewis's performances are absolutely typical of a first season with a team, learning how to operate, build relationships, discover each other.

It has been a very tough year technically, dealing with these tyres and I think that sometimes makes a consistent performance more difficult.

"When you have been with a team [McLaren] as long as he was, you develop a style or you get used to certain things. His comments on our car were stronger in some areas and not so strong in others. The areas where we were not strong were not areas where we had particular focus in the past, they are areas we became more focused on and found solutions."

"We have improved, perhaps not to where Lewis wants to be but we've gone a long way and we've got some things we want to do with the car over the winter to try to take another step."

Rosberg's high point came at Monaco, where he had to take a very conservative approach and soak up pressure given the team's tyre degradation problems.

"We had nothing to gain from pushing the car or tyres any harder than we had to. Nico drove a very intelligent race and was perfect," says Brawn. "He did push at various times, just to get the right gaps and he drove the perfect race. Monaco is definitely a track where you don't have to have the fastest car to win."

"Nico met the challenge of Michael Schumacher exceptionally well. He was a little difficult to judge because no-one really knew what level Michael was at when he came back but I think Nico's performance against Lewis has given people fresh references again. He's had a great year and I've said it before: either one of them could win a world championship for us."

It remains to be seen whether either will be in a position to bid for the title next year. But Mercedes came good in 2013 and, with expectations high going into the new rules set, it is at the front of the queue to challenge Red Bull.



Just how does he do it?

Sebastian Vettel took his domination of F1 to another level this year. MARK HUGHES explains the finer points of his technique



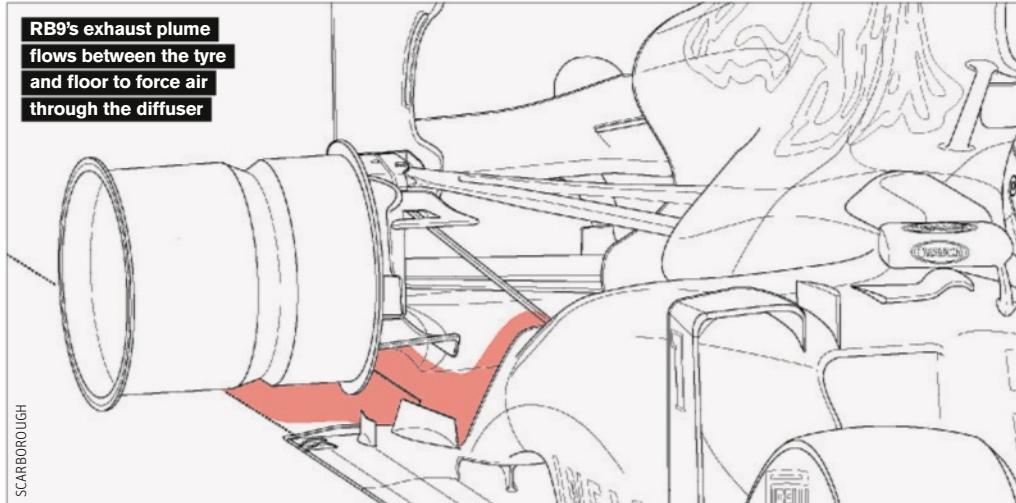
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He's just a good driver in an amazing car, say some. But not as many as used to say it. Sebastian Vettel gives the impression he doesn't mind when they say this about him. In fact, once a couple of years ago he even agreed – but only superficially, only to score another psychological point over an opponent.

When asked about his reaction to Fernando Alonso saying he felt he was competing not against Vettel but Adrian Newey, Seb said: "Yes, it's a fantastic team with fantastically gifted people and I'm very happy to be a part of it." Brackets – yes, that's why I will keep beating you, Fernando.

That's the sort of multi-sparking brain that allows Vettel to do what he does in the cockpit so brilliantly well. That multi-functioning element is there in his conversation, his humour – which often relies on the stand-up comic trick of introducing a theme early and returning to it later – and in everything he does.

At the track he homes in on the area of performance that will bring him the most lap time and he ruthlessly unpicks the combination that allows him to access it. In the last few seasons it's been all about the very specific technique needed to maximise exhaust-enhanced aerodynamics. Prior to that it was all about minimising time lost in changing direction into slow corners. Both skills require an unusually high tolerance for rear-end instability. Yet he's not aggressive in the way he



works that instability; rather he embraces it, allows the car to breathe, confident he can ride out its brief stormy phase.

As the regulations have tightened over the years so Red Bull has repeatedly found ways around them, making for a very specialised breed of racing car. With off-throttle (or 'cold') blowing banned from the start of 2012 but on-throttle ('hot') blowing still allowed, any car that was stable upon corner entry would be understeering once rear downforce was boosted by the throttle being applied. The trick came to be to have a car that was unstable upon entry, then as the rear-end slide built up the driver hauled the slide by standing on the throttle – the very opposite

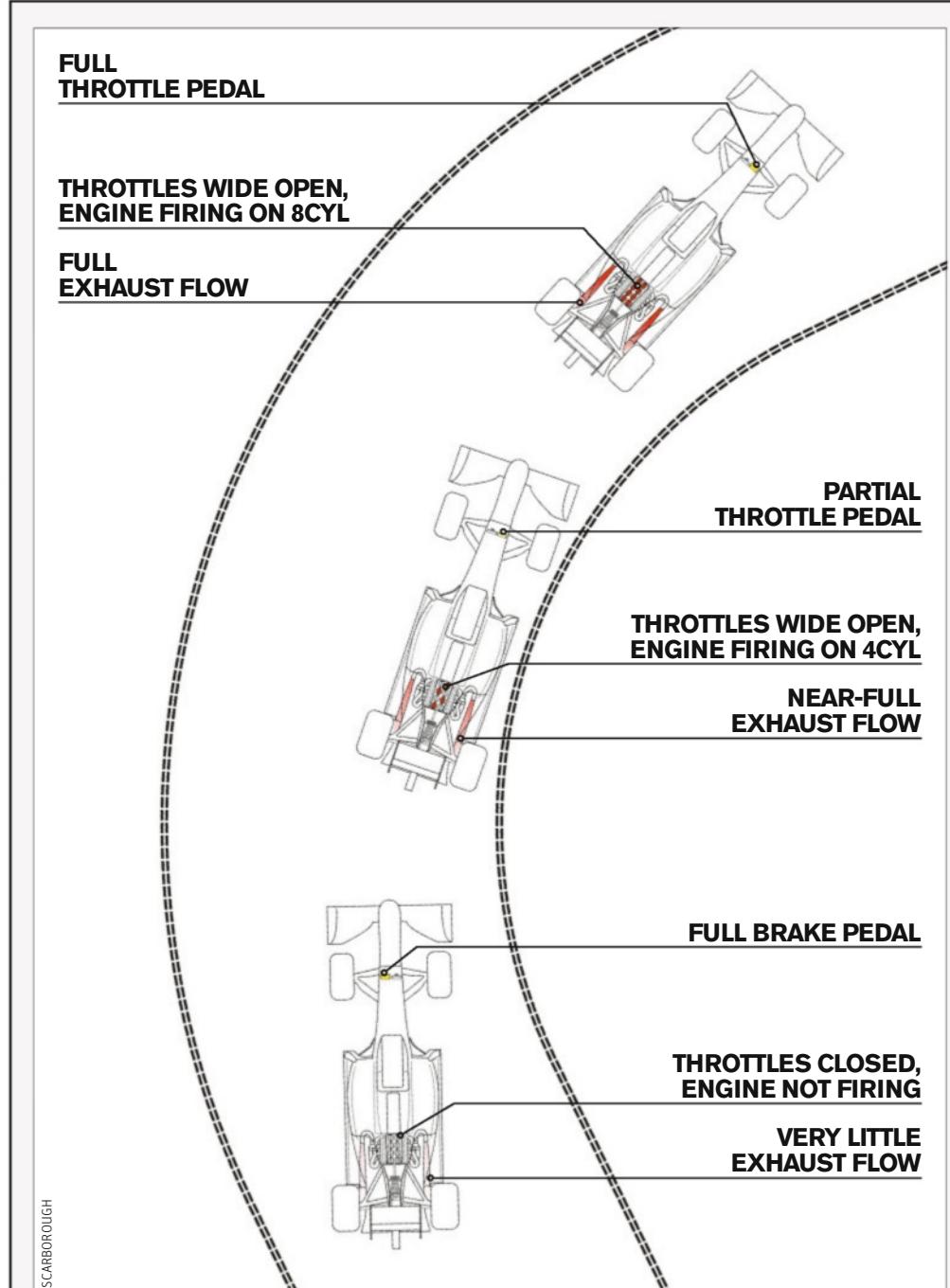
of what intuition borne of driving normal cars will be telling him to do.

Many found this very difficult to do. Vettel became supreme at it. It was this ability that allowed the team to proceed further along this route than any other. In other words, Vettel's ability contributed to making the car intrinsically faster. In a case study like that, how do you unpick which is driver and which is car? They are always inter-related but in this case have become intensely so.

"He drives the car very much like a motocross rider or a speedway rider on corner entry," says Christian Horner. "He is totally relaxed to have the car moving around beneath him as he turns in – and not many drivers are. I would say he's



Man and machine:
Vettel has adapted
his technique to
RB9's innovations



developed that feeling and sensitivity over the years because what is so impressive about his technique now is its repeatability.

"We've seen fantastic things from him over the years, moments of brilliance, but in this season what has been so outstanding is how it's switched on – on demand. He's driving to a fantastically high level all the time. It's really on an elevated plane, I feel. I would put him against anyone in these cars and I think he'd come out on top."

Many top drivers are quite relaxed about a bit of entry oversteer, but how many of them have the mental capacity to fine-hone that into such an asset?

Latterly, the Red Bull engine's cylinder cut is believed to have been used as a cornering aid. Cutting the cylinders on only one bank or the other according to which way the steering is turned when off-throttle can enhance the car's turn in – or, alternatively, give it stability. As Vettel stands on the gas to halt any slide, he then sometimes must come back off it to prevent wheelspin, at which point the cylinder cut comes back. It requires a bewildering mixture of different reactions to ostensibly the same sensations. It's an intricate dance that requires a supple mind as well as natural feel.

If you were to add Vettel's talent and that mind, plus an intense ambition and desire, to the most ingenious technical brain, and that whole in turn supplied with the biggest budget, it would be pretty much unbeatable, surely? That's what the last four years of F1 have been about – and Vettel is absolutely central to it, in a way that probably no other driver could have been. ■

THE SECRETS OF EXHAUST-BLOWING

Red Bull's RB9 gains its speed through a complex mechanism of aerodynamics. The car is set up with an extreme 'raked' attitude – nose down, tail up – to maximise diffuser space and lower the front wing. Both these effects can increase potential downforce, if managed correctly.

The resulting gap between the diffuser and track is some 10cm. Such an open-sided diffuser would be expected to leak like a sieve and lose all downforce, so this gap is bridged by the exhaust blowing into the void to seal it.

From an upward-pointing exhaust (by regulation) the exhaust plume is teased downwards over the ramped sidepod by the Coanda effect. The exhaust plume is guided between the tyre and floor to fill the void like a fluid skirt.

As this seal is dependent on the exhaust blowing, Red Bull and Renault Sport have devised a legal engine mapping solution to maximise blowing under all conditions.

At mid-corner, a driver would normally be on part-throttle, with very little exhaust energy being created, which would mean less downforce is being created. With the Red Bull, when on part-throttle, the engine runs on just four cylinders, this means the throttles can be kept wide open, to allow the firing cylinders enough air, but also allow air to be pumped through the non-firing cylinders. This creates a good proportion of the exhaust energy as when on full throttle.

Unlike the off-throttle blowing we saw two years ago that was outlawed, this is totally legal, as the engine isn't burning fuel simply to gain downforce and the engines power output is matching the driver's demand at the throttle.

Although this set up can be tricky to handle, as the driver has to maximise use of the throttle mid-corner, it can provide more downforce than a conventionally driven and equipped car.

Craig Scarborough

Vettel's year of domination

MASON/GETTY

The world champion equalled Michael Schumacher's record for victories in a season with 13 in 2013. Here's what Red Bull team principal CHRISTIAN HORNER, race engineer GUILLAUME ROCQUELIN and SEBASTIAN VETTEL himself said about those famous wins



1 MALAYSIA

Vettel ignores team orders, passing Mark Webber for victory despite "Multi 21" hold-station instruction.

Horner: "It was probably the most controversial win. But what was annoying was we achieved a dominant one-two and broke the pitstop record three times, but of course all that went uncovered with the other sideshow. It was a difficult race. We were concerned about the reliability of the tyres, having seen them fall apart all weekend, and from a team point of view it was all about 43 points. For the driver, it's a little different..."

Vettel: "It wasn't the right thing to do. I put myself above the team in that moment. You're not entirely happy inside yourself with what you've done. I went to the factory to see the people who are most important to tell them why I did it. And I had a face-to-face conversation with Mark."



2 BAHRAIN

Dominates after taking the lead from Nico Rosberg on lap two.

SV: "At the beginning, I thought if there was a small chance to get into the lead I have to take it because then I could take care of the tyres."



3 CANADA

Dominates from pole position.

CH: "Canada was a really big one for us. We had never won in Montreal and Sebastian was so dominant that weekend and absolutely nailed it. That was a really satisfying win."

4 GERMANY

Passes Lewis Hamilton at the start and wins under pressure from Kimi Raikkonen and Romain Grosjean.

Rocquelin: "For Sebastian to win in Germany was quite special. Also we were under pressure from the Lotuses all race, so to win that was very special too. Towards the end it looked like it might get away from us."

SV: "The in-lap after the German Grand Prix was the best moment of 2013. The feeling I had when I crossed the line and to see so many people standing up and cheering... it was a very special moment. I'd tried many times to win in Germany and finally succeeded."

5 BELGIUM

Passes Hamilton for the lead on the Kemmel Straight on lap 1.

CH: "After the summer break, to come back and win at Spa was important. Sebastian got the job done early on by passing Lewis Hamilton after a tricky qualifying in mixed conditions."

6 ITALY

Takes pole position and is never threatened.

CH: "Spa and Monza had been our Achilles' Heel, so to complete a dominant double at both of those venues was really satisfying and the start of an incredible run for us."

7 SINGAPORE

Takes pole position, fastest lap and leads every lap.

SV: "On days like this it's just a pleasure to be in the car."

He rules the night:
win number seven
came in Singapore



8 KOREA

Takes pole position, fastest lap and leads every lap.

SV: "I tried to build a gap and keep it quite consistent. I knew that on the soft tyres it will be tricky and yeah, obviously with the safety car later on it got quite busy."

9 JAPAN

Runs third behind Romain Grosjean and Mark Webber early on, but his two-stop strategy allows him to jump the Australian and then pass the Lotus for the lead.

GR: "We weren't leading at the start and it was a question of good strategy and good pace to try to overtake Grosjean at the end. That one was satisfying."



10 INDIA

Dominates from pole position.

GR: "Obviously, we won the championship there but it's also special because nobody else has won in India in three years."

11 ABU DHABI

Takes the lead from Webber at the start and wins by over half a minute

SV: "I was flying at some stages. At least it felt like it."

No other driver has ever won in India



12 USA

Controls the race from pole position.

SV: "It was a bit tight at the start; Romain had a good start initially, I didn't know whether it would be enough. We had incredible pace again in the car and could control the gaps."

13 BRAZIL

Matches Alberto Ascari's record of nine wins from consecutive starts.

SV: "In terms of Ascari, you can't really compare it as it's at a completely different time. In the 1950s, the races were much longer and there were a lot of breakdowns, much more than nowadays where reliability is exceptionally good. I think his record still stands out a lot." ■

Now-trademark donuts in Brazil



Red Bull-Renault RB9

Adrian Newey's latest masterpiece dominated the 2013 F1 season, winning 13 times in Sebastian Vettel's hands. GARY ANDERSON explains just why the car was so good

DNA

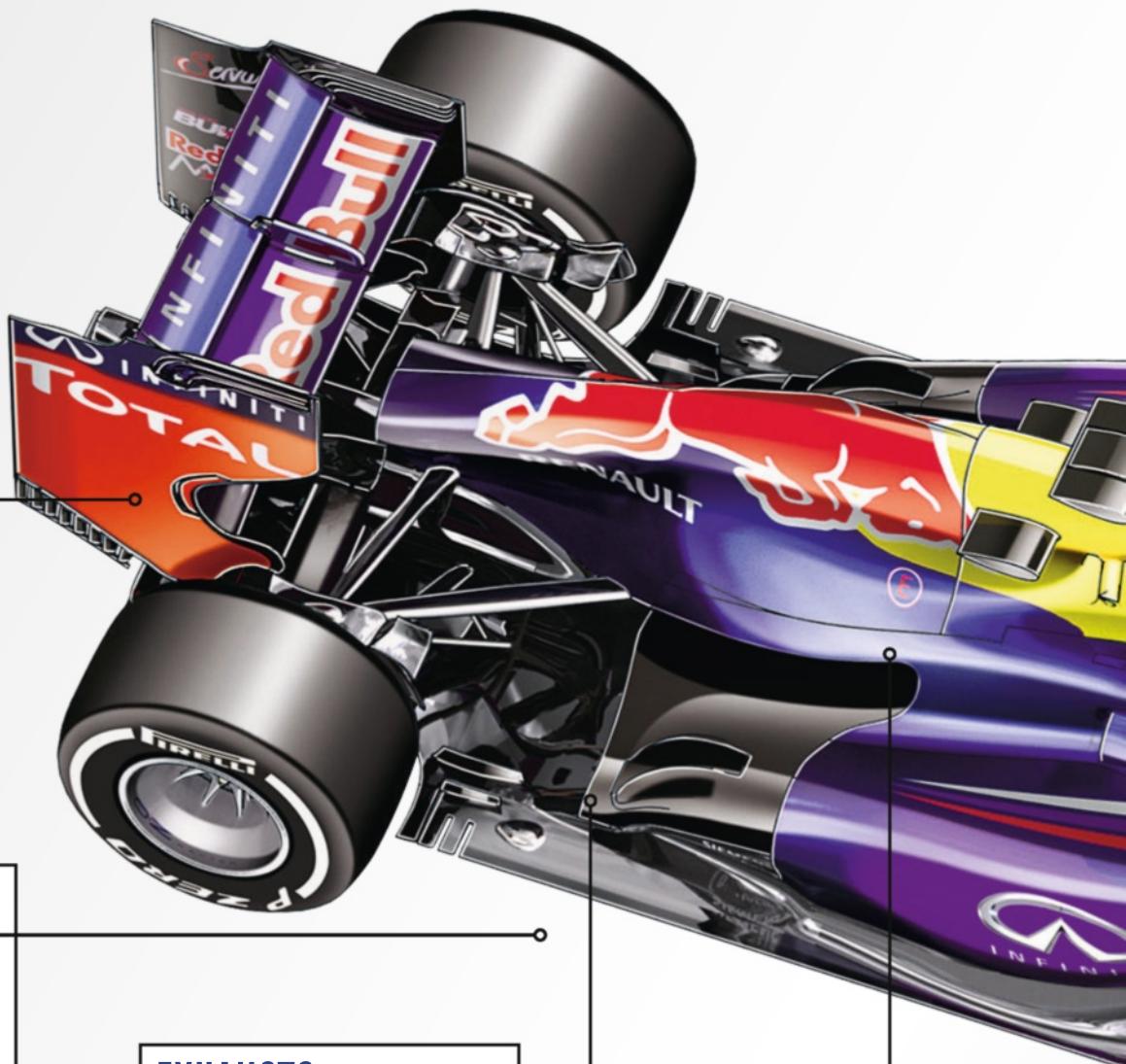
Looking at the whole car, you can see the lineage that stretches back to the 2009 Red Bull RB5. While others keep trying to start with a clean sheet of paper, Red Bull has made the necessary small steps to stay ahead.

REAR WING

This rear wing is relatively conventional. The car runs with a fair amount of wing as the team doesn't generally chase big straightline speed numbers. But since Mercedes became a problem, the team sacrificed a bit of wing in a bid to increase straightline performance.

RAKE

Red Bull has gained a lot from being able to run high levels of rake (the sloping angle of the car: low at the front, high at the rear). To do that, you need an aero map that is very stable with rideheight changes. In slow-speed corners, you want the centre of aerodynamic pressure to move forwards to counteract understeer, but you want it further back in high-speed corners for stability. If you have an aero map that allows you to do that, you can run the rear a bit softer and you also gain traction, but if it is too critical, you have to run stiffer. Others have tried to run this level of rake but have struggled.



EXHAUSTS

Red Bull is, along with Sauber and Lotus, one of only three teams to master a genuine Coanda-effect exhaust. While others shoot the airflow across a gap, it has a bodywork that the exhaust gas attaches to and that directs that flow to the brake ducts, which are effectively downforce-producing devices. Less of the exhaust gas is washed away by the mass airflow, with the flow actually accelerating on that ramp, meaning more energy gets to the brake ducts.

ENGINE

The Renault engine is the best of the V8s from a packaging perspective. While it is giving away a little power relative to the Mercedes or Ferrari, it gains on driveability and fuel consumption. It is also less demanding on cooling, meaning there is more airflow that can be used to generate downforce, and the radiators can be smaller. The engine mapping has been key to optimising the exhaust-blown downforce, even though the rules have restricted the level to which this can vary this year.

DRIVER

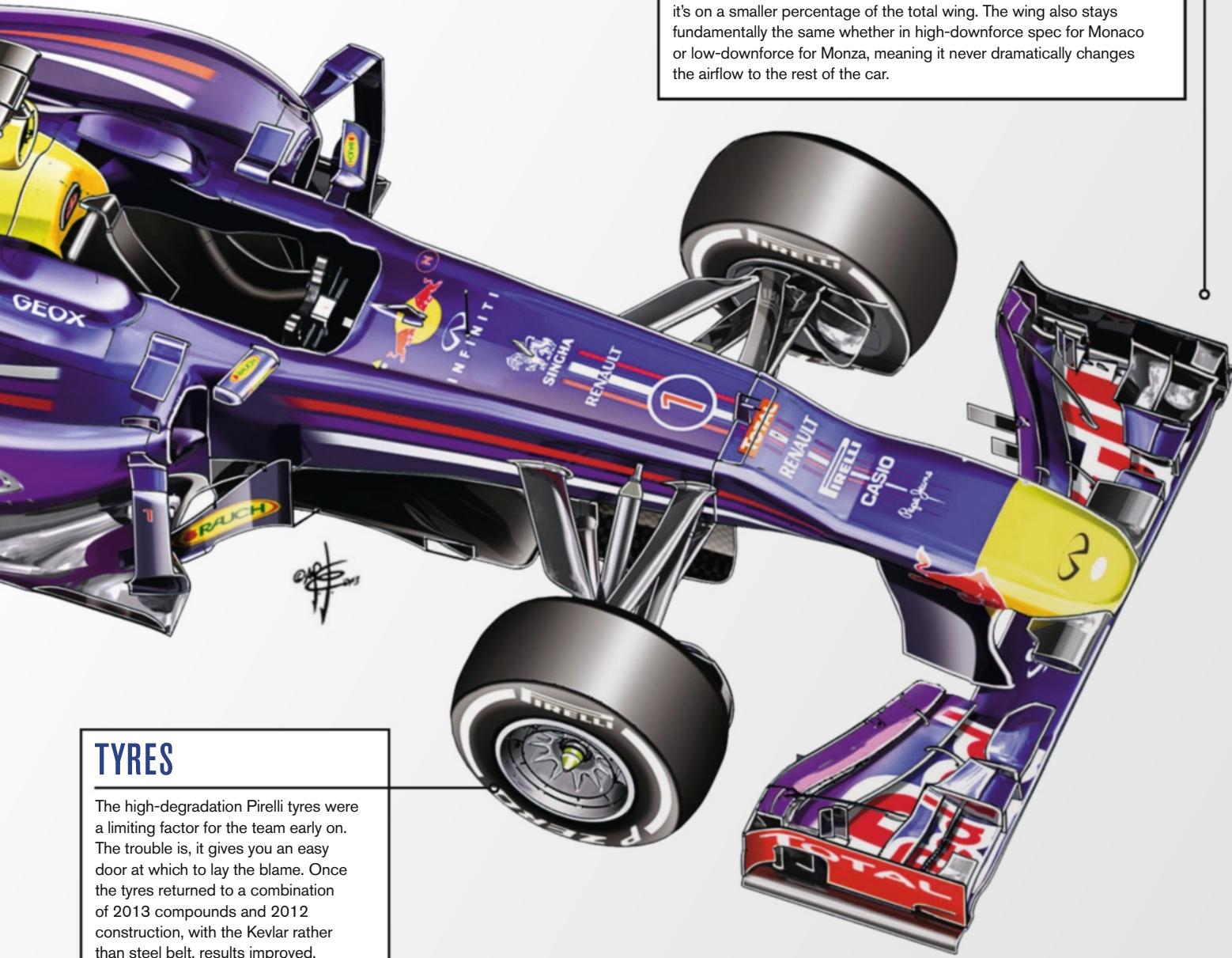
You compromise the effectiveness of the Coke bottle by incorporating the Coanda exhaust but that overall is a negative if you don't use the exhaust effect to the maximum. This is something that sometimes hurt Mark Webber. But Sebastian Vettel is remarkable at using the car to its maximum. Trackside, you can see how early he gets on the throttle and changes up gears to get rid of the torque. He makes a great car better.

**THE NEWEY EFFECT**

Adrian Newey has been key in ensuring the right development path for Red Bull's cars, which has led to the RB9. Consistency is a huge asset other teams have missed out on. Adrian leads the way with the shape, he is responsible for the concept, then he cuts it up into a jigsaw for his lieutenants to optimise its individual parts. This ensures the whole concept comes together and functions as one better than any other team.

FRONT WING

The front wing is the part that dictates the airflow to the rest of the car. It's not just about peak downforce. This front wing features as many as seven elements. While more slot gaps mean less downforce-producing surfaces, it's about creating consistent downforce. If you do get a stall, it's on a smaller percentage of the total wing. The wing also stays fundamentally the same whether in high-downforce spec for Monaco or low-downforce for Monza, meaning it never dramatically changes the airflow to the rest of the car.

**TYRES**

The high-degradation Pirelli tyres were a limiting factor for the team early on. The trouble is, it gives you an easy door at which to lay the blame. Once the tyres returned to a combination of 2013 compounds and 2012 construction, with the Kevlar rather than steel belt, results improved.



The miracle of Enstone

Plagued with financial uncertainty, rumours and instability off-track, the Lotus team excelled during the 2013 season against all odds. EDD STRAW examines how it managed to do so

Lotus was constantly in the news during 2013. Be it high-profile staff defections, the everlasting wait for promised investor funds, late payment of staff, or the messy end to its alliance with Kimi Raikkonen, the team seemed eternally to be at the heart of a maelstrom. Yet against all odds, Team Enstone had a very successful season on-track.

For Lotus still to be in contention for second in the constructors' championship at the season finale, win a grand prix and claim 14 podium finishes was nothing short of sensational. The man in the middle is team principal Eric Boullier, whose lifetime of experience in motorsport equips him well for the difficult job of keeping the ship and crew intact in stormy waters.

"First, we have excellent, skilled people in Enstone," says Boullier of the secrets of his team's success. "Secondly, there are two different communication flows. The financial one comes from Genii and the sporting one from the team.

I have always said I don't want politics in the team so I have tried to keep them separate.

"It's not easy. But you have to do it when you are in the office, speaking to people about racing and the daily glitches to be fixed. Part of my personality is to be straightforward and not hide anything, so there is trust and communication with the team so they know what is going on. If you are born in the racing world, like most of the people here, you know that there is your job on track and there is talk off it. There is a clear divide between those."

Genii deserves more credit than it gets for Lotus's success. It bought the team when Renault wanted out in the aftermath of the revelations about the manipulation of the 2008 Singapore GP and has invested heavily. But frustrations over several expected outside investments have made life difficult and Genii is unwilling to throw money at Lotus indefinitely. On the downside, the occasional late payment of staff can't have helped morale at Enstone.

This has made Boullier's challenge hugely difficult, but he appears to have been extremely

successful. Lotus's famously straight-talking trackside operations director Alan Permane has been at Enstone since 1989 and is well placed to judge Boullier's efforts.

"He is very good at that and does shield us from that side of things," says Permane. "People read stuff, but there has been so much written about us this year that people largely switch off to it and get on and do their jobs! People aren't





Raikkonen drew first blood in Australia...

buzzing around the internet looking at stories. Eric is very good at keeping these things like that at arm's length. He's a racer and his background is in race engineering."

While Permane remains a constant at Enstone, there have been significant personnel losses. Technical director James Allison was removed from his role shortly after the Bahrain Grand Prix pending his move to Ferrari and hugely capable aero chief Dirk de Beer has followed him. Nick Chester was promoted to replace Allison, with ex-Ferrari chief aerodynamicist Nicolas Hennel taking de Beer's place. There have also been plenty of defections among very skilled rank-and-file personnel who don't grab the headlines. Yet still Lotus gets results.

It's too early to judge Allison's successor as technical director, the very well-regarded Chester. But on his watch the switch to the longer (by about 100mm) wheelbase version of the car has been successfully implemented, suggesting that he is keeping up the good work started by his predecessor.

"There are downsides and upsides to this," says Boullier. "It's true that we have a more or less flat structure and there is a lot of openness between the key technical figures. The upside is that if you lose some key people you don't get hurt too much because you can find a replacement. The system still works because you spread the ideas over a group of technical people.

"The downside is that being open between us, when you lose somebody you lose more than just their technical skills."

But the race team could not be entirely insulated from the ructions affecting Lotus. The relationship with Kimi Raikkonen deteriorated from mid-season and became a major talking



"I have always said that I don't want politics in the team so I have tried to keep them separate"

ERIC BOULLIER

point among F1 fans. The Finn did not endear himself to everyone working with him at Lotus and the final stages of the otherwise mutually beneficial Raikkonen/Enstone axis were not straightforward.

Boullier adds: "Having Kimi onboard was the foundation point, it was reassuring and gave confidence to the team that if they push and deliver, there was someone on track that would deliver. Since July, it started to be [a little bit disruptive] and that foundation point was not as reliable as we liked, so it was disturbed a bit."

Fortunately, the emergence of team-mate Romain Grosjean picked up any slack. The Franco-Swiss driver has always had huge potential, and after the disaster of the Monaco Grand Prix, where he hit everything he could, be it barrier or Daniel Ricciardo, his future looked dicey. But from the British GP onwards, his form rapidly improved. Lotus deserves huge credit for keeping faith with Grosjean and nurturing his prodigious underlying ability.

"After Monaco, we had some worries," admits



Boullier operates on openness and honesty

Boullier. "We could not have accepted going down this spiral again. But from Silverstone, we started to see some lights and in Germany it was a big surprise to see him fighting for victory. The question then was how consistent would he be?"

The answer, it turned out, was 'very'. In the final six races of the season, he was on the podium four times, finished fourth once and retired early at Interlagos with a Renault engine failure. Most significantly, he was the highest points scorer other than Vettel. Again, this is testament to the faith Boullier showed in Grosjean, support that often did not put him in the easiest of positions.

Lotus faces the winter off-season amid inevitable ongoing uncertainty about its future. But whatever happens in 2014 there is one thing that can be relied upon. If the conditions give the men and women of Enstone a sniff of being able to do so, they will continue to defy expectations and deliver the goods even in the most stressful circumstances. ■

“I feel ready to lead the team, ready to be one of the best”

72

Romain Grosjean emerged as one of the best drivers in Formula 1 in the second half of the season. EDD STRAW quizzed him about his difficult path to the top

You started the season with a lot to prove after last year's troubles. How did you approach the start of 2013?

It wasn't the easiest season for me. I burned a lot of energy in the first part of the year trying to make things right. The second part of last year was really bad, so there was a lot of pressure. But I didn't lose my self-confidence, which was important. The first mission of the year was to have no first-lap crashes but I was really struggling with the car. Kimi was flying in the first three races and I was nowhere. It's always hard to see your team-mate winning races, standing on the podium when being between eighth and 10th is the best you can do. It wasn't an easy start.

Were you trying a bit too hard to make it all come together?

Yes. Then we went to Bahrain. Friday was the same story as normal, I was one second off on the long run and couldn't understand anything. Then, on Friday night, we said, 'ah, if we try that'. On Saturday morning when I sat in the car, wow it was working and we were on the podium. Then at Barcelona I was on target for a podium and we broke the rear suspension.

Then I went to Monaco, where I was super-quick and had a good feeling but I danced quicker than the music. If I went back to Monaco in the same circumstances today, it would be very different. In some ways it did help me to make a step forward.

How did you feel after Monaco, where you were very fast but kept hitting things? Was it a lower point than even last year's ban at Monza?

Yes. But it was important that the team was behind me and although I knew I had a terrible weekend, I understood why and could work on it and make sure it wouldn't happen again. For

three days, I was feeling shit and not very happy. I was in a bad mood. But I worked, we went to Canada and tried to forget. Yes, there was a 10-place penalty let's see what we can do. Our low-downforce package didn't work well, so it was in some ways a good place to have the penalty! Then we went to Silverstone...

You outqualified Kimi there and were right with him in the race. That seems to be the start of the upward curve?

Then it started to go better. Bahrain was like the start of winter testing with a 'normal' car. So by Silverstone it was looking good and we were going for a top five but had a front-wing issue and had to retire. Then I went to Germany. People say it was like a switch. But for me, it wasn't. It was progressive but we couldn't show it for other reasons. When things came together it started to develop.

The low-downforce tracks, Spa and Monza, were difficult for the team, but you were extremely strong from Singapore onwards...

I think the races got stronger and stronger. You get to know your car better, you get to fight with the big guys again. People forget that I have



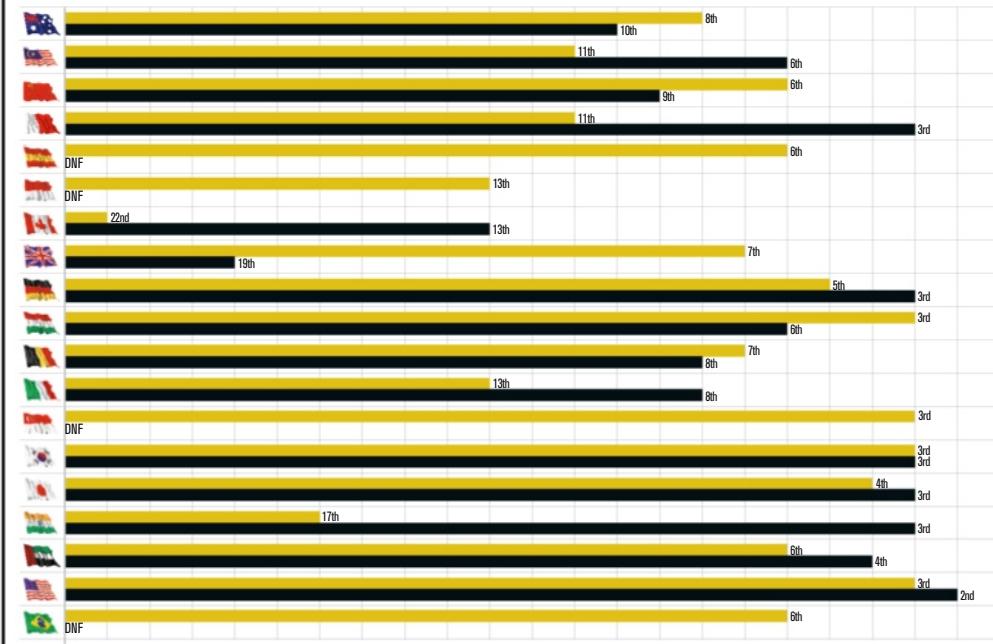
Grosjean admits he "danced quicker than the music" in Monaco



COATES/LAT

GROSJEAN'S SEASON – RACE BY RACE

Start position
Finish position



73



DUNBAR/LAT

"I burned a lot of energy in the first part of the year trying to make things right"

started fewer grands prix than someone like Daniel Ricciardo. I have only started 45 GPs and there are a lot of things to learn. In Germany and Hungary we were at the front, then forgot the low-downforce tracks! In Singapore we were back at the front consistently. You keep improving yourself and learning. For example, Kimi was behind me in Korea and I made a small mistake so he could have a go and pass me. Today, I would not make that mistake.

The mistakes seem to have been eliminated. Suzuka was an outstanding performance: you managed to keep a slower car in the lead into the second stint against the odds...

Yeah, Suzuka was again a new experience for me, leading the race on a normal strategy. There were cars behind me that were quicker so I had to drive at 100 per cent, but I could not make a mistake because if you go into the gravel the first time that you are leading a race everyone will go 'oooh'. So that was a new situation. It's not easy to lead a race or be number one and when you get there, it's hard to stay there. But I have recently done some work with a psychologist that has helped. That was a very strong race.

Do you feel like you've arrived as a top-liner?
Yes, I think the past few races have shown that. Kimi has left the team and we are still up there doing the right things at the right time. I feel ready to lead the team, ready to be one of the best, which is not easy when you get to F1 with people like Vettel, Hamilton and Alonso.

Are you ready to be a world champion?
Yes, if the chance is there. That is what I am aiming for in the future.

How important has Lotus team principal Eric Boullier been to you being given the time to fulfil your potential?

He understands and likes racing, which is very important. I didn't make life easy for him, but we were in the same boat as he had backed me up quite a lot so it was important for us to grow in the same direction. Today, the relationship is really good. He's not having the easiest time in his career but he does things very well.

Without him, would you be on the scrapheap?
Probably. A few team principals would not have seen the potential. It takes time to get to F1 and maybe took me longer than others to settle. ☑

THE STORM BEHIND THE SCENES

There was plenty to talk about on-track in 2013, but some of the events behind closed doors were just as dramatic, and perhaps more important, as DIETER RENCKEN explains



The 2013 Formula 1 season finished as it had started: without a fully fledged Concorde Agreement, the covenant that outlines the mutual technical, sporting and commercial obligations of each of F1's three player groups: the governing body (FIA), the commercial rights holder (Formula One Management), and

the 11 competing teams collectively.

In the absence of this crucial document, which had controlled the sport since 1981, F1's governance fell apart, with only the (tenuous) goodwill of all parties averting disaster. For example, where under the 2010-12 Concorde, Formula 1 Commission meetings – at which motions are approved before submission to the FIA's World Motor Sport Council for ratification – were held quarterly, this season a single such meeting was convened. And it came after the final WMSC session of the year...

Thus, with less than two months remaining before 2014's eco-friendly, turbocharged hybrid engines hit the tracks for pre-season testing, a number of technical and sporting issues remain unresolved, with the minimum weight of the new cars, which incorporate hefty batteries and intercoolers/radiators, still up for discussion.

This year marked the first season in which four teams were rewarded under the Constructors' Championship Bonus concept, which provides for the top teams (Red Bull Racing, Mercedes, Ferrari and McLaren) to be paid premiums for their participation. So inequitable is the structure that a CCB team scoring zero points throughout



Ecclestone has said
Red Bull boss Horner
may one day run F1

an entire season is appreciably better rewarded than any non-CCB team winning both titles!

A novelty for this year was the formation of F1's six-strong Strategy Group, a 'think tank' drawn from the CCBs plus Williams (through heritage) and the top-scoring 'other team', currently Lotus. Due to assemble prior to F1 Commission meetings, the Strategy Group had sat but once at the time of writing. And at that meeting more questions were raised – including one concerning its own legality – than answers provided.

In fact, the formation of groups seems to be vogue in F1, for, apart from the Strategy Group, a variety of ad-hoc groups were formed, including Legal, Financial and Commercial – by team body FOTA – while sole supplier Pirelli hosted a Tyre Working Group.

The previous (FIA-convened) Sporting/

Technical Working Groups were downgraded to Committees before being reconstituted as Groups (!), while the Strategy Group formed a number of sub-Groups, including one for tyres. Yet, despite all the grouping, the sport held not a single meeting at which all team principals plus FIA/FOM were present simultaneously, while the only meeting of consequence attended by Bernie Ecclestone (FOM) and all team bosses was held back in April – in Shanghai.

In keeping with the global economy, 2013 was the year in which the rich teams got (appreciably) richer, the poor got (substantially) poorer and the extremely rich made a killing: the last-named being FOM's owner CVC Capital Partners, which syphoned off £550m while Marussia posted a £60m loss, having received just 10 per cent that amount as its share of Formula 1's billion-pound revenues for the 2012 season.

The Anglo-Russian team was far from the only operation to report red figures, for Lotus found itself in dire straits despite winning a grand prix and remaining in contention for the runner-up spot in the all-important constructors' championship until the final round. Sauber was forced to turn to Russian investors despite finishing seventh in the 2013 championship.

That F1's current business model is seriously stretched is underscored by the fact that both McLaren and Williams posted 2012 losses, with Marussia and Caterham linked to mergers and acquisitions, not only among themselves, but equally with other operations.

Faced with potentially dwindling grids, FOM pushed for an 'A'/'B' team system whereby the top five teams would supply cars and kit to an equal number of customers, but this concept fell rapidly out of favour for a variety of reasons, not least



ETHERINGTON/LAT



"A number of 2014 technical and sporting issues are unresolved"

being that the demise of an 'A' team would take its customer with it. Therefore Eight-3 – eight teams with three cars each, with the additional entry being for rookies – is under discussion.

That F1 at all reached this worrying stage is a legacy of the 113-year commercial rights deal cut by the FIA – at the time presided over by Max Mosley – with Ecclestone for around three per cent of intrinsic value, with the latter in turn selling the rights to eventual owner CVC via a contentious chain of transactions.

During 2013 these became the subject of several (civil and criminal) actions on both sides of the Atlantic, with the verdict of the first being considered by Britain's High Court at the time of writing. The sight of FOM's CEO defending himself in court made for sorry viewing, and there is little doubt F1's image was dented by the shenanigans, even if only due to the enormous

pile of dirty rags being laundered in the process.

A welcome by-product of the legal issues is that F1's much-vaunted IPO on Singapore's Stock Exchange is on indefinite hold. Intriguingly, during testimony in the High Court, CVC co-founder Donald Mackenzie suggested that where once the relationship between teams and CRH was akin to "bad marriage", matters had recently improved considerably such that "we now have a stable series". Really?

FOTA played a major role in devising the previous Concorde, but the body lost momentum and relevance as first Red Bull Racing and sister outfit Toro Rosso departed at the end of 2011, then Ferrari and Sauber. After the final 2013 race the remaining members were questioned about FOTA's future, being given three options, including disbandment of association.

More is the pity, for correctly structured, FOTA

proved an effective foil against the bulldozing of teams by both the FIA and FOM while playing an active role in promoting fan and other forums.

A bright point of 2013 was, though, the signing in September of an agreement between FIA President Jean Todt and Ecclestone for a framework (note) for the 2013-20 Concorde Agreement. While the final document remains some way off (despite reassurances to the contrary from FOM) and all teams would need to agree to its terms before the tripartite covenant comes into effect, Formula 1 can at least look forward.

In negotiating the framework Todt insisted on enhanced financial terms for the FIA, so much so that he secured as much as £150m for the governing body during the full 2013-2020 term. Taken in conjunction with increased entry/licence/penalty fees, the body is again sufficiently well funded to discharge its duties and obligations, having previously been left severely cash-strapped by the original commercial rights deal.

This enabled Todt to confidently stand for re-election during the FIA's quadrennial elections, his task aided considerably by the withdrawal of sole opponent David Ward in a process that, ironically, the Englishman had previously helped develop while acting as consultant to Mosley.

Thus on December 6 Todt was elected for his second four-year (and final) term uncontested – but not unopposed, for Ward, who resigned as Director-General of the FIA Foundation to stand, has continued to take a stand against the FIA's current governance.

While 2013's political noise at times rivalled the shriek of the sport's (now-silenced) V8 engines, there is little reason to believe that next season's conflicts will take after F1's new (muffled) turbo power units... ■

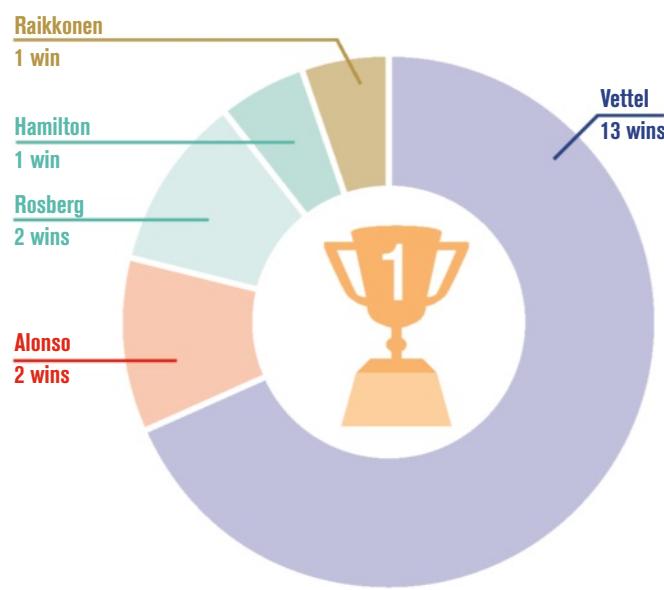


FERRARIO/LAT

Non-CCB team
Marussia made
a £60m loss

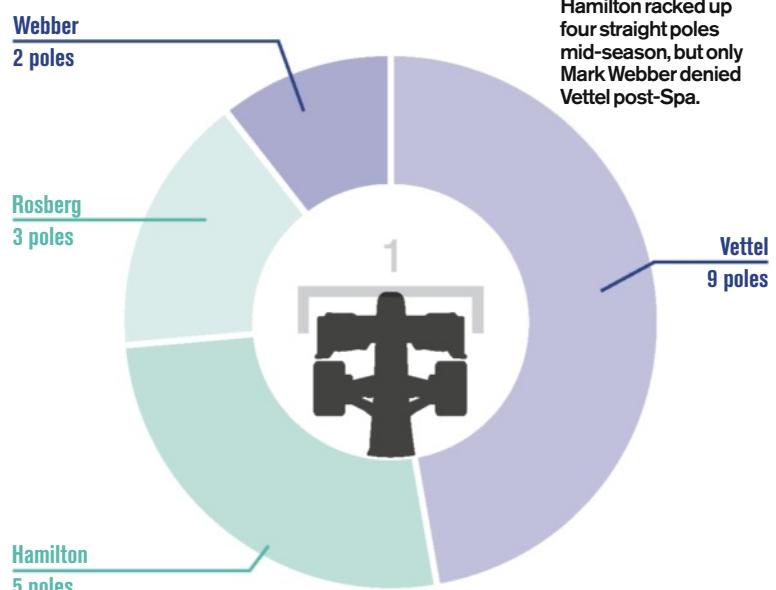
F1 stat attack

RACE WINS



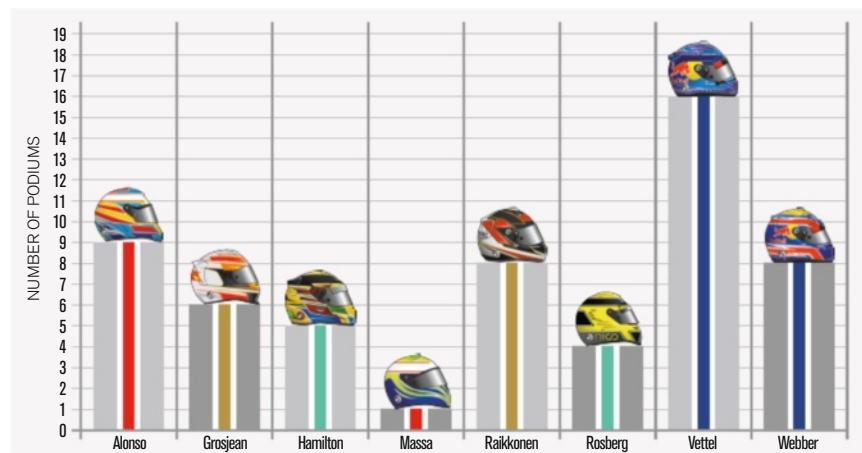
It was a season of two halves, with five drivers sharing the first 10 wins and just one – Sebastian Vettel – scoring a record-breaking nine-in-a-row in the second half.

POLE POSITIONS



It was a straight fight between Red Bull and Mercedes in the qualifying table. Hamilton racked up four straight poles mid-season, but only Mark Webber denied Vettel post-Spa.

PODIUMS

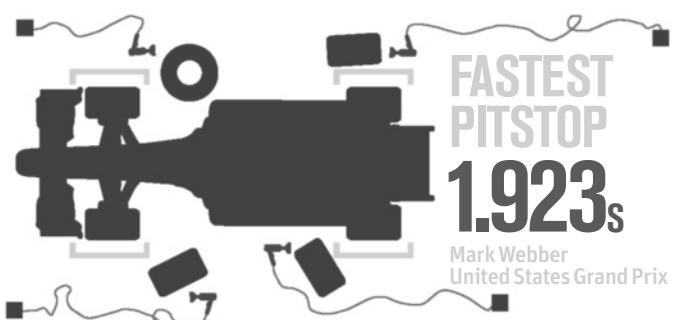


On only three occasions did Vettel fail to stand on the podium in 2013, while Romain Grosjean tripled his career tally.

HIGHEST TOP SPEED

212 MPH

Esteban Gutierrez
Italian Grand Prix



LAPS LED

Vettel led considerably more laps than the rest of the field put together. Adrian Sutil's 11 laps at the head of the pack in Australia were his first at the front in F1.



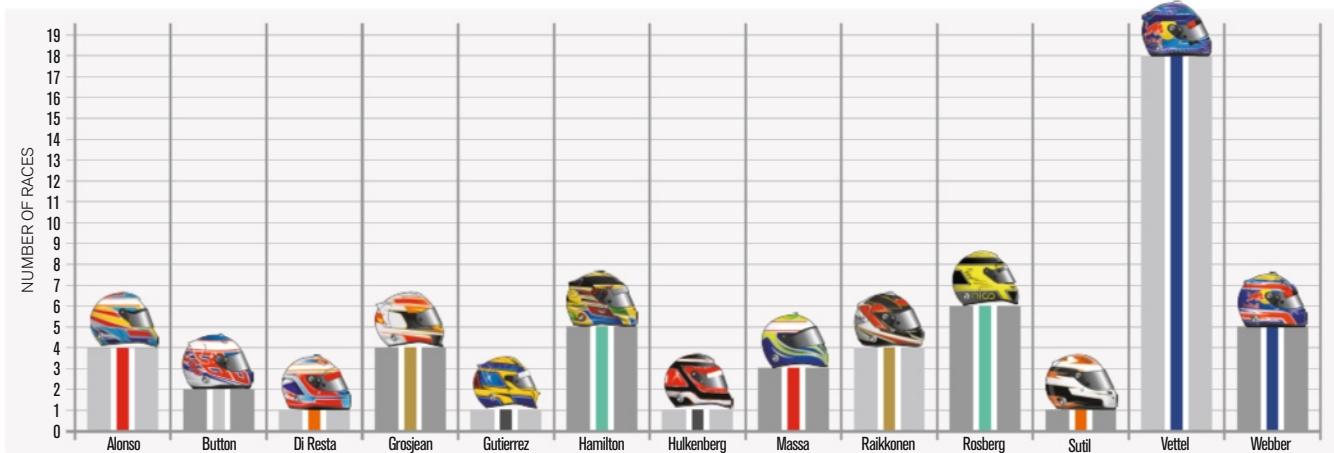
MOST RACE LAPS COMPLETED

1126 LAPS – JENSON BUTTON (TOTAL WAS 1131)



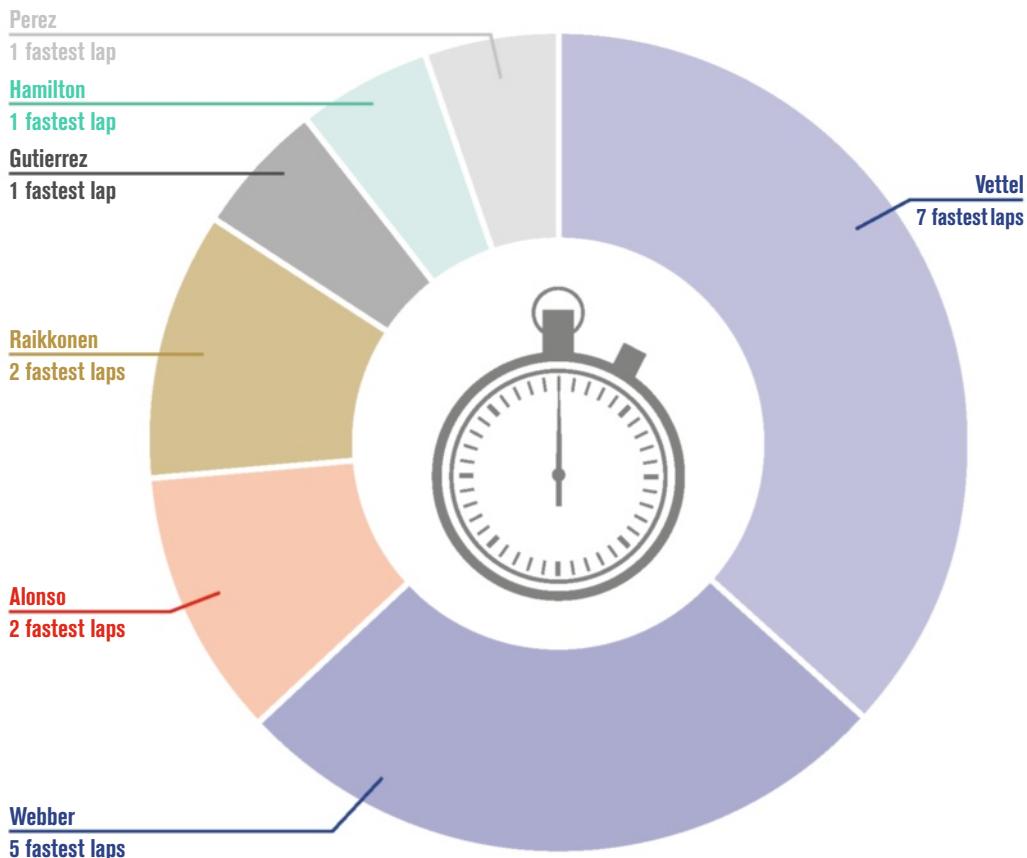
RACES LED

In years to come naming the race Vettel failed to lead in 2013 will be a quiz question. It was the Monaco GP.



FASTEST LAPS

Webber runs Vettel close for fastest laps. Fresh tyres and light fuel accounted for Sergio Perez and Esteban Gutierrez making the list.

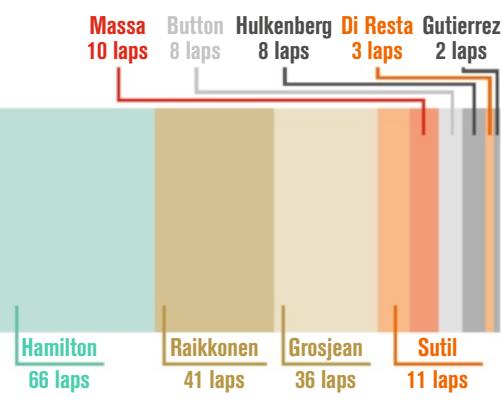


QUALIFYING HEAD TO HEAD

17	Vettel	Webber	2
11	Alonso	Massa	8
9	Button	Perez	10
11	Raikkonen	Grosjean	6
0	Kovalainen	Grosjean	2
8	Rosberg	Hamilton	11
18	Hulkenberg	Gutierrez	1
12	Di Resta	Sutil	7
8	Maldonado	Bottas	11
4	Vergne	Ricciardo	15
11	Pic	Van der Garde	8
17	Bianchi	Chilton	2

2013 SEASON FINES
€256,900

Most-fined driver:
Pastor Maldonado
€120,000

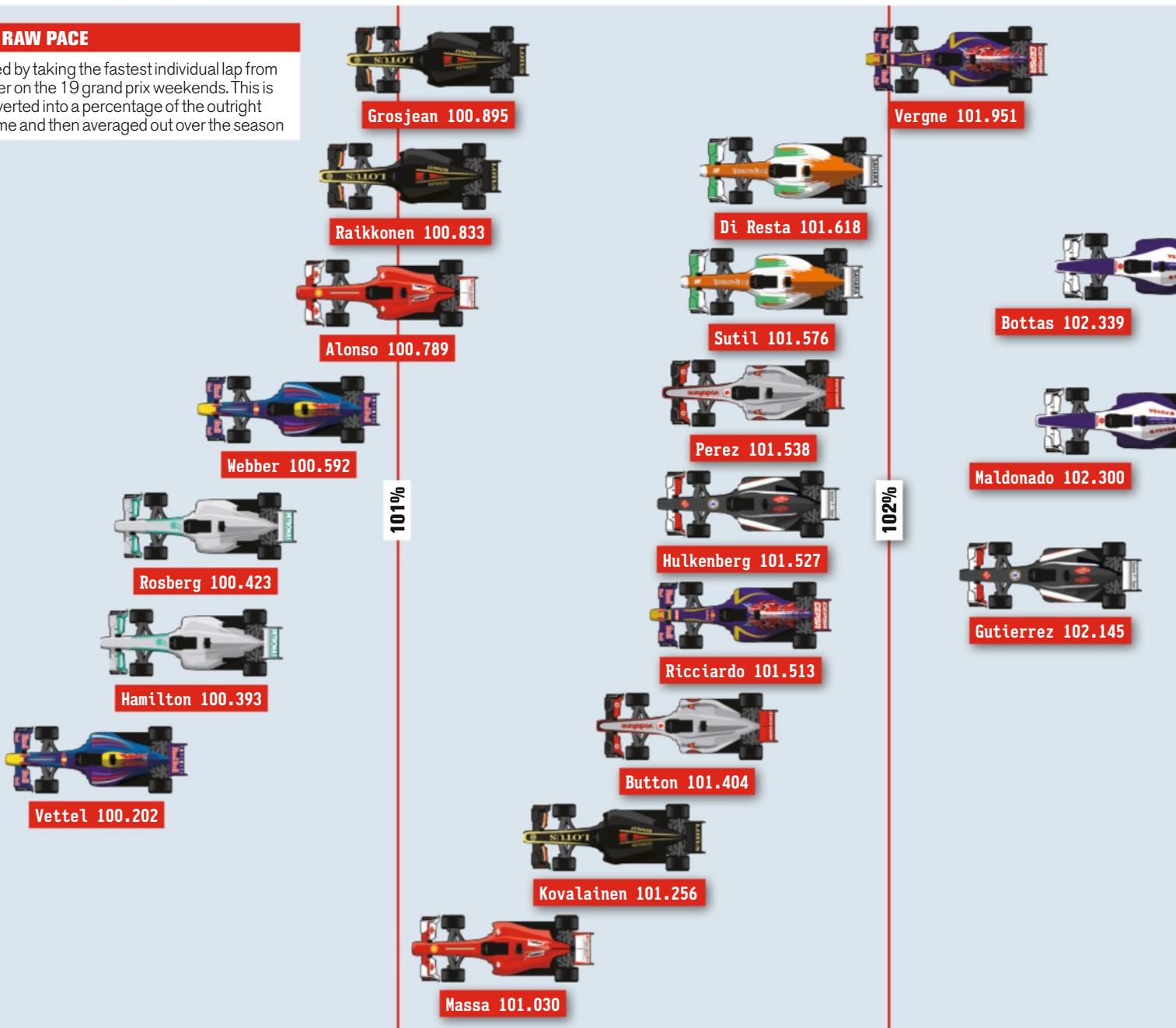


Performance analysis

DRIVER RAW PACE

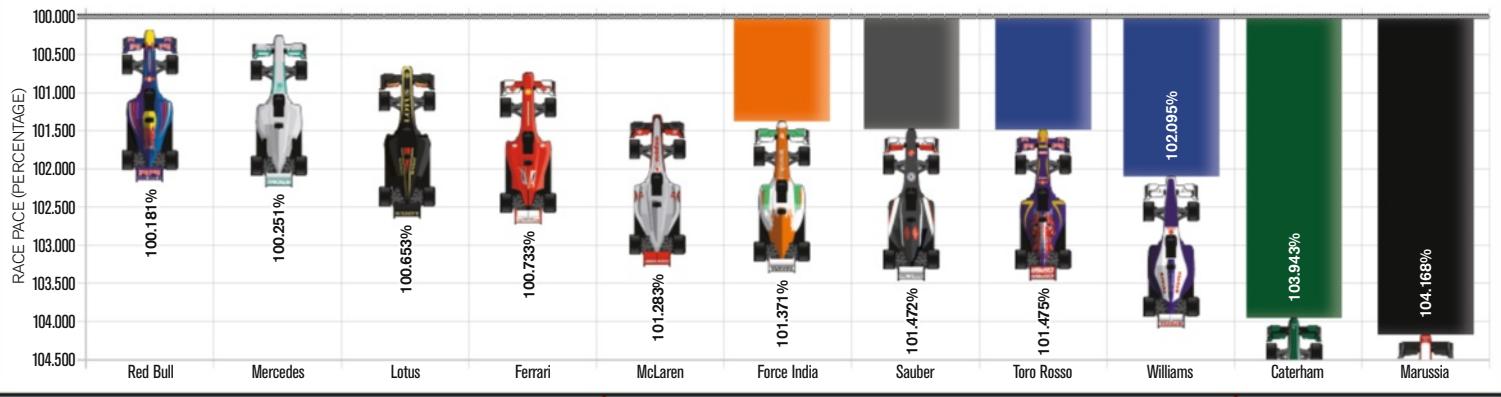
Generated by taking the fastest individual lap from each driver on the 19 grand prix weekends. This is then converted into a percentage of the outright fastest time and then averaged out over the season

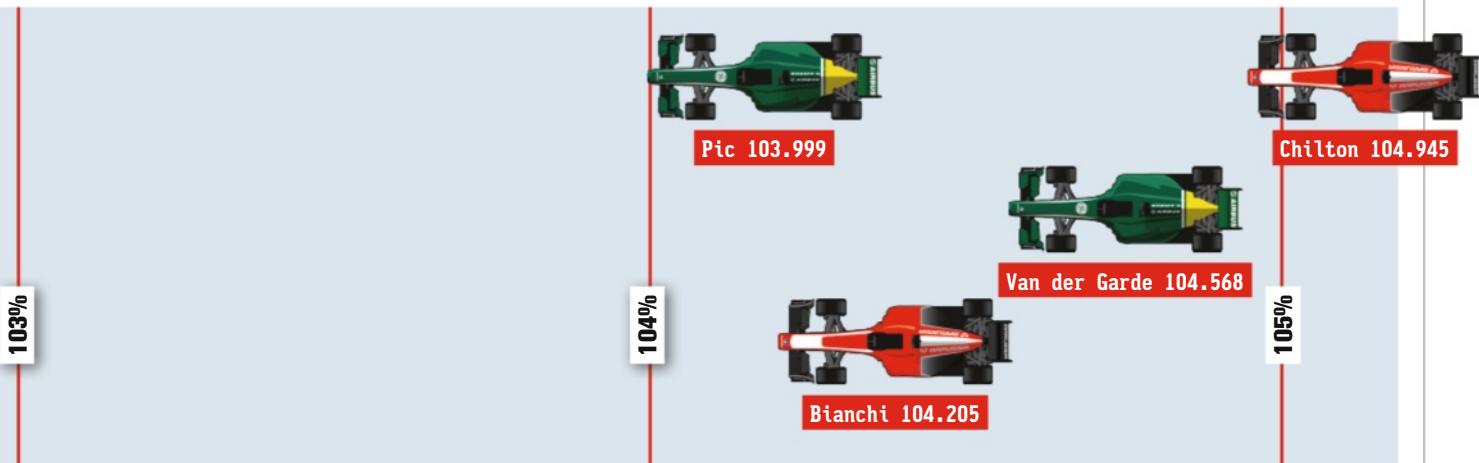
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CAR RACE PACE

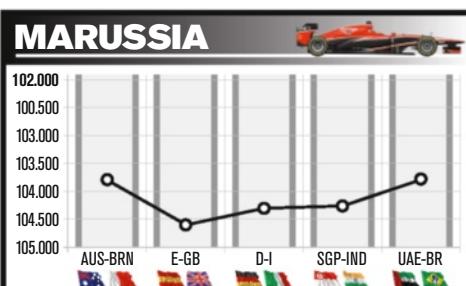
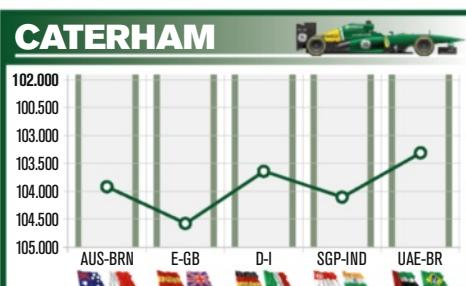
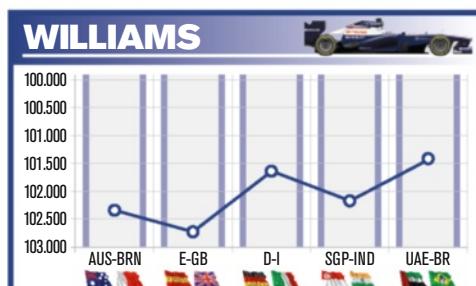
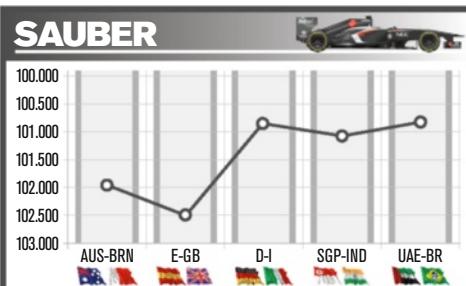
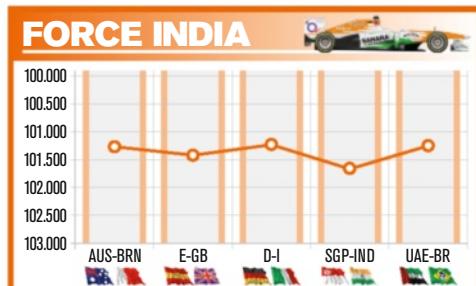
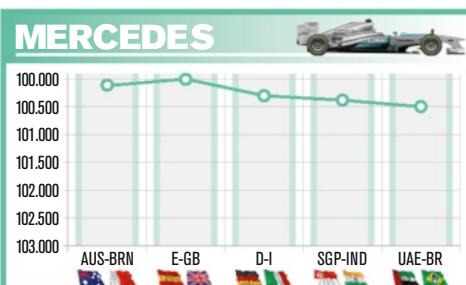
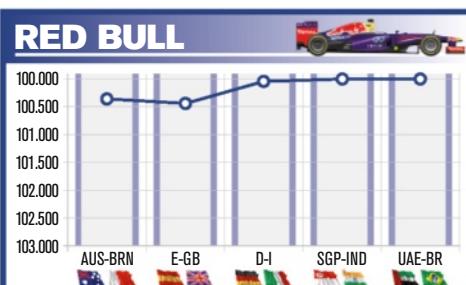
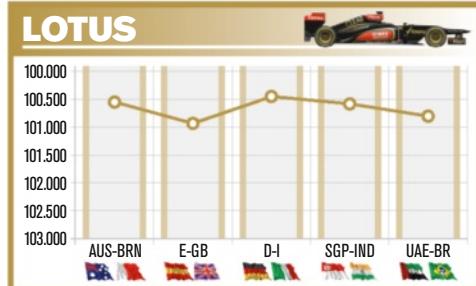
The Mercedes had the edge for a long time, but the Red Bull ultimately emerged as the quickest car over a single lap on average over the course of 2013





THE DEVELOPMENT WAR

By breaking the season up into blocks – four of four races and one encompassing the final three – the ebbs and flows of the development war can be tracked, showing just how dramatically Red Bull took control of the year in its second half.



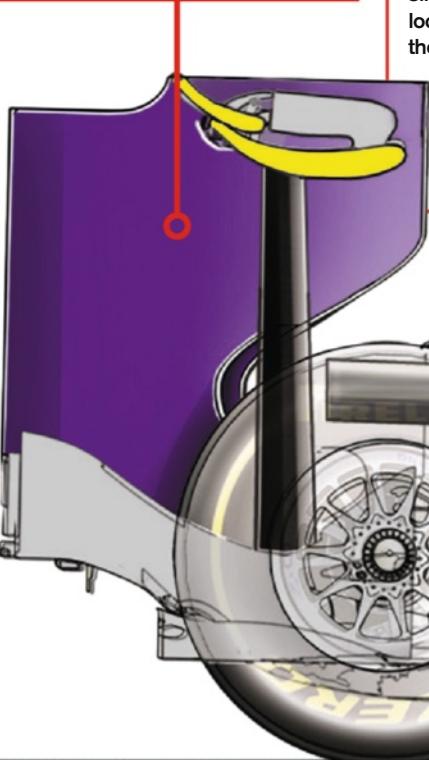
Inside F1's 2014 rules

With the dust now settled on this year's grand prix season, attention is turning to 2014.

GIORGIO PIOLA and EDD STRAW reveal the shape of things to come in Formula 1

Rear wing

The rear-wing planes (yellow) are a little shallower, but the main change is the removal of the beam wing (circled on bottom image). This part of the wing was a powerful producer of downforce.



Exhaust positioning

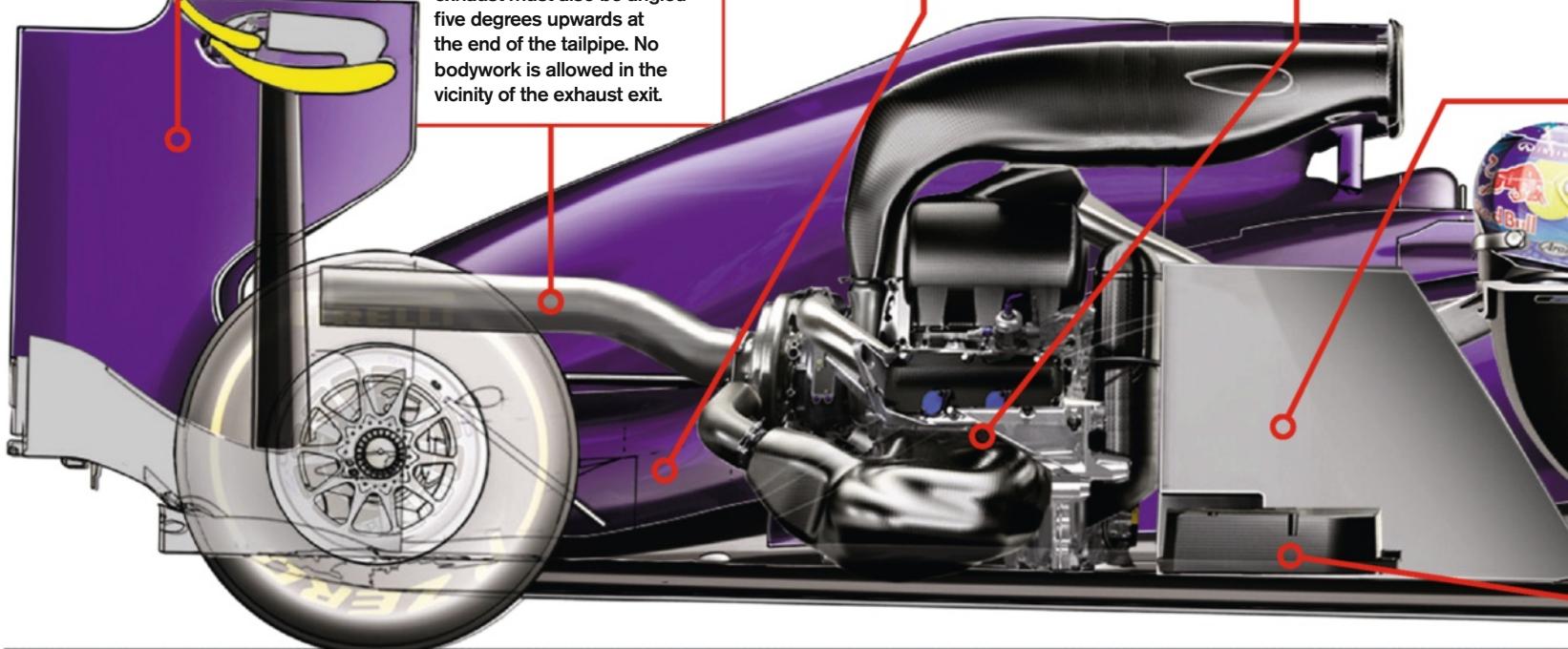
After the attempt to wipe out exhaust-generated downforce in 2012 failed, a much more effective solution has been put in place for next season. Article 5.8.2 of the technical regulations mandates a single, rearward-facing tailpipe located 170–185mm behind the rear-wheel centre line. The exhaust must also be angled five degrees upwards at the end of the tailpipe. No bodywork is allowed in the vicinity of the exhaust exit.

Gearbox

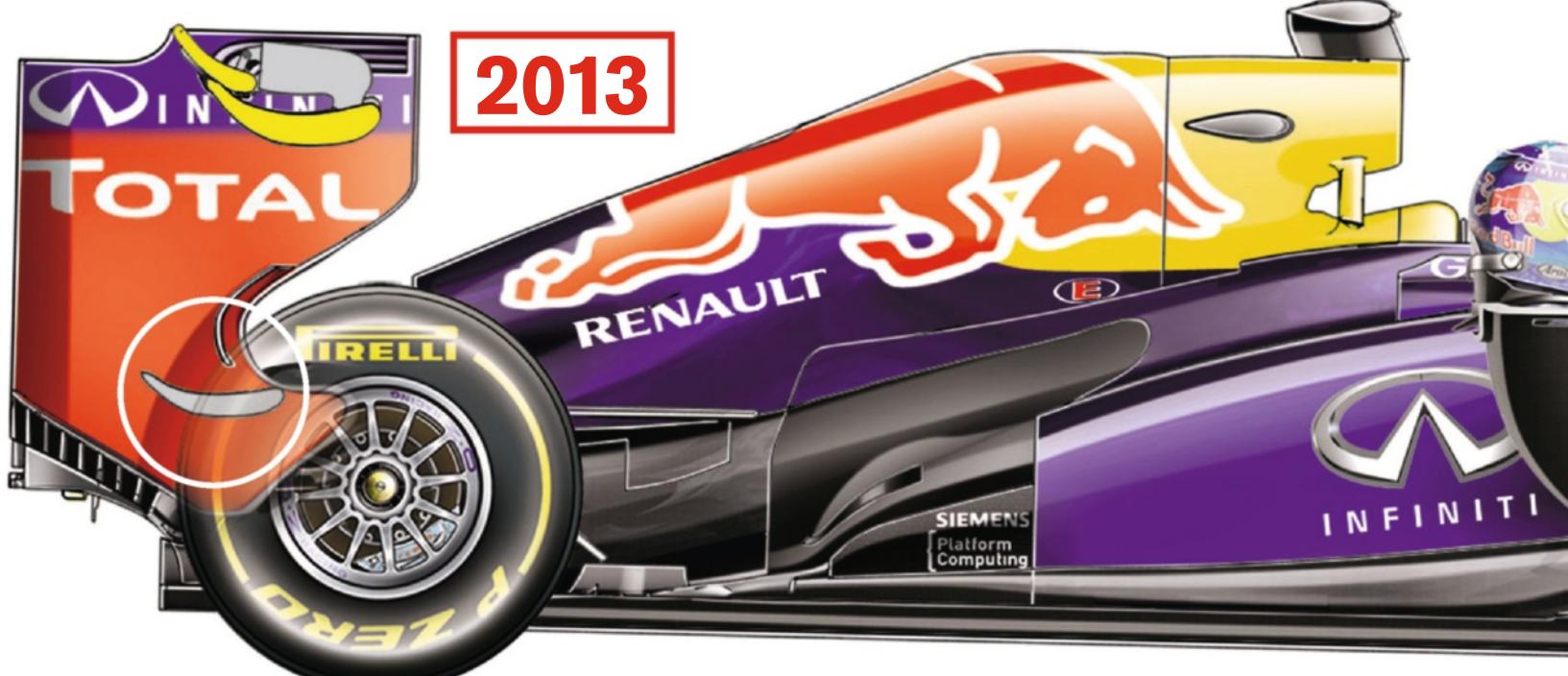
Gearboxes will have eight forward gears next year. Teams will have to choose their eight gear ratios, which will be locked for the year, before the first race. Currently, teams have a pre-selected choice of 30 ratios.

Engine

The current 2.4-litre, normally-aspirated V8 engines are replaced by the new 1.6-litre turbocharged V6 powerplants in 2014. This is the first time F1 has run turbo engines since the end of 1988. The rev limit has been reduced from 18,000 to 15,000rpm.



2013



Sidepods

The cooling demands of the 2014 engines are significantly greater than on the previous generation of cars. This means chunkier radiators and has an effect on sidepod size. Also, a new mandatory side-impact crash structure must be incorporated (inset), further influencing the shape.

**Fuel**

Only 100kg of fuel can be used during a grand prix. This means a significantly smaller fuel tank, approximately one-third smaller than that of a 2013 car. The maximum permitted fuel-flow rate will be 100kg/hour, down from in the region of 165kg/hour currently.

Weight

The minimum weight, including driver, is increased to 690kg. This is an increase of 48kg from 2013. Even with this increase, teams are struggling to hit the minimum weight, hence concerns over taller, heavier drivers such as Nico Hulkenberg. An increase of a further 10kg is likely to come in for the 2015 season.

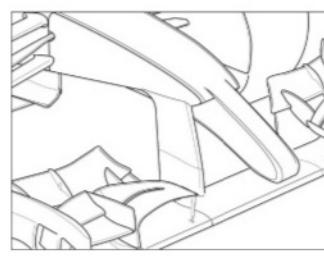
Nose

The unsightly noses expected in 2014 (below) have been a major talking point recently. For safety reasons, the regulations now stipulate that the nose (measured 50mm behind the tip) is centred at a height of 185mm. The need to meet

this regulation – combined with stipulations for the minimum surface area of 9000mm² and the desire to keep the chassis and nose as high as possible to maximise the airflow under the car – will lead most teams to take the ugly route.

Chassis height

The maximum height of the front of the chassis has been lowered slightly, from 550mm to 525mm.

**Front wing**

The front-wing width has been reduced by 150mm, from 1800mm to 1650mm. This is still wider than it was in 2008, the last season before front wings were increased to the full width of the car.

2014

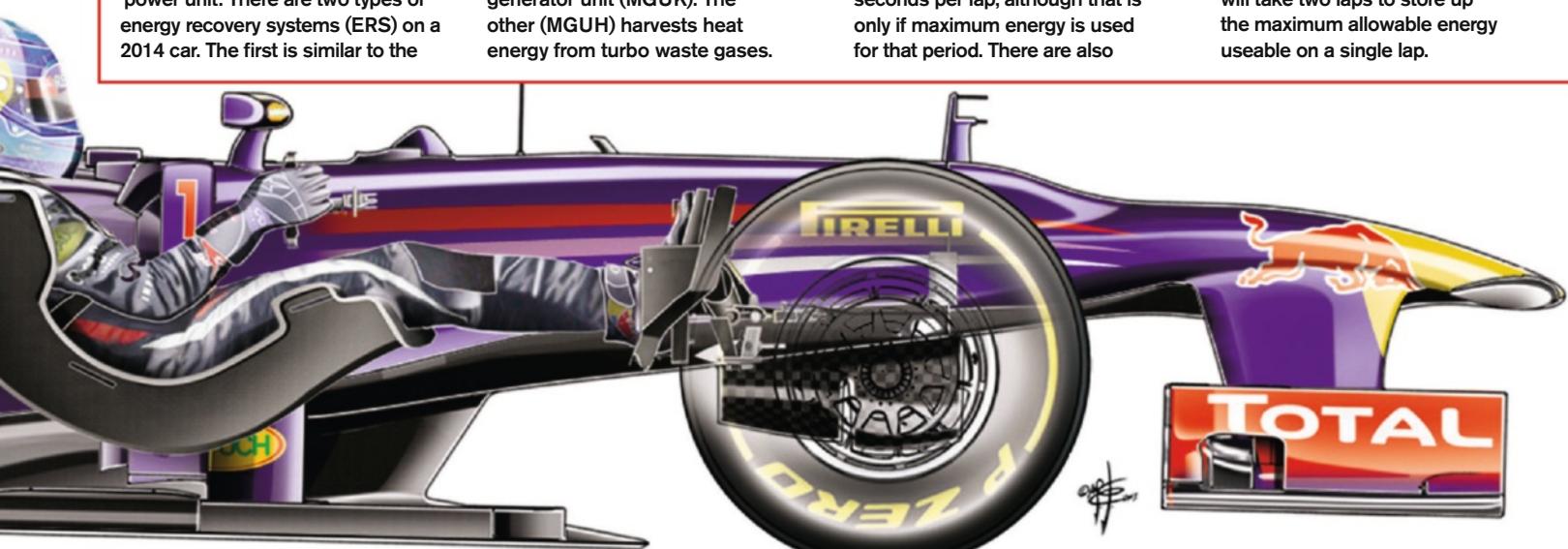
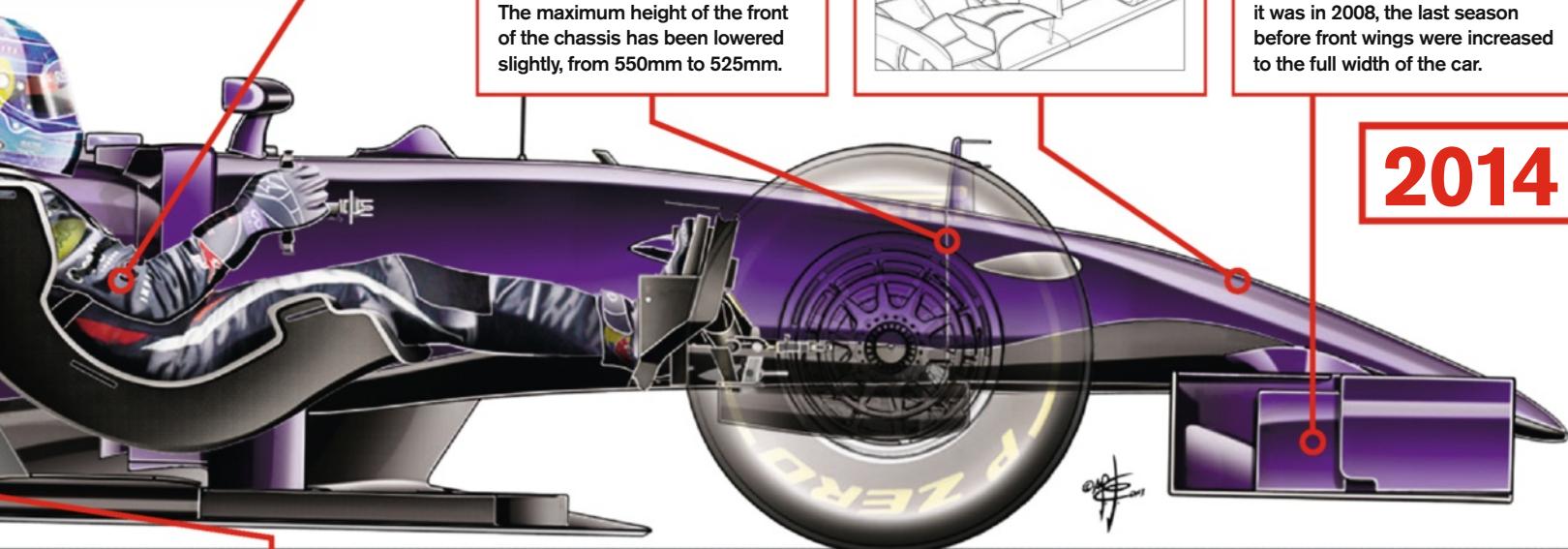
Energy recovery systems

The internal-combustion engine is now only one component of a green 'power unit'. There are two types of energy recovery systems (ERS) on a 2014 car. The first is similar to the

current KERS, with braking energy harvested and re-used by a motor generator unit (MGUK). The other (MGUH) harvests heat energy from turbo waste gases.

In total, an extra 163bhp is available for deployment for a total of 33 seconds per lap, although that is only if maximum energy is used for that period. There are also

restrictions to the rate at which energy can be harvested, so it will take two laps to store up the maximum allowable energy useable on a single lap.



Debating where IndyCar goes next

US racing legend Mario Andretti and IndyCar boss Mark Miles disagree on how the sport should progress. MARK GLENDENNING gets both sides of the story

It has been roughly a year since Randy Bernard stepped aside as IndyCar CEO, and with Mark Miles now in charge — Miles being CEO of Hulman & Co, parent company of IndyCar and the Indianapolis Motor Speedway — the series' new direction is beginning to take shape.

Many of the changes have taken place behind the scenes, but in competition terms, IndyCar is preparing for a self-described ‘transitional year’ in 2014. The calendar will be squashed into five months, and a winter series (which may or may not be international) is in the works for 2015 to help fill the downtime. Also, the Indy road course will be used for the first time in 2014.

Some team owners have given Miles their full backing. Many harbour private concerns, but are staying publicly quiet in the interest of harmony. Several drivers have spoken of fears that the Indy road course race will hurt the Indy 500; many teams are worried about job security for crew members when they



IndyCar's transitional calendar in 2014 includes a race on the Indy road course

face so many inactive months, or the difficulty in convincing sponsors to part with the same amount of money for a shorter season — after all, the running

costs remain unchanged. Mario Andretti and Miles stand at opposite sides of many of the arguments, so we asked each about the other's views.



Q&A



TEE/LAT

**MARIO ANDRETTI
FOUR-TIME INDYCAR CHAMPION**
What is your take on next year's race on the Indy road course?

It's a risk. It seems like Mark Miles takes a lot of advice from the Boston Consulting Group, who haven't got a clue, in my opinion, about our sport.

No-one loves road racing more than I do, so from the standpoint of having more road races, fine. But it

diminishes the mystique of the main event. I'm on the record with him that I totally disagree, and he looks at me like I'm a naysayer. I've lived in the business all my life. He comes from tennis, or whatever. Why doesn't he pay attention to some of the things that actually have worked?

I raced at the first and second Daytona 24 Hours. All the main teams were there. There was nobody around. Today, the main NASCAR stars turn up, IndyCar

stars... nobody there [in the stands]. You go to Sebring, and it's elbow-to-elbow. Why? No ambiance [at Daytona]. There is not a single road-racing circuit inside an oval anywhere on this planet that draws [a crowd].

So why does he think that by changing some of the layout at Indianapolis, it's going to make a difference? If F1 can't make it work on the road course, nothing will. So it's not that I'm a naysayer. I'm just trying to talk sense based on what we know.

You sound disappointed with Miles...

He has his own way, and he has this Boston group that he hired when he was on the Board, and that's what he takes all his advice from. For him to end the IndyCar season at the end of August is criminal to IndyCar. He's saying, 'even NASCAR has a heavy TV ratings fall during the Chase'. That's bullshit. NASCAR is 20 per cent up on last year.

It's presence. NASCAR, Formula 1 and IndyCar are the three big series on the globe. NASCAR starts its season in February and ends in mid-November.

F1 starts in March and ends at the same time as NASCAR. We are out of sight and out of mind for two months before that, and you think you are doing the series a service? Give me a break.

IndyCar plans to fill some of the gap with a winter series...

There's going to be no winter series. Where the hell is he going to go? We just lost Brazil. When you have the awareness that we used to have, [countries like] Australia want IndyCar. There was no commercial reason to go there, but the sanction fee was good. The only way you're going to go to Asia, or Europe, is if you get a sanction fee that makes sense. And nobody's going to pay it.

It's not going to happen. That's the reality of it. If he'd said, 'OK, I'm going to announce that the series will end at the end of August, but here's what we have already in place', then that's OK. Now, he says, 'that's to be determined'. Well, good luck, my friend. That's all I can say.

Q&A


**MARK MILES
CEO OF INDYCAR'S PARENT COMPANY**

Mario Andretti said that he has been complaining to you all year about what he considers to be wrong with IndyCar, and he puts much of the blame on the fact that you don't have a background in motorsport...

I understand that I didn't come to the sport as an insider, with all the history

and perspective that that might give me. Whether that is an advantage or not, time will tell. But it is what it is. I've worked this year to make sure that I don't make rash judgements about where we have to be going, and I understand the different perspectives and underlying data, and will take in the perspective and the knowledge of the folks who have been around a long time before we try to set a course.

How difficult is it to balance all the different viewpoints?

It isn't a popularity contest. It's trying to set the course for growth. And the first thing is understanding all the perspectives, and not being arrogant enough to think that my instincts are necessarily right.

Take the Indy road course. I knew from the beginning that some would think that it was heresy on some rhetorical level. But beyond that there was a concern – and Mario was one of those who expressed it – that it might affect the Indy 500 if we had a road course race at the beginning of May. So we took that very seriously, and got feedback from every imaginable stakeholder, broadcasters, some market study work, and lots of the team owners and drivers. I think it's telling that you haven't heard an ongoing, strong chorus from folk who thought this was a bad idea.

Many teams believe that the compressed 2014 calendar will make it harder to retain staff. Is that a concern?

Yes. It is something that we believe we'll

deal with in 2015 when we can get back to the kind of expansion and international elements that we talked about [when the calendar was announced]. I don't know any other way to address it. We've got to keep our eye on the ball in terms of what we're trying to accomplish, and the first step is to come up with a schedule that is more followable.

Motorsport has historically found it difficult to get new races in emerging markets off the ground, and make them sustainable – IndyCar experienced this with the cancelled Chinese race. If it's hard to get one race up and running, why are you confident that you can do several?

We would be looking at whether there are ways to develop other markets in North America. But that's not easy, given just the weather and the climate, with how few places you can race in February. There really aren't many choices.

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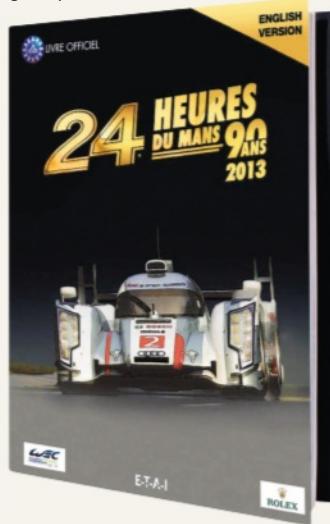


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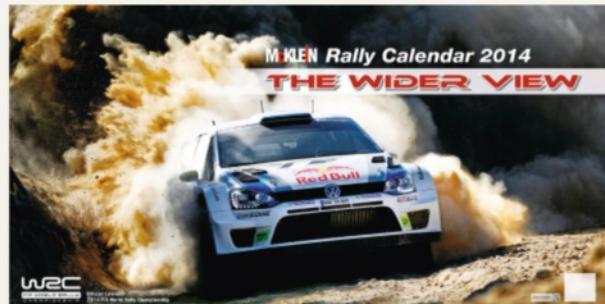
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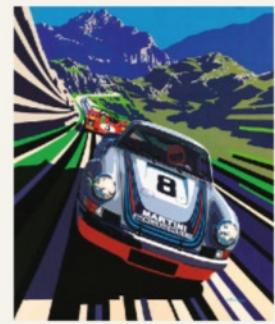
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SUPER TC2000

With Toyota's Matias Rossi crowned already, the season-closer at the scenic San Luis layout was a formality. Outgoing champion Jose Maria Lopez (Fiat Linea, above) led from start to finish, with Fabian Yannantuoni (Renault Fluence) within 2s most of the way. Franco Vivian's Chevy Cruze was third. Rossi ran fourth, but damaged his car on the kerbs.

BRAZILIAN TOURING CARS

Ricardo Mauricio retained his title at the double-points Curitiba finale, as Honda clinched the manufacturers' crown. Despite wonky steering in his JLM Civic, Mauricio was fourth in the first race, won by Denis Navarro. Mauricio won an intense duel in race two with Ricardo Zonta, who fell to fourth when his Toyota Corolla's floor broke.

SUDAM F3

Felipe Guimaraes took his 13th win from 18 races in the Curitiba season finale. The new champion was beaten to pole by just 0.048s by the improving Leonardo de Souza, and fell to eighth after stalling at the start, but recovered to win by 5.375s. A puncture following contact with Raphael Raucci on the first lap restricted Guimaraes to sixth in the reversed-grid sequel, as de Souza won.

FIA MIDDLE EAST RALLY

Nasser Al-Attiyah rounded off his title-winning season with a ninth victory in 11 years on the Dubai International Rally. The Qatari's Ford Fiesta finished the 12 desert stages 18.2 seconds in front of the UAE's Khalid Al-Qassimi to record his 50th win.

TOYOTA TR86

Ex-NZV8 champion Angus Fogg lost his lead in New Zealand's new one-make series after an off in round two at Pukekohe. Tom Alexander, a frontrunner in Formula Ford last season, took the series lead with a win and two thirds. Ashley Blewett and former TRS contender Jamie McNee won a race each.

V8 SUPER TOURERS

Greg Murphy won the title for Holden after a back-and-forth battle with Ford's Ant Pedersen in the finale at Pukekohe. Pedersen's fading tyres in the last race decided it. In the enduros, Shane van Gisbergen won race one with Alex Davison, but in race two their Ford's engine failed. Lee Holdsworth/Tim Edgell and Scott McLaughlin/James Moffat (below) also won.



Pic leads Ellinas and Svendsen-Cook in close lead fight

MRF CHALLENGE SAKHIR(BRN), NOVEMBER 29-30 RD 2/4

Pic takes charge with victory

ARTHUR PIC OVERHAULED TIO

Ellinas's early points advantage in the MRF Challenge as the Indian series with an international outlook moved to Bahrain for its second round.

Ellinas, reunited with engineer David Hayle after their partnership at Atech Reid GP in Formula Renault in 2011, beat Pic to pole for race one.

Third qualifier Rupert Svendsen-Cook beat both away at the start to lead into Turn 1. Despite the distraction of an oil-warning light, Svendsen-Cook pulled away. But the ex-F3 racer had to do it all over again after Renan Guerra flipped Sam Dejonghe into Turn 1, necessitating a safety car period. Dejonghe extracted himself nursing a bruised knee, while former Brazilian GT young gun Guerra lost a solid fifth to a drivethrough penalty.

At the restart, Svendsen-Cook made another break as second man

Ellinas, running on older tyres to ration a new set for race three, backed up Pic and Harry Tincknell.

Pic seized second when Ellinas lost momentum onto the pit straight, having run out wide onto the kerb. Pic improved on his qualifying time, hunting down Svendsen-Cook, but the leader presented the FR3.5 race winner no opportunity to pass and hung on to win by 0.693s.

Fourth qualifier Shinya Michimi dropped outside the top 10 at the start, but the Cincinnati-born Japanese racer staged an impressive recovery to finish fifth.

Michimi lined up with Yudai Jinkawa to form an all-Japanese front row on the top-six reversed grid for race two. Given that there were reduced points on offer, Svendsen-Cook elected to fit an older set of tyres. Making the most of his new set, Pic stormed from fifth to second

at the start and pressured Jinkawa.

Into Turn 1 on the second lap, Pic stabbed down the inside. A resistant Jinkawa's attempts to defend resulted in a lock-up. He overshot the corner and dropped to sixth. Jinkawa's overambition allowed slow starter Ellinas into third. The Cypriot gained another spot by taking second from Tincknell, but victory, decisively, belonged to Pic.

Michimi held off a backmarker-baulked Svendsen-Cook by half a car length to claim fourth, but equally deserving of plaudits was Dejonghe's charge from the last row to sixth.

Everything was set for Ellinas to take a maiden MRF victory in the final race of the weekend. A combination of pole, on a grid determined by drivers' second-fastest qualifying laps, and new tyres promised much and Ellinas delivered the most dominant win of the event.

Svendsen-Cook was embroiled in a race-long battle for second, but was eventually forced to settle for fourth, behind Pic and Dejonghe.

● Peter Mills

Svendsen-Cook sweeps around
Pic at the start



RESULTS

Race 1 1 Rupert Svendsen-Cook, 10 laps in 21m32.410s; 2 Arthur Pic, +0.693s; 3 Tio Ellinas; 4 Harry Tincknell; 5 Shinya Michimi; 6 Yudai Jinkawa. **Race 2 1** Pic, 10 laps in 20m36.199s; 2 Ellinas, +1.959s; 3 Tincknell; 4 Michimi; 5 Svendsen-Cook; 6 Sam Dejonghe.
Race 3 1 Ellinas, 10 laps in 20m37.018s; 2 Pic, +10.268s; 3 Dejonghe; 4 Svendsen-Cook; 5 Sam Brabham; 6 Michimi. **Points** 1 Pic, 90; 2 Ellinas, 86; 3 Svendsen-Cook, 68; 4 Dejonghe, 43; 5 Michimi, 34; 6 Jinkawa, 33.

V8 SUPERCARS HOMEBUSH (AUS), DECEMBER 7-8 RD 14/14

Whincup joins Aussie tin-top greats



Whincup netted his fifth V8 Supercar title

BLYTH/GETTY IMAGES

JAMIE WHINCUP WROTE HIS NAME onto the top line of Australian V8 Supercar history when he sealed his fifth title at Sydney's Olympic Park.

Whincup dominated Saturday's opening 250km race to take a stranglehold on the title, and third place on Sunday was good enough to overcome what was previously a bogey track for him. Whincup had never before finished on the podium at Homebush but any pain was swept aside with the result. At 30, he joins legends of the sport Mark Skaife, Dick Johnson and 'Pete' Geoghegan as five-time title winners.

"It's incredible sitting here with five championships," said Whincup, who won them in six years. "I am a huge fan of Skaife and what he did, so to join him on that number of

championships is an honour."

"This is not a debate about the number of poles and wins – the fact we did more races – but the title numbers. It doesn't matter how many races; it's still a big number."

Whincup knocked Ford's Mark Winterbottom and Will Davison out of mathematical contention on Saturday and needed only to finish 22nd on Sunday, even if Triple Eight Holden team-mate Craig Lowndes won. As it was, Shane van Gisbergen came through the field late in the race to pick off leader Jason Bright, who was attempting to win the race with a fuel-conservation drive. Once through into the lead 'The Giz' cleared out, and for a while Bright and Whincup engaged in some hand-to-hand combat before things settled down.

A Whincup DNF would have handed the title to Lowndes.

Saturday's race had been contentious, particularly when Winterbottom and Lowndes clashed. Lowndes suffered a damaged fuel filler, compromising his race strategy, while Winterbottom soldiered on until his damaged car eventually stopped, ending his title hopes. Lowndes bounced back for fifth on Sunday to cement second overall.

Van Gisbergen's Tekno Holden team-mate Jonathon Webb starred in what looks to be his final race before he steps into a management role, taking second on Saturday, while Jason Bright scored fourth and second. His results somewhat put to rest the street-race nightmares that have plagued Brad Jones Racing.

Will Davison took seventh in the second race, which was important; had he not, he and Winterbottom would have tied for third overall. Davison only took the place when the car in front – driven by his older brother Alex – ran wide on the final lap.

● Phil Branagan

RESULTS

RACE 1 Jamie Whincup (Holden Commodore VF), 74 laps in 2h02m28.22s; 2 Jonathon Webb (Holden), +1.79s; 3 Shane van Gisbergen (Holden); 4 Jason Bright (Holden); 5 Will Davison (Ford Falcon FG); 6 Tony d'Alberto (Holden). **RACE 2** 1 van Gisbergen, 74 laps in 1h58m09.03s; 2 Bright, +1.95s; 3 Whincup; 4 David Reynolds (Ford); 5 Craig Lowndes (Holden); 6 Mark Winterbottom (Ford).

Points 1 Whincup, 3094; 2 Lowndes, 2966; 3 W Davison, 2799; 4 Winterbottom, 2793; 5 van Gisbergen, 2508; 6 Fabian Coulthard, 2501.

DEVELOPMENT V8s

Dale Wood took his first Dunlop V8 Supercar title in Sydney with a conservative ninth in the first of two races. Ashley Walsh and Steve Owen shared the wins in their Fords, ahead of Taz Douglas (Ford) and Holden's leading driver, Jack Perkins. Former MotoGP champion Casey Stoner ended his disappointing season in V8s with 12th and ninth.

ANDROS TROPHY

Jean-Philippe Dayraut won the opening rounds of the Andros Trophy ice racing series at Val Thorens in France. His Mini beat the Renault Clios of Jean Baptiste Dubourg and Franck Lagorce on Saturday, then topped Lagorce and fellow ex-F1 racer Olivier Panis in the new Mazda 3 on Sunday.

ASIAN LE MANS SERIES

Ho-Pin Tung and David Cheng won the final round of the Asian Le Mans Series at Sepang in Malaysia in their OAK Racing Morgan-Judd, taking the title in the process. After three hours of racing, Tung (below) took the flag 1m20s ahead of the KCMG Morgan-Nissan of Tsugio Matsuda/James Winslow. The Craft Racing-run ORECA of Richard Bradley/Dan Polley/Pu Jun Jin was the only other car on the lead lap in third.



Whincup trophy cabinet will stay well stocked

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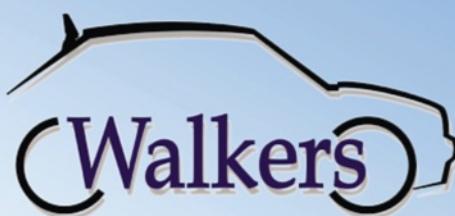


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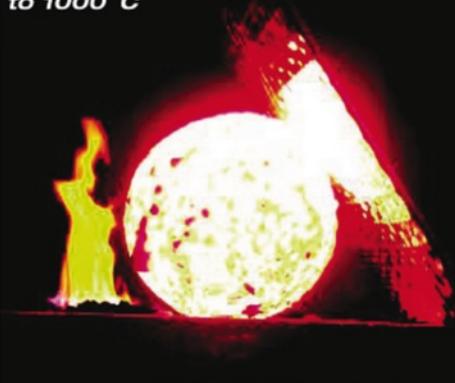


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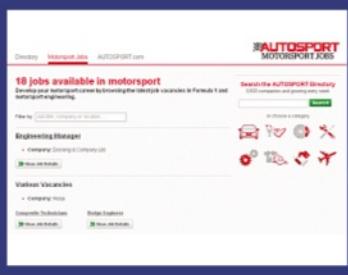
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WALKER

Real Motorsport Ltd wants the circuit to host races by March after taking control

**SCOTT MITCHELL
EDITORIAL ASSISTANT**

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GIVEN THE YEAR ALL THOSE

affiliated with Mallory Park have endured, the very fact that its new operators are talking of hosting races again is a welcome change of pace.

For what seems like an age now, the only developments in Leicestershire have been negative. However, the combined efforts of Stuart Hicken and Eddie Roberts – both firmly entrenched in motorcycle racing, with personal ties to the circuit – look to have ensured its immediate future is secure.

You certainly cannot fault either their enthusiasm or determination to get Mallory hosting races again. They face a few obstacles, including appeasing the council and the locals, but putting a calendar in place has to be top priority. The trouble is that by now most, if not all, organising clubs have their calendars for 2014 on the verge of being finalised. The 750 Motor Club expects to confirm its calendar within the week, while the BRSCC's is "about 80 per cent" done.

The BARC probably remains its best chance, given the size of its operations, and Roberts said the two parties were talking in a professional way. Whether that leads to Mallory being crowded onto the odd schedule remains to be seen, particularly with a self-imposed deadline of January. Perhaps a fairer way of assessing the pair will be to judge them on how they rebuild the circuit's reputation with its local community and put together a more viable business model.

Tidying up the loose ends of a new arrangement with the council means that particular dispute may finally be put in the past. Getting that sorted quickly would allow Roberts and Hicken time to focus on the real priority – bringing racing back to 'The Friendly Circuit'.

Embattled Mallory in new hope

New operator of Leicestershire circuit pledges to host races next year

MALLORY PARK BOSSSES ARE confident it will host races in early 2014 after the embattled circuit was taken over by new operators.

Real Motorsport Limited, set up by British Superbike team boss Stuart Hicken and Eddie Roberts, was awarded the lease of the facility last week and immediately targeted a spring-time resumption of racing.

With most organising clubs having provisionally or officially confirmed their respective 2014 calendars, the circuit's options of thrashing out a deal to accommodate a March start date are believed to be limited.

Roberts has set a self-imposed deadline of less than two months to finalise Mallory's schedule, but says the response to their appointment gave him cause for optimism.

"We must have a calendar set in place by the end of January," he admitted. "We are quite confident. Car clubs, bike clubs, track days; they've all been on the phone."

The future of the Leicestershire circuit had looked bleak after a long-running noise dispute with its local council resulted in the previous leaseholder of the land – and organising club – the British Automobile Racing Club walking away from negotiations.

That led to then-operating company Mallory Park Motorsport Limited being put into administration, before being liquidated last month, a move that allowed control of the land to be placed back into the hands of landowner Titan Properties on December 3. Hicken and Roberts, who have already met with Hinckley and Bosworth Borough Council executives, were awarded the 15-year lease the following day.

At the centre of MPML's failed battle to continue running Mallory was a forced reduction of its on-track activities to two days per week, as per the pre-existing 1985 agreement, which it claimed put it in financial difficulty.

While a new arrangement has not

been confirmed, AUTOSPORT has learned the number of active on-track days will increase despite fears of a cut.

Titan's Ian Wright said: "The council has agreed in principle a much more flexible agreement – 128 days has been suggested, and it may be expanded. I think they can fill them all."

The 750 Motor Club and British Sports and Saloon Car Club confirmed they were open to working with RML in the future but that it was probably too late to arrange anything for next season. The BARC could not be reached for comment, but both parties are understood to be open to reuniting.

Roberts accepts that the short timeframe meant it would be foolish to gamble on previous partners over the coming year, and believes the focus instead should be on consolidation. "There's so much else out there," he added. "What I've got to do now is sift out what I want and what's best for Mallory. This year has to be about making it viable."

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Continental GT3 will be raced in British GT next year under the Generation Bentley Racing banner.

The car has been bought by David Appleby Engineering, which formerly fielded an Aston Martin Vantage GT4 in the GT4 Cup in Europe as Generation AMR.

It will be raced in Britain by James Appleby, son of team boss David, and British GT regular Steve Tandy.

The car, chassis 3, is under

construction, with the team scheduled to take delivery of it in January.

Former SEAT Cup racer Appleby Jr, who won a round of the GT4 Cup in 2011 in the Aston, said: "My father has known Malcolm Wilson [boss of Bentley developer M-Sport] for 30 years after working with him on the Metro 6R4 Group B rally car.

"If we were going to step up and move away from the Aston, it made sense to go to another iconic brand like Bentley."

Tandy, who raced a Triple Eight BMW Z4 in British GT in 2013, added: "It will be a great privilege to participate in a Bentley. It's an exciting opportunity and potentially more than a one-year project. Yes it's risky, but maybe it will be the surprise package."

Generation Bentley is also looking at contesting the European-based Blancpain Endurance Series with the twin-turbo V8 contender, alongside two Continentals run by M-Sport, with a different driver line-up.

The manufacturer will make its return to motorsport with the Continental in the Gulf 12 Hours at the Yas Marina circuit in Abu Dhabi tomorrow (Friday).

Meanwhile, the AF Corse team, Ferrari's factory representative in the World Endurance Championship, will return to the British series in 2014. It will again run a solo Ferrari 458 Italia GT3 for Aaron Scott and John Dhillon. The pair finished 16th in the 2013 standings.

BRDC F4

Karting ace Russell to BRDC Formula 4 with Lanan in 2014

FORMER EUROPEAN KARTING

champion George Russell will graduate to car racing with BRDC Formula 4 champion Lanan Racing next season.

The 15-year-old won back-to-back European KF3 crowns in 2011 and '12, and starred on his maiden test run in a Formula Renault 2.0 in October.

"To be able to join the champions is a privilege," said Russell, who has already begun testing with the team. "I'm aiming to win the championship in my first year."

Russell will be joined in F4 next season by fellow kart graduate Charlie Eastwood, who will race with Douglas Motorsport, while new Brazilian team PetroBall Racing will join the grid with two cars.

Meanwhile, McLaren protege Ben Barnicoat will contest the FR Northern



European Cup with Fortec in 2014. Monegasque karter Charles Leclerc will front the team's FR ALPS campaign, in which FR BARC Autumn Cup champion Barnicoat will also contest selected races. The FIA has listed Tatou, Mygale and Dome as potential chassis builders for FIA F4, which will gain a British series in 2015. Volkswagen, Fiat, Renault and Ford are the options for engine suppliers.

Ginetta GT Supercup

Woodhead eyes Supercup graduation after G55 test

GINETTA JUNIOR CHAMPION

Harry Woodhead will step up to the Supercup next season after purchasing and testing a G55.

Woodhead, who turned 16 in November, won the first 10 races of this season as he walked away with the 2013 title, wrapping it up with two rounds remaining.

He tested the new car for the first time at Silverstone two weeks ago, and is now evaluating which team to run with.

"We've purchased the car from Ginetta and now we have to decide which team would serve Harry the best," his father Andrew told AUTOSPORT.

"He will be competing in the Supercup



Woodhead drove
new G55 at Silverstone

in 2014. The test session was his first outing and he set very impressive times. He has to learn to be quick and race at the same time; that will be the tricky bit."

Ginetta GT5 Challenge racer Luke Davenport tested a United Autosports-run G55 at Donington Park as he assesses a similar move.

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Silverstone Classic

Silverstone Classic races to mark Ford Mustang's 50th anniversary

TWO GRIDS OF MORE THAN 50

cars will form part of a special Ford Mustang celebration at next year's Silverstone Classic.

The American muscle car celebrates its 50th anniversary in 2014 and will be honoured on and off-track at the event, which runs from July 25-27.

As it did for the Porsche 911 this year and previously the Jaguar E-type and Ferrari F40, the Classic will include displays and parades showcasing all five

generations of the model, as well as two races that will also include other V8 cars.

Event director Nick Wigley said: "The Mustang celebrations follow on perfectly from the amazing party we had last summer for the Porsche 911.

"The Mustang has become a global icon among sportscars. We are thrilled that the Mustang Owners Club will be holding its official birthday festivities at the Classic and expect a record number of Mustangs racing on the track."



Organisers expect a bumper Mustang field

EBREY

Goodwood

Champions of motorsport tribute at Goodwood Festival of Speed

THE THEME FOR NEXT YEAR'S

Goodwood Festival of Speed will be 'Addicted to Winning – The Unbeatable Champions of Motorsport'.

The 22nd running of Lord March's event will celebrate drivers, riders, teams and manufacturers that have proved dominant throughout the sport during particular eras.

Examples include Bentley's five pre-World War Two Le Mans 24 Hours wins, the Silver Arrows' supremacy in 1930s Grand Prix racing, Juan Manuel Fangio's five Formula 1 titles, Porsche's 16 Le Mans successes, and Sébastien Loeb's domination of World Rallying this century.

A number of anniversaries will also be celebrated at the June 26-29 event,

including the centenary of Maserati, 60 years of the Jaguar D-type, the Mini's first Monte Carlo Rally victory in 1964, and the 40th anniversary of McLaren's first F1 title.

The date of the 17th Goodwood Revival has also been confirmed as September 12-14.



Fangio's five F1 titles will be honoured at FoS

Toyota Racing Series

Piquet's son set for car racing bow in Toyota Racing Series

THREE-TIME FORMULA 1 WORLD

champion Nelson Piquet's youngest son Pedro will make his car racing debut in the Toyota Racing Series in January.



Latest Piquet heads to racing

The 15-year-old will contest the New Zealand-based championship with M2 Competition, which ran Nick Cassidy to last year's title alongside Macau Grand Prix winner Alex Lynn.

"My goal for TRS 2014 is to be competitive against the other drivers and gain more experience driving formula cars," said Piquet. "Nowhere else in the world can you do 15 races in five weeks."

Team USA scholar Neil Alberico is also confirmed for the quintet of triple-headers. The 21-year-old will drive for the Victory Motor Racing team in the series, which begins at Teretonga on January 11.

HUMBLE PYE

The voice of club racing



Classic F3 is set for another fine season in 2014

Classic F3's support can vary but 2014 calendar is exciting

Like many championships or series, especially in financially challenging times, competitor support for Classic Formula 3 has been cyclical in recent years. The vital signs of the attractive two-litre class are strong, though, and with superb race opportunities ahead – on complementary UK and French (F3 Classic) calendars – it ought to be a growth area in 2014.

As a co-founder of CF3 (initially run by the BRSCC for 1974-80 cars) in '86, and an early racer with Argo JM6s, I have kept an avuncular eye on it, although I've not competed since a one-off in the late Frank Gomm's ex-Nelson Piquet Ralt RT1 in 2004. Having enjoyed its highs – particularly its Monaco Grand Prix Historique debut in '10, its 25th season – and shared concerns when in the doldrums, I'm excited again.

Part of the HSCC family for more than a decade, the scope of CF3 was widened to match the French regulations that allow 1981-84 chassis – with the later 'wing cars' of the Ralt RT3-dominated era obliged to run flat-bottomed – a couple of seasons back. While Graham Fennimore (a quality champion wherever he's raced, including the SPEED sportscar series) won this year's title in an RT3, earlier cars remain ultra-competitive.

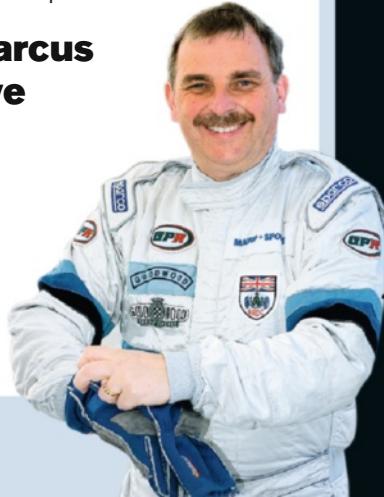
While investors in new-generation kit, like Fennimore and his backers, are deflated there is no Monte Carlo

call-up for them – the Automobile Club de Monaco's announcement of a 31/12/78 cut-off was presaged by those 'in the know' snapping up earlier chassis – the chosen timeline will hopefully result in more early cars returning to the tracks regularly.

Domestic action kicks off at Thruxton's Easter Revival. Snetterton (on the AUTOSPORT 3 Hours bill) and Cadwell Park's F3-themed Wolds Trophy meeting in June should be fun too, but the chance to compete on the Brands Hatch and Silverstone Grand Prix circuits inside a fortnight is unmissable. The French legions are invited to the Silverstone Classic double-header, and Bernard Honnorat and Laurent Vallery-Masson's group returns to the Brands Hatch circuit in September.

On the continent Monaco (May 9-10) is followed a week later by a race on the historic French street circuit at Pau, the charismatic university town that has hosted racing since 1900. If longer gearing and run-off areas trip your trigger more, Dijon and Imola are among Europe's greatest tracks and should be on everybody's wish list. You can do so much in an F3 car, preferably with it dressed in the colours of period heroes.

Marcus Pye



"The chance to race on the Brands Hatch and Silverstone Grand Prix circuits is unmissable"

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Renault's saloon stairway

The French firm has long been a supporter of racing in the UK, and its flagship Clio Cup is getting a new car. But Renault still has the grassroots at heart, as GLENN FREEMAN discovered

Confidence is worth so much in motorsport. Even the best drivers at the top level can struggle if they don't feel at one with their machinery. Sometimes their talent and experience will be enough to get around such an obstacle, but newcomers to racing rarely have those sorts of reserves to call upon.

As the British Touring Car Championship-supporting Clio Cup series prepares to welcome a new, faster car for 2014, so it moves itself a bit further away from being accessible to the majority of newcomers to racing. That's no bad thing for the series, which is well-placed as a proving ground for touring car and GT racers of the future. But Renault doesn't want to overlook the grassroots of UK racing, and as a result it has put together a three-tier ladder with the BTCC support series at the top.

The outgoing Clio 3 model caught a glimpse of its future home in the new-for-2013 Cup Series, which will become a fully fledged club championship next season, and also

features an entry-level category for converted road cars.

Championship promoter Simon North explains: "We're progressing with the new car taking us to a new level, but what does that do to the level we're already at? How do we engage with people who want to start their racing career in a Clio? That's where this series, and the road-car class, comes in. It's a place for people to start out at a lower

and quite-affordable level. It's the first time we've really had a ladder like this."

This year AUTOSPORT has sampled the top and bottom rungs of that ladder. The new Clio 4 model is a serious, technologically advanced racecar that requires the finesse of a skilled and experienced racer. It's precise and rewarding when driven correctly, but it can bite. Coming back to our earlier

references to confidence, it's unlikely to instill much of that to a rookie who keeps charging off the track with every small mistake.

That's where the road-car class comes in. Based on the 197 Clio model, a simple conversion kit (£4100+VAT and rollcage of £950+VAT) is applied to a roadgoing version and it's ready for the track. As AUTOSPORT found driving the car at Brands Hatch, it's forgiving to

Road-car class was small in 2013 but offered good action



FROM WRC TO NATIONAL RACING

AUTOSPORT's outing in the road-car class of the Clio Cup series at Brands Hatch was a milestone for former factory Suzuki World Rally squad Monster Sport Europe: it was the team's first circuit race!

When the Suzuki WRC project came to a close in 2008, MSE switched its attention to the British Rally Championship, setting up the Swift Sport Cup within the series. That eventually led to a deal to look after Renault's business at a similar level, so when the manufacturer wanted to create an entry-level racecar it turned to the Milton Keynes-based company to come up with an affordable concept.

Having worked on the development of the car throughout the year, it was by



Monster ran
Suzuki WRC effort...

chance that MSE's first race outing would be with AUTOSPORT at the wheel.

"Circuit racing is good, and it's warmer and cleaner than rallying!" says head technician Andrew Gardiner. "I think we've slotted in all right. In motorsport everyone is the same really – it doesn't matter if you're in rallying or racing."

...but now its focus
is on helping create
affordable racing



Converted 197 offers
a good starting point
for the uninitiated



"People can see the path that we're trying to create. There's a ladder of progression"

SIMON NORTH

drive, and wills you to push harder with every corner. It makes you feel like you can do no wrong, and even if you do make an error it's unlikely to punish you.

The first-season field in the slower class was small – as to be expected in a start-up series – but its three regulars offered a good cross-section of the types of driver the series can cater for.

Norwegian Tommy Ostgaard was a converted single-seater racer who had been priced out of that particular ladder, his team-mate Sam Randon was a karter who has chosen to pursue a tin-top career, while Jake Honour was a trackday enthusiast taking up racing as a

result of the simple conversion method that turns a road car into a racer. Heading into year two, the series – with running budgets of around £10–15,000 for privateers and £25–30,000 to run with a team – appears to be cementing its position as a serious option for youngsters looking to start a career in cars.

"Now we've established it, people can see the path that we're trying to create to the threshold of the BTCC," says North. "There's a ladder of progression, and we're beginning to engage with young drivers who are very enthusiastic to join that ladder. As someone who runs a single-seater championship as well [Formula Renault BARC], I'm finding that more young drivers are looking towards saloons now."

North believes that the success of Andrew Jordan in the BTCC will inspire more young drivers to view tin-top racing as a serious career, and in his eyes Renault is "trying to build a stairway to the BTCC".

When Renault first came up with the road-car plan it enlisted the help

of former Suzuki World Rally squad Monster Sport Europe to devise a simple, affordable way of creating a race car. Taking some bits from the Renault Sport asphalt rally kit for the same car, the UK-based firm came up with a conversion method.

MSE head technician Andrew Gardiner says: "The idea was for people to be able to build it in their garages, so it's very simple. We've adapted the rally kit so that it's affordable and it keeps the Renault Sport branding involved, so people

know the parts going on the car are of high quality."

The long-term plan is to have the race and road cars competing as separate grids in the club-level series. When AUTOSPORT entered a race in the road-car class at Brands Hatch in September the racing was frenetic even with just a four-car field (and the faster race cars lapping us), so the thought of a full grid battling for an overall victory at the bottom of Renault's new ladder is a tantalising one. ■

In pictures

Pics from around the globe, from the US to Australia via Scotland, France... and Somerset



WHO D'YOU THINK YOU ARE, DAVID BAILEY?

Sebastian Vettel gets a snapshot memento on his phone as Audi's WEC champions Loic Duval, Tom Kristensen and Allan McNish are crowned at the FIA Awards in Paris

FIA/DPI

WHINCUP'S FANTASTIC FIVE
V8 Supercar star Jamie Whincup sealed his fifth Australian touring car title at Sydney's tree-lined Homebush track last weekend for the Triple Eight Holden team



KANAAN JOINS THE FACES
Tony Kanaan pulls his 'race face' now immortalised on the famous Borg-Warner Indianapolis 500 trophy, which features the visage of all of its winners since 1911



TRIBUTE TO A GREAT CHAMP
IndyCar legend Dario Franchitti receives an SMRC lifetime achievement award from Jane Leslie (widow of David) in Edinburgh



JENSON LIGHTS UP THE NIGHT AT HOME
McLaren F1 ace Jenson Button performed a quick demo of his McLaren in the streets of his home town of Frome before switching on its Christmas lights from the balcony of a pub



CROWDHURST/GETTY IMAGES

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WHAT'S ON

ON TRACK AROUND THE WORLD



ANDROS TROPHY

Rd 2/7
Circuit d'Andorra, Andorra
December 13-14
tropheeandros.com

V8 STOCK CARS

Rd 12/12
Interlagos, Brazil
December 15
stockcar.com.br

GULF 12 HOURS

Yas Marina, Abu Dhabi,
United Arab Emirates
December 13
gulf12hours.com



AUTOSPORT

Supposing you had the chance to banish your worst nightmares – what would they be? Formula 1 editor EDD STRAW gives his arguments to get rid of his pet hates to motorsport's Room 101



Ah, the good old days:
1968 South African GP

the skills of drivers who excel in categories such as NASCAR and IndyCar have made little effort to understand the discipline. It's not just about turning left, and even when racing at 100 per cent throttle the racecraft and focus required is phenomenal.

PERFORMANCE BALANCING

This isn't about success ballast, but about the kind of performance breaks applied to try to keep racing close in categories such as touring cars and GT3.

If you want all your touring cars to have the same performance potential, build a spaceframe silhouette car. Same with your GT3 cars. What is the incentive to invest in developing your car if it's later hobbled?

Certain types of racing thrive on close competition, and there's nothing wrong with that. But the associated games and shenanigans that surround any categories that operate balance-of-performance regulations are a tiresome distraction.

If you want to sling 75kg on someone because they've just won a race and you don't want them to win the next one, fine. That's a fair way of doing things and everyone knows where they stand.

But don't move the goalposts.

REVERSED GRIDS IN JUNIOR SERIES

Most of the major European feeder series a step or two below F1 have adopted reversed grids in recent years. The idea is that this is to improve the show. The trouble is, very often this is a show that nobody is watching anyway and simply serves to undermine the reasons for their existence.

Completely reversed grids, as used in short-oval



Let's performance balance everyone not called Muller

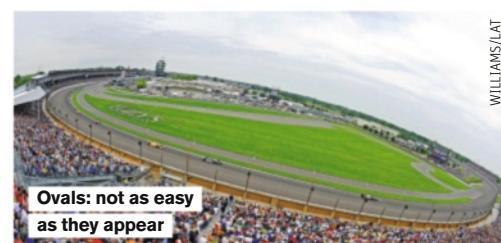
racing, aren't a problem. It's only decades of history in circuit racing that make everybody believe that starting cars in qualifying-pace order is the natural thing to do. But junior single-seater categories are all about showing which drivers are the most promising.

Reversing the top eight or top 10 after a first race is no way to achieve that. In a category such as GP2, drivers can put a win against their name for finishing eighth in the feature race then winning the sprint from the resulting pole, just the same – but far less deservedly – as someone who dominates from the front earned by qualifying pace. It creates a chasm between the reward for finishing eighth or ninth.

That's one of the reasons why Formula Renault 3.5, which has a qualifying session and race on each day of a weekend and dropped reversed grids after 2009, is such a compelling category.

INTERNET CONSPIRACY THEORIES

In last year's Brazilian Grand Prix, Sebastian Vettel drove past a flashing yellow light. A few moments later, he drove past a waved green flag. He then overtook someone. No amount of anomaly hunters with gloomy YouTube clips effectively arguing black is white changes that. It was legal. Deal with it.



WILLIAMS/LAT

LUDDITES

It's a frustrating characteristic of human nature that most prefer to look backwards to some halcyon, often-fictitious, past rather than offering constructive suggestions for improving things in the future. In Formula 1, this problem is inescapable.

Usually, the idea is to uninvent technology. 'Remove aerodynamics', they cry. Well, the only way to do that is to stop a car moving through the air at high speed, presumably by placing 20 or so grand prix tracks in a vacuum. After all, when F1 cars didn't have wings, the racing was always a thrill-a-minute rollercoaster ride. Which it wasn't. Just like now, sometimes it was great, sometimes it was terrible, sometimes it was OK.

Technology has always been part of motorsport. There's nothing wrong with arguing that certain technologies should be restricted, modified or applied differently for the good of the sport, but if you base your logic on trying to make motorsport into whatever it was when you were 13, nothing will be achieved.

Uninventing the wheel is not the way forward.

OVAL SCEPTICS

There's nothing wrong with not liking US-style oval racing if it's not your cup of tea. But those who deride

Your guide to the best events taking place in the UK and around the world – plus TV and online

ON TELEVISION

THURSDAY DECEMBER 12

- 0230-0430 Sky Sports 4**
- V8 Supercars:
Homebush Highlights
- 0900-1035, 1825-2000 Motors TV**
- Andros Trophy:
Val Thorens Highlights
- 0830-0935 Eurosport**
- WTCC: 2013 Season Review
- 1310-1620 Motors TV**
- V8 Supercars:
Homebush Highlights
- 1600-1815 Sky Sports F1**
- F1 Classics: Bahrain GP 2007
- 1900-2000 Sky Sports 4**
- Racemax

FRIDAY DECEMBER 13

- 0500-0600, 1400-1500 Sky Sports 4**
- Racemax
- 0930-1000 ESPN**
- Planet Speed
- 1105-1210 Motors TV**
- FIA GT Series:
2013 Season Review
- 1415-1545, 2305-0040 Motors TV**
- Andros Trophy:
Val Thorens Highlights
- 1545-1645 Sky Sports F1**
- F1 Classics: Spanish GP 1986
- 1645-1730 Sky Sports F1**
- F1 Classics: Spanish GP 1991
- 1730-1815 Sky Sports F1**
- F1 Classics: Spanish GP 1994
- 1815-1900 Sky Sports F1**
- F1 Classics: Spanish GP 1996
- 2200-2230 Sky Sports F1**
- Caterham: Dutch Courage

SATURDAY DECEMBER 14

- 1015-1115 ITV**
- Motorsport UK
- 1730-1820 Sky Sports F1**
- F1 Classics: Monaco GP 1992
- 1820-1900 Sky Sports F1**
- F1 Classics: Monaco GP 1996
- 1900-1930, 2200-2230 Sky Sports F1**
- Marussia: Mission Accomplished
- 1930-2200 Sky Sports F1**
- F1 Classics: Monaco GP 2008

SUNDAY DECEMBER 15

- 1005-1310 Motors TV**
- V8 Supercars:
Homebush Highlights
- 1600-1645 Sky Sports F1**
- F1 Classics: Canadian GP 1995
- 1645-1900 Sky Sports F1**
- F1 Classics: Canadian GP 2008
- 1900-1930, 2215-2245 Sky Sports F1**
- Williams: A long way back
- 1930-2215 Sky Sports F1**
- F1 Classics: Canadian GP 2011

MONDAY DECEMBER 16

- 0250-0340 ITV**
- Motorsport UK
- 1600-1800 Sky Sports F1**
- F1 Classics: British GP 1987
- 1800-1900 Sky Sports F1**
- The F1 Show: Journalist Special
- 1900-1930, 2210-2240 Sky Sports F1**
- Toro Rosso: Ricciardo on the Rise
- 1930-2010 Sky Sports F1**
- F1 Classics: British GP 1994
- 2010-2210 Sky Sports F1**
- F1 Classics: British GP 2008

ONLINE

HOT ON THE WEB THIS WEEK

HOW TO TURN A RENAULT CLIO INTO A RACER



SEARCH FOR: Michelin Clio Cup Series: How to build a racecar (46:07)

Got an old Renault Clio 197 lying around and fancy a bit of racing? Watch this 45-minute tutorial and you could be on the grid. You could even end up like our man Glenn Freeman who went on to race the #40 Clio at Brands Hatch. Find out how he fared on page 104.

AUTOSPORT +

Exclusive content coming up in
our premium website this week

GET AUTOSPORT ON THE MOVE

I IN THE IPAD
ISSUE THIS WEEK...

I HOW TO CONVERT
YOUR RENAULT CLIO
INTO A RACER!

I ON SALE ALL OVER
THE WORLD FOR
ONLY £2.99

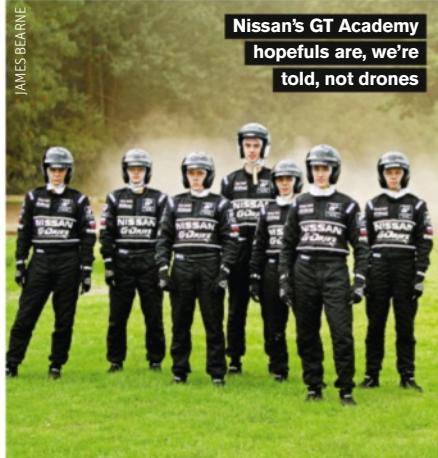
Download it now
from autosport.com



We pick out Dario Franchitti's 10 greatest drives and the top 10 riders in MotoGP this season. We also go back into our archive to revisit some 'Race of My Life' choices from motorsport greats. Plus, the next part in our look back at the rules and developments that shaped Formula 1 from 2009 to 2013.

Revved up over what's on the box

Nissan's GT Academy
hopefuls are, we're
told, not drones



IT'S BEEN A BAD WEEK TO BE a human being. First of all Amazon threatened to make posties obsolete by announcing plans to send its tax-avoiding packages by drones. Presumably these pilotless carriers will be aware if you're not in before carelessly dropping their cargo in the neighbour's back garden before firing an incomprehensibly scrawled note through your letterbox.

Then, that utterly benign and in no way infringing upon your privacy overlord Google revealed that it's been investing heavily in robot technology, no doubt so the process of monitoring every aspect of your life and then bombarding you with adverts that are obliquely related to what you've done before can be

completely devoid of trivial things like compassion and empathy.

And finally, *GT Academy* returned to our TV screens.

For those living under a rock (the only place where Google can't spy on you), *GT Academy* is the process of finding professional racing drivers from amateur computer gamers. Or, if you're prone to hyperbole, the death of feeder formulas and all those humans involved in such dirty and redundant vocations such as building racing cars.

It starts at Race Camp at Silverstone, where the "fastest gamers in Britain" begin the intensive process of being judged by Paul O'Neill (his best line: "he's the sort of racer I would put in the wall").

The whole programme is underscored by an *X Factor*-style backstory and the jeopardy of who's in the bottom two and thus in danger of heading back to their bedroom. Naturally all of them pledge to give "100 per cent" and that winning "would mean everything". And the teary heartbreak for those whose dream is over would make Simon Cowell proud.

The challenges range from showing overtaking skill to Ken Block gymkhana-style clickbait to a *Krypton Factor*-esque assault course. Given they got this far by using their thumbs, the physical toil brings some hopefulness to their knees.

So fresh air, exercise and a pulse are valuable after all. For now at least. *Revved Up*

Max Wilson

"I went to Interlagos realising this race might relaunch my career"



Wilson led works Alfa man Larini in the wet, but got a call to move over

LAT ARCHIVE

THE INTERLAGOS ITC RACE IN

1996 was the most important race of my life and a real crossroads in my career. It dictated how things would take shape over the next few years, culminating in me almost making my F1 debut in 2000.

Back in '96 I was having a tough time in German F3 and had to change teams after a few races. I ended up with Italian team Prema and I flew from Italy to Germany many times to compete in the series. It was a boring flight, but one of them ended up being important.

I got talking to a Brembo technician on one flight after I had won a race at Diepholz. He told me, through his contacts at Alfa Romeo, that their boss, Giorgio Piatta, was looking for a driver to compete in the Interlagos round in October. My ears pricked up! Especially when he explained they had to be Brazilian.

Just a few days later I was at Mugello testing the JAS Motorsport Alfa 155, with Piatta studying my every move.

I got the drive and it was a welcome lucky break for me because I couldn't even afford to complete the F3 season. So I arrived at Interlagos, my home track, in a car I barely knew, realising this race might just relaunch my career.

There were two ITC races over the weekend. I finished the first one in ninth place, which against that quality of field seemed to be a solid

start. It was a fully dry race and because JAS was a satellite team of the main works Alfa Romeo squad, we were about 12 months behind on development and were just not quick enough. But for the second event it was wet and there is nothing better for levelling the field.

As soon as the race started I could feel the car was really good and I knew the best lines from my

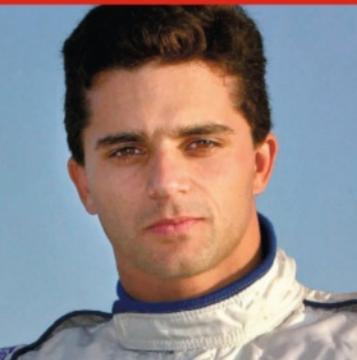
Formula Chevrolet and SudAm F3 days. After four laps I was in the lead and I started to pull away. Then it started to dry and Nicola Larini in the works Alfa caught me. He was right on my tail with a few laps to go and I got a message on the radio, 'Scusi Max, remember that Nicola is the works driver and quicker than you now! Do not fight too hard!'

That was tough to take on my home track but I had no option but to let him through. Second place was still a great result and because of my performance I clinched some deals and went back to Europe with a full season of F3000 for 1997.

I did three seasons and was then offered the Minardi F1 seat for 2000. At the last minute Gaston Mazzacane turned up with a sack of money. I don't have any bitterness about it – that day at Interlagos changed things for me and I carved out my career in motorsport, which has been a wonderful experience and one that I still enjoy to this day.

Max Wilson was talking to Sam Smith

PROFILE



LEVITT/LAT

GERMAN-BORN BRAZILIAN

Max Wilson was runner-up in the 1995 SudAm F3 series before a move to Europe and German F3 for '96. He then dovetailed a F3000 career with Williams, Minardi and Michelin F1 testing duties before moving to Champ Car in 2001. A switch to Aussie V8s in 2002 preceded a return to Brazil in V8 Stock Car racing, where he was crowned champion in 2010.

NEXT WEEK CHRISTMAS DOUBLE ISSUE!
Top 50 drivers; exclusive Xmas track test

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THANKS JOLYON!

Comma wishes to celebrate its Sponsorship of Jolyon Palmer in this year's GP2 championship. Congratulations Jolyon for great victories in Hungary and Singapore during 2013. It's been a memorable year, and all of us at Comma look forward to another exciting season with Jolyon in 2014.

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