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VW POLO WRC LAUNCH

VW's all-new WRC polo: Mint!

Volkswagen Motorsport launched its World Rally Championship effort in Monaco's Casino Square last weekend, showing off its Polo R WRC and drivers Sebastien Ogier, Jari-Matti Latvala and Andreas Mikkelsen. And the message was clear: watch out Citroen, watch out Ford...

Pic: Volkswagen



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Kubica on brink of full-time rally deal

Ex-F1 star closes on drive in revamped European Rally Championship in a modified Ford Fiesta run by British squad M-Sport. By DAVID EVANS

Robert Kubica will commit to a season-long rally campaign next year, most likely at the wheel of an adapted Ford Fiesta Regional Rally Car.

The Polish ex-Formula 1 star, who suffered a major injury to his right hand and arm when he crashed a Skoda Fabia S2000 on the Ronde di Andora in February last year, has competed regularly in France and Italy in the second half of this season as part of his recovery programme. AUTOSPORT has learned that he is on the verge of cementing his first ever year-long commitment to rallying for 2013.

Sources have confirmed that Kubica's most likely option is a European Rally Championship campaign driving for the M-Sport team in the revamped series.

M-Sport managing director Malcolm Wilson has confirmed ongoing discussions with Kubica, but he denied any deal was done.

"We would very much like to work with Robert in the future," said Wilson. "He's a huge talent in whatever car he drives, but his speed on recent events is an indication of just how fast he is in a rally car."

"At the moment, there's nothing more to say – we're talking about it and that's all."

The legacy of Kubica's injury is that the crash weakened his right arm, which is one of the principal reasons he has been competing in older-specification World Rally Cars.

Current-spec World and Regional

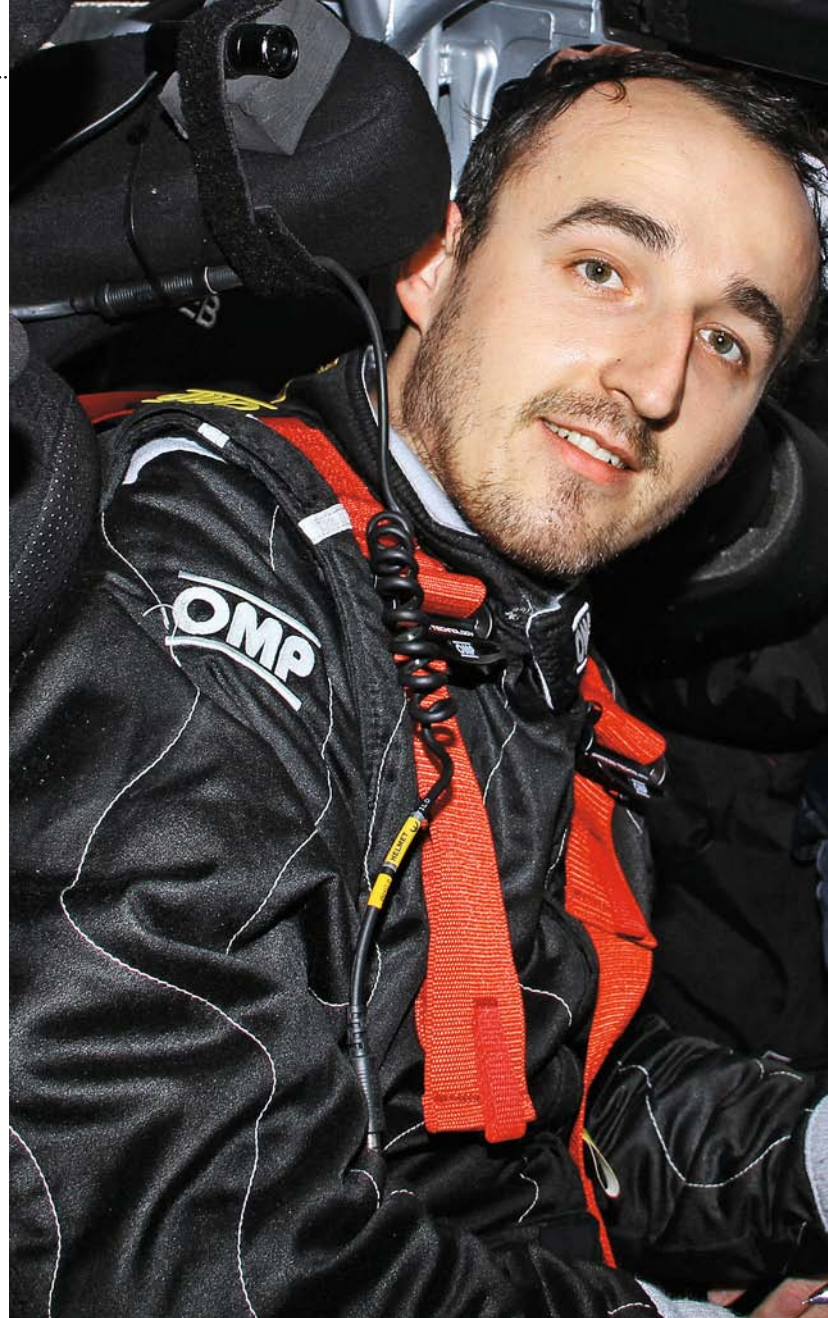
Rally Cars have been shorn of electro-hydraulic assistance from the gearshift, leaving a straightforward and physically more demanding sequential shift.

Following his outing on the Rally Gomitolo in a Subaru Impreza WRC, Kubica said: "I chose the car bearing in mind the specific needs I have at the moment. It was easy to modify certain components of the Subaru, such as the paddleshift, which was moved to the left, as well as other small but important adjustments."

Kubica's last two events have been in a Citroen C4 WRC, with the Rallye du Var being his most impressive outing to date. The Pole had built up a lead of nearly six minutes when he crashed following a co-driving error. Had he made it to the end, he would have dominated one of French rallying's toughest national-level events with an almost unprecedented winning margin.



Kubica shone in a Citroen C4



Despite that dalliance with the multiple world title-winning manufacturer, Kubica's immediate future lies with the British-based M-Sport squad, not Citroen.

Sources within the FIA have confirmed a proposal for a waiver to develop a 'retarded' paddleshift, which would be fitted to the left-hand side of the steering column in Kubica's car. The gearshift would be slowed to the same speed as a manual sequential shift. That waiver was granted by last week's

meeting of the World Motor Sport Council, giving a green light for a potential entry in the Eurosport-run ERC. The calendar includes Rally Poland, the highest-profile motorsport event in his homeland.

Kubica already has strong links with M-Sport and Wilson, having tested the Cumbrian's factory Fiesta RS WRC in France in the summer. He was reckoned to have lapped Circuit de Ecuyers, close to Reims, faster than both works Ford drivers Jari-Matti Latvala and Petter Solberg.

Eurosport Events' motorsport development director Francois Ribeiro said: "It would be amazing if Robert came to the ERC. It is a unique story but he is proving to be extremely fast in rallying. He could be a star, at the same time learn rallying in an incredibly competitive environment, which is something he needs to do."

"The ERC would offer him the opportunity to compete against a mixture of young and experienced drivers and he would also benefit from the promotion, the live television and the expertise we have."



Kubica will use modified controls

AUTOSPORT SAYS...

DAVID EVANS
RALLIES EDITOR

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Those in the know, knew. And nodded, sagely. Robert Kubica had been quick. Savagely quick.

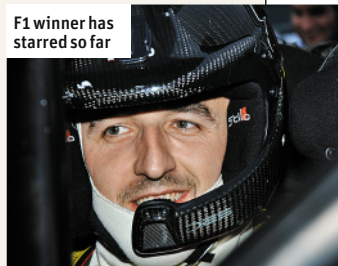
There was little if any official comment on Kubica's test of a factory Ford Fiesta RS WRC in the summer. But now, as time passes, people have talked a little more. One thing that shines through nobody saying much is the comparative ease with which Kubica found the speed and commitment to steer Petter Solberg's and Jari-Matti Latvala's car quicker than either of them could...

Kubica to the European Rally Championship is massive. He's one of the sport's biggest names and fastest drivers. Doubtless, he would dominate the asphalt rounds, but the intriguing part will be to see how he runs on the dirt. Going to the gravel is alien to racers, but it'll need to be second-nature to the Pole if he's going to put together an ERC title tilt.

Precise details of his ERC programme are unknown, but September's Rally Poland is a must. Poland is Eurosport's second biggest television market and a home run would be the foundation of the commercial deal to bring Kubica to the party. The organisers of the revamped ERC must be rubbing their hands together as well...

Sources say the deal may not be inked yet, with Citroen still vying for Kubica's services, but whether it's in a Fiesta or a DS3, the one thing that seems certain is that the former F1 star is set for a season on the stages.

F1 winner has starred so far



WHAT WILL KUBICA BE DRIVING?

- The Regional Rally Car is a de-tuned version of the 1.6-litre direct-injection, turbocharged World Rally Car.
- The turbo restrictor is 30mm compared with 33mm on the WRC car. The RRC machine offers around five per cent less power, but torque for the WRC car is 450Nm versus 360Nm in RRC.
- A more modified WRC flywheel is the only other mechanical difference between the two cars.
- Externally, the RRC looks less dramatic than the WRC equivalent with a smaller rear wing and less aerodynamic bodywork at the front of the car.
- Kubica's RRC will come fitted with a semi-automatic, hydraulic gearshift. He will pull a left-handed paddle towards him to go up the gearbox and push it away to go down the gearbox. The speed of the shift will be slowed to match that of a manual sequential shift in the other cars.



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No end in sight for Vettel/Newey partnership

Driver and designer behind the last three world titles are happy to stay committed to winning with Red Bull.

By EDD STRAW

Triple world champion Sebastian Vettel and Red Bull technical chief Adrian Newey have no immediate plans to break up their all-conquering partnership, with both insisting to AUTOSPORT that they are happy to remain at the team.

Vettel has been extensively linked with Ferrari, but AUTOSPORT understands that a new contract extending his stay at Red Bull beyond its current expiry at the end of 2014 is on the cards.

The 25-year-old, who has spent his whole Formula 1 career driving for Red Bull's teams – save for his debut for BMW Sauber in the 2007 United States Grand Prix – insists that his current employer offers everything that he requires.

“Obviously, you never know what happens in life one way or the other, but being completely objective there are two things that a Formula 1 driver needs,” Vettel told AUTOSPORT. “One is that

Newey and Vettel with boss Horner



you need to feel happy in the environment that you work in, within the team that you drive for. The second is that you need a competitive car.

“In my case, I’m very happy that I’ve got both of them. And not just looking at it objectively, but listening to myself, I’m incredibly happy and I think that we can still do better.”

Vettel is unlikely to spend his whole F1 career with Red Bull and has admitted in the past that

driving for Ferrari would appeal. But any move to the Italian team is unlikely to happen as long as Fernando Alonso, who is contracted until the end of 2016, is still there. Vettel would be wary of moving to a team where the Spaniard is so well-established as the lead driver, and such a move would go against Ferrari’s and Alonso’s preference for having an undisputed number one.

Newey has been the target of regular overtures from other teams

in recent years, although given that he feels so comfortable at Red Bull the only thing that threatens his role there is if he becomes bored with F1. Several times during his career he has referred to a desire to work outside motorsport, with America’s Cup yachting a particular interest, but the 53-year-old is enthused by the recent run of success at Red Bull.

This is despite his admitting that he is frustrated by the ever-more-restrictive regulations and the demands of working for an F1 team in an era of 20 races per year.

“I’m still loving what I do,” Newey told AUTOSPORT. “I must admit on a personal note – and I think this applies to a few people not just in our team, but throughout the grid – it has been a long, exhausting season and I’m certainly looking forward to trying to get a week’s holiday somewhere through the winter to recharge the batteries. But I still love Formula 1.

Vettel has three F1 titles in Newey cars



TOP 6 PARTNERSHIPS

Newey and Vettel now stands as one of the most successful partnerships in F1 history. Here's how they stand compared to other great combinations.



1 SCHUMACHER & BRAUN

At Benetton and Ferrari, Michael Schumacher and Ross Brawn won a record seven drivers' championships together. Brawn was central to all but three of Schumacher's F1 wins.

2 STEWART & TYRRELL

"From the day we met until the last time we spoke a few days before he died, I trusted Ken [Tyrrell] unconditionally, and I know he felt able to trust me," said Jackie Stewart. The result was three world titles and 25 victories.

3 VETTEL & NEWEY

The day that Red Bull prevailed in a dispute with BMW as to who owned Sebastian Vettel's contract proved to be a very good one for the German. Vettel is renowned as one of the hardest-working drivers in the paddock, which is key to the success of the pairing.

4 CLARK & CHAPMAN

Jim Clark's incredible successes came almost exclusively in machinery produced by Colin Chapman. In F1, they won two drivers' titles and 25 world championship races together, not to mention another 19 non-points-paying events.



5 BRABHAM & COOPER

Jack Brabham started out working for Charles Cooper on the shop floor before driving for him. In 1959 and '60, Cooper chassis spearheaded by John Cooper, combined with Brabham's driving skills and gearbox-manufacturing prowess, led to back-to-back titles.

6 PIQUET & MURRAY

The early '80s Brabham team was fully focused on star driver Nelson Piquet. He took Gordon Murray's BT49C to glory in 1981. Two years later the pairing won the title for a second time with the BT52.



VETTEL & NEWEY

Sebastian Vettel has raced Adrian Newey-produced cars for 99 per cent of his grand prix career. At Scuderia Toro Rosso, he raced Red Bull machinery powered by Ferrari engines with limited modifications, meaning that all but one of his world championship points have been scored in Newey cars.

VETTEL IN NEWEY F1 CARS

Teams: Toro Rosso (2007-2008), Red Bull (2009-present)

Drivers' championships: 3

Constructors' championships: 3

Races: 100

Wins: 26

Poles: 36

Podiums: 46

Fastest laps: 15



"Red Bull is a great team to work for. I do have a slightly protective, paternal feeling towards the team. They are a great group of guys. I've always said I don't want to spend my whole career in motor racing and certainly not F1, but at the moment I'm still enjoying it. As long as I do that and people are willing to offer me work, then I'll keep doing it."

Newey's emotional ties to the team are seemingly unbreakable. When he joined in February 2006, one of the key appeals was the freedom to develop the technical side of the team in his own image. He has described his success here as finishing the job that he started at Leyton House March in the 1980s, with the feeling that it is 'his' team vital to his job satisfaction. He also pointed to the lack of politics within the team as key to its appeal.

"It's a team where we concentrate on the core job and don't get



Vettel drove 'Newey' Toro Rossos as well

distracted," said Newey. "We try to keep egos and politics to a minimum, come in with a positive attitude every day and try to have an atmosphere where there is no finger-pointing. If someone makes a mistake, at least they've tried."

"We encourage creativity, communication, all the usual things, but it's down to the personnel. You can say all of those things, but if they don't take that ethos and run with it, it doesn't work, and they have."

The F1 stories that clicked with you

AUTOSPORT's website brought you all the biggest news of the 2012 Formula 1 season. Here are the ones that topped the 'most-read' chart



1

Williams garage goes up in smoke



1 F1 personnel injured in Williams fire

May 13

Shortly after Williams driver Pastor Maldonado took that famous victory in the Spanish Grand Prix, the team's garage erupted in flames due to a spark while Bruno Senna's car was being drained of fuel.

Sky Sports and BBC F1 forum viewers had seen the conflagration live, but it was not until later in the afternoon that it was confirmed that personnel from Williams, Caterham and Force India were being treated at the medical centre.

● Technical chief Mike Coughlan gives us his exclusive line about the Williams revival on page 56.



Lotus name stayed

2 Lotus ends title sponsorship

April 6

Yet another complicated twist in the return of the Lotus name to F1. While the Enstone-based team retained the name, financial uncertainties for Group Lotus meant that the relationship between the marque and the former Renault squad formally ended.



Mercedes wing got attention

3 Brawn downplays wing concept

March 16

Remember the early days in the 2012 season when Mercedes was on the pace and the paddock was abuzz with talk about the benefits of its DRS-activated front-wing-stall trick? In the wake of the team's disappointing slump, it's easy to forget just how strong the silver cars were in the opening races.

After fighting to prove its legality, team principal Ross Brawn played down the benefit of the design. History has proved him right.

4 Red Bull feared Vettel would retire

November 26

Sebastian Vettel thought it was all over when Bruno Senna ran into him on the opening lap of the Brazilian Grand Prix.

"It's probably about as bad as you can possibly have and still finish the race," explained technical boss Adrian Newey after the race.

As well as bodywork damage, which cost downforce, the clash creased the exhaust, forcing Red Bull to change the engine mapping to reduce the temperature and stop the exhaust breaking and setting the car alight.



Vettel takes a big hit in Brazil



Lewis lost Spanish GP pole



De Villota suffered injuries

5 Hamilton loses Spanish Grand Prix pole

May 13

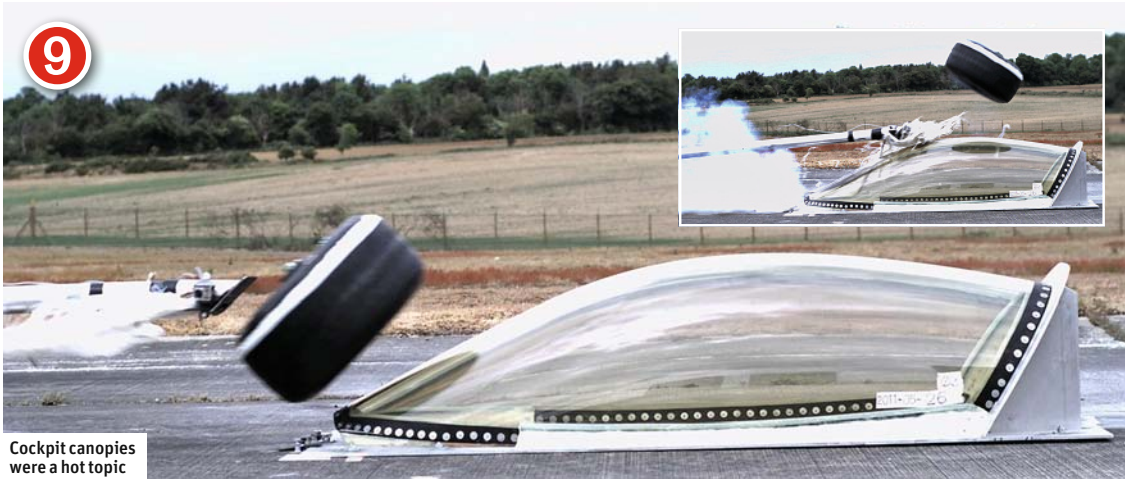
After Lewis Hamilton ground to a halt on his in-lap after setting the fastest time in qualifying for May's Spanish Grand Prix, it was clear that there was going to be trouble. A mistake in the garage had led to the fuel filler being set to 'drain' rather than 'fill'. Although this was noticed, the car was sent out before the allotted fuel had been taken on board.

McLaren claimed force majeure, but stewards did not accept this as the team knew about the fuel problem when he was sent out. The result was that, almost four hours after the session, he was excluded from qualifying and sent to the back of the grid.

6 De Villota loses right eye in accident

July 4

The most unpleasant story of 2012, with motorsport fans desperate to find out news after Maria de Villota's terrible crash during a straightline test for Marussia. While the news that she had survived was welcome, it later emerged that the Spaniard had paid a horrible price for the accident.



Cockpit canopies were a hot topic

OTHER TOP STORIES
IN 2012

11 2013 Formula 1 calendar revealed (September 21)

The FIA releases the first public draft calendar for 2013



12 Vettel penalised for Button pass (July 22)

Vettel is relegated from second to fifth in the German GP

13 Button 'more than marginal' on fuel (March 18)

Button had to take it easy on his way to winning in Australia



14 Monaco announces track changes (April 19)

Barrier tweaks in the wake of Sergio Perez's 2011 crash

15 Massa secures Ferrari future (October 14)

After much speculation, Massa earns a one-year Ferrari deal

16 McLaren equals Merc's Hamilton bid (September 25)

McLaren has one last throw of the dice on Hamilton



17 Sauber denies Ferrari conspiracy (March 25)

Sauber insists it did not help Fernando Alonso win in Malaysia

18 Schumacher delay led to Hamilton chase (September 28)

How Schumacher's indecision encouraged Mercedes to sign Hamilton from McLaren



19 Brawn hits out at rivals' exhausts (March 20)

Ross Brawn questions rival teams trying to harness the exhaust-blowing effect

20 Hamilton replaces Schumacher at Mercedes (September 28)

After months of discussion, Hamilton signs for Mercedes



JV hit out at Vettel



Kimi shrugged off Brazil detour

7 Vettel reacts like a child - Villeneuve November 14

Former world champion Jacques Villeneuve's critique of Sebastian Vettel made headlines around the world. He compared Vettel's demeanour in adversity negatively to that of Fernando Alonso.

"Alonso remains calm, cool and rational, while Vettel most times gets upset, angry, screams and flicks the middle finger. He reacts like a child," said Villeneuve.

8 Pirelli responds to Schumacher April 22

After Michael Schumacher criticised Pirelli's 2012 F1 rubber, the Italian firm's director of motorsport, Paul Hembery,

explained to AUTOSPORT that he was unimpressed. "I'm disappointed to hear those comments from someone of Michael's experience," said Hembery. "Others were getting on with the job and getting their tyres to work. His comments during winter testing were that he was very happy with the tyres, and now he seems to have changed his tune."

9 Closed cockpits now 'inevitable' September 3

McLaren technical director Paddy Lowe declared that "something is inevitable because it is the one big [safety] exposure that we have got" about the prospect of driver protection being increased.

This followed the accident at

the start of the Belgian Grand Prix in which Romain Grosjean's Lotus passed close to Fernando Alonso's head.

10 Raikkonen: I knew where I was going November 25

Kimi Raikkonen stories were incredibly popular during the season on the AUTOSPORT website, none more so than after his off-track excursion during the season-ending Brazilian Grand Prix. Raikkonen went off at the final corner, and lost more time and places when he attempted to rejoin by going through the support-race pitlane.

"Where I went off you can get back on the track by going through the support-race pitlane, but you have to go through a gate," said Raikkonen. "I know this as I did the same thing in 2001 and the gate was open that year. Somebody closed it this time. Next year, I'll make sure it's open again."



Schumacher and Pirelli fell out

F1 2012 REVIEW P24

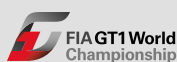
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THIS WEEK IN F1

GROSJEAN DECISION DELAYED

Lotus has delayed its decision on whether to retain Romain Grosjean for the 2013 season. The team's senior management met last week to discuss the Frenchman's future, but have yet to make a final decision.



I would rather he had stopped as a seven-time world champion than stopping now. People new to the sport - people who have joined the F1 fan fraternity just recently - will remember Michael now, not what he was. They don't see the hero that he was but the human that can fail



Bernie Ecclestone reveals that he thinks Michael Schumacher's comeback was a mistake

WEBBER HAS FINAL SURGERY

Mark Webber last week had the final operation on the leg that he broke in November 2008. "Hospital trip planned a while back," said the Australian on Twitter. "I needed further surgery from previous injury. All good and on the mend."



AUSTRIAN RACE COULD RETURN

Spielberg, which held grands prix from 1997-2003 as the A1 Ring, is ready to take the vacant slot on the 2013 F1 calendar, according to circuit owner Red Bull. The revamped 'Red Bull Ring', which hosted a DTM round this year (pictured below), is among the contenders to take the vacant July 21st slot - created by the German GP moving to July 7. Races in France, Turkey and at the Valencia street circuit are also in contention.



AUSTIN WANTS DATE CHANGE

Organisers of the United States Grand Prix at the Austin circuit are lobbying the FIA for a date change. The 2013 US Grand Prix is scheduled for November 17, but there are concerns that it will be overshadowed by the University of Texas versus Oklahoma State American football game that is being held a day earlier.

'ELECTRIC' PITLANE ON HOLD



The FIA has rubber-stamped plans to defer the introduction of the rule insisting that cars use only electric power in the pits until 2017. It has also scrapped proposed bodywork rule changes, with the 2014 cars now based more on the current regulations.

CHANGES RATIFIED FOR F1 2013

The FIA's World Motor Sport Council has ratified a number of rule changes for next year. This includes more stringent front-wing flexibility tests, the removal of the

'force majeure' excuse from the regulations, and the banning of the use of DRS anywhere except in the designated zones during practice and qualifying.

F1 LANDS ROLEX DEAL

Luxury watch brand Rolex will become official timekeeper to Formula 1 from the start of next season. The deal is reportedly worth approximately €20 million per year.

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Rollbar Mount



Adhesive Mounts



MARK HUGHES

GRAND PRIX EDITOR

Formula 1 cars do go wrong from time to time, as do the teams that run them. Let's look at how 2012 would have played out if there'd been no 'finger trouble'

What if there'd been no mechanical unreliability or pitstop dramas for any of Formula 1's title contenders this year?

Sebastian Vettel has said several times that he doesn't consider himself to be the best driver out there, but merely someone trying to compete with the best. That may be humility, it may be disingenuous; it may be a psychological strikeback at the little digs made through the past couple of years by Fernando Alonso and Lewis Hamilton. But Vettel is undoubtedly right when he says it's impossible to disentangle the relative contributions made to the laptime and result by driver and car. We can know to an order of magnitude, but not to any accurate degree.

But when looking back at the season just gone, we could at least disentangle car failures and pitlane problems as nothing to do with the driver — and see how that might have affected the championship.

If we could, for example, give Seb the victory he would surely have

taken in Valencia but for the failed alternator, Lewis the wins he'd been set for in Barcelona (team operational error in qualifying), Singapore and Abu Dhabi (gearbox and electrical failure respectively) and all the others in between, the winning tally for the season would have looked as follows: Hamilton seven wins; Vettel five, Jenson Button four, Alonso and Mark Webber two each.

What we actually had was: Vettel five; Hamilton four; Alonso and Button three; Webber two; Nico Rosberg, Pastor Maldonado and Kimi Raikkonen one.

This is based on the following: Button's pitstop in China not going wrong and him catching and passing on new tyres the old-tyred Mercedes of Rosberg; Hamilton dominating from pole in Barcelona (thereby denying Maldonado); Vettel leading start to finish in Valencia (denying Alonso); no gearbox problem for Hamilton in Singapore (denying Vettel); and no electrical failure for Hamilton in Abu Dhabi (denying Raikkonen).

Removing unreliability and operational errors in this way at least gives us a comparison of the competitiveness of each car/driver combination through the season. But in terms of how the championship points would have worked out, things would have been rather closer fought.

Hamilton's non-scores in Valencia, Germany and Belgium (accident, puncture and accident respectively), while Vettel was scoring consistently, would have put Seb 13 points clear of Lewis coming into the final round in Brazil, with Alonso an out-of-touch 56 points adrift. With the Brazilian Grand Prix we had, Vettel would have become

world champion with 298 points to Hamilton's 277, despite having won two races fewer.

But up until the moment Nico Hulkenberg clashed with Hamilton whilst attempting to wrest the lead, Lewis would have been in a position to have won his eighth race of the season and defeated Vettel by 302 points to 296. Even if Mark Webber had surrendered a place to team mate Vettel, that would still only have put Seb on 298.

But what if Hulkenberg had been successful in passing Hamilton and gone on to win? Then the McLaren man would have lost the title by one point (or two if Webber had moved aside for Red Bull team-mate Vettel). At the moment Hulkenberg passed Hamilton, Lewis would have known he desperately needed the extra seven points and would surely not have settled for second. There were 17 laps left when Hulkenberg made that move, and the title would have hung in the balance as Lewis used those laps to attempt to re-pass. It would have been even more electric than the title decider we got.

Then there's the question of whether Hulkenberg would have even tried a move on one of the title contenders in the finale. Or would he have stayed meekly in line, ensuring he stayed out of trouble and with a great second place in his hands? As it was, he was able to race freely, knowing Hamilton was not in title contention.

But what the exercise underlines is that, on performance alone, Alonso and Ferrari were not title contenders. That they became so says everything about the relentlessness of Alonso, Ferrari's reliability and pitstop excellence — and the failures at McLaren. ❧

PIC: TEE/LAT



Did this man's team cost him his second title?

“On performance alone Alonso and Ferrari weren't contenders”

PORSCHE SUPERCUP

NEW LOOK SUPERCUP

Porsche's new Supercup car, based on the latest 991-spec 911, was unveiled last weekend. The car, which features a paddleshift gearbox for the first time, produces 460bhp – 10 more than the 997-based model – and has wider tyres and improved brakes.



INDYCAR/V8 STOCK CARS

Barrichello could quit IndyCar

Formula 1 veteran evaluating a full-time switch to Brazilian V8 Stock Car series for next year

Rubens Barrichello could walk away from the IndyCar Series to race in Brazilian V8 Stock Cars full-time next year.

The 40-year-old Brazilian competed in IndyCar with KV Racing Technology this year after ending a 19-year stint in Formula 1, but also drove in the final three rounds of his home country's top domestic series.

During last weekend's V8 season finale at Interlagos he told AUTOSPORT that he is seriously considering a number of offers to race in his homeland next year.

"Both Stock Cars and IndyCar

have a lot of positives," Barrichello said. "In IndyCar I had to adapt to something totally different to F1 and I would like another year to use the knowledge I've gained.

"On the other hand, I've enjoyed racing Stock Cars, the environment, the teams and the warm welcome I've had from the drivers, some of whom were my good friends anyway."

Barrichello, the most experienced grand prix driver in history, finished 12th in the IndyCar points this year and recorded a best finish of fourth at Sonoma.

Since leaving KV in September he has been linked to seats with the Schmidt Hamilton and Rahal Letterman Lanigan teams, plus Chip Ganassi's second-string line-up alongside Charlie Kimball.

But AUTOSPORT understands that each of these offers would require him to bring around £1.25 million in backing for a full season.

"I have been searching for sponsorship to go back to Indy racing for the last three months, but I've still not found it," he said. "I will not start a season with half a budget. I don't want to and I don't deserve to."

Barrichello will not be required to find backing should he decide to accept one of several V8 offers he is currently considering.

Maurício Ferreira, whose Full Time Sports squad has run Barrichello's Chevrolet in his three events this year, said: "If he comes back to Brazil, I have no doubt it will be with us. There are no other good teams that have available cars."

Barrichello described his chances of driving for Ferreira's squad next year, should he chose a tin-top career, as "60 per cent".



Bueno celebrates his fifth V8 title

CAMILO WINS FINALE, BUENO TAKES TITLE

Rubens Barrichello finished his part-season in V8 Stock Cars with 22nd spot in the end-of-year One Million Reais race at Interlagos, while series debutant Helio Castroneves took 14th spot.

Caca Bueno led most of the race after opting to forego a fuel stop and hold track position. Driving conservatively, he was passed by rookie Galid Osman with a handful of laps left, but found himself back in the lead when Osman's engine blew on the penultimate tour.

Bueno's Red Bull Chevrolet ran dry on the uphill drag to the finish, allowing Thiago Camilo to win from 20th on the grid. Despite main title rival Ricardo Maurício taking the runner-up spot, Bueno's third place was still enough to make him champion for a fifth time.

Barrichello has raced three times in V8s





RAM will run a pair of 458s

ELMS/LE MANS

New Ferrari team to enter ELMS

A NEW TEAM FOUNDED BY

Michael Schumacher's former lead mechanic will mount an assault on the GTE division of next year's European Le Mans Series.

RAM Racing has been set up by Dan Shufflebottom, who was a number one mechanic at the Mercedes Formula 1 team from 2011 to April this year, and an anonymous backer from the Middle East. It will field two Ferrari 458 Italias in the ELMS and plans to lodge one entry for the Le Mans 24 Hours.

Shufflebottom, 32, said: "It's a strange jump, but I was presented with this opportunity through a mutual friend and would have been crazy not to give it a go.

"The plan is to start in ELMS and build a strong foundation. We will submit a Le Mans entry for next year and if we don't get in we will try again in 2014."

RAM had been planning to run two cars in the Pro class before it was decided that only pro-am entries would be allowed. This means the

team will have to convert its new 458s back to 2012 specification.

Sportscar stalwart Johnny Mowlem is the first confirmed driver.

The announcement by RAM is likely to trigger more entries in GTE category. The JMW Ferrari and ProSpeed Porsche teams had made it clear that they were only willing to commit to the series if there was significant opposition.

The new squad has no connection with the F1 team of the same name of the 1970s and '80s.

AUTOSPORT SAYS...

MARK GLENDENNING
US EDITOR

@m_glendenning



Rubens Barrichello's rookie – and potentially only – IndyCar season was not the disaster it might have seemed. Even for one as well-credentialed as the Brazilian, this was a particularly difficult season to parachute into and make an immediate impact.

The field was the deepest in talent that anyone could remember, and KV Racing Technology was always going to have its work cut out in cracking the code of the Dallara DW12 at the same pace as the Penskes, Ganassis and Andrettis. But three top 10s from the first four races showed that the fundamentals were there, and two top fives from the last three outings demonstrated the progress that he'd made. Along the way, he also qualified inside the top 10 for his first oval race at Indianapolis, and achieved top-10 finishes at Milwaukee and Iowa.

He left F1 feeling that he still had something to prove and, if this is the end of the road for him in IndyCar, you can guarantee that he'll walk away with the same sense of frustration. But money talks, and in IndyCar hardly anyone has any.

It would be a shame for Barrichello and his fans to be denied the chance to see how he built upon his first year in the US, but if V8 Stock Cars can do what IndyCar can't and offer a proper, paid drive in a car that is capable of making him champion, nobody can blame him for taking it.

Barrichello has tin-top offers



WEC/LE MANS

Bernhard and Dumas return to Porsche

LE MANS 24 HOURS WINNERS Timo Bernhard and Romain Dumas have ended their loan spells with Audi to return full-time to Porsche.

The duo have been on loan to Audi for prototype duties since 2009, the year before they won the 24 Hours together with Mike Rockenfeller. Both had to choose between Audi and Porsche as the LMP1 returnee gears up to take on its sister marque with its new hybrid in 2014.

Bernhard said: "We always knew we would have to decide in one direction by the end of

2012. Porsche is in my blood. They gave me so many opportunities, which is why I want to stay loyal to them."

Bernhard and Dumas will spearhead development of Porsche's new P1 hybrid, which will run for the first time in mid-2013.

Porsche has confirmed that the car will be run by an in-house team based at Porsche's Weissach research and development facility, where the car is being designed and built. It has also retained all 11 of its factory drivers, including Marc Lieb, Richard Lietz and Jorg Bergmeister.

● Nick Tandy became only the third Briton to win the Porsche Cup last Saturday. The award is given to the best-performing non-factory driver in Porsche machinery in a season.

Tandy, who won races in ADAC GT Masters and GT Open, joins Tim Sugden and John Fitzpatrick on the list.



Harvey with Calado in '13

GP3/GP2

Harvey joins Lotus for GP3

BRITISH FORMULA 3 CHAMPION JACK

Harvey will join fellow Racing Steps Foundation protege James Calado at Lotus GP on Formula 1's support bill in 2013.

Harvey will contest the GP3 Series with the ART-run team, while Calado will remain for a second season in the GP2 Series.

It will be a return to the F1 support bill for Harvey, who was runner-up in Formula BMW Europe in 2010. He recently tested GP3 machinery for Lotus and Carlin, the team with which he won the F3 title, in the post-season run-outs.

● Carlin has completed its GP2 line-up, with Monaco Grand Prix support race winner Jolyon Palmer transferring from iSport International for his third season in the category to line up alongside Brazilian Felipe Nasr, who raced for DAMS in 2012.



Duo is ending Audi spell

REMEMBER WHEN...

OCTOBER 18 2003



...Dumas and Bernhard first shared a car? Romain and Timo's inaugural race together came at the American Le Mans Series' Petit Le Mans in 2003. They shared an Alex Job Porsche 911 GT3-RS with Jorg Bergmeister.



WRC

CITROËN'S FRESH EASTERN FLAVOUR

Citroën launched its 2013 World Rally Team in Abu Dhabi last week in deference to its new sponsor. Mikko Hirvonen will lead the team, while Sebastien Loeb, Dani Sordo and Khalid Al-Qassimi will also drive DS3 WRCs.

WTCC/WRC/GT3

New WTCC regs persuaded Loeb

Rally dominator convinced to switch to touring cars by FIA promise to make its tin-tops more spectacular

Nine-time World Rally champion Sebastien Loeb says the new rules being introduced to the World Touring Car Championship were a key factor behind him wanting to race in the series.

Last week's meeting of the FIA World Motor Sport Council confirmed that the 2014 WTCC regulations will give manufacturers greater technical freedom and the chance to produce more spectacular cars. And Loeb, who also revealed last week that he will race a McLaren MP4-12C GT3 in Stephane Ratel's new GT Sprint series next year to get used to circuit racing, said the new rules appeal to him and Citroën — which is yet to sign off its anticipated WTCC programme for 2014.

"Maybe they are not the most exciting cars [built to the current regulations], but the fun comes because you have a big battle," said Loeb. "And the regulations in the WTCC will change a lot.

"The cars will have more power, more downforce, and they will be

wider and lower to the ground."

Loeb explained that his decision to race a GT3 car next year was because he likes the format of two one-hour races in the sprint series, and he also believes the performance of the car will not be too different to those in the WTCC.

"The performance of the WTCC is not too bad compared to the GT car, even with 200bhp less," he added. "When you drive a car on track you get used to it, it doesn't matter if it's front- or rear-wheel drive. You can adjust your style, and if you are fast you are fast [regardless of the car]."

Loeb, who also announced at last week's Citroën WRC launch that his part-time rally schedule will be made up of events in Monte Carlo, Sweden, Argentina and France, admitted that he cannot guarantee his switch to circuit racing will be a success.

"Maybe I won't make the top in WTCC," he said. "It would be a miracle to be immediately at the right level. If you are 0.4 seconds behind then you are 10th. Maybe I



Loeb wants a fast touring car

will not be able to do it, but it's a good challenge to learn a different way of working. If after two years my best result is 10th then I won't have fun, and maybe then I go to an easier discipline where I can win!"

FIA Touring Car Commission president Alan Gow told AUTOSPORT that the FIA was keen to make the WTCC more of a spectacle.

"It's a world championship so it's correct the cars are a step up from national championships, which they're not at the moment," said Gow. "The result of discussions with manufacturers and teams was a feeling they should be faster and more spectacular.

"But it won't be a sea change. It's evolutionary and has to be because we've got to be careful of cost."

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FORMULA 2

MSV to consider future of F2 machines

MOTORSPORT VISION IS IN NO RUSH to decide on the future of its fleet of Formula 2 cars following the announcement last week that the series will not run in 2013.

MSV chairman Jonathan Palmer said that the series had failed to thrive as predicted under its centrally-run operating concept, leading to his decision to can the series a season short of its initial five-year FIA deal.

Although Palmer did not rule out reviving F2 using a more conventional team-versus-team concept in the future, he said that a decision on what will happen to the cars is a long way off.

"We haven't really thought about what the future holds for the cars," Palmer told AUTOSPORT. "They could be sold, and there might be a chance to run them in another series. These are things we'll certainly be thinking about over the next few months."

"These are high-performance cars with very strong chassis, powerful engines and durable gearboxes. They have lots of



2012 was last season for F2

life left if we can identify a sensible opportunity for them."

While admitting there were flaws to the centrally-run concept, Palmer said he had no regrets about reviving the category under the FIA Formula 2 Championship banner.

"Sometimes you have to take a risk," he said. "And I think MSV did a great job in creating a professionally run, sub-F1 championship and a high-level car for

less than £200,000 [in 2009].

"Unfortunately the centrally-run concept isn't right for this level of single-seaters. When you haven't got teams involved, you haven't got them acting as salespeople and telling everyone they should come and do your series; in fact, you've got the opposite."

"But, it only would have taken something like GP3 not happening [in 2010] to have given F2 a much brighter future."

IN BRIEF



New car was quick

NEW AUTO GP CAR TESTS

Auto GP's new car was fastest on both days of series testing at Barcelona last week in the hands of development driver Adrian Quaife-Hobbs. Vittorio Ghirelli (Super Nova) and Jordan King (Manor MP) were the fastest drivers in 2012 machinery.

ANDRETTI CONFIRMS LINE-UP

IndyCar champion Ryan Hunter-Reay will again be partnered by Marco Andretti and James Hinchcliff in 2013. Hunter-Reay will, unusually, run with #1 on his car.

LOTUS ENDS INDYCAR STAY

IndyCar has released Lotus from its engine supply contract after just one season, leaving Honda and Chevrolet to power the field in 2013. Lotus has not ruled out returning to the series in the future.

HAWKSWORTH'S LIGHTS DEAL

Star Mazda champion and McLaren AUTOSPORT BRDC Award finalist Jack Hawksworth will step up to Indy Lights in 2013 with Sam Schmidt Motorsports.

NEW WEC QUALIFYING FORMAT

Grids for World Endurance Championship races next year will be based on the aggregate times of two drivers. The fastest two laps of each of the two drivers taking part in qualifying will determine the order.

GREEN CONFIRMS AUDI MOVE

Jamie Green has confirmed his switch from Mercedes to Audi for next year's DTM, as revealed by AUTOSPORT (November 8). The 30-year-old Brit said: "I'm convinced I can win the title with Audi."

NASH NABS BAMBOO DRIVE

James Nash will race a Chevrolet Cruze 1.6T for Bamboo-Engineering in the 2013 World Touring Car Championship. The 26-year-old Briton finished 20th with the Arena Ford squad this year.

VW PASSATS FOR BTCC

Tony Gilham Racing is building a pair of NGTC Volkswagen Passats for next year's British Touring Car Championship. Gilham is also running his regular S2000 Honda Civic and at least one Vauxhall Insignia.



VW joins the BTCC

GRAND-AM

Jordan off to Daytona

BRITISH TOURING CAR INDEPENDENTS'

champion Andrew Jordan will make his Daytona debut in the event supporting the 24 Hours in January.

Jordan, 23 will contest the two-and-a-half hour Grand-Am Challenge at Daytona in a Honda Civic Si run by the successful Compass 360 squad under the Team Seattle banner. The outfit was created 16 years ago to raise money for the Cardiac Care Unit at Seattle Childrens' Hospital and has so far raised more than £3.1million.

"Racing at Daytona has always been



Jordan will campaign a Honda Civic for C360

one of my ambitions and I hope that this drive could lead to the chance to tackle the 24-hour race one day," said Jordan.

"We know we'll be on the class pace with the front-wheel-drive cars so I can really focus on learning the circuit. I'm thrilled to have been invited to race for the team and I'm determined to repay their

faith in me with a good result."

Jordan, who has enduro experience from 2011 outings in British GT, has not ruled out competing at other events.

"I'm committed to the BTCC for a couple of years at least, but it's something else to look at," he said. "I'd love to do more and if this goes well, anything could happen."

WRC

M-Sport and Prodrive rush to fill seats



Neuville is a wanted man

BOTH M-SPORT AND PRODRIVE WERE battling to sign rising Belgian star Thierry Neuville for the Monte Carlo Rally as AUTOSPORT closed for press.

Entries close for the World Rally Championship opener tomorrow (Friday), with neither team having firming up their line-ups for the event.

M-Sport signed Norwegian Mads Ostberg earlier this month to front its leading, Qatar-backed team and must choose between Evgeny Novikov, Juho Hanninen (who already has a deal with the team for the Monte and Sweden) and former Citroen Junior driver

Neuville for the second Fiesta RS WRC.

Prodrive, meanwhile, has yet to secure a driver for its Mini WRC. It is, however, confident of doing so as it chases its first World Rally victory since 2005.

● Andreas Mikkelsen was confirmed as Volkswagen's third driver at the manufacturer's team launch in Monte Carlo last weekend. The double Intercontinental Rally Challenge title-winner will drive a Polo R WRC from round four in Portugal onwards and will have a new co-driver in Mikko Markkula.

NEXT

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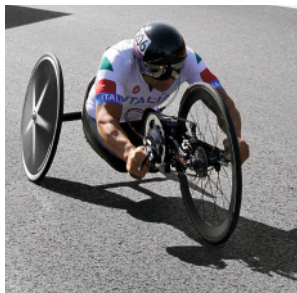


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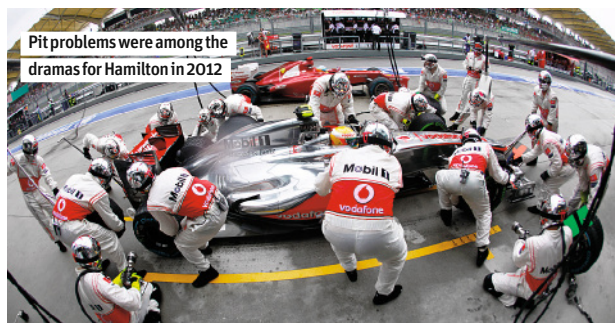
BUMPER 156-PAGE SPECIAL ISSUE – CONTENTS CORRECT AT TIME OF GOING TO PRESS



Majestic Alonso took Ferrari to Malaysian Grand Prix win



Rosberg gave Merc Chinese GP success



Pit problems were among the dramas for Hamilton in 2012

PICS: GILHAM/GETTY, COATES, DUNBAR, TEE/LAT

What on earth is F1 anyway?

Business and politics mean it can be hard to concentrate on the sport in the modern era. MARK HUGHES looks at a dramatic 2012

No-one has ever really resolved what Formula 1 is at any given moment. Just as the quantum physicist will tell you a particle cannot have both a velocity and location, only a precision of one and an approximation of the other, so F1 is at any given moment approximately a business, entertainment, sport, a political battleground and a technical exercise. What's more, that mix is by nature never static, or fully under control.

Where that combination took F1 to in 2012 was sometimes a baffling place so that we had, after the Spanish Grand Prix, the Red Bull team principal - a racer whose team is a key part of the marketing operation of a soft-drinks business and who employs the sport's best technical brain - saying: "Success in F1 has always been about aerodynamics. But this year that seems to be far less a factor than historically. I'm struggling to explain it and it seems to be all about the black art of managing these tyres. Whoever understands the tyres and broadens the window in which they work will prevail this year. But we are a long way from understanding it at the moment, and the only comfort we take is that it would appear everyone else is in the same boat!"

This was just after we'd had the fifth different winner in the first five races, a sequence that would extend to a record-breaking seven from seven. "The lottery continues," said Mark Webber after Lewis Hamilton had taken that seventh victory, and in the wake of Mark having just finished seventh off the back of winning Monaco.

For some, all this was great entertainment. For those of a more purist disposition towards what they like to think is a sport, it was all a little too random. There really didn't seem to be any particular merit about why one team or driver - and not someone else - had

won on a given day, other than they'd stumbled into the right part of the tyre temperature-car continuum for reasons they didn't understand.

That's how it was for most of the season's first half. The reduction in downforce resulting from the restriction upon exhaust-blown diffusers together with the latest-spec Pirellis gave the tyres an exceptionally narrow operating window - fronts reluctant to switch on, rears prone to a runaway state of overheating.

Untangling and understanding the unintended consequences of those changes occupied F1's best technical brains for much of the year. But they did it eventually - and then it became all about aerodynamics, just as always. And as usual when it's about aero, Adrian Newey's design came to prevail - but only for the last third of the season, when a unique design feature of the Red Bull RB8 allowed it to take spectacular advantage of a double-DRS system. There were times in those last few races when Sebastian Vettel was able to drive the car like this was still 2011, even if the third consecutive drivers' and constructors' championships were much more closely fought than in that record-busting season.

Up until the tyre conundrum was worked out - approximately mid-season - all you needed to be was in the hunt, among the contenders, among those who had stumbled onto a few good days. All you needed was this as foundation for the all-important run-in to the season's end.

Red Bull and McLaren each developed their cars to become ever faster, but the silver machines were punished by unreliability in addition to a series of pitstop dramas in the first half-season. Combined, that took Hamilton out of the championship equation despite driving at the absolute height of his formidable powers.

Ferrari, meanwhile, had put together a remarkable half-season, considering the ▶



This is what it's all about: Vettel, a deserving three-time champion



Maldonado scored shock - and welcome - win for Williams

Raikkonen won in Abu Dhabi. Don't worry – he knows what he's doing



Perez took advantage of his light-on-tyres Sauber



PICS: DUNBAR, TEE/LAT

Massa illustrates how getting to grips with the tyres proved tricky in 2012



◀ car it began with was around one second off the pace. A bit of luck (the Malaysia weather), a quick correction of the initial car's more glaring faults, and a quite brilliant campaign by Fernando Alonso had him leading the championship into the second half. But the car was stubbornly resistant to further development and, for the second time in three years, he lost the title in the final round.

Pirelli's choice of a squarer-shouldered tyre and a narrowing of the gap between compounds was designed to give greater fidelity in tuning the tyre to the desired number of stops, something that had been difficult in 2011 because the round-shouldered shape had concentrated wear over a relatively narrow strip of the tread, thereby making the pivot between too many stops and too few overly delicate.

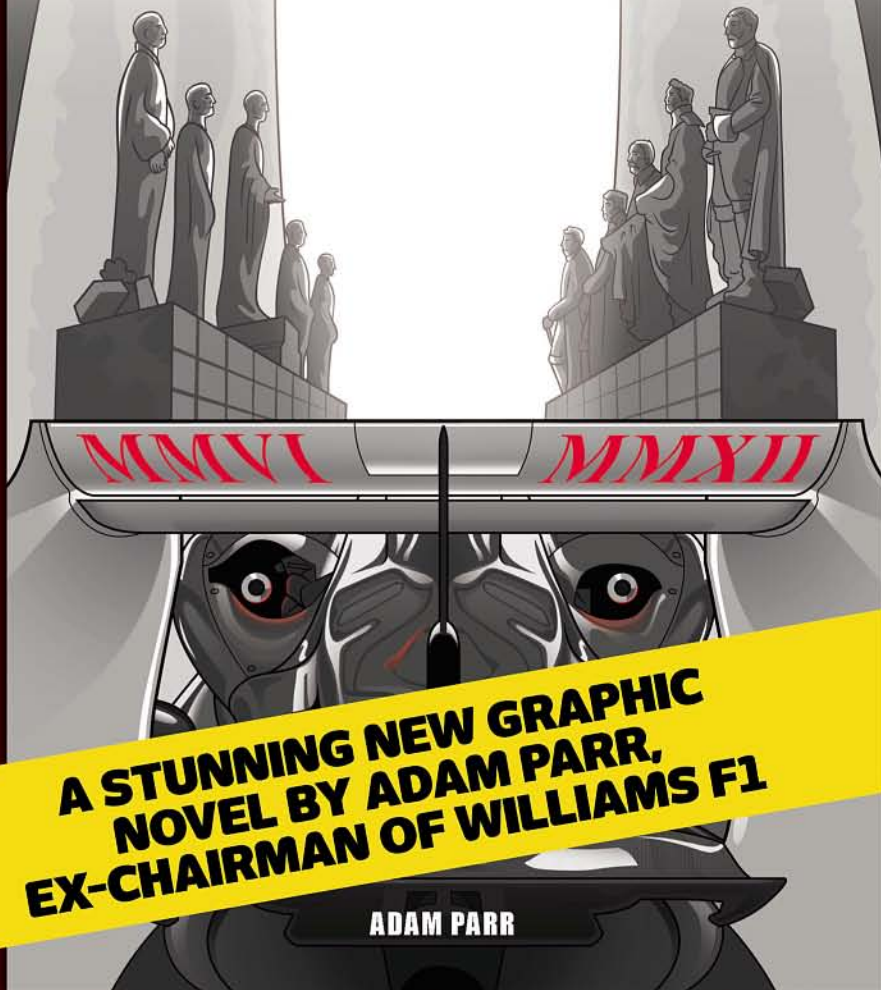
Instead, two entirely different things happened as a result of the square-shouldered shape spreading the load across a wider contact patch: at the rear, the greater energy fed into the tyre's core made that core overheat; at the front, the more evenly-spread load meant that generating tyre heat took longer than before. So you could begin a qualifying lap with not enough front temperature, and by the time they came in the rears could be overheating.

The high-downforce cars were still fast in qualifying, but the stiffer suspension that higher downforce generally demands made those cars more punishing of the delicate tyres in the races, so there were several Sundays where a Williams or, particularly, a Sauber would be the fastest thing on track. Williams and Pastor Maldonado together converted this to a brilliant win at Barcelona; Sauber converted it to four podiums over the year.

The exception to the high-downforce/stiff-suspension relationship was the Lotus, softly suspended and invariably fantastically fast in the early races, but missing a few tenths in qualifying. It was ▶

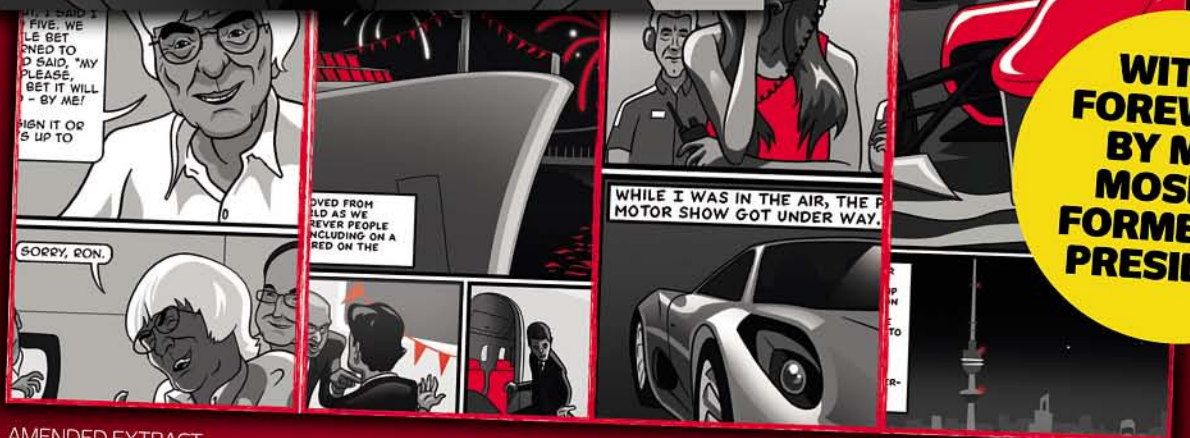
THE ART OF WAR

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Calamitous Grosjean triggered first-corner Belgian GP mayhem

◀ a very useful tool for Kimi Raikkonen to make his comeback in.

A couple of winning opportunities were lost early-season, but the breakthrough victory came in Abu Dhabi where Kimi delighted his fans with his laconic radio transmissions. Meantime, team-mate Romain Grosjean was alternately thrilling and terrifying, and was even briefly banned.

As can be appreciated, this was a very bad year in which to come up with a car that was at all hard on the rear tyres, which is exactly what Mercedes did. In China, unusually it was front-tyre wear rather than rear heat degradation that formed the generic limitation and this - in combination with how well the car's then-unique double DRS worked in qualifying - allowed Nico Rosberg to score a historic victory. But it was downhill all the way from there.

Michael Schumacher rewound the years

“Little had changed in Bahrain since a year earlier when the race was pulled: people being oppressed, punished for protesting”

to be fastest qualifier in Monaco, though a grid penalty left him starting sixth. Thereafter the car fell steadily down the grid as others developed and it stood still. Schumacher was not sufficiently convinced by what he'd seen to immediately accept a three-year offer made to him and, as he hesitated, Hamilton's management - having failed to entice either Red Bull or Ferrari into signing its client - slotted him in, thereby leaving the seven-time champion rather hanging out to dry. Only a week after Hamilton's place at Mercedes for 2013 was confirmed did Schumacher announce his (second) retirement. The three-year comeback hadn't been a total failure, but obviously fell far short of his first career.

Meanwhile, Vettel has put himself on course to maybe one day approach the phenomenal Schumacher records, but it took time for his season to take off. Red Bull believed it had devised a way within the new regulations to reclaim much of the effect of the 2011 blowing exhausts, with sophisticated ducts behind the rear-axle line that would redirect the exhaust flow exactly where it was needed - to the diffuser sides.

This was banned before even being built.

The car therefore appeared with the exhausts more or less as originally configured but without the ducting, which made it a very plain-vanilla system compared to the Coanda-effect systems on the initial McLaren, Ferrari and Sauber. By the final day of winter testing and for the first race there was a Coanda system on it, but with a difference: undercut tunnel inlets that took flow off the bottom of the sidepod to a hole just ahead of the diffuser. These tunnels simply didn't work as intended originally, but the concept would in time come to take the RB8 clear of the rest. Vettel wasn't sure if he liked the car in this form and it was definitely slower than the McLaren at this stage. After the tunnels were blanked off, he promptly won from pole in Bahrain. But it was to be slim pickings for him after that for quite some time.

Vettel's brief return to form wasn't the main talking point of Bahrain: it was what F1 was doing in a country in the midst of internal turmoil, with demonstrations against the very people who were hosting the race. Little had changed since a year earlier when the race had been pulled: people were still being oppressed, punished simply for protesting. F1 insisted it didn't get involved in politics, but as former FIA presidential candidate Ari Vatanen commented: "Human rights cannot be just ignored as an inconvenience to a sporting event. Saying you are not political is just an excuse to do nothing. ▶



Aufwiedersehen. Schumacher retired, for the second time

◀ “By definition if you hold a sporting event in a politically sensitive place you are involved in politics.”

By not putting out the message that it would love to return to the country when the government and its people were at peace, or that turning up at this time of tension was not serving either F1 or Bahrain well, F1 made itself look crass, greedy, uncaring and even complicit in oppression. Saying nothing had the exact effect of making F1 a political football. The sport does not exist in a bubble and ignores events in the outside world at its peril. But Bahrain pays a reported \$50 million for everyone to turn up - and everyone turned up.

Such short-termism is only to be expected of a business being run on behalf of a profit-maximising private-equity company, CVC. That it takes only slightly less than half the profit straight out of the sport is a deeply unsatisfactory arrangement - and the whys and hows of that go back over a decade to when the FIA, under Max Mosley, leased the 100-year commercial rights of the sport out for a ludicrously low sum for Bernie Ecclestone to do what he wished with.

Metaphorical shit and blood continues to ooze from under the expensive carpet as a consequence of that. In June the German banker Gerhard Gribkowsky was jailed for taking bribes from Ecclestone, back when CVC was trying to buy the sport from the banks who'd ended up owning it. The details uncovered in that case have triggered a lawsuit from American financial institution Bluewater Communications, which is claiming \$650 million in damages for the winning bid having been awarded to CVC rather than to the highest bidder.

Meanwhile, with billions being fought over and millions being spent by the top teams, one of the small teams - HRT - looks in the process of going out of business. This was one of three attracted in under the premise of a £40m budget cap - a



Ecclestone, Todt and Bahraini bigwigs: no, sport's not political at all...



Horner's relationship with Bernie caused suspicion



PICS: GILHAM, WASON, THOMPSON/GETTY, COATES, FERRARO/LAT



HRT looked to have reached the end of its troubled existence

Mosley initiative but one that never came to be as he stood down from his presidency in 2009. Cost control continues to be an incendiary subject among the teams. Red Bull Racing had turned over £176m in '11 and rival teams were claiming this was beyond the spend limit everyone had loosely agreed to some time earlier. Team boss Horner countered that he doubted his squad was even the biggest spender once engines and driver salaries were factored in, and that it was because of this he was refusing to be party to a cost cap he felt would unfairly punish him.

Other teams viewed that stance with suspicion, as they did his close working relationship with Ecclestone. The combined outcome of those various pulls was the teams being no longer in the loose unity they'd presented since 2009 and reverting to being just as vulnerable as ever to being used as pawns in the power play between the governing body and Ecclestone.

Meanwhile, outside the top five teams there are seven in various states of financial woe, trying to sustain scales of spend and resource determined during the boom years, but now within a seriously depressed world economy. Not the greatest time to be trying to introduce an expensive new engine technology, but the FIA pressed on with its turbo V6 formula for 2014. Mercedes, Ferrari and Renault between them have spent an estimated half a billion dollars on development of these engines already, and it's going to be quite a challenge making them affordable enough to keep the small and medium-sized teams viable. This would all be far less problematic, of course, if around 40 per cent of the money wasn't disappearing out of the sport.

Meantime, the engineers were spending all that money to good effect and, once they'd understood the combination of suspension geometry, dynamic weight distribution, castors and cambers necessary to keep these tyres alive, it was back to full-on aero simulation. McLaren's big upgrade appeared at Hockenheim in July, the wet qualifying there punishing the car's traits, but essentially it regained from that time until Monza in September its season-opening status of F1's fastest car.

Jenson Button book-ended the season with two great wins and scored another in between at Spa, the weekend when Hamilton tweeted details of his set-up to the world, somewhat to the irritation of his team. But Lewis served them brilliantly well behind the wheel and his was a much more consistently dazzling display than we'd seen from him in 2011. Nevertheless, with the relationship between him and McLaren forever locked between rebellious child and firm-handed parent, he felt it time to move on and the Mercedes deal was inked a couple of days after he was forced to retire from a commanding lead in Singapore with gearbox trouble. Were it not for that, and similar reliability

and pitstop problems, he could comfortably have gained a second world title this year.

When Red Bull added an innocuous double-DRS system to its car from Singapore on, the effect was way greater than could be accounted for by that. This was when those bodywork tunnel inlets - reintroduced in much-enhanced form at Valencia in June - came into their own. Whenever the diffuser ran so low that the flow from the underbody began to stall, it simply sucked harder on those tunnel ducts. With a ride height that could be kept more consistent without stall, it was feasible to run a lot of rear wing. Double DRS could then get rid of the downsides of that, so allowing yet more wing. It was a beautiful virtuous circle and was combined with tweaks in the rear suspension that allowed a roll oversteer into the corner that could then be countered by Vettel nailing the throttle hard at high revs - as he did with the blown exhausts of 2011. Suddenly Seb had car in which he could 'perform his tricks', as he put it.

It was enough to overhaul Alonso's points lead, though the outcome fittingly went all the way to the finale in Brazil. It did so by way of Austin, Texas for the penultimate round, and in that venue was everything that F1 should be aspiring to: a race conceived around a commercial model of bringing lots of people to the track to see some great racing on a spectacular course, with lots of marketing and hard selling of the event - and no hideous white-elephant overscaled hubristic paddock-and-buildings complex. F1 was back in America for all the right reasons and it was a resounding success. Just a pity that the organisers were instructed to neuter the Stars and Stripes run-off track paintings: that little instruction symbolised much of what is still wrong about F1 and how out of step it is in assessing its own importance.

But the old ways cannot last forever, and thankfully there's much that remains majestic about this sport that can be cultivated and amplified in future. And watching Alonso make that fabulous first lap at Valencia from 11th on the grid, then seeing and hearing the crowd respond with every new place he made up on the way to a stunning victory, was a reminder that for 90 minutes or so this really was a sport. 🏆



Mechanical failure did for Hamilton in Singapore



Vettel recovered from Senna assault in Brazil to claim crown



Alonso in Valencia: a reminder that this is sport

The top 10

F1 drivers of 2012

As ever, he's endlessly watched, analysed, brain-picked and computed this year. So here is the top 10 according to **MARK HUGHES**



10th

Pastor Maldonado

HE OUGHT NOT BE HERE. HE MADE way too many errors, threw far too many points away, got pulled into that red-mist frenzy where all reason can go to hell too often. It was as if he drove around looking for a fight at times – and his point-blank refusal to give an inch of racing room in combat was downright scary at times. And yet... there is a fantastic driver locked in there somewhere and at Barcelona he found his way out of the fog.

He's brilliantly quick, albeit in a ragged way that leaves him having to improvise new ways of being so each lap, and can ally that to a wonderfully sensitive feel for the

tyres. The Williams boys are regularly amazed at the fidelity of that feedback from the rubber and he was a large part of why that team was one of the first to understand what the Pirellis required. These are rare skills and they've allowed him in through the back door, shimmying this way and that and following a logic only he knows.

He's trying hard to decouple the emotion from the battle, and he understands the mechanism that triggers it all. But in moments of stress we revert to old habits and that understanding becomes subservient to the rage.

Daniel Ricciardo

EVERYTHING'S LIGHT TO THE TOUCH with Danny and it's misleading. The laughing, smiling demeanour can make it seem like he's not serious or focused, the smooth inputs in the car can make it appear like he's not on the edge. But both impressions would be wrong.

Ricciardo absolutely wrung the neck of a less-than-great Toro Rosso this year and into the latter half of

the season regularly backed that up with tough, relentless race performances that got him into the points. Unlike a Perez or a Grosjean he was not super-strong for four or five races but missing in action or a liability in many of the others; once he got his head around what the tyres required of him he was always maximising what was at his disposal.

9th



Nico Rosberg

"WHAT WAS NICO'S TIME?" ASKED Michael Schumacher of his Mercedes team-mate over the radio just after completing his own Q3 lap in China. "Oh..." he said upon being told. Then a gap... "Well done to him." It scrambled Michael's mind and secured Rosberg pole. It was one of the best single laps anyone put together all season, and he was then faultless from the front in taking his first victory.

That was only his due, for he's operated at a high level for seven seasons now. But that was early season when the Merc was quick, when its double DRS gave it a qualifying advantage before the development limitation it imposed had become apparent. What about in adversity, when the car had dropped into the midfield?

Very difficult to rate a guy in circumstances like that, but there was a run where his 16-year-old team-mate Schumacher had it over him, was regularly quicker – and Michael was not the Michael he used to be. So that has to raise questions.

8th





7th

Nico Hulkenberg

THE SMILING HUSTLER WHO JUST lets his driving do the talking, whose sunny disposition gets everyone in the team onboard with him, did his stuff in 2012, built on that Williams foundation season of 2010. F1 got a fuller reading of Hulkenberg this time and what it read promised great things.

He's underlined his claim to be one of F1's great wet-weather drivers too many times for it to be dismissed – but he's terrific in the dry too, his gung-ho style moderated when the tyres dictated to emerge ahead of as tough a team-mate as Paul di Resta.

The transfer to Sauber should be seen as a move into the fringes of the Ferrari family, but not a binding one. The future's up to him: if he can achieve his potential he'd be wasted as an Alonso tailgunner.



6th

Kimi Raikkonen

LOW WATTAGE REDEFINED, KIMI'S return was as near to perfect for him as could be in a modern F1 replete with sponsor days and inane media questions. Lotus is a team asking next to nothing of him other than being Kimi – just getting in the car, asking for what he needs, then expressing a talent given him on a day the gods must have been feeling very generous.

He's missing a couple of tenths from his great days, when he used to make a Sauber or a McLaren dizzy with his high-wire acrobatics. But he's slotted into exactly where he was in the Ferrari days, which is still way beyond the

dreams of most the other guys on the grid: a practised, clean success machine. He could get those missing tenths back – but it would involve too much compromise in the rest of his life.

How you feel about that is irrelevant to him, which in turn either enrages or endears or even excites. That's how Kimi incites such an amazing range of emotions – by displaying almost none.

He likes to nudge against the limits of the tyre on entry to the corner and he needed steering with less sensation pollution. Once they understood what he was asking for, he was even better.

Mark Webber

THE DRIVER WHO WAS POUNDED into the ground by Vettel's blown-diffuser trick techniques in 2011 bounced back right to where he'd been in 2010 – a hard, hustling handful, flat through the fast corners, adrenalin pumping. He'd rather go beyond feasibility than accept anything less than more.

While the Red Bull RB8 was just like any other racing car into the first part of the season, Webber was absolutely as powerful a force as Vettel. Those victories in Monaco and at Silverstone showed Vettel what happens if he's off his game even just a little. Given the season

Mark had just been through, doesn't that just say everything about the competitive, combative spirit within? This creates problems in a Seb-centric team – but it's a great problem to have.

Team boss Christian Horner may have been unimpressed with Webber's leaning on Vettel into Turn 1 of the title decider, but what about the seven points the exact same attitude had taken off Vettel's title rival by catching and passing him at Silverstone? Combine Webber's spirit with Raikkonen's God-gift and what a driver that would be.



5th

Jenson Button

WHEN THE CAR AND HE ARE IN LOVE, in synch, each anticipating the other's every move and nuance, Button is untouchable, nuzzling up to limits out of reach even to those who can rescue miracles from disaster: Melbourne, Spa, the early drizzly stages of Interlagos.

But a racing car's not usually so cooperative, even in this simulation age. It usually requires a bit of cajoling, a bit of working around, some acceptance that it's not always going to be on exactly the

wavelength you like. When that happens he can lose the thread spectacularly, and the capricious traits of the Pirellis in the first half of the season, when people didn't understand them, caused him to get even more lost, spun him into a three-race sequence of oblivion.

But he got it back, and don't ever underestimate the steel fist beneath that purple velvet glove.

Three years, almost 60 races, as team-mate to one of the fastest of all time – and JB's record is comparable.



Sebastian Vettel

ALONSO AND HAMILTON MAY GO OUT of their way to let the world know they rate only each other and that Vettel is just a good driver in a great car, but he's rattled them into saying those things. Rattled them by his very acceptance that he's benefiting from being part of a very special partnership, shrugging his shoulders and smiling that sunny smile, saying he's very proud to be part of it. It's a reaction that's guaranteed to wind them up, surely – effectively saying: 'Yes, you're right. That's why I keep beating you and why I will continue to do so.'

He's every bit intelligent enough for that to be his actual belief. But to take advantage of what Red Bull provides him with still requires a pretty special

talent. He races exceptionally well anyway – look at that drive to second at Spa – but when the RB8 was induced to behave like the RB7 from Singapore onwards, he was able to conjure the tricks that went with that. He was able to use the on-throttle exhaust blowing to stand on the gas to stop the entry oversteer he'd induced with his speed, just as he'd been able to do through 2011.

In putting the pieces of a qualifying lap together built up over a weekend, building to a crescendo of perfection, he's perhaps the best in the business. If there are still a few flaws in his race game – a bit of over-emotion in times of stress perhaps – recall his age and the fact that he's still improving.

Lewis Hamilton

AN F1 CAR YEARS TO LET RIP through a top-gear blast, tons of downforce grinding it into the ground. Twists between the walls like those at the end of the lap in Singapore or Abu Dhabi feel too tight and restrictive for such a machine.

But Hamilton can make his car do tricks here, can cast a spell over it that gives him liberty to do anything he wishes. There is no-one else around who can even approach the level of acrobatics he can conjure around such places and if this is all F1 was – driving an F1 car like it was a 750bhp kart – then no-one else but Lewis would ever win a race.

This year he's combined that with the perfect balancing point of restraint and aggression in his driving, as dictated by the Pirellis, to maximise a great car. The dips and inconsistencies of 2011 were but a memory – though one he invoked at Spa – and once he'd made the decision about his future it was as if he just relaxed into the enormity of his natural gift and expressed himself even more freely.

There's a whole dimension called leadership missing from his game though. How else could a team not be dumbstruck that such a talent was leaving?





➔ P37 TEAM BOSSES

Fernando Alonso

A MAGNIFICENT WARRIOR'S campaign of season-long relentlessness, locking onto every half-opportunity and never letting go. It was as if pre-season he took on board the enormity of the task of going for a title with this car and realised he'd need to produce not just special, but sustained special.

With the possible exception of Valencia, there were no drives of the gods, but he scored 9.9 out of 10 in every department. In an off-the-pace car for the first four races of the

season, the chink of a chance arrived with a downpour on the Sepang grid and there was an inevitability about his rise to the front. With a half-decent car he produced the perfect qualifying lap in front of his adoring fans at Barcelona, transcending the car's level by about two rows.

In Monaco the car was driveable, but not particularly quick out of the corners or at the end of the straights – yet had he not been called in for his stop when setting purple sector

times he'd likely have won on raw and relentless pace. To have seen him at Tabac dancing between brakes and steering, a lot of initial lock, then less as he came off the brakes and gave the tyres more bite, and yet shaving the inside barrier by millimetres – every time – was to understand how the lap time was coming. These early races set the tone of his season and he maintained that throughout, inspiring and cajoling the team along the way.

1st

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F1 team principals' top 10

They inhabit a prat-perch twilight zone for 20 weekends a year, so which drivers do they rate? Here's the verdict from the men (and woman) at the top

THE PANEL



Christian
HORNER
Red Bull



Stefano
DOMENICALI
Ferrari



Martin
WHITMARSH
McLaren



Ross
BRAWN
Mercedes



Eric
BOULLIER
Renault



Frank
WILLIAMS
Williams



Bob
FERNLEY
Force India



Monisha
KALTENBORN
Sauber



Franz
TOST
Toro Rosso



Cyril
ABITEBOUL
Caterham



John
BOOTH
Marussia



Luis
PEREZ-SALA
HRT

With seven different winners from the first seven races - and Kimi Raikkonen making it eight victors in total - few seasons have delivered the driving quality in depth

that we witnessed in 2012.

AUTOSPORT's annual team principals' top 10 gets as close as possible to defining what the paddock heavy-hitters really think of the talent on show - they are the ones who get a closer feel than anybody for

the job being done by the men in the cockpit.

We asked principals of all 12 of the current teams for their top secret top-10 ranking of the best drivers of the grid. Not publishing these individual lists is important as the secrecy ensures a more honest appraisal from the bosses.

Instead, points are awarded like the F1 scoring system (25-18-15-12-10-8-6-4-2-1), with the results collated to deliver their definitive verdict on who were the best drivers of 2012.



1st
FERNANDO
ALONSO
269

▲ UP 2



2nd
SEBASTIAN
VETTEL
198

▼ DOWN 1



3rd
LEWIS
HAMILTON
177

▲ UP 1



4th
KIMI
RAIKKONEN
176

RE-ENTRY FROM '09



5th
JENSON
BUTTON
104

▼ DOWN 3



6th
MARK
WEBBER
66

► NO CHANGE



7th
NICO
HULKENBERG
50

RE-ENTRY FROM '10



8th
NICO
ROSBERG
30

▼ DOWN 3



9th
SERGIO
PEREZ
30

NEW ENTRY



10th
FELIPE
MASSA
27

RE-ENTRY FROM '10

PREVIOUS YEARS

*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

1. SEBASTIAN VETTEL	76
2. JENSON BUTTON	67
3. LEWIS HAMILTON	65
4. FERNANDO ALONSO	39
5. RUBENS BARRICHELLO	35
6= KIMI RAIKKONEN	30
6= 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



David Coulthard

Season review

13-time GP winner and 2001 world title runner-up

The AUTOSPORT columnist and BBC TV pundit gives his views on the best - and worst - bits of F1 2012

This year's Formula 1 World Championship was nothing short of remarkable. That Hollywood ending at Interlagos was the climax of an unpredictable season - a shame then that it was slightly tainted by that yellow-flag controversy a few days after the chequered flag fell.

Sebastian Vettel richly deserved his third successive championship, but Fernando Alonso would also have been a worthy champion if that final race had worked out in his favour. He showed admirable resilience, and has created a special aura as 'Fernando at Ferrari'. Lewis Hamilton was back to his best after his dip in form that we talked so much about in 2011, and Jenson Button showed that fantastic touch of his.

Kimi Raikkonen's comeback after a couple of years out was a big success, and we all loved that radio banter with his engineer in Abu Dhabi! We saw some great racing, super overtaking moves, and I think it was a season we'll remember in years to come.

A lot of people should be proud of the show that they created in 2012. Looking back now, there were lot of good stories, weren't there?

VETTEL'S TRIPLE CROWN

In the five years since his F1 debut, Sebastian has scored three world drivers' championships, which is an incredible achievement in such a short space of time. I only raced against Sebastian very briefly, so it's difficult to say how I'd judge him if I was racing him week-in and week-out now, but I think it's fair to say he's more liked than his compatriot Michael Schumacher was during his dominant period.

Red Bull's third consecutive constructors' title was also impressive.



Alonso and Vettel: this probably isn't post-Monza

Looking at the stats, a one-in-four hit rate of grand prix wins is mighty.

Red Bull struggled slightly at the start of the season, although still won the races in Bahrain and Monaco. It was nothing like the dominance of 2011, until the team hit that purple patch around the Singapore Grand Prix. Like with anything in life, if something is too successful then even hardcore fans of that team or driver crave some competition and battles.

From my media standpoint, it's not a great story if Sebastian and Fernando are friends having breakfast and playing pool together. While they weren't at loggerheads, like Piquet and Mansell were, you started to sense a flavour that wasn't vanilla between them. Monza was a good example; there's a bit of needle there.

You've got to look at Belgium and Japan as the races where the championship went away from Fernando. Spa was just one of those racing deals that you can't do anything about. At Suzuka, I can't see what else he could've done. I don't think he was actually trying to squeeze Kimi Raikkonen, but I also think Kimi should've realised Fernando wasn't going anywhere. All very unfortunate, and Alonso winning the championship in a Ferrari that was a long way off being the fastest car would have been an amazing story. He drove quite brilliantly with what he'd got.

NOT BAD FOR NUMBER TWOS?

When you look at Mark Webber and Felipe Massa, they were very much in the shadow of Vettel and Alonso respectively. You'd say Mark has the better chance of realising his dream. He's a fast driver, but you have to say Seb enjoys a psychological edge over him.

“Perez has to be quick to get his head around a new mentality”

Hamilton finished his McLaren career before heading to Merc



“When I finished at McLaren, it was more forced than Lewis”

I lived through a time at McLaren where I wasn't the chosen one, and with the benefit of hindsight I also realise that over the fullness of my career I wasn't as quick as Mika Hakkinen. When you're in your career, of course you don't see that.

In pace terms, there's probably not that much between them, but Mark didn't get the car off the grid very well, and has never won a race from anywhere other than the front row in his F1 career. When he's on form, like Monaco and Silverstone, he can have the dominant weekends. Why he can't do that every time? That's a question for him.

As for Felipe, he did a great job in the second half of the year to come back from nowhere and look like the driver he was prior to his nasty accident.

McLAREN FALLS SHORT AGAIN

It's remarkable that McLaren, considering the pace its car packed combined with its driver line-up, actually finished behind Ferrari in the constructors' championship. How do you work that one out when Massa didn't turn up for half the races?

The season was topped and tailed with wins for Button, in Australia and Brazil, and his new role as McLaren team leader for the future should help iron out any bumps in his performances. Jenson has shown Lewis-matching pace on occasions, and he's in a confident, happy place now after winning the last race of the season.

The last two years of Hamilton's McLaren career have been intriguing to watch. I thought we'd lost the Lewis that we saw challenging for the world title in his debut year - he grew up in the public eye and had a few things affect him from the personal side.

After a tricky 2011, he was a far more

solid performer this year. When the decision was announced regarding his move to Mercedes, whether it'll be for better or worse, it was like having the old Lewis back. It's going to be so interesting to see how that scenario develops as they fine-tune that organisation.

When my McLaren career ran its course, it was more of a forced-hand switch than the way Lewis has decided to leave a team that still wanted him. For me, they'd signed Montoya a year in advance, although he only lasted a year and a half before he buggered off and joined WeightWatchers! Lewis has moved on as a racing driver and he'll move on as a person, as he won't be so micro-managed to the point of being

advised what to say.

The other big McLaren news of 2012 was the decision to take Sergio Perez over Nico Hulkenberg. Were Perez's great results in that Sauber in Malaysia and Italy down to the car, and can he deliver the consistent results McLaren expect? He's got a huge learning curve ahead of him - wins will be expected, and even making the podium can be a disappointment. It's a different mentality to get his head around, and he'll have to be quick about it.

Arguably Hulkenberg would have been a safer pair of hands. Never mind what he did in Brazil, he was getting stronger and stronger at Force India as the season progressed. Looking at it another way, commercially you can say that McLaren has shaken the British tree, which might have precluded Paul di Resta, and the German tree has been pretty well shaken too. Mexico, on the other hand, is another market to tap into.

KIMI'S BRILLIANT COMEBACK

At the beginning of the year, it looked like Raikkonen was just easing himself back into it. He looked a little bit heavier than when he first arrived in Formula 1, carrying a wee bit more neck fat, and you certainly won't see him entering ▶

Raikkonen: DC had to be convinced on his comeback





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◀ any triathlons soon! I have to admit, I wasn't convinced, and that slight hesitancy in Bahrain probably cost him a race win early on.

Later in the year, he delivered some bloody good wheel-to-wheel racing. On reflection, he took a while to get that sharpness back, but that ballsy move on Schumacher at Eau Rouge put that one to bed. He finished every race, and only didn't score in China because of a poor tyre strategy. That consistency served him well, and his approach paid off.

His team-mate Romain Grosjean was making an altogether different F1 comeback, and his post-Spa ban made the most headlines. He came back looking like he was driving scared, but when you're involved in so many incidents it can't always be someone else's fault. I know Jackie Stewart made himself available to Romain, so I'm surprised to hear he didn't tap into that vast knowledge.

THE SCHUEY EXPERIMENT - #FAIL

I was chatting about this to Jenson the other day, and he thinks Michael still had the speed. Now Jenson may have more data to come to that conclusion than I have, but looking at the basics, comparing Michael to his team-mate is the key indicator, and it didn't look like that to me. Is Nico Rosberg slightly quicker than Michael at his peak? Maybe... but for me the more likely explanation was that Michael lost that great single-lap qualifying performance.

Will anyone notice Michael isn't there next year? Any more so than they didn't notice Jarno Trulli or Nick Heidfeld weren't there this year? Nobody is bigger than Formula 1, not even its most successful driver.

This was a defining moment for Rosberg to outpace and see off Schumacher, and take his first grand prix win in China. Now he's got another huge test with Hamilton coming into the team next year. Will he try to be the number one, or will he be number



Maldonado was strong, but how will he fare alongside Bottas?

“The Toro Rosso guys are both very good, or both very average!”

two to Lewis's speed? Let's see his results when the pressure is really on.

WILLIAMS BACK ON TOP

As ever in racing, stuff happens that can make things just drop into place for you. When Lewis was slung to the back of the grid at Barcelona, Pastor Maldonado was unleashed and drove away from the front, holding off great pressure from Alonso, and took his first grand prix win.

And after his most impressive moment of the year, a fine display of managing his pace and tyres, he proceeded to not score any points for ages! I know Frank rates his 2013 team-mate Valtteri Bottas very highly, and he actually mentioned he was in the Ayrton Senna-like category, which was a very bold statement.

AS FOR THE REST

Both the Toro Rosso guys achieved enough to get another year, but the only comparison we have is against each other. So we know they're either both very good, or both very average! I presume they're good, as they've made it to F1, and the stats suggest that Daniel Ricciardo is better at



Sportsmanship: Hamilton and Vettel in USA

getting the car further up the grid, but that Jean-Eric Vergne's a decent racer. So year two for them will either be their last in F1 or their springboard to greater things.

In terms of tail-end teams, I remember not making myself popular with them by saying F1 was all about quality, not quantity. This sport is a hell of a challenge even when you've got big funding, never mind building a team from a standing start three years ago. I admire what they've done, because you could argue it's harder work on a smaller budget to achieve what they do.

But when you can't score a point, even when they go down to 10th, it shows how bloody hard it is.

MY PERSONAL HIGHLIGHT

Being an old-fashioned sportsman, my highlight of 2012 was actually the etiquette displayed by Vettel when he crossed the line in Austin. He'd just been beaten, lost a race due to traffic, but you can see him clapping his hands towards Lewis after the chequered flag. That was a fine moment of acknowledgement that reminded me of my father telling me to always shake the hand of the winner, so if you win there will always be someone to shake your hand. I love that. ✘



Coulthard disagrees with Button on second-era Schumacher



Why do people hate Red Bull?

It's become the dominant force in F1 with a hard-working team and a triple world champion in the driving seat, but Red Bull still struggles to find favour in the sport. EDD STRAW investigates

Christian Horner has a stock response when Red Bull is criticised for sailing too close to the wind legally. It's a well-worn soundbite, polished through regular use. There have been countless variations on his mantra that "success inevitably leads to criticism" that don't bear repeating here.

It's a legitimate point, for while others are criticised for underachievement, Red Bull is the victim of barbs, both public and private, from its rivals. Then again, glance back over the past couple of decades of F1 and it's hard to find a title-winning team that hasn't received similar treatment.

That is not to say that Red Bull is automatically exonerated. You often hear rival teams commenting about alleged 'stretching' of F1's resource-restriction agreement. But in an era where clever interpretation of the wording of rules is the battleground for innovation, that should hardly be a surprise. The key moment came in 2009, when Adrian Newey was astonished that the double diffuser was allowed, a concept that only worked thanks to a very dubious, but technically acceptable, definition of what is or isn't a hole.

But as Red Bull is the dominant force and lacks the racing heritage that makes Ferrari and McLaren so popular, many fans still appear to dislike F1's leading team. You still see 'anyone but Red Bull'

banners displayed in the grandstands at some races. From a distance it would appear that everyone hates Red Bull.

But it's unfair to run down Red Bull's success, for Horner and Newey have built a team up from laughing stock (in its Jaguar days) to the point where it's behind only Ferrari, McLaren, Williams and Lotus in terms of achievement. But during the season it has become engulfed in plenty of controversies.

MONACO FLOOR

In the build up to the Monaco Grand Prix, rumours started to circulate about a possible protest against Red Bull concerning slots in the floor of the RB8 just ahead of the rear wheels.

Ferrari, McLaren and Mercedes led the questioning of the design, which offered a small advantage in performance by allowing air to energise the underfloor and the diffuser. Those three teams, and in fact most rival teams, believed that it infringed Article 3.12.15 of the technical regulations, which did not allow "fully enclosed" holes in the floor. For while both Sauber and Ferrari ran similar holes, a tiny slot extending from the edge of the hole to the edge of the floor allowed them to argue that they were slots, not holes.

No protest was lodged against race winner Mark Webber, although FIA technical delegate Charlie Whiting did force Red Bull to change the design

ahead of the Canadian GP. But it is understood that Red Bull had run its design past Whiting before Monaco and had it approved. So while rival technical directors struggled to understand what Red Bull's justification was, the fact that Whiting initially had no issue with it means it cannot be considered to have done anything wrong.

And as rival teams refused to protest at Monaco, apparently because they did not want to risk discrediting Formula 1's blue riband race, the case against the team couldn't stick.

CANADA RIDEHEIGHT

During the Hungarian GP weekend, it emerged that Red Bull had been ordered to remove the capacity to adjust rideheight by hand at the Canadian GP earlier in the season.

"It was something that could either be changed by hand or by tool, but the FIA said they preferred it was a tool that was used," Horner told AUTOSPORT's Jonathan Noble. "We never changed the rideheight in parc ferme or anything like that. It really is a non-issue."

But it wasn't a non-issue. And the reason was simple: the above quote sounded a lot like an admission that the car had been explicitly in contravention of the rules, specifically Article 34.5 of the Sporting Regulations, which read: "In order that the scrutineers may be completely satisfied that no alterations have been made to the suspension systems or aerodynamic configuration of the car (with the exception of the front wing) whilst in post-qualifying parc ferme, it must be clear from physical inspection that changes cannot be made without the use of tools."

Horner confirmed that it could be changed by hand as well as tools, which appeared to break the rules. Certainly, Ferrari took a particular interest in this admission and there were suggestions that it would challenge Red Bull legally, something that has not come to pass. But despite that, there is no evidence that Red Bull took illegal advantage of this adjustability. ▶



What's Sebastian Vettel doing to his Red Bull in parc ferme?

Vettel and Newey: winners on track but not in popularity stakes

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ENGINE MAPPING

At Hockenheim, during the German GP weekend, the FIA stewards summoned Red Bull Racing after technical delegate Jo Bauer concluded that the torque maps being used were not legal.

His statement read: "Having examined the engine base torque map of car numbers 1 and 2 it became apparent that the maximum torque output of both engines is significantly less in the mid rpm range than previously seen for these engines at other events. In my opinion, this is therefore in breach of Article 5.5.3 of the 2012 Formula 1 Technical Regulations as these engines are able to deliver more torque at a given engine speed in the mid rpm range. Furthermore, this new torque map will artificially alter the aerodynamic characteristics of both cars."

The engine map being used was designed to get the best out of the exhaust-blowing effect and the feeling was that the relationship between throttle pedal position and torque demand was not linear. The stewards, however, were eventually convinced that it was legal, although took the unusual step of revealing that they "do not accept all the arguments of the team".

Prior to the next race in Hungary, the FIA clarified Article 5.5.3 of the F1 technical regulations, giving teams a limited amount of adjustments to the engine torque map race by race. Teams were required to nominate one map as a reference, which had been used during the first four races of 2012. Based on that, the engine torque curves above 6000rpm could not vary from that by plus/minus two per cent.

That bottom line is that Red Bull had been cleverer than its rivals. As Adrian Newey has often said: "there is no such thing as the 'spirit of the regulations' regulation" and Red Bull had again found a clever interpretation that put its rivals in the shade.

THE CONTROVERSY THAT NEVER WAS

IN THE WAKE OF THE INTERLAGOS

season finale, claims did the rounds on the internet that Sebastian Vettel had overtaken Jean-Eric Vergne under yellow flags on the fourth lap. He quite simply hadn't, demonstrably so, for after passing a flashing yellow light covering Pastor Maldonado's stricken Williams at Turn 3, he then passed a marshals' post where a green flag was being waved. He passed this a good five seconds before passing Vergne. There was no transgression, and there were not even good grounds for suggesting that there was, hence there was no reason for an investigation on the day.

Ferrari stoked the fire by asking the FIA to clarify that the manoeuvre was



Vettel stopped out on track at the end of Abu Dhabi GP qualifying

ABU DHABI FUEL

There were all sorts of conspiracy theories doing the rounds after Sebastian Vettel stopped on track after qualifying third for the Abu Dhabi GP. A stewards' investigation led to him being, quite rightly, excluded from qualifying for having insufficient fuel available for a full one-litre sample and sent to the back of the grid.

There was some puzzlement that the stewards accepted Red Bull's initial claim of force majeure, but once you understand the sequence of events it makes more sense. In Austin, Charlie Whiting explained that it was, most likely, the consequence of Red Bull making a simple mistake when fuelling the car.

"The process that the stewards

followed was firstly to establish why the team stopped the car," said Whiting. "We had the data to show that the fuel collector had got very low and they turned the engine off because they were worried about running the pumps dry. They thought there was a pick-up problem. The stewards accepted the fact that the engine was stopped to avoid failure. At that point in the investigation, the stewards were satisfied that it was force majeure.

"The next stage was to see if there was any fuel in the car and there wasn't. Force majeure became irrelevant because there wasn't a litre in the car."

While the result was the same as McLaren suffered in Spain, where Lewis Hamilton was excluded from qualifying after taking pole, the course of the investigation was very different. The stewards at no point accepted a force majeure claim from McLaren as the team admitted to sending the car out in the knowledge it didn't have enough fuel after a garage blunder. Red Bull's mistake was similar, but at the time the car was sent out, the team was apparently unaware of the problem.

Put this one down to a mistake, rather than anything more nefarious.

IN CONCLUSION

Every F1 team pushes the limits of the regulations. If Red Bull is pushing them further and harder than the rest, then that's the nature of competition in grand prix racing. Until such time as any of the charges stick, the team remains in the clear. That's the line that every F1 team dances on. It's just that Red Bull is the best at it in contemporary F1. ❄



Horner chats to rival team boss, Ferrari's Stefano Domenicali



McLAREN: WHAT WENT WRONG?

Having started previous seasons badly, McLaren had arguably the quickest car from the word go in 2012. So how did it again miss out on both titles? JONATHAN NOBLE investigates

Mclaren managing director Jonathan Neale drew a breath and looked ahead to the 2012 season. "We need to start next year quick," he said. "We're showing that we can outdevelop and stay close to everybody. We've consistently won races, we're consistently on the podium, but we don't win championships enough and that's a frustration. We've got to get out of the blocks."

Heading into the campaign, there was a widespread feeling within McLaren that if the MP4-27 could start the year as the pacesetter, then the team's history of strong development would help maintain its advantage all the way to title glory.

In other words, it was about rolling into Melbourne with the car that was the class of the field.

After all, before the 2011 season McLaren had endured one of the worst winters in its history. Only a last-minute change of exhaust concept helped it get anywhere near Red Bull, which it then managed to stay close to for most of the season. Imagine what would have been possible if, rather than being a few tenths behind all the time, the team had been in front from the start...

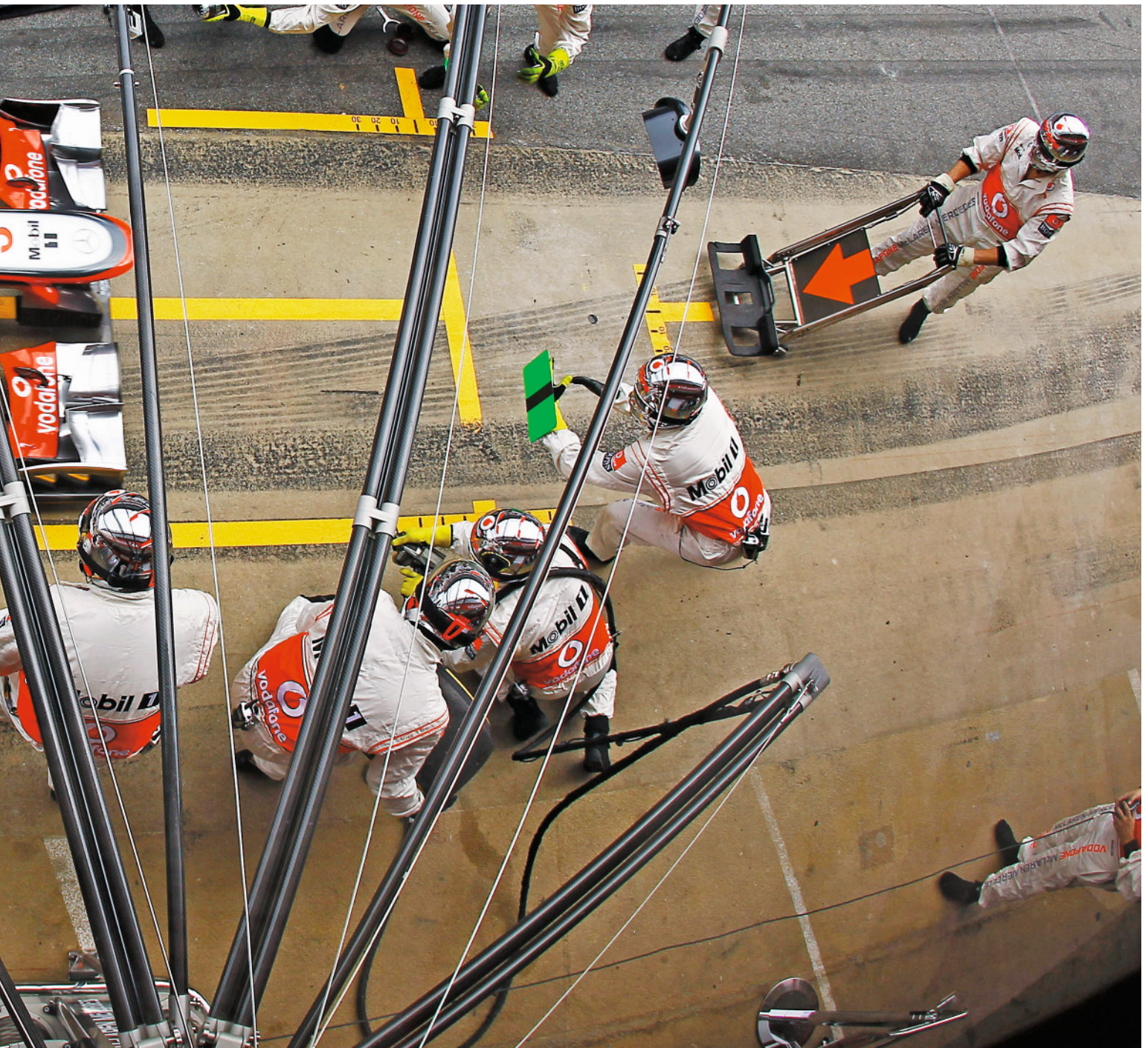
So when Jenson Button and Lewis Hamilton locked out the front row of the grid and delivering a one-three finish in Australia this year, and followed that up with another front-row sweep in

Malaysia, it seemed like mission accomplished for the Woking team.

Here is what bullish team principal Martin Whitmarsh said about McLaren's title prospects in Australia: "We can win this if we improve the car at a quick enough rate. We've got two fantastic drivers and a strong team, and now it's up to us. We're starting from the right place."

Little did it realise at the time, but as McLaren left Sepang it was heading towards frustration rather than elation. Yes, there would be more wins, but never again would McLaren deliver as big a points haul as it had in Australia, and there would be just two more front-row lockouts in the last 18 races.

Looking back now, the warning bells



were already ringing in those first two races, for two key factors had already burst into the spotlight.

Firstly, McLaren's operational qualities at the start of the campaign were not as strong as they needed to be. What should have been a straightforward one-two in Melbourne slipped from its grasp when a decision to pit Button and Hamilton together at the second stops backfired as a safety car came out, allowing Sebastian Vettel a free chance to slip between the two silver cars. In Malaysia, Hamilton was left frustrated by a botched pitstop, and it wouldn't be the last time he was hurt like that.

Secondly, Malaysia showed that, while the McLaren was almost certainly the

fastest car in the dry, in the wet Button could not get sufficient heat into his tyres. That complaint would recur time and again over the season.

Over the first half of the campaign, the pitstop/garage/strategy and tyre-temperature issues effectively negated all the hard work that McLaren's design department had put into the MP4-27.

There would be more pitstop problems (Button in China; Hamilton in Bahrain), plus the famous fuel issue in Spain that cost Hamilton pole position and an almost certain win.

At a time when Button's season went off the rails through a wrong direction with car set-up - he scored two points in a four-race spell from Bahrain to Canada

- McLaren had lost any chance of building up the momentum it had hoped to over the course of the campaign.

Yet the game was not up...

MID-SEASON RECOVERY

While the doom-mongers were ready to write off the whole campaign, the middle phase of the season produced two decisive weekends that, although they did not deliver a win, provided evidence of a turnaround in form.

The first sign of progress came at the European Grand Prix, even though the team has, for some reason or other, always struggled for pace in Valencia.

What was then a record-breaking pitstop showed that McLaren could be ►

◀ inspired in this area, but offset against this was a poor first stop for Hamilton, when the front jack failed.

New sporting director Sam Michael had taken a fair beating in the press over the first half of the campaign as pitstops were under his jurisdiction. He knew that McLaren needed to up its game on the pitstop front and he had to push the crew and the equipment to the limit. That's why the mistakes happened.

"We're in a world where we're dealing with milliseconds, rather than tenths," says Michael. "It's as competitive as the aero game now."

On track too things were getting better. At the German Grand Prix, McLaren introduced a major update that helped lift the car's performance. While the wet weather at Hockenheim did not allow the MP4-27 to show the full extent of its pace, a run of three successive race victories in Hungary, Belgium and Italy did.

As the team arrived in Singapore, there was every belief that another triumph there would put Hamilton well on course for the championship. The car was strong, the pitstop issues appeared to be a thing of the past, and the team was fully on top of tyre understanding.

EARLY RETIREMENT

Yet another - and perhaps the most devastating - negative factor of all reared its head on the streets of the Marina Bay circuit: reliability.

The failure of Hamilton's gearbox cost him a potentially key victory. And, coming just a fortnight after Button was stopped at Monza with a fuel-tank issue that had cost the team another chance of a one-two, it was a harsh reminder that having a quick car is not enough.

There was worse to come. Just as Red Bull got into its stride with the RB8, time and again McLaren found its efforts thwarted by unexpected trouble: there was Hamilton's suspension problem in qualifying in Japan; a rear anti-rollbar failure for him in South Korea; a fuel-pump failure that cost another victory shot in Abu Dhabi.

By the time Hamilton took a stunning victory in United States, it was all too late for the championship.

HAMILTON TITLE SHOT LOST

Looking back at the season as a whole, McLaren's campaign was effectively derailed by three key moments: the fuel issue in Spain; the gearbox in Singapore; and the fuel pump in Abu Dhabi. Three

NO TITLES, BUT A LONG LIST OF WINNING YEARS

McLaren has won just two drivers' championships (Mika Hakkinen in 1999 and Lewis Hamilton in 2008) since its last constructors' success all the way back in '98. Yet in that period it has an enviable record of being among the frontrunners each year. It has only finished outside the top three in the constructors' table once in the past decade.

Here is how McLaren's win tally each year stacks up against the eventual champion, showing how competitive the team's cars have been even though titles have been elusive.

McLAREN WINS/ POSITION	CHAMPION TEAM'S WINS
2012: 7 (3rd)	Red Bull: 7
2011: 6 (2nd)	Red Bull: 12
2010: 5 (2nd)	Red Bull: 9
2009: 2 (3rd)	Brawn: 8
2008: 6 (2nd)	Ferrari: 8
2007: 8 (DSQ)	Ferrari: 9
2006: 0 (3rd)	Renault: 8
2005: 10 (2nd)	Renault: 8
2004: 1 (5th)	Ferrari: 15
2003: 2 (3rd)	Ferrari: 8
2002: 1 (3rd)	Ferrari: 15



McLaren was quick in Malaysia, until it got wet



McLaren pit crew came under focus after dramas



Hamilton was victim of first-corner Spa Shunt

PICS: COATZ/FERRARIPOLTA

almost certain victories gone.

With an extra 75 points on his tally (plus deduct points from his rivals), Hamilton would have gone into the season finale in Brazil with a shout at the title - and with the most competitive car on the Interlagos track. In such a scenario, he would likely not have got himself so involved with Nico Hulkenberg.

One area where McLaren could not lay any blame this year was on Hamilton. Bar getting tangled up in that unnecessary clash with Pastor Maldonado in Valencia, he was as flawless as could be throughout the campaign.

At his peak, you could argue he drove better than even Sebastian Vettel and Fernando Alonso. His fantastic wins from behind in Canada and the United States were from the top drawer.

It was perhaps only his ongoing frustration about lost opportunities at the team that played on his mind: cue the early-season radio critiques of the team and that Twitter outburst at Spa over the wrong wing choice.

And although he wouldn't say it at the time, perhaps it was the gearbox failure in Singapore that ultimately proved to be the final nail in the coffin of his

McLaren career. If the team had squandered a title chance in the year when it had the quickest car, what hope was there for the future?

Although McLaren's run of late-season reliability issues would point to a big problem, those on the inside at the team think events on track did not paint the true story of what happened, and that the MP4-27 was actually one of the more reliable cars.

"It's just a matter of chance really," says technical director Paddy Lowe. "If we analyse the total mileage of this car and the number of faults that either did or would have stopped you in a race, this car has been the most reliable since I started recording it.

"It doesn't feel that way because so many of those problems have occurred in actual races when we've been in the lead, for instance. But that's the way the dice have fallen - and all the retirements were unrelated.

"If you have a chronic issue, you can go and address that one thing. And the things that have just happened are unlikely to happen again.

"We have improved it - although it doesn't look like that or feel like that, so we just have to keep getting better."

Michael nevertheless agrees that it was the reliability factor that proved most costly. "You can't do it unless you're reliable," he says. "We will get there.

"We need a quite impressive development programme to make sure we develop hard over the winter. All the faults we've had, we have processes, systems and people in place to make sure we don't have those issues again.

"We never stop learning. The world changes, the regulations change, people you work with change - some of it never stops. The team has made good progress over the past 12 months and we expect a step change for next year."

McLaren had plenty of reasons for soul searching this year: what if those reliability issues had hit only in free practice rather than races? What if that blunder with the fuel in Spain hadn't happened? Would Hamilton have made a different decision on his future if the car had delivered the win in Singapore?

"In motor racing you can't look back like that," says Michael. "Looking back just gives you a stiff neck."

So now McLaren will look forward, knowing painfully that, in F1, even getting out of the blocks fast is not enough. ❁



Raikkonen and Lotus return to the front

Two great names with a big history returned to the top step of the podium in 2012 and there could be more to come. EDD STRAW speaks to the engineers behind Kimi Raikkonen and Romain Grosjean

Kimi Raikkonen dusted the gravel off his overalls, washed the mud off his shoes and strode back into Formula 1 after two years sliding around in the World Rally Championship. Harnessed to the revival of the team we used to know as Renault and Benetton as a race-winning force, it was deservedly one of the stories of the 2012 season. But amid the controversy that engulfed team-mate Romain Grosjean, it's easy to forget that for much of the season, the pseudo-rookie in the second Lotus gave Raikkonen a very hard time.

So much so that for over half the season, Lotus might have wondered if the secret to success would be to hand Grosjean Raikkonen's helmet and send him out in car number 9 to qualify on his behalf.

In the final reckoning, qualifying was almost even between the pair, with Grosjean shading it 10-9. But in the 11 races that preceded the August break, the Franco-Swiss half of the garage bossed the intra-Lotus driver battle, winning 7-4.

The final race before the summer break - at the Hungaroring - was a classic example of what we saw several times in the first half of 2012. Raikkonen qualified 0.364s off Grosjean, lining up fifth. By the end of the race, the Finn was pressuring leader Lewis Hamilton. Had he started second, where Grosjean lined up, in all probability Raikkonen's first comeback victory would have come earlier.

That's not a big criticism of Raikkonen, who inevitably had to reacclimatise to F1 after two years away from grand prix machinery. But the dynamic between the two Lotus drivers creates a fascinating framework to analyse their campaigns.

Mark Slade was Raikkonen's race



Kimi back on top: the Finn guzzles the booze

engineer at McLaren and rejoined the Enstone squad this season to work with the 2007 world champion.

"He had to learn to deal with the Pirellis this year," says Slade. "They are quite different to the tyres he's used in the past and it took him a little longer than he perhaps anticipated to get his head around them. To some extent, he's had to resist his natural urges to drive the way he's used to driving, and I also think he's taken quite a cautious approach. He's hardly had any incidents all year, which is unusual for him to be honest! But that just indicated that his mind is firmly set on achieving as much as he can and making sure he brings the points home. That approach is why he's third in the drivers' championship.

"The other thing that strikes me is the lack of testing. Kimi used to do a lot of tyre testing and that used to be very useful for refining qualifying and long-run techniques. Despite the fact that he's very experienced, the fact that we don't have that anymore has got to have some impact when you're trying to learn new tyres and a new team.

"Kimi's driving style is relatively light on

the tyres, particularly the fronts. There have been some races where we haven't managed to get the front tyres into the working window, where Romain has done. That has accounted for maybe four of the races this season where he [Grosjean] had an edge on one-lap performance.

"Kimi has also had a lot of development work to contend with on Fridays, and that is going to have an impact on how the rest of your weekend goes. It's fair to say that hasn't always gone as well as we'd like, so you have to factor that into some of the qualifying performances. I'd say he's done well under the circumstances."

Certainly, Raikkonen's long-run technique seemed to be the strong point early in the season, or at least it was after a disastrous Chinese Grand Prix, where he was up in second place but plummeted to 12th in just two laps after his tyres 'fell off a cliff'. That experience banked, his tyre management and race pace were generally impressive from then on. For Grosjean, the situation was reversed. His qualifying pace was astonishing at times, notably in the Melbourne season opener, where he lined up third.

"It was a huge learning process because Romain is much less experienced than Kimi," says Grosjean's race engineer, Ayao Komatsu. "In winter testing, his speed was very good, but he struggled on the long runs with looking after the tyres. But he's very intelligent and, when you go through the data with him, his understanding is very good so he kept making good progress. [In the final third of the season] I didn't have many worries about him looking after the tyres."

But it's clear that it wasn't only experience that played a part in the differences between the pair. Raikkonen and Grosjean have slightly differing driving styles that meant that they were looking for different things from the car. This played a part in Raikkonen chasing power-steering that gave him more accurate feedback for a big part of the year.

"The fact that they have differing styles sometimes highlights where the issues actually are," says Slade. "If one drives in one way, one in another and one is having a problem, it can help us to learn. If both drivers were driving the same car in the same way, maybe you'd get stuck in a rut. ▶



Komatsu (left) with his charge Grosjean



Raikkonen scored seven of the Lotus podiums

LOTUS'S 10 PODIUMS

BAHRAIN 🏆🏆
Raikkonen challenges Vettel's Red Bull for victory. The Finn finishes second ahead of Grosjean, the team's first appearance on the podium in over a year (when it was Renault).

SPAIN 🏆
Raikkonen finishes within four seconds of surprise victor Maldonado after a final-stint charge as Lotus again shows strong race pace.

CANADA 🏆
After a difficult weekend, Grosjean surges to second in the final stint thanks to strong tyre strategy, earning his best finish in F1.

EUROPE 🏆
Grosjean is running second when he drops out with alternator failure, promoting Raikkonen to second place behind Alonso.

GERMANY 🏆
Raikkonen struggles in a wet qualifying, but the Lotus's race pace is again impressive. Finishes fourth, and is promoted to third after Vettel's penalty.

HUNGARY 🏆🏆
Grosjean lines up second on the grid and finishes third. In the race, Raikkonen come from further back to harry victor Hamilton to the flag.

BELGIUM 🏆
Hopes are sky-high heading to Spa and, even though Lotus doesn't live up to expectations, Raikkonen still starts and finishes third, losing second position to Vettel on-track.

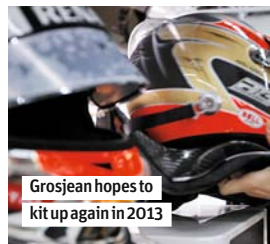
ABU DHABI 🏆
Raikkonen looks to have the pace to fight everyone except Hamilton. The McLaren's demise promotes him to first and lays the way for victory.



Grosjean had a fine run in Canadian GP



The Lotus E20 brought Enstone to the front



Grosjean hopes to kit up again in 2013



◀ So I don't think it's a bad thing at all. "Kimi has always had a different style to many other drivers. Ideally, he would like a certain degree of feedback and a certain degree of sensitivity that allows him to react as quickly as he would like to. He has particularly fast reflexes and likes to drive on those. The most obvious comparison I can make is with Juan Pablo Montoya, who was incredibly aggressive with the wheel. Someone who drives like that doesn't necessarily require much feedback in the corner. For Kimi, it's a more reactive process, so if the steering is giving him either insufficient information or inaccurate information, it causes a little reduction in his ability to respond.

"With power-steering, if you get a huge amount of phase lag in it, you can give completely the wrong message. If the driver is holding onto it through the corner, not anticipating to be as close to the edge on front grip, he doesn't necessarily need that sort of response, but Kimi does. That's the way he has driven from day one and it has always been a difference between him and his team-mates."

Grosjean certainly falls into the camp of drivers who don't need that sensitivity. Instead, his problem was with getting the car to feel right under braking to allow him to pull off that aggressive turn-in style, something he found harder in the second half of the season.

"Romain is more predictable than Kimi, so as long as the feedback is consistent he's not really worried about it," says Komatsu. "He's much more sensitive to the braking of the car. We don't have many tyres during the race weekend so that's a moving target with tracks changing, grip levels changing, and the tyre-operation conditions changing. Sometimes, during qualifying, we had a car set-up that he was happy with under braking, but as we took the fuel out he was a bit more on edge."

But these differing styles don't add up to a significantly different overall set-up. Certainly, neither Slade nor Komatsu believes there's much to the idea that in the first half of the year, Grosjean's set-up was better suited to qualifying and Raikkonen's to the race. There's no

ENSTONE'S FOURTH COMING?

Lotus has made great efforts to promote the heritage of the team this year. But that's not based upon its famous name, it's based upon the desire to remind everyone about just what this team has achieved since coming into Formula 1 back in 1981.

What is generically called 'the Enstone team' entered F1 as Toleman, and its fortunes have ebbed and flowed over the years. In 1986, with potent BMW turbos, Gerhard Berger heralded the new era of the team as Benetton with a stunning victory in Mexico. That established the team as a competitive runner and occasional winner.

In 1994 the squad had its second coming, emerging as a genuine world championship-winning force. With Michael Schumacher, Ross Brawn and Rory Byrne, the team won two drivers' and a constructors' title before slipping down the order after they all left.

Renault acquired the team in 2001 and, with Fernando Alonso, it enjoyed another two glorious years in 2005 and '06, winning back-to-back double titles.

Two years ago it seemed that Enstone was back on the path to recapture the glory days with Robert Kubica. But after a difficult time in 2011, losing him to a rally accident and then struggling with a forward-facing exhaust concept that was innovative but proved a developmental cul de sac, it is now on the brink of something big.

Team principal Eric Boullier insists the target is for Lotus to re-emerge as a title-challenging force. This year, it finished a feisty fourth in the championship and won its first race since 2008. Under James Allison and Alan Permane, it has strong technical and engineering leadership which, combined with the re-emerging Raikkonen as team leader, could still be on the up.

reason why, for example, Raikkonen couldn't have replicated his team-mate's qualifying performance, and Grosjean the other car's race pace.

"The mechanical set-up of the car is probably not massively different," says Slade. "Some of it is on the control-systems side of things, where at times we have run quite different set-ups in terms of KERS management. That's down to the finer details of how the driver wants the car to feel at a given moment around the corner. The difference is more than the amount of front wing or anti-roll bar. It really is that subtle, but it's so important that if they swapped cars you would probably find quite a big change. A lot of it comes down to the Pirellis, which are quite sensitive. Subtle things can be quite significant and on the control-system side of things, you can make big gains or losses."

Komatsu concurs: "I completely agree. Because it's so sensitive and they have slight differences in set-up, if you give

them exactly the same set-up, one guy might be just about getting into the working window and then the other might be just out."

With a season's experience banked, the Lotus/Raikkonen/Grosjean combination has potential to be even stronger in 2013 - provided, of course, the Franco-Swiss driver stays on after hitting a few too many things this season. Both race engineers believe that there is more to come.

"Going into a second season with tyres that are relatively similar, I suspect you'd see a relatively big step forward in terms of how we approach it," says Slade. "There is still time to come and Kimi will get the maximum, or near-maximum, out of it."

Of his charge, Komatsu says: "There is still a reasonable amount of time to come. He's new to the team, new to the tyre, new to the racing so we are quite often reacting to problems rather than anticipating. If you are reactive, you are one session behind. All that information will be useful for next year." ❄

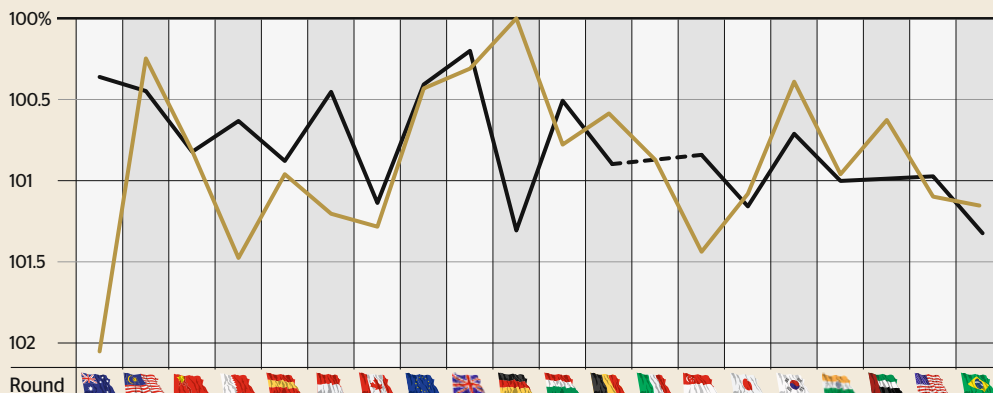
A bit too much of this from Grosjean cost him points



RAIKKONEN VERSUS GROSJEAN

On average, Romain Grosjean's raw pace was fractionally quicker than Kimi Raikkonen's in 2012. Raikkonen's best lap of a grand prix weekend was, on average, at 100.890% of the fastest. Grosjean, by comparison, managed 100.794%.

— Kimi Raikkonen
— Romain Grosjean



PICS: BELLANCA, ETHERINGTON, FERRARO/LAT

Hulkenberg takes his second chance

Many felt Nico Hulkenberg didn't deserve to drop out of F1 last year. He proved them right with some starring performances in 2012. By ADAM COOPER

A Formula 1 driver is only as good as his last race, and Nico Hulkenberg could hardly have signed off the 2012 season in more spectacular fashion.

At Interlagos he seized his moment in the greasy conditions and joined Jenson Button as one of only two drivers able to stay out on slicks in the opening part of the race. Ultimately he blotted his copybook when he made contact with Lewis Hamilton, but nevertheless he was up there leading and taking on both McLaren drivers with a Force India - and looking like he was born to do it.

The performance came as no surprise to anyone who has followed Hulkenberg's career. On his way to F1 he won everything in sight in Formula BMW, Euro F3, A1GP and GP2, and as a result he has one of the best CVs of any driver in the pitlane.

But what he hasn't done thus far is convince one of the top teams to take him on, and instead after spells with Williams and Force India he moves to Sauber for 2013.

The new arrangement is widely seen as a holding camp on the way to Maranello. It's an easy assumption to make, although the reality is that more drivers have graduated from Sauber to McLaren than to Ferrari. Nico himself plays down the connections.

"I don't know, to be honest," he

insists. "What I've done with Sauber is a standalone deal, and what will happen in the future, I don't know. It's written in the stars, and we will see. It all depends obviously on how successful you are and how things develop."

Along with team-mate Paul di Resta, he was also a serious candidate for the McLaren seat that ultimately went to Sergio Perez.

"It's always nice and sounds rewarding if you get linked to top teams and if you have contact with them. It's a positive thing; it shows that you've done something right."

Hulkenberg spent this season locked in a fascinating battle with di Resta, and it's probably fair to say the fact they were so closely matched made it hard for either man to stand out.

"It's been intense and it's been close, but it's a good thing, obviously," says the German. "When we push ourselves we push the team forward at the same time, and I've enjoyed the battle."

Hulkenberg eventually got the upper hand as di Resta hit problems over the last third of the season. Indeed, one key McLaren source admits that had the team been making its choice now, Nico would have had a much stronger claim.

It was perhaps inevitable that, after a 2011 confined to Friday FP1 sessions, it would take him a little time to gain momentum.

"I always knew going into the year that

HULK v DI RESTA	
Qualifying	
12	8
Points	
63	46
Best qualifying	
4th	6th
Best finish	
4th	4th



the first couple of races were going to be a bit more challenging and difficult, because of course after being out for one year you can feel that you're a bit rusty. Every now and then you can feel it's not how it's supposed to be.

"But really from the European season onwards, and especially the second half, I just felt it was getting better and better. I was learning and learning, and just improving the feeling in the car and how to work with the team, gaining more confidence and getting comfortable. That was also reflected in the results."

Given that he was winning in A1GP as long ago as 2006, it's hard to believe that Hulkenberg is only 25. And he's still getting better.

"I'm older and more experienced, and that's very important in F1. To drive these cars is tricky, and the more experience you have, that will help you to a certain level. I can feel that now: starting at the beginning of the year to where I am, everything I've learned, I've progressed. It's a massive difference."

He's now heading to his third midfield F1 team. Others, like Hamilton or Sebastian Vettel, have been lucky enough to go straight to the top in their first or second seasons.

"That's how it is," says Hulkenberg. "We have a lot of good drivers in F1, a lot of world champions. If you take Jenson's case he was in a relatively uncompetitive car for many years, and the opportunity came around the corner for him. Lewis and Sebastian are quite unusual, I think. You need to be patient, and you need to earn the opportunity as well."

Hulkenberg has a commendably level-headed approach. That year spent on the sidelines as a third driver taught him a good lesson.

"It makes you value it a bit more," he admits. "Obviously, it's pretty harsh and sad and disappointing when you have the car in the first session and you get changed and see someone else stepping in, when you think that you deserve to race as well."

"I don't want to talk about it too much because it's all behind me now. I'm not looking backwards - I'm looking forwards." ❄



Hulkenberg starred in Brazil... until he walloped Hamilton



RISING STAR REFUTES 'SIDEWAYS' MOVE

Peter Sauber had mixed feelings watching the Brazilian Grand Prix unfold. On the one hand, his team's new signing was proving his worth, but on the other, there was a serious danger that Force India could earn enough points to deprive the Swiss team of sixth in the world championship.

In the end it didn't happen, but the situation underlined the fact that Hulkenberg's move appears to be a sideways one. The man himself doesn't see it that way.

"They had a very competitive car this year, that's for sure," says Nico. "Otherwise you will not score four podiums. I think on many occasions they have been quite unlucky as well, they could have had even more points than they have. We had to fight against them in many races, and obviously F1 is a performance-driven sport.

"They've shown that they've been competitive this year and I hope we can continue that next year. It's going to be a new season, everybody

brings new cars, and at this stage who knows who's going to be where? For sure we want to be competitive and battle for good results."

What Hulkenberg does have at Sauber is the chance to seize the opportunity to be a clear team leader alongside rookie Esteban Gutierrez, although he downplays that opportunity. "We have equal status. He's my team-mate and I want to beat him and he wants to beat me; that's the situation."



DIRECTING THE WILLIAMS REVIVAL

EDD STRAW talks to Williams technical director Mike Coughlan, the architect of the team's re-emergence as a race-winning force in 2012

PIC: DUNBAR/LAT



Mike, you joined Williams as chief engineer in June 2011 before taking over as technical director in October. What had to change to make the team successful and what was already right?

To be honest, I didn't dwell on what was done before or on the 2011 car too much because Sam [Michael, the previous technical director] was still here. We set some aggressive aerodynamic development targets, and I put some things in place that were important in terms of car architecture, suspension geometry and stiffness targets. What was apparent was that Williams as a company had invested very wisely in previous seasons and had everything in place to be a top team. There were several things wrong with the old car that were obvious. The major one was exhaust blowing.

So it was about natural evolution rather than any dramatic changes?

Absolutely. Adam [Parr, ex-Williams chairman] brought in Jason [Somerville as head of aerodynamics] and Mark [Gillan as chief operations engineer],

but I didn't change the structure at all. Ed Wood is still here as chief designer. But it became obvious that there had to be a process put in place for the designers. We have a design review every day from nine o'clock until 10 on different areas of the car. I made it clear to people that this review was not to go through the detail, but was the mechanism by which they convinced me that they are doing the right thing. Jason has brought his group on tremendously well. He's different to the old regime. He's more inclusive, he tries to inspire, he tries to be more innovative. So he takes a lot of credit for the performance of the car.

How far advanced was the 2012 car when you came in?

It was very early. Don't forget it was June time and we had to wait for the rules on exhaust blowing to settle, as that is fundamental to the car architecture.

Mark Gillan has said that you give extremely clear technical direction. How would you describe your style?

Through the years, I've grown to realise

what is important. I don't aim to win every battle, I just say, 'This is what I want. I don't care how you get there; this is what it must meet.' I prefer to set a target weight, a target stiffness, a target time to change something. But generally, you're far better off having a direction and just getting on with it, even if you only get 98 per cent of the performance available. I'd like to think that I leave clear instructions. I rarely get cross with people. I work hard and I expect my people to work hard.

That suggests things at Williams were fundamentally working?

Yes, we did a lot of things very well. KERS is an example. Fundamentally it was a good approach. There were some small detail things that needed to change and I gave them some targets. I would say that we have an industry-standard KERS unit today. The best of the breed.

Williams hadn't won a race since 2004, so did it surprise you to end that drought in Spain just five races into this season? ▶

◀ The win was obviously a surprise. But the thing to remember is that it was a dominant win. We held off Fernando Alonso, in a Ferrari, in Spain and we were able to pull away at the end. At the beginning of the year, I said that we needed to be in a position where we could qualify a car consistently in the top 10, and that's what we've done: Pastor Maldonado has been in the top 10 in qualifying 13 times. We let ourselves down in a couple of races where we were in good positions. We've got to ensure that we are able to bring home our full potential and I don't think we did that. Our view would be that we have at least the fifth-best car and we haven't delivered fifth place in the championship. But we've realised our failings and we are working hard to fix those. We'd like to think that we are able to deliver on our potential next year.

With Pastor having a lot of incidents and Bruno Senna often struggling,

how much of that underachievement was down to the drivers? Surely the lack of points has to be down to them...

No. We could have done a better job of ensuring Pastor was in a better position not to make his mistakes. Pastor has to take his part of the problem, but we play as a team, we fight as a team, we take the victory as a team, we lose as a team. What could we have done better there? Could we have said to Pastor, 'Use Turn 13 to overtake, it would be better', so there are things we need to improve upon. And I'm sure Pastor realises that. We don't look to blame anybody.

Looking at the 2012 car, what were the positives and the negatives?

The Renault engine is a huge advantage. It's light, strong, no degradation and that's why it's a world championship-winning engine. It's a tremendous powerplant. Renault looks upon things very much as what makes the car go

faster and they are a credit to themselves. We concentrated on aero development with the car. We lost our way towards the end of the season but we were able to recover from that through good analysis. We had a couple of silly problems but our core reliability was pretty strong. The car had a robust design, it was aerodynamically insensitive, easy to set up, and quite sensitive to set-up changes.

Do you find it a positive sign that Williams recovered from a shaky spell around the Korean and Indian grands prix to qualify in the top six at the end of the season?

We track our qualifying performance against pole and we've kept that within one per cent. That's very rewarding. Our plan is to make sure that continues through the winter and into next year, when we hope to be able to move in the championship to fourth or fifth.

One of the other strengths was the tyre understanding that Williams had. You were well ahead of others...

Although I think most people caught up with us, I still think we have a good understanding of degradation and life.

It seems to be that your focus is very much on the factory side of the operation, with Mark Gillan heading the race side under you. Is that a simplistic way of looking at it?

Maybe it is... but I think it's generally true. I always say that the car leaves the factory as fast as it's going to be. Performance - true, core performance - is made here. This is where you are better off spending most of your time if you want to make your car go faster because it's a war. You're better off maximising the potential that you arrive at the circuit with rather than generating more potential. Understanding is obviously a big part of that. ▶



FIRE-FIGHTING AT WILLIAMS - QUITE LITERALLY

The Williams team's greatest moment of 2012 was rapidly followed by its worst. After Pastor Maldonado had scored the squad's first win since Juan Pablo Montoya's triumph in Brazil 2004, senior members of the team, including Frank Williams, gathered in the garage after the Spanish Grand Prix. Suddenly, a spark triggered a fire while Bruno Senna's car was being drained of fuel.

Thankfully, almost everyone got out uninjured, but there was still a fire to fight. Neighbouring teams dived in to help, eventually bringing it under control and preventing it from spreading throughout the pit building. Despite losing vast amounts of equipment, Williams was back up and running for free practice in Monaco 11 days later.

"Honestly, I would say it affected the season very little, mainly because of the response from other teams," says chief operations engineer Mark Gillan. "We had nothing, we lost the lot in the garage. You see pictures of it retrospectively and realise that it was bad.

"The elation of the win was tempered by what happened with the fire. But in Monaco we were operational, we had borrowed equipment from other teams. One of the biggest issues was that we had no radios! But we borrowed and our suppliers, particularly of IT kit, helped. It was very impressive.

"We all learned, collectively, in the pitlane from what happened and ultimately it had a beneficial impact on safety in F1."

The FIA's Charlie Whiting looked into the



incident and issued some guidelines into fuel-handling practice, including the suggestion of wearing overalls when handling it. It was a stark reminder that the dangers of F1 always remain, even in the most mundane of circumstances.

1

TECHNOLOGY OF CHAMPIONS

Mobil 1™ Oil: An Aerodynamic Aid

With exhaust-blown diffusers effectively a thing of the past, the Mobil 1 engine oil in the Vodafone McLaren Mercedes MP4-27 race car has enabled the team to increase rear downforce by improving aerodynamic performance.

Quest to be the Best - Martin Whitmarsh, Team Principal, Vodafone McLaren Mercedes, recently commented at the launch of the MP4-27, "While there are clear visual changes to this year's car, there's greater change beneath the skin, with lots of fresh thinking applied." With no stone left unturned in the quest to be the best, Mobil 1 engineers have developed a breakthrough engine oil for 2012 that allows a significant increase in the engine operating temperature.

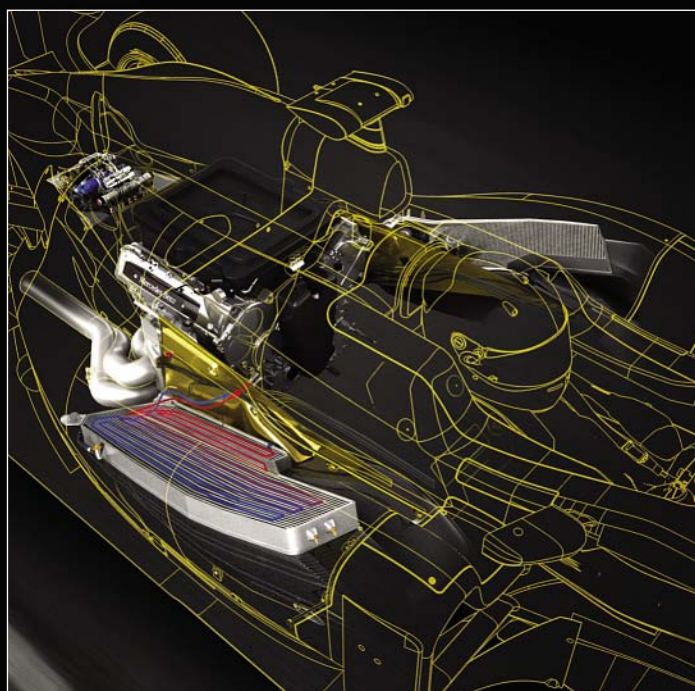
Cool Performance - The MP4-27 uses oil and water radiators to help cool the engine. Located in the right-hand side pod, the oil radiator and Mobil 1 technology provide an almost equal share of the engine cooling requirement.

Running Hotter - There are several advantages of being able to run the engine hotter. Drag can be reduced by re-optimization of the radiator and aero packaging. Increased rear downforce can also be achieved through aerodynamic improvements to the exit ducts.

In to Win - The excellent thermal performance of Mobil 1 technology is one feature that allows both higher operating temperatures whilst still protecting the engine and is a real advantage. When the winning margin can be fractions of a second, using the right engine oil can make the difference.



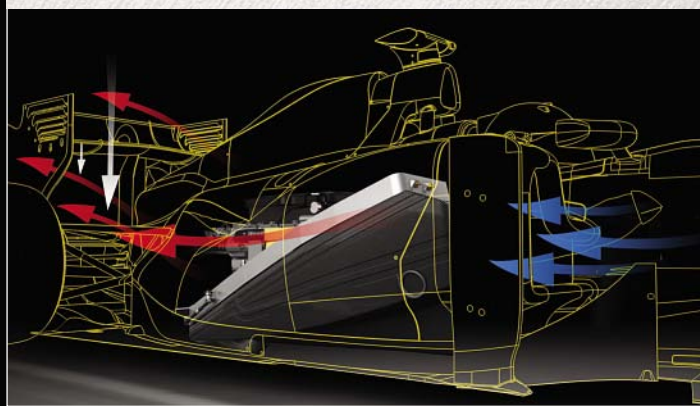
**Vodafone McLaren Mercedes
Powered by Mobil 1 Engine Oil**



Grand Prix Engine Oil Cooling Package Explained. The Mobil 1 engine oil flows through the radiator cooling down by approximately 40°C, whilst the air channelled through the side pod inlet heats up about 75°C.

Race Technology in Your Car - The tough testing ground of Grand Prix racing provides the ideal environment for Mobil 1 engineers to develop advanced engine oils which can help optimize the performance of your car. Similar to the advancements in Grand Prix race cars, recent developments in road cars often put increased pressure on the oil in your car to perform. Mobil 1 synthetic engine oils are formulated to help keep your vehicle running like new. For more information on Mobil 1, the world's leading synthetic engine oil brand, visit mobil1.com

Side Pod. Increased downforce and reduced drag equals faster lap times.





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Maldonado and Williams
victorious in Spanish GP



WILLIAMS BY THE NUMBERS

8th IN THE CONSTRUCTORS' CHAMPIONSHIP

1

WIN/POLE POSITION

131-RACE WINLESS STREAK ENDED BY MALDONADO'S SPANISH VICTORY

33

NUMBER OF PLACES LOST BY MALDONADO TO GRID PENALTIES

POINTS SCORED BY SENNA

31

76 POINTS SCORED BY WILLIAMS

45 POINTS SCORED BY MALDONADO

◀ **That seems to be one of the weaknesses of the past at Williams - a lot of parts were thrown at the car but maybe the hit rate wasn't great...**

Certainly, that's a view expressed by people who were here in both periods. And the Coanda exhaust [which Williams tried several times in 2012 but never raced] was an interesting one. I said we have to be confident that it gives more performance and that it's going to be reliable. Ultimately, maybe we were slightly too conservative on that and certainly, when we ran it in Brazil with

Valtteri Bottas, we realised that we probably had quite a performance step. But again, you have to balance that with the pure resource that you've got available. In the end, Brazil didn't work very well for us but we could have been in a very strong position. Pastor came by in P8 on lap one from 16th on the grid.

Pastor had an interesting season. Are you seeing signs of him maturing?

Yes. Pastor has come on in leaps and bounds. It's very difficult to say how he would have reacted earlier in the season

to Abu Dhabi [where he finished fifth despite battling a KERS problem]. He was very mature in that race; it becomes very difficult when you lose KERS. It's a very convenient defensive tool so you have to change your driving style. He got his head down. Maybe earlier in the year we'd have seen a different Pastor but he was tremendous that day. I thought that was a better drive than Barcelona in maturity and the ability to react under pressure.

Looking back, there were quite a few missed opportunities. Were there more races where you should have had podiums?

Absolutely, but we learn from them. You look at Australia: we should have just pulled away and said, 'Bring that one home.' Valencia was a possible podium, Singapore... They're all painful.

Everyone is waiting for a championship challenge, but is there now a trajectory that can take the team there rather than just hope?

The race win was nice and was deserved, but ultimately you're up against a lot of very clever people. We've proved that we have a top-10 qualifying car and we can race in the top eight. For me, in two years from now we would be disappointed if we weren't able to be consistently on the podium and then after that a championship contender. That's where we all want to be. ☼

Coughlan (right) with Senna's race engineer Tom McCullough



STAR WARS ATTACK

British F1 fans had to pay for all 20 races on Sky, or watch half live on the BBC for



Sky's pitlane banter, led by Simon Lazenby, didn't quite work as well...

THE GOOD

Sky Sports F1 HD: Having paid a king's ransom (well Bernie's) to add Formula 1 to its sports portfolio, Sky had to do something to demonstrate the strength of its commitment to its new baby, and so the F1 channel was born. Broadcasting in a higher bit rate (more than double) the BBC's, the improvement in picture and sound quality was striking.

GP2/3: Having a bespoke channel created a lot of air time to be filled and that meant all the GP2/3 sessions and races were live, giving true fans a good chance to witness the next generation of F1 stars in action.

The Skypad: Sky opted to copy the BBC's format of having a group of blokes chatting in the paddock (see right), a pretty girl asking questions in the drivers' pen and a roving reporter in the pitlane. Where they differed was in the introduction of the Skypad, where Georgie Thompson (capable, if irrelevant) and an ex-driver (Anthony Davidson, Allan McNish, Karun Chandhok) beautifully deconstructed key moments of the race. This especially came into its own in the case of Romain Grosjean's Spa start madness. The way every millimetre of his faux pas could be seen from a variety of angles was light



Sky's Race Control service added extra viewing choice

years ahead of the analysis three blokes and a clipboard were able to offer.

Race control: Want to go onboard with the stars at the start of a race? Of course you do! Listen to team radio, see the timing screen or driver tracker? Being able to do this was almost worth the subscription cost on its own.

Legends: Great names interviewed by Steve Rider - although they became repetitive quite quickly. Pieces such as the sublime Nigel Roebuck series where AUTOSPORT's legendary Grand Prix correspondent recalled past conversations with the sport's greats were a triumph.

THE BAD

The theme tune: Anaemic rather than anthemic; a dreary ode for the metrosexual generation. It's about as rousing as Nora Batty's wrinkled stockings. Just humming it is sending me to sleep.

Ted Kravitz making stuff up: In general Ted does a good job. He puts in the hard yards and is brave enough to ask hard questions. But sometimes, you also get a feeling he doesn't know what's actually going on. This was especially true at Spa where he confused himself on what lap Vettel had stopped and was adamant

he needed to pit again... he didn't. **'Lazers':** At first Simon Lazenby looked like a rabbit in the headlights, then he looked like he just needed a good lie-in. He did get better, but never quite sparked with Damon or Johnny in the way Jake Humphrey did with EJ and DC.

THE UGLY

Gridgate: With two British crews patrolling the paddock like a horde of inquisitive local bobbies, it was obvious that at some stage they would try to apprehend the same man at the same time.

Having been spotted taking pole for the US GP, PC DC went over to see Sebastian Vettel for further questioning. Moments later DI Brundle arrived on the scene: "Quick word if I can just squeeze in?" said the Inspector, pulling rank.

"You've just outqualified David," said the suspect. "David was first!" "He's not live at the moment, we can do it both together if you like," offered Brundle. "I'm German, he was first, we love queuing," said the foreigner, before turning to DC, who got his question in first before Brundle then butted in and took over.

Uncomfortable viewing, and it certainly never happened on Z Cars.

OF THE CLONES

free. Our outspoken TV critic REVVED UP looks at how the two shaped up



...as the BBC trio of Jake Humphrey, Eddie Jordan and David Coulthard

THE GOOD

It's free: For hard-up Brits, forking out (a minimum) of an extra tenner to watch F1 live was a bitter pill to swallow, and many simply put up with only seeing half the races as they took place and the rest in highlights form. Fortunately the Beeb is superb at this sort of thing. Its musical outros were generally better than Sky's, especially in terms of the tunes used.

Radio 5 Live: Out and about having a life on the weekend? Pop on the radio. Every session covered, free practice done in fine good humour too. The sort of service that's often overlooked is one of the reasons why the licence fee is still relevant in the internet age.

The banter: F1's answer to the *Top Gear* trio, Jake, DC and EJ have a chemistry that's like Marmite. If you like it, you love it, and if you don't... It's not my taste, but it's clear that for casual F1 fans it sets the tone just right - not too technical, not serious.

Ben Edwards: Back on the F1 beat and not before time. The best motorsport commentator in Britain? I think so.

Gary Anderson: AUTOSPORT's technical man can read a race as well as anyone out there. Probably operating at a level that goes over the head of 90 per cent of the audience. He's easily my favourite

part of the team for his insights. **The theme tune:** Need I say more?



THE BAD

Only half the races live: If you're reading a book, you don't skip over half the chapters - you wouldn't be able to follow the plot. And it's the same with F1. A lot of the far-flung Tilkedromes might look the same, but each played their own key role in the unfolding narrative of the season. Twenty races is probably too many now for the average viewer to follow, but if you skipped half of the races this year I can't believe the stunning events of the Brazil climax felt as exciting.

No bells or whistles: Little or no attempt was made to graphically dissect incidents like Sky did, apart from showing footage we'd already seen. Imagine Gary Anderson with a Skypad rather than his notepad?

THE UGLY

Eddie Jordan at the British Grand Prix's 'live' fan forum on Radio 5 Live. Clearly well-lubricated, EJ put in a performance that hard-partying footie ace George Best or hard-partying thespian Oliver Reed would have been, er, proud of. It made for spectacularly uncomfortably listening, but at least I was spared a beer soaking unlike half the front row.

That, and the football terrace "B-B-C!" chanting meant that aside from when professional interest required, channel 408 was my home of F1 in 2012 and it will remain so in 2013. ☹



THE TROUBLE WITH TYRES

Pirelli was again a major talking point in 2012. GARY ANDERSON analyses the rubber, and asks if teams could have done a better job

Throughout the year, everyone moaned incessantly about the tyres. Until, that is, around the late European races at Spa and Monza. There, the tyres changed, with some rubber taken off the inner shoulders to try to counteract blistering.

Pirelli insists that it didn't continue with this narrower-gauge construction after the two fastest tracks of the year. But while the following race in Singapore brought a return to the previous problems, perhaps because the rubber had already been shipped there, in the final races the tyre seemed much better.

There was a different kind of racing in the closing stages of 2012. At the start of the season we saw some dramatic grands prix, but there was also an element of luck as far as strategy and tyre use were concerned. That made for a good mix, because it made teams' strategy calls very involved and required the drivers to think a lot about the way they drove because the tyres were fragile.

There were cars that seemed to be well balanced, for example the Sauber, which went well in the races. It was similar for Lotus, which had a decent car and made the tyre work consistently in the race but wasn't so good over a single lap. That stopped those teams having the opportunity to win races in any way other than playing catch-up, and to do that required others to have a bit of a problem. The McLaren, by contrast, was very often the quickest car over a single lap, but the team struggled to turn that into results.

"We felt that we didn't understand the tyres and were struggling on them more than other people," says

McLaren's Jenson Button. "We didn't know what the maximum of the car was. You would push on the out-lap and get the tyre working, then another time it would be one degree cooler and it wouldn't work. It was very strange to understand.

"We had a period of three races when the car wasn't that strong for me or Lewis and, before that [starting at the Spanish Grand Prix], on my side of the garage we went in a direction that didn't work for us. But we had to try it because we were struggling for tyre temperatures."

If you look at McLaren over the year, it was on average the fastest car, at least in qualifying. But on average race pace it was miles off. All you can do is to look at that and conclude that McLaren, and Lewis Hamilton in particular, were good at getting the tyre to work for a single lap but struggling in the race. Yes, McLaren won seven races, but very often did so by controlling a race from the front.

But McLaren is just one example. The whole 2012 season was about having a car good enough to make the tyre work over a single lap and then be consistent in the race. It seems that the attitude to tyres in F1 has changed to the point where they are seen as a simple, bolt-on part. But the tyres we have seen this year are more like an old-fashioned tyre, where if you put the work in they are good enough to produce the lap times.

At the early races, everyone complained about tyre problems. But most of the issues were still, fundamentally, car problems. If you have a car that has good, stable aerodynamic characteristics, it will still be good to the tyres. That's why the teams found the tyres easier to use as they added downforce. From

trackside, you could see that the teams complaining about overheating the rear tyres had the cars that were suffering with wheelspin.

The car problem is what leads to the tyre problem, not vice versa. It's a control-tyre formula, you've got what you've got and it's up to you to make the car work with those tyre characteristics.

Tyre pressures are a significant factor. You can run the tyres at higher pressure to get the temperature, but you harden the tyre. If you use the philosophy of keeping the temperature low and keeping the pressures low, because temperature builds and makes the pressure, you can go out, use the tyre harder, heat up the construction of the tyre and they will work.

In a way, it's like a new pair of shoes. At first, they're always too hard. With a new tyre, everything is bonded together and has to be stressed before it takes the load properly. The only way to stress it is to load it. The key is carcass temperature. If you have that, you get a good, stable surface temperature. If you spin the wheels, you get high surface temperature, which dissipates and the grip goes away. That's why the carcass temperature is important.

The problem early on seemed to be that there was so much rubber on the shoulder of the tyre. That was quite hard to manage, but the narrow-gauge tyres changed that. The less rubber you have, the easier the heat dissipates, so you can put more energy into the tyre and get rid of it when there's too much. It has made it much easier for teams to stabilise the tyres, which has led to one-stop strategies and the occasional less-eventful race. ▶



TYRES BY THE NUMBERS

140km: average lifespan of a wet tyre

7012km completed by

31,800 Tyres
Pirelli's Renault test car

147 overtaking manoeuvres
in the Brazilian GP

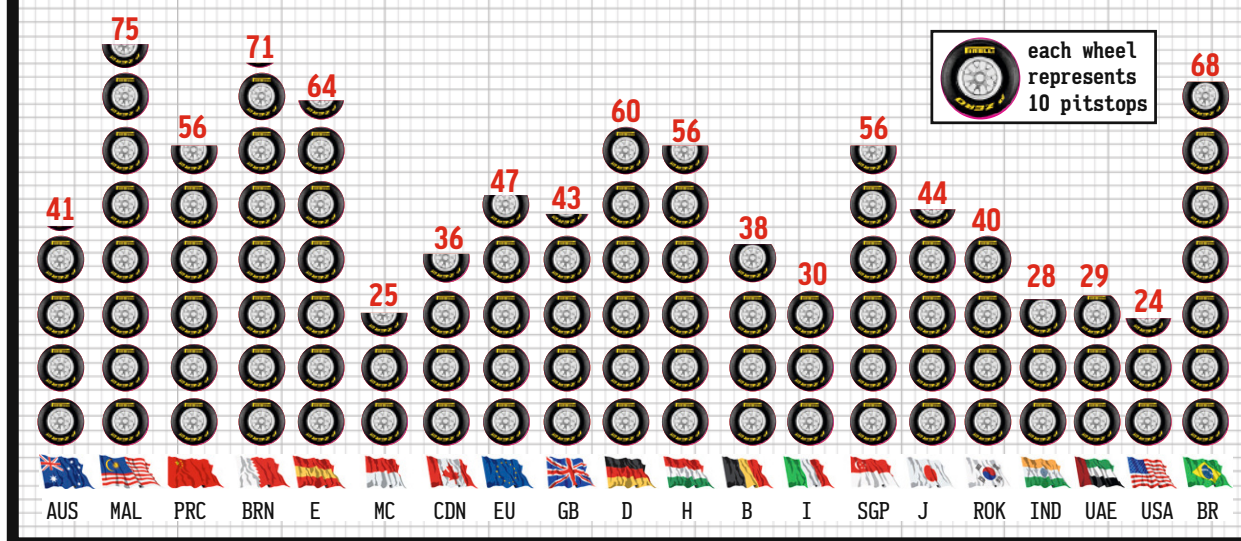
75 stops for tyres in Malaysia

24 stops for tyres in the United States

55C hottest track temperature (Brazil)
11C coldest track temperature (USA)



PITSTOPS PER RACE IN 2012



◀ This is going to change next year, but in 2012 we had a soft-compound tyre with a stiff construction. This means that the tyre moves around a lot and we've seen the rubber moving on the rim, which teams don't like. Button has talked about the tyres 'juddering', which is because you load up the sidewall, then you overload it and the tread lets go, then you get the grip back and it happens again. You need the car to load the tyre smoothly through the car characteristic. This has played a part in the fact that the drivers who load the tyres more progressively and for longer in corners, such as Button (in other words, the smoother drivers), have struggled more compared to those who are point-and-squirt.

These tyres don't like being asked to brake and turn at the same time. So a short, sharp style is the right way to go whereas with the Bridgestones, which were much more compliant, the smoother, long-load style worked well. Red Bull, at the end of the season, did this to perfection with Sebastian Vettel in particular.

I don't buy into the idea that the tyres

changed dramatically this year. The ban of exhaust-blown diffusers meant less rear downforce and that changed the balance. At the majority of the circuits, it's the rear tyres that are the limiting factor in terms of degradation. But if I was still working as a technical director, I'd be looking a lot harder at suspension design. Aerodynamics have become king in F1 over the years and everybody still seems to be happy to compromise the geometry for improved airflow. But with these tyres, the suspension needs to absorb more of the loading than perhaps it had to in the Bridgestone era (see panel below).

The cars do move a little bit more now because you have softer tyres and slightly softer suspension. Whenever these cars roll, the outside wheels go into positive camber. The greater the lateral force, the higher the roll and the greater the roll; you can see the tyres tucking under the rim. The maximum camber you can run is limited and most people run to that, but the tyres still roll onto the outside shoulder. The objective of the camber is that the lateral displacement means that the contact

patch is at the maximum under load and you change the camber to suit that.

My concern about the suspension geometry is that there is too much movement in where the force is on the tyre as you go through the corner. Having gone back in time to a tyre that deflects more, there is a bigger disadvantage to making compromises in the suspension for aerodynamic reasons. It would be great for someone to look really closely at the geometry and make it a higher priority.

Tyres are important because they are the contact between car and track and, as we've seen this season, it's a mistake to neglect that side of things. Some compromises have been made with the rear suspension, but there's a feeling that the front suspension is only there to hold the wheels on.

There has been a lot of talk about whether the tyres have been an artificial element this year, but the teams with the best understanding still do the best job. Maybe rather than complaining about the tyres, the teams would be better off trying to get their cars to work with them. ☼

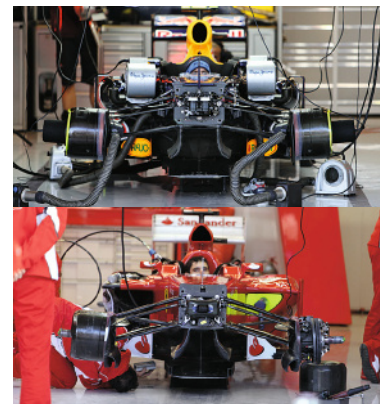
WHO MAKES THE MOST OF TYRES?

Red Bull

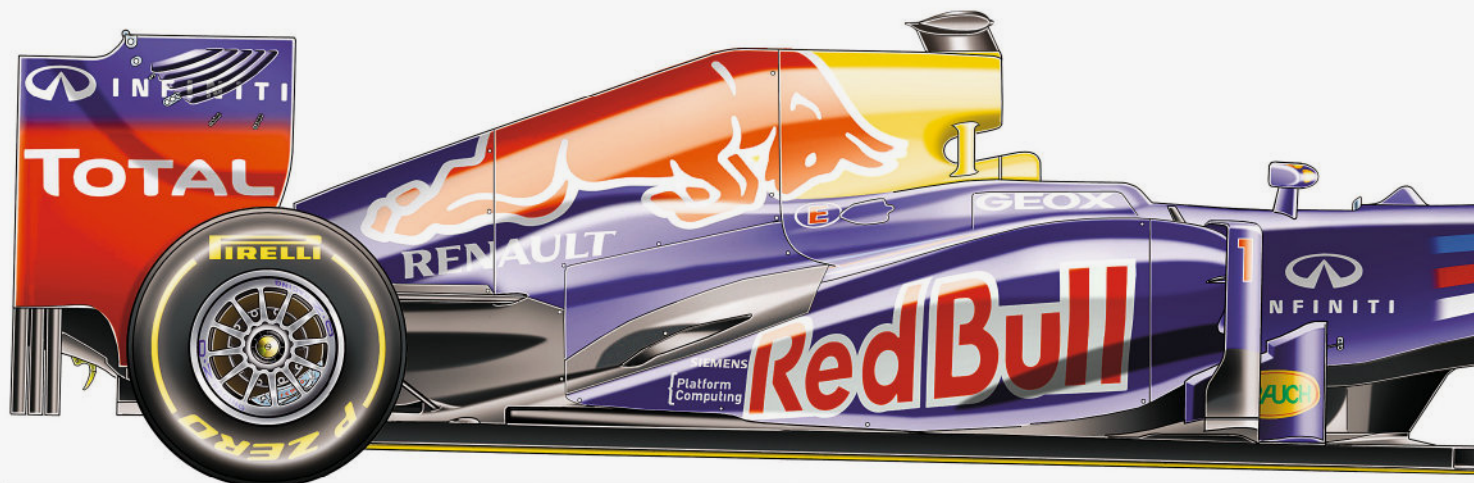
It's one of the teams that appears to have least compromised its front-suspension geometry for aerodynamic reasons (top photo), even though it does still lean in that direction. The trackrod and wishbones appear to manage the airflow off the front wing, while the pushrod coming down through the suspension cuts across that. Although the pullrod set-up is advantageous aerodynamically, the pushrod should let the tyre work better.

Ferrari

The F2012 features a pullrod front suspension (bottom photo) for aerodynamic reasons and its wishbone angles are far more extreme than Red Bull's RB8. So that's a greater compromise. The pullrod is significantly less of an aerodynamic blockage, but to get the geometry to work with that you end up with the suspension loads being very high and running the car perhaps stiffer than you would ideally like, given the characteristics of the tyres.



Red Bull



Despite efforts by the powers-that-be to derail Red Bull's aerodynamic advantage of 2011, the Milton Keynes squad made it a hat-trick of title doubles

By restricting exhaust blowing and flexi noses for 2012 the FIA seemed to be specifically targeting Red Bull. If so, it partly succeeded, for the team had to fight for these double titles much harder than in 2011. Sebastian Vettel took five victories rather than 11, six poles rather than 15, on his way to a title clinched narrowly at the final round rather than comfortably, with four rounds still to go.

There was another crucial regulation clarification behind the scenes on the eve of the season that further foiled the plans of Adrian Newey and his design team. The dimensional cone, aft of the exhaust, prescribing where no bodywork was permitted, extended as far as the rear-wheel centre line. Red Bull interpreted this as allowing ducts behind that point that would capture the exhaust flow and re-direct it to the exact

point around the diffuser it was needed.

The RB8 was conceived around this feature - which simulation had shown would have been highly effective in clawing back a big chunk of the 2011-style exhaust's aero benefit. The FIA outlawed it a month before the car was due to appear.

That explained the Plain Jane exhaust system the car was launched with - merely the original system but without the banned ducts. By the final day of testing and into the start of the season the car featured a Coanda-effect exhaust - as already launched by Sauber, McLaren and Ferrari - but with a subtle difference: inlet tunnels that took airflow from the bottom of the sidepods to a point ahead of the diffuser. Initially they didn't work quite as simulation had suggested, but their principle would later come to form a crucial part of replicating the behaviour of the 2011 car.



Despite efforts to slow it, this was again the team to beat in 2012

Sebastian VETTEL (D)



Championship position	Starts	20
	Wins	5
	Poles	6
	Fastest laps	6
	Points	281
	2011 position	1st

1st

His fantastic gift for a qualifying lap was much more evident when late in the season the RB8 was finally induced to behave more like the RB7. He's still getting better and heat-of-the-moment rashness can still be triggered in him. But unquestionably a great.

Mark WEBBER (AUS)



Championship position	Starts	20
	Wins	2
	Poles	2
	Fastest laps	1
	Points	179
	2011 position	3rd

6th

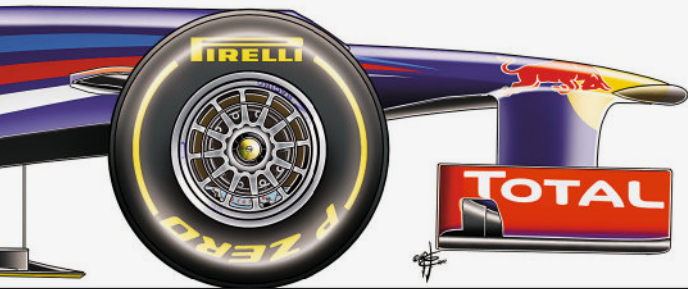
Two great wins and a much more consistent challenge to Vettel than in 2011, Webber just bounces back like the great competitor he is. The reluctance to lay it on a plate for Vettel at Interlagos was from the same well as catching and beating Fernando Alonso at Silverstone.

Vettel didn't have it as easy as he did last season



PICS: KALISZ, TEE/LAT

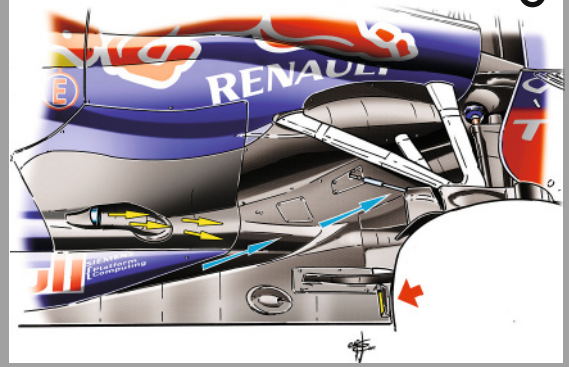
“Further developments of front and rear wings right up to the last two races showed just how fruitful and powerful a direction Red Bull had succeeded in finding”



1st Championship position
7 Wins
14 Podiums
8 Poles
14 Fastest laps

GARY ANDERSON'S TECHNICAL APPRAISAL

➔ Last year, the exhaust-blown diffuser was vital and Red Bull had a good handle on the concept. In 2012, the rules restricted the use of the exhaust effect for generating downforce. Red Bull's launch car featured a simple package but the b-spec, introduced at the final test, harnessed the Coanda effect. Unlike some, who did this in free stream, Red Bull added bodywork behind the exhaust to get the exhaust airflow to attach to this section. The whole package was very tidy, with ducts underneath (blue arrows) to feed the air to the diffuser, which ensured it didn't stall at high speeds when running high levels of rake. Once Red Bull had 'sealed' the diffuser to avoid leakage, it was a big advantage.



Those tunnels were blanked off as Vettel took his first victory of the year, in Bahrain for round four, and remained off until their enhanced re-introduction in Valencia. During that period the car was intermittently competitive - and Mark Webber won at Monaco - but a far cry from the dominant machine of 2011.

For Valencia there was a new, flatter rear-bodywork arrangement that facilitated bigger inlet tunnels and a less ambiguous airflow distinction between the exhaust-enhanced airflow from the top of the sidepods to the diffuser sides and the inlet-connected flow from the bottom of the pods. Vettel was in sensational form, on a comfortable pole and looking like a dominant winner until derailed by one of several Renault alternator failures.

The car wasn't quite as formidable away from the slow turns, though Webber took his second victory one race after Valencia with a fighting victory over Fernando Alonso at Silverstone. But as the McLaren was then given a major upgrade at Hockenheim - and the calendar included the high power/low downforce venues of Spa and Monza - so Red Bull reverted to being merely competitive.

For Singapore a relatively simple double DRS system was introduced that, in itself, was probably worth little more than 0.1s of qualifying performance. But there was more to it than that. It's believed to have amplified the advantage of those inlet tunnels, allowing the car to be loaded up with more downforce without the diffuser stalling at low rideheights. Together with rear-suspension geometry changes that rolled the car into oversteer to combat the slow-corner understeer and a Coanda exhaust effect that was working powerfully, it allowed Vettel to drive the

car much like he had in 2011.

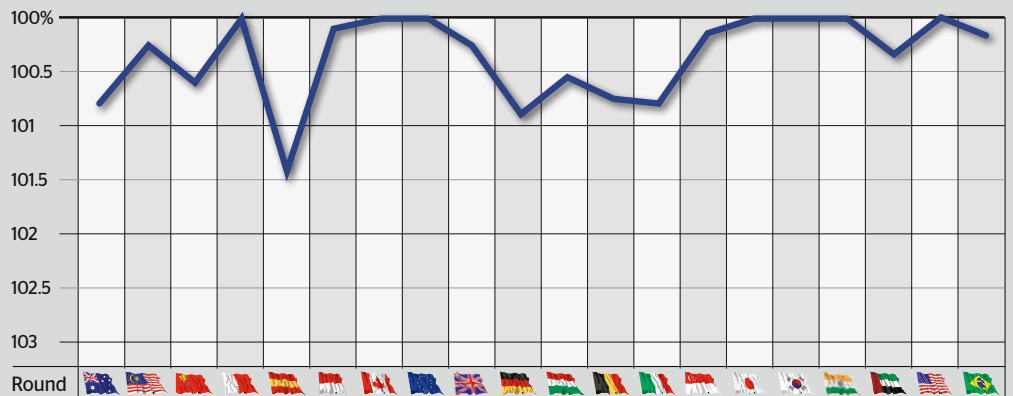
He could now once more stand on the throttle to combat the oversteer, allowing him to take a lot of entry speed into the turn. It was notable that with the car in this form, Vettel was able to get a step change from his own performance, squeezing way more from it than could Webber - much as had been the case with the full blown-exhaust 2011 car. In Japan, Korea and India, Vettel was unbeatable.

Further refinements to the sidepod around the exhaust area from Korea allowed yet more downforce to be created. Less space was devoted to the inlet tunnels, more to enhancing the Coke-bottle profile and thereby increasing flow over the diffuser. In this way it would stall earlier and more advantage could thereby be taken of the double DRS system. Yet further developments of front and rear wings right up to the last two races showed just how fruitful and powerful a direction Red Bull had succeeded in finding despite all that was done to rein it in.

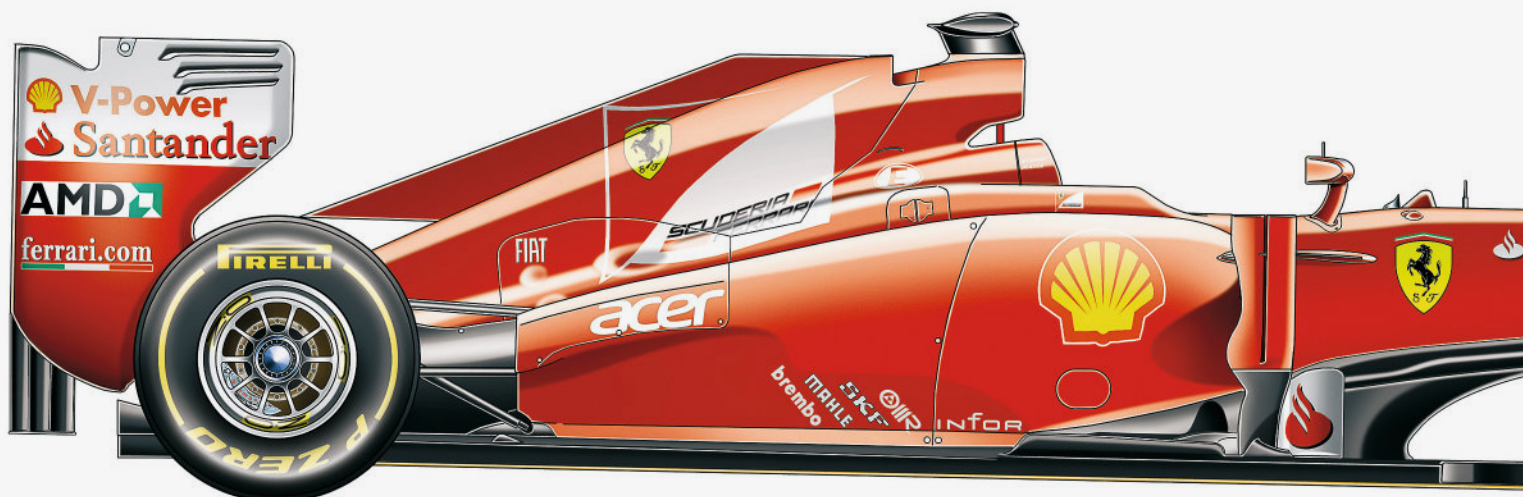


Two wins for Webber in a more competitive season

RED BULL'S PERFORMANCE, AT EACH RACE, RELATIVE TO THE ABSOLUTE PACE



Ferrari



Ferrari came into 2012 well off the pace, but hard work and the talents of Fernando Alonso meant the Scuderia headed to the finale in contention for the drivers' title

With a car beginning the season around a second off the pace it was pretty impressive that Ferrari was part of a final-round title showdown, rather replicating the team's 1997 season. Much of the credit for that has to go to Fernando Alonso, but there was more to it than just that.

Once the car's more obvious design shortcomings were understood, the team was quickly able to correct them and for much of the 'European' part of the season the F2012 was actually a very useful tool; competitively quick on all types of tracks and less sensitive than the other front runners to variations in the weather and track temperature - an excellent all-rounder in a season when that was a valuable trait. It was also very reliable and the team had the fastest average on pitstops. But into the latter half of the season it proved stubbornly reluctant to

respond to further development and, as Red Bull and McLaren stretched their technical legs, so Alonso was left fighting a rear-guard defence of what at one time had been a 39-point lead.

Pat Fry led a design team that came up with a fairly aggressive concept, moving to pull-rod suspension not only at the back but also - uniquely among 2012 cars - at the front, for the benefit of aero. But an odd choice of radiator angle made for sidepods that both in frontal area and plan view were hugely bigger than the Red Bull's, partly a reflection of the Ferrari engine's greater heat rejection. A Coanda-style exhaust featured on the car from the start - but quickly proved problematical, the first sign that the team's windtunnel shortcomings had still not been overcome a full year after moving to 60 per cent models. A conventional exhaust went onto the car for the rest of winter testing and for the first four races.



Alonso celebrates third-place finish in home race at Monza

Fernando ALONSO (E)



Championship position	Starts	20
	Wins	3
	Poles	2
	Fastest laps	0
	Points	278
	2011 position	4th

2nd

A magnificent effort in a less-than-great car, helped by McLaren and Red Bull trading blows and sharing points at places Ferrari didn't figure. His win in Valencia was spectacular, those of Malaysia and Hockenheim deeply impressive. More than that, he inspired and led the team.

Felipe MASSA (BR)



Championship position	Starts	20
	Best finish	2nd
	Best grid slot	3rd
	Fastest laps	0
	Points	122
	2011 position	6th

7th

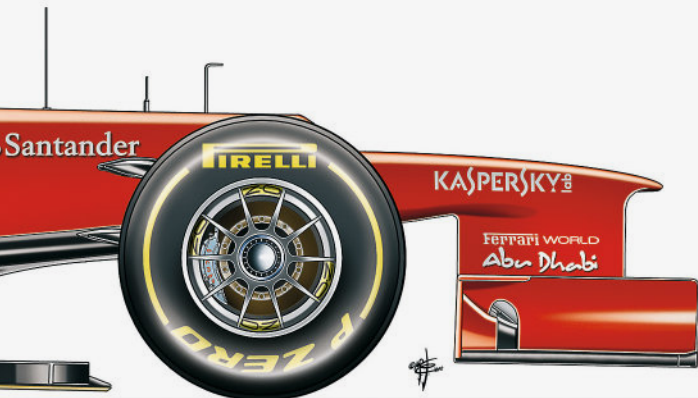
It was difficult to see how Felipe was going to hang onto this drive as the third year of his comeback from injury was going much as the previous two. But then at Suzuka he seemingly switched on and this time retained the sparkle we used to see so regularly for the rest of the season.

Alonso had the upper hand over Massa for the entire season



PICS: COATES, DUNBAR, TEE/LAT

“Pat Fry led a design team that came up with a fairly aggressive concept, moving to pull-rod suspension not only at the back but also - uniquely among 2012 cars - at the front”



2nd

Championship position

3

Wins

15

Podiums

2

Poles

0

Fastest laps

Moving to Toyota's windtunnel quickly established where the problems lay, but the solution involved a complete redesign of the sidepods and the layout within them. Meantime the car was at best a marginal Q3 qualifier - but had a trait relatively rare among 2012 cars of being able to switch on its front tyres quickly, demonstrating that the years-long previous bugbear of Ferrari had been cured. This played a crucial part in Alonso's victorious drive in a wet Malaysia for round two, a fantastic result for the team as it tried to limit the points damage while the redesign was underway.

The first part of the update was on the car for Barcelona, with the full Coanda exhaust then going on from Canada onwards. This essentially switched the whole car on and Alonso rattled off a series of podiums and strong points finishes that allied to that wet Malaysia win kept him right in contention. But the team's risk-averse strategy calls actually ended up costing many points. Slightly sharper calls could have given Alonso a win in Spain rather than second, a victory at Monaco rather than third and a second in Canada rather than fifth. That's 25 points right there for someone who lost the title by three. Ferrari might also have been first rather than second at Silverstone had it been prepared to run a longer first stint. Being over-cautious in keeping Webber behind around the first stops ultimately allowed Mark to pass late in the race.

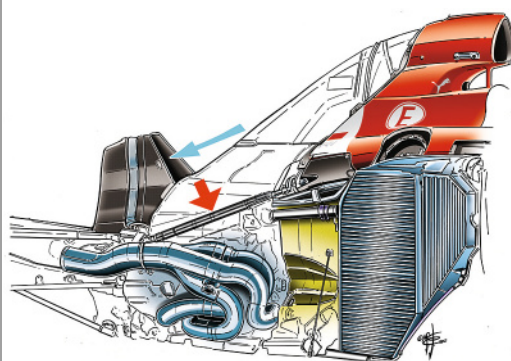
Alonso himself maximised every half chance and was quite brilliant - and slightly lucky - to win in Valencia. He seized upon wet qualifying at both Silverstone and Hockenheim to take two consecutive poles, winning in Germany. But he didn't win again as the car lapsed behind in the development race. It was noticeable that the car's straightline speed

responded spectacularly well to DRS - perhaps too well, with the suggestion that the airflow was not reattaching quickly enough, giving the car stability issues in qualifying when DRS is used freely. This would explain why it was more competitive in the race than in qualifying and its good wet-weather performance.

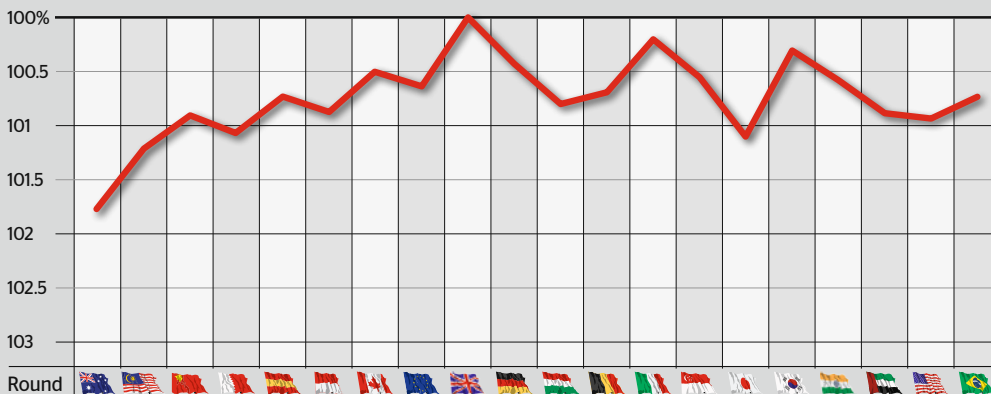
But amid several aero limitations, the car - from Spain onwards - was extremely driveable, allowing Alonso to get a lot from himself. He was unfortunate to be taken out at the start at Spa by Romain Grosjean but was at least partly to blame for his first-corner retirement at Suzuka after clashing with Kimi Raikkonen. But that and a spin in China that lost a place were the only blots on a magnificent personal performance. Felipe Massa struggled for most of the year, but for the last six races was back to something approaching his best - and actually out-performed his team leader in the last couple of races. Ferrari can head into 2013 confident it has two front-running drivers at last. But serious questions must remain about the aerodynamic department.

GARY ANDERSON'S TECHNICAL APPRAISAL

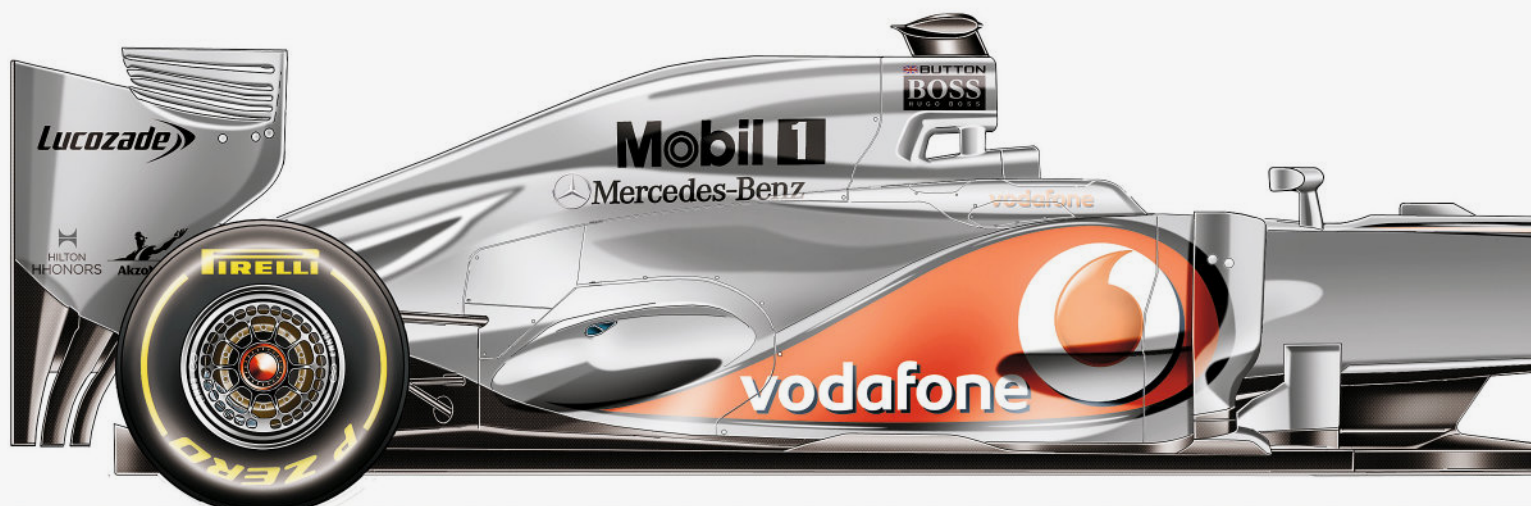
➔ Ferrari started with a very bulbous Coke bottle because everything was devoted to trying to get the exhausts to work. Unfortunately, the exhausts didn't and the Coke bottle wasn't working as effectively as it should. This has an effect on the whole car because a good Coke bottle sucks the airflow through the sidepod undercut more quickly, which in turn sucks the air through the front wing. Ferrari did improve this, but the vertical radiators remained. This gave it a smaller surface area than a standard radiator, which would be mounted at around 30 degrees to the horizontal. But the fin thickness within the radiator had to be thicker, slowing down the airflow more, and with the radiator exits interfering with the exhaust gas flow. It was an aggressive step too far for the Scuderia.



FERRARI PERFORMANCE AT EACH RACE RELATIVE TO THE ABSOLUTE PACE



McLaren



McLaren's competitive advantage see-sawed during the season and it was organisational blunders and reliability woes that put paid to its title hopes

Mclaren went into the season with the fastest car, lost that status after a regulation tweak post-China, regained it with a mid-season upgrade, lost it to Red Bull in the 'Asian' part of the championship, then bounced back hard to win the final two races.

The variation reflected a hugely intense development war, but for a car that scored seven victories and eight poles (the same tally as Red Bull), finishing third in the constructors' championship and fourth and fifth in the drivers' title race - with Lewis Hamilton and Jenson Button respectively - must rank as a disappointing outcome.

Operational errors in the first half of the season and unreliability in the latter half cost it the chance of sweeping up both titles. The MP4-27 was an elegant update of last year's car and had what

became the definitive Coanda exhaust arrangement on it from the start. Together with the potent Mercedes powertrain, the blistering pace of Hamilton and the shrewdly applied skills of Button, it was enough to lock out the front row on four occasions.

It started well enough with a one-three in Australia. The wet weather played against it in Malaysia as it struggled to switch on its tyres as effectively as Ferrari, Sauber and Williams. Button might have beaten Nico Rosberg to win China but was thwarted by a pitstop problem - the first of many.

The team had aggressively pursued pitstop time-saving, with reduced turning wheel nuts and quick-fit pegs - both of which increased the chances of getting it wrong. Articulated jacks that could be put under the car before it had actually stopped were another feature - and one of these burst a seal during a Hamilton



Lewis HAMILTON (GB)



Championship position	Starts	20
	Wins	4
	Poles	7
	Fastest laps	1
	Points	190
	2011 position	5th

4th

Lewis's final season at McLaren was one of his best, without the inconsistencies of 2011. An unnecessary clash with Maldonado in Valencia and a bit of a meltdown at Spa aside, he was magnificent. His acrobatics through the twists of Singapore and Abu Dhabi were beyond the scope of others.

Jenson BUTTON (GB)



Championship position	Starts	20
	Wins	3
	Poles	1
	Fastest laps	2
	Points	188
	2011 position	2nd

5th

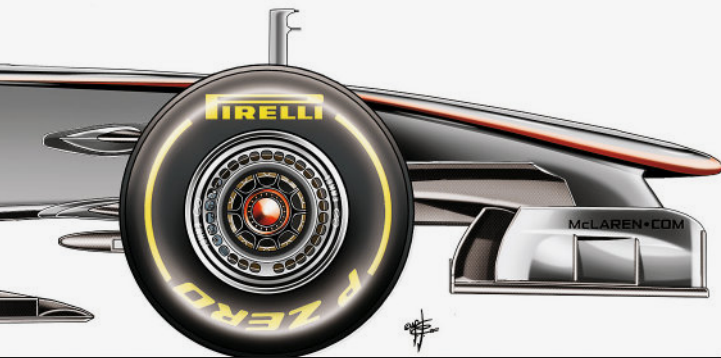
As ever, the highs were brilliantly high, the lows too frequent. Getting his head around the tyres sent him on a set-up cul-de-sac but after that he was the one who could sniff out the slightest chassis imbalance. His three wins were superb - and his Spa drive temporarily unhinged his team-mate.

Button and Hamilton dived hard in the Brazilian GP finale



PICS: TEE, BELLANCA/LAT

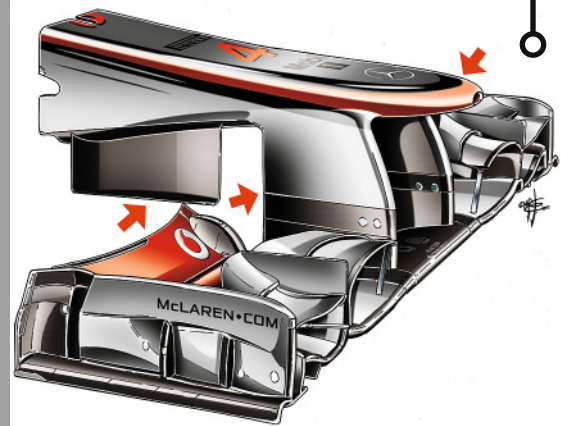
“This season will be looked back upon by McLaren as a championship that it lost through its own flaws rather than through being out-performed”



3rd Championship position
7 Wins
13 Podiums
8 Poles
3 Fastest laps

GARY ANDERSON'S TECHNICAL APPRAISAL

➔ McLaren was one of the few teams to miss the trick of the high chassis chosen by most. The original concept was all about maximising the performance of the front wing, with the vertical central fin and the horizontal wing section as low and near the front wing as possible. Before the first race, this changed to twin turning vanes, which were designed to improve the airflow under the car rather than helping the front wing. The higher nose was introduced at the Mugello test before the Spanish Grand Prix, indicating that McLaren had bought into the benefits of optimising underbody aero. Without the highest possible chassis, overall airflow available under the car was compromised. Even if it was only a 0.1s loss, it was still a disadvantage.



stop in Valencia. It took most of the first half of the season to iron-out these woes.

Post-China the FIA informed the team that it could not continue to consider the splitter beneath the nose as part of the 3mm tolerance for the flatness of the floor. This enforced a reduction in the amount of effective rake the car ran and did seem to adversely affect it into slow corners, struggling noticeably in the slow sections of Bahrain's Sakhir circuit.

Like all recent McLarens, the MP4-27 was optimised around a narrow range of rideheight/attitude and needed a stiff platform to keep it there, which often had the effect of setting up a wave motion in the tyres feeding into the car to give a front-rear rocking phenomenon. Around fast turns it remained mighty and Hamilton was fastest by a big margin in Barcelona qualifying, but was thereafter excluded after being sent out with insufficient fuel to complete an in-lap and provide a fuel sample: another operational error, another possible victory thrown away.

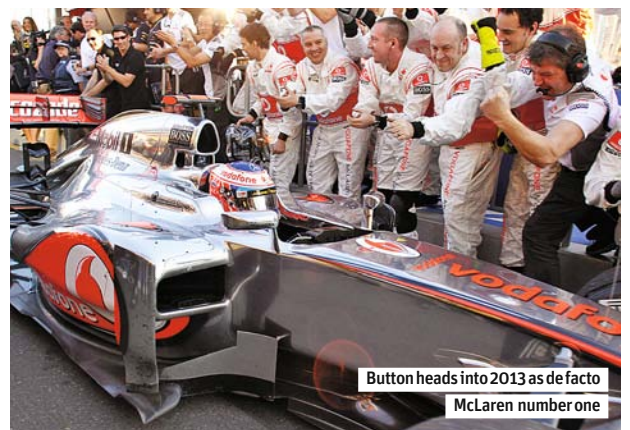
Button got into a mid-season crisis with his set-up choices, having tried to veer away in a new direction after the car overheated its tyres in Bahrain. He wasted Spain, Monaco and Canada trying to sort that out before reverting to what Hamilton had stayed on all along.

Lewis finally got his seasonal victory tally underway with a brilliant drive in Montreal, something he was unable to repeat until after the car had received a major update. This first appeared at Hockenheim and comprised more tightly-profiled Coke-bottle rear bodywork, new floor and sidepods, all increasing the flow volume that had been partly limited by the choice of an un-stepped nose.

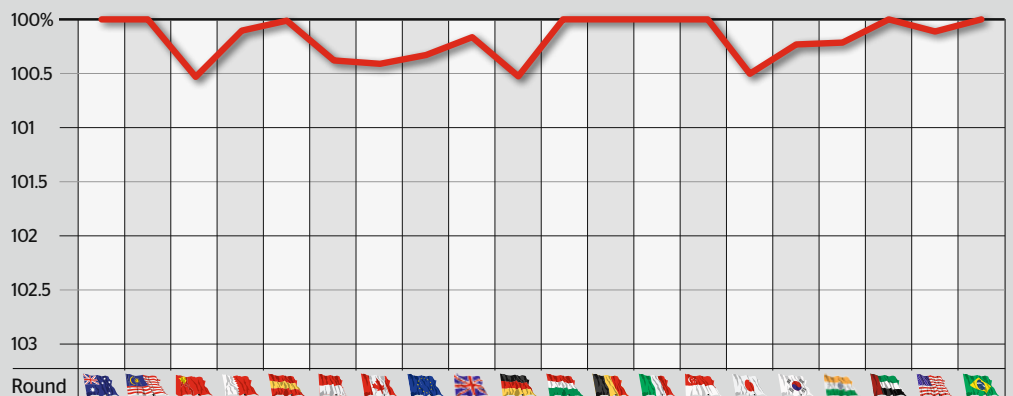
In this form the car regained its former status of fastest right through until

Singapore, with Hamilton winning in Hungary and at Monza, and Button dominating at Spa. Lewis was only denied victory in Singapore thanks to a gearbox failure, something Button suffered in Japan, this in addition to a rear-damper problem for Hamilton at Suzuka. Electrical failure denied Hamilton another win in Abu Dhabi. It was an unfortunate time to encounter reliability issues as they effectively removed Hamilton from the title battle.

The car's development path was not as strong as Red Bull's in the five-race Singapore-Abu Dhabi phase of the championship but a new front wing and associated tweaks re-invigorated it for the last two races. Lewis brilliantly ambushed Vettel for the win in the inaugural Austin GP and Button followed that up with a typically velvet glove/iron fist performance in the changeable conditions of the Interlagos finale. This season will be looked back upon by McLaren as a championship lost through its own flaws rather than through being out-performed.



McLAREN'S PERFORMANCE AT EACH RACE RELATIVE TO THE ABSOLUTE PACE



Lotus



The rebranded Enstone squad produced a car that allowed a returning Kimi Raikkonen to score heavily and pull off one of the year's most popular wins

The renamed Enstone-based team bounced back to full competitiveness for the first time since its title-winning 2006 season. And it did so with both a car design and driver line-up that created a lot of intrigue.

The Lotus E20 (Enstone's 20th F1 car regardless of Benetton, Renault or Lotus labels) was an elegant but fairly conventional car. Tech director James Allison chose against a Coanda exhaust; once bitten, twice shy after his difficulties with the front-exit exhaust car of 2011. This liberated an extra 12-13bhp over the identically-engined Red Bull but limited its slow-corner downforce.

Through fast corners, however, the car was mighty and within its notably soft suspension it was rumoured there was

some sort of front/rear inter-connection. That softness seemed to enhance its ability to look after the delicate Pirellis, though at some expense in one-lap qualifying pace, especially if weather conditions were at all cool.

Extravagantly multi-planed front-wing endplates took airflow around the front wheels, with multiple slots allowing them to retain decent airflow even as the wheels were steered. It's an area the team has led the way on over the past couple of seasons and seemed to be a big part of the car's excellent driveability.

Pre-season the FIA banned a planned feature of the car's front suspension – small hydraulic cylinders maintaining the front rideheight under braking. "That cost us about a tenth-and-a-half," says Allison. "But it may have become more because if you have a car that inherently



Grosjean was mighty in Valencia but let down by his alternator

Kimi Raikkonen (FIN)



Championship position	Starts	20
	Wins	1
	Best grid slot	3rd
	Fastest laps	2
	Points	207
	2011 position	N/A

3rd

Took up where he'd left off at Ferrari in '09 as a superior gun for hire. His two years away did not show. Fantastically consistent and impeccably fine-judged in battle, but the savagely fast McLaren driver was only rarely seen. But even his dimmed days are beyond the dreams of most on the grid.

Romain Grosjean (F)



Championship position	Starts	19
	Best finish	2nd
	Best grid slot	2nd
	Fastest laps	1
	Points	96
	2011 position	N/A

8th

It was a pity his accidents and incidents overwhelmed some terrific performances. In Canada, Valencia and Hungary he was superb and a potential winner. The line between finely-judged racecraft and cack-handed blunders was very thin and he may have blown his second chance.



Grosjean took three podiums but it may not have been enough...

PICS: DUNBAR, FERRAROLI/LAT

“Once conventional development was underway again, a Coanda exhaust was introduced for Korea and it brought the slow-corner performance the car had lacked”



4th Championship position
1 Win
10 Podiums
0 Poles
3 Fastest laps

moves less, which is what it allows you to have, then you can afford to develop aerodynamics that are more rideheight sensitive because you know there won't be as much rideheight movement. You can go for a peakier, more aggressive rideheight platform.”

In the early part of the year the Lotus E20 was probably the fastest race-day car of all - but it was prevented from converting this into victories by its relatively weak qualifying effort. Kimi Raikkonen, returning after his two year rallying sabbatical, came within an ace of winning in Bahrain, but ultimately was thwarted by having had to battle his way from 11th on the grid.

Romain Grosjean got his second bite at the F1 cherry and was immediately super-fast, usually quicker than Kimi. Whenever they each had clear runs throughout a session, the team noted, he tended to have a couple of tenths over his more exalted team-mate. In fact, by the time of the British Grand Prix when there'd been time to make only one new front wing, it went to Grosjean as the man the team felt offered the best chance.

Raikkonen though was fantastically consistent and ultimately proved to be a far superior points-winning machine. His driving style was rather different to Grosjean's and much of his season was taken up trying to get the steering feel to his taste. This was difficult to do and the team was only partly successful in eliminating the hysteresis in the system - the ability to absorb bumps and frequencies without it changing the steering angle. Raikkonen wanted that filter removed so he could nibble away at the tyre's adhesion limits into the turn.

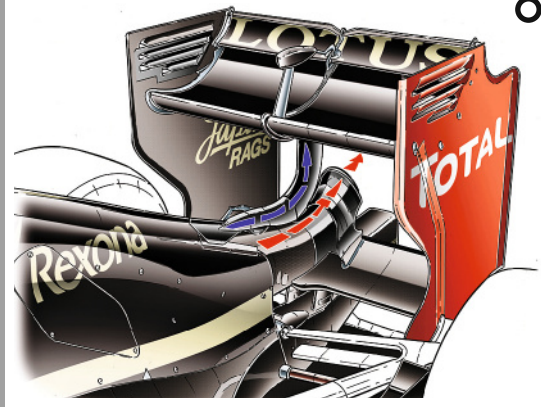
The two drivers managed podium finishes between them in Bahrain, Spain, Canada, Valencia, Germany, Hungary and Belgium, but thereafter the car fell behind

in the development race. This coincided with the team's attempts to get its passive double DRS system to work and Allison admits that, with hindsight, he would not have spent so much time on it - a feature that the car never raced with.

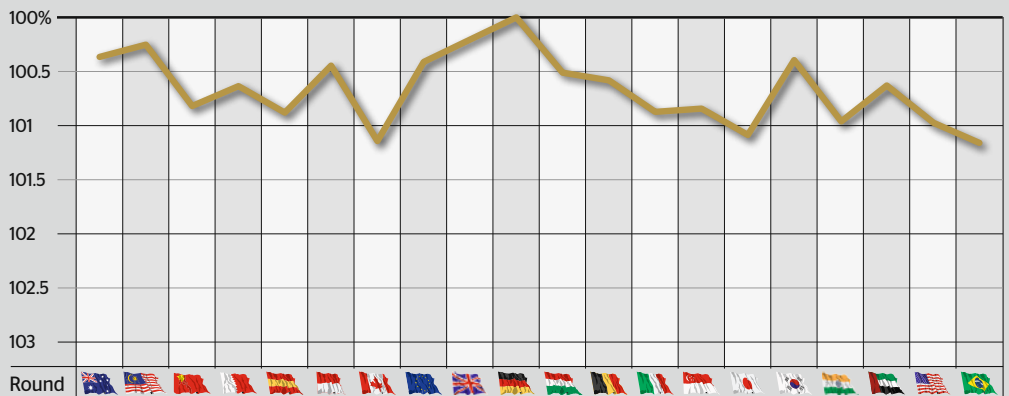
Once conventional development was underway again, a Coanda exhaust was introduced for Korea and it instantly brought the slow-corner performance the car had lacked. The breakthrough victory came in Abu Dhabi as Raikkonen was able to start from the second row. Grosjean by this time was very much the team's number two after a series of accidents, the Spa error earning him a one-race ban by the FIA. A second-corner collision with Mark Webber in Japan hardly aided his cause and he was notably cautious for a couple of races - but then had perhaps the most worrying incident of all in a close shave with an HRT during qualifying through the sixth-gear final turn of Interlagos. The team began to question whether his lack of recognition of red alert danger signals might not be a permanent trait rather than just needing a bit of work.

GARY ANDERSON'S TECHNICAL APPRAISAL

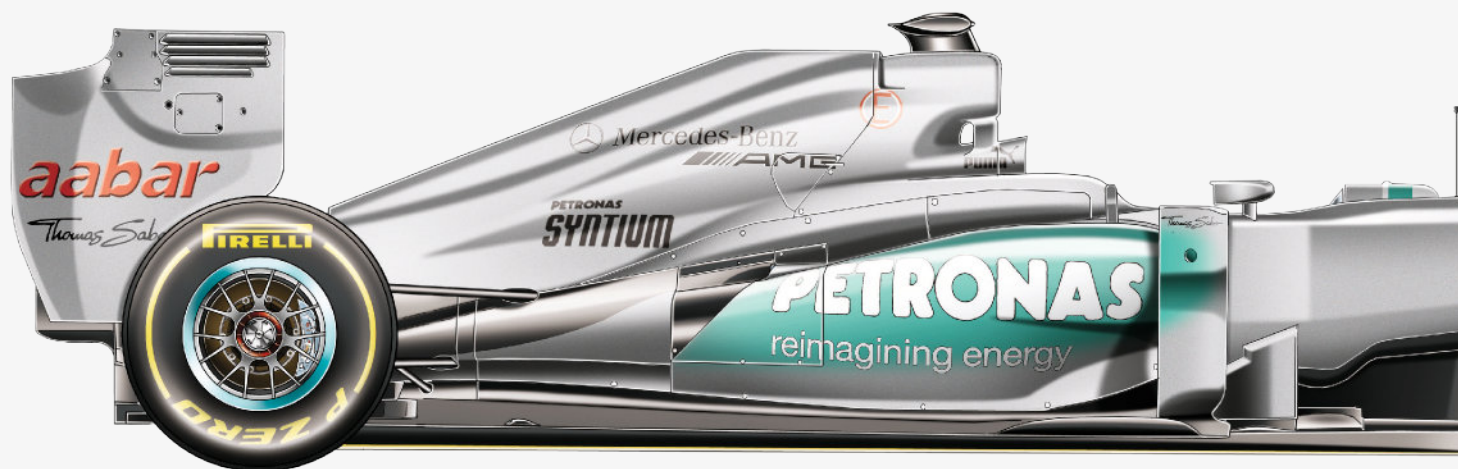
➔ With the DRS only free to be used in practice and qualifying, Lotus, along with Mercedes, played with a 'passive double DRS' that would cut drag on the straights in the race. But it's very sensitive. At lower speeds, the air going through those ducts exits from the rear of the car (red arrows), but there is a narrow pipe (indicated by the blue arrows) that can channel air to stall part of the rear wing, reducing drag. As low pressure on the rear wing increases with speed, this acts as the switch. The trouble is, the lag when decelerating rapidly means that it's very difficult to ensure the rear wing is giving you the downforce when you need it. Setting it up was very tricky.



LOTUS PERFORMANCE AT EACH RACE RELATIVE TO THE ABSOLUTE PACE



Mercedes



An early-season win for Nico Rosberg in China gave the team hope, but it soon headed down a development blind alley and only finished fifth in the makes' race

Around Shanghai in April Nico Rosberg scored his maiden grand prix victory and in so doing made Mercedes a race-winning F1 constructor for the first time since Monza 1955. It was a great win, scored off the back of a brilliant pole position lap and seemed set to be the foundation of a strong season for the team. But it didn't work out that way.

A cure was never found for the car's tendency to over-work the delicate rear Pirellis, and the unique double DRS system that had provided a 0.3s-0.4s advantage in qualifying ultimately hindered the development potential of the car and brought problems on race day.

The team made a mid-season change from 50 to 60 per cent windtunnel models and its chief of aero Loic Bigois left early in the year, being replaced by Mike Elliot of Lotus. The development direction of the

car appeared haphazard and unproductive, and several technical U-turns were made. Relative to Rosberg, Michael Schumacher had the most competitive of his three-season comeback, but was insufficiently convinced about the team's potential to immediately accept an offer to renew his contract. While he dithered, Lewis Hamilton was signed, leaving Michael to announce his second - and surely final - retirement.

With hindsight that China victory came about in a perfect storm of circumstances. It came on a track that, unusually, placed the tyre limitation on front wear rather than rear heat degradation. It came as Schumacher in second place held back a couple of faster cars that might otherwise have been able to challenge - and also after Jenson Button, who was on-course to be fighting for the win after the strategies had played out, suffered a pitstop delay.

As other cars developed, the Mercedes remained static. Team principal Ross

Nico Rosberg (D)



Championship position	Starts	20
	Wins	1
	Poles	1
	Fastest laps	2
	Points	93
	2011 position	7th

9th

Made the breakthrough to race winner and retained his team-leader status on paper, but was outperformed by the 16-year-old Schumacher on several occasions. After his seventh season, he has yet to make an unarguable case to be considered among F1's elite.

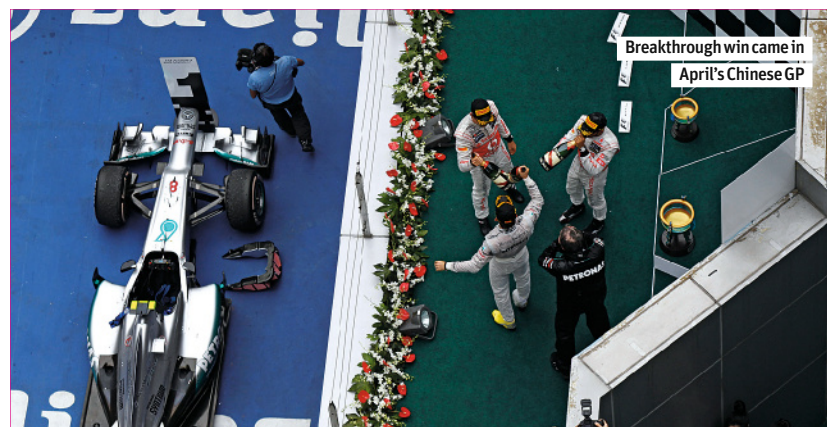
Michael Schumacher (D)



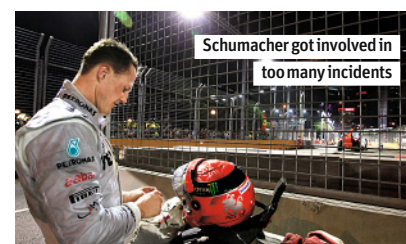
Championship position	Starts	20
	Best finish	3rd
	Best grid slot	2nd
	Fastest laps	1
	Points	49
	2011 position	8th

13th

The most competitive of his three comeback seasons, there were glimpses of the former greatness, especially during Monaco qualifying. But it wasn't sustained, the traits of the tyres and car did not suit his natural driving style, and the end result fell far short of his expectations.



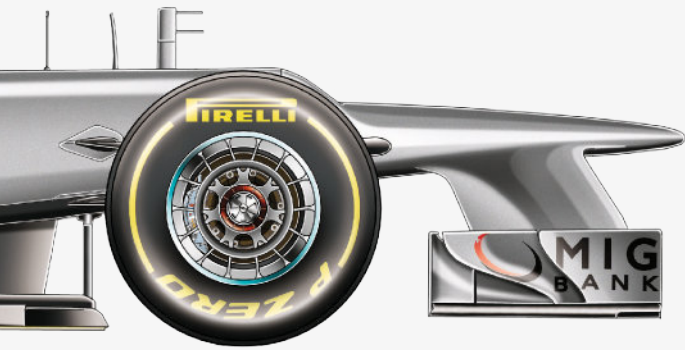
Breakthrough win came in April's Chinese GP



Schumacher got involved in too many incidents

PICS: COATES; ETHERINGTON/LAT

“As other cars developed, the Mercedes remained static. Team boss Ross Brawn acknowledged that the car’s double DRS system may have hindered development”



5th Championship position
1 Win
3 Podiums
1 Pole
3 Fastest laps

Brawn was acknowledging by the end of the year that the car’s double DRS system may have hindered conventional development. It was an ingenious - some might say over-reaching - reading of the regulations whereby opening the DRS flap exposed holes in the rear wing endplates that took air through channels, exiting on the underside of the front wing. Blowing the downforce off the front wing, the front would rise up and the drag-inducing rear would sit down, thereby reducing drag much further. But the system limited how much the contours of both the rear-wing endplates and front-wing flaps could be developed. It also created certain issues in race trim, as there was an inevitable delay in the airflow reattaching to the front wing after the DRS flap was closed, promoting entry understeer. Altering the flap angle to compensate for this would tend then to give too much front downforce when the flow finally did reattach, thereby hurting those delicate rear tyres.

As an indication of how these flaws came to assume increasing importance as other cars were developed and the Merc stagnated - for a variety of reasons - its average grid position in the first half-season was 3.8. In the second half that had slumped to 9.2 and the car that had been fastest qualifier in both Shanghai and Monaco was by the end of the year the best part of 1s off the pace.

Schumacher took full advantage of the car’s good mechanical grip at Monaco - a circuit with none of the long-duration turns that put so much heat into the rear tyres - to qualify fastest. A five-place penalty from the previous race - for his collision with Bruno Senna - meant he started only sixth. At Valencia he took what would stand as the only podium of his three-year comeback. He outqualified Rosberg 10 times from 20 (taking out the Monaco

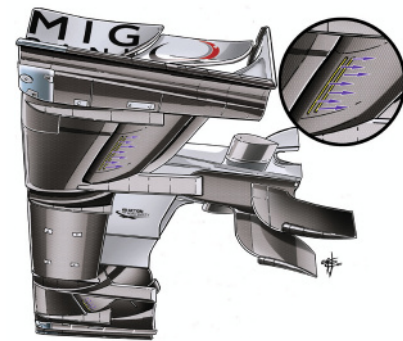
penalty) and his old wet-weather flair was very evident in qualifying on row two at both Silverstone and Hockenheim. Into the second half of the season the team was generally looking to him as its best chance. It was the best season-long personal performance of his comeback, though a couple more clumsy collisions did beg rather awkward questions about his closing-speed judgement.

But though Michael may have been less than he was, that was still comfortably better than the car - particularly into the latter half of the season. Unlike even those teams that had simulated and not chosen a Coanda exhaust during the winter, this feature was not even looked at until other cars appeared with it. It took until Singapore before it made it onto the car but was never made to work satisfactorily and had been removed by the final race.

Many behind-the-scenes technical changes were made mid-season - in both personnel and equipment - and Lewis Hamilton will hope they’ve been effective; because this was a mediocre performance for a properly funded factory team.

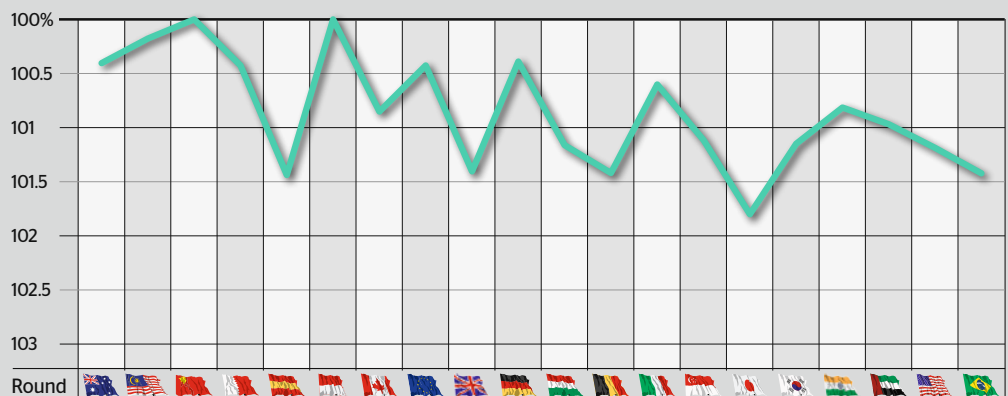
GARY ANDERSON’S TECHNICAL APPRAISAL

Mercedes started the season with the double DRS, which bled air through the rear wing via tubes (below) to stall the front wing whenever the DRS was open. The problem was that when you shut the DRS, there is low pressure under the front wing that has to be pulled all the way through the car before you get the front wing back to maximum downforce, meaning there’s a lag before the front wing is working fully. In Montreal, Mercedes introduced the more simplified front wing. In Montreal, you can get away with that but the endplate in front of the front tyre plays a big part in controlling the airflow. But Mercedes sacrificed some of the front end to find the balance, so it was running less front wing than it could have done.



Schuey’s only comeback podium came in Valencia

MERCEDES PERFORMANCE AT EACH RACE RELATIVE TO THE ABSOLUTE PACE



Sauber



Sauber's C31 was quick and consistent, giving Sergio Perez and Kamui Kobayashi some strong results, although sixth in the title race doesn't reflect that

Outside of its BMW days, this was Sauber's most competitive season and its sixth place in the constructors' championship sells it well short. There was a feeling from within the team that the car was actually superior to the identically-powered Ferrari and all that limited it was the driver line-up. That said, Sergio Perez and Kamui Kobayashi both had moments of glory: the Mexican was the fastest on race day in Malaysia, Monaco, Canada and Italy, taking three podiums along the way; the Japanese was on the front row in Belgium and the podium for his home race at Suzuka.

Although the C31 was conceived during a technical reshuffle, it was based heavily on the 2011 car and shared that car's big set-up adjustability - and that was a

crucially important tool in trading off tyre degradation against tyre wear, particularly valuable with the 2012 Pirellis. Pre-season, James Key resigned as technical director. This came a couple of months after the re-recruitment of Willem Toet as chief of aero. He had been made redundant in the staff cull of 2009 after the BMW pull-out. He replaced Seamus Mullarkey who moved on to head up R&D. Key was replaced by a three-man technical management team comprising Toet, vehicle performance chief Pierre Wache and chief designer Matt Morris.

The car this group of people conceived between them featured a sophisticated Coanda exhaust arrangement with accompanying steeply-raked sidepod. It also had a unique nose slot, taking air from the low-pressure area beneath the nose and ducting it over the top just

Sergio Perez (MEX)



Championship position	Starts	20
	Best finish	2nd
	Best grid slot	4th
	Fastest laps	1
	Points	66
	2011 position	16th

10th

Star of the show in Malaysia, Montreal and at Monza, Perez delivered his best stuff as McLaren was watching. Once he'd secured the 2013 McLaren ride he proceeded to deliver a series of error-riddled performances. The peaks were high, but the troughs were too frequent.

Kamui Kobayashi (J)



Championship position	Starts	20
	Best finish	3rd
	Best grid slot	2nd
	Fastest laps	1
	Points	60
	2011 position	12th

12th

Although he took his first front-row start and his first podium, Kobayashi was somewhat overshadowed by Perez for a second consecutive year. A solidly consistent racer with great passing ability and a knack for bringing the car home, he failed to convince the team of his ultimate potential.

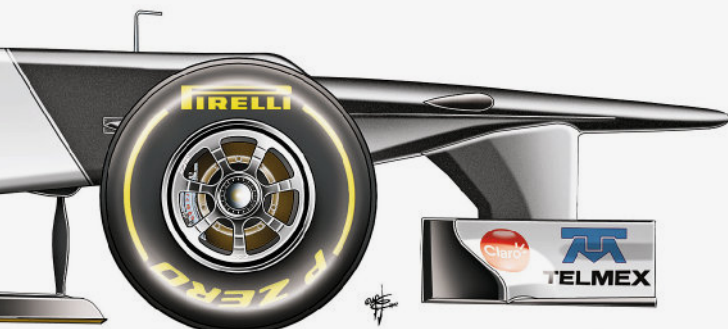


Perez was mighty in the Malaysian GP monsoon - and nearly won



Did Perez give up once his McLaren deal was safe?

“The C31 was based heavily on the 2011 car and shared that car’s big set-up adjustability – and that was a crucially important tool in trading off tyre degradation against wear”



6th

Championship position

0

Wins

4

Podiums

0

Poles

2

Fastest laps

behind the step. This helped keep the under-nose flow attached and reduced lift on the top surface. At the rear, the car and its pull-rod suspension were more tightly packaged around the Ferrari engine and gearbox than the F12 itself.

Perez took maximum advantage of the car’s ability to quickly switch on the tyres to be very quick in the wet of Malaysia. A possible victory looked on the cards until the team was too conservative in the timing of the final tyre change, but even after that Perez was able to quickly close on Fernando Alonso’s Ferrari and only finally lost the chance of the win when he ran wide on a wet kerb.

The car was invariably super-fast through high-speed corners, but not quite as strong – though still respectable – through slow ones. Both drivers complained about its braking stability and it was clear that the effectiveness of the Coanda exhaust brought challenges of balance change between entry and mid corner. Its DRS wing was extremely effective – giving a big boost in straightline speed but none of the difficulties of re-attachment seen on the Ferrari. On Kobayashi’s front-row Spa lap he was fastest of all through the downforce-demanding middle sector, but still among the fastest at the end of the long straights of sectors one and three. The C31 was invariably a factor in any race where rear heat degradation was a limiting factor but tended to almost disappear off the radar at those tracks where front wear was a limitation.

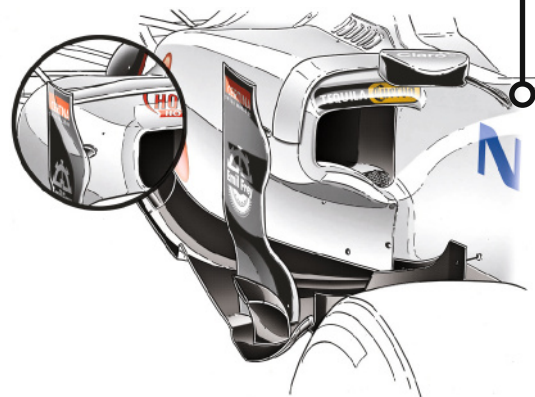
With the car’s gentler tyre usage allowing a one-stop strategy, Perez’s late-race speed on the option tyre was sensational in Montreal, surging him past Sebastian Vettel and Alonso and onto the podium. At Monza it was a similar story and a great tyre-strategy call ensured he was the only one on the correct rubber

throughout the race, allowing him to charge past the Ferraris – at Monza! – and close dramatically on winner Lewis Hamilton in the closing stages. He’d picked a good time to deliver such an eye-opening performance, given that this was when the ‘Hamilton to Mercedes’ rumours took hold.

But Perez’s performances were not uniformly of such a calibre and he was consistently slower than Kobayashi around Suzuka – just as he’d been at the similar high-speed demands of Spa – and Kamui delighted his home fans by holding off Button for the final podium place. Had it not been for the wild Grosjean at the Spa start, it’s not a stretching assumption that Sauber – with cars starting from second and fifth but both being forced to retire from opening-lap accident damage – would have scored enough points there to ultimately take the team ahead of Mercedes in the constructors’ championship. Which, given the respective performance of the two cars, would have been a just outcome.

GARY ANDERSON’S TECHNICAL APPRAISAL

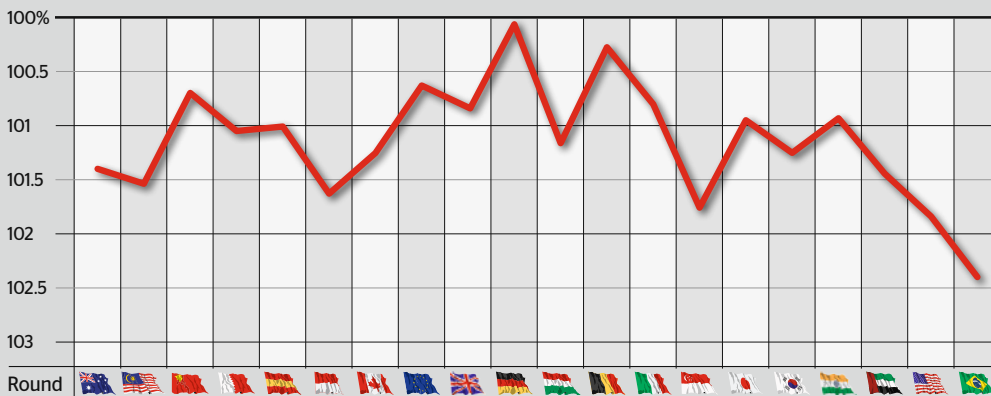
➔ The winglets on the sidepod were there to mitigate the lift caused by the airflow being directed over the top of the sidepod. The aim was to redirect the airflow onto the surface of the top of the sidepod. It should also have helped the airflow to the rear of the car. Because of the complexity of the airflow over the car, this winglet could also have assisted the airflow over the front wing and even under the sidepod. The large vertical turning vane was also part of this system, channelling the turbulent air coming off the front tyre and trying to re-align it all with the sidepods and into the coke bottle area. Everything Sauber did here was designed to maximise the usable airflow by controlling it.



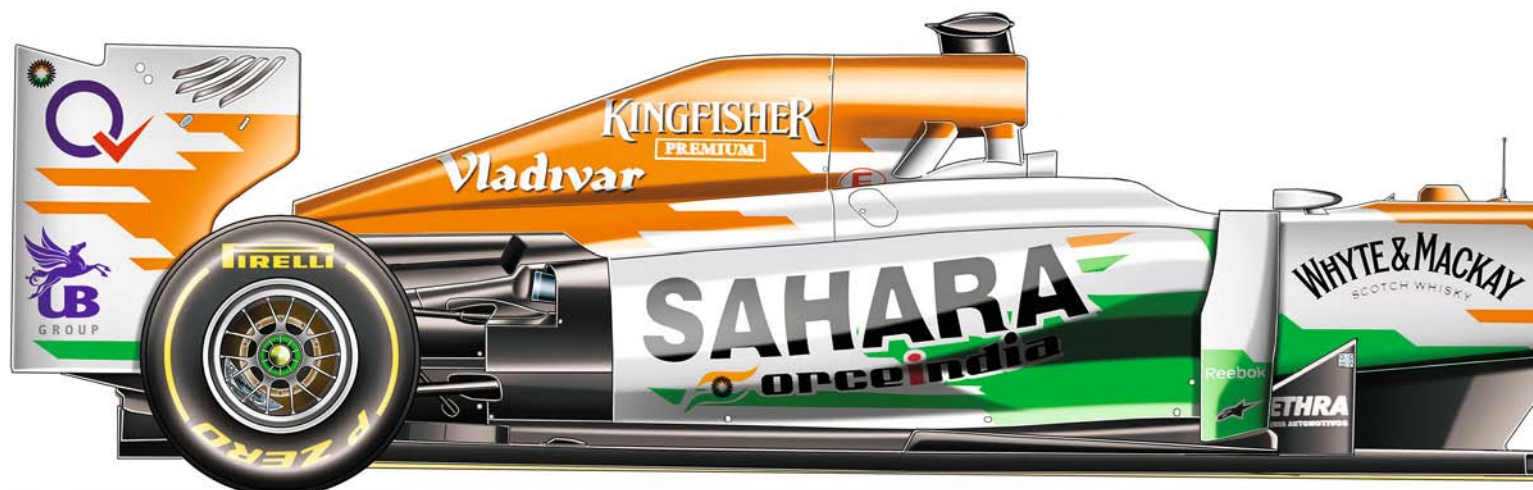
Kobayashi finished third at home, behind Ferrari’s Felipe Massa



SAUBER PERFORMANCE AT EACH RACE RELATIVE TO THE ABSOLUTE PACE



Force India



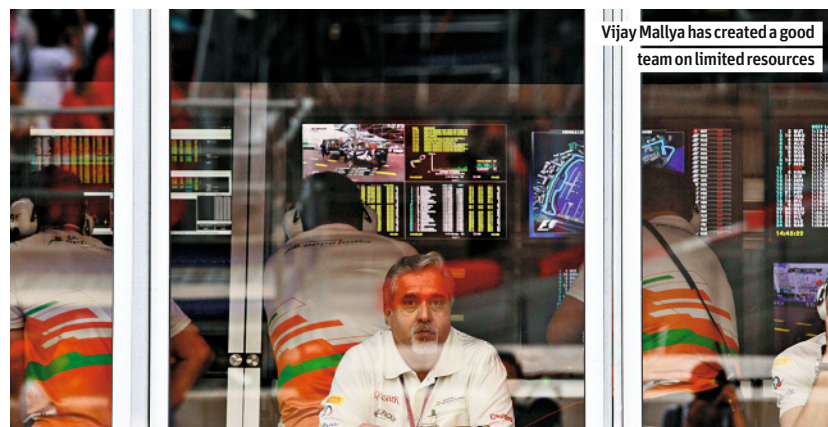
Force India slipped back from its 2011 position, thanks to several midfield rivals edging ahead, but the team did a solid job with the resources at its disposal

Force India opted for a clean-sheet design heading into 2012 as Andy Green and his design team sought to break through the glass ceiling their previous concept seemed to have limited them to. A new Enstone-like 'outwash endplate' front wing with the de rigueur three main elements, rather than the previous two, defined a realignment of the car downstream too. The sidepods stood proud of the floor, rather like those of the 2011 and '12 Toro Rosso. Although aerodynamically new, mechanically it was much as before with a Mercedes engine/KERS and the latest McLaren gearbox, to which was attached a pull-rod rear suspension layout.

The initial exhaust layout was a simple one, using the airflow over the downward sweep of the sidepods to bring the regulation upwards-pointing

exhaust flow down with it, but training the plume inboard over the brake ducts and beam wing. Although a Coanda arrangement - the exhaust pointing more outboard to help seal the diffuser sides - had been simulated in the tunnel, the team wasn't confident such a solution would be deemed legal. Only when Sauber, McLaren and others began racing their Coanda systems without protest did Force India feel confident enough to actually do its version. This appeared for the Spanish GP in May.

As a generalisation, compared with 2011, the car's performance dropped down the order relative to the others as Williams and Sauber surged clear with very competitive designs. Actually the lap-time deficit to the front was less than before - it was simply that other teams had leapfrogged into that smaller gap ahead of Force India. For much of the season it was a Q2-level car, only rarely



Vijay Mallya has created a good team on limited resources

Paul DI RESTA (GB)



Championship position	Starts	20
	Best finish	4th
	Best grid slot	6th
	Fastest laps	0
	Points	46
	2011 position	13th

14th

There were days when Paul's smooth style worked against him in tyre warm-up and, together with the slight decline in Force India's competitiveness, it made 2012 seem like a holding season. Like Button, he seems sensitive to chassis imbalance, but when all's well he's mighty. See Singapore.

Nico HULKENBERG (D)



Championship position	Starts	20
	Best finish	4th
	Best grid slot	4th
	Fastest laps	1
	Points	63
	2011 position	N/A

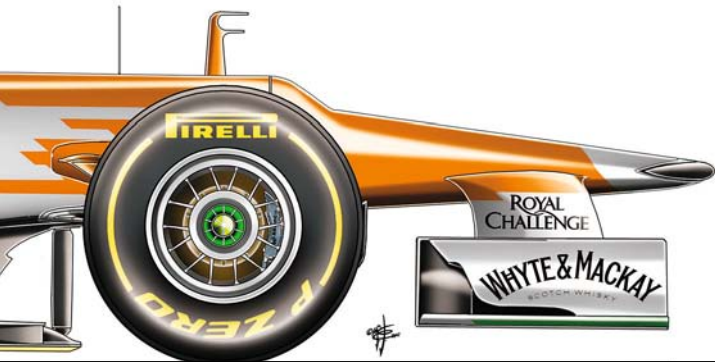
11th

Nico's gung-ho style allowed him to gradually grind ahead as the team's lead scorer. Whenever the conditions were wet he was invariably brilliant - see Hockenheim qualifying or, especially, fighting for the race win in Brazil. The Hamilton to di Resta's Button.

Hulkenberg outscored di Resta in first season with Force India



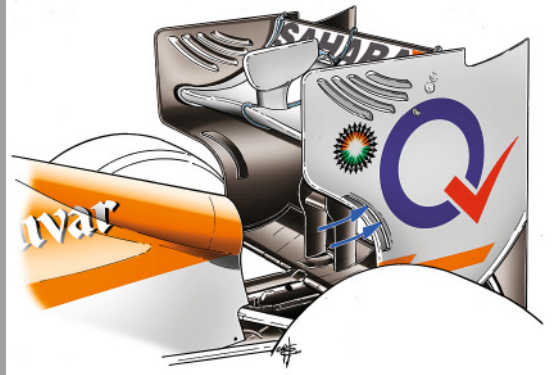
“As a generalisation, compared with 2011, the car’s performance dropped down the order relative to the others as Williams and Sauber surged clear with competitive designs”



7th Championship position
0 Wins
0 Podiums
0 Poles
1 Fastest lap

GARY ANDERSON’S TECHNICAL APPRAISAL

Force India has done a good job on limited resources. Correlation between the windtunnel and the track has always been good here, going to my days there back when it was Jordan – a lot of the people are still the same. This slot in the rear-wing endplate was a small detail that shows the team has a good handle on what it is trying to achieve. It was there to take the airflow that was deflected over the top of the rear tyre, which will have helped to attach the air to the endplate. It made the airflow over the rear wing more efficient by cutting the drag because it’s a simple and effective way of managing the airflow better. This shows a good understanding of the car.



straying into Q3. Cool conditions played into its favour as it was better able to generate good front-tyre temperature than most. This, in combination with the skills of Nico Hulkenberg, ensured the car was usually a strong force in the wet – never more so than in the final round in Brazil where, in his final race for the team, ‘The Hulk’ led on merit and was restricted to fifth only through the drivethrough he was awarded after clashing with Lewis Hamilton while trying to retake the lead.

Wet qualifying conditions also played a large part in Hulkenberg qualifying on the second row at Hockenheim (after Mark Webber’s penalty) – and in the dry of race day they sunk back down to the car’s natural level, finishing ninth.

Other highlights included Paul di Resta’s fourth-fastest qualifying time at Monza and his fourth-place finish in Singapore, pressuring Alonso’s Ferrari for a time. But more usually, lower-place points finishes were the most either driver could hope for.

In its performance profile the car reverted to Force Indias of two and three years ago in that it went better on low-downforce tracks. One of the car’s key limitations was in achieving a consistent balance between entry and mid corner – in the transition between no exhaust blowing and blowing. Getting accurate modelling of the aero effect of the exhaust proved beyond the resources of the team, with a CFD department that is still very small.

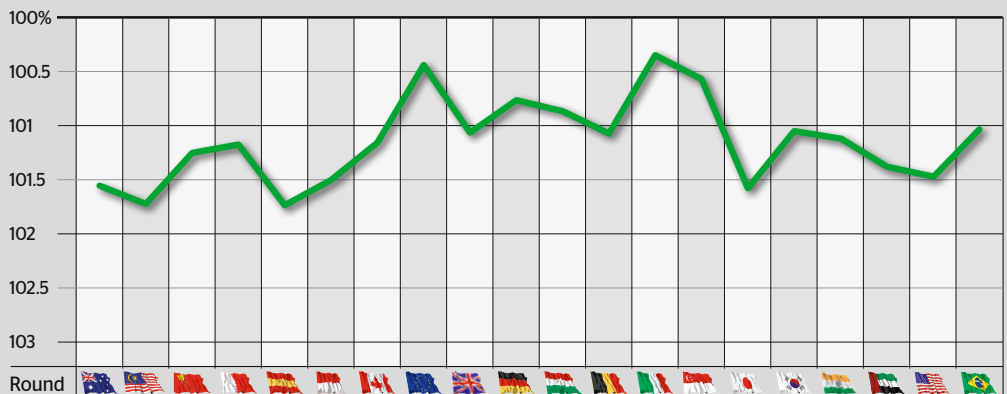
“We don’t have access to an engine dyno where we can look at the nature of what the exhaust does and we don’t have good enough tools to simulate exhaust exits,” admits Green. The development therefore had to be more pragmatic and to work in conjunction with the inevitable learning curve of the 2012 Pirelli rubber.

In this latter endeavour Green feels the team did well. “We don’t have the big scatter between our drivers,” he points out. “We don’t see the big surge to the front and then the drop to the back; we just seem to be there in the middle, consistent, every race, which to me indicates that we are managing them quite well. That is where the overall performance of the car is. That race consistency has come on in leaps and bounds since last year. It was a big focus, and it’s been difficult because previously there hasn’t been a tyre-management department in the team before. There’s a huge aerodynamic department and the tyre department was next to nothing, so to build something up over a short period of time has been quite difficult. And we’re missing a few tools that will help us that will come online eventually.”

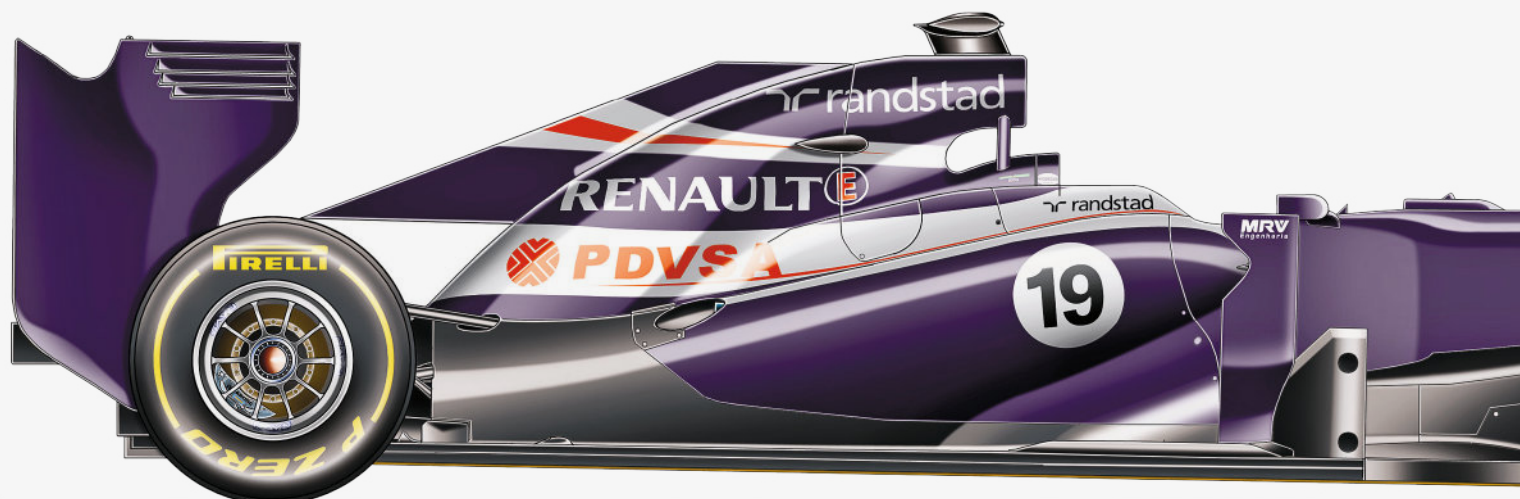
At around 300 employees, the team is on the smaller side of medium and, with a relative lack of simulation tools, its success is often down to development-direction hunches. As the field bunched up, Force India was caught slightly short.



FORCE INDIA PERFORMANCE AT EACH RACE RELATIVE TO THE ABSOLUTE PACE



Williams



Williams focused on understanding its 2012 car rather than over-developing it – and Maldonado’s Spanish GP win was just reward for this legendary F1 outfit

Williams returned to the top step of the podium for the first time since 2004 as Pastor Maldonado impressively held off Fernando Alonso’s Ferrari to win in Barcelona. It was the confirmation that the team was on the way out of the technical doldrums it has suffered for year after year and that the new technical management team of Mike Coughlan (technical director), Mark Gillan (chief operations engineer) and Jason Somerville (chief of aero) had got a good handle on amplifying the strengths and correcting the weaknesses of the team. Ed Wood remained as chief designer. On the downside, the FW34’s competitiveness was in no way reflected in its championship position, as Maldonado threw away several big points chances with red-mist moments.

Conceptually the car was not a lot different from the unsuccessful 2011

machine, featuring the same tiny gearbox, with the differential rotated downwards from its usual position and requiring sharply angled driveshafts. But the Cosworth engine was replaced by a Renault – a much more extensively developed motor, with smaller cooling requirements that could be used to aerodynamic advantage. Crucially, its homologated layout allowed the engine cover to be slimmed down significantly – thereby unblocking some of the aero potential to be gained from the small gearbox. The engine was mated to the team’s own KERS unit. At the front a hugely intricate wing with highly sophisticated ‘outwash endplates’ reflected a team that was very confident in its CFD capabilities. At the rear the exhaust plume was directed inboard, with no initial attempt being made at a Coanda-style system that sealed the diffuser sides. As with Lotus, the team had assessed such a system but had preferred to take

Pastor MALDONADO (YV)



Championship position	Starts	20
	Wins	1
	Poles	1
	Fastest laps	0
	Points	45
	2011 position	19th

15th

An exciting performer, but a raw and overly emotional one at the moment. Outside the car he is bright and has a good understanding and feel for the technicalities. But that can all evaporate in a few seconds of madness, should he be induced into a fight.

Bruno SENNA (BR)



Championship position	Starts	20
	Best finish	6th
	Best grid slot	9th
	Fastest laps	1
	Points	31
	2011 position	18th

16th

There were flashes of a very good F1 driver in there – his race in Malaysia was superb, for example. But he was unable to string it together over a season and he was invariably a couple of tenths adrift of Maldonado – often the difference between going out in Q2 and making it to Q3.



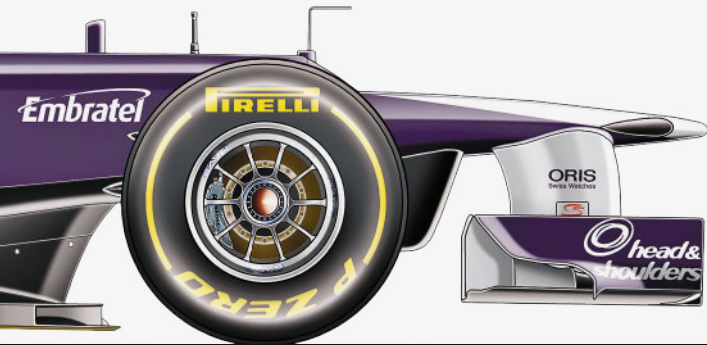
It all came good for Maldonado in the Spanish GP



Senna was outscored by his team-mate and has lost his drive

PICS: DUNBAR/LAT

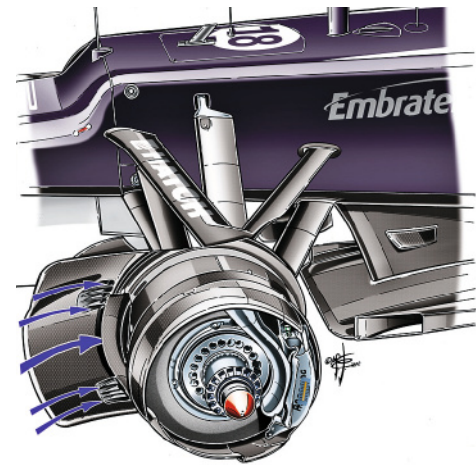
“The Cosworth engine was replaced by a Renault – a much more extensively developed motor with smaller cooling requirements that could be used for aerodynamic advantage”



8th Championship position
1 Win
1 Podium
1 Pole
1 Fastest lap

GARY ANDERSON'S TECHNICAL APPRAISAL

➔ The front brake ducts were aimed at covering the tyre so that the tyre rotation didn't affect the airflow. To do that, the vane was added to stick forward as far as is allowed by the rules, which limit a maximum radius. You need to have a gap because the tyre moves around on the rim a bit and you might as well have a fractionally bigger gap and use the distance between the carbon faring and the tyre as the brake duct. The airflow goes inside the tyre and into the gap and that works for cooling. It works very efficiently and you can do whatever you want with the inner surface to optimise the airflow. The greater the mass flow there, the better. The Williams design managed the air well.



the certainties of greater engine power than the possibilities of a small aero gain.

It began the year unspectacularly in the upper midfield. The first glimpse of something more than that came in the rain of Malaysia where both Maldonado and Bruno Senna were among the fastest on track. Steady, incremental development was a big contrast to the previous philosophy of throwing new parts on as quickly as they could be made. Understanding of the car built progressively so that after the three-week break between Bahrain and Spain, a competitive jump had been made. In Mugello testing prior to the Barcelona race, a Coanda exhaust had been tried but its performance did not make a case for itself and although versions of that system would appear sporadically in practice throughout the year, the car always raced with a conventional system.

The non-Coanda exhaust layout led the team to extensively develop its rear brake ducts and by the time of Barcelona these had become very sophisticated, with a skirt maintaining good downforce from them even as the car moved up and down on its suspension. It again reflected a powerful simulation capability.

“That was a real strength that Jason [Somerville] inherited,” says Gillan. “There was a very talented group of people in the aero department and it's a good facility.”

Big improvements were made in the build quality too - and that had a direct impact on development speed. “Last year the build quality wasn't where it needed to be,” says Gillan, “and that made it very hard to properly assess the effectiveness of developments on the car. When the numbers don't even correlate between two seemingly identical cars in the garage, it makes it very hard to know the right direction for the aero guys to go in.”

When Lewis Hamilton was thrown to

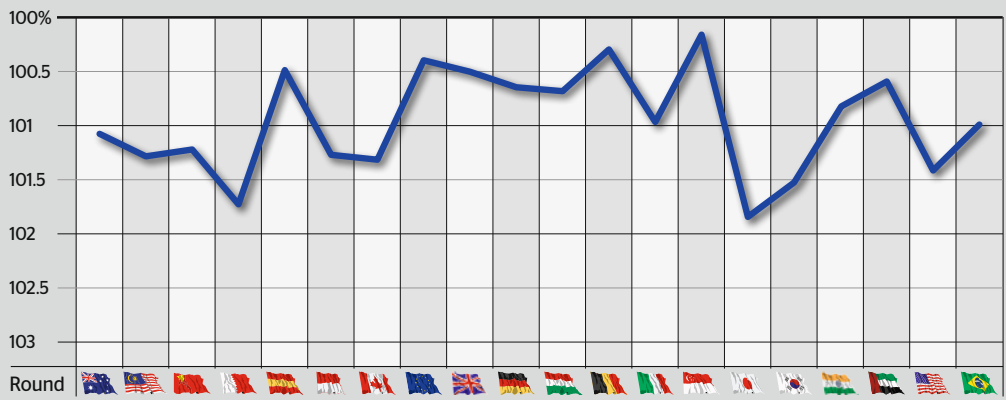
the back of the Barcelona grid, it moved Maldonado's Williams onto pole - a position he converted into a flawless win. The Venezuelan's raw speed was not his only strength - he also had a great feel for the tyres and when and how hard they could be pushed. In fact the only real weakness in his game is emotion-triggered responses in high-stress moments. This was very much in evidence at Monaco where his wheel-banging during practice with Sergio Perez and his big accident later in the lap helped to completely disguise the big potential of the Williams/Maldonado combination around the streets on which he's starred in the past. Senna could not usually conjure the same turn of speed but was a more consistent points scorer.

Although Barcelona was the highlight, Maldonado qualified third at Valencia but clashed with Hamilton late in the race, was sixth quickest at Hockenheim, third quickest at Spa (penalised to sixth) and on the front row in Singapore. A hydraulics failure took him out there but all the other efforts were wasted by accidents.



Williams tech team gelled to produce its best car for many a year

WILLIAMS PERFORMANCE AT EACH RACE RELATIVE TO THE ABSOLUTE PACE



Toro Rosso



Scuderia Toro Rosso got left behind in Formula 1's development race this year, with a mid-season technical director reshuffle not helping matters

Toro Rosso fell back in competitiveness in 2012, especially once the frighteningly quick development rate of even the medium-sized teams kicked in. The car, the STR7, was based heavily on the previous year's machine, with similar uplifted sidepods. It retained a Ferrari engine/KERS and its own gearbox.

A wholesale change was made in the cockpit, with Daniel Ricciardo and Jean-Eric Vergne taking over from Sebastien Buemi and Jaime Alguersuari. The car had been conceived, as before, under the direction of Giorgio Ascanelli but the team lost the benefit of his talent and experience mid-season following a falling-out with team principal Franz Tost.

Ascanelli's replacement as technical director was James Key - who joined the

team only from Monza onwards.

The car was initially up with Force India and Williams as one that, with a good lap, might just squeeze into Q3. Ricciardo managed to do this in Australia and Bahrain, and at Sakhir he then produced one of the qualifying laps of the season to go sixth on the grid. It was a performance that had Ascanelli raving and making comparisons with Vettel, but was wasted within a few seconds of the race with a bad start and contact with another car. Vergne meanwhile was struggling in qualifying but putting together some excellent races. This would remain a theme throughout the year, as the French rookie seven times failed to make it out of Q1, but four times brought the car home to score points in a good eighth place.

Once the European phase of the

Jean-Eric VERGNE (F)



Championship position	Starts	20
	Best finish	8th
	Best grid slot	11th
	Fastest laps	0
	Points	16
	2011 position	N/A

17th

His style often seems over-aggressive in qualifying. He's ballsy and it wasn't for lack of commitment he so regularly fell short of making it out of Q1. But he has a good feel for the car and tyres on Sunday. It happened too often to be coincidence. If only he can nail the demands of qualifying.

Daniel RICCIARDO (AUS)



Championship position	Starts	20
	Best finish	9th
	Best grid slot	6th
	Fastest laps	0
	Points	10
	2011 position	27th

18th

His Bahrain Q3 lap was one of the best of anyone all season. His smooth style is in stark contrast to his team-mate's, and it's very effective on Saturday. That said, there wasn't much wrong with his racecraft later in the season and he's done nothing to suggest he isn't potential Red Bull material.



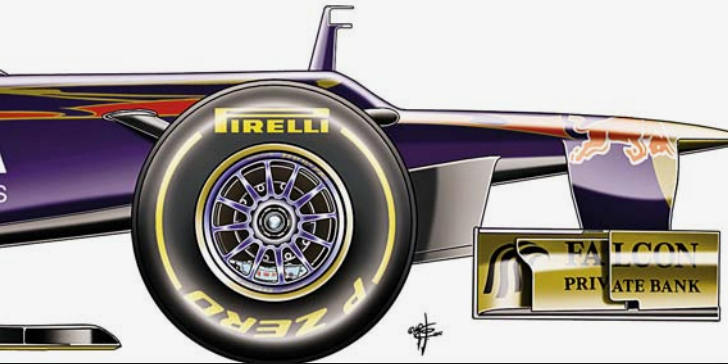
STR boys Ricciardo (l) and Vergne joke with Sky F1's Nat Pinkham



Ricciardo made a good fist of qualifying the STR7...

PICS: MASON, THOMPSON/GETTY IMAGES

“Once the European phase of the season began and the bigger teams around them had developed their cars more, the STR7s sunk to the lower part of the Q2 grid”



9th Championship position
0 Wins
0 Podiums
0 Poles
0 Fastest laps

season began and the bigger teams around them had developed their cars more, the cars sunk to the lower part of the Q2 grid. There was a barren mid-season spell where they failed to score points for nine consecutive races, but from Spa onwards both drivers became regulars in the lower points-paying positions. It was a relatively lacklustre season for a small team that has experienced some giant-slaying moments and it appeared as if it had simply been outgunned in what was a very intense development race.

When Key arrived what he found was a car that was somewhat locked into a technical rut and an aero department that could benefit from a lot of strengthening. The car's rear downforce fell off rapidly if taken out of its ideal rideheight window - both because of a somewhat peaky aero platform and a mechanical layout that didn't allow for much adjustment.

“Actually, given that, we did surprisingly well in looking after the tyres,” said Key, “and that wasn't down to any developments we made, but was just about the drivers getting their heads around what was required, not pushing flat out the whole way, but judging when to hold back and by how much and then pushing hard later on. They both became very adept at that.”

One reason for the team's relatively good showing in 2011, particularly in the latter part of that season, had been the good handle it had on exhaust blowing in a season in which a lot of the medium-sized teams struggled with it. So well had it grasped that technology that rivals were even questioning if the parent Red Bull group had been involved. Whatever it was, that advantage for Toro Rosso was removed with the 2012 regulation restrictions upon the technology - and

clawing it back did not play to the strengths of the team's facilities.

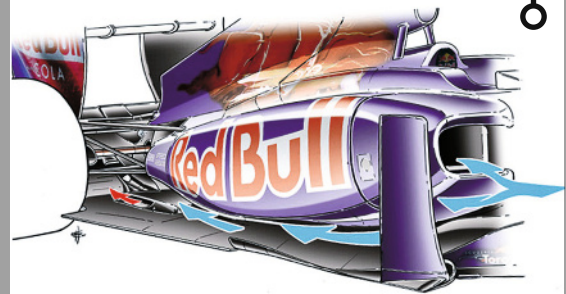
A Coanda exhaust went onto the car from Montreal onwards, the small CFD department having done well to approximate the system's traits. But in linking the windtunnel, CFD and track together there is still a lot of work to do.

“The tunnel [in Brackley] is OK,” says Key, “but isn't how you would spec it if you were starting from scratch and we need to do more work to define its accuracy. Ideally we could do with another 10 aerodynamicists.”

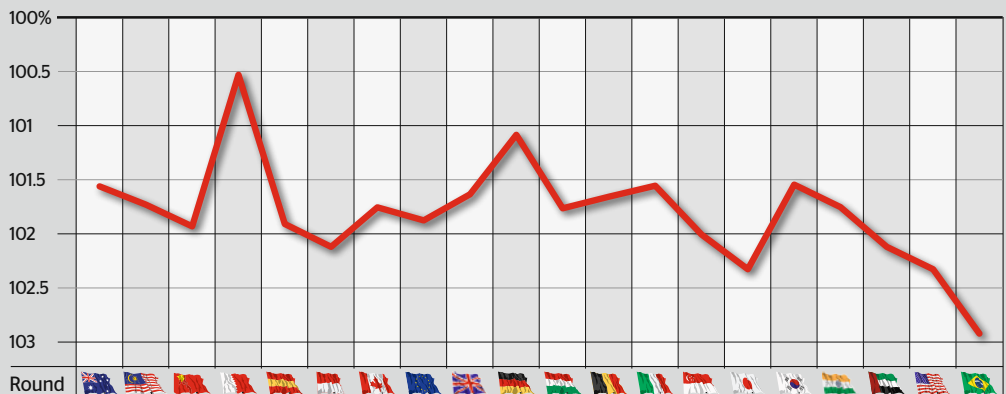
Front- and rear-wing updates followed on from the new exhaust. There was a new floor and, in Japan, new front brake ducts, followed by new rear ducts in India. Each brought small gains. But this was at a time when others were making big gains, particularly in fine-honing the potential of exhaust flow in boosting rear downforce. It all left Toro Rosso in a competitive vacuum, well clear of the three infant teams, but definitely at the back of the next group. Can it recapture some of that giant-killing magic in 2013?

GARY ANDERSON'S TECHNICAL APPRAISAL

➔ Toro Rosso was the only team to exploit the sidepod undercut to this degree. In simple terms, it allowed the airflow straight through from the front to the back of the car. But when there is an undercut underneath the leading edge of the sidepod and it comes to nearly the maximum width, you get airflow accelerating around that corner. Because you are accelerating it, less tends to end up under the underfloor. With the STR7, the airflow was at low pressure so more could leak under the floor. The problem was that while this made the car very efficient at a track like Montreal or Monza, it reduced the potential for downforce production by the diffuser because of that loss of air under the floor.



TORO ROSSO PERFORMANCE AT EACH RACE RELATIVE TO THE ABSOLUTE PACE

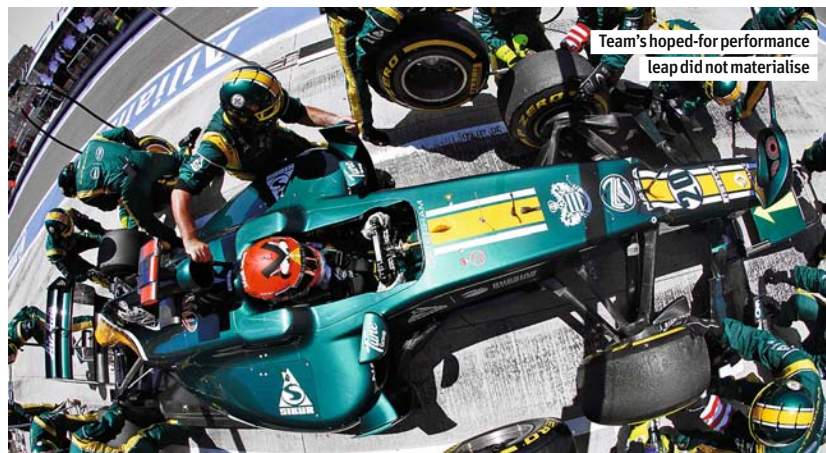


Caterham

“In summary, the team under-achieved, given the resources devoted to it and the aspirations with which it entered the season”



The team, formerly ‘green Lotus’, claimed it could get onto the tail of the midfield in 2012, but the reality was rather different



The team did not make its anticipated step to the back of the midfield group in this its first season under the Caterham moniker. Instead it remained firmly in the Q1 part of the grid and only an 11th-hour overtake by Vitaly Petrov in Brazil secured the team a place above Marussia in the constructors' championship. The gap to the Q2 part of the grid was slightly narrowed - at around 1s - but so was its performance advantage over Marussia, a car with a less well-developed engine and no KERS.

The Renault-powered CTO1 was conceived under the technical directorship of Mark Smith, though still visibly related to the Lotus T128. John Illey joined as performance director in November, so had no input into the design of the car, which was conceived in the Aerolab tunnel in Italy but subsequently developed in the Williams tunnel. That change brought a few snags as the correlation between the two was inevitably not exact.

KERS was a new technology for the team and the extension of the wheelbase to make room for it allowed a better

transition of the rear bodywork to the rear wing. Drivers Heikki Kovalainen and Petrov reported the car to be balanced but lacking downforce. A Coanda-effect exhaust was incorporated from Silverstone onwards but the gains from it were not as big as simulation had suggested. The Williams tunnel only got exhaust-flow simulation late in the season.

The team moved from Hingham, Norfolk to the old Super Aguri/Arrows base in Leafield, Oxfordshire mid-season and that was achieved reasonably smoothly, though some production capacity had to remain in Hingham for the balance of the year. Kovalainen was twice able to take advantage of the problems of bigger-team cars to get through to Q2 - in Bahrain and Valencia. He had a 0.3s advantage over Petrov in qualifying but in the races things were much more evenly matched.

In summary, the team under-achieved, given the resources devoted to it and the aspirations with which it entered the season. Mike Gascoyne, who had moved on within the Caterham group, said last year: “There are good reasons we can be in the midfield [in 2012]... If we don't, we've cocked it up.”

10th

Championship position

0
Wins

0
Podiums

0
Poles

0
Fastest laps

Heikki KOVALAINEN (FIN)



Championship position	Starts	20
	Best finish	13th
	Best grid slot	16th
	Fastest laps	0
	Points	0
	2011 position	22nd

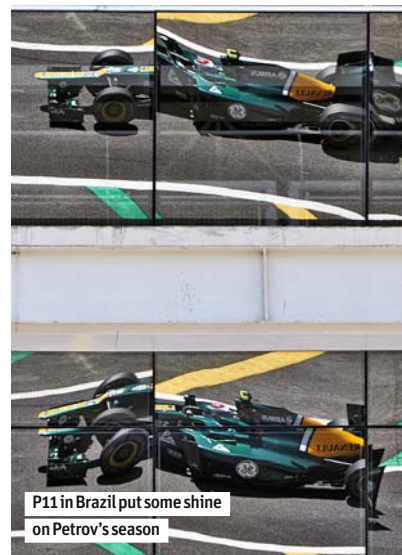
Remained committed and focused under disappointing circumstances, but his race performances were often only on a par with Petrov's, probably reflective of the car's low limits.

Vitaly PETROV (RUS)



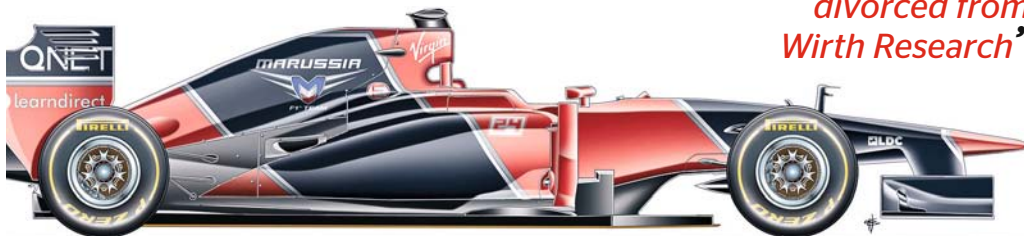
Championship position	Starts	20
	Best finish	11th
	Best grid slot	18th
	Fastest laps	0
	Points	0
	2011 position	10th

For a driver in his third season of F1, he struggled sometimes with some of the basics, especially KERS usage and braking overlap. But showed good spirit and opportunism in the races.



P11 in Brazil put some shine on Petrov's season

Marussia



“It was a worthy effort from the team, now freshly divorced from Wirth Research”

The ex-Virgin squad had control over its car for the first time

Until the last two laps of the season Marussia was on course to nick 10th place in the makes' race off Caterham. It was a worthy effort from the former Virgin team that in 2012 was freshly divorced from Wirth Research, giving it control over car design and manufacture for the first time.

The Cosworth-powered and KERS-less MRO1 was a big step on from the 2011 car with neat packaging around a pull-rod rear suspension. A technical partnership with

McLaren Applied Technologies allowed for access to a windtunnel and driver-in-loop simulator, but this came too late to help the largely CFD design. The tunnel programme came on song as the season got underway with the car was starting 4.5 per cent off the front but ending up 2.5 per cent adrift.

Rookie Charles Pic gave Timo Glock a closer run than any of the team's previous drivers, though the experienced German retained the upper hand overall. The biggest update package came at Spa with a new rear wing, brake ducts, additional front wing bridges and a revised tea-tray profile at the floor's leading edge. At Monza the new wing, with around 20 points more downforce than the usual Monza skinny wing, gave the same straightline speeds, illustrating aero-efficiency gains.

11th

Championship position

0
Wins

0
Podiums

0
Poles

0
Fastest laps

Timo GLOCK (D)



Championship position	Starts	20
	Best finish	12th
	Best grid slot	18th
	Fastest laps	0
	Points	0
	2011 position	25th

Continues to push hard in circumstances that remain challenging. It would be interesting to see how he'd respond if he was ever in a competitive F1 car again.

Charles PIC (F)



Championship position	Starts	20
	Best finish	12th
	Best grid slot	18th
	Fastest laps	0
	Points	0
	2011 position	N/A

Several of Glock's Virgin team-mates could get close to him in qualifying but Pic hung onto him in the races too - and sometimes even outperformed him.



HRT



“The Cosworth-powered F112, with a Williams gearbox, was still related to the Dallara-originated car of 2010 and 2011”

Tail-ender struggled on to the end and left with little to show

HRT staggered out of the sport much as it had staggered into it: fighting against insurmountable odds. Thesan Capital - which had bought the team mid-way through 2011 from Ramon Carabante - chose former Minardi F1 driver Luis Perez-Sala as team principal, replacing Colin Kolles. The HQ was moved to a small industrial unit near Madrid and a new car was built using a confusing myriad of

independent design and manufacturing companies spread all over Europe.

The Cosworth-powered F112, with a Williams gearbox, was still related to the Dallara-originated car of 2010 and '11, but significantly reconfigured and re-packaged. This had been commissioned by former tech director Geoff Willis, who had left in November 2011. Taking over his role was former chief of racing Toni Cuquerella. After failing key crash tests, the team failed to compete in the opening race - again - but from Malaysia on Pedro de la Rosa and Narain Karthikeyan could at least take part.

The car averaged less than 1s slower than the Marussia and former McLaren racer de la Rosa was able to use his experience to give direction.

12th

Championship position

0
Wins

0
Podiums

0
Poles

0
Fastest laps

Pedro DE LA ROSA (E)



Championship position	Starts	19
	Best finish	17th
	Best grid slot	20th
	Fastest laps	0
	Points	0
	2011 position	20th

At 41 he still had the taste for the fight - and this really was a fight. He was often quicker than his team-mate and gave good direction.

Narain KARTHIKEYAN (IND)



Championship position	Starts	19
	Best finish	15th
	Best grid slot	21st
	Fastest laps	0
	Points	0
	2011 position	26th

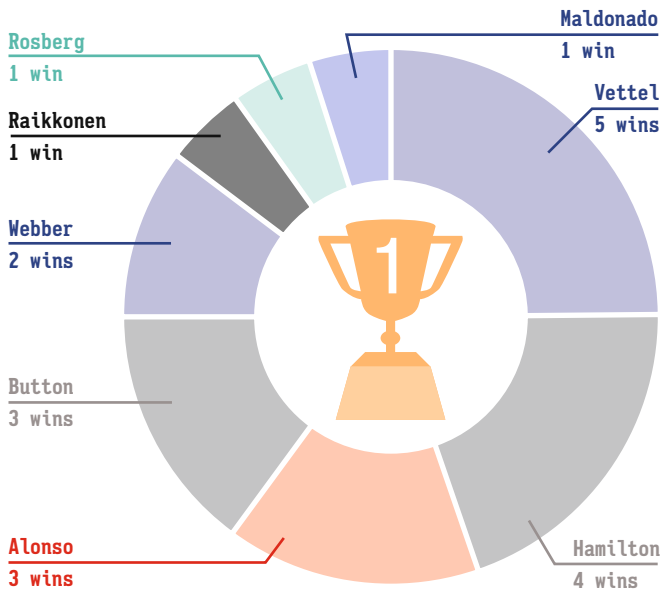
During another spell at the back of the grid, he did what he could. He did well in wet/dry Brazil, but there were few chances to shine.



With eight different race winners the 2012 F1 season gave **ANDREW VAN DE BURGT** and **SCOTT MITCHELL** plenty of stats to mull over

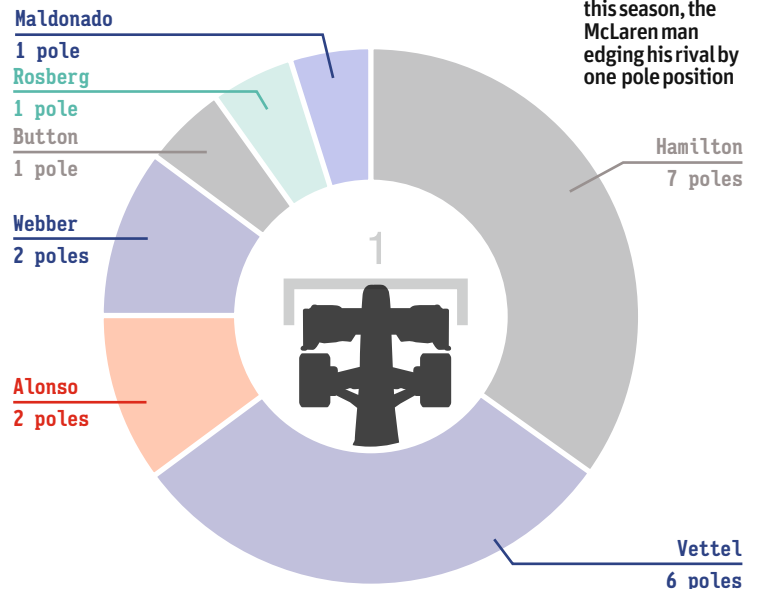
RACE WINS

The wins were more evenly shared than 2011, but Sebastian Vettel still won a quarter of this season's races



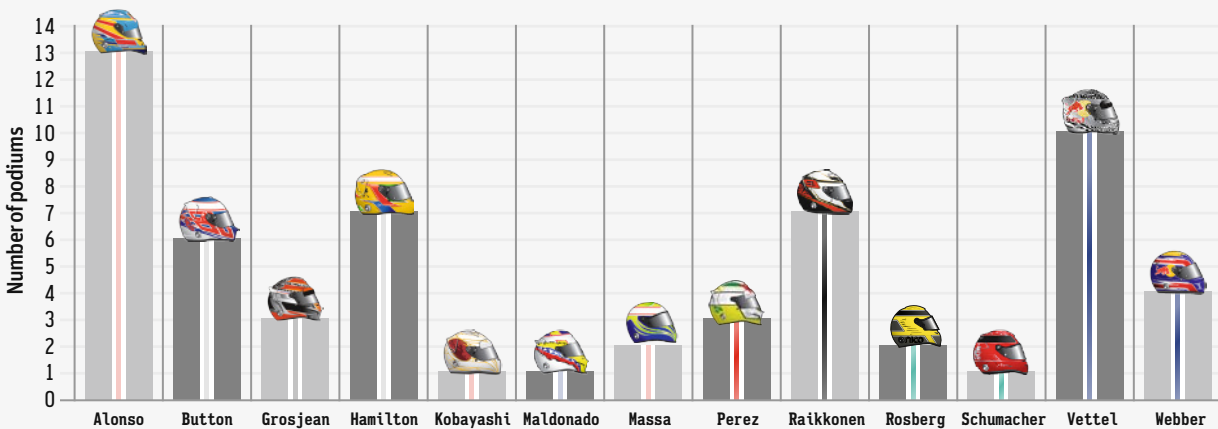
POLE POSITIONS

Hamilton and Vettel were the stars of Saturday this season, the McLaren man edging his rival by one pole position



PODIUMS

He might not have had the fastest car at any point this season, but Alonso visited the podium more than any other driver



HIGHEST TOP SPEED

215 MPH
Kimi Raikkonen
Italian Grand Prix

FASTEST PITSTOP

2.31s
McLaren, for Jenson Button, German GP

LAPS LED

Though not as dominant as in 2011, Red Bull's triple world champion still led just shy of one third of race laps this season

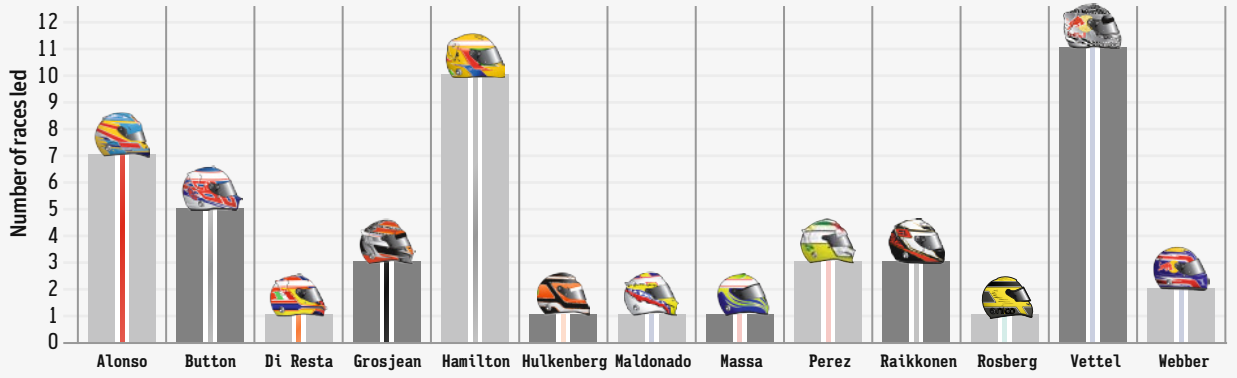


MOST RACE LAPS COMPLETED

1191 - Kimi Raikkonen

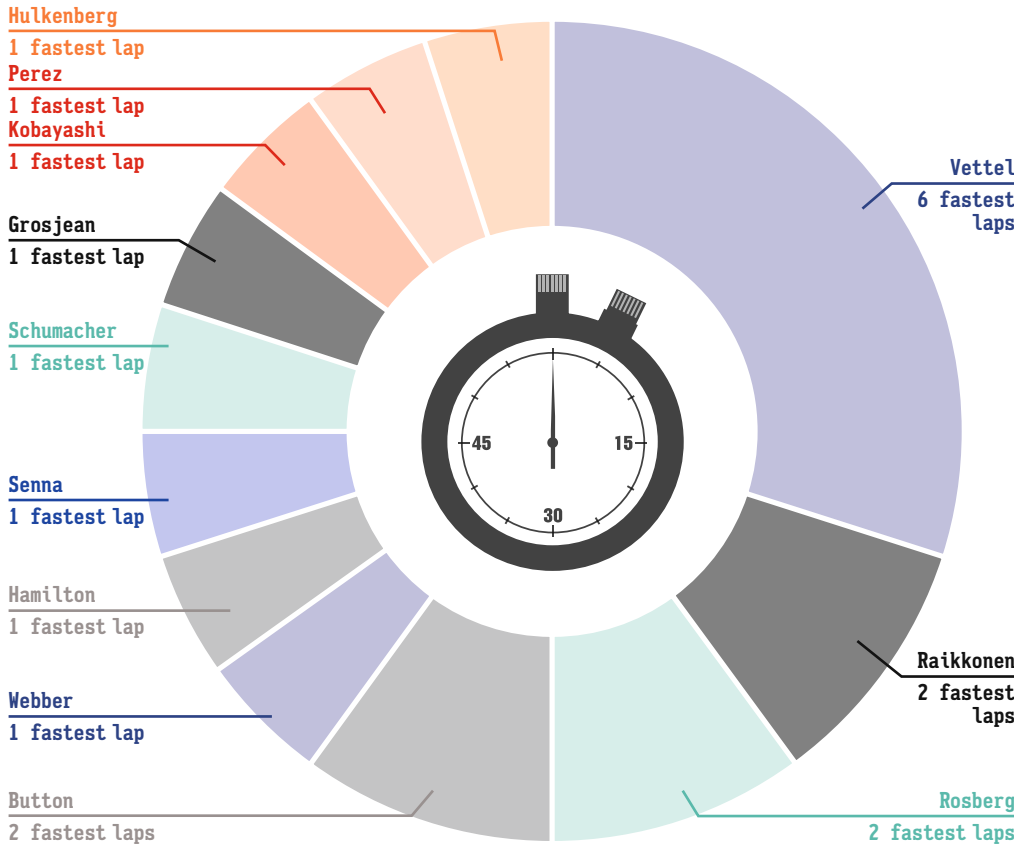
RACES LED

Vettel and Hamilton are a class apart, with the 2012 world champion ahead of the Briton by one race



FASTEST LAPS

Vettel returned to a 2010 state of fastest-lap dominance, with three times as many as anyone else. Championship rival Alonso doesn't manage one

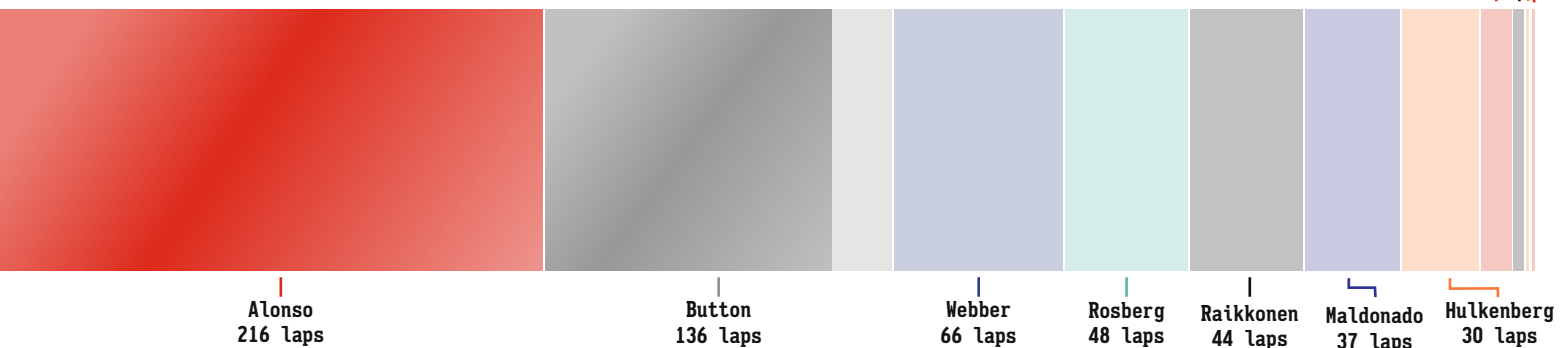


QUALIFYING HEAD TO HEAD

11 Vettel	Webber 9
4 Button	Hamilton 16
17 Alonso	Massa 3
10 Schumacher	Rosberg 10
9 Raikkonen	Grosjean 10
1 Raikkonen	d'Ambrosio 0
8 Di Resta	Hulkenberg 12
10 Kobayashi	Perez 10
16 Ricciardo	Vergne 4
18 Maldonado	Senna 2
14 Kovalainen	Petrov 6
18 De la Rosa	Karthikeyan 2
13 Glock	Pic 6

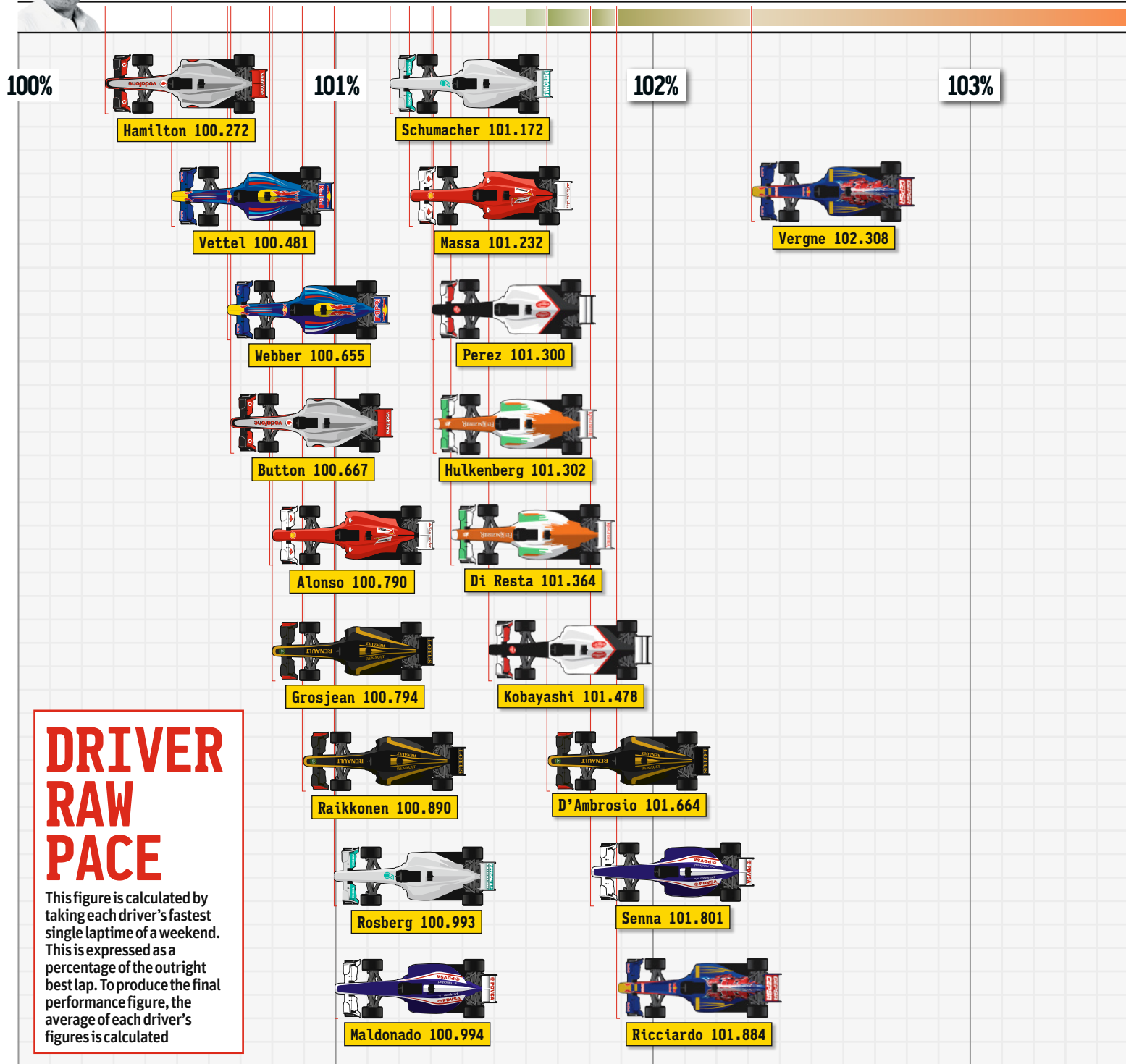
14 NUMBER OF DRIVE-THROUGH PENALTIES

Perez 12 laps	Grosjean 4 laps	Di Resta 1 lap	Massa 1 lap
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GARY ANDERSON crunches the numbers to understand which teams and drivers were the best performers during the 2012 F1 season

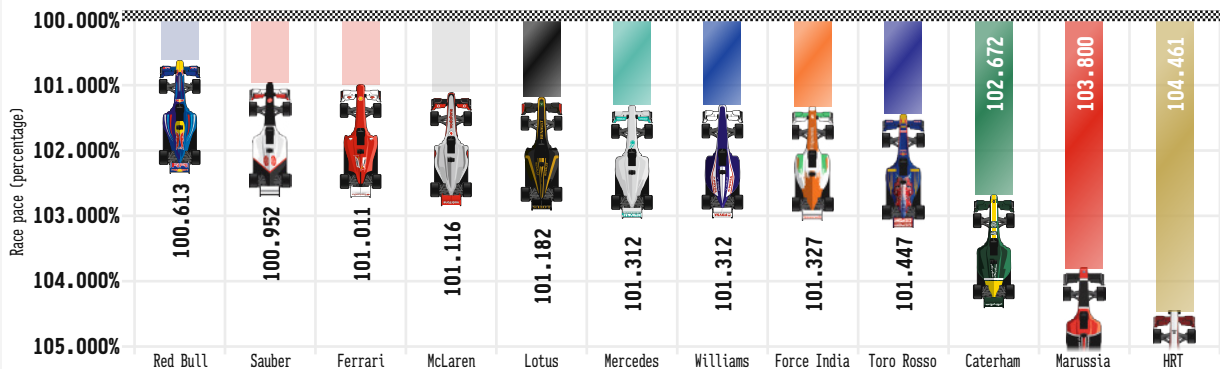


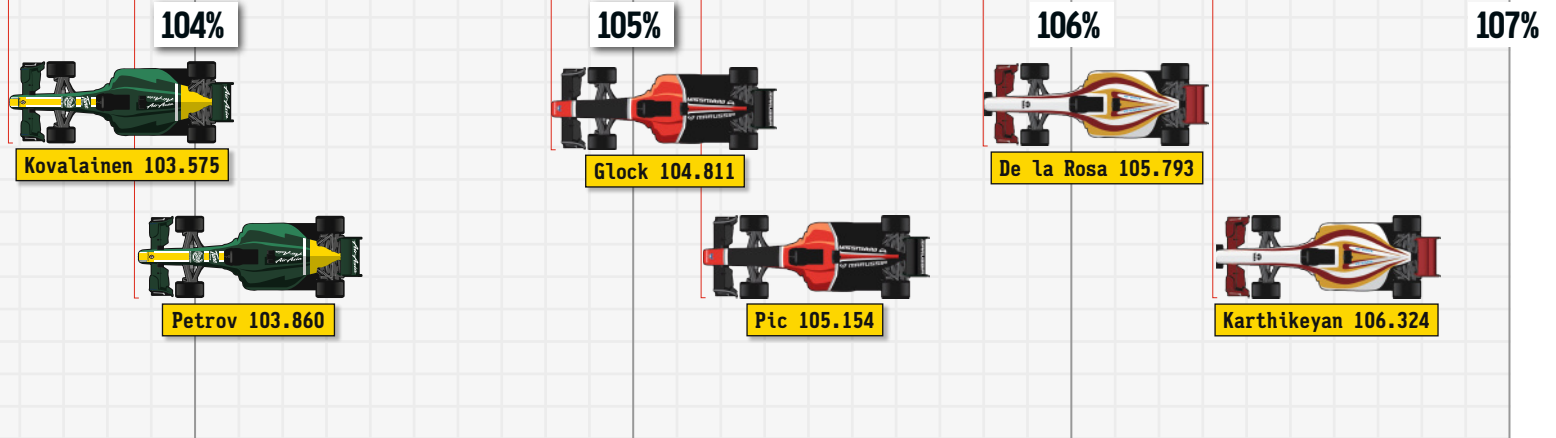
DRIVER RAW PACE

This figure is calculated by taking each driver's fastest single laptime of a weekend. This is expressed as a percentage of the outright best lap. To produce the final performance figure, the average of each driver's figures is calculated

CAR RACE PACE

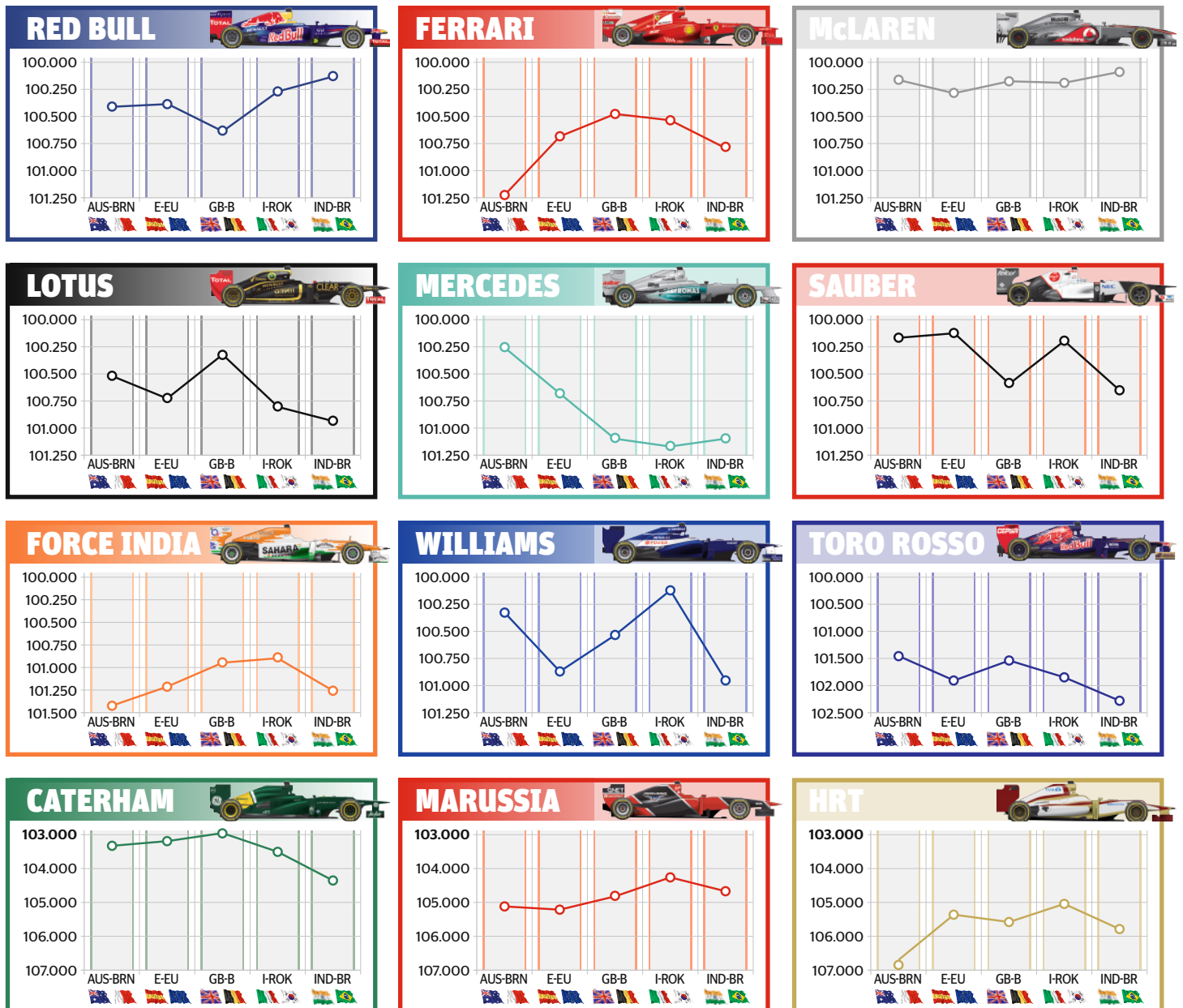
This is calculated in the same way as the driver performance figure, but using race fastest laps only





DEVELOPMENT WAR

Using the raw performance figure for each team's fastest driver on every weekend, averaged out in blocks of four races, we can map out the ebbs and flows of the development race



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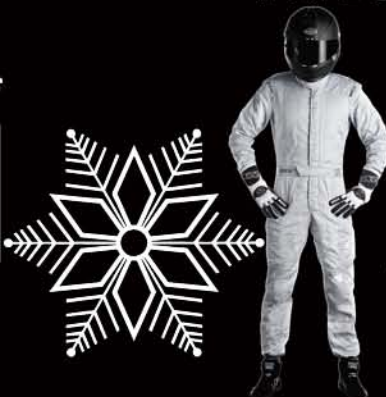
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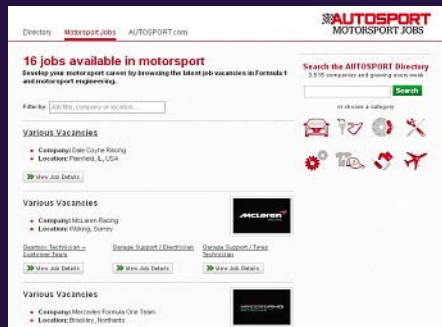
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- Working with design and manufacturing to reduce procurement lead-times whenever possible.

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REF: SW3901710

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- Conducting pre-event and post-event tyre related analysis and simulation duties.
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- Supporting the tyre model correlation work and assisting in the development of the tyre understanding and analysis methods.

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HR07121201 – MODELLING AND SIMULATION ENGINEER

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HR07121202 – SIMULATION ENGINEER

In this role you will develop new simulation algorithms and use your mathematical and programming skills to develop response surface models of our existing algorithms in order to significantly improve the productivity of our simulation tools.

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Applicants will also ideally have a familiarity with machine learning, computer vision and signal processing techniques and have experience in designing and implementing algorithms using object-oriented programming methods in languages such as C#, C++ and Java. Finally experience of using engineering software tools, such as Matlab and Maple, and scripting languages such as Python are also desirable for this role.

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Radical launches coupe

British sportscar maker unveils its first car with a roof for 2013

RADICAL SPORTSCARS has designed its first coupe model to race in various GT categories in 2013. The Radical Xtreme Coupe (RXC) will be launched at AUTOSPORT International in January. It will feature a carbon tubular steel spaceframe chassis allied to a 3.7-litre Ford Mustang V6 engine, capable of producing over 380bhp. Radical has developed a bespoke seven-speed Quaife gearbox for the 900kg road and racecar, with which marque boss Phil Abbott hopes to “Radicalise the GT scene by keeping an eye on costs”. “This is a bit of a milestone for us.

It’s our first closed car and our first car designed completely on CAD [computer-aided design],” he said. “We’ve been picking it up and putting it down for three and a half years now, but have spent the last nine months flat-out finishing it. “Ian Flux [veteran Radical works driver] said he’d never heard me so excited about a car in 15 years.” Following the ultra-successful SR8 and SR3 open sports-racers of recent years, plus the ‘street-legal’ version of the SR3 Radical produced in 2011, the RXC is described by Abbott as “the culmination of everything we have learned so far”. “It will be more of a race car than

the SL and more of a road car!” he added. “It will have the weight distribution of an SR3 with SR8 levels of performance. “We’ve been doing open cars for 15 years and there are a lot of GT cars out there for an awful lot of money. “There’s quite a number of people who won’t step into an open car and the cost of running a Ferrari is going up all the time. This will give them a nice alternative.” Abbott expects the car, which will undergo an extensive test programme in Nevada in the New Year before being rolled out to customers, to join the Radical European Masters grid in 2013, as well as GT series. “GT Cup will welcome us with open arms as will Britcar,” he said. “It can also race in VdeV in Europe and the new Super Lights section of the Dutch Supercar Challenge, and we will definitely put it in our European Masters because it will enjoy the bigger circuits. “Will it be as fast as an SR8? Not in year one, but it won’t need to be.”



Abbott expects new RXC to join SR8s on Masters grids

AUTOSPORT SAYS...

BEN ANDERSON
NATIONAL
EDITOR

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THE RADICAL JUGGERNAUT

rolls on unabated, with the sportscar maker set to launch yet another new car in 2013 (following the SR3 SL in 2011 and the SR1 of this year).

Phil Abbott’s philosophy of maximum bang for minimum buck will no doubt mean Radical’s first coupe will make for a fine driving experience when it hits the tracks.

‘Mr Radical’ is clearly very excited by his new toy and can point to road-legal status when sports-prototype DNA inevitably leads to questions about the RXC’s authenticity as a GT car. Plus, the new machine has the potential to open up Radical’s range to those drivers who don’t like racing without a roof over their head.

Speaking of attracting new drivers, there are encouraging signs over in British Formula Ford world, which has reportedly sold out places on its sampler day at Silverstone this Saturday (see page 109).

This will be the first time the new slicks-and-wings EcoBoost 200 formula will take to the track in anger and clearly there is plenty of interest in what is (whichever way you feel about it) a landmark move for the category. Once this weekend is done and dusted, championship bosses will be hoping a significant chunk of this curiosity turns into cold, hard commitment for 2013.

News that leading BTCC squad Motorbase (in conjunction with tyre supplier Dunlop) will offer prize tests in its NGTC cars to the top two in next year’s title race will only help, especially as increasing numbers of drivers are having to look at alternative options to single-seaters at ever-earlier stages in their careers.

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p111 TOP 10s OF 2012 CARS

BARC retakes control of Clios

Tin-top series parts ways with SRO as teams welcome back former manager



SRO will not run Clio Cup in 2013

THE BARC WILL REPLACE SRO as promoter of the Renault Clio Cup in 2013.

SRO, which promotes the British GT and F3 championships, took over the running of the Clio Cup and Formula Renault UK from the BARC and Simon North in 2011, on a three-year deal.

However, Formula Renault UK died on the eve of the 2012 season and North, who operates Formula Renault BARC, has been brought back onboard to run Clios again from next year.

"It's a privilege to have been welcomed back into the Renault UK Clio Cup family and to have been entrusted with the role of championship manager once again",

said North, who originally ran the series from 1992 until 2011.

"I'm very much looking forward to working with all of the excellent teams in the Clio Cup paddock."

2013 FORMAT

Next year's Clio Cup will encompass 16 races at eight of the 10 BTCC rounds, excluding only August's meeting at Knockhill and September's trip to Silverstone.

The series will also switch from Michelin to Dunlop tyres on a multi-year deal, which will bring the category into line with the BTCC.

Renault UK communications director Jeremy Townsend said: "It was of paramount importance for the Clio Cup to be entrusted to

a safe pair of hands and with the BARC's stewardship and Simon's experience we certainly have that.

"Renault UK is proud to have a long-standing relationship with the BARC, so we're looking forward to an excellent season to set the scene perfectly for the arrival of the new Clio Cup car to the UK in 2014."

TEAM REACTION

Mark Hunt, team boss of leading squad Team Pyro said the move was a real boost for the series.

"You don't realise what you've got until you've lost something," he said. "Having Simon back as the championship manager is really good for everyone and the BARC is all about racing 100 per cent.

"They understand what's needed and how to make championships like Clio Cup work – especially in such tough economic times.

"They're used to working from grassroots all the way up to the BTCC itself so they have the experience. With Dunlop coming in as well, it's giving it a whole new lease of life."

Colin Stancombe, who ran Paul Rivett to six wins in 2012 added: "With the knowledge and experience offered by BARC and Simon, and the support the BARC will give, the series can't fail to succeed.

"It'll make such a difference to all of the teams and drivers to have people who really care about Clio Cup looking after it again."

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Star Mazda

Former team owner Andersen steps in to save Star Mazda

THE AMERICAN STAR MAZDA

series will continue in 2013 under new ownership and with a new name.

The future of the single-seater series, which forms part of the Mazda Road to Indy ladder, had been in doubt after founder Gary Rodrigues put it up for sale earlier this month.

Andersen Promotions has now stepped in to operate the series, which will become known as the Pro Mazda Championship. The current cars and 260bhp Mazda rotary engines will be retained, as will the Indy Lights scholarship award to the champion.

Andersen Promotions owner Dan Andersen, who founded and ran the USF2000 championship between 1991 and 2001, said: "I would like to say thank you to Gary and the entire Rodrigues family for all of the effort they put into this series over the years.

"As a former multi-car team owner in the series, I am well acquainted with the programme and the value it has for racers climbing the ladder."

Rodrigues said: "After 22 years of growth it was not possible to secure sufficient support to keep the programme going.

"We feel confident the series will achieve its potential under new ownership and it is our intent to make the transition as expeditious and seamless as possible."

Star Mazda has helped in the careers of many drivers and was won this year by McLaren AUTOSPORT BRDC Award finalist Jack Hawksworth.



Star Mazda will continue thanks to new owner

Classic F3

Dutton to race ex-Mansell F3 car

FORTEC MOTORSPORT TEAM boss Richard Dutton is to make his comeback as a single-seater racer next season, in an ex-Nigel Mansell Formula 3 March.

Dutton, 61, is to campaign the March 783 that was raced under the March Racing banner by Mansell in the early stages of the 1978 British F3 season.

"The boys at Fortec have been rebuilding the car since the Macau Grand Prix," said Dutton. "We'd just completed a Chevron B38, but then the March became available. I raced one in period, so we're selling the Chevron and I'll be out in the March for the first Classic F3 round at Cadwell Park."

Dutton said Paul Crosby, who



Dutton will race ex-Mansell March in historic

ran the March Racing team, will "engineer it at some stage".

After racing in Formula Ford 2000, Dutton's last single-seater race was in friend Simon Kirkby's 783 in Formula Libre in 1979.

He has recently returned to competition in Historic Touring Cars, first in a Lotus Cortina and then a Ford Mustang.

British GT

British GT to Zandvoort in 2013

THE BRITISH GT CHAMPIONSHIP

will have a race at Zandvoort next season after revising its 2013 calendar.

The series will have two races at the Dutch circuit as part of the Trophy of the Dunes event in September.

Erik Weijers, chief operating officer at Zandvoort, said: "The Trophy of the Dunes is an event with great heritage here in the Netherlands, dating back to the 1960s - there is always a good crowd with a great atmosphere.

"Bringing British GT to Zandvoort is a big achievement for us."

REVISED 2013 BRITISH GT CALENDAR

Date	Track
March 30-April 1	Oulton Park
May 5-6	Rockingham
May 25-26	Silverstone GP
June 15-16	Snetterton 300
August 10-11	Brands Hatch GP
September 6-8	Zandvoort
October 5-6	Donington Park GP

MARCUS PYE

HUMBLE PYE

The voice of club motor racing



Priaulx's BMW track test brought back fond memories

Wow! That fabulous image of the BMW Junior Team 320 Group 5 car on last week's cover stirred my juices, as it did 35 years ago when I watched Marc Surer and the late Manfred Winkelhock race them in the Nurburgring's 1977 Deutsche Rennsport Meisterschaft finale. It's been one of my favourite race cars ever since, so it was great to learn what my old pal (now Munich legend) Andy Priaulx made of it.

The ADAC-Bilstein Super Sprint event, on the start and finish loop, was not blessed with great weather. That exacerbated the gulf between aces and also-rans in the silhouette machines. Porsche 935 tamers Rolf Stommelen and Bob Wollek, plus Toyota's moustachioed Harald Ertl (all long gone, too soon), starred in the bigger cars, while Klaus Ludwig (BMW Schnitzer 2002 turbo) and Hans Heyer (Ford Zakspeed Escort) bested Winkelhock's surviving works 320 in the two-litre division.

BMW Motorsport M12/7 engines, developed by Paul Rosche, motivated the slash-striped caricature saloons, the third of which was allocated to Eddie Cheever. Their savage induction roar, familiar to fans of period F2 (in which the 300bhp production-based units dominated between

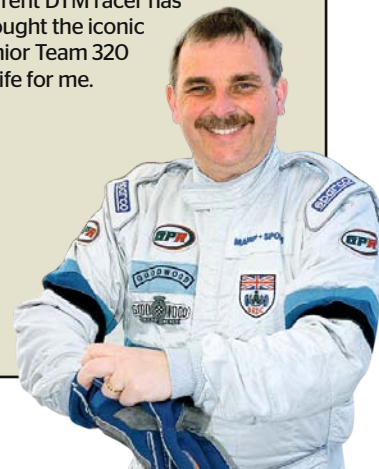
Renault and Honda V6 reigns), was wondrous to experience.

I drove Marc Surer's '79 European title-winning March 792 at the 'Ring in '93, but a run in a 782 - March's best F2 model, in which Bruno Giacomelli thrashed rivals with eight victories the previous year - is missing from my 520+ car CV. Having owned a 782, minus the noisy bit, it's one that got away!

Another that I feared gone was my first shot in a Formula 5000 Lola T330, one of the class's all-time greats. I was climbing into one by Donington's pit exit in 2002 when I spotted a trickle of water from a hairline split in a radiator union. As the team pushed it away I was sitting on the wall, frustrated, when BMW GB's Peter Walker broke news that a European Touring Car budget was in place for '03.

"Who would be on your short-list to drive?" he asked. "A very short list: Andy Priaulx," I replied. I'd followed the Guernseyman from his hillclimb roots (10 round wins in a Pilbeam-DFL MP58 made him runaway '95 British champion) through the Renault formulae and F3, to Honda's BTCC team. The rest is history, but I'm glad BMW's current DTM racer has brought the iconic Junior Team 320 to life for me.

I followed Andy Priaulx from his hillclimb roots through Renault and F3 to Honda's BTCC team"



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Formula Ford drivers will sample NGTC Focus

British Formula Ford

BTCC test prize for FFord aces

Motorbase to run top two 2013 EcoBoost drivers in its NGTC Ford Focus

THE TOP TWO DRIVERS IN NEXT year's Formula Ford EcoBoost 200 championship will win a British Touring Car test with leading team Motorbase.

Formula Ford will move onto the BTCC support bill next season, with a slicks-and-wings version of its current EcoBoost-engined single-seater.

Motorbase boss David Bartrum, whose team runs Ford Focus cars in the BTCC, will allow the top two drivers at the end of the season to share a day's

testing in one of his NGTC machines.

The prize comes courtesy of a tie-up with Dunlop, which supplies tyres to Formula Ford and the BTCC.

The championship has also sold out the 18 places for its sampler day at Silverstone this Saturday (December 15). This will be the first time the revised formula will appear on track and drivers among the line-up include McLaren AUTOSPORT BRDC Award winner Jake Dennis, 2010 British FFord race winner

Dan Cammish, plus '12 FFord racers Luke Williams and Fred Martin-Dye.

Sam Roach of series promoter RacingLine said: "We have been greatly encouraged by the amount of interest shown in the new Formula Ford.

"There are drivers from previous seasons keen to try the new car, drivers fresh from karting and other junior series and, most encouragingly, new teams looking at contesting Formula Ford."

Caterham Academy

Caterham prize for showgoers

THE CATERHAM ACADEMY IS running a competition for readers to win a race seat in its 2013 novice series.

Anyone who buys a ticket for the Performance Car Show at AUTOSPORT International in January and then submits 150 words on why they should win to Pistonheads.com is eligible.

Pistonheads will select 10 finalists, who will then go head to head in a special challenge to decide the winner.

The winner of the £25,000 prize, for which the deadline for applications is January 13, will also write a blog for Pistonheads.com through the season.

Caterham chief motorsport and technical officer Simon Lambert said: "This competition is a new initiative for us and is a unique opportunity. We're excited to see what new talent we can add to our Academy alumni."



ASI visitors could win Caterham race seat

HSCC

HSCC to host tin-top celebration



BMW M3 E30 will be part of BTCC display

THE HISTORY OF THE BRITISH Touring Car Championship will be celebrated by a special display at AUTOSPORT International in January.

The Historic Sports Car Club, which has organised a number of displays before - covering Formula 5000, F3 and two-litre sportscars - is planning to bring at least one significant BTCC car from each decade to Birmingham's NEC.

Cars already confirmed include an ex-Bill McGovern Hillman Imp, a Toyota Corolla formerly campaigned by double champion Chris Hodgetts, and an Alan Mann Racing Ford Escort. An ex-Steve

Soper BMW M3, John Cleland Vauxhall Cavalier and a later Super Tourer are also expected.

The HSCC is also hoping to gather together all surviving BTCC champions and other leading drivers at its AUTOSPORT International stand on the Friday morning, January 11.

Club chief executive officer Grahame White said: "We hope to have up to eight cars spanning five decades. We have also located the Austin A105 Westminster that Jack Sears used to win the first championship in 1958 and hope to have that car on the stand."

IN BRIEF



Complete Racing GT4 Vantage will be back

FORMER VW RACING CUP

champion Steve Chaplin will return to British GT for a full season in 2013. Chaplin's Complete Racing squad will run an Aston Martin Vantage GT4 for Chaplin and fellow ex-VW Cup pilot Tom Wilson.

SUCCESSFUL BRITISH KARTER

James Kellett will make a full-time switch to Ginetta Junior with the HHC team next season. The 14-year-old made his debut with the squad in this year's Winter Series at Rockingham.

TRUCK RACING CHAMPION CHRIS

Levett has joined forces with former BTCC racer Nick Beaumont to run a new squad in next year's VW Racing Cup. Beaumont will act as manager and driver coach, while series frontrunner Levett will lead JWB Motorsport's driver line-up in a new Scirocco.

EX-FORMULA RENAULT UK RACER

Dan Wells finished runner-up in the Formula Pilota China championship following the season finale at Sepang last weekend. Antonio Giovinazzi sealed the title with a win in race one, while the Eurasia Motorsport squad that runs the Italian took the teams' crown.

JURGEN EVERS' EJ AUTOMOTIVE

squad plans to run dual campaigns in the new Formula Ford Duratec North Sea Series and Formula Renault Junior 1.6 NEC in 2013.

AVON TYRES WILL SUPPLY RUBBER

to the Lotus Elise Trophy and Lotus Cup UK and Europe series for the next three years after agreeing a deal with the Lotus on Track Racing Drivers Club.

THE NEW SIN O1 RACECAR WILL BE

unveiled at AUTOSPORT International in January. The 1200kg car, powered by a 500bhp, 6.2-litre Chevrolet V8 engine, is the product of a partnership between Daventry-based Pro Formance Metals and SIN Car GmbH, based in Germany.

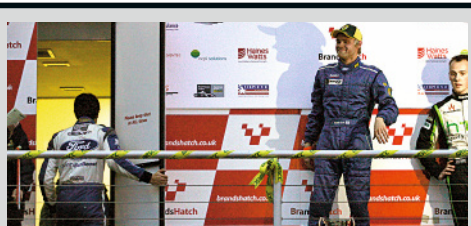


It's a Sin! New racer unveiled in Birmingham

TOP 10

Rivalries of the year

Plenty of battles - some clean, some not so clean - raged throughout the world of club racing in 2012. Here's our pick of the best



10 **Lichtenstein v Buri** *British Formula Ford*

After a year of fighting for wins in the thinly supported EcoBoost Formula, Antti Buri and Eric Lichtenstein went head-to-head in the Duratec Brands Festival, where Eric was tipped into a spin and stormed off the podium.



9 **Six-way MG title fight** *MG Trophy*

This series went down to the wire for the third successive year in 2012. Six drivers went into the finale with a shot, but two outright race wins were enough for Chris Bray's Class B ZR190 to edge out Paul Savage's Class C 160.



8 **Mawdsley v Hill** *Production Golf GTI*

In a battle between two Cheshire racers, veteran John Mawdsley beat the younger Simon Hill in a final round showdown. Hill won more races (6-4) but clutch failure in race one of the finale gave him too much to do.



7 **Tovey v Winrow** *Production BMW*

Given Ben Winrow's form in PBMW over the past two seasons it was always going to be tough for reigning champ Mike Tovey to retain his crown. But it went to the final round, where they raced clear, just tenths apart.



6 **Dow v McEwan** *Scottish Formula Ford*

This battle was ultimately settled in an MSA court. Ray driver Alistair Dow successfully protested the exhausts on Ross McEwan's Van Diemen. McEwan appealed and was confirmed champ when the protest wasn't upheld.



5 **Bell v Smith** *Radical Clubman's Cup*

Matt Bell started the season with four wins, but once into his stride, Smith took the fight to his rival. The eventual score was eight wins to six in Smith's favour, his two Brands GP wins by less than a second proving crucial.



4 **Brown v Marshall** *Scottish Legends*

Ross Marshall took the most wins (17) but Carol Brown's greater consistency meant she prevailed in the Legends battle North of the border. Just 20 points decided a series in which 6000 are available across the season.



3 **Stock Hatch showdowns** *Classic Hatch & Stock Hatch*

Stock Hatch is always one of the 750 Motor Club's most competitive series. Both classes went to the final race but Damian Cottrell's Vauxhall Nova's three-point defeat of Matt Rozier (Peugeot 205) was the closest.



2 **Robinson v Langley** *Caterham Tracksport*

Another fight settled in the final race. David Robinson went out after hitting Terry Langley in a pass for the lead. Langley continued to seventh, but missed the title by two points and then ran out of time to protest.



1 **Darby v Tinkler** *MG Peter Best Challenge*

The battle between Class A rivals James Darby and Simon Tinkler in the Peter Best Challenge couldn't have been closer. After trading class wins through the season this pair of MGB GT racers ended the year tied on points, thanks to a last-gasp fastest lap by Darby at the Snetterton finale. Out came the calculators post-race and Darby claimed the title by dint of winning six races to Tinkler's five.

TOP 10

Cars of the year

Here are the one-off specials, new designs, and venerable old warhorses that have caught the imagination of spectators and racers in 2012



10 **Aston Martin Vantage GT3** *British GT*

A lot was expected after Aston finally ditched the ageing DBRS9 and rolled out a new racer. The hoped-for title belt never materialised, but Jonny Adam proved the car's pace and rival teams felt it was the best GT3 out there.



9 **OMS Powertec** *British Hillclimb*

Breaking Gould's domination of the British Hillclimb scene, which dates back to the 1990s, is no mean feat and that's what OMS achieved in 2012, Trevor Willis pipping Gould-mounted multiple champ Scott Moran.



8 **BMW Z4 GT3** *British GT*

The Z4 won the final two races in last year's Blancpain Endurance Series, so Ecurie Ecosse knew they had a good car when they bought one from Marc VDS for British GT. Great strategy and reliability almost delivered the crown.



7 **AHS Dominator** *Formula Vee*

Alan Harding's Dominator showed its pace at times last year and Paul Smith used it to devastating effect in 2012. Against one of the category's best fields in recent history, Smith took 10 wins from 14 rounds to take the crown.



6 **Nissan GT-R GT3** *British GT*

RJN Motorsport made a real splash as the JRM-built car enjoyed its first full season racing in Britain. The Nissan was never the fastest over one lap but always went well in races and almost won the title at the first time of asking.



5 **Spire GT3** *RGB*

Was there a more dominant car in club motorsport in 2012? Tim Gray won 14 out of 14 races to take the 750 Motor Club's RGB title this year, and John Cutmore was second 11 times in the sister car.



4 **Porsche 997 GT3** *British GT*

Porsche has been popular in British GT for many years now. Winter upgrades kept the German marque competitive and it won as many races (three) as any other, plus the title, in British GT's toughest season.



3 **BMW Compact** *BMW Compact Cup*

After a modest debut half-season in 2011, the Compact Cup exploded into life this term. Paul McElean's 750 Motor Club-run series has grown grids into the 20s with ease, and expansion into Scotland is on the cards for 2013.



2 **McLaren MP4-12C GT3** *British GT*

Only did half a season in British GT but became the benchmark car as soon as it hit the track. Porsche driver Michael Caine described the aero on the McLaren, which won three of the four races it started, as "unbelievable".



1 **Tatuus FR2000** *Formula Renault BARC*

This has been a tough year for professional single-seater racing in the UK. Formula Renault UK died on the eve of the campaign, Formula Ford's new EcoBoost car failed to take off in its first year, and InterSteps battled on for one more season before being killed off. Meanwhile, Formula Renault BARC enjoyed its best campaign ever, as the venerable Tatuus again showed its remarkable staying power.

YOUR SAY

What you think of the motorsport news of the past week



Loss of FIA GT1 World Championship lamented

Time to put the 'grand' back in GTs

Following on from your article about the demise of the FIA GT1 World Championship (November 29), fans now have very limited international GT racing to attend in the UK.

GT racing has become more popular with spectators, mainly due to close racing, affordability and the fantastic noise from the mixture of supercars. Please can someone get a grip on organising a decent calendar like the BTCC has done with its package before GT racing becomes a thing of the past.

RD Blake, Banstead, Surrey

AUTOSPORT.COM

TOP FIVE ON OUR WEBSITE

1. HAMILTON NOT RULING OUT McLAREN RETURN
2. BRAUN: HAMILTON WINS STILL AIM FOR 2013
3. BILLIONAIRE PLANS NEW MALAYSIAN CIRCUIT
4. DI MONTEZEMOLO HITS OUT AT ECCLESTONE
5. SCHUMACHER 'SHOULD NOT HAVE RETURNED'

AUTOSPORT+

TOP STORY ONLINE

WILLIAMS: NEW PROMISE OR FALSE DAWN?

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ROAD ANGEL VANTAGE

This week's star letter will receive a Road Angel Vantage – a dedicated safety camera and blackspot locator that displays the legal speed limit of every road you drive, automatically and wirelessly updating its database every few minutes as you drive. For more details on Road Angel visit www.roadangelgroup.com Please ensure that your full address is included on all correspondence.

FROM THE FORUM - forums.autosport.com

WHAT OUR READERS ARE TALKING ABOUT RIGHT NOW

- Did Alonso "Choke" In 2012?
- Jensen v Lewis – a retrospective view

CORRECTIONS AND CLARIFICATIONS

It is the policy of AUTOSPORT to correct significant errors as soon as possible. Please note the issue date and page number when contacting us on autosport.editorial@haynet.com

EDITORIAL CONTACT mail@autosport.com

I read with interest Mr

Winstone's comments (December 6) on podium interviews. I would question his conclusion.

They have worked well when an ex-driver with broadcasting experience has conducted them. JYS, Brundle, Herbert and Coulthard all did well. The inexperience of others showed...

Stick with it Bernie! Get the right interviewers and allow the drivers to show their personalities.

Maybe have a driver of the day presented with a bottle of champers. Could be a way of

getting a popular local hero in front of the fans, if they merit it, and maintain the podium procedure. **Paul Young** Bicester, Oxfordshire

I visited a Citroen main dealer in Bournemouth just after the World Rally Championship had been decided. I looked around and noticed there was not one poster celebrating yet another Sebastien Loeb title.

I think that says a lot about the state of rallying today.

Alan Harding Aldwick, West Sussex

It's clear from the photos of the AUTOSPORT Awards (December 6) that three constructors' and drivers' world championships for the Red Bull team have taken a heavy toll on Adrian Newey. No time to shop for shirts! **Richard Wallis** By email

I was interested to see Vettel's biggest fan keen to rename the city of Graz as 'Vettelheim' (*The Week in Pictures*, December 6).

However, I think she's a bit late to that trick. Two days later my seven-year-old son

Jerome spotted Lewisham on the BBC weather map...

Ian Lindsay East Barnet, Hertfordshire

Why have Michael Lyons' performances not been recognised? He has outclassed more seasoned drivers in both UK and European races.

His performances in Historic F1 and F5000 have been outstanding for his age, and let's not forget the magical Monaco result. He should have been in last week's Club top 10.

Alex Moss Allesley, Coventry

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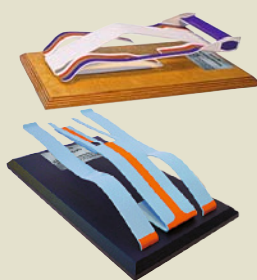


SCALEXTRIC LOTUS-RENAULT R31

£49.99

scalextric.com

Scalextric's latest, limited-edition racer will have slot-racing aficionados salivating – and it's a good time of year to be suffering. Limited to 1500 units, the Bruno Senna Lotus-Renault R31 from 2011 comes with a 20,000rpm motor – that's more than the real thing – quick-change pick-ups and everyone's favourite cheat: Magnatraction. It'll generate huge downforce and you won't have to run it past Charlie Whiting first.



PORSCHE SCULPTURES

£199.99 each plus P&P
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These handmade aluminium sculptures are based on Porsche's iconic 917 and 962 sports-racers, as campaigned by five-time Le Mans winner and double world sportscar champion Derek Bell. They are limited to just 50 of each, measure 35cm in length and are offered with a choice of bases.



THE ART OF WAR

£25 (signed); £3.99 ebook
amazon.co.uk

An amusingly frank graphic novel from former Williams F1 chairman Adam Parr, who relives his five years in the 'Piranha Club', with its struggles to introduce cost-capping and rules stability, not to mention the failed attempts to eradicate much of F1's short-term self-interest. And the caricatures just top it off.



R/C FERRARI/RED BULL

£24.99 (1:18); £49.99 (1:12)
autosport.com/shop

These radio-controlled plastic F1 racers are super-quick and sturdy, ideal for younger pedallers. The Red Bull RB7 comes in 1:18-scale (25cm), the Ferrari F2012 in larger, 1:12-scale (40cm) – and both have batteries included. You can't race them at the same time, as the frequency is identical.

HOT ON THE WEB THIS WEEK

YOUTUBE: CHAMPIONS COLLECT THEIR POTS IN ISTANBUL



SEARCH FOR: FIA Awards 2012 - F1 Ceremony highlights (4:46)

Fresh from their appearance at the AUTOSPORT Awards, Sebastian Vettel (who found a tie!) and Christian Horner jetted off to Istanbul to collect their F1 world championship silverware. It also features Fernando Alonso and Kimi Raikkonen.

WHAT'S ON...

Your guide to the week ahead, including TV listings and online – plus opinion columns

AUTOSPORT

GREAT DEBATE

In the first of our intra-office talking points: IS NASCAR ALL IT'S CRACKED UP TO BE?



NO

SAYS KEVIN TURNER FEATURES EDITOR

Old technology, spec cars, dubious yellows and the Chase are just a few of the reasons why it's difficult for some true motorsport fans to like NASCAR.

For a category supposedly at the pinnacle of the sport in the US, it's remarkable that things such as fuel injection have only just been introduced, while the move to cars that are essentially the same (save for the stickers) removes a genuine appeal that played an important part in the growth of NASCAR.

The races are often overly long, with the emphasis on getting the car sorted for the final stages, and the number of yellows means much of the racing – and lots of overtaking – is rendered pointless. And that's before we get onto the subject of fuel-mileage races, where the timing of pitstops and caution periods can rob the best teams and drivers of victory.

It's also pretty clear that the Chase, which resets the points of the top 12 drivers with 10 races to go, is designed purely to make sure the title fight and 'tension' go down to the wire. To minimise the importance of two-thirds of the season suggests NASCAR could do away with some rounds, especially given the track variety is not great. How many 1.5-mile ovals do you really need anyway when there are some fine road circuits in North America?

The reliance on ovals also prevents more drivers from starring. Without the car being properly hooked up, there's not a lot a Juan Pablo Montoya, Dario Franchitti or Marcos Ambrose can do on an oval. That also makes the NASCAR stars look a lot better than former F1, IndyCar and V8 Supercar drivers, but are they really?

That question highlights

perhaps my biggest gripe with NASCAR. There's little doubt that Jimmie Johnson, Jeff Gordon, Brad Keselowski and Tony Stewart are good drivers, but how good? With NASCAR being almost all-encompassing we'll probably never know.

NASCAR sucks the American driving talent out of single-seater racing. It's no wonder there hasn't been an American F1 frontrunner for two decades or that IndyCar isn't as strong as it could be (even after unification) when stock car racing swallows so much of the continent's money and ability.

"To minimise the importance of two-thirds of the season suggests they could do away with some rounds"



YES

SAYS CHARLES BRADLEY EDITOR

Yes, it's belt-and-braces. Sure, the technology is unlikely to get Adrian Newey's creative juices flowing. Absolutely, the 'show' is as important – if not more so – than satisfying the racing purists. But you really need to behold NASCAR at first hand to appreciate its true majesty.

NASCAR in the flesh is raw in tooth and claw. Stand next to one when its 5.7-litre V8 fires up. Watch the 195mph approach to Turn 3 at Charlotte, and see the drivers wrestle their bucking broncos into the corner, drivers' wits versus one and a half metric tons, disputing the laws of physics. Witness 40-plus cars in pack, bump-drafting at 200mph at a superspeedway when the consequences of making a mistake are simply catastrophic (see October's race at Talladega for details).

I'll allow that the stock car movement

"If you wish to underestimate the drivers, ask Dario Franchitti how he rates Jimmie Johnson"

often overlooks the richness of America's road courses, but also point out the Nationwide Series races at Montreal and Road America, and the recent Truck Series event on the dirt at Eldora shows a willingness to experiment. More please!

But the old chestnut that ovals are "just big left turns" falls down when you ask any driver, be they NASCAR or IndyCar stars, how difficult it is to unlock their intricacies. To lump Martinsville in the same category as Dover, Indianapolis, Darlington or Talladega is frankly ludicrous. And the

proximity of solid (albeit SAFER-lined) concrete walls, combined with those high speeds, means you could argue that these guys are the bravest of the brave on a week-in, week-out basis.

If you wish to underestimate the strength of its drivers, just ask Dario Franchitti how highly he rates Jimmie Johnson, or look how long it's taken Juan Pablo Montoya or Marcos Ambrose to crack the stock car code. As for Kimi Raikkonen, we'll never know as he settled on a return to his F1 comfort zone.

Is it NASCAR's fault that US open-wheel racing tore itself apart? While realising that its southern-rooted fare had mass appeal, all NASCAR is guilty of is following market forces that prefer simplicity over sophistication. And if we think we're any different, then there'd be more fans watching British F3 than the BTCC.



Looks like a car park, but they're doing 200mph

Television

THURSDAY DECEMBER 13

1105-1310 [Motors TV](#)
V8 Supercars: Sydney Highlights
1200-1300 [Premier Sports](#)
NASCAR Sprint Cup: 2012 Highlights
1515-1650, 2235-0010 [Motors TV](#)
Andros Trophy: Highlights
1800-1900 [Sky Sports 4](#)
Racemax
1800-2100 [Sky Sports F1](#)
Indian Grand Prix Highlights
2100-0000 [Sky Sports F1](#)
Abu Dhabi Grand Prix Highlights

FRIDAY DECEMBER 14

0410-0505 [Motors TV](#)
Formula 3 Macau Grand Prix: Highlights
0525-0555 [ESPN Classic](#)
F1 British GP: 1977
1005-1135 [Motors TV](#)
Andros Trophy Highlights
1800-2100 [Sky Sports F1](#)
US Grand Prix Highlights
2100-0000 [Sky Sports F1](#)
Brazilian Grand Prix Highlights
Relive F1's title showdown at Interlagos.
2100-2205 [Motors TV](#)
WRC: Season Review

SATURDAY DECEMBER 15

0350-0420 [Channel 5](#)
Motorsport Mundial
0915-1015 [ITV4](#)
Motorsport UK
1000-1430 [Sky Sports F1](#)
Australian Grand Prix replay
1300-1605 [Motors TV LIVE](#)
Bangkok Race of Champions: Nations Cup
1600-2100 [Sky Sports F1](#)
Malaysian Grand Prix replay

1800-1900 [Sky Sports 3](#)
Max Power
2100-0010 [Motors TV](#)
Bangkok Race of Champions:
Nations Cup Replay

SUNDAY DECEMBER 16

0010-0115 [Motors TV](#)
Formula 3 Macau Grand Prix: Highlights
0315-0600, 0955-1300 [Motors TV](#)
Bangkok Race of Champions:
Nations Cup Replay
0700-0730 [Channel 4](#)
The Grid
1000-1500 [Sky Sports F1](#)
Chinese Grand Prix replay
1300-1605 [Motors TV LIVE](#)
Bangkok Race of Champions
1500-1600 [Sky Sports F1](#)
Mario Andretti
1600-2100 [Sky Sports F1](#)
Bahrain Grand Prix replay
1605-1705 [Motors TV](#)
WRC: Season Review
1705-1840 [Motors TV](#)
Andros Trophy Highlights
2100-0010 [Motors TV](#)
Bangkok Race of Champions: Replay
2230-2300 [Sky Sports F1](#)
Inside Track: A weekend with Marussia

MONDAY DECEMBER 17

0145-0315, 1210-1340 [Motors TV](#)
Andros Trophy Highlights
0240-0330 [ITV 1](#)
Motorsport UK
0315-0600 [Motors TV](#)
Bangkok Race of Champions: Replay
1105-1210, 2205-2305 [Motors TV](#)
WRC: Season Review

Online

AUTOSPORT+

Coming up in our premium web content this week



More work, less money for F1 boys

HOW F1 COULD BE KILLING ITSELF

With a seemingly ever-growing calendar combined with resource restrictions, F1 is putting a big strain on the people that make it all possible. Edd Straw looks at how the individual harm could end up damaging the sport itself.

VW AND CITROEN IN THE 2013 WRC

David Evans looks at the recent WRC launches by VW and Citroen.



TOP 10 MOTOGP RIDERS OF 2012

Sam Tremayne picks out his top 10 performers of MotoGP's 2012 season.



REVVED UP OVER WHAT'S ON THE BOX

We cast a critical eye over the best and worst of this week's TV coverage

Huff's A40 conquered Reidy's massive Jag



THERE WAS A TIME WHEN even catching a glimpse of a racing car on telly was enough to get a young Revved Up, er, revved up. Whether it was an Opel Manta yumping its way over a stage in the BRC or an XJS winding its way down the mountain at Bathurst, or especially a DFV-powered F1 car drifting – it was sheer elixir.

God knows how we coped without live coverage, but we got by. And in the main this was thanks to Barrie Hinchliffe Productions. Maestro Bazza and his merry men brought us

amazing images of racing and rallying, sometimes joining the two together in the epic Rallysprint.

Pre-roof dishes, it was only through programmes such as *Grandstand* and *Sport on Friday* that quality motorsport was beamed into our living rooms, the notion of broadcasting live a rare treat reserved for the British Grand Prix.

The true brilliance of these recordings was the tightness of the editing. These were highlights in the truest meaning of the word. Nothing incongruous; there was a beauty about the ebb

and flow and, without the pressure of live direction, the cameramen were free to shoot what interested them and little was missed. Thus, an inept backmarker spin could punctuate a captivating battle for the lead.

But the world moved on and, like Ceefax and faxes, *Grandstand* and its ilk died, a victim of the sheer volume of media and the necessity to fill it at any cost.

However, a glorious reminder of this art was this year's Goodwood Revival in one-hour form on ITV4. While the Festival may have broken new

boundaries as Sky aired this year's event live in 'stunning' 3D, the pure racing format of the Revival perfectly lends itself to the abridged format.

It was little surprise to see BHP stalwart Steve Saint's name high on the credits after an hour-long blow-out of tremendous racing, strung together with mega onboarders – Anthony Reid's big Jag v Rob Huff's tiny Austin A40 and so on. Combined with genuine celebrity interviews, and a splash of off-track fun, this was a throwback to the good old days. *Revved Up*

THE WEEK IN PICTURES

Our lensmen pounding the beat, from Brazil to Turkey, via the USA and Italy



WE HOPE THAT'S NOT A KERS FAILURE
Last weekend Chevrolet unveiled its 2013 Brazilian V8 Stock Car challenger in a blaze of glory (or something)



TO THE VICTORS, THE SPOILS 1
FIA prize-giving in Istanbul filled the stage with its major champions



TO THE VICTORS, THE SPOILS 2
Ryan Hunter-Reay and Michael Andretti get their IndyCar trophies



THE RUNNING OF THE (RED) BULLS
It's Bologna in Italy, rather than Pamplona in Spain, where Daniel Ricciardo and David Coulthard show off for the crowds at the Motorshow in Toro Rosso & Red Bull

PICS: LEVITT/LAT. CAMPELLI, TERENA/RED BULL, FIA

FROM THE ARCHIVE

Emerson Fittipaldi scores his first podium in a Fittipaldi chassis, Brazil 1978



“Fittipaldi tucked into fifth early on, traded blows with Gilles Villeneuve and by lap 12 worked his way into third”

Fittipaldi leads the Ferrari of Villeneuve

WITH EMERSON FITTIPALDI CELEBRATING HIS 66TH birthday this week, we take a trawl back through the Formula 1 annals to his home grand prix in 1978, when he delivered a superb – and unlikely – first podium in Brazil for Fittipaldi Automotive.

Fittipaldi was already a double world champion – in 1972 with Lotus and two years later with McLaren – when, in 1976, he made the shock decision to join older brother Wilson’s fledgling team. Supported by Brazil’s state-run sugar company Copersucar, Emerson’s first outing at Interlagos was promising as he qualified fifth. It was to prove the exception rather than the rule.

In the remaining 15 races he cracked the top 14 just once in qualifying, and failed to even make the grid at Zolder. When the car wasn’t breaking down he was able to grab a clutch of sixth-place finishes, but he couldn’t do better than 17th in the championship.

The misery continued in 1977, with Fittipaldi contrasting three fourth-place finishes with two failures to qualify.

In 1978 there was a change of name to Fittipaldi Automotive, but an underwhelming opening in Argentina had many ready to write the Brazilian off once more. Come Rio Jacarepagua, however, he was immediately more competitive, and on Friday posted the third-fastest time.

Things did not stay so jubilant. On Saturday, just as he was going for fast times, a CV joint broke. Half a dozen hands suddenly appeared and began pushing him back to the pits, only for a marshal to stop the ‘dangerous operation’. Fittipaldi, normally so placid, waded into the marshal and picked up a \$2500 fine.

After a few laps in the spare car, Fittipaldi was able to resume in his race chassis – until a broken front rollbar finally ended his run. Unable to improve, he dropped four places to seventh on the grid.

Still the drama wasn’t finished, with the air-starter system developing problems minutes before the start. The spare was ready, and after a few frantic changes Fittipaldi was able to line up.

The race was far more serene. Fittipaldi tucked into fifth early on, traded blows with Gilles Villeneuve and by lap 12 had worked his way into third. As a litany of drivers fell off behind him, he held position behind Carlos Reutemann and Mario Andretti up until the final seven laps, when Andretti slowed dramatically. The American was stuck in fourth gear, allowing Fittipaldi to shoot by and clinch second, to the wild delight of the crowd.

But it was something of a false dawn, and Fittipaldi would stand on a grand prix podium only once more. ❖

THIS WEEK IN...



DECEMBER 7 2006

WITH MICHAEL SCHUMACHER

retiring – for the first time – in 2006, AUTOSPORT turned its attention to Felipe Massa and the matter of whether the momentum gained from his first season with the Scuderia would help him see off Kimi Raikkonen in 2007.

In the same week, Oliver Turvey was named as the 18th winner of the McLaren AUTOSPORT BRDC Award. Turvey had finished second in the Formula BMW UK Championship despite missing the first three race weekends to earn his selection among the final six, then impressed in the judging process to win the award.

Also at the AUTOSPORT Awards, Sebastien Loeb was named International Rally Driver of the Year, but couldn’t prevent Marcus Gronholm ending Ford’s drought with a fine victory in Rally GB.



PIC: LAT ARCHIVE

COMING SOON!

THE AUTOSPORT LEGENDS SERIES RETURNS

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DAMON HILL



JOHN SURTEES



JAMES HUNT



A must-read collection of special issues celebrating a quartet of Britain’s finest grand prix world champions

ROBERTO GUERRERO

■ Checker 200 ■ Phoenix ■ April 12, 1987 ■ March 87C ■ Maiden CART Indycar win – from the back of the grid



Guerrero (4) won at team boss Vince Granatelli's home track

I HAD BEEN SO CLOSE TO winning a CART race ever since my rookie season in 1984. I was second at Indy in only my third CART race and should have won at Miami in '86, but ran out of fuel on the last lap and lost to Al Unser Jr.

For 1987 things were looking very good indeed. Vince Granatelli bought out Dan Cotter's team and we had STP sponsorship. The March 87C was a really good car and I still had Morris Nunn engineering me. We had been together since 1982 in F1.

Phoenix was Vince's home track and we were confident going in to the race, so it all looked positive. But as we all know, racing is just not that straightforward. In qualifying we were third fastest and all looked promising.

Then at scrutineering the car was found to be two and a half pounds under the minimum weight. Everyone ran slightly under the limit, and what you did was ballast it up to the minimum. Before qualifying the CART technical people thought they had taken all of the fuel out but they left a little in the tank, so when they weighed it there was still a little in. So we essentially

"I could go inside and outside the others: Rahal, Andretti, Little Al, Emmo. It didn't matter who they were - I was going past them like there was no tomorrow"

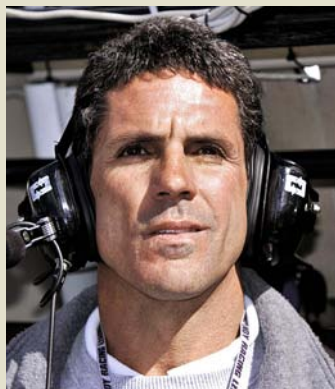
had a wrong reading from the start of the meeting and that caught up with us after qualifying when they actually did pull all the fuel out correctly and, of course, we were under. The punishment was we had to start at the back of the grid. It didn't go down well with Vince!

There wasn't much time to feel sorry for ourselves and I really

went for it from the get-go. In the early stages the car was handling like a dream. I could go inside and outside of the others: Rahal, Andretti, Little Al, Emmo. It didn't matter who they were – I was going past them like no-tomorrow!

With a caution period thrown-in I started to think, "wow, we can maybe win this thing."

IN PROFILE



MOVING FROM COLOMBIA TO THE UK in 1977, Roberto Guerrero rose through single-seaters, winning in the British F3 and European F2 series, before embarking on two seasons of F1 in 1982-83 with Ensign and Theodore. A switch to the US in '84 netted two CART wins and two runner-up positions at Indy. A 1987 testing crash at Indy left him in a coma for 17 days before returning to CART in '88. He raced in the IRL until 2000. Most recently Guerrero, now 54, has competed in the Baja 1000.

Soon I was up to second and behind Bobby Rahal. I hunted him down easily, took him and pulled away fairly quickly. I had learned from my previous disappointments in CART not to get too confident too early. And sure enough at one of my final stops I ran over one of my wheels leaving the pit.

I got a stop/go penalty, which made it a little more interesting, especially as I nearly crashed leaving the pit!

Even after that the car was so good it was ridiculous and I even rejoined still in the lead. From there it was quite simple and I remember the relief when I crossed the line. It felt so, so good to get that first win and especially in Vince's home town and sharing it with Morris too after all we had been through together.

After all the hullabaloo of the podium had died down, I went back to the garage and saw something hanging out of the radiator. I pulled it out and it was my team-mate Arie Luyendyk's mirror, which had fallen off and jammed in my rad! That was when I knew it really was 'my day'.
Roberto Guerrero was talking to Sam Smith

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