

Formula 1 review
How Hamilton
took his best title



AUTOSPORT AWARDS 2018
HAMILTON AND HAKKINEN
SCOOP THE BIG PRIZES

Halo saves Leclerc
Star's Spa salvation
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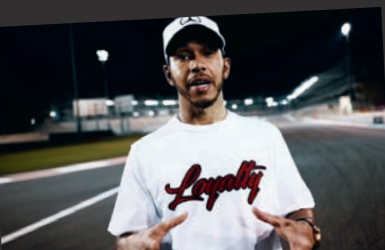
F1 2018 **review**

140-page
special
issue

- *Top 10 drivers*
- *Mercedes and Ferrari tech insights*
- *Best race drives*



PLUS YOUR WINNERS REVEALED AT THE AUTOSPORT AWARDS





ALPINESTARS PROTECTS CHAMPIONS

MOTOGP CHAMPION MARC MARQUEZ

24HRS OF LE MANS CHAMPIONS ALONSO, BUEMI, NAKAJIMA

AMA 450 SUPERCROSS CHAMPION JASON ANDERSON

FORMULA E CHAMPION JEAN-ERIC VERGNE

MXGP CHAMPION JEFFREY HERLINGS

FORMULA 2 CHAMPION GEORGE RUSSELL

WORLD SBK CHAMPION JONATHAN REA

FORMULA 3 CHAMPION MICK SCHUMACHER

AMA 450 NATIONAL MX CHAMPION ELI TOMAC

MOTO3 CHAMPION JORGE MARTIN

MOTOAMERICA CHAMPION CAMERON BEAUBIER

SUPER GT CHAMPION JENSON BUTTON

DAKAR CHAMPION MATTHIAS WALKNER

CROSS COUNTRY RALLIES WORLD CHAMPION TOBY PRICE

AMERICAN FLAT TRACK CHAMPION JARED MEES

EUROPEAN JUNIOR KART CHAMPION PAUL ARON

GNCC CHAMPION KAILUB RUSSELL

TOP DAKAR WOMAN LAIA SANZ

WORCS MC PRO CHAMPION GIACOMO REDONDI

AMA 250 NATIONAL MX CHAMPION AARON PLESSINGER

GP3 CHAMPION ANTHOINE HUBERT

WORLD TRIALS CHAMPION TONI BOU

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MUCH MORE THAN HAMILTON'S FIFTH WORLD CROWN

Despite Lewis Hamilton's sizeable final winning margin of 88 points, the 2018 Formula 1 World Championship featured a fine tussle at the front for much of the year. Sebastian Vettel and Ferrari took the fight to Mercedes and for some time looked like they were gaining the upper hand.

Red Bull also managed to get into the battle for wins at various points, while the incredibly tight midfield contest was worthy of its own prize. Throw in the arrival of Charles Leclerc, Honda's salvation and the behind-the-scenes shenanigans involving Liberty and the teams, and it's clear that there were plenty of subplots this year.

Our team of F1 journalists delves into all of the above and more in this special review issue, which also includes our now-traditional top 10 drivers list (page 34) and team bosses' vote (p41).

We also celebrate your stars of the season following the Autosport Awards at Grosvenor House last Sunday (p96). Hamilton and Leclerc were among the winners, while Le Mans legend Jacky Ickx, double world champion Mika Hakkinen and FIA president Jean Todt also picked up special awards.

The evening culminated in the announcement of the 30th winner of the McLaren Autosport BRDC Award. Tom Gamble topped an impressive first year in single-seaters by scooping the spoils, which include a McLaren F1 test drive. He joins a list of winners that includes Jenson Button, David Coulthard, George Russell and Lando Norris. Many congratulations to Tom.

Like Gamble, we will soon be looking ahead to 2019, but we have two more special issues first. Next week we'll ask you to vote for the F1 era you think was the best, while our Christmas double issue (December 20-27) will include our Top 50 drivers, Fernando Alonso's greatest F1 drives, and a review of an epic WRC season.



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Motorsport Images

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EXCLUSIVE: HALO SAVED

FORMULA 1

The FIA's official investigation into the first-corner crash in August's Belgian Grand Prix has detailed how the halo on Charles Leclerc's Sauber stood up to being hit by Fernando Alonso's wheel, and how it prevented a helmet-visor strike.

Following a thorough analysis of the incident, which was caused when Nico Hulkenberg pitched Alonso's McLaren into the air and over Leclerc at La Source, the FIA's conclusion, revealed here for the first time, shows how the halo proved its safety benefits beyond all doubt.

Accident report

The official crash report into the Spa accident, put together by the FIA Global Institute, confirmed that the main point of contact was Alonso's right-front wheel striking the right-hand upper side of Leclerc's halo with a force of 58kN – or 7G. "If the wheel had contacted Leclerc's helmet with a similar force, there would have been potential for a very serious head or neck injury," said the report.

The 58kN force is 46% of the 125kN that the halo and its attachments must withstand under the FIA mandate. The tests are conducted in an area of the car close to where the impact took place.

Sauber was able to remove the halo and its attachments without any issue. Damage was limited to the aerodynamic fairing only, with the halo itself remaining "structurally intact and in a usable condition".

Pictures of the accident captured by the FIA's high-speed cockpit camera showed that Leclerc was only hit by small pieces of carbon debris from Alonso's car as it flew over his cockpit. But without the halo, the incident would have been worse, even though the front wheel's trajectory would not have made contact with Leclerc's head.

Speaking exclusively to Autosport, FIA safety director Adam Baker said: "From the available data and video footage, we are confident that the wheel would not have hit Leclerc's helmet. But, as Alonso's car continued to yaw relative to Leclerc's, we believe that Alonso's front-wing endplate would have just contacted Leclerc's visor. It is difficult to predict the severity of the contact with any precision though."

The conclusions from the Leclerc/Alonso crash come after the FIA judged that the halo saved Formula 2 driver Tadasuke Makino from serious injury or worse in a crash in the Spanish Grand Prix support race in May.

Nirei Fukuzumi's car was launched over the top of Makino's, with his left-rear tyre making contact with the right-side

Seoul race close as UK eyes return

FORMULA E

The ABB FIA Formula E Championship intends to host a race in South Korean capital city Seoul during its 2019-20 campaign – and is evaluating a return to the UK.

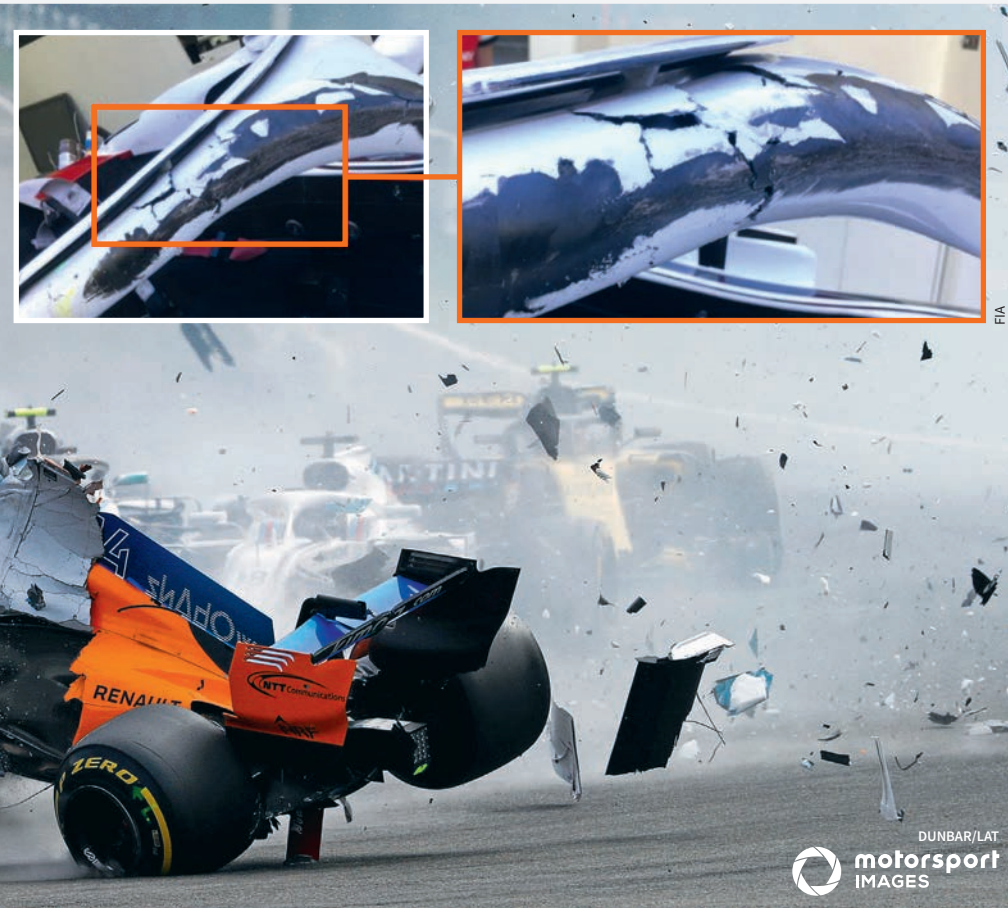
The Gwanghwamun Square and City Hall Square areas of Seoul have been highlighted as likely locations for the race, which would be promoted by JSM Holdings. The potential race remains subject to approval from city authorities and the FIA.

Although FE CEO Alejandro Agag (below) would not make a full-on declaration that a Seoul E-Prix is happening, he explained that the situation is “kind of 90% – we’re almost there. We need to choose the final place and get permission for the streets. There are many cities that want it – Seoul is probably the one that has more options, but we may go to Busan [on the country’s south coast] or to another city in Korea; we need to define the exact location. But having a promoter that takes on the cost of the race and all the financial side and all the organisation is 90% of a race.”

After he teased the audience of last Sunday evening’s Autosport Awards that he would be having a “secret meeting” with Motorsport UK chairman David Richards on Monday morning, Agag explained that FE and the UK’s governing body have a “little plan” to bring the electric championship back to Britain. London – which played host to the series in 2015 and ’16 in Battersea Park – is a “really strong option”, but Birmingham and Manchester are also in contention.

Agag also acknowledged that FE is “working on” a return to Russia, which appeared on the calendar only in 2015 with a round in Moscow. The series is “talking to the promoter of Formula 1 in Sochi” about a future race in St Petersburg, Agag explained.

ALEX KALINAUCKAS



LECLERC FROM VISOR HIT

bodywork of Makino’s car and then, more importantly, the right-side upper surface of the halo. The impact measured a peak lateral force of 20.4kN and vertical force of 28.0kN – much less than the Alonso/Leclerc incident – but crucially the trajectory of the car was such that the wheel would have hit Makino’s head had it not been deflected by the halo.

The official report into that Barcelona crash concluded: “The halo likely prevented contact between the tyre and the driver’s head. Without the halo there would have been potential for a very serious head or neck injury.”

Halo improvements

The two incidents have given the FIA valuable data and understanding about the halo design, which it will be able to use to help further improve safety.

The calculation of the loads applied to the halo will, for example, assist in determining the performance criteria for the future generation of designs. The FIA’s next step is to integrate a high-speed camera into the halo itself.

“The new camera position gives us a better view of the upper body and its interaction with the cockpit environment without obstruction from the steering wheel,” said Baker. “The halo camera will

be fitted in all cars for the first Formula E race [this month] in Riyadh. It will then be adopted into F1 for 2019 and F2 for ’20.”

Improving the look

While the halo did face early criticisms for its looks, and some would have preferred F1 to adopt an aeroscreen solution such as IndyCar is pursuing, the FIA is clear that there is a big disparity in the safety benefits of the two systems.

F1 race director Charlie Whiting suggested that the aeroscreen would not have stood up anywhere near as well as the halo in the Spa crash. “What we’ve seen with the accident in Spa is that the sort of device tested by IndyCar would probably not have been as effective – it would probably only offer about 10% of the protection that the halo offers,” he said.

That is why F1 is committed to the halo for now, but it is confident that as the sport moves to a new design concept for 2021 the system can be better integrated aesthetically. “The next generation of halo will be part of the F1 regulation update planned for 2021,” said Baker. “Importantly the halo is a key element of the car concept from the beginning, enabling a true structural integration and a shape which blends visually into the profile of the car.”

JONATHAN NOBLE



FORMULA 1

Charles Leclerc started his career as a Ferrari Formula 1 driver with the fastest time in last week's Pirelli tyre test in Abu Dhabi, as several drivers began working with the teams they will join for 2019.

Leclerc improved on his 2019 Ferrari team-mate Sebastian Vettel's Tuesday time to top the Yas Marina test, although the fact that the lap was 1.7 seconds slower than the pole time for the Abu Dhabi GP is an indicator of the relative lack of meaning of the times.

The purpose of the test was to give the 10 teams experience of Pirelli's finalised 2019 tyre range. Leclerc used Pirelli's 'Compound 5'

F1 TESTING TIMES			
POS	DRIVER (TEAM)	TUESDAY	WEDNESDAY
1	Charles Leclerc (Ferrari)	-	1m36.450s
2	Sebastian Vettel (Ferrari)	1m36.812s	-
3	Valtteri Bottas (Mercedes)	1m37.231s	1m38.448s
4	Lance Stroll (Force India)	1m37.415s	1m38.044s
5	Pierre Gasly (Red Bull)	-	1m37.916s
6	Max Verstappen (Red Bull)	1m37.947s	-
7	Sergio Perez (Force India)	1m37.976s	-
8	Lando Norris (McLaren)	1m38.187s	-
9	Carlos Sainz Jr (McLaren)	-	1m38.547s
10	Artem Markelov (Renault)	-	1m38.590s
11	Nico Hulkenberg (Renault)	1m38.789s	-
12	George Russell (Williams)	1m39.512s	1m38.802s
13	Daniil Kvyat (Toro Rosso)	-	1m38.862s
14	Louis Deletraz (Haas)	-	1m39.069s
15	Pietro Fittipaldi (Haas)	1m39.201s	-
16	Robert Kubica (Williams)	1m39.269s	1m44.208s
17	Kimi Raikkonen (Sauber)	1m39.878s	-
18	Sean Gelael (Toro Rosso)	1m40.435s	-
19	Antonio Giovinazzi (Sauber)	-	1m40.435s

Bold denotes driver's fastest time over the entire test

tyre – the 2019 hypersoft – to end up on a 1m36.450s, almost four tenths quicker than Vettel's time from Tuesday set on the 2018 hypersoft. The new spec of that compound is thought to offer similar performance but has been improved to suffer less graining.

Valtteri Bottas drove both days of the test for Mercedes and his time from day one was good enough for third-fastest overall, ahead of newly confirmed Racing Point driver Lance Stroll, who made his debut for the team. Pierre Gasly was next, driving for Red Bull ahead of his 2019 move to the team from Toro Rosso.

More than half of the 19 drivers who took the part in the test will either be making their debut, returning to F1 or switching teams next season. As well as Leclerc, Gasly and Stroll turning out for their 2019 teams, Lando Norris (eighth for McLaren) and George Russell (12th for Williams) drove ahead of their F1 debuts next year. Norris was joined at McLaren by Carlos Sainz Jr, experiencing the team for the first time after his season with Renault came to an end.

Russell shared his Williams with 2019 team-mate Robert Kubica, who is preparing to end a long absence from the F1 grid next year, while another returnee – Daniil Kvyat – drove at Toro Rosso.

Kimi Raikkonen appeared behind the wheel of a Sauber for the first time in 17 years on day one of the test, but his reunion ended with an on-track stoppage because of a technical problem. His team-mate for next season, Antonio Giovinazzi, drove on day two.

Louis Deletraz (14th) and Pietro Fittipaldi (15th) made their F1 test debuts for Haas, while Artem Markelov and Sean Gelael appeared for Renault and Toro Rosso respectively.

SCOTT MITCHELL





Deletraz leads F2 running

FORMULA 2/GP3

Straight after his maiden Formula 1 test with Haas, Louis Deletraz stayed on at Yas Marina, hopped into Carlin's ex-Lando Norris weapon, and topped the three-day Formula 2 post-season running.

The Swiss, who has raced with Charouz Racing System during his second F2 campaign, headed two of the three days with Carlin, setting the overall fastest of the test in the final session. The team still ostensibly has one seat available for 2019 alongside Honda protege Nobuharu Matsushita, who is returning to Europe.

"The test was great and I'm very happy with what we achieved – especially setting the fastest time across all three days," said Deletraz (above). "It was enjoyable to run with Carlin and to get to know each other a little better. We tried lots of different things during the test and I think we worked well together and did a good job."

Second quickest was Luca Ghiotto,

returning to the Virtuosi-run Russian Time team, which was running for the last time under that name as it has been sold to new owners for 2019.

Ghiotto topped one session, as did DAMS driver Nicholas Latifi, GP3 champion Anthoine Hubert (MP Motorsport) and somewhat surprising GP3 midfielder Juan Manuel Correa (Charouz).

The GP3 Series machinery also got one last airing at the Abu Dhabi venue when the F2 cars weren't on track, as drivers and teams prepared for the FIA F3 Championship that replaces the category.

After a spell racing in F2, Niko Kari returned to GP3 to lead the way with Trident, the Finn heading two of the first four sessions but not running on the final day. The other four periods were all topped by Jehan Daruvala, who ran on the first day with MP Motorsport before switching to Campos Racing. The Indian is tipped to compete for Prema Racing in 2019.

MARCUS SIMMONS

TOP 10 F2 TIMES

POS	DRIVER (TEAM)	TIME
1	Louis Deletraz (Carlin)	1m49.638s
2	Luca Ghiotto (Russian Time)	1m49.904s
3	Juan Manuel Correa (Charouz)	1m49.958s
4	Nicholas Latifi (DAMS)	1m49.976s
5	Guan Yu Zhou (Russian Time)	1m50.036s
6	Sergio Sette Camara (DAMS)	1m50.092s
7	Giuliano Alesi (Trident)	1m50.136s
8	Nobuharu Matsushita (Carlin)	1m50.139s
9	Mick Schumacher (Prema)	1m50.166s
10	Callum Ilott (Charouz)	1m50.250s

TOP 10 GP3 TIMES

POS	DRIVER (TEAM)	TIME
1	Niko Kari (Trident)	1m53.890s
2	Jehan Daruvala (MP)	1m54.461s
3	Sebastian Fernandez (Campos)	1m54.708s
4	Richard Verschoor (MP)	1m54.799s
5	Devlin DeFrancesco (Trident)	1m54.897s
6	David Beckmann (ART)	1m54.957s
7	Logan Sargeant (Trident)	1m54.983s
8	Linus Lundqvist (Campos)	1m55.041s
9	Yuki Tsunoda (Jenzer)	1m55.043s
10	Oscar Piastri (Jenzer)	1m55.085s

IN THE HEADLINES

STROLL JOINS TEAM...

The Formula 1 world was not hit with a huge surprise last Friday when Lance Stroll was confirmed alongside Sergio Perez in the line-up for the team that at that particular moment was known as Racing Point Force India. Stroll's appointment in the team, owned since August by a consortium led by his father Lawrence, completes the F1 field.

...WITH MULTIPLE NAMES

Later that evening, the FIA published the 2019 F1 entry list, with the team formerly known as Jordan, Midland, Spyker, Force India and Racing Point Force India now rebranded as Racing Point F1. But that will change again before the season kicks off. "It [the new name] is just a placeholder to indicate future change which will take place and be announced before the 2019 season," said team principal Otmar Szafnauer.

DE VRIES IN ART GALLERY

Formula 2 racer Nyck de Vries's move from Prema Racing to ART Grand Prix for 2019 was confirmed last week. The switch, predicted in Autosport last week, brings him back to the French squad, with which he raced in GP3 in 2016. He will partner Nikita Mazepin. On the same day, Prema announced that it will retain Sean Gelael alongside F3 European champion Mick Schumacher.

MARKELOV JAPAN QUEST

Renault F1 test driver and Formula 2 star Artem Markelov is closing on a switch to Japan for 2019 to race in Super Formula. The Russian was set to take part in this week's two-day test at Suzuka with Team Le Mans. Another SF newcomer to take part in the test is ex-F3 and latter-day LMP2 racer Harrison Newey. The son of Red Bull tech wizard Adrian Newey was due to drive at Suzuka with the new B-Max/Motopark collaboration.

HMS SUNK FOR 2019

The HMS Racing British Touring Car Championship team, which ran an Alfa Romeo Giulietta for Rob Austin this season, will not be on the grid in 2019. The squad has loaned its licence to Motorbase Performance. The championship organisers have released a list of entrants' licence holders for next term, with 30 permits issued. The most prolific squad on the grid is Team Hard with four permits, while WSR and Motorbase have three apiece.

FERRARI MAN TO BIKES

Ferrari Driver Academy chief Massimo Rivola has joined Aprilia's MotoGP team. The ex-Toro Rosso team manager and Ferrari sporting director oversaw drivers including Charles Leclerc and Antonio Giovinazzi at FDA.



Rowland gets Nissan call-up to replace F1-bound Albon

FORMULA E

Williams Formula 1 tester Oliver Rowland has replaced Toro Rosso-bound Alexander Albon at Nissan e.dams for the 2018-19 ABB FIA Formula E Championship.

Shortly before Albon's 2019 Formula 1 seat was confirmed last month, Nissan announced that it had agreed to part ways with the 22-year-old. Rowland, who replaced Albon for the final day of FE pre-season testing at Valencia in October, was

confirmed in Nissan's line-up on the eve of the 21st annual NISMO Festival at Fuji.

Rowland raced for e.dams sister team DAMS in Formula 2 in 2017, when he finished third in the standings. "We know the guy – that was the biggest argument," said team principal Jean-Paul Driot. "He's a tough racer, he's a strong character – he is a strong man."

Driot suggested that 15-20 drivers had contacted Nissan regarding an FE seat after Albon's F1 graduation was first mooted as

the Valencia test got under way. But he said that no others were ultimately evaluated. "I had Rowland in mind [originally]," he explained. "It would either have been Albon or Rowland. Because I don't want an old guy – old for motor racing – I wanted a young quick driver who is able to develop in the right direction with the right people."

Mitsunori Takaboshi will be Nissan's test and reserve driver, and Jann Mardenborough will be the team's official simulator driver.

ALEX KALINAUCKAS

Farfus joins Hyundai's tin-top megateam

WTCR

The start of the World Touring Car Cup off-season has been a busy one, with Hyundai announcing a stellar 2019 line-up including Augusto Farfus, and new entrant Cyan Racing revealing details of its testing programme.

Farfus announced at last month's Macau Grand Prix that he would step away from his DTM commitments but would remain a works BMW driver as part of its GT roster. The Brazilian

had also been tipped for a Hyundai WTCR drive, and has now been announced as part of a four-driver assault on his return to World Touring Cars for the first time since 2010.

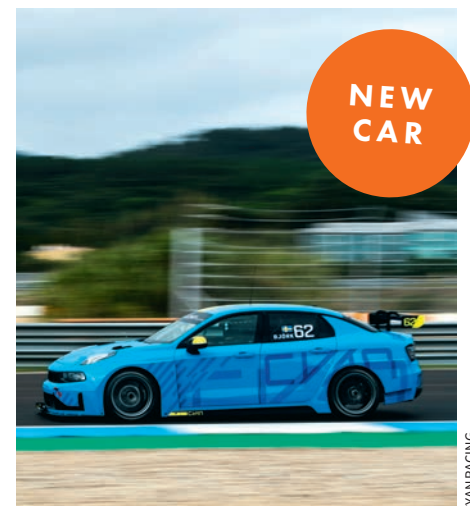
He is joined by fellow BMW man Nicky Catsburg, who drove for the factory Lada and Volvo WTCC outfits from 2015-17, while inaugural WTCR champion Gabriele Tarquini and BRC Racing team-mate Norbert Michelisz have been retained.

Hyundai's second team

for 2019 has not yet been announced, as Yvan Muller's operation will move over to join Cyan's programme. Assisted by Geely Group Motorsport, Cyan has started testing its Lynk & Co 03 challenger (right) at Mantorp Park and Estoril.

While testing details remain light, Cyan revealed that Muller and 2017 WTCR champion Thed Bjork have driven the car so far, and said it will take delivery of the Lynk & Cos close to the start of the 2019 season.

JACK COZENS





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IMAGES

Alonso's top Daytona ride

DAYTONA 24 HOURS

Fernando Alonso was top of Wayne Taylor's list when he went looking for drivers to bolster his team's line-up for next month's Daytona 24 Hours. But he ended up signing another name from Toyota's World Endurance Championship squad first: Kamui Kobayashi.

Now Wayne Taylor Racing has ended up with the pair of them in its Cadillac DPi-V-R alongside full-season drivers Jordan Taylor and Renger van der Zande for the IMSA SportsCar Championship opener on January 26-27. And Taylor Sr is understandably billing it as "the best driver line-up in the race".

Taylor met with Alonso on his sportscar debut at Daytona this year with the United Autosports squad. That contact was maintained through the season in what the team owner calls an "up-and-down" struggle to sign him for 2019. When it looked like Alonso wasn't going to be available, Taylor and WTR co-owner Max Angelelli turned to Kobayashi.

"We wanted drivers with the best possible sportscar experience," explains Taylor. "Max has known Kamui for a long time, so we called him when Alonso was looking unlikely, and we actually got his signature first."

Taylor's preference was to run four drivers at Daytona – something WTR has

done in three of the past five years – and was ready when Alonso came back into the frame. "A driver can get sick, and that gives you a problem if you only have a three-man team," he says. "Fernando became available again and it all came together very quickly."

Alonso will be getting into a race-winning car this time around, Taylor points out. He drove for a newcomer to Daytona in 2018, whereas next month he will be racing for an established IMSA frontrunner that won both the 24 Hours and the championship in 2017.

Alonso says he's looking forward to "attempting to conquer one of the most important races in the world" as he gears up for the beginning of what is likely to be an eclectic 2019 race programme. He reckons he's "brimming with hunger and desire" as he aims to add a second 24-hour victory to his 2018 Le Mans success.

WTR and Cadillac will again face opposition from Nissan in the Daytona Prototype ranks. The CORE Autosport squad, this year's IMSA series runner-up, will run one of the Onroak-Nissan DPis formerly raced by Extreme Speed Motorsports. CORE has reversed its decision to stick with its ORECA-Gibson 07 after one of the Nissans, which is based on the Ligier JSP217, became available after ESM closed its doors following the loss of title sponsor Tequila Patron.

GARY WATKINS

IN THE HEADLINES

WRT SET FOR DAYTONA

Belgian sportscar leviathan WRT is set to make a bid for another 24-hour crown at Daytona to go with its outright triumphs in the Spa, Nurburgring, Dubai and Zolder sportscar classics. The team is moving towards an assault on the GT Daytona class of the IMSA series opener next month with a single Audi R8 LMS GT3. Starworks Motorsport, winner of the 2012 WEC LMP2 title, will make a return to racing for the first time since '16 with a full-season IMSA GTD campaign with a solo Audi.

NEW NAME FOR OLD F3

The DTM's support series for Formula 3 cars will be renamed Formula European Masters for 2019. F3V, a subsidiary of the DTM-promoting ITR, will continue what was formerly the F3 European Championship for the 2012-18 generation of F3 cars, which have been supplanted by the new F1-supporting FIA F3 Championship.

SIX TO TEST DTM AUDIS

Audi's DTM team will test six drivers next week at Jerez. The marque's three-time Le Mans 24 Hours winner Benoit Treluyer gets a run, along with World Rallycross ace Andreas Bakkerud, F3 European Championship racers Ferdinand Habsburg and Jonathan Aberdein, Porsche Supercup ace Mattia Drudi, and Audi WTCR racer Frederic Vervisch.

55 WOMEN IN SHOOTOUT

The women-only W Series has long-listed 55 drivers to vie for places in the 18-driver single-seater series in 2019. Ex-Formula Renault 3.5 racer Beitske Visser features along with former GP3 drivers Alice Powell, Vicky Piria, Samin Gomez and Carmen Jorda. Apart from Powell, Brits include BRDC British F3 contender Jamie Chadwick, former Ginetta Junior champ Sarah Moore, Carrera Cup GB pilote Esmee Hawkey and sometime F4 racer Jessica Hawkins.

NAKAGAMI TOPS TEST

LCR Honda rider Takaaki Nakagami topped last week's two-day test at Jerez to close MotoGP's 2018 season. Nakagami edged out champion Marc Marquez to shade the first-day test topper of Ducati's Danilo Petrucci.



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PLAY THE TEAM GAME

Valtteri Bottas is on a hiding to nothing trying to beat Lewis Hamilton. Instead, by being the perfect number two he could actually increase his perceived value

EDD STRAW

Valtteri Bottas didn't like being referred to as Lewis Hamilton's "sensational wingman" by Mercedes team boss Toto Wolff after this year's Hungarian Grand Prix. No racing driver would, and his response revealed just how difficult it is to accept taking one of the most difficult jobs in motorsport.

"Wingman hurts" was Bottas's response. It was an innocent comment from Wolff that reflected the race situation at the Hungaroring, where Bottas had held second place behind his team-mate before a painful slump to fifth in the final six laps thanks to a combination of tyre troubles and on-track clashes, rather than a preordained status within the team.

But Bottas did become the de facto Mercedes number two on the basis of performance, and fell short not only of his own expectations but even what you'd hope for from a support act in terms of final results. To improve on that next year, and have a shot at a longer-term Mercedes future, he needs to accept that he is Hamilton's wingman to allow him to get the best from himself.

This might sound counter-intuitive. If you accept defeat before the battle, haven't you beaten yourself? Can a driver who has pushed himself to reach this level really accept this

"THERE'S NO SHAME IN NOT BEING QUITE AS GOOD AS ONE OF THE GREATEST OF ALL TIME"

status and still perform? What's more, surely you will extract your best performance by trying to lead the way... After all, to win the championship, in very basic terms, you need to be as fast as possible. To be the best number two, you need to do a similar thing – and if Bottas isn't going to be as quick as Hamilton regardless, what's the difference?

But elite sport is a psychological game and the human mind is not straightforward. It's all about Bottas getting into the correct headspace to extract the most from himself. He ended the campaign, by Finnish standards, crushed by the whole experience.

Bottas started the season with designs on fighting for the world championship, not just being part of a push for the constructors' crown. Perhaps that's why he was beating himself up so much about his "worst season" during the Abu Dhabi weekend.

But is the fundamental framework on which he's basing that criticism realistic? After all, his team-mate is Lewis Hamilton.

Remember, Hamilton is justifiably regarded as one of F1's all-time great qualifiers – he's statistically *the* greatest – and in dry conditions Bottas's deficit to him this year has been, on average, only 0.153s. That means qualifying is a strength for Bottas, considering the level of the bar Hamilton has set.

Bottas's race performances have been a little less robust, and what's clear is he's less adept at balancing the many challenges of managing the car and tyres than Hamilton. In particular, the Pirelli tyres can be a battle, which is what's played a part in races getting away from him. The most recent example is Abu Dhabi, where he slid from second to fifth.

You could argue that this explains what is probably the most alarming statistic from Bottas's season – the massive zero in the wins column. Racing drivers are built to win, so that must hurt Bottas even more than the qualifying position. Had things gone differently, he could easily have had two wins, perhaps as many as four or five, but in the second half of the season in particular he had some difficult races.

If Bottas were to go into next season focused not on beating Hamilton, but on getting closer to him, might that change things? There's no shame in not being quite as good as one of the greatest of all time, but let's say the objective in qualifying was to halve the pace gap...

That would mean even better qualifying performances. He was on the front row only nine times in 2018, with two pole positions, so before even thinking about beating Hamilton he must consistently be right with him. Close the gap, and he's more often than not going to start alongside F1's qualifying superstar. But most importantly, he needs to match Hamilton's tyre management skills and improve his racecraft.

But even if Bottas does get replaced at Mercedes in 2020, surely being the perfect number two will help his cause with finding a new employer. Let's say he's consistently finishing just behind Hamilton, and less than a tenth off in qualifying. Well, if you can't get Lewis Hamilton, why not sign the guy who is almost as good and has a huge wealth of experience from the best team in F1? It could even lead to a move to a team capable of a championship challenge where he wouldn't have to beat so strong a team-mate.

To win the war, you need to know when discretion is the better part of valour. It's not about giving up, it's about setting achievable targets and focusing on getting the most out of yourself rather than fixating on beating a driver for the ages like Hamilton.

In doing so, Bottas could make himself a more valuable commodity both to Mercedes or, should he not get a new deal for 2020, a rival team. It's a case of whether he's psychologically robust enough to accept that status and thrive. ✎



WAITING ON THE WINGS

While doubts linger over the effectiveness of next year's rushed-through aero tweaks, 2021 holds the promise of radical and effective change

ADAM COOPER

Will the changes to the 2019 Formula 1 front-wing regulations make any difference to overtaking? Or will we have to wait for what some are already suggesting is a much more promising solution when a completely new aerodynamic concept is introduced in '21?

Seven months after those 2019 changes were fast-tracked through to beat the April deadline, the fine detail is finally being agreed by the teams and the FIA, as loopholes are closed. But there remain doubts about how significant an impact there will be, despite all that effort and expense.

To recap, it all kicked off in the aftermath of what many saw as a dull Australian Grand Prix, when Jean Todt and Chase Carey agreed that something should be done to boost overtaking.

They seized upon one element of the 2021 work being conducted for F1 by Pat Symonds and his group of engineers. The theory was that by reducing the outwash effect – which in essence sends the front-wheel wake outwards instead of over the rear wing – it would be easier for the car behind to follow.

After some extra last-minute research was contributed by teams, significant changes to endplates and front-brake ducts

“SOME REMAIN ADAMANT THAT THE 2019 CHANGES WON'T BE POSITIVE FOR THE SPORT”

were assimilated into next year's regulations.

Teams have continued to learn as they've ramped up their development programmes for their 2019 cars, and some of that knowledge has fed back into a complicated process of loophole closing to stop teams recreating outwashing. The rules should finally be fully signed off this week.

“I think it's become a little more complex than we expected,” admits the FIA's Charlie Whiting, “simply because it was done in a bit of a hurry. I think we're pretty much there now. The latest detail changes are going to the World Motor Sport Council, but they are only details, and I think everyone's happy with them.”

Will the changes have a positive effect on the racing in 2019? That's the big question.

“Probably with hindsight, I think all the teams would recognise it wasn't the right thing to rush through,” says Christian Horner, whose Red Bull team voted against the

changes in April. “But let's reserve judgement until we see the first four or five races next year...”

Renault executive director Marcin Budkowski says: “We don't believe it's going to have such a strong impact that it's going to suddenly make following an F1 car easy.”

Budkowski says the focus is already very much on 2021 and the changes that are being formulated by Symonds and his colleagues: “Recently F1 has released a geometry – the whole shape of the car, all the aerodynamic surfaces – to the teams, which they've been asked to study and contribute feedback. It's a provisional geometry – by no means will it be the final geometry – but I think F1 has to use the firepower of the teams to accelerate that development and evaluate the solutions.”

Force India technical director Andrew Green suggests that the wing changes that were voted through in April could become irrelevant. But he believes that the 2021 package will address the overtaking problem.

“I think we jumped too early,” he says of the 2019 rules. “My gut feeling is that the change is going to be too small for us to measure. Massive changes are coming for 2021, which is really exciting. Just a completely different concept. It's a case of throw everything that we are doing at the moment out of the window. It looks really positive.”

“They've discovered there are much bigger tools, or changes that they can make to the car, that have a massive effect on the performance of the trailing car. And then when you look at the front wing compared to that, it's tiny.”

Green says the concept is so fresh that there will be no need to attempt to recreate outwashing: “Now we're looking at a set of 2021 regs that are completely different to anything we've ever raced before, the wake is completely different. It's a little bit to do with the front wing, but it's a lot to do with something else – just the overall geometry of the car, the way it develops downforce.”

“It makes it so that the outwashing is not the big thing that we strive for. Currently that's a big performance driver for these cars – we get outwash, we get performance. In the 2021 regs we don't need outwashing to get performance.”

All of that sounds promising, but it's still a couple of seasons away. For the moment the focus is on 2019, and some remain adamant that the impact won't be positive for the sport.

“It's a significant change,” says Horner. “One thing affects another, and it's been a very costly change. Will it affect the ability of the cars to follow closely? Maybe a little, but not tangibly so. And inevitably somebody will get it right and some teams will get it wrong.”

“If anything, it will put more gap between the teams. The best way to achieve a close grid is stability, and then the teams will concertina and converge.” ❄

YOUR SAY

They said we'd get used to them, but they just irritated me more as the year wore on – especially as the halo trashed the in-car camera views

GUY DORMEHL

This year's alternative title fight

Ever think 'what if...' about how the 2018 season would have been without the top three teams? What a season it was, with nine different race winners and only three drivers not once on the podium. That's how F1 should be!

Jukka Kamarainen

By email

That's exactly what we did – great minds and all that. See page 52 for our round-up of the thrilling 2018 'Class B' title fight – ed

The forgotten grand prix

I have followed grand prix motor racing for well in excess of 30 years. I've have the good fortune to attend some of the most memorable races in that time (Brands Hatch 1986, Silverstone '87, Monza '88, Silverstone '92).

I have been in attendance when world champions were crowned (Abu Dhabi 2010) and when all-time qualifying lap records were broken (Monza '02).

I have been privileged to watch races from the intimacy of team garages (Williams, Monza 1987; McLaren, Abu Dhabi 2010). Indeed, I have even been published in these pages before. I am, it would be fair to say, 'an enthusiast'.

Yet, the weekend before last, and for the first time ever, I completely forgot that there was a grand prix being staged and, although I avoided the result, I then lost interest in finding it out. Me, a lifelong fan. That should tell Messrs Carey and Bratches all they need to know about the current state of F1.

Jonny Britz

Dippenhall, Surrey

Halo's just as ugly as ever

They said we'd get used to them, but they just irritated me more as the year wore on – especially as the halo trashed the in-car camera views. The helmet-cam shots are even worse and look like a split-screen Morris Minor.

Pre-halo cars now just inherently look fabulous... and that is important for F1.



I'm not being insensitive about safety, but should F1 (and all the sadly filtered down junior categories) be safer than many people's weekend recreational activities – or work jobs? And I don't recall an F1 incident where the halo would have benefited the driver in the past few decades.

Surely there is a better alternative (if it is seriously a concern) – enclosed cockpit or a halfway step between nothing and the bloody ugly halo. Perhaps higher and more forward roll hoops?

Guy Dormehl

Garden Route, South Africa

See page 6 for the FIA's report on Charles Leclerc's Spa crash, and page 80 for our look back at the first year of the halo – ed

It's all in the pronunciation...

It's juvenile, yes, but I do find it amusing (and, actually, rather appropriate) that Alain Prost pronounces Lewis as 'le wiz'.

Graeme Innes-Johnstone

Elland, West Yorks

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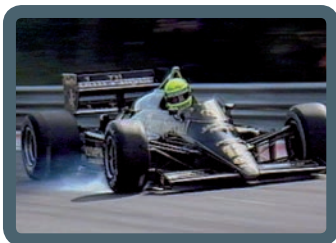
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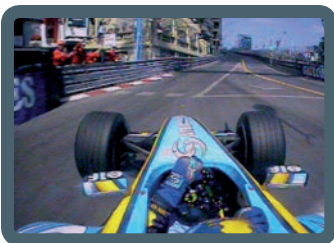
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*How Hamilton beat Vettel
to take his fifth – and finest – world title*

F1 season review

2018



Overview

Hamilton's greatest F1 season

Edd Straw

Mercedes' superstar claimed his fifth world championship title in Mexico, with two races still to go. But the margin belied a closely fought season



GALLOWAY/SUTTON
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This was quintessential Formula 1: two great teams going at it hammer and tongs; constant shifts in the balance of power; a tough development war; political and technical intrigue; and a pair of quadruple world champions butting heads. That the challenge of Ferrari and Sebastian Vettel ran out of steam and Mercedes and Lewis Hamilton wrapped up both titles with time to spare doesn't change that. This was a ferocious battle that deserved a more dramatic denouement.

The brilliance of Hamilton in surely his greatest F1 season to date, and an exceptionally resilient Mercedes team, denied us that. When it came to the pressure points, Vettel and Ferrari simply were not as robust and too often imploded or were consumed by chaos, despite spending more than half of the 2018 season looking the more likely victors. Driver and team superiority equated to an ostensibly comfortable victory, but really this was F1's fiercest fight in a decade.

Hamilton's performance level reached new heights this season. For the vast majority of the 21 race weekends he was at the top of his game, and there were few significant mistakes or examples

of underperformance. Yes, he struggled in China and Canada, while in Azerbaijan he locked up and damaged his tyres to compromise his strategy before winning fortuitously, but beyond that any negatives drift into the realm of the hyper-critical. And he got stronger and stronger as the year went on, with the final 88-point advantage testament to an outstanding year of sustained excellence.

Some seasons are about a single pivotal moment, an individual race or decision that changed the course of the year. But this battle twisted and turned, with the form book turned on its head time after time. It wasn't until the Spanish Grand Prix in May, the fifth race of the season, that what was clearly the faster car over a weekend won. This was one of the weekends when everything worked perfectly for Mercedes, and Hamilton disappeared into the distance, winning by the biggest margin of the season – 20.593 seconds.

When a car did vanish up the road, which didn't happen too often, it was usually a silver one. Of the four biggest wins of the season in terms of advantage over second place, three of them were achieved by Hamilton. But the Mercedes W09 inherited some of the diva qualities of its predecessor. It could be tricky to get into the optimum operating window, especially for getting the best out of the tyres.



Hamilton excelled,
whereas Vettel made too
many errors in 2018

To those looking closely enough, this was clear right from the start of the season, when Hamilton blew Vettel out of the water on his final Q3 run by 0.664s at March's Australian GP. This wasn't the consequence of a Hamilton special, for, good as the lap was, he actually owed the pace to Daniel Ricciardo getting in the way on the out-lap. This forced Hamilton to back up to find space and, by fluke, he ensured the tyre temperatures were right where they needed to be at the start of the lap to give good rear grip in the crucial final sector.

"We did thrash around a bit at the start of the year," says Mercedes technical director James Allison. "Melbourne was a good indication of not being on top of it. One lap just out-of-this-world amazing, then a whole bunch of quite average things. We got lucky, but it showed the potential, if you got things right, that was there in the car."

It also set a trend for Mercedes losing out to strategic blunders. An error in the operation of the tool used to calculate how close Hamilton needed to be to Vettel to retake the lead were the safety car to be deployed meant the Ferrari driver could stop and retain the lead. It was a fortunate win for Vettel, who won by dint of this being one of the rare occasions he was the slower Ferrari driver and was therefore left out in the hope of just such a situation arising.

In the following race in Bahrain, rear-tyre overheating for Mercedes in qualifying gave Ferrari the edge. Hamilton struggled that weekend, not helped by being hit by Max Verstappen early on, but Valtteri Bottas had the pace to challenge leader Vettel had Mercedes clocked earlier than Ferrari had decided to extend the second stint to the finish rather than stop again.

At the third race in China, Mercedes couldn't start a qualifying lap with the fronts at a high enough temperature and the rears not overdone. The battle with tyres was never decisively won by Mercedes, and there were late-season races where problems arose, but more often than not the team had it under control.

But if you had to pick one race as a microcosm of the season, it was the Italian GP at Monza in September. This embodied the differences between Ferrari and Mercedes, between Vettel and Hamilton. In qualifying, Ferrari inexplicably failed to use Kimi Raikkonen to tow Vettel, resulting in the 'wrong' one of its drivers being on pole. To make matters worse, this was also the time Ferrari chose to inform Raikkonen he would not be retained in 2019.

Vettel, frustrated at his failure to jump Raikkonen at the start, and looking for a way past into the second chicane, was mugged by >>

F1 season review **Overview**

Hamilton and spun while trying to hold on to second place. Hamilton went on to win after Mercedes forced Raikkonen into an early pitstop and resulting blistering through pushing too hard at the start of the second stint. Hamilton bided his time before passing him for what was arguably the best victory of the season. When Mercedes blitzed the following races in Singapore, Russia and Japan the title fight was all over, even though it wasn't until the Mexican GP that Hamilton made sure of it.

To isolate what really made the difference, you have to look first in the cockpit for what team boss Toto Wolff called "the differentiator": Hamilton retained his ability to deliver a swashbuckling pass or other-worldly qualifying lap, harnessed to a relentless consistency that ensured there were no weekends when he went missing, even though there were a few dicey ones early on.

Vettel was capable of glorious speed, particularly during the early stages of the season, when he turned a slender Ferrari performance advantage into a run of three consecutive pole positions, but when he needed to improvise he continually came up short. When there was overtaking to be done, aside from a clean pass for the lead at Spa, he was the one who too often blew it, while in wet conditions

he underachieved, notably when he threw away victory at Hockenheim in July's German GP after sliding off on slicks in the wet. A small mistake with big consequences, as Vettel kept pointing out, but it was far from an isolated error.

On top of the German shunt, a lock-up while trying to take the lead in Baku, hitting Bottas at the start in France, baulking Carlos Sainz Jr in Austria qualifying and getting a grid penalty, spinning after hitting Hamilton while trying to hold him off at Monza, spinning after hitting Max Verstappen at Suzuka, spinning while battling with Daniel Ricciardo at Austin... Quite the rap sheet. Whichever way you slice it, eliminate those errors and Vettel gains enough points at the very least to have taken the title fight down to wire, and perhaps even win it. Dealing with 'what ifs' is dangerous, but it's not too difficult to come up with an alternative history that gives Vettel at least 88 more points.

But for much of the season it was close – before Vettel's errors and Hamilton's supremacy created a yawning chasm between the two title contenders. Having prevailed over Ferrari in 2017, Mercedes looked strong in pre-season testing but started shakily, primarily because the development curve was shallow in the early stages of the year.



Mercedes' tyre problems gave Ferrari and Vettel the edge in Bahrain



Race by race by Ben Anderson



Australia

1 Vettel 2 Hamilton 3 Raikkonen

Lewis Hamilton qualifies six tenths clear of the pack but is denied victory by Mercedes' strategic miscalculation under virtual-safety-car conditions, which hands the race to Sebastian Vettel's Ferrari. Haas suffers a double blow as both cars retire, thanks to two botched pitstops, while running strongly inside the points.



Bahrain

1 Vettel 2 Bottas 3 Hamilton

Vettel fends off Valtteri Bottas to win again. After Mercedes misjudges Vettel's strategy, Bottas is slow to give chase, and thinks better of attempting a pass on the final lap. Hamilton recovers from a grid penalty to finish third, while Kimi Raikkonen retires when his car strikes a Ferrari mechanic during his pitstop.



China

1 Ricciardo 2 Bottas 3 Raikkonen

Bottas looks good to win this race, after jumping Vettel in the pits, but the timing of the VSC leaves him struggling to resist a late Red Bull charge. Verstappen goes off trying to pass Hamilton around the outside, then crashes into Vettel. Ricciardo's more measured judgement allows him to steal victory from Bottas.

“We were better than them by the barest whisker [in 2017],” says Allison. “Mainly because our power unit was a shade better; our chassis was a match. While we had a good winter and found a decent amount through to the winter test car, we had a very fallow period afterwards where it was tricky to find gains.

“So from January to the end of February, we didn’t really find anything and at that point it did feel like it was going to be a real sweaty fight because they were quicker and we weren’t finding stuff. We were kept in the game by our race drivers doing brilliantly and our race team doing a good job with what we gave them.

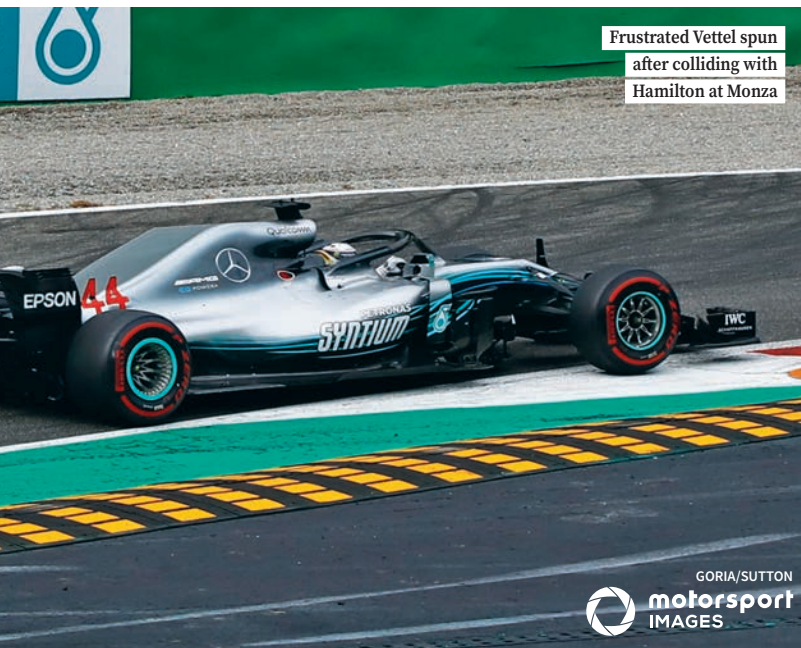
“Luckily, it then picked up really strongly. It can happen with windtunnels – development curves are never a smooth curve. We had an unusually flat period, then we got payback from that as it forced us to investigate a few new parts aerodynamically, and the gains came at Paul Ricard, Red Bull Ring and Monza – all those upgrades were chunky.”

This pattern was reflected by who had the faster car based on outright lap time. During the first seven races of the season, Ferrari was quicker than Mercedes on five occasions (one of those in Monaco, where Red Bull set the outright pace and won). Extend

that to the 14th race of the season at Monza and Ferrari was faster nine times. But from Singapore onwards, it was Mercedes all the way (although Red Bull again was fastest of all in Mexico).

The engine-development battle was central to this, with the big performance steps for both teams coinciding with the introduction of upgraded power units. In Canada in June, Ferrari introduced a new engine specification and Vettel won at a track Hamilton considers his own, which at the time suggested a potentially decisive blow. But Mercedes hit back with its own upgrade in the following race at Paul Ricard, meaning it was back in the ascendency. Both teams took the next engine step in the Belgian GP after the summer break, which again seemed to favour Ferrari. But that weekend was the last time Ferrari had control, and from then on Mercedes was usually on top.

Throughout all of this, there were concerns from both teams about the legitimacy of what the others were doing. Ferrari’s engine performance was constantly under scrutiny, and some in Mercedes suspected something questionable was going on related to using more than the permitted maximum battery energy. Certainly, the Ferrari performed very well in a straight line, but it must be stressed that the FIA never found anything wrong, even after taking a close >>



Azerbaijan

1 Hamilton 2 Raikkonen 3 Perez

Another race Bottas should have won. This time debris eliminates him with just three laps left, following a late-race restart after the Red Bull drivers wipe each other out battling over fourth. Vettel botches a bid for the lead moments before Bottas’s puncture and drops to fourth, as Hamilton inherits victory.



Spain

1 Hamilton 2 Bottas 3 Verstappen

Feeling comfortable with the set-up of his Mercedes for the first time since Australia, Hamilton dominates in Spain, winning by more than 20 seconds. Vettel runs second until Ferrari’s over-eager appetite for Pirelli’s special low-gauge tyres forces him to make a second pitstop and drops him behind Bottas and Verstappen.



Monaco

1 Ricciardo 2 Vettel 3 Hamilton

After Verstappen’s crash in final practice, Ricciardo takes pole and leads comfortably until an MGU-K problem robs his car of power and forces him to avoid using seventh and eighth gears. Ricciardo wins despite the problems, describing the victory as “redemption” for the Red Bull pitstop blunder that cost him in 2016.

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THE ULTIMATE REVIEW OF 2018

Whilst rival F1 annuals come and go, **AUTOCOURSE** – The World's Leading Grand Prix Annual – is proud to have reached its 68th year of publication as the indisputable leader in its field.

The 2018 season once more saw the continuing domination of Mercedes-Benz as Lewis Hamilton reached new heights in winning his fifth world driver's championship.

The 21-race Formula 1 Grand Prix season is covered with its usual meticulous attention to detail. The vastly experienced and much-respected Tony Dodgins and Maurice Hamilton – both long-time paddock insiders – bring you all the drama and intrigue that is Formula 1. Supporting their race commentaries are detailed results spreads that include specially prepared lap charts and tyre strategies.

Mark Hughes once more analyses the successes, frustrations and failures of each of the constructors in his Team-by-Team review, which includes key personnel, sponsors and technical specifications of the F1 cars, highlighted by the specially commissioned F1 car illustrations of Adrian Dean.

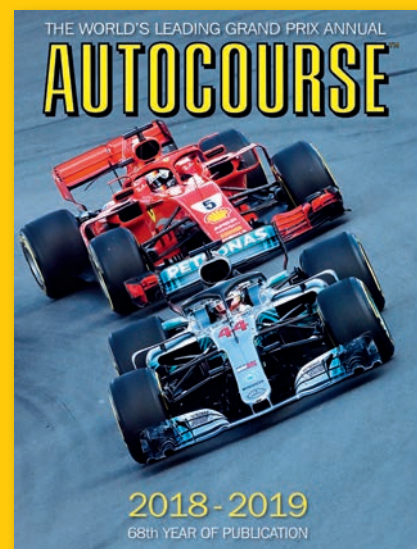
The sport's other leading categories are also given ample coverage, including the single-seat ladder from Formula 3 up to Formula 2, which showcases the pool of rising talent, all aiming to make their way into Formula 1.

Also described is the continuing rise of Formula E, sports car racing, with Toyota finally winning at Le Mans, in their domination of the World Endurance Championship, and the typical door-banging combat that is Touring Cars, in all their respective categories.

Veteran scribe Gordon Kirby gives his usual no-holds-barred assessment of both Indycar and NASCAR during the racing year in the United States.

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Raikkonen had stronger season, with US GP win, but still leaves Ferrari

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Wolff's (right) Mercedes kept cool, but Arrivabene's Ferrari team faltered

look. As for Mercedes, the cooling holes that appeared in its wheelrims, which stewards ruled legal but the team took off for several races while sealing the constructors' title, attracted questioning glances from Ferrari.

But Ferrari's late-season struggles were not just about Mercedes getting more out of its car, for the team also lost its way. Following the death of chairman Sergio Marchionne in July, things seemed to become more unstable inside the team, for as well as the Monza qualifying strategy error, there was a panic in qualifying that affected both cars at Spa, then the introduction of some floor upgrades that actively hurt Ferrari's pace.

Not only did Mercedes gain an advantage, but Ferrari also dropped back closer to Red Bull. Rumours swirling round suggested that, before Marchionne's loss, there was a plan to put well-regarded technical director Mattia Binotto into overall charge of the team and move Maurizio Arrivabene out. What happened after Marchionne's death – with Arrivabene becoming more punchy in public and rumours about Binotto leaving – suggested there was some truth at the heart of all this. Whatever, it wasn't good for Ferrari's focus, leadership or decision-making.

This is where Mercedes deserves huge credit – while Ferrari appeared to overreach and try too hard in the development war, Mercedes stood firm. While Toto Wolff's team doubled down on its processes, maintained its relative lack of politics and had faith in the way of working that had already yielded so much success, Ferrari seemed to panic. The leadership there at times appears to be wracked by insecurity and unable to give the team – including perhaps Vettel – the confidence they need.

Having rolled back the troublesome updates at Austin in October, Ferrari was back on form and once again able to challenge Mercedes. Raikkonen won the US GP in style – for once not finding a way to make an error or lose pace at crucial moments in a season where he lost multiple win shots – while Vettel was never too far behind. But that Austin win was an oasis in a victory desert for Ferrari as Mercedes asserted itself. Perhaps that's the difference between a mature, confident, established winning machine and one still attempting to reach that level, but, whatever the reason, Mercedes deserves a huge amount of credit for the progress made.

Not that it was perfect for Mercedes, for there were some strategic blunders. But it says a lot about the way the team works that after >>

Race by race



Canada

1 Vettel 2 Bottas 3 Verstappen

Vettel grabs the championship lead with a comfortable victory from pole in Montreal. Hamilton endures a difficult weekend on one of his favourite circuits and ends up a distant fifth after suffering engine-power "drop outs". A failed challenge on Bottas at the start forces Verstappen to settle for third.



France

1 Hamilton 2 Verstappen 3 Raikkonen

Hamilton uses Mercedes' delayed engine update to great effect, winning from pole as Vettel is restricted to fifth after colliding clumsily with Bottas on the opening lap. Bottas's title hopes take a further blow as he can only recover to seventh, while Verstappen takes up vain chase of Hamilton and finishes seven seconds adrift.



Austria

1 Verstappen 2 Raikkonen 3 Vettel

An anomalous race where both Mercedes retire with mechanical problems after running one-two for the first 13 laps. A first-lap error that gifts position to Verstappen thus costs Raikkonen his shot at victory. Vettel recovers from a grid penalty for impeding in qualifying, including passing Hamilton on-track, to complete the podium.

F1 season review **Overview**

making a wrong call during the Austrian GP, chief strategist James Vowles took responsibility in a radio message to Hamilton to help ensure the team's star driver could refocus on the race. And while there were some results lost, it's important to note that there were many other races when the strategy was bang on the money.

At no point did there appear to be any kneejerk reactions to the problems, just a focus on understanding the errors and preventing their repetition. Mercedes did have a reliability disaster with both cars eliminated in Austria, but beyond that problems were few and far between. What's more, there seemed to be a genuine relish within the team for the intensity of the battle that proves even a massive grand prix team can be a group of pure 'racers'.

The other factor that helped Mercedes was rain. In Germany, a Ferrari was faster but rain in the race allowed Hamilton to charge and led to Vettel's error. A week later at the Hungaroring, Mercedes locked out the front row, surely beyond it in dry conditions, and Hamilton converted that into a victory. It almost happened three times in a row when Hamilton took pole in the wet at Spa, only for Vettel to pass him on the Kemmel Straight.

This showcased the advantage Hamilton had when it came to

improvising, to judging the available grip and living on his wits. When everything was right, Vettel was stunningly fast, but in damp conditions, or when things got away from him in races, too many times he unravelled. Hamilton, by contrast, usually got his head down and hit back – as with his brilliant pass on Vettel after his pitstop in Russia was delayed by a lap and cost him track position.

Raikkonen and Bottas were the clear number two drivers in the teams, and the statistics confirm that it was Raikkonen who did the better job by clinching third in the championship. Bottas slumped to fifth with a poor late-season run.

Raikkonen was often solid, and there were too many race weekends where he hinted at having winning pace but made small errors at inopportune moments, but he was very consistent. Aside from clattering into Hamilton at Silverstone, he was clean on track and had the best year of his second Ferrari stint. That said, Ferrari was right to replace him with Sauber sensation Charles Leclerc, a driver who showed time and again during 2018 that he's a future star.

As for Bottas, he should have won in Azerbaijan in April, when he suffered a late puncture, and Russia, where he obeyed team orders and handed victory to Hamilton. He might also have won in China



Race by race



Britain

1 Vettel 2 Hamilton 3 Raikkonen

A brilliant pole lap leaves Hamilton physically shaking from the effort, but his good work is undone when Raikkonen turns him around at Village on lap one. Bottas inherits the lead when Vettel pits for a second time, but loses out to a bold Vettel pass at Brooklands six laps from the finish.



Germany

1 Hamilton 2 Bottas 3 Raikkonen

A pivotal moment in the title race as Vettel slides off the track when rain arrives and throws away a race he looks sure to win after Ferrari surreptitiously orders Raikkonen to move aside. Hamilton recovers from a gearbox failure in Q1 that leaves him 14th on the grid to claim victory and the championship lead.



Hungary

1 Hamilton 2 Vettel 3 Raikkonen

Another race Ferrari clearly has the pace to win, until heavy rain lashes the circuit for qualifying. Hamilton's wet-weather wizardry does the rest, giving him an unlikely pole he duly converts into victory. Vettel finishes second after passing Bottas late on, and somehow surviving being rear-ended by the Mercedes.

– having brilliantly undercut his way past Vettel – had the safety car not come out when it did, and could even have taken Bahrain had the pitwall given him the chance to attack one-stopping Vettel earlier. Scoring a couple of those wins would transform the way his season is viewed but, while his qualifying pace improved relative to Hamilton's, there were too many races where he slipped away and he couldn't match his team-mate's ability to manage the tyres in particular. But he did start strongly, and that helped him earn a third campaign at Mercedes, which gives him a chance to recover from what, at the end of the year, he described as his worst F1 season.

Red Bull was the occasional interloper in the battle at the front, which was a comedown from the hopes of a title push off the back of Renault engine improvements that weren't big enough. In particular, it was the deficit in terms of qualifying modes that made life difficult, more often than not leaving the Red Bull drivers on the third row of the grid. The team remained as effective as ever in sniping for wins, and is still perhaps the sharpest race team on the grid. The result was four victories: two each for Ricciardo and Verstappen.

Two of those came on merit. Ricciardo's opportunistic win in China was a result of how well Red Bull worked the tyres, and a

risk-free switch to softs under the safety car caused by Toro Rosso stablemates Brendon Hartley and Pierre Gasly colliding at the hairpin. Verstappen, of course, should have been the one to capitalise as he took the restart ahead of Ricciardo, having outperformed him all weekend, but his impatience passing Hamilton led to him going off and losing position. He then clattered into Vettel as what had already been an error-strewn start to the year got worse.

By the time Verstappen shunted needlessly at the exit of Swimming Pool in FP3 in Monaco, his list of mistakes was terrible. That cost him a second potential victory, with Ricciardo brilliantly weathering the shutdown of his MGU-K to win on what was one of only two weekends that favoured Red Bull. Beyond those errors, Verstappen also spun in Australia, hit Hamilton in Bahrain and contributed to a race-ending collision with Ricciardo in Azerbaijan. Six races in, the team management was tearing its collective hair out at Verstappen's failure to calm down. Verstappen himself jokingly – well, probably in jest, it's difficult to be sure – suggested ahead of the seventh race of the season in Canada that he would "headbutt" the next person to ask about whether he would change his approach.

It is to Verstappen's credit that he did change his approach – from >>



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Ricciardo claimed brilliant Monaco win despite MGU-K problems



ANDRE/SUTTON

Belgium

1 Vettel 2 Hamilton 3 Verstappen

Hamilton claims pole by a huge margin as rain affects qualifying again, but cannot prevent Vettel crucially slipstreaming past on the first lap. Verstappen finishes third as Bottas recovers to fourth after a grid penalty. The controversial halo is praised after a collision sends Fernando Alonso airborne and onto Charles Leclerc's Sauber.



ANDRE/SUTTON

Italy

1 Hamilton 2 Raikkonen 3 Bottas

A psychologically crucial win for Hamilton, as he comes from behind to beat Ferrari on its home turf. Poleman Raikkonen finishes a feisty second after being told he's lost his drive for 2019, while Vettel is only fourth after colliding with Hamilton on lap one and spinning to the back.



GALLOWAY/SUTTON

Singapore

1 Hamilton 2 Verstappen 3 Vettel

Hamilton takes a surprise pole on what is traditionally Mercedes' weakest circuit with a lap Toto Wolff calls the best he's ever seen, and extends his championship lead to 40 points with an assured drive to victory. Vettel loses out to Verstappen in the pits after overtaking him for second early on.



Verstappen came back from early-season errors to win in Austria

the first corner of the Montreal race, where he realised discretion was the better part of valour and backed out of a dicey battle with Bottas that would very possibly have led to another collision. That earned him third place, and set Verstappen back on the straight and narrow. From Canada to the end of the season, he was back to his formidable best, having learned a very important lesson, namely that he is fast enough not to have to force the issue.

Hamilton knows Verstappen is his biggest long-term threat and acted accordingly. He doesn't admit it, but Hamilton does seem to give Verstappen a wider berth on track than his other rivals — their late-race Austin battle is evidence of that. He also took every opportunity to play a few mind games, as his comments proved after Verstappen was robbed of Brazilian GP victory by Esteban Ocon's hamfisted attempt to unlap himself. Hamilton's remarks, that he would not have got caught up in such an incident, were less of an old head passing on advice than a top driver attempting to undermine a rival. And there's nothing whatsoever wrong with that.

Ricciardo, who was rightly considered a title outsider after winning two of the first six races, spent much of the rest of the season firmly in Verstappen's shadow and often a couple of tenths

off in qualifying. Unreliability and grid penalties hurt his results, with his two victories backed up by a next-best result of fourth, and he had the air of someone who couldn't always deliver his brilliant best. Perhaps that explains why he had to turn his back on Red Bull, even though a move down the grid to Renault is a huge gamble.

As for the rest, they were nowhere. So significant was the advantage of the big three teams, in resources and therefore pace, that only one of the 63 available podium slots was taken by the other seven teams. With almost tedious inevitability, it was Sergio Perez and Force India that defied a poor start to the season to bag third place at Baku fourth time out, passing Vettel along the way but also capitalising on the Red Bull wipeout and Bottas's blowout.

Beyond that, the closely fought Class B battle (see page 52) was usually fought for sixth or seventh place. So pronounced was the deficit that this pack usually parted like the Red Sea whenever one of the leading cars was coming through after a mishap or from a lowly grid position. This was a feeble display of enforced servility, but entirely understandable given there was rarely any hope of keeping them behind. Why waste valuable seconds dicing with someone you have no hope of beating when the real fight is elsewhere?

Race by race



Russia

1 Hamilton 2 Bottas 3 Vettel

Wolff momentarily becomes F1's pantomime villain by ordering another Hamilton win. Bottas annexes pole and has the race under control until Mercedes botches Hamilton's strategy and drops him behind Vettel. Hamilton reposses the Ferrari before Bottas is ordered to move aside to mitigate any remaining threat. An awkward podium ensues.



Japan

1 Hamilton 2 Bottas 3 Verstappen

Ferrari bungles its tyre choice in mixed conditions in Q3, leaving Hamilton and Bottas clear to set up another Mercedes one-two finish. Vettel starts strongly from eighth but spins trying to pass Verstappen and finishes only sixth. Verstappen pressures Bottas towards the end as Hamilton stretches his points lead to 67.



United States

1 Raikkonen 2 Verstappen 3 Hamilton

Raikkonen ends a personal victory drought of 111 races by beating Hamilton off the line then managing tyres perfectly. Mercedes parks its innovative wheel design as a precaution against protest and Hamilton is only third after making an extra stop. Verstappen is second from 18th on the grid, while Vettel again spins in battle.



Big three teams maintained big gap to chasing pack

It was a fascinating subplot, but also living proof of the divide between F1's behemoths, guaranteed a massive payout regardless of where they finish. Worse still, of the seven teams in that group only Renault is anywhere near the size needed to break out of the midfield ghetto. Grand prix racing has always been about the haves and the have-nots, but this divide is far more pronounced than we have seen before and enshrined in the inequitable distribution of revenues.

This is not quintessential F1. It's ferociously difficult to get to the front, but for decades there has been a realistic hope of climbing to the lead pack on your own merit. The Class B glass ceiling can now only be smashed through by immense investment from a manufacturer such as Renault or maybe a motivated, rich, consortium such as the one led by Lawrence Stroll that runs Racing Point Force India. This is what Liberty Media has set out to change, but has yet to convince it has the resolve to do.

There is also a need to address the style of the racing. Given how difficult it is to follow closely, the strategy always tended towards minimising the number of stops, given track position was so hard to regain. This led to too many races where cars were circulating well off the pace because this was the best way to maximise the result.

There are attempts to correct this for next season, and that would certainly be to the benefit of the drivers and the spectacle.

In the driver market, for the first time in world championship history, there was not a single driver change during the campaign and only 20 drivers participated – with all of them scoring points. That unprecedented stability acted as a counterpoint to a frenzied driver market, with only Haas and Mercedes retaining the same line-up for 2019. Ricciardo's move to Renault, a decision made when he was all set to agree a one-year contract to stay at Red Bull, triggered a cascade effect that led to many more changes and poor Ocon frozen out and facing a year as Mercedes reserve driver.

There are still legitimate concerns about the landscape of F1, with smaller teams by necessity affiliated to larger ones, and finances impacting which drivers get a seat, which needs to be addressed.

But for all that, this was a wonderful season. Hamilton attained the status of five-time world champion and displayed the extent to which he has added a brilliant all-round racing brain and an approach perfectly suited to the needs of both the team and individual to the virtuosity of his early career. To 'Schumacher and Ferrari' or 'Clark and Lotus', we must now add 'Hamilton and Mercedes'. ❄



Mexico

1 Verstappen 2 Vettel 3 Raikkonen

Verstappen is furious at losing pole to team-mate Ricciardo, but puts that right with a strong race as Ricciardo botches the start. Mercedes again struggles with tyre life and Hamilton clinches his fifth world title with a subdued race to fourth. Ricciardo declares his car "cursed" after another technical failure while running second.



Brazil

1 Hamilton 2 Verstappen 3 Raikkonen

A stirring drive from fifth on the grid puts Verstappen in position to win again, but a collision as Esteban Ocon tries to unlap himself hands the race back to Hamilton – whose engine comes close to failing from an exhaust problem. Verstappen is punished for confronting Ocon after the race.



Abu Dhabi

1 Hamilton 2 Vettel 3 Verstappen

Hamilton rounds out 2018 with an impressive 11th victory after beating Bottas to pole. Bottas slumps to fifth in the race, and the championship, after another underwhelming outing – this time struggling with his brakes. Vettel comes through to second while Verstappen recovers from a tough start to record his fifth consecutive podium.

Autosport's top 10 Formula 1 drivers of 2018

Edd Straw



10

Kimi Raikkonen

Re-entry

Raikkonen was Ferrari's Mr Consistency, which earned him third in the championship and allowed him to outscore Vettel over the closing stages of the season. But he finds himself 10th in this list simply because there weren't enough peaks, and too many race weekends where he might have been able to win had he not made a mistake at a key moment.

Austin, of course, was the exception. This was a superb victory requiring him to nail it in several key phases of the race, and he did it perfectly to take a long-awaited victory. The trouble was, this didn't happen often enough and he ended up with the third-weakest dry-qualifying pace-average team-mate comparison of the whole grid.

There were other high points, of course. His Monza pole position was well deserved, while he was actually the stronger Ferrari driver in Australia on the one weekend where, because of the Mercedes VSC error, victory went to the slower one. But Azerbaijan, Austria and Britain were among the race weekends where he hinted at having the pace but couldn't string it together.

Overall, though, he did the job Ferrari needed. He outscored his most direct competitor, Valtteri Bottas, which means Ferrari could have won the constructors' championship had Vettel not thrown away so many points. It was a strong finish to his second stint at Ferrari, although his position relative to Charles Leclerc shows why the time is right for him to move on and let a younger driver take over.



9

Pierre Gasly

New entry

It can be hard to make a big impression in a Toro Rosso, given it remains an erratic team in terms of performance, but Gasly's high points this season convinced Red Bull to promote him to the A-team and showed he's got what it takes to make a name for himself at the front of the field.

Bahrain (where he was fourth) and Hungary (sixth) stand out, for these were the weekends where the Toro Rosso had a good turn of pace and Gasly absolutely nailed it. Both were what could be termed 'grand prix winning drives in the midfield', and in Bahrain he twice had to fight off the combative Kevin Magnussen to hold on to his position.

There was more to Gasly's season than this. Despite underachieving in Q3, he was quick in Monaco, while as the season progressed he showed he had the ability to nick the odd point in tricky circumstances. But it was the way he drove that most caught the attention. From the first lap of FP1, he's always super-committed and not afraid of the car moving around, making him one of the most spectacular drivers to watch.

His consistency could be criticised, although it's hard to separate driver from car performance in this regard. And while he wasn't as far ahead of team-mate Brendon Hartley on pace as the points may suggest, Gasly's tendency to be on the right side of a small time split in qualifying suggests he can deliver under pressure. He'll need to do that in spades next season up against Max Verstappen at Red Bull.

8

Esteban Ocon

Up 1

Ocon ended the season with fewer points than team-mate Sergio Perez, but overall he had a small performance advantage for the majority of the season. His misjudgement in trying to battle with Raikkonen in Baku explains the gap between the two in the championship.

Monaco perhaps epitomised what Ocon is capable of – he took what was not the fourth-fastest car to ‘Class B’ victory after a great qualifying lap that put him ahead of quicker machinery. There were plenty of other strong performances – Austria, Britain, Belgium, Italy, the USA; all stand out and ensured Mercedes sees Ocon as a legitimate contender to succeed Bottas. In fact, had the team taken its driver decision later, perhaps Ocon’s form might have changed the outcome.

There were a few careless moments beyond Baku. Losing his front wing on the first lap in Mexico and hitting Verstappen in Brazil were costly, leading to suspicions that he may have been trying a little too hard late on given his lack of a 2019 drive.

But ranged against that there was also some good sense at play, notably when he backed out of a potential move for the lead at the start at Spa that could have resulted in a collision.

It’s a travesty that Ocon will not be on the grid at the start of next season, but there is surely no doubt that he will be back in Formula 1 soon enough. He is too good to be left on the sidelines and this must not be the end for him in F1.



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7

Daniel Ricciardo

Down 2

Ricciardo’s capacity to execute a race to perfection remains his calling card – when he has reliable enough machinery under him, that is. And there were some outstanding race drives during 2018, in particular his brilliant victory in China after charging from sixth place. He also dominated in Monaco from pole position.

And yet there are some nagging doubts about his season, best summed up as ‘Max Verstappen’. For both of his victories, Ricciardo relied on Verstappen’s errors to leave the way clear. And in qualifying, there was a consistent pattern of Ricciardo giving away 0.15-0.2s to his team-mate. No amount of brilliant racecraft can make up for that over a season given how quick Verstappen is on Sundays, even if Ricciardo remains a great overtaker – as his pass on Bottas for the lead in China proved.

The long period when he was mulling over signing a new Red Bull deal, enduring the disappointment of being shunned by Ferrari and Mercedes, also cast a shadow over his season and seemed to have an impact on his performances. For all that, he remains a quick and very classy driver, and his results in the second half of the season were devastated by unreliability and grid penalties. Without those, his season would look very different.

The new start at Renault is going to be hard work and may make him yearn for the years when he could ‘only’ snipe for the odd circumstantial victory, but perhaps it is much needed.

6

Nico Hulkenberg

Up 1

Formula 1's midfield was famously congested during 2018, so it's testament to how good Hulkenberg's season was that he clinched the unofficial 'Class B' title with a round to spare. Nobody was so consistently strong in that part of the field and, even though he had the might of Renault behind him, his performance relative to formidable team-mate Carlos Sainz – outperforming him on all key indicators – shows how good he was.

In total, he 'won' the midfield battle six times – nobody else managed more than three. It was a little harder in qualifying, but he was still on top three times, and the Renault wasn't always the easiest car to drive.

It wasn't a perfect season, and the tendency to drop it unnecessarily – which you often hear cited as a reason why a top team hasn't taken a chance on him – did show itself this year. He crashed out while running fifth in Baku, while at the start at Spa he locked up and drop-kicked Fernando Alonso's McLaren into Charles Leclerc's Sauber. Then, in the Abu Dhabi season finale, he didn't leave Romain Grosjean room while passing him and ended up on his head. There were also a couple of needless practice shunts that gave the team extra work. Furthermore, there were occasions when his old *bete noire*, tyre management, made life difficult, but this is an area where he has improved over the years.

This was perhaps Hulkenberg's best season since his outstanding 2013 campaign with Sauber, and a reminder of the ability he's always had.



5

Charles Leclerc

New entry

Those who rushed to judgement after the first three grand prix weekends, during which Sauber struggled with cooling problems and Marcus Ericsson looked the stronger driver, were made to look very stupid as the season progressed. Leclerc improved in leaps and bounds, starting with a superb sixth place in Baku, and ended what proved to be a brilliant season with a run of four seventh places in six races.

What impressed with Leclerc is that he kept improving, even after he had secured promotion to Ferrari for 2019. There were mistakes – of course there were because he's a rookie – but he didn't repeat those errors and was consistently able to get the best out of the Sauber regardless of track configuration in the closing stages of the season. What's more, he was robbed of some other big results, notably to an unsafe release at Silverstone while on course to undercut his way past 'Class B' leader Hulkenberg, due to circumstances beyond his control.

The biggest criticism is that, while he showed a superb knack for escaping Q2 in tight battles – most impressively on a slightly damp track at Interlagos – his performances in the top 10 shootout fell slightly short. He strung together his theoretical best qualifying lap based on sector times only three times during 2018, and there were too many occasions when he missed out on a grid position as a result. That's something he must improve when he goes up against Vettel.

4

Sebastian Vettel

No change

Vettel made too many mistakes during 2018. He knows it, everybody knows it and, even with Ferrari's struggles in the closing stages of the season, there is no doubt he should have made a closer fight of the world championship.

When the Ferrari was strong relative to Mercedes, generally it had only a slender advantage and for the first half of the season he was very effective in translating that into victories. In particular, his win in Bahrain impressed as he extended his second stint in a car that wasn't as good as the Mercedes on race pace. He was also able to turn the tables on Lewis Hamilton by passing him at Spa after wet qualifying had held Ferrari back. After that win, despite being 17 points behind Hamilton, Vettel was many people's favourite for the title.

What followed, however, was extremely disappointing. After Spa, he failed to win again and was matched by Raikkonen. The mistakes continued with increasing frequency, and Vettel and Ferrari faded dramatically from title contention. The errors he made easily cost him his eventual 88-point deficit to Hamilton, so this was unquestionably a title shot missed. The off in Germany that cost him victory gave away the most points, but it was the repetitive later-season blunders that really reflected badly on him.

That said, we must not overlook his strengths. No driver nailed his theoretical fastest qualifying laps more times than he did, and he had the third biggest average qualifying-lap-time advantage over his team-mate of anyone during the season.



3

Fernando Alonso

No change

While it's a terrible waste that what may well have been Alonso's final season in Formula 1 was spent in a car unworthy of this great driver, it did at least allow him to showcase what he could do. He had no business achieving some of the results he got, and 11th in the championship in what was, on average, the ninth-fastest car of the season is a miraculous result. McLaren's sixth place in the constructors' championship was thanks to Alonso.

There were some strong qualifying performances but, as has been the case throughout his career, it was in the races that Alonso shone. In the first half of the season in particular, he hauled the McLaren to a series of results that wouldn't have been possible for most drivers. Baku stood out, as he probably should have retired given the first-lap damage he sustained yet managed to haul the car to seventh.

But there were times when he lost interest and some needless on-track belligerence – trying to battle with the recovering Vettel at Paul Ricard and spinning, and short-cutting the track at Suzuka and Abu Dhabi, for example – makes the performance less superhuman. But who can blame him?

What stood out was that, in a car cursed with rear-end instability, he was able to live on the edge and use his incredible car control to drag times out of the McLaren that team-mate Stoffel Vandoorne couldn't. That resulted in a 21-0 qualifying whitewash, with Vandoorne's performance demonstrating the natural level of the car and just how brilliant Alonso was.

2

Max Verstappen

No change

The first six races of Verstappen's season were catastrophic. He made too many mistakes, potential victories in China and Monaco were thrown away, and he had the air of a frustrated driver trying too hard. At the end of May, it was inconceivable that he could end the season so high in this ranking.

But from the Canadian Grand Prix onwards, Verstappen was the only driver to come close to Hamilton's level. While he still has a habit of moving around too much in braking zones, hence a needless penalty at Monza, by recognising there is a time and a place to force the issue he emerged as a much more dependable performer. Verstappen's epiphany appeared to be grasping that he's so good that he doesn't need to be right on the limit every lap, a realisation that has elevated him to an even higher level.

His victory in Austria was excellent, founded upon an opportunistic first-lap pass on Raikkonen, while in Mexico he controlled the race beautifully. That performance alone should force those who regard him as nothing more than a devastatingly fast but limited driver to think again, even if some argue he could have avoided the Ocon collision that cost him victory in Brazil.

Verstappen also destroyed team-mate Ricciardo in qualifying and, while things were slightly less emphatic on Sundays, he also had the advantage in the races. This surely played a part in Ricciardo feeling he had to leave Red Bull, and underlines just how good Verstappen was during 2018.



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1

Lewis Hamilton

No change

Hamilton's fifth world championship victory was his greatest, turning what looked set to be a battle that went down to the wire with Vettel into a walkover. Hamilton is a driver in perfect balance both with his own mind and the Mercedes team, showing impeccable judgement on track and outclassing his title rival in every area.

His qualifying performances were excellent, he produced two outstanding passes on Vettel at Monza and Sochi that were critical in crushing the Ferrari challenge, he was a superior race manager than Bottas, particularly when it came to the tyres, and produced relentless consistency. There were days in the past when Hamilton would go missing in races, but not anymore.

No driver is perfect and there were a few low points. In Canada and China he struggled for pace, and a lock-up in Baku compromised his strategy. But everything is relative, and these were lows only by his standards, not compared to what we saw from the rest of the field. Beyond that, you could argue he might have made a better fist of keeping Vettel behind him on the first lap at Spa, but he was only

“You cannot point to another driver on the grid who came as close to maximising the potential of his car week in, week out”



ahead thanks to his inspired qualifying performance in the damp in the first place, and the Ferrari was the stronger car.

You can say that Hamilton had the best car, but he played a key part in making it so and for much of the year it was nip and tuck with Ferrari. But you cannot point to another driver on the grid who came as close to maximising the potential of his car week in, week out. His wasn't just a great performance compared to his peers, it has to stand as one of the great seasons in terms of sustained performance, with Hamilton now having a preternatural ability to judge when to deliver a race-changing pass or stunning qualifying lap and when he just needs to let things come to him.

There were so many highlights. In the rain in Germany he flew on slicks, while in wet qualifying at the Hungaroring and Spa he turned the tables on the faster Ferrari to take pole position. His qualifying lap in Singapore was sublime, around six tenths faster than what Mercedes reckoned was possible, and he showed no inclination to relax, even subconsciously, once the title was secured by winning the final two races. He's now a driver who knows you leave no stone unturned and give the opposition nothing, and saw the end of this season as the start of the next.

But it wasn't just what Hamilton did that made his 2018 campaign so extraordinary, it was the way he did it. During the past 30 or so years there has been a deterioration in driving standards and a belief that you have to be utterly ruthless to prevail, but Hamilton has a genuine and heartfelt desire to win the right way. He doesn't just have a desperate desire to win, but to win cleanly. For the many young karters who will idolise the five-time world champion, that may be an even greater legacy than the success.

Outside the top 10

Valtteri Bottas's season was better than fifth in the championship suggests, and he certainly should have had at least two wins given what happened in Azerbaijan and Russia. But while his qualifying performances improved versus Hamilton, there were too many times when his races unravelled – particularly late in the season.

Carlos Sainz Jr remained a class performer and was robbed of midfield victories both in France (MGU-K failure) and Mexico (battery). But while he still demonstrated his ability to turn in strong race drives, such as a superb 10th place in the Japanese Grand Prix that he effectively scored from nothing, he was outperformed by team-mate Nico Hulkenberg both in qualifying and race results.

Sergio Perez was far closer to team-mate Ocon's performance than the qualifying head to head suggests. But despite outscoring him and taking a brilliant podium in Baku, he was marginally the less impressive Force India driver.

Romain Grosjean had a disastrous first part of the season, but once the Canada upgrade was introduced gained the upper hand on his Haas team-mate and strung together a stunning run of 11 Q3 appearances out of 12 in the ultra-congested midfield. But there were too many mistakes and, as a result, not enough points finishes. As for **Kevin Magnussen**, he achieved new levels of consistency and had a particularly strong start to the year, but ultimately couldn't match Grosjean's pace once the other Haas driver was back in the groove.

Brendon Hartley struggled to match team-mate Gasly's knack for picking up points, although the performance difference

between the pair was smaller than the points table suggests and he was largely a very effective team player. Hartley was constantly on the wrong side of tiny splits between the pair and, even though there was plenty of bad luck, he also struggled to string together 'complete' race weekends.

Marcus Ericsson had, on average, the worst qualifying deficit to his team-mate and spent much of the season trying to find performance on Saturday. He did eventually and, harnessed to his decent race pace, that made him a good performer, but overall he was blown out of the water by Leclerc.

Rookie **Sergey Sirotkin** was made to look poor by a dire Williams, but actually acquitted himself very well and was the stronger Williams driver on Fridays. He did miss out on the two strongest weekends for Williams, Azerbaijan and Italy, compared to his team-mate, but over the course of the season he created a platform he would have built on given a second season.

Stoffel Vandoorne endured a painful season and was destroyed by Alonso in qualifying. The problem was a combination of McLaren's bad year and very much being the number two driver, but he also couldn't live with the instability that Alonso was able to deal with. Even so, given a second chance at F1 he would surely show the ability he did in the junior categories.

Lance Stroll on occasion seemed to be marking time before moving to Racing Point Force India, but at Monza he seized his opportunity to take an improbable Q3 position and had a strong race to his second points finish of the season.

Below the bubble



Grosjean gained the upper hand on Magnussen

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Renault



Gunther Steiner
Haas



Zak Brown
McLaren



Otmar Szafnauer
Racing Point
Force India



Fred Vasseur
Sauber



Franz Tost
Toro Rosso



Claire Williams
Williams

Lewis Hamilton's charge to a fifth Formula 1 world championship marked him out

as the standout driver of the year. So it's no real surprise that he ended up dominating Autosport's team principals' top 10 drivers of 2018.

But what was always going to be more interesting was how the order stacked up behind him, with a host of drivers having had seasons of various highs and lows.

Sebastian Vettel had some brilliant wins but also made some big errors. Max Verstappen starred at the end of the campaign but had a real struggle at the beginning. And then there was Fernando Alonso, who again dragged his McLaren to places that others may have struggled to reach.

Here, then, is the verdict of F1's team bosses. In what has now become an Autosport tradition, we asked each team principal to give us their top 10 drivers in secret. By doing it anonymously, it ensures that we can get a more honest opinion about what they really think, rather than feeling that they have to toe the PR line.

Points were then awarded to each driver using the F1 structure (25-18-15-12-10-8-6-4-2-1), and the results collated to deliver the final verdict. 🏆

How the team chiefs voted



1 218PTS

Lewis Hamilton

No change



2 139PTS

Max Verstappen

No change



3 105PTS

Sebastian Vettel

No change



4 103PTS

Fernando Alonso

Up 2



5 85PTS

Daniel Ricciardo

Down 1



6 71PTS

Charles Leclerc

New entry



7 57PTS

Kimi Raikkonen

No change



8 38PTS

Valtteri Bottas

Up 2



9 27PTS

Esteban Ocon

Down 4



10 23PTS

Nico Hulkenberg

Down 1

Last season

2017

- 1 Lewis Hamilton
- 2 Max Verstappen
- 3 Sebastian Vettel
- 4 Daniel Ricciardo
- 5 Esteban Ocon
- 6 Fernando Alonso
- 7 Kimi Raikkonen
- 8 Carlos Sainz Jr
- 9 Nico Hulkenberg
- 10 Valtteri Bottas

Readers' driver ratings

How Autosport readers scored the drivers across the 21 races, taking the average rating for each driver.

- | | |
|-------------------------|--------------------------|
| 1 Hamilton 8.2 | 11 Ocon 7.1 |
| 2 Leclerc 7.6 | 12 Hulkenberg 7.1 |
| 3 Ricciardo 7.6 | 13 Gasly 7.0 |
| 4 Raikkonen 7.5 | 14 Perez 6.8 |
| 5 Vettel 7.4 | 15 Ericsson 6.4 |
| 6 Verstappen 7.3 | 16 Grosjean 6.3 |
| 7 Bottas 7.2 | 17 Hartley 6.2 |
| 8 Magnussen 7.2 | 18 Vandoorne 6.0 |
| 9 Alonso 7.2 | 19 Sirotkin 5.8 |
| 10 Sainz 7.2 | 20 Stroll 5.3 |



Mercedes Ferrari

The development war

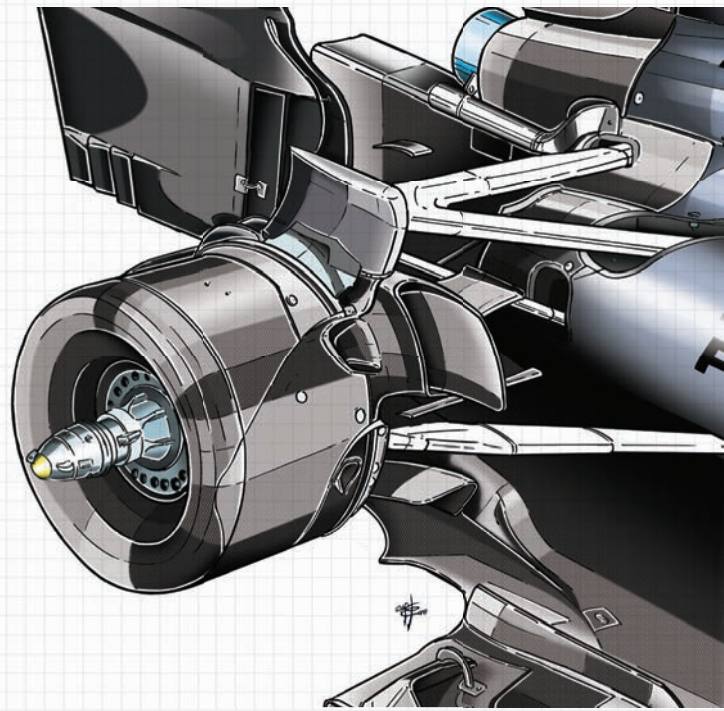
Giorgio Piola and Gary Anderson

Mercedes and Ferrari waged an intense development war throughout the 2018 season. Giorgio Piola was there to capture every major development as they appeared

Mercedes

Rear suspension

Mercedes was the only team to raise the pick-up point of its rear upper wishbone in 2018, a move that improves both the downforce level of the car and the consistency with which it is delivered. Mercedes has gone for a more-inboard and higher pick-up point. The pullrod pick-up appears to be just below the wishbone pick-up, allowing better system stiffness without adding weight. This allowed Mercedes to move the lower wishbone higher and away from the diffuser upper surface, creating better airflow over the top of the diffuser. This, in turn, helps to get more airflow out of the diffuser itself and improves overall underfloor performance. More importantly, it removes the blockage of the outboard end of the wishbone and moves the pullrod inboard and upward that little bit, allowing Mercedes space to use rear brake ducts with more turning vanes. These improve the performance of the outboard area of the diffuser and also produce downforce in their own right. This load goes directly onto the tyre contact patch, so there is no time lag in the grip this produces as the suspension moves up and down over kerbs and bumps. Also, under braking, when the rear of the car starts to rise and semi-unloads the rear contact patch, this load, directly onto the wheel and tyre, is more consistent and improves the reliability of the rear grip and corner entry.



Front suspension

Packaging the front suspension of a Formula 1 car is no easy task. There are just so many components to find space for, including the pedals, master cylinders and the driver's feet.

The 2018 Mercedes was no exception. It had the common top-and-bottom carbon wishbone and a carbon pushrod operating inboard rockers (1). Where the black top part of the pushrod changes to the silver part, there are shims (slightly darker silver) to alter the ride-height. As the angle of the pushrod is about 45 degrees, adding a 0.5mm shim raises the ride-height by roughly 1mm.

Looking at the car from the front, it has torsion springs on both sides (3). The left-hand torsion spring is splined into the machined-out rocker. A torsion spring is a round bar or tube

with a spline at each end, one end anchored to the chassis at the driver's feet and the other end to the rocker. When the suspension moves down, it twists the bar and the stiffness this creates supports the car. A torsion spring that is shorter, with a larger diameter, or a thicker wall, increases the vertical stiffness.

As the two additional rockers (4) are joined together in the middle with a solid link that effectively creates a third connecting rocker to help the other two drive the anti-roll bar, the small-toothed plate on the right-hand-side rocker is to locate the torsion spring to that rocker. Having this small plate allows adjustment so there is no preload on the system.

The interesting thing is where Mercedes has fitted the front anti-roll bar. It is inside the left-hand torsion spring (3 indicates left and right torsion springs). Its lower spline fits into a spline

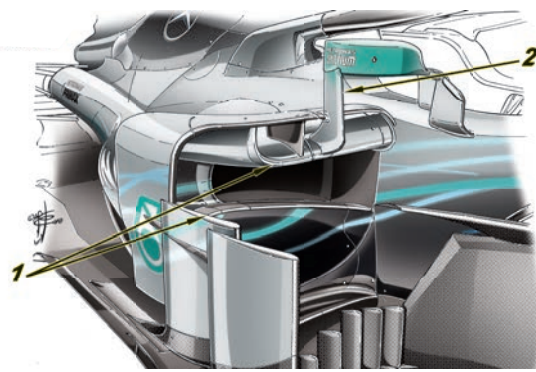
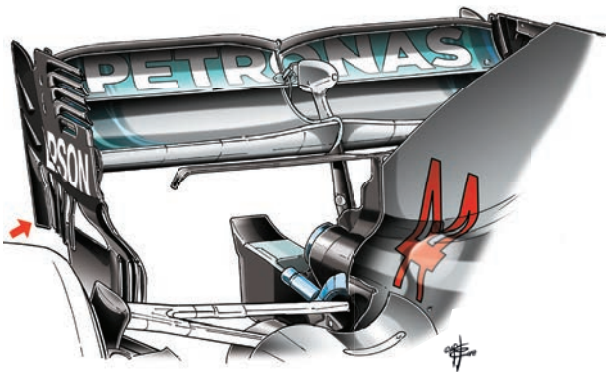


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Austrian GP update

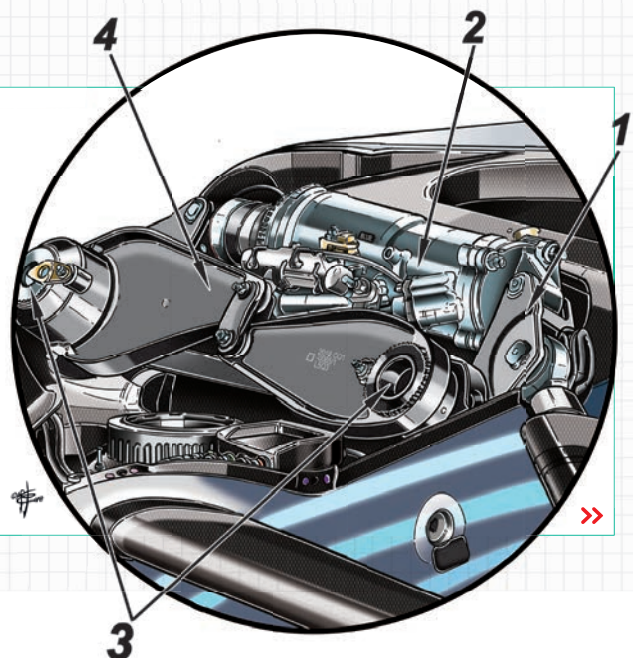
Mercedes introduced a major upgrade package for the Austrian Grand Prix, including a new rear wing and endplate. It was very similar in concept to what McLaren uses in that the transition between the lower, narrower section to the upper, wider section of the endplates has now become a louvred panel, helping to expedite the airflow from below the undersurface of the rear wing. It also manages the airflow spilling around the rear tyres, reducing the negative effect this turbulent airflow has on the

rear wing's undersurface. Both of these changes make the rear wing more efficient. Mercedes also introduced a new vane package around the leading edge of the sidepod. This is much more complicated than the previous version, and seems to use the same philosophy as the Ferrari sidepod-inlet system. The objective of this package was to improve the performance of the sidepod undercut. Making this area work more efficiently improves nearly every other area of the car, including the front wing, the underfloor, the Coke bottle and, in turn, the diffuser.



on the inner diameter of the left-hand torsion spring and its top spline is driven by the small-toothed plate. When the car sits on the ground and the aerodynamic force builds up, the left-hand rocker rotates clockwise. The right-hand rocker rotates anti-clockwise and, with the solid link connecting them in the middle, they rotate at the same ratio, closing the gap between them, acting as a central damper. When the car reaches a certain speed, that central gap becomes zero and the car sits on the silver mesh-style bump stop. In a straight line, this reduces the car's vertical movement dramatically as this bump stop is very stiff.

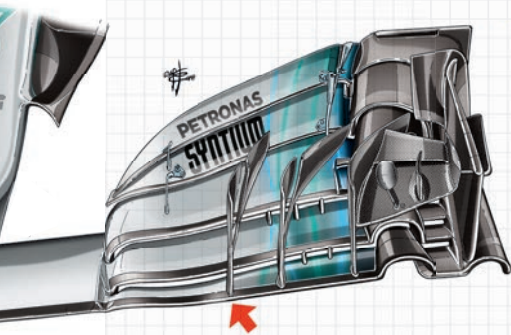
But in a right-hand corner, when the chassis rolls, both left-hand and right-hand rockers rotate anti-clockwise. This twists the anti-roll bar. In this condition, the sum of anti-roll bar and the torsion spring stiffness gives the car its total roll stiffness.



Front wing

Following the summer break, Mercedes adopted the philosophy that if one is good, two must be better – it added another curved vertical turning vane to the front-wing assembly. Two vanes work in conjunction with the front-wing endplate and together they set up an airflow-turning moment

to move more mass airflow around the outside of the front tyre. This means that less-turbulent airflow goes between the inside of the front tyre and the chassis, allowing the front wing and the leading edge of the sidepods to work more efficiently.



Mercedes wheelrims

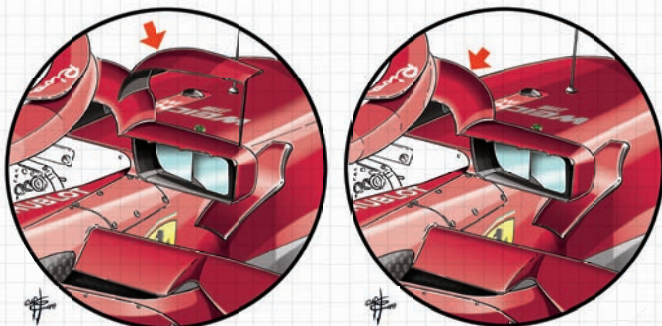
The controversial Mercedes rear wheelrims first appeared at the Belgian Grand Prix, and at the Mexican GP the team asked stewards to investigate them, resulting in them being ruled legal. It's always difficult to quantify what is a moveable or moving aerodynamic device. The basic principle of cooling a brake disc by passing air through the holes in the disc means that, like the wheel, which at the very least has spokes, they are a moving aerodynamic device. But they are not moveable and the geometry is consistent when the car is stationary. Adding holes in the wheels is just exaggerating the wheel-spoke design.

Managing the tyre temperatures for both one lap in qualifying and over the full race is not easy. You want the tyres, especially the fronts, to warm up quickly for a qualifying lap, and over a race distance you want the rears in particular not to overheat. It is fairly easy to get the rears to come up to temperature by just spinning the wheels, but you don't have

Ferrari

Mirror mounts

Ferrari briefly ran a mirror design that required an extra vane for support, which it was asked to remove for the Monaco Grand Prix as it could offer an aero advantage. This resulted in this revised version being introduced, using the halo to mount the mirrors. The only reason the extra component was there originally was to improve the aerodynamics.

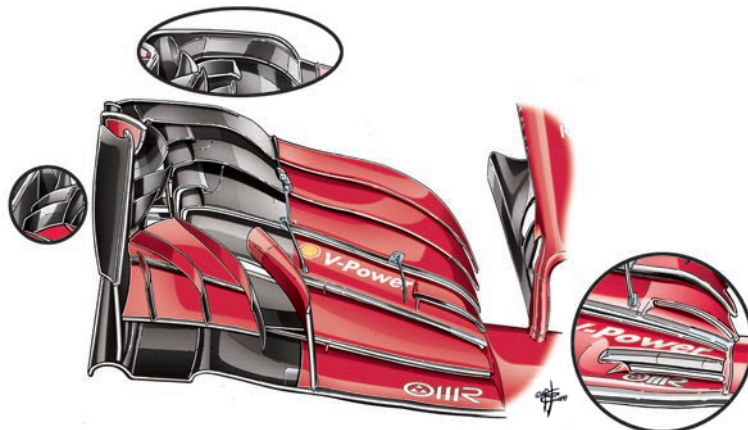


Canadian GP bargeboards

Ferrari's small changes on the bargeboard assembly for the Canadian GP added up to a decent performance gain. As you find a little problem with the airflow attachment on one surface, you might need to alter the chord length of that component. Ferrari has continued the concept of slot gaps further rearward. The trailing edge is now curved as opposed to vertical, and Ferrari also altered the footplate area, so now has an optimised bargeboard package.

French GP front wing

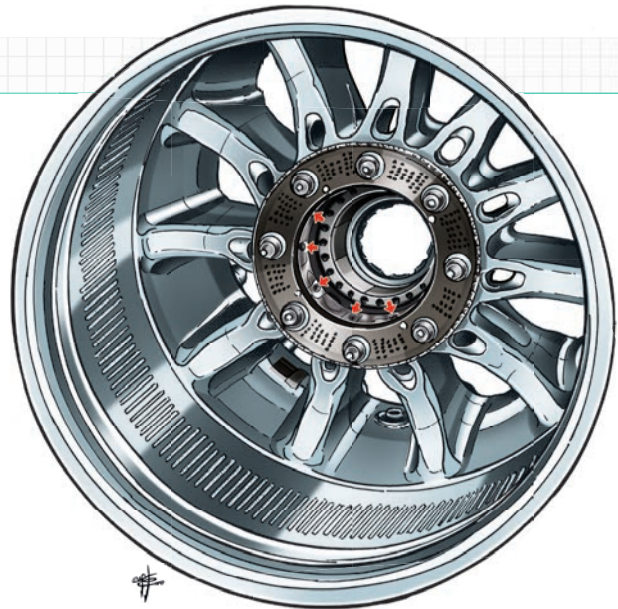
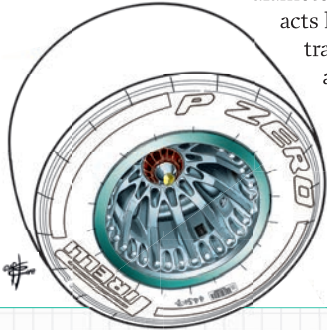
The biggest change on Ferrari's French GP front wing was the short slot gap in the main plane just below the V-Power sticker shown in the inset. Now it continues along its full length, making the main plane into two shorter-chord elements. The longer-chord main plane was introduced mid-season last year and was something I questioned at the time. Yes, Ferrari will probably get more downforce from it, but it will be that bit more pitch-sensitive. So it really depends on what your car can live with overall. The new version will be more driver-friendly but may induce a little bit more understeer. The outer flaps (black section) also have a gentler transition where they join the red parts of the flap. The trailing-edge gurney flap again is more progressive as it increases in size going outwards. These changes will be to reduce sensitivity issues, as the gentler the



that option with the fronts. So getting them up to temperature is all about using the brake-disc temperatures to influence the wheelrim temperatures, which increases the tyre temperatures.

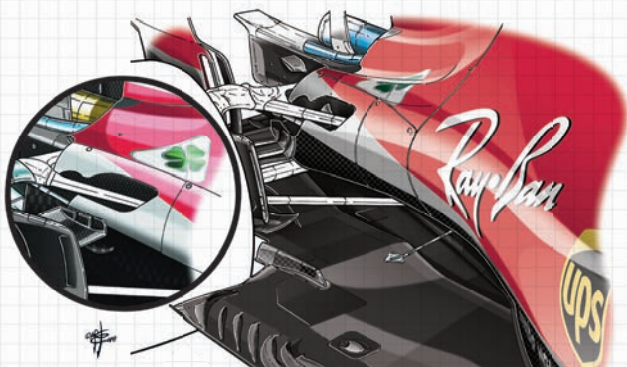
That's the reason why Mercedes has concentrated on only the rear wheels. Basically, it has vented some cool air directly from the brake-duct inlets through the wheel spokes just outside the diameter of the wheel-retaining nut. This acts like an insulator, reducing the heat transfer that the hot brake disc and axle have on the wheel mass.

With the brake discs running at something like an average of 650C and even higher just at the end of braking at corner entry, the cooling air is then carrying some of that heat with it through the wheelrim.



British Grand Prix floor

Ferrari's floor-development programme has been non-stop, and the package introduced for Silverstone closed the gap to Mercedes. Ferrari has concentrated on the area in front of the rear tyre and the outer section. Combined with the vortex that is set up by the trailing edge of the bargeboards, this area works like a skirt that seals the underfloor from airflow leakage down the sides. This allows the diffuser to pull the airflow it requires through from the front of the floor.

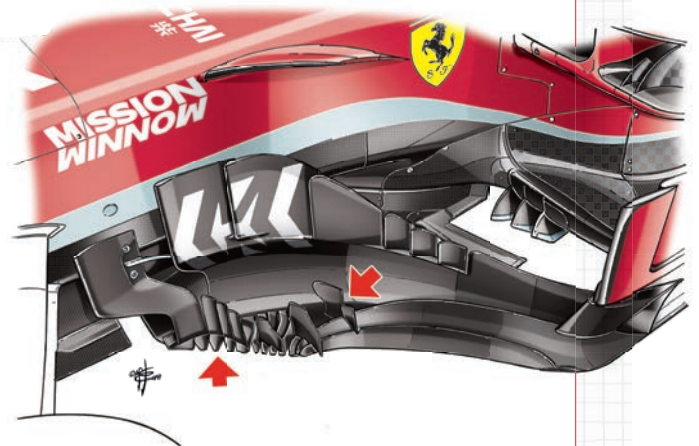
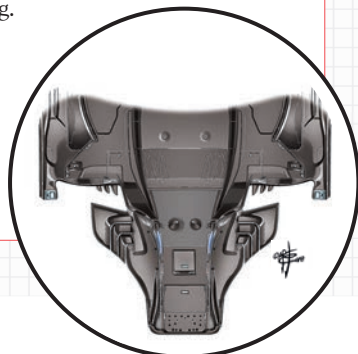


Ferrari failed floors

Over the Japanese and US Grands Prix, Ferrari introduced two new floors but neither made it to race day. Either Ferrari wasn't getting what it predicted from them or the development direction had reached a crossroads. I wasn't sure what it expected to get with the detail changes it had made to the slots around the tyre contact patch from the Suzuka development. At Austin, that area was modified again – with a few more turning vanes added. The idea of this Coke-bottle area and the underfloor is to get as big a pressure differential as possible across the floor structure, with low pressure underneath and a higher pressure above. But you need to maintain good high-speed airflow inside the rear tyre to help the performance of the rear wing and diffuser.

The longitudinal slots pull airflow from the floor's upper surface, and act like a skirt, reducing the amount of airflow pulled under the floor. These small vertical turning vanes are intended to set up an outwash vortex along the floor's outer edge, similar to the effect of the trailing edge of the bargeboards and front-wing endplates, to improve the performance of the slots and underfloor. ✘

transition, the less chance of getting some aerodynamic crossflow. Ferrari also had a new floor, with detail changes to the forward delta-wing areas. The 'L' slot gaps have now been reversed, increasing the amount of airflow that will be pulled through them. This, in turn, works the underneath surface of these wings harder, allowing them to produce more downforce. This modification will have been made possible by the changes to the front wing. With more consistent airflow through the inner edges of the front wheels feeding this area of the underfloor, the challenge would have been to use that extra airflow to improve underfloor performance.

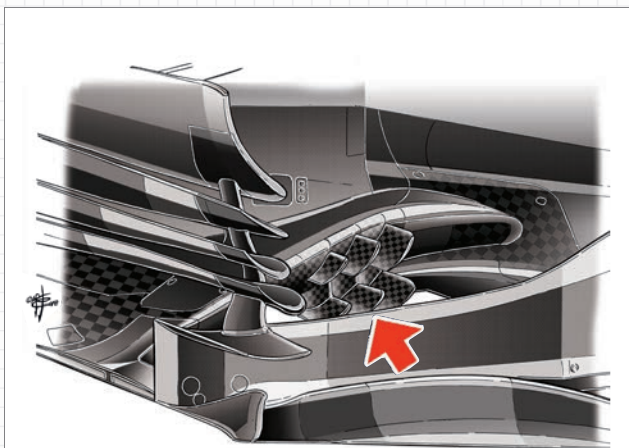
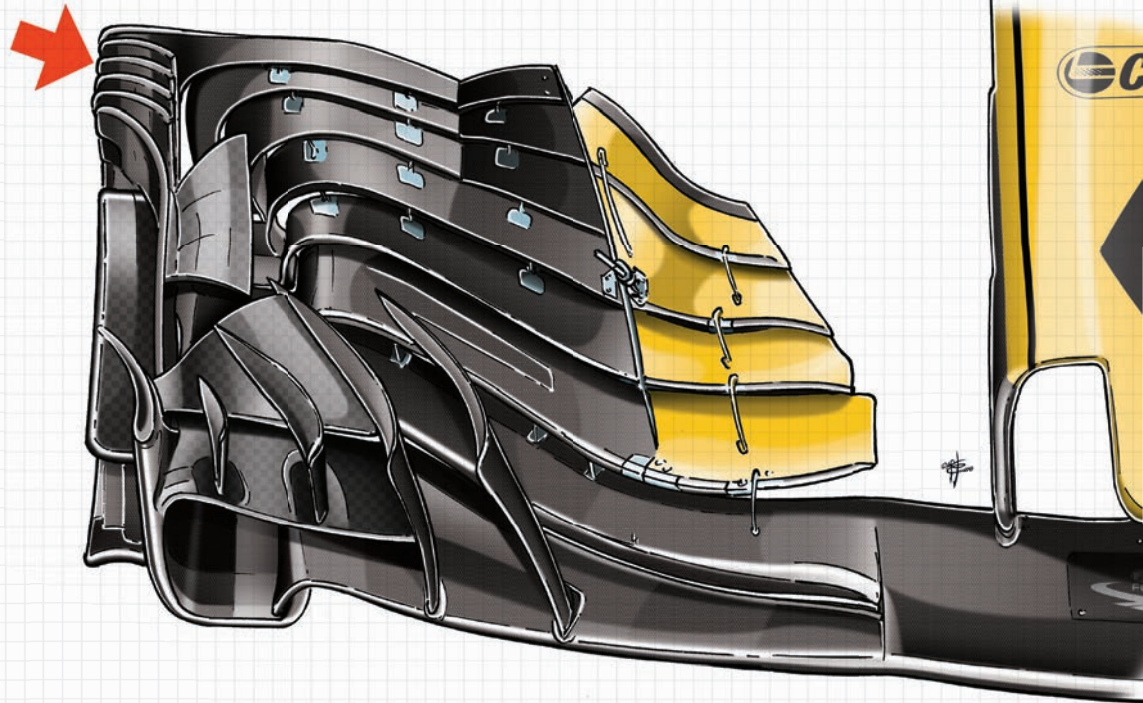




The best of the rest

Renault

Introduced in Hungary, Renault's updated front-wing assembly, which I called the 'Venetian blind', is just that. Starting with the endplate, the trailing edge has five outward turning vanes to strengthen the outwash airflow in this area. The vertical section of the wing flaps is also slotted to improve the consistency of the outwash flow. The adjustable inner section of the flaps (yellow part) is now much smaller. This has a positive reduced flow-characteristic change on the outboard section when the wing angle is changed, but also makes it more difficult to alter the car's aerodynamic balance.

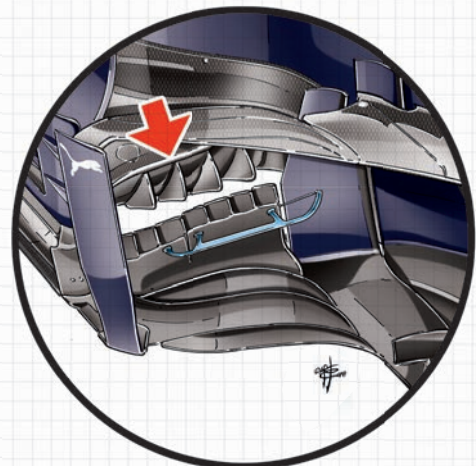


Haas

Haas introduced a major aerodynamic upgrade package in Canada, and part of this was the bargeboard area. The red arrow highlights the small turning vanes on the leading edge of the underfloor. These are very similar to what Red Bull had run, and each one is designed to set up a vortex that goes underneath the flat area of the underfloor to improve its overall performance. The outboard horizontal louvre section is fairly similar to what Haas ran before, just a bit more detailed and aggressive.

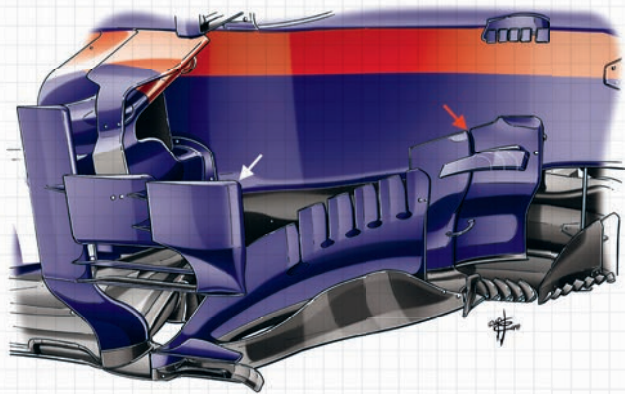
Red Bull

Over the season, Red Bull introduced small modifications to the leading edge of its underfloor. At the beginning of the year, it had a package of three vertical turning vanes and one larger one on the forward-facing fingers of this area of the floor. In France, it was reworked and had five plus one, which are further rearwards. Any improvement helps the performance of the front wing, and helps the airflow along the outer sides of the underfloor act like a skirt. This reduces the amount of airflow that leaks into the low-pressure area underneath the car, improving the performance of the underfloor.



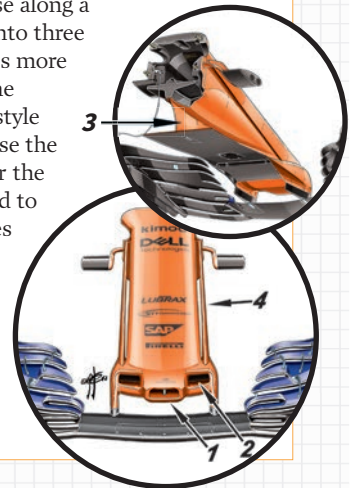
Toro Rosso

Along with the front-wing endplates, the bargeboard area of an F1 car has been allowed to get out of hand. If anyone wants to reduce the costs and improve the show, these two areas should be addressed very quickly. This drawing shows you the number of turning vanes that work together to improve the underfloor performance. It is a fantastic feat of aerodynamic flow-structures optimisation but, as soon as you get close to another car and the airflow to these components gets any level of turbulence, this aero-flow structure falls over and reduces the performance of the other aerodynamic components it was influencing. The other, and probably more important, issue with this area of the car for the teams themselves is that there are no sponsors because there is no surface that can be seen from different angles. This problem is being tackled with the 2019 regulations.



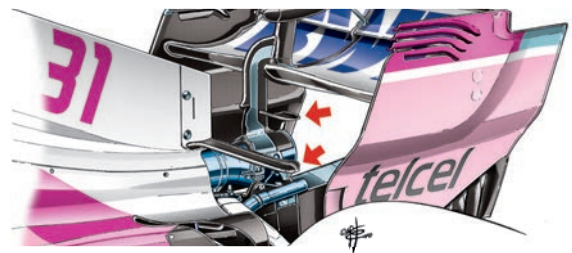
McLaren

In Spain McLaren introduced what it called its definitive 2018 car, the most obvious part being the new nose section. The previous nose was the same width as the front of the chassis, using very long wing-mounting vanes with vertical slots to help pull as much airflow as possible under the nose and chassis central section. The new nose is narrower and has small turning vanes (4) running up the top outer corners of the nose. These will help turn the airflow and keep it attached to the sides of the nose. The leading-edge inlet section (1) is very similar to Red Bull's and the side inlets (2) very similar to Force India's. They exit under the nose along a horizontal slot that is divided into three sections (1 & 2). This again takes more mass airflow and directs it to the undersurface of the Mercedes-style duck bill. All of this is to increase the mass airflow that is going under the centre section of the chassis and to improve its direction as it comes off the trailing edge of the duck bill. The duck bill is mounted on a vertical vane (3) splitting the airflow left to right. This could also be a bit of a problem in turbulent airflow or crosswind conditions.



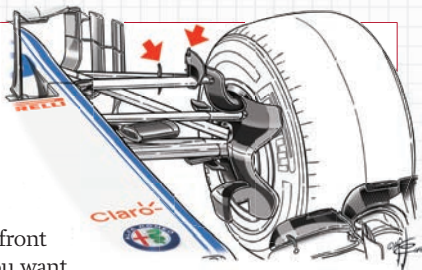
Force India

Force India added a small T-wing to the trailing edge of the engine cover just above the radiator cooling exits as part of its major Melbourne upgrade following a performance shortfall in testing. There is also a small gurney flap at the outer end of this component to make this area of the T-wing work harder. This T-wing will produce a small amount of downforce, but more importantly will help tidy up the airflow going to the underside of the rear wing.



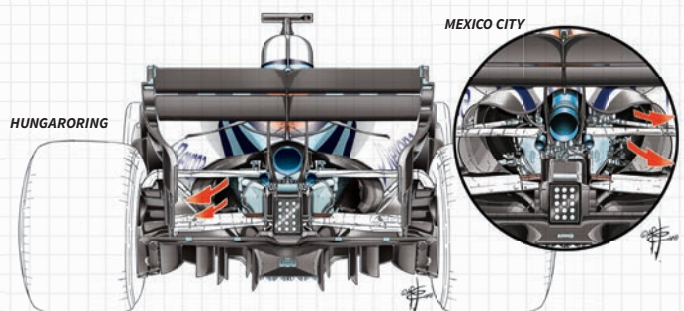
Sauber

Sauber ran turning vanes on the upper part of the front wishbone, a concept later applied by Mercedes to its own front suspension. What you want to do here is pull air into the low-pressure area behind the front tyre because it's a very turbulent area, and the more you fill up that hole created by the tyre, the less work the parts in front of the sidepod have to do. The brake ducts also work towards this. Also, when the tyre is rotating and the airflow is navigating it, you create a bit of lift on the tyre's upper surface, so this also helps to eliminate some of that negative. For this to be legal, you have to comply with the regulation requiring an aspect ratio of no greater than 3.5:1 in suspension components.



Williams

Mexico was the most difficult race of the season for cooling. The air is pretty thin so it reduces downforce, drag and cooling quite dramatically. But with the engine able to create 160bhp from electrical harvesting and having a turbo, some of the engine power is retained. Williams took a dramatic approach to its cooling there, as its rear exits were fairly brutal even compared to what it ran in Hungary.



Red Bull

Did Red Bull fall short in 2018?

Adam Cooper

Team boss Christian Horner on what worked – and what didn't – this season



Red Bull in the hybrid era

2014

Points 405 (2nd)
Wins 3
Poles 0

2015

Points 187 (4th)
Wins 0
Poles 0

2016

Points 468 (2nd)
Wins 2
Poles 1

2017

Points 368 (3rd)
Wins 3
Poles 0

2018

Points 419 (3rd)
Wins 4
Poles 2

W

as 2018 the best season of the hybrid era thus far for Red Bull? That judgement depends on how you measure performance. In both 2014 and '16 the team finished second in the constructors' championship, and this year it was 'only' third. And in the latter of those runner-up seasons the team logged 468 points, considerably more than the 419 it managed in '18.

But those numbers are skewed by the fact that in 2014 and '16 Red Bull happened to have a better package than Ferrari, while Mercedes was still in a league of its own. This year was different. Ferrari and Mercedes were both quick – and the Milton Keynes team kept them very much on their toes.

Instead of just picking up the odd win when freak circumstances allowed, Red Bull was competitive enough to occasionally triumph on merit, at least at venues where outright power was less of a differentiator. And to the surprise of perhaps even the team itself, over the last few races the RB14 was often the fastest car in race trim, helped by being kinder on its tyres than its rivals.

Had race leader Max Verstappen not tripped over Esteban Ocon in Brazil, the Dutchman would have scored a stunning victory to add to the two he had already logged, and the two scored by team-mate Daniel Ricciardo. Nevertheless, that final total of four wins, backed up by two pole positions, was proof that this really was Red Bull's most competitive season since F1 dumped V8 power.

It was also a year of abject frustration. The already fragile relationship with Renault was pushed beyond breaking point after a series of failures, and team principal Christian Horner and Red Bull motorsport boss Helmut Marko were never slow to make their feelings clear. In the summer we had confirmation that the senior team would jettison the French manufacturer and join Toro Rosso with Honda power in 2019.

"I think it's been a bittersweet season in many respects," says Horner. "The victories have been extremely sweet, winning in China, in Monaco, winning our home grand prix in Austria, and of course Mexico. They've been the undoubted high points.

"I think the low points have been the amount of times that the car hasn't made it to the finish, the number of technical issues that we've had to endure, and having to try to counter for deficiencies in outright power. That's been the bitter part of it. Generally on a Sunday we've had a very strong race car, and the drivers, when they've been able to, have raced extremely strongly.

"It's been a bittersweet season in many respects. The victories have been extremely sweet"

"In 2014 we had a better power unit than Ferrari, in '15 they made a big step, in '16 we were just better as a team and we didn't have reliability issues. I think this year has been frustrating, with the amount of power-unit failures. Whether the power unit hasn't been able to cope as well as previously with the added stresses of the current regulation of car, I don't know. But that's obviously been our Achilles' heel."

There was an important but subtle change as Pierre Wache was named as technical director. That took some of the workload from Adrian Newey, who remained chief technical officer and still contributed where he could.

There were no doubts about the quality of the 2018 chassis, which was good at the start of the season and just seemed to get better. "I think RB14 has been a very strong car – arguably it's been the >>

Horner reckons the RB14 was the best chassis on the grid this season

F1 season review Red Bull

strongest chassis of the season,” adds Horner. “If you were to equalise the power between the top three teams, I think you’d see that RB14 has been an extremely good race car.

“Look at whenever the power unit hasn’t been a factor, or as predominant a factor – we won in Monaco even with an MGU-K failure, we were second in Singapore, we won in Mexico again when altitude played a key role. Those races we’ve been particularly strong in.

“Obviously we tend to run lower downforce levels to try to create the same top speeds, and as soon as you try to trim wing to do that you introduce other compromises into the handling of the car. But when we’ve able to run full spec... we should have had a front row lock-out in Monaco, and we had one in Mexico.”

Did Red Bull win four races *despite* Renault? That’s one way of looking at it, albeit a slightly cruel one.

“Credit where credit is due,” says Horner. “In Mexico we were provided with an engine that was capable of winning, as we were in Austria and China. We were lucky in Monaco, even without an MGU-K. Any other circuit and we would have been stuffed.

“I have total admiration for the Renault guys in the garage that are working their socks off, week in, week out. But I think they’ve ultimately been let down by the main house’s lack of commitment to development and reliability.

“I think too often you see parts being taken from one engine to go onto another... That’s been too much of a theme over the whole hybrid era, and that must compromise dyno time, that must compromise endurance running, and so on.”

This was an extraordinary season for Verstappen. His year began with a series of clumsy errors, including a clash with Sebastian Vettel in China and an expensive practice crash that left him out of qualifying in Monaco, where he could well have taken his first career pole.

It ended with a run of superb drives that convinced even



the most sceptical critics that he’s more than ready for a tilt at the title, equipment permitting.

“For me Monaco was a turning point for him,” says Horner. “Early in the season he did make some mistakes that cost him dearly, in China, in Melbourne, in Bahrain. And Monaco was the one that really hurt him. All credit to him, he recognised what he needed to temper, and from Montreal onwards he was outstanding, the amount of podiums he’s had, the fantastic drives he’s put in. From the summer break only Lewis [Hamilton] outscored him.”

Verstappen often demonstrated a cool demeanour on the radio when being told to protect his tyres and so on while leading races. Everything was under control, he made it look so easy and, as with all the greats, he had plenty of capacity

Ricciardo versus Verstappen

In 2017 Daniel Ricciardo outscored Max Verstappen by 200 points to 168, while in '18 the Dutchman beat the Australian by 249 to 170. That represented an extraordinary turnaround in their respective fortunes, and one that was heavily influenced by the high number of retirements that afflicted Ricciardo this year.

But that wasn’t the whole story. After Monaco, where Verstappen started at the back following a practice crash and Ricciardo won in style, the younger man was never beaten by his team-mate in a grand prix that they both finished. He also consistently outqualified Ricciardo, often with a couple of tenths between them.

Red Bull was convinced that Ricciardo would stay for 2019, having met his salary



demands, and a contract was waiting to be signed immediately after the Hungarian GP. Instead he got on a plane to the United States, had a long think, and on arrival called Renault to say he wanted to join. He then had to tell Christian

Horner that he was leaving.

Could Red Bull have done anything differently? “We looked at it and I think we did everything that we possibly could to retain him,” says Horner. “He actually said this – he did the classic break-up – it

not you, it’s me! And I think he just genuinely wanted to take on a new challenge.

“I think he was also probably concerned about his value with the evolution of Max, and was probably uncertain about Honda at that time. Subsequently

he’s seen what we were talking about start to come to fruition.”

Horner denies any suggestion that Red Bull favoured Verstappen: “The number one driver in this team is the driver who is ahead on the track. That’s the simple rule. And there is zero favouritism in the way that we operate the team, from one driver to the other. Daniel will tell you that very openly.

“Mexico was the first time that Daniel outqualified Max since Monaco. Max’s qualifying performances have been huge, and that was probably part of Daniel’s decision.

“You always have a Plan B. I think once we understood that he was serious, that that was his mindset, it was a very easy decision to come to regarding Pierre Gasly.”

MOTORSPORT IMAGES/ANDRE/SUTTON



Ricciardo bore the
brunt of engine
unreliability

to think about the bigger strategy picture.

“It’s part of his evolution – he’s just gathering more experience and using that experience,” says Horner. “For example, in the way he managed races in Austria and Mexico this year, with the tyre deg and issues that were going on. And Austin and Sochi as well. If you look back at some of the drives he’s put in, he’s been mightily impressive.”

Verstappen was a little less controlled in Brazil, where he was understandably riled by the clash with the lapped Ocon, after which he had to settle for second. He made his anger clear on the radio on the slowing-down lap, and when he remonstrated with the Frenchman in the FIA garage – and was met with what he took to be indifference – it ended in a little pushing and shoving.

Ricciardo meanwhile was robbed many times of good results, logging a painful eight retirements. Remarkably his only podium finishes were his wins in China and Monaco.

“It’s been a difficult season for Daniel – he’s had to cope with Max’s continued evolution, and while issues have happened to both drivers they’ve tended to happen to Daniel on a Sunday rather than Max,” admits Horner. “The clutch bearing that Daniel had fail on Sunday in Mexico, Max had on Friday. In practice in Brazil Max’s oil tower developed a leak and a crack that was there from Mexico, and yet thankfully it didn’t stop the car there. And yet 12 months ago Max was having that bad luck.”

The engine unreliability was clearly frustrating, but given that he’s heading for the works Renault team it was hardly a contributing factor to Ricciardo’s decision to leave (see panel, left).

Doubts about Honda’s potential may have played a role. Horner insists that the decision to switch to Honda for 2019,

“We could see that Honda’s investment and commitment was different to what our current supplier was doing”

made after Toro Rosso ran a key upgrade in Canada, was the right one: “Through the involvement of Red Bull Technology supplying the transmission to Toro Rosso there had obviously been interaction with Honda, and we could see that the scope of investment and commitment was different to what our current supplier was doing.

“And then once we saw the performance in Montreal the decision to make that change was absolutely strategically the right path for us moving forward. The energy that it’s put into the whole team – you can feel it in the factory, there’s real optimism about the ability to close that gap down to Mercedes and Ferrari ahead of us.”

This season Horner often reminded us that his cars were losing 0.6s or thereabouts to the pacesetters just on the straights, depending on the venue. Will Honda really plug that in 2019?

“We can see very clearly the progress that they’re making, and if they continue on the same trajectory hopefully we can close that gap,” he replies. “The great thing is they share the same commitment, same desire, ambition and determination and are committing the resource to back it up.”

Red Bull witnessed
how well Honda was
operating at Toro Rosso



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motorsport
IMAGES

Meanwhile, in a parallel universe...

Edd Straw

It wasn't quite a last-round showdown, but Autosport's imagined Class B title fight between a multitude of drivers and teams was a thriller



GORIA/SUTTON
motorsport
IMAGES

Nine winning drivers, six victorious teams, half a dozen championship contenders and no way of knowing who would lead the way on any given race weekend. Formula 1's unofficial 'Class B' championship, comprising the seven teams outside the big three that duked it out in the midfield, created a dramatic, if disconnected, subplot during the 2018 season.

Had it been the battle for outright victory, this would have gone down as an all-time classic season, even though 'champion' Nico

Hulkenberg clinched the title with a race to spare when you reshape the season with Mercedes, Ferrari and Red Bull eliminated. For the purposes of this story all results reflect a revised classification for each race disregarding those 'big three' teams, in an era that has an unusually distinct chasm between the lead group and the rest.

While the seven protagonists – Renault, Haas, (Racing Point) Force India, Toro Rosso, McLaren, Sauber and Williams – represent a wide range of team sizes, they had one thing in common. All were in a group that was disconnected from the top three, with an average qualifying deficit of around 1.5 seconds from pole position to the best of our Class B runners. Hulkenberg took six midfield victories, winning the



Hulkenberg led home Sainz, and Renault was top constructor

crown by eight points from Renault team-mate Carlos Sainz Jr. He sealed the title in the Brazilian Grand Prix, despite retiring from the race, crowning his strongest season in terms of position in the real world championship, in which he finished seventh.

“I’m driving pretty well this year,” said Hulkenberg. “There have been a few instances when maybe not, but if you look at the bigger picture – the whole season – I’ve been driving well and having solid races. And that’s why I find myself in this position. It doesn’t really satisfy me enough, but you have to take the best you can achieve. And I think that’s the best I could have achieved this year with the current package and car that we have. Our target for the future is

to get closer to the front, but for this year – apart from a few weekends – we’ve capitalised on what we have.”

But Hulkenberg’s charge to the Class B title was far from straightforward. Early in the season, McLaren driver Fernando Alonso led the way off the back of a fortuitous victory in the Australian GP. Alonso owed that win to the Haas team’s pitstop blunders, which first removed Class B leader Kevin Magnussen and then Romain Grosjean, who stopped on track, leading to the deployment of the virtual safety car. Hulkenberg pitted at the same time as Grosjean, allowing Alonso to take a cheap stop and jump to the front of the midfield ahead of Hulkenberg. >>

How Haas proved its worth



Steiner (l) happy to be “first of the privateers”; Grosjean’s early mistakes were costly

There are two ways to look at Haas’s 2018 campaign. One was that it had, on average, the fourth-fastest car and failed to translate that either into ‘Class B’ victory or best-of-the-rest in the constructors’ championship. The other is that Haas is in only its third season and emerged as a consistently strong force to beat a clutch of better-established teams.

Haas ended up 29 ‘real’ points behind Renault, and it’s not difficult to find the ‘missing’ points. From the first race of the season, when both cars retired thanks to cross-threaded wheelnuts costing a likely fifth and sixth place, there were too many missed opportunities. Romain Grosjean’s litany of errors early in the season, notably crashing under the safety car while running sixth in Azerbaijan, were also costly, while early in the season aero parts had a habit of shaking themselves to pieces.

“It was our own fault that we didn’t finish fourth,” says team principal Gunther Steiner. “It’s part of the learning process we’re in as a team. To finish fifth, and the first of the privateers, as we call it, is great. We could have been fourth but ‘could’ doesn’t give you anything, so I’ve decided to be happy with fifth.”

He’s right to be, considering how rare it is for a new team to climb so high, so quickly. And Haas, which has logically capitalised on a partnership with Ferrari to use as many of the so-called ‘non-listed parts’ as possible so it can focus on performance development in harness with Dallara, has proved its mettle. The car was quick from pre-season testing, and although there was the odd bad weekend, the erratic form of its first two seasons was eliminated.

“Our ability has taken a big step in the last 18 months,” says Haas head of aerodynamics Ben Agathangelou. “Pursuing goals of car behaviour, aero-map behaviour in different parts of the vehicle envelope, has been a lot more easily achieved. Maybe we had the ideas two years ago but we couldn’t really execute them. It’s all about maturity of processes and people that allow you to be more productive.”



Pierre Gasly’s shock Bahrain victory, which came from nowhere after Toro Rosso struggled in Australia, was one of two triumphs for the rookie. He also won comfortably in Hungary, but was never consistent enough to be in the title hunt.

Hulkenberg took his first win in the third round of the season in China with a dominant performance, hitting the top of the points table for the first time. But for the second consecutive year he crashed out of the Azerbaijan GP, and Alonso’s heroic drive to fourth in a heavily damaged car allowed him to retake the lead. Hulkenberg was then wiped out at the start in Spain by Grosjean’s Turn 3 spin, leaving Magnussen a clear run to victory. Alonso’s third place extended his lead to 15 points over Sainz.

Alonso’s consistency allowed him to still lead despite retiring from the Monaco GP. Esteban Ocon won in Monte Carlo – Force India’s second victory of the year after Sergio Perez’s triumph in Baku – with Hulkenberg in third.

Hulkenberg’s second victory of the season came in Canada, where Renault dominated and Sainz backed him up in second place. But although Sainz then took the championship lead by two points in the following French GP thanks to a second place ahead of Hulkenberg, it was actually a missed opportunity. Sainz had utterly dominated, but an MGU-K failure in the closing stages meant he dropped behind Magnussen.

Magnussen’s second place in Austria behind Grosjean, who had ensured he wouldn’t be a title contender by only picking up three points in the first six races, drew him to just six points behind leader Sainz after a disastrous weekend for Renault. Hulkenberg retired with an engine failure, while Sainz’s race started promisingly, but he managed only ninth in class thanks to tyre-degradation problems.

The next two races were critical to Hulkenberg’s season. At Silverstone, he led the first stint but was set to be undercut by Charles Leclerc when an unsafe release forced the Sauber driver to stop. Sainz’s collision at Copse with Grosjean put him out,

“Pierre Gasly’s shock Bahrain victory came from nowhere after Toro Rosso struggled in Australia”

and allowed Hulkenberg to take a 15-point lead over Magnussen, who survived his own clash with Grosjean to finish fourth.

Magnussen looked set to close the gap in the German GP before the rain came and he started to struggle, which allowed Hulkenberg to pass him for the lead. Magnussen then faded to seventh, with Grosjean and Perez coming through to complete the podium. Eleven races down, Hulkenberg had a 34-point lead over Magnussen, and Sainz was a further eight points back. But he went into the August break with that advantage cut to 22 points in Hungary thanks to Magnussen following dominant winner Gasly home.

Force India drivers Ocon and Perez were close enough to potentially get in the hunt, but it was in the races immediately after the break that both hit form. In the reborn Racing Point Force India team, they took a pair of one-two finishes at Spa and Monza, with Perez winning in Belgium and Ocon in Italy, while Hulkenberg managed a paltry four points. The Renault star’s mistake at the start at Spa, where he locked up and booted Alonso into Leclerc’s Sauber, was particularly costly. Although Alonso hit back by winning in Singapore, it was McLaren’s final victory of the season and he was only a peripheral figure in the title fight to the end of the season.

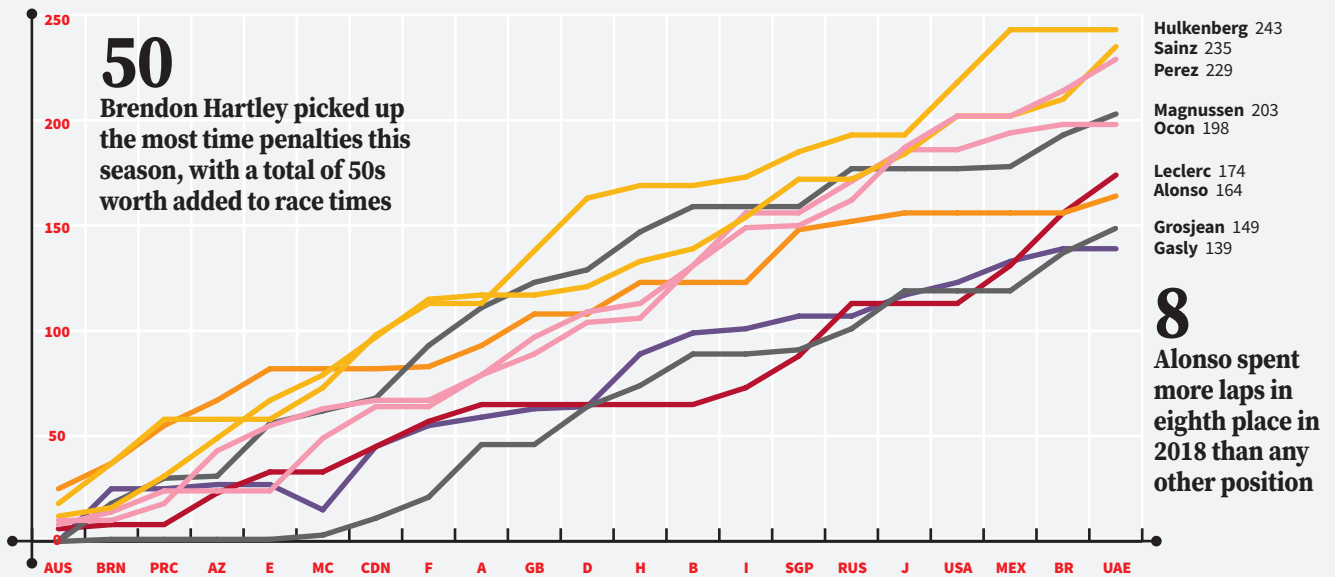
Sainz’s second place in Singapore, which followed third at Monza, meant Hulkenberg’s lead was down to 13 points, with Magnussen 26 down and the Force Indias just behind. But the pink cars’ momentum had been slowed when Perez hit Ocon in Singapore, >>>

This is based on recalculating the qualifying and race results having removed Mercedes, Ferrari and Red Bull. For the purposes of our unofficial Class B championship, Force India and Racing Point Force India are considered to be a single team.

Drivers' standings

POS	DRIVER	AUS	BRN	CHN	AZ	E	MC	CDN	F	A	GB	D	H	B	I	SGP	RUS	J	USA	MEX	BR	UAE	PTS
1	Nico Hulkenberg	2nd	3rd	1st	ret	R	3rd	1st	3rd	R	1st	1st	7th	R	8th	4th	6th	R	1st	1st	R	R	243
2	Carlos Sainz	4th	8th	3rd	2nd	2nd	4th	2nd	2nd	9th	R	8th	4th	7th	3rd	2nd	11th	4th	2nd	R	6th	1st	235
3	Sergio Perez	5th	13th	6th	1st	4th	6th	8th	R	4th	5th	3rd	9th	1st	2nd	10th	4th	1st	3rd	R	4th	3rd	229
4	Kevin Magnussen	R	2nd	4th	10th	1st	7th	7th	1st	2nd	4th	7th	2nd	4th	11th	12th	2nd	R	EX	10th	3rd	5th	203
5	Esteban Ocon	6th	7th	5th	R	R	1st	3rd	R	3rd	2nd	4th	8th	2nd	1st	R	3rd	3rd	EX	6th	8th	R	198
6	Charles Leclerc	7th	9th	13th	3rd	5th	12th	4th	4th	6th	R	11th	R	R	6th	3rd	1st	R	R	2nd	1st	2nd	174
7	Fernando Alonso	1st	4th	2nd	4th	3rd	R	R	10th	5th	3rd	12th	3rd	R	R	1st	8th	8th	R	R	11th	6th	164
8	Romain Grosjean	R	10th	11th	R	R	9th	6th	5th	1st	R	2nd	5th	3rd	EX	9th	5th	2nd	R	11th	2nd	4th	149
9	Pierre Gasly	R	1st	12th	9th	ret	2nd	5th	R	8th	8th	10th	1st	5th	9th	7th	R	5th	7th	5th	7th	R	139
10	Marcus Ericsson	R	6th	10th	8th	8th	5th	9th	7th	7th	R	5th	10th	6th	10th	5th	7th	6th	5th	4th	R	R	107
11	Stoffel Vandoorne	3rd	5th	7th	6th	R	8th	10th	6th	12th	6th	9th	R	11th	7th	6th	10th	9th	6th	3rd	9th	9th	106
12	Brendon Hartley	9th	14th	14th	7th	7th	13th	R	8th	R	R	6th	6th	10th	R	11th	R	7th	4th	9th	5th	7th	71
13	Lance Stroll	8th	11th	8th	5th	6th	11th	R	11th	10th	7th	R	12th	9th	4th	8th	9th	11th	9th	7th	12th	8th	65
14	Sergey Sirotkin	R	12th	9th	R	9th	10th	11th	9th	11th	9th	R	11th	8th	5th	13th	12th	10th	8th	8th	10th	10th	34

The race to the title

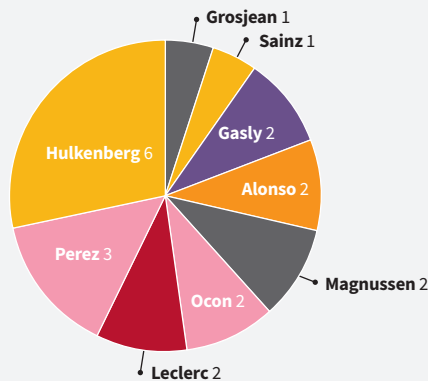


Pole positions per driver

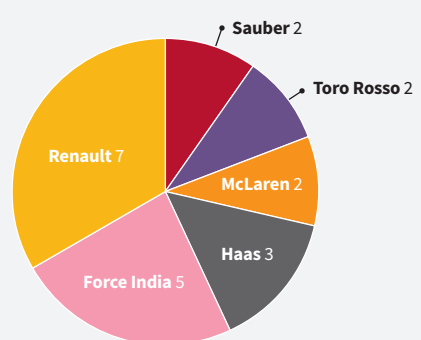
Magnussen	5	Sainz	2
Ocon	4	Gasly	1
Grosjean	4	Perez	1
Hulkenberg	3	Ericsson	1

Wins

Per driver



Per constructor



Constructors' championship

CONSTRUCTOR	PTS
1 Renault	478
2 Force India	427
3 Haas	352
4 Sauber	281
5 McLaren	270
6 Toro Rosso	210
7 Williams	99

F1 season review **Class B title fight**

then had struggles with Sergey Sirotkin.

Magnussen's hopes were hit at Sochi – despite Hulkenberg struggling to sixth and Sainz 11th – when he was passed by eventual victor Leclerc early on. That second place moved the Dane ahead of Sainz and to within 16 points of Hulkenberg. But after a sensational pass around the outside of Leclerc at Suzuka's 130R, Magnussen's foolish defending put him out of the race when he made contact with Leclerc. It also meant the Haas driver couldn't capitalise on a poor weekend for Hulkenberg, who retired thanks to being out of outright points contention (euphemistically described by the Renault team as a problem with the rear, which actually meant a problem with being at the rear of the race!). Perez won after passing Grosjean – who was miraculous on his way to second despite the rear-left wheel having a dangerous amount of play in it – to close to six points off Hulkenberg, while Ocon's third place meant he was only one point further back. Renault's poor form meant that the smart money was now on one of the two Force Indias, or Magnussen, to take the title.

Then came Renault's resurgence at Austin – Hulkenberg and Sainz took a one-two ahead of Perez to steady the ship. But Perez then looked set to close to eight points off Hulkenberg by beating him to victory in Mexico. Although Hulkenberg qualified on pole position, with Perez only seventh, the Renault driver was locked in to starting on the hypersoft Pirellis. Perez ran longer after starting on supersofts when brake problems hit on lap 32. After struggling on for a couple of laps, he retired following a caliper failure. Hulkenberg built a 41-point lead as a result, meaning the title fight was as good as done.

"It's been really intense," said Perez after his home race. "Since day one, tenths make a big difference to your weekend. I should be really close to Hulkenberg now, but when you have a race like I've had, and Nico has scored so many points, it's very hard."

Hulkenberg sealed the title despite retiring with overheating problems at Interlagos. While Perez, Sainz and Ocon were all still in mathematical contention heading into the race, Leclerc's win from the damaged Haas of Grosjean prevented any of this trio scoring big points. So when Grosjean booted Hulkenberg into a roll in Abu Dhabi, it didn't matter because the German had already made sure he'd win the title by eight points.

Leclerc led that race initially, but stopped early and allowed Sainz to run long after starting on ultrasofts. Sainz's pace late in his stint was strong enough to allow him to pit and rejoin ahead of the Sauber to take what was his only victory of the year. It was a just reward for Sainz – who'd had the French GP in the bag before losing the MGU-K, and was also set to win in Mexico before an engine

"It's been really intense. Since day one, tenths make a big difference to your weekend"

shutdown – and gave him second in the championship.

The gap to Hulkenberg was flattering, as the champion had seven retirements, although two of those were down to his mistakes, but Sainz was a consistent performer who also took six second places and deserved his late-season success.

Sainz, along with the Force India drivers and Magnussen, all have reason to regret not winning the midfield battle. But ultimately Hulkenberg had more sustained peaks than any of his rivals, as the final victory tally of six proves. Behind the top five, Leclerc's late-season run of success, with a win and a pair of seconds in the final three races, allowed him to pip Alonso to sixth in the standings.

With an unpredictable battle and so many title contenders, you can't help but wonder what it would be like if the front of the field was as hard-fought as the midfield was in 2018. ❦



Hass blunders left the door open for Alonso to triumph on Oz

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Perez's drive to Class B victory in Baku was good enough for actual podium

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In the pink: Ocon was a dominant winner on Monaco streets

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Hungary winner Gasly did not have title-bid consistency

MOTORSPORT IMAGES/ANDRE/SUTTON



Gasly and Toro Rosso boss Franz Tost share their delight in Bahrain



Magnussen won twice, here at Barcelona and in France



Grosjean lead home a Haas one-two in Austria (and was a 'real' fourth)



Renault: mission accomplished

Engine kingpin Taffin acknowledges Renault's Saturday-pace shortfall

Renault had a clear objective in 2018 – to finish fourth in the constructors' championship in the third season of its return as a works team. It achieved this aim, but it wasn't easy given the prodigious pace of the Haas – on average the faster car, albeit only by 0.167% – and the strength of Racing Point Force India in its two incarnations.

That Hulkenberg won the 'Class B' crown and Renault the equivalent constructors' title confirms this was a strong season and a formidable test of the team's mettle, considering how close things were.

"We can say we reached the main target," says Renault team principal Cyril Abiteboul. "We had set ourselves to double the total of points, which we've done by a margin, and secondly to improve the championship position for both drivers and teams. That's a box that is ticked with the team in P4, so there's no doubt about our position.

"I'm happy for the drivers as well – P7 for Nico is well deserved – but a bit disappointed that we let Carlos down a little bit on a couple of occasions with reliability issues that cost him direct points; I'm thinking Paul Ricard and also Mexico."

The Renault was generally strong in slower corners, although did sometimes struggle for stability in medium and fast turns. But the downside was that the gap to the front wasn't closed by as much as the team had hoped – it was pretty much identical to last year. On race day the engine was much more competitive, and the main weakness was the lack of special qualifying modes.

"If we look at the race, we always see that the Renault-powered cars look more competitive on Sunday than Saturday," says engine technical director Remi Taffin. "It's a matter of how you develop the engine and how much you can take out of it. Maybe we paid too much attention to what we would develop for racing, but not that much emphasis on what could be done for Saturday."



Nearly-man Sainz ended season on a high in Abu Dhabi



Force India

Racing Point(s) don't always make prizes

Edd Straw

A financial struggle, lack of new parts and a change of ownership don't sound like the ingredients for a success story. But the Force India team performed miracles to not only survive but bounce back on the track. Here's how

T

he record books disagree, but Force India finished fifth in the 2018 constructors' championship with 111 points. Its mid-season rebirth as Racing Point Force India thanks to its sale to a consortium led by Lawrence Stroll (it was technically a new entry using the assets of the old one rather than a continuation) robbed it of more than

half the points it scored and relegated the team to seventh. But despite spending the first part of the season struggling increasingly desperately for cash, it hung together and again proved why it is probably the best pound-for-pound team in Formula 1.

Exceeding expectations has been Force India's stock-in-trade for years, clawing its way from the back of the field in 2008 to finish fourth in both '16 and '17. But this season it reached a new level in defiance of adversity. With a car that was behind even before the season started, early aerodynamic problems requiring troubleshooting, cashflow problems, upgrades designed that couldn't be built and, as the first half of the season went on, diminishing stocks of spares, things couldn't have been less promising.

"It was an incredibly hard year," says technical director Andy Green. "Things were tighter than they've ever been and it was a real challenge to produce a car for the beginning of the season. We had to make a lot of compromises early on and that affected our on-track performance early in the season.

"We were properly on the back foot in winter testing. We didn't have the car we wanted and it took a while for us to get any sort of development parts that made a significant difference. Once we got some momentum after the first few races, it started to come together. We still weren't putting updates on the car in anything like the quantity we wanted to, but made good with what we had and got whatever points were available. We were treading water for a while."

Based heavily on the 2017 Force India VJM10, with the need to integrate the halo requiring a new chassis that consumed significant financial resource, the start-of-season VJM11 was, says Green, "the minimum amount to get onto the grid". The performance in Australia was dreadful, Force India's least competitive weekend of the season, and in the early races the team struggled.

"We had some surface-flow issues around the sidepod and top of the diffuser that didn't match what we were expecting, and we spent some time getting them on track," says Green. "There was no point continuing to develop the car in the tunnel and CFD if they were not matching reality. We cleared that relatively early – we were just waiting for updates."

The fixes came, but performance updates, of course, were glacially slow in coming. It was not because the design and

development work had ceased, but because the team couldn't afford to manufacture the parts that had been designed.

When the car was finally updated for the Singapore Grand Prix in September, it represented three design cycles and a performance step reckoned to be worth in excess of 0.6 seconds.

Despite those problems, the first half of the season was surprisingly fruitful. And in the fourth race of the season in Azerbaijan at the end of April, the team's knack for grabbing unlikely podium finishes yielded third place for Sergio Perez. And there would have been more points had team-mate Esteban Ocon not crashed out after contact with Kimi Raikkonen on the opening lap of the race. A good race set-up, and the fact that the car was at its best on lower-downforce tracks, played a big part in this success.

This period of the season was particularly impressive for Force India, as for some teams the situation could easily have spiralled out of control. But it remained a relatively regular points threat, even though heavily aero-dependent circuits such as Barcelona did starkly expose the weaknesses of the car.

Green himself, who had to hold the technical team together while

“Andrew Green is a man of few words – he doesn't talk when he doesn't need to, but when he talks you listen”

other squads circled like vultures to recruit key personnel – including, it seems, Green – deserves huge credit for this. Solutions were found to the problems and the best was extracted from an undercooked car.

"Andrew is a man of few words – he doesn't talk when he doesn't need to talk, but when he talks you need to listen," says chief race engineer Tom McCullough, another key technical player. "The group he's assembled, the people he's surrounded himself with, all want to help each other and, ultimately, him as technical director.

"When things are difficult, like at the start of the year when it was last year's front wing and loads of stuff that wasn't right, that always hurts your understanding because the car wasn't developed around that. You expect when you get the right bits, it should sort the problems out but you never know.

"That's a real strength of the team. Over the past couple of years we've had times when the car hasn't worked as it should do. It's >>



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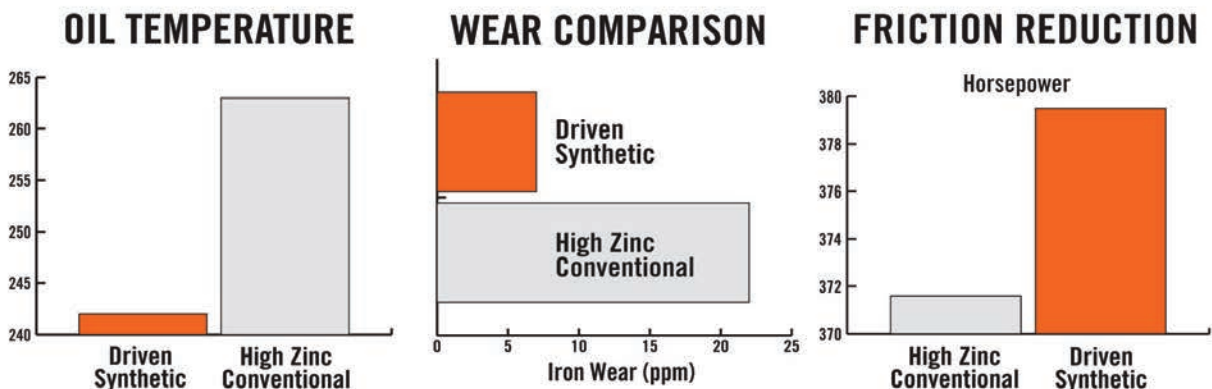
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very understanding-led and we're always honest when things don't go as well as they should have. It's a matter of cards on the table, and time and again we've done this. That culture, and this mentality, helps you to bounce back from those situations."

Culture is something that is regularly cited as key to Force India's success. The lack of politics, all too easily cultivated in big, multi-department teams, is crucial. When it became clear that a new owner was required to give the team a future, holding it together was the key challenge.

Force India went into administration during the Hungarian Grand Prix weekend in late July and, although there were multiple interested buyers, it required a steady nerve to hang on and wait.

"I tried to insulate them as much as I could and make sure they were focused on making the car go faster," says Green of the technical team. "Obviously, I had to manage the situation when parts didn't get to the car, but keep reassuring them we're going to get out of this, stick with us and we'll be good. And 99% of the people have because they can see a bright future.

"They could see no-one was going to let a team like us go under – we've got too much potential. They were incredible in their dedication, which was unrelenting. It became a bit of a running joke in the design team when things couldn't get made. We just called it a 'non-technical issue' and moved on."

That paid off, with the team's future secured over the August break. The rebirth under the 'Racing Point' name coincided with Force India's two most competitive race weekends – Spa and Monza. This was before any of the long-awaited new parts were manufactured; these arrived for the following race in Singapore.

The two cars qualified third and fourth at Spa, and Ocon momentarily threatened to take the lead on the approach to Les Combes as he squeezed alongside Lewis Hamilton, Sebastian Vettel and Perez. And this was a day after Perez was frustrated that he had missed out on pole position in the wet conditions.

The biggest disappointment of the season was that the team lost 'virtual' fourth place to Renault. A few too many points went begging in the second half of the year. Mexico was a disaster, with Perez losing a likely seventh place to a brake failure and Ocon shedding his front wing at the start. To get within 11 points of what Renault scored is a remarkable achievement, and given a normal season Force India would certainly have taken the position.



"The midfield has got more and more competitive this year," says McCullough. "The last two years we were fourth quite comprehensively and this year it's been a much closer fight. We often went to a track with three or four teams, therefore six or eight cars, that you were fighting with to get into Q3. I actually enjoy tighter seasons like this one rather than last year. When you have the fourth-fastest car, it's relatively easy to finish fourth. But this year, we haven't had the fourth fastest car for a lot of the year."

All things considered, it was a remarkable campaign. Force India came out of it with great credit, having stared oblivion in the face, held firm and been rewarded with a bright future. The next challenge is whether the planned expansion to transform it into a top team can happen without throwing away the strength of what is already there.

And even amid the turmoil, Green's technical team had an eye on the future. One of the parts it did manage to make before the August break was an experimental 2019 front wing, as it was recognised that any knowledge that could be gained to steal a march on rivals the following year might prove vital in the long term. That kind of foresight, doing something many teams would shun in favour of facing the seemingly more immediate problem, is what makes Force India a very different kind of Formula 1 team. >>

"It became a running joke when things couldn't get made. We called it a 'non-technical issue'"

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Perez's Baku podium was a season highlight



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“The strength of the team is the people. If they didn’t stay together through bad times there was nothing to sell”



Ocon wisely backs out of Spa move

Q&A

Otmar Szafnauer, team principal

Scoring almost enough points to finish fourth looks like a miracle – was it?

The strength of this team isn’t the factory, the buildings, the infrastructure, because that’s sub-standard compared to our competitors. The strength of the team is the people, and if those people didn’t stay together through the bad times then there was nothing to sell. It was the administrator’s job to sell the team and do the best for the creditors. The only role I had was to keep the team together.

What was the key to being able to do that given the very obvious financial difficulties of the team?

The way you earn trust within the team is be honest. When you are trying to predict the future, you can predict it that way but it goes this way and, for a while, you



Szafnauer (left) believes Force India’s strength is its personnel

lied! But you didn’t lie, you thought it was going here but actually it went there. If you explain it to people and say, ‘I think it’s going here and I’m 80% sure but there’s a 20% chance of here’, they trust you and see things the same way. Reasonable people with the same

information come to the same conclusion, but in situations like that not everyone has the same information I do so you share that information, the logic, and if they are reasonable they will come to the same conclusion. And you hold them together.

How difficult was the first half of the season?

Really difficult, because we had developments in the pipeline that we couldn’t deliver to the car. Our launch car ended up being our first-race car and we had huge developments in between we couldn’t

produce. That’s frustrating, when you know the car should be better and you’re struggling to score points.

People say that a certain type of person works for Force India, and that this helped keep it together...

Yeah I think that’s the case. We can’t all be the same, but we have to have a similar racer’s edge to do whatever it takes, whatever we can do to help in order to make sure we perform to the best of our ability. Not everybody is like that. When we find people who don’t have that attitude, we either educate them or, because not everyone’s like that, sometimes we have to say, ‘Sorry but you’re not one of us’ and we replace them. Your IQ is your IQ and you’re born with it, but your attitude you have 100% control of, and it’s that attitude we look for – going that extra mile. ✎

McLaren

Alonso's big quotes of 2018

Ben Anderson

The double champion departs grand prix racing railing against its predictability, bemoaning it's more about off-track polemics than on-track excitement, and criticising the 'amateur' abilities of some of the drivers. Here Ben Anderson picks the off-track highlights of Alonso's final (we think) outspoken season in F1

"The best race of my life"

Azerbaijan GP

Alonso became fond of hailing his own efforts, but hauling a damaged car to seventh at Baku in April was deserving of self-praise. "It was the result of persistence and pride," he said, having had to pit with damage at the end of lap one. "I think no-one [else] would have reached the pitlane. They would have parked the car and if they could reach the pitlane they would have retired. But we didn't park or retire the car and fought for every tenth, every lap, close to the walls all race long. I think it was the best race of my life."

"Probably the most boring race ever in Formula 1"

Monaco GP

Alonso skipped the first Monaco race held under F1's last aerodynamic revolution to contest 2017's Indy 500, and was underwhelmed by this year's race: "Extremely boring. Without a safety car, without yellow flags, the sport needs to think a little bit about the show because this is very disappointing. Probably the most boring race ever in Formula 1."

Predictable F1 "will probably never change"

Canadian GP

He escalated his criticism of F1 in the build-up to the summer break, before announcing he'd take a sabbatical at the end of the season. "It's obviously the top series in motorsport, but it's true that in the last years things are so predictable," he lamented. "You can play basketball and one night have a magic night and you score 80 points and maybe win the game together with your team-mates. Here everyone can guarantee that Mercedes or Ferrari will win the race. Probably it will never change. This has been F1 for many years."



"What we've done is a revolution for motorsport"

French GP

Alonso's victory with Toyota at Le Mans in June – which he bizarrely claimed was on a "higher level" than any other Le Mans win ever – following his unsuccessful attempt at winning the Indy 500 in 2017, led Alonso to claim he is pioneering a revolution against modern motorsport's highly specialised nature by competing in multiple categories. "In the last two decades, we were more into professional drivers in one discipline maximising the skills in that discipline," he explained. "What we are doing now is going back a couple of decades and changing motorsport and I'm happy to lead that change. What we've done over the past years is probably a revolution for motorsport."



Formula 2 in Russia:
more fun than
F1 qualifying?

MAUGER/LAT
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“FOM is quite annoying with my radio”
Hungarian GP

The reason much of Alonso’s radio chatter is broadcast is that he’s entertaining, but he took exception after his Q2 exchange with McLaren’s engineers was aired in Hungary, where he responded to a query about whether to run intermediate or wet tyres by saying: “I don’t know, mate. Put whatever tyre you want. The last sector is impossible so even if you put on a rocketship we would be 11th”. Afterwards Alonso said: “FOM is quite annoying with my radio. It’s their favourite hobby, so good luck to them.”

Claiming he’d rejected Ricciardo’s old seat
Belgian GP

Daniel Ricciardo shocked F1 by turning down a new Red Bull contract to join Renault for 2019. Alonso claimed he’d been offered the seat and asked Red Bull to apologise for repeated denials of this. “The offers I had, including that one [from Red Bull], they were not for winning,” he said. “To be fifth, sixth or seventh will not be the same challenge as I can find away from F1 in 2019.”

“There are many classes of drivers, then there’s Haas”
Italian GP

There was a feeling among sections of the grid that Alonso became more aggressive after announcing his decision to quit F1. At Monza, he clashed with Pierre Gasly and mocked Haas driver Kevin Magnussen after the pair came to blows at the first chicane in qualifying. “There are many classes of drivers and then there are the Haas ones, who have the third or fourth-best car of the grid and are out in Q2,” said Alonso. “It doesn’t change much for me, I guess more for them, but it’s fun, a lot of fun.”

F2 more fun for fans than “nonsense” F1 qualifying
Russian GP

The lack of cars running in qualifying for the Russian GP, where the Renault and Honda-powered machines were compromised by grid penalties, led Alonso to suggest the spectacle was “nonsense” and “boring” for F1 fans. “It’s more asking the fans what they think to have a nonsense Q1 and a not very important Q2,” he said. “At least I think they enjoyed the F2 race. It’s definitely the most fun part of the day for the spectator.”

18th fastest with “one of the best laps I did in my life”
Japanese GP

Qualifying heroics again from Alonso, who in 2017 claimed his Chinese GP qualifying lap for 13th place was a “divine present” for how well he drove. Having claimed that qualifying 13th for the British GP was the best lap of his season up to that point, owing to McLaren’s lack of downforce, Alonso felt he was even better in qualifying 18th in Japan. “It has probably been one of the best laps I did in my life at Suzuka,” he said. “I saw the onboard in the engineers’ room. If you have a chance, watch it because there is not 1mm in any corner, on entry, on exit, on the kerb. It was maximum risk.”

“There are more amateurs in F1 than any other series”
United States GP

In comments he later clarified, Alonso suggested F1 contained more amateur drivers than the World Endurance Championship (which actually includes an amateur class!) after he was eliminated from the US GP in a first-lap clash with Lance Stroll’s Williams. “There are more amateurs here than in other series,” Alonso said. “Maybe when there’s a big crash they [the FIA] will do something. Until then we’ll try to have fun in other categories where we race against 34 cars, against amateur people, against 60-year-old men and nothing ever happens. Here we need bumpers, like rental go-karts, so we can all crash into each other.”

McLaren

The year McLaren hit the bottom

Stuart Codling

After three seasons struggling with Honda power, surely a switch to Renault would help push the once-great squad towards the front... No. Another bad campaign has led to lots of changes and soul-searching in Woking





It is one of the time-worn tropes of Hollywood storytelling, and a pillar of the classical three-act structure, that the hero of the piece must at some point be sorely tested and laid low. Whether delivered to rock bottom by accident or his own hubris, our hero then dusts themselves down, and through some form of equally challenging self-improvement proceeds towards the resolution.

You might have thought that McLaren reached its nadir in 2015, when the team's much-vaunted new relationship with Honda delivered little in the manner of results, but plenty in the way of festering rancour. Then, after brief glimmers of hope in '16, '17 proved similarly wretched, costing the head of long-time figurehead Ron Dennis. But surely by '18 McLaren would at least be angling towards the proceedings of the third act... The marriage with Honda had been annulled, a new relationship with Renault set in train. The sunlit uplands were in sight.

No. 2018, assuredly, was the season in which McLaren touched hitherto unexpected – and often absurd – new lows.

The key plot point, as it were, played out over the course of three months from the Bahrain Grand Prix onwards. Here a longstanding element of hubris was ruthlessly exposed: since 2015 McLaren's position had been that its car was good enough to challenge the top three, but was hamstrung by a gutless and unreliable engine. Switching to Renault power should therefore have generated an immediate competitive uplift. But it didn't.

"It [the shift to Renault power units] was our choice and in hindsight definitely the right thing to do in terms of reliability and performance," says McLaren chief operating officer Simon Roberts. "We did it at light speed – we just didn't want to miss winter testing.

"That's where the reliability started to suffer, because we didn't have time to really diligently go through the car-systems side of it – the integration. The engine had been reliable but our car wasn't, and that is something that was rooted in the late change."

That meant a new front-end aerodynamic concept that should have been introduced in Australia was delayed until the beginning of the European season. The team's form in Melbourne then flattered to deceive, as Fernando Alonso qualified 10th and finished fifth, and Stoffel Vandoorne raced from 11th to ninth.

Bahrain delivered what Roberts describes as "the big wake-up" as both McLarens qualified outside the top 10 – and, although both drivers salvaged points finishes, the speed deficit to

"Bahrain was really difficult, and we started looking internally – have we got something wrong?"

the Honda-powered Toro Rossos was shaming. Pierre Gasly's STR13 finished fourth.

"Bahrain was really difficult," says Roberts, "and we started looking internally – have we got something wrong? Is it just a mistake?"

"Some aspects of the car were not going as intended," says performance director Andrea Stella. "At the same time, the Spain package was to come. In Spain and Monaco we had a decent performance – P8, P7 [on the grid]. We knew there was something to understand, but by Canada it forced us to face the reality that actually the car wasn't performing. After that we just consolidated and we got nowhere near Monaco and Spain."

If the messy divorce with Honda has an upside, it is that it delivered McLaren to a point where it had to interrogate its most >>

basic assumptions – chief of which was that it was creating a brilliant car. The MCL33 was an iterative development of the 2017 concept, which McLaren believed to be a competitive chassis. Time and again through the Honda era McLaren racing director Eric Boullier would insist that the cars were quick through corners and that GPS data backed up his claim.

Others, such as Autosport technical consultant Gary Anderson, weren't so sure. The McLarens generally seemed to be running more wing than rival cars, which would also account for at least part of that cornering performance – as well as of the straightline-speed deficit for which McLaren was so ready to blame Honda.

In fact, the 2017 concept had inherent weaknesses that had gone undetected and were now impeding development of the MCL33. New components didn't work as anticipated, or sufficiently ameliorate the car's main problems: chronic instability at the rear, and draggy aero that didn't deliver downforce consistently through corners.

"Coming from 2017 to the '18 car we wanted to keep developing the '17 baseline since it was a good car," says Stella. "We thought we were not changing very much but we tried to expand, to consolidate

"We'd embedded some aero issues in the car, creating a bottleneck, making development very difficult"

some concepts of the car. In hindsight, after lot of methodical investigation, we'd embedded some aero issues in the car, creating a bottleneck, making development of the car very difficult."

In Bahrain the cars had failed to perform under the very noses of the Bahraini royalty who are, through the Mumtalakat state investment vehicle, key shareholders. Over the following three months, as the scale of the problems became apparent on track, rifts also developed behind the scenes. During the French GP weekend the *Daily Mail* published an excoriating takedown of McLaren's operations. A key management clique of so-called "untouchables" was roundly hated, it alleged, as was the jokey practice of rewarding staff with chocolate bars for hitting production targets.

Whether true or not, the story was enthusiastically uptaken and regurgitated by the shuffling horde of cut-and-paste internet bottom-feeders who attend the train of the F1 circus like Roman camp followers. In the regular FIA team principals' press conference, Boullier faced a barrage of questions concerning both confectionary and his own future. No, he said, he did not plan to resign.

Within two weeks, he had resigned.

Veteran senior engineer Tim Goss had gone in April, chief engineer Matt Morris quit in late July. Since the summer a new leadership team has been in place, comprising Gil de Ferran as sporting director, Stella as performance director (having been head of race operations), and Roberts. Former chief engineer Pat Fry – who left for Ferrari in 2010 – returned in September, and James Key will join from Toro Rosso as technical director at an as-yet-unspecified point (but too late to steer development of the 2019 car).

De Ferran brings considerable racing and managerial savvy,

Stoffel on the scrapheap

For Stoffel Vandoorne there's one statistic he will never be able to escape. He was emphatically 'nilled' in qualifying by Fernando Alonso in 2018, beaten 21 times.

Vandoorne was also dropped by McLaren, the team that spotted his talent in his early days in the junior formulas and had supported him ever since. It was a sad way to end – or at least pause – an F1 career that had promised so much.

Despite that depressing qualifying stat, Vandoorne is much better than he has seemed. It's been a case of right place, wrong time. He was fantastically dominant in GP2 against some high-quality opposition but, even as he homed in on an F1 drive, circumstances turned against him.

He was impressive in a one-off drive substituting for Alonso in 2016, and could reasonably have expected the team to have improved by



the time he made his full-time debut in '17. But it didn't, and Vandoorne was very much a product of the McLaren regime that was in the process of being ousted. When Zak Brown took charge he naturally brought in

people with whom he had previously worked. Lando Norris, in whose management Brown has an interest, was always likely to get the nod for '19. Equipped with difficult cars, Vandoorne struggled

– overdriving at first in 2017, then getting closer to Alonso, then falling away again in the troublesome '18 chassis.

"Last year Stoffel was closer," says Andrea Stella, McLaren's performance director and long-time

engineer to Alonso. "This year the window opened between them. Working with Fernando, the more difficult the car, the greater his [Alonso's] margin over his team-mate. The 2014 and '12 Ferraris were not easy cars."



McLaren sometimes failed to beat the Toro Rosso-Hondas

MOTORSPORT IMAGES/DUNBAR/LAT

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Number of GPs since McLaren last won

and he got a head start in getting to know what he calls “the characters” at McLaren by acting as a consultant during Alonso’s Indianapolis 500 bid in 2017. He has a lot on his plate, not least in establishing his leadership credentials in a large organisation with some big characters on staff – characters who have been with the team for many years and can boast their authorial stamp on championship-winning cars. Depending on who you speak to, Boullier either thumped the table too hard or not enough when dealing with such individuals.

“In general you grow more from recognising your own weaknesses than otherwise,” says de Ferran. “We’ve spent quite a lot of time looking inwards and trying to recognise what we do well, what we can improve on. It’s not all bad. There are a lot of strengths within the team, and there’s a lot of talent

across the organisation at every level. But there’s no denying that this hasn’t been a great season and we have to look inwards, trying to understand where we’re weak, where we’re strong, and where we need to change.

“There’s definitely a hunger. Nobody is sitting there saying, ‘Hey! It’s all OK!’ There’s a lot of effort going into improving clarity across the organisation, improving processes, improving communication. We have to work on it day in, day out.”

Finding the root of the problems has required the team to turn GP Fridays into an ongoing science experiment. At Suzuka in October both drivers griped that there had been no developments on the car since May. That’s because many developments haven’t worked as expected because of the “bottleneck” on the car, explains Stella, as well as the need for the team to rigorously evaluate its own processes.

“Even though we knew there were some areas that might be the culprit, it wasn’t so obvious,” he says. “So we had to conceive some tests to interrogate the entire car. It was a big effort in terms of experiments and tests with not necessarily what would have been raceable parts. And even if these tests provide clear answers, they can’t necessarily be transformed and processed into something that can be developed for this year’s car.”

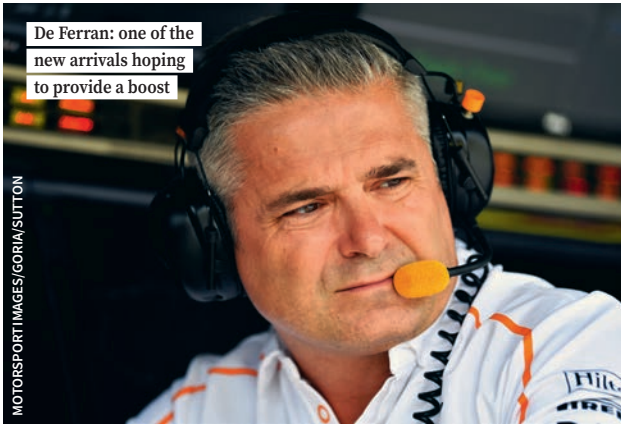
Development will continue to be difficult because the windtunnel at the McLaren Technology Centre is obsolete, and so ‘baked in’ to the building’s structure that it cannot be brought up to the required standard. Under Dennis the company sought planning permission for a new facility that would house both the burgeoning McLaren Applied Technologies division and a new tunnel. But it was bounced by the planning authorities on account of its traffic impact, even though the scheme included an underground-transport system that team insiders dubbed the ‘Ronorail’. McLaren has been using the Toyota tunnel in Cologne, adding an unwelcome layer of complication and expense to the team’s research processes.

Race operations may also need a tune-up. Alonso accused the team of “lacking ambition” in Russia, pushed back against a call to fit intermediate tyres during the German GP, and has generally been chippy and truculent in open communications with the pitwall.

A few years down the road, McLaren’s principals might look back at this season as the turning point – where the team had to confront the proof of its own shortcomings and learn to be better. “We’ve left no stone unturned,” says Roberts. But the route to the third-act redemption isn’t direct, easy or obvious.

“I can’t make predictions on where it ends,” says de Ferran. “Our shareholders and board members have been very supportive. I don’t know what the future holds. If I start worrying about the future, how does that help me? As a driver I never sat on the grid worrying about what-ifs, I just focused on the aspects I could control – getting through the first corner, how I was going to manage my tyres, and so on – and the results came.

“I just focus on what I can do today to change the short, medium and long-term. I focus on the process because I truly believe that when you do that,” and he thumps the table for emphasis, “when you do the best job you can on the day, the future takes care of itself.” ❦



De Ferran: one of the new arrivals hoping to provide a boost

MOTORSPORT IMAGES/GORIA/SUTTON



Fine Monaco performance could not be maintained throughout the season

TEE/LAT
motorsport IMAGES



Toro Rosso

How Honda rehabilitated itself

Scott Mitchell

The Japanese manufacturer had a lot to prove after its disastrous stint with McLaren, and a switch to Toro Rosso proved just the tonic it needed. Now it could be on the brink of an even better mix with Red Bull

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ormula 1 changes very quickly, and a year is a very long time. Surely, though, not long enough for anyone to have ever believed 12 months ago that, at the end of the 2018 season, Honda would be viewed as a potential deciding factor in the '19 world championship.

This year has been vital for Honda, which could have walked away from grand prix racing, tail between its legs, after three dismal seasons with McLaren. Instead it looked to Toro Rosso for redemption, in the hope that it could convince the team's parent operation Red Bull it was worth backing longer-term.

That target was very rapidly hit in 2018. Honda scored its best result since returning to F1, as Pierre Gasly's fourth-place finish in Bahrain – just the second race of the Toro Rosso-Honda partnership – eclipsed anything achieved with McLaren.

That was the peak in terms of results, but the good news kept coming. In June, Honda brought an upgraded F1 engine to the Canadian Grand Prix that took it at least level with Renault and convinced Red Bull to make the change. Another upgrade, admittedly later than desired, appeared to lift the Japanese marque ahead of its French rival for the first time.

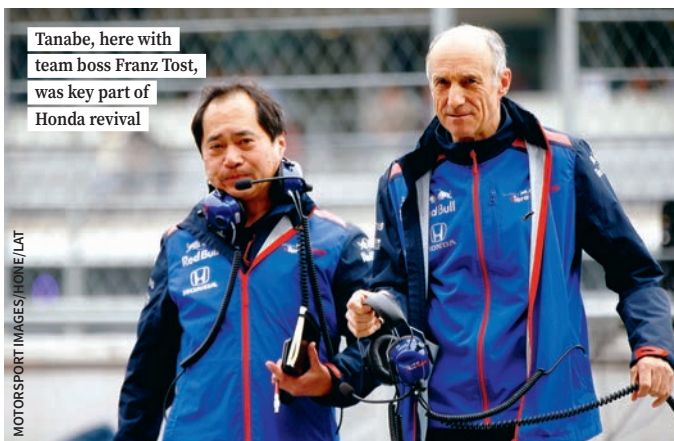
Yes, Honda used many more engines and components this season than any other and yes, Gasly suffered two failures during the final weekend in Abu Dhabi. Reliability is clearly not perfect. But it's better – “completely different” to 2017, reckons Honda technical director Toyoharu Tanabe – and the performance step is very real.

That means the bold targets set, aiming for redemption, were met. But Honda started the year unsure whether that would be the case, despite racking up the miles in a promising pre-season.

“It was very hard to set expectations for this season early this year because we had a new partner and we had a lot of failures and



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Tanabe, here with team boss Franz Tost, was key part of Honda revival

MOTORSPORT IMAGES/HONDA/LAT

issues in past years,” explains Tanabe. “Our first priority was reliability for this season, and of course performance. It was still not perfect to understand what goes on at the track, that’s why it’s hard to expect this season and the position of the team. But we tried to finish with both cars! That was one of the priorities.”

Honda appeared to have failed at the first hurdle when Gasly’s season opener ended after only a few laps. The internal-combustion engine was damaged by a problem with the turbocharger and MGU-H. At the time, Honda said it had modified those parts for the next race in Bahrain. The reality was that Honda had started the season with a 2017-specification MGU-H and could only introduce the latest version after Australia. That threat of unreliability for the opening round was always there, and explains why Honda was not too concerned in the aftermath and why Bahrain was so different.

“The first race we had a failure on Gasly’s car that was hardware from last year,” Tanabe admits. “After that, from a reliability point >>



Honda found its Toro Rosso partnership better than the one with McLaren

of view, it improved reasonably. We had some unknown failures this year but we are comfortable with the reliability of the unit – it was completely different from previous years.

“We started with the first spec, updated it and again, so the gain of the [power-unit] performance was seen at the track, not only on the dyno. That was another good point of this year.”

Tanabe is a key figure in the Honda revival. He was drafted in to the F1 project at the end of 2017 after spending several years leading the Honda Performance Development charge in IndyCar. Former Honda F1 boss Yusuke Hasegawa’s role was split between Tanabe, at the track, and Yasuaki Asaki – a Honda engineering legend who had not worked in F1 since being part of the 1980s turbo engine project and was charged with running the Sakura research-and-development part of the operation.

Asaki was very good at making sure Sakura worked through a priority list and Tanabe’s strength was not being blinded by the desire for performance and losing sight of the need for reliability.

Between them, the communication between trackside and Sakura improved, and Honda gradually focused more on what it needed to do, not just on what it wanted to do.

Usually, the sort of cultural change that Honda has gone through over the past year would take a bit longer to yield big benefits. What helped is that Honda was not actually in as bad a shape as was being publicly made out in late-2017. It cannot be forgotten that, during Honda’s obvious and public struggles, McLaren twisted the knife by insisting how good its car was.

Without dwelling too much on something from early 2017, broadly speaking Honda’s decision to switch to a Mercedes-style engine layout sparked a dismal pre-season of woeful unreliability that sowed the seeds for McLaren-Honda’s divorce. But it also paved the way for a steep development curve.

“The headlines, and the very public thing you have with reliability, masked the fact that not only did they overcome all those problems but they made progress as well,” outgoing Toro Rosso technical director James Key told Autosport mid-season. “So, by the end of the year they were pretty good, and the reliability problems had been ironed out. They weren’t able to show their full performance when they had such a difficult set of circumstances.”

The changes Honda made were so significant that, for the first time, it is preparing to use the same engine layout for a third season in a row – this year’s engine is the basis for the ’19 unit. With hindsight, it is easy to make out the turbulence Honda had to just buckle up and ride through. Fortunately, it had a very good

“The biggest change with Toro Rosso is we had much better communication compared to the past”

new partner by its side, with which it was able to work closely.

“The biggest change with Toro Rosso is we had much better communication with the team compared to the past,” says Honda motorsport boss Masashi Yamamoto, who oversaw the structural changes that helped convince Red Bull that there was a tangible difference within the operation. “As a result of that, we had a better connection between the chassis and power unit on the technical side. In terms of the engine itself, we were able to see the improvement of reliability and performance. We had Spec 2 and Spec 3 and improved the performance gradually.

“It was good preparation for next year. We had some troubles at the beginning of the year – reliability issues – and some delays on development, but in the end both reliability and performance improved.”

Putting Honda’s progress into numbers is difficult, given nobody is willing to share power gains and the like. But it has put a lot of effort into its combustion-engine technology this year, and also made decent gains with how it uses its energy-recovery systems.

Speed-trap figures can be misleading, but using F1’s power-sensitive races at Spa and Monza as a point of comparison reveals that Honda trimmed its top-speed deficit year on year. Gasly followed up a top-10 finish in the Belgian GP by making it into the final part of Italian GP qualifying at Monza as Honda’s engine stood up to the test of two of F1’s fastest tracks.

As well as running the engines harder, Honda has also reacted to deficiencies exposed by the Azerbaijan GP earlier this season. It has since developed its energy-deployment strategy and adapted its communication between team and drivers. This combined to facilitate Honda’s encouraging performance while it waited to introduce its final major upgrade.

That came in Japan in October – belatedly, and not without issue. It was meant to be used in Russia the weekend before but gearbox oscillations proved higher than expected. A rapid bit of calibration



work in the days between races allowed the upgraded Honda to make its debut on home soil at Suzuka, where Brendon Hartley qualified sixth and Gasly made it two cars in the top 10. The performance gain was clear.

Further changes followed as Honda made more tweaks to introduce a proper solution to the oscillation troubles and then identified a possible assembly problem that proved to be a false alarm. By the end of the season few doubted that Honda had taken third spot in the engine pecking order from Renault, which introduced its own third-spec engine (although the works team avoided it because it came with a reliability warning).

Honda's progress, particularly its first step in June, was the final part of winning Red Bull over. It persevered with development over the course of the season, and even sacrificed Toro Rosso's race weekends to introduce minor amendments or tactically add fresh engines to the pool.

No stone was left unturned because it was all part of what 2018 represents for Honda: rehabilitation. That's why Yamamoto describes the rebuild of its reputation in just one year as "not really a big surprise".

"The key point was the race performance in Canada," he says. "We were able to prove we could step forward to a certain level and were able to get trust from Red Bull. After that, we were able to continue in that environment and Red Bull was also seeing that. I think the relationship is quite stable, good, and we are getting that trust." ❧



Canada upgrade proved crucial to 2019 plans

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Seizing the big chances



Pierre Gasly rates his first full year in Formula 1 as 8.5 out of 10. "Why? Because I think in my first complete season my main target was to make the best out of the package I had," he says. "I knew there would be two, three, four opportunities in the season to score points, big points – I had to make sure that in these kind of moments I would be right there and be able to make them happen. And I think that's what I did."

He's not wrong. As well as banking Honda's best result since returning to F1, with fourth place in Bahrain, Gasly scored big twice more before the summer break – he was seventh in Monaco and sixth in Hungary. But Toro Rosso's general lack of car progress prevented big hits in the second part of the season.

"Bahrain, Monaco, Budapest, I would say they were the main three ones where we managed to do the right thing," says Gasly. "In Bahrain we had to deliver a good qualifying at the right time to have the free air in the race and that's what I managed to do. In Monaco we had to make it into the Q3, better starting grid position, that's what we did.

"In the wet in Budapest in

"I knew there would be some opportunities to score big points and we made it happen"

quali, I managed to make it to Q3 and have a good starting position. They were the races where we had a bit more performance compared to others and we managed to make it happen when it mattered."

Gasly learned of his promotion to the Red Bull senior team over the summer break, following Daniel Ricciardo's shock decision to leave for Renault. While the big results stopped after that, there were still highlights – like a gutsy drive to ninth in Belgium, and nicking a point in Mexico. He should have had a point in Britain too, but lost it because he was judged to have been too aggressive in battle.

Ultimately, Gasly was the better of the two Toro Rosso drivers. But Brendon Hartley did run him close in qualifying and Gasly may need to step up a gear to stand a chance against Max Verstappen at Red Bull.

Sauber

The rise of Leclerc

Scott Mitchell

How the 2017 Formula 2 champion went from hopeful rookie to Ferrari's new superstar in less than a year

Can you remember anything from Charles Leclerc's first three Formula 1 races? Maybe his spin in Bahrain Grand Prix qualifying or his trip through the gravel during the Chinese GP spring to mind.

Leclerc arrived in F1 with Sauber with massive expectations as runaway Formula 2 champion, and everybody around him trying to play them down. The argument was that he needed time and was going up against a much more experienced – and quite underrated – team-mate in Marcus Ericsson. So it didn't matter if Leclerc needed half a season to find his feet before progress took hold.

If Sauber was willing to accept a 'season of two halves' from Leclerc, it must have been absolutely chuffed to watch its driver enjoy 'a season of one-seventh and sixth-sevenths'. After those first three races, in which Leclerc looked every inch a rookie driver learning the ropes, came 18 weekends in which he regularly rose to new heights and looked every inch the superstar-in-the-making everyone had been hoping to see.

In his fourth race, Leclerc was one of the stars of a chaotic grand prix in Azerbaijan. He made it into the second part of qualifying for the first time and scored his first points by rising from 13th on the grid to sixth. Leclerc explained at the time that carrying over his driving style from GP3 and F2, which he had won back-to-back in 2016 and '17, had not worked early on with Sauber's C37.

The trick was to dial understeer into the incredibly tail-happy

“It may be harsh to focus on a weakness, but if there is one area to improve it is getting the most from qualifying”

Sauber, which had thrown Leclerc and Ericsson off the road several times in pre-season testing and the early GPs. Leclerc adapted his style too, and the turnaround was swift and substantial.

Most of these review pages could be filled digging into the details of what made Leclerc's run after Azerbaijan so impressive. It's quicker to pull out the highlights. Holding off Fernando Alonso for most of the Spanish Grand Prix, where Sauber was definitely slower than McLaren, was a valuable lesson in racecraft. Leclerc was mugged by Alonso at a restart, not helped by the Sauber's struggle to retain heat in its tyres, but still held on to score a point at a track

Leclerc's 2018

Points 39

Best finish 6th (Azerbaijan GP)

Best qualifying 7th (Russian GP)

where Sauber had looked very poor in testing.

Leclerc looks back on that Alonso fight fondly, but he found new peaks very quickly. He stunned by making Q3 for the first time at June's French GP and grabbed another point as he regressed to the mean of the car's performance in the race. More points were earned in Austria despite a first-lap trip through the gravel, thanks to a patient and consistent recovery drive in a race of relative attrition.

He should have been best of the rest outside the top three teams at Silverstone, but a botched Sauber pitstop put paid to that. What Silverstone did expose was Leclerc's tendency to fail to improve in Q3 – when he made the top 10, he was often slower than in Q2. A mid-season lull then took the edge off a bit, thanks to bad luck and Sauber's low-downforce package struggling at Spa and Monza, but Ferrari still announced that he would replace Kimi Raikkonen in 2019.

This was the ultimate validation of his impressive rookie campaign, but it came off the back of a five-race pointless streak, Leclerc's worst of the season. Now, with more eyes on him than ever, he responded in supreme fashion.

He celebrated his Ferrari move with ninth in Singapore, then his first 'Class B' win in Russia, having passed Kevin Magnussen around the outside at the start. Assault from Magnussen and the other Haas of Romain Grosjean in Japan and the United States wrecked those races early, but a hat-trick of seventh-place finishes in Mexico, Brazil and Abu Dhabi – where he ran a stunning fourth early on after jumping the Red Bulls on the opening lap – cemented Leclerc's swift ascension into a very, very good all-round package.

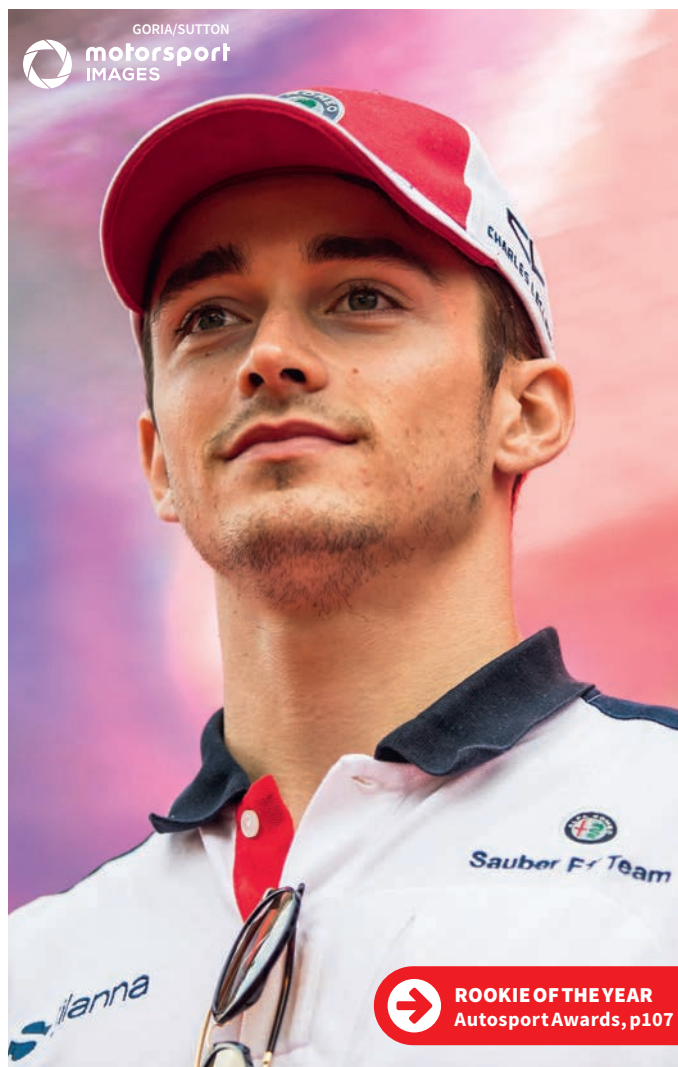
It may be harsh to focus on a so-called weakness in Leclerc's game this season, but if there is one area he can improve then it is in ensuring he gets the absolute most from qualifying when it counts.

A run of five Q3 appearances in six races at the end of the year shows that Leclerc was getting a lot out of the improved Sauber package, although a pesky trait of going slower than in Q2, or not hooking up his best sectors, often remained. It cost him a place on the grid a few times this year and that will hurt more in 2019.

Apart from that it is almost impossible to fault his campaign, arguably the finest rookie effort since Lewis Hamilton's in 2007. Given that it has laid the foundations for Leclerc's Ferrari career, it could prove to be just as significant. ✘



Leclerc scored his first F1 points in Azerbaijan with terrific drive to sixth



ROOKIE OF THE YEAR
 Autosport Awards, p107



Q&A
Fred Vasseur, Sauber team principal

How do you view Sauber's progress this season?

The first race we were more fighting with the medical car at Turn 1! We always had strong engine performance and reliability. We're a small team – it's very important to focus on the chassis and not the engine. We recruited to improve every single part of the company, and it's paying off.

It seems that you've outdeveloped everybody...

It's much easier to improve when you are four seconds off than when you are fighting for tenths! At one stage you will become more or less flat [in terms of development] and we were more on the high gradient.

The next step will be by far the most difficult.

Did your progress compromise preparation for next year?

Not at all. We switched all resources to next year's car quite early. When you have a change like this to the regulations it's a drastic one. You can take the wrong direction and we will understand this perhaps [only during testing] in Barcelona.

Have you laid down a marker to be best of the rest next year?

We are fighting for the top 10, and in terms of teams between P4 and P6. We have to do at least the same next year. It will be the target.

Williams

How Kubica made it back to Formula 1

Adam Cooper

One of the subplots of 2018 was the work of someone who *didn't* race in a grand prix



R

obert Kubica's return to a 2019 Formula 1 race seat with Williams is an extraordinary story, one that shows that determination and bloody-mindedness can pay dividends.

It began with some outings in an old V8-powered Renault last year. After enduring years of pain and frustration since his devastating 2011 rally crash, Kubica

proved that he could still handle an F1 car, although prospects of a genuine comeback seemed slim. An official session in Hungary with a current hybrid car showed that things were getting more serious. But Renault remained tight-lipped, and there were still doubts about whether he could really extract the last few tenths.

"It was my first time with a hybrid car, everything was new, a lot of people were watching," Kubica recalls. "Many times people from F1 forget that this is a sport. It's normal that drivers who are doing whole seasons and driving every week are in better condition.

"Apart from the experience and knowledge of what's going on in the car, it's also not easy to jump in an unknown car, because it requires quite a lot more energy, stress and attention. Once you drive more frequently everything becomes more natural, and it becomes easier."

When Carlos Sainz Jr was signed by Renault for 2018 there was no vacancy at Enstone. Then a test with Williams after the last race of '17 in Abu Dhabi opened up a new opportunity. But the word was that Kubica didn't do enough to convince the team and, helped by substantial Russian backing, rookie Sergey Sirotkin landed the race seat. To his credit the Pole didn't walk away. He accepted the reserve job, and that impressed Williams.

Kubica was given two days of running before the season, then made an emotional return to race-weekend action with FP1 outings in Spain and Austria. Test days at Barcelona and the Hungaroring added to his mileage.

"In the end I was offered a reserve or development role, which was good experience," reckons the 33-year old. "It was not a small thing that this opportunity gave me a chance to get back to the paddock, live it, live my passion, and it's a long time that I have been away. I was also curious to see what emotions it would give me, and how I would find it.

"Of course, results were far away from what we were expecting. The season has been quite a tough one for everybody, which is not a secret. We found it out quite soon – Barcelona winter testing – that the car was not where we wanted it to be.

"But then I've seen in the past with BMW things turning around quickly, or in a few months, with some progress. It did happen here, but in a bit of a different way. We had some other issues that we had to solve first, before thinking about performance."

Kubica was embedded in the struggling team on race weekends, able to offer the benefit of his knowledge as the engineers tried to fix a package that had fundamental problems.

"It's fair to say that what I was looking for from a driving point of view, I got," he continues. "What I was looking for from a working point of view, and how I could be part of the team from the in-season process, and working with the team, I think it worked pretty good.

"I did practically the whole testing once the season started, and this was not planned. This showed they relied only on my feedback. I have mixed feelings because, with the current situation, I couldn't help enough with getting more performance in the car.

"I was much more involved from a development point of view, throwing ideas, or giving areas where we can potentially improve. I think this year Williams was more focused on understanding and solving the issues than fine-tuning and trying to find the last couple of tenths from improving small things."

Few thought that he had a chance of securing a 2019 race seat and, when he didn't drive for more than three months following the Hungaroring test, Kubica dropped off the radar.

Then circumstances began to work in his favour. Lance Stroll's impending departure created a vacancy, and when George Russell

Williams hits a new low



The rollercoaster recent history of Williams continued into 2018, and this time it hit rock bottom. Ninth in the last season of V8s in '13, ahead at least of Marussia and Caterham, the team bounced back to be third, third, fifth and fifth in the four subsequent seasons, flattered perhaps by the superiority of Mercedes power in the early days of the hybrid era.

However, in 2018 the Grove outfit slumped to 10th and last by a significant margin, its only scores an eighth in a high-attrition race in Baku, and ninth and 10th at Monza, where in low-drag configuration the team managed to find some performance in the FW41.

Elsewhere it was a struggle for Lance Stroll and his rookie team-mate Sergey Sirotkin. Both were often on the back row of the grid. The departures in May of chief

designer Ed Wood and head of aero Dirk de Beer suggested that there was considerable turmoil as the team wrestled with fundamental issues.

"There are substantial changes that are needed in the company to get us from here to where we want to be, near the front," tech chief Paddy Lowe conceded at the Abu Dhabi finale. "I don't think that mindset has been present in the team for many, many years, if ever. And that is the mindset that's necessary."

This focus on the bigger picture for 2019 was of little comfort to the drivers, as the car never improved. Stroll at least knew from the summer that he would be going to Force India, but Sirotkin, who impressed with both his racecraft and intelligent approach, was not invited to be part of the recovery process.

was hired it became clear that Williams would not take a second Mercedes protege in Esteban Ocon. Meanwhile, F2 racer Artem Markelov dropped out the picture.

It came down to a straight choice between keeping Sirotkin, or balancing Russell's youth with Kubica's experience. And in the end, Williams made the bolder choice. His technical contributions aside, Kubica also brings commercial value at a time when the team is in need of funding, having tumbled to last in the constructors' table.

Now it's up to him to show what he can do. Only 31 days older than Lewis Hamilton, he still has time on his side, and no-one can doubt his commitment after those years of struggle. The biggest challenge he now faces will be the one provided by his new and highly rated team-mate. ❧

The best race drives of 2018

Edd Straw



Romain Grosjean Japanese GP (8th)

This is one of those performances that it's impossible to appreciate the quality of at the time. In fact, while watching the race it seemed that Grosjean had been too soft in letting Sergio Perez get past him into the chicane at a virtual-safety-car restart. But then certain facts emerge that change your perception.

It turned out that, unbeknown even to the team, the rear-left corner overheated during the safety car that was on track from laps four to seven. This led to the rear trackrod shroud debonding and meant there was a huge amount of play in the left-rear wheel – to the point that the team would very likely have retired the car for safety reasons had it known. Video footage subsequently showing the wheel being moved by hand confirmed the extent of the play, which was very significant.

It did have an impact on the car, which would not drive straight, and affected it dynamically in the corners. But Grosjean probably would have held on to seventh place without the VSC allowing Perez, who had got on the power earlier, to attack into the chicane. But once Perez had a run, Grosjean wouldn't have had the rear-left grip to hold him off in the right/left chicane.

A superb performance in circumstances that would have defeated most drivers.



Grosjean kept it together in his wayward Haas



Underdog Perez seized his chance on streets of Baku



Sergio Perez Azerbaijan GP (3rd)

It has become traditional in recent seasons for Force India to be one of the few teams to gatecrash the top-three party at the front, but that seemed desperately unlikely after the first three races of the season given how much the squad was struggling. But in Baku the team got the car exactly right, and Perez made the most of it to take probably the most unexpected of his five podiums for Force India.

He started a promising eighth, but had to stop early after damaging his front wing on the opening lap. From there, he drove brilliantly. There were some retirements, but he had to overtake six cars himself. What really made this a great race was his opportunistic pass on Sebastian Vettel on lap 49 of 51. This wasn't in the immediate aftermath of the Ferrari driver's mistake – it was simply an underdog seizing the moment and capitalising on a set-up designed to make passing easier, to beat a car he had no business being ahead of, which is what elevates this above many of the excellent drives to 'Class B' victory from the midfielders we saw in 2018.

Valtteri Bottas suffering his late blowout meant Perez was rewarded with a podium.



Fernando Alonso Azerbaijan GP (7th)

Alonso wasn't afraid of talking up his performances this year, but when he described Baku as one of the best of his career he was right. Already mightily impressive hustling the McLaren around the unforgiving track half a second faster than team-mate Stoffel Vandoorne in Q1, he picked up significant damage after being hit by Sergey Sirotkin, who was himself forced to move left by Nico Hulkenberg drifting towards him, on the first lap.

The damage was significant, impacting the teatray and the right side of the diffuser and floor. As he came into the pits, he was unable to make the final left-hander in the pit lane and hit the wall. Yet he was sent out on fresh rubber with a new front wing, in a car reckoned to be half a second slower than it should have been, and charged.

Yes, he was helped by the deployment of the safety car that allowed him to take the restart at the back of the pack on the lead lap in 17th place, and half of the 10 positions he gained were down to others retiring. But despite car damage he overtook Kevin Magnussen, Brendon Hartley, Vandoorne, Pierre Gasly and Lance Stroll, repassing Stroll on the last lap for seventh.



Max Verstappen

Mexican GP (1st)

In these days of tyre and fuel management, it's unusual for a driver to disappear into the distance. Doubly so in a race like the Mexican Grand Prix, which was at the extreme end of the spectrum for looking after the Pirellis. And yet, somehow, Verstappen took what was arguably the most dominant victory of the season.

Initially he was told to build up a 3.5-second lead over Lewis Hamilton, but his advantage went beyond that as it became very clear that there was only going to be one winner of this race. With Hamilton pitting at the end of lap 11, Verstappen was comfortable enough to go two laps longer and still have a 2.2s advantage. The main challenge from here was the team trying to slow him down, something that wasn't easy as Verstappen's pace made it impossible for him not to build his lead. Most impressively, he was able to make a luxury precautionary pitstop and still have a comfortable advantage over team-mate Daniel Ricciardo, who started from pole position and made a one-stopper work.

Verstappen's tyre management has been a strength since his Toro Rosso days, and this was a race in which he combined that skill with what speed the race situation allowed him to show. A crushing victory.



MAUGER/LAT
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IMAGES

Even minding his tyres,
Verstappen couldn't
help but romp away



Lewis Hamilton

Italian GP (1st)

You could name several of Hamilton's drives as contenders for this ranking, but Monza was his most complete performance. It combined several key elements – superb overtaking, strong race pace, patience, intelligence and the all-important ability to pounce when the stakes are highest. This combination allowed him to turn the tables on Ferrari.

Seizing the opportunity presented by Sebastian Vettel's desperation to get ahead of Kimi Raikkonen, Hamilton ensured he got a good run out of the first chicane. With Vettel looking for a way past on the inside of Raikkonen, Hamilton took the orthodox line on the approach to the second chicane and went around the outside. Vettel, onto the move too late, tried to defend but ended up clipping Hamilton and spinning to the back.

With one Ferrari out of the way, it became a race of patience. When Raikkonen, covering the undercut, pitted on lap 20, Hamilton was fast enough to remain a threat as he extended his first stint, forcing Raikkonen to push on. And while it wasn't enough for Hamilton to overcut Raikkonen, the Ferrari driver was struggling with rear blisters.

Then it was just a matter of time, and Hamilton took the lead – and a brilliant victory – by passing Raikkonen eight laps from home.

Hamilton bossed
both Ferraris on
team's home turf

GORIA/SUTTON
motorsport
IMAGES

Alonso's McLaren is
launched over the top of
Leclerc's Sauber at Spa



How the halo proved itself

Jonathan Noble

You'd be hard pressed to think of any motorsport innovation that has stoked more spluttering ire than the halo. And while familiarity seems to have bred a lessening of contempt for its looks, its life-saving capabilities are no longer in any doubt

W

hen Formula 1's 2018 cars emerged for the first time, fans, drivers and team bosses were pretty clear that the latest generation of grand prix machinery did not look good. Max Verstappen even used the word 'ugly'.

It was all down to the halo. The device had been controversial from

the start – while people understood the safety benefits, they did not like the looks. Mercedes boss Toto Wolff said at the launch of his team's W09: "I'm not impressed with the whole thing. If you give me a chainsaw, I would take it off. We need to look after the drivers' safety, but what we have implemented is aesthetically not appealing."

Come the end of the season in Abu Dhabi and the mood in the paddock and pitlane had changed completely – and that was down to two factors. First, time had dulled much of the negativity about the looks. Yes, there's still a desire for a better-looking solution, but people quickly grew used to the appearance of the cars and a new norm was accepted.

But, more importantly, two crashes during the season – one in F2 and the other in F1 – served to silence the loudest critics. The halo first proved itself in May's Spanish Grand Prix F2 support race, when the cars of Tadasuke Makino and Nirei Fukuzumi collided at Turn 4. Fukuzumi was launched over the top of his rival and his left-rear tyre hit the right-side bodywork of Makino's car and then, more significantly, the right-side upper surface of the halo.

Subsequent data analysis showed that the maximum lateral and vertical accelerations of Fukuzumi's car during the halo contact were 2.8g and 3.8g respectively, measured at a peak lateral force of 20.4kN and vertical force of 28.0kN.

This was well within the halo tolerances of 125kN – but far in excess of what are considered to be the tolerances of the driver's neck and head, which are 3-4kN.

The official report into the crash from the FIA's Global

Institute concluded: "The halo likely prevented contact between the tyre and the driver's head. Without the halo there would have been potential for a very serious head or neck injury."

Then, at the Belgian Grand Prix in August, came perhaps the defining moment in answering critics of the halo.

When Fernando Alonso's McLaren was pitched over the top of Charles Leclerc's Sauber by Nico Hulkenberg's Renault, his right-front wheel struck the Sauber's halo and left large tyre marks, prompting an initial conclusion that Leclerc was saved from injury or worse by the cockpit-protection system.

Initial analysis showed that Alonso's wheel struck the halo with a force of 56kN – in other words, more than twice the impact of the Makino/Fukuzumi crash.

A detailed accident report has been completed by the FIA (see Pit & Paddock, page 6), offering an analysis of the part played by the halo during the impact.

But even before this report was written it had become obvious that drivers were walking away from incidents that in the past might have had serious consequences. Doubt had been taken out of the equation.

"I was probably not a big fan of the halo when it was introduced," says Leclerc, "but after what happened in Belgium I have to say that I think it deserves to be in F1."

"We cannot know what would have happened without it [Leclerc was talking before the completion of the FIA's report – Ed], but one thing is for sure – I would prefer to have had the doubt about whether it will or will not have touched my head. Because if it was really touching my head, then it could have been really bad."

Change is constant in Formula 1 and the subject of safety is no exception. The FIA will take on board the lessons from what the halo has achieved this year, and make improvements as it moves to what's called 'halo 4'. Longer-term, the potential for a better-looking system – perhaps like the aeroscreen – remains on the table if it can match the halo's safety levels.

For FIA president Jean Todt, who was defiant amid criticisms of the halo, it's obvious that those two crashes this year have vindicated his decision to push through with making it mandatory. And he is clear about the risks that motor racing faces if the quest for safety is not pursued.

"A few decades back, after [crashes like] that, drivers would not be there," he says. "What was acceptable 40 years ago would not be acceptable now. And it could maybe mean that motor racing would be banned. Things have changed. So we must consider that. Motorsport remains dangerous. We should never forget that." ✎

"I was not a big fan of the halo at the start, but after what happened in Belgium I have to say it deserves to be in F1"



Makino's F2 car bears the scars of the tyre impact on its bodywork and halo

Politics

Liberty pulled back to reality

Adam Cooper

Formula 1's new management found that the honeymoon was definitely over in its second year in charge, as it faced challenges across the board to its plans for the sport's technical, sporting and commercial future

T

he 2018 Formula 1 season was the second to be conducted under the sport's new management. Having laid the groundwork last year, investing and dramatically expanding staffing levels at its new HQ, Liberty Media was probably hoping to achieve rather more than it actually did.

F1 chief executive Chase Carey and his colleagues are playing the long game, with a focus on 2021 and beyond, and they stress that there shouldn't be a rush to judgement. But it was inevitable that there was a little impatience in some quarters, and by the end of the year F1 team bosses were questioning an apparent lack of progress on various fronts.

The shape of the sport from 2021 was the dominant topic. Liberty's basic plan was to review distribution of income among the teams, to address costs and to attempt to level the competitive playing field. It sounded great in principle – the tricky bit was how to go about achieving it.

A key moment came on the Friday of the Bahrain Grand Prix in April, when Carey and Ross Brawn (F1 managing director of motorsports and technical director) made a presentation of their grand plan to the teams. This was the first time that everyone had come together to hear the full story laid out.

The basic philosophy was to move away from the Bernie Ecclestone model, one that ensures that the main players take the biggest slice of the revenue pie come what may, and to instead focus more on performance, thus rewarding results. In an acknowledgement that a total revolution would not be possible, Ferrari, in its role as the sport's oldest team, was still guaranteed a \$40million bonus.

Mercedes and Red Bull Racing were set to lose more than most, with the latter no longer enjoying the benefits of the close relationship that always existed between Ecclestone, team boss Christian Horner and Red Bull owner Dietrich Mateschitz. Teams further down the grid were more enthusiastic, with Claire Williams even announcing that she wanted to open a bottle of champagne.

“The basic philosophy was to ensure a bigger slice of revenue pie for the main players, rewarding results”

Exactly how those revenue payments would be structured remained under discussion as the year progressed, as did the plans for a budget or cost cap. The big teams made it clear that, even with items such as driver salaries taken out of the equation, they would never come close to the \$150m that was originally touted.

A reality check came in October, when the 2017 financial results of the UK-based teams reached the public domain. Mercedes had spent nearly £310m just on its race team to win that year's title – the cost of engine development was not included – while, even as an independent, Red Bull Racing's budget was £227m.

By coincidence, both teams had spent 17.4% more than in 2016, a direct result of the move to wide-track, high-downforce cars that winter, and a reminder of how expensive rule changes can be.

The struggles of the midfield teams to make ends meet was brought into sharp focus when Force India came close to imploding in the summer. Thanks to some nifty footwork by COO Otmar Szafnauer and a substantial investment from Lawrence Stroll the team emerged at Spa as a new company and with a new entry, and yet it retained the prize money due to its predecessor.

That latter point was questioned by rival team owner Gene Haas. But in pushing everything through, Liberty and the FIA had taken a common-sense approach and ensured that we still had 20 cars on the grid, and 400-plus people still had their jobs.

Reversal on engines

One clear development on the 2021 front concerned power units, which obviously had to be a priority given the lead times involved. Originally, major changes were planned, in part because there was a theory that a reset and fresh start would encourage newcomers to enter the sport. And that meant Porsche, which was represented in relevant meetings.

When no firm decision was forthcoming from the Stuttgart manufacturer, the four current suppliers began to ask why they were being subjected to expensive new rules. After a debate with the FIA and Liberty, the sensible decision was made to rein in those changes and instead just tinker with the current hybrid package for 2021.

“A year ago we were probably headed towards a more significantly rebuilt engine,” Carey noted in November. “I think as we got into discussions with all the teams we all came to an agreement that the right path was more stabilising the existing engine, and marrying it to a series of sporting and technical regulations that improved competition, and addressed some of the economic issues around that.”

Meanwhile, Pat Symonds and the rest of the team of engineers engaged by Brawn continued to work away on future chassis and aero concepts, in conjunction with FIA man Nikolas Tombazis. >>



Ross Brawn (left) and Chase Carey have big plans to transform F1

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Brawn and Carey presented their ideas for F1 to teams at Bahrain

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One element of their 2021 research was cherry-picked and fast-tracked into the '19 regulations. Significant changes to front wings, intended to help cars follow each other and thus overtake, were pushed through in a vote just before the end-of-April deadline. Whether the move pays off remains to be seen, but the episode showed that a ticking clock can focus the attention of the sport's various stakeholders.

A move to 18-inch rims and low-profile tyres was the first confirmed detail of the 2021 package. With Pirelli's current deal running out at the end of '19 that left an awkward interim year with current sizes at the start of the next contract in '20, and that was discouraging for any potential new entrants. Hankook had a look, but in the end Pirelli was given the nod.

Generating income

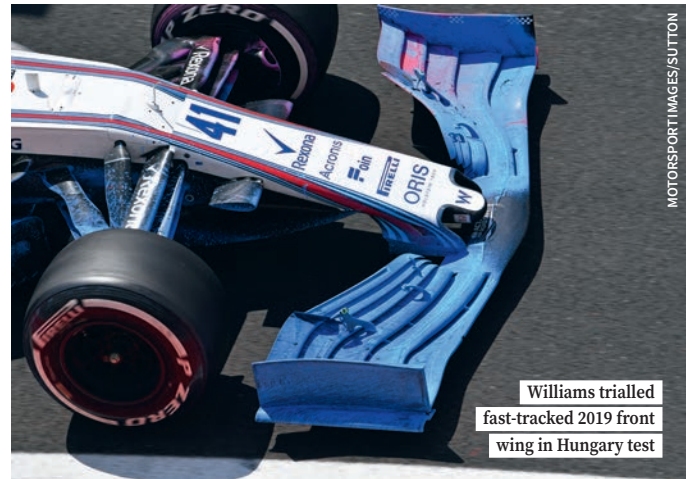
Aside from its focus on 2021, Liberty also had to bolster short-term income, derived from the three main revenue streams, namely race-hosting fees, broadcasting rights, and sponsorship.

Adding extra races should be low-hanging fruit. Provisional plans for a Miami street race in 2019 were announced, but the logistical and political issues proved to be far more complex than anticipated. In July it was acknowledged that F1 wouldn't be going to Florida until '20 at the earliest.

Liberty remained keen to show that it could conjure up a new race, and in November a Vietnam GP was confirmed for 2020 – and even that was based on a project that Ecclestone had long worked on, and ultimately not followed through with. The street course looked spectacular on paper, but not everyone was convinced that Hanoi was the sort of appealing “destination city” that Carey had so often talked about.

Securing the future of existing races remains as much of a challenge as finding new ones. New deals were done with Hockenheim and Suzuka, while Silverstone, Monza and Barcelona are among those to come up for renewal after next season.

Liberty made life difficult for itself when it became known that Miami promoter Stephen Ross had been offered a very special and unprecedented deal that involved risk-sharing with F1 – and a modest upfront fee. Promoters who were paying upwards of \$70m per year, especially those now locked into long-term contracts,



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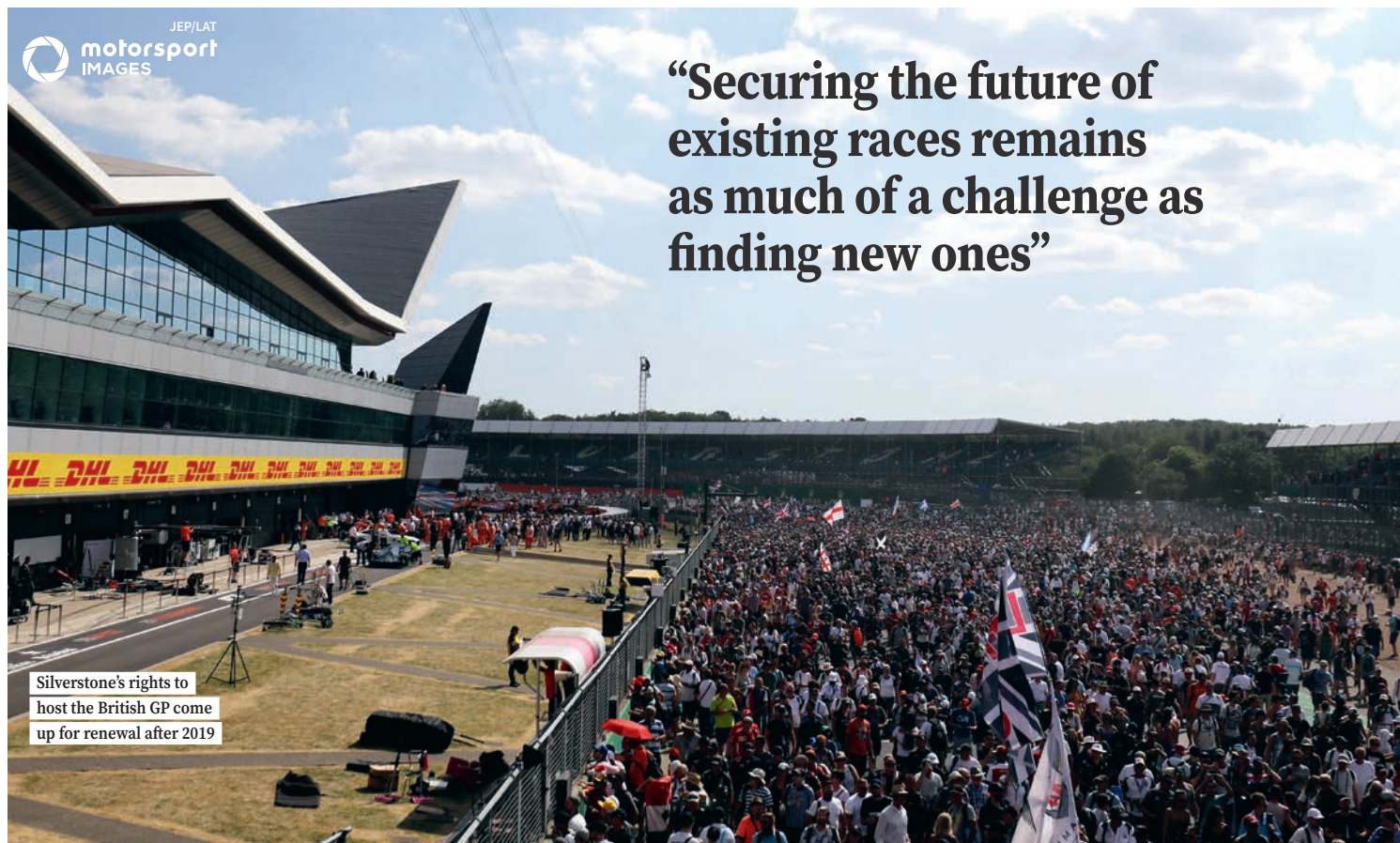
Williams trialled fast-tracked 2019 front wing in Hungary test

were left bemused by this development. Anyone approaching the end of an Ecclestone-negotiated deal was naturally keen to see if they too could come to a special arrangement.

Liberty faced some push back from promoters, and it was a similar situation with broadcasters. One of its major hopes for the future is OTT, or ‘Over The Top’ streaming, in other words reaching viewers without going via traditional channels. The problem was that Ecclestone's deals with traditional broadcasters always gave them exclusivity in their regions, and now they would find themselves competing directly with F1.

So when F1 TV was launched with some fanfare it was only in countries that had recently renegotiated deals that now allowed Liberty to do its own thing in parallel. The new service used unproven technology, and fans who had signed up were not slow to complain about its inadequacies. Carey subsequently insisted that this was a “beta-testing” year, and that the proper launch will come in 2019.

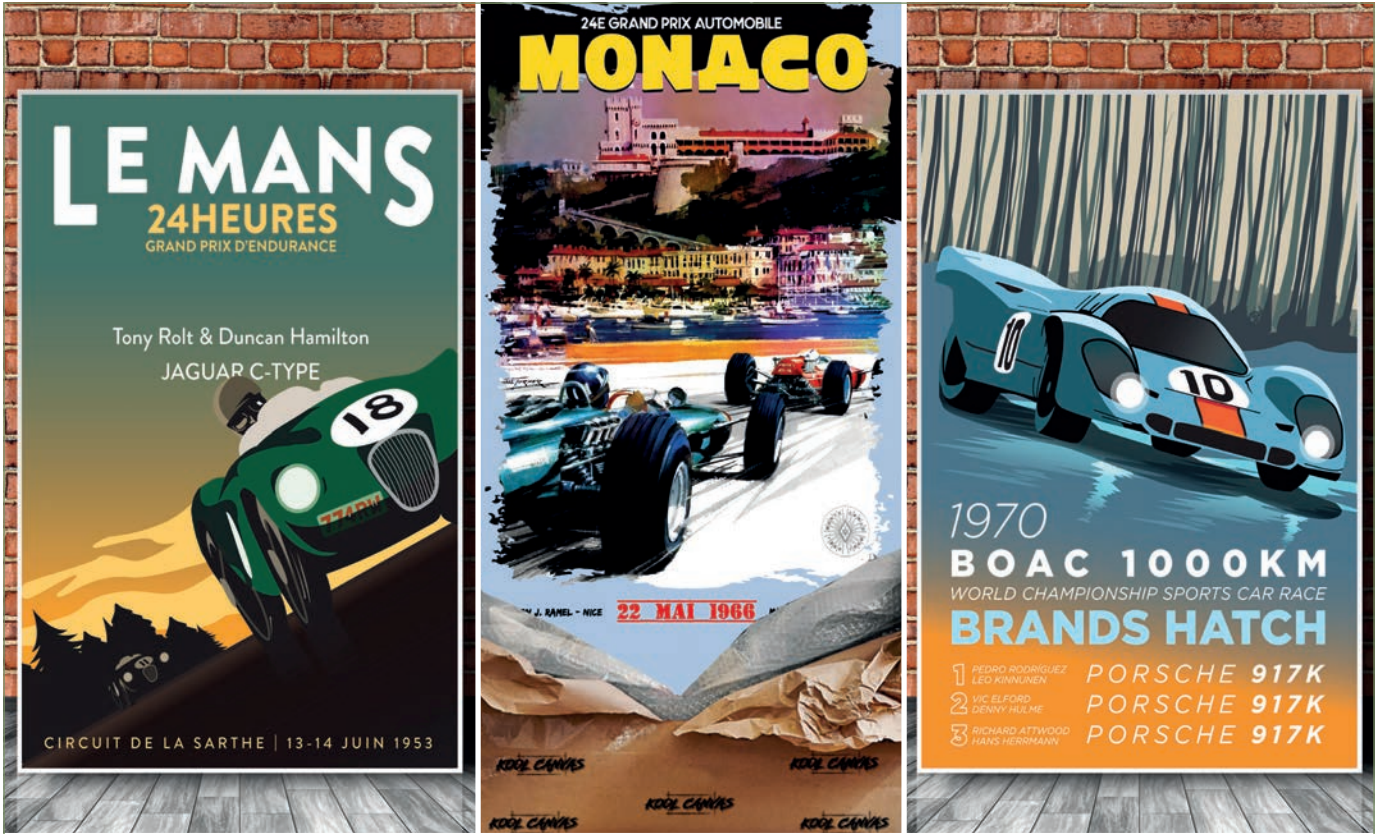
UK viewers who don't pay for Sky's coverage were disappointed when Channel 4's commitment to show half the races live was reduced to just the British GP in 2019, with highlights of the rest. >>



JEP/LAT motorsport IMAGES

“Securing the future of existing races remains as much of a challenge as finding new ones”

Silverstone's rights to host the British GP come up for renewal after 2019



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“Realistically it takes time to build. We came into a sort of organisation start-up and a business turnaround”



One of F1's priorities is improving the racing spectacle

ANDRE/SUTTON
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Fans of C4's Tom Clarkson will have to wait for highlights on all-but-one occasion in 2019



Greg Maffei, president and CEO of Liberty, F1's owners

A similar move away from free-to-air had a big impact in Italy, another of the sport's traditional key markets – on its own, it contributed to a 5% reduction in worldwide viewing numbers.

That sort of statistic doesn't exactly encourage sponsors, and there were few signs that Liberty's promise to increase the number of official partners over the small number preferred by Ecclestone has paid off. Existing arrangements with major backers DHL and Emirates were extended, but the only truly significant new deal was in the controversial area of betting.

Falling share price

The bigger picture of the commercial side of the 2021 package remained in limbo and, as the year progressed, little seemed to be happening. Meanwhile, the death of outspoken Ferrari chief Sergio Marchionne in July subtly changed the political landscape.

An intriguing development came at Suzuka, where the team bosses held a meeting without any Liberty or FIA representation, supposedly to talk about improving the show.

A nervous Carey then called one of his own for the next day, at which he reminded attendees that it was "good to talk". After that, there were similar gatherings at virtually every race until the end of the season. There was more intrigue in Brazil when the midfield teams – the 'have-nots' – met separately from the big three.

The lack of clarity over 2021 made Wall Street a little nervous,

and the downward slide in the share price of FWONK was a story that Liberty could not hide. They owned an asset that would be worthless as of December 31 '20 without a new Concorde deal in place, and at the end of the year Liberty boss Greg Maffei addressed the issue in a phone chat with analysts.

"There's probably some overhang around the stock and the Concorde Agreement and the perception of uncertainty," he said. "That's not positive on what it could trade at. I think we remain very bullish about the direction of the business.

"The market gave us a lot of credit right out of the blocks – we appreciate that. But sometimes the market can also have immediate gratification syndrome. We have gone and laid the foundations of a bunch of things, including hiring, including building our substantial capabilities."

Carey also made it clear that Liberty shouldn't be judged on what we see at the moment. "I realise that the market wants to gravitate to the short-term quarter," he noted. "Not that we ignore it, but I guess we've tried to be as clear as we can what our priorities are. I've said from the get-go, where are we going to be in 2020? Where are we going to be in three to four years? Not three months.

"Realistically it takes time to build. What we came into is sort of an organisation start-up, and a business turnaround. Those things don't happen overnight and, whatever expectations were in there in the short term, our focus has been building for 2021." ❦

Top Formula 1 Autosport.com stories

Accurate as of December 2 2018



Ferrari told to stop obscuring camera

Ferrari created intrigue during the middle of the season when it was observed placing a bag over its rollhoop onboard camera before track sessions – including on the grid. The team claimed it was a cooling bag for the camera electronics, but the explanation didn't wash with the FIA, which ordered the practice to stop.



Vettel defends Lewis's Verstappen remark

On seeing a replay of his collision with Max Verstappen in the Bahrain Grand Prix before the podium ceremony, Lewis Hamilton was heard describing the Red Bull driver as “a dickhead”. Naturally this led to a cross-examination during the press conference, prompting title rival Sebastian Vettel to jump to Hamilton's defence.



Kubica agrees 2019 Williams race deal

Robert Kubica's remarkable return to an F1 race seat – nearly eight years after his life-changing rally accident – became a reality ahead of the Abu Dhabi GP. Autosport broke the story a day in advance of the official announcement that the popular and talented Pole would partner George Russell in 2019.

AUTOSPORT

Verstappen's driving in Bahrain prompted burst of Stevenage vernacular



Vettel sad to learn of Raikkonen's departure

When news broke that Kimi Raikkonen would finally be leaving Ferrari, making way for the highly rated Charles Leclerc, Sebastian Vettel paid tribute. Vettel described Raikkonen as the best team-mate he has ever worked with in Formula 1. “It's sad to know that Kimi is not there any more,” he added.



What's behind Ricciardo's switch?

Daniel Ricciardo rocked the F1 driver market during the summer break by unexpectedly rejecting a Red Bull contract offer and switching to Renault for 2019. Autosport's seasoned Formula 1 reporters got together on camera to dissect the reasons behind the Australian's extraordinary decision.

GORIA/SUTTON
motorsport
IMAGES



Hidden change that transformed Merc

Following an unexpected victory for Lewis Hamilton in the Singapore Grand Prix, a bogey race for Mercedes, Giorgio Piola's exclusive photographs revealed a key change Mercedes had made to its wheel drums. Tying in with a detail change to the wheelrim design and mounting, this provoked much intrigue.



Rivals want 'magic' Haas investigated

As soon as it became clear at the Australian GP that Haas had a quick car for 2018, the team came under fire for its close links to Ferrari. Haas is unique in the way it competes, relying on the technical partnership for key components, but midfield rivals believed the US-owned team's car had too much in common with the SF71H.



Ferrari ready to replace Raikkonen

Word got out as early as June that Ferrari was highly likely to promote Charles Leclerc at Kimi Raikkonen's expense, this being the wish of company president Sergio Marchionne. But Marchionne's downturn in health and sudden death in late summer meant a final decision was ultimately delayed by several months.



Alonso not bluffing about F1 return plan

Not everyone believed Fernando Alonso when he announced that he was stepping back from F1 for good at the end of the 2018 season. Surely such a fierce competitor would be open to coming back in the future... Former team-mate Jenson Button said that Alonso would be back in a flash if he could get a competitive car.



Intrigue surrounds Vettel's extra paddle

Early in the season it was observed that Sebastian Vettel's steering wheel had an extra paddle on the back that did not feature on Kimi Raikkonen's car. Giorgio Piola caught a proper look at the device when Vettel stopped on the grid for his interview after setting pole position in Bahrain. Ferrari remained tight-lipped.

The year in numbers

Compiled by forix.autosport.com

Drivers' standings

POS	DRIVER	AUS	BRN	PRC	AZ	E	MC	CDN	F	A	GB	D	H	B	I	SGP	RUS	J	USA	MEX	BR	UAE	PTS
1	Lewis Hamilton	2nd	3rd	4th	1st	1st	3rd	5th	1st	R	2nd	1st	1st	2nd	1st	1st	1st	1st	3rd	4th	1st	1st	408
2	Sebastian Vettel	1st	1st	8th	4th	4th	2nd	1st	5th	3rd	1st	R	2nd	1st	4th	3rd	3rd	6th	4th	2nd	6th	2nd	320
3	Kimi Raikkonen	3rd	R	3rd	2nd	R	4th	6th	3rd	2nd	3rd	3rd	3rd	R	2nd	5th	4th	5th	1st	3rd	3rd	R	251
4	Max Verstappen	6th	R	5th	R	3rd	9th	3rd	2nd	1st	15th	4th	R	3rd	5th	2nd	5th	3rd	2nd	1st	2nd	3rd	249
5	Valtteri Bottas	8th	2nd	2nd	14th	2nd	5th	2nd	7th	R	4th	2nd	5th	4th	3rd	4th	2nd	2nd	5th	5th	5th	5th	247
6	Daniel Ricciardo	4th	ret	1st	R	5th	1st	4th	4th	R	5th	R	4th	R	R	6th	6th	4th	R	R	4th	4th	170
7	Nico Hulkenberg	7th	6th	6th	R	R	8th	7th	9th	R	6th	5th	12th	R	13th	10th	12th	R	6th	6th	R	R	69
8	Sergio Perez	11th	16th	12th	3rd	9th	12th	14th	R	7th	10th	7th	14th	5th	7th	16th	10th	7th	8th	R	10th	8th	62
9	Kevin Magnussen	R	5th	10th	13th	6th	13th	13th	6th	5th	9th	11th	7th	8th	16th	18th	8th	R	EX	15th	9th	10th	56
10	Carlos Sainz Jr	10th	11th	9th	5th	7th	10th	8th	8th	12th	R	12th	9th	11th	8th	8th	17th	10th	7th	R	12th	6th	53
11	Fernando Alonso	5th	7th	7th	7th	8th	R	R	16th	8th	8th	16th	8th	R	R	7th	14th	14th	R	R	17th	11th	50
12	Esteban Ocon	12th	10th	11th	R	R	6th	9th	R	6th	7th	8th	13th	6th	6th	R	9th	9th	EX	11th	14th	R	49
13	Charles Leclerc	13th	12th	19th	6th	10th	18th	10th	10th	9th	R	15th	R	R	11th	9th	7th	R	R	7th	7th	7th	39
14	Romain Grosjean	R	13th	17th	R	R	15th	12th	11th	4th	R	6th	10th	7th	EX	15th	11th	8th	R	16th	8th	9th	37
15	Pierre Gasly	R	4th	18th	12th	R	7th	11th	R	11th	13th	14th	6th	9th	14th	13th	R	11th	12th	10th	13th	R	29
16	Stoffel Vandoorne	9th	8th	13th	9th	R	14th	16th	12th	15th	11th	13th	R	15th	12th	12th	16th	15th	11th	8th	15th	14th	12
17	Marcus Ericsson	R	9th	16th	11th	13th	11th	15th	13th	10th	R	9th	15th	10th	15th	11th	13th	12th	10th	9th	R	R	9
18	Lance Stroll	14th	14th	14th	8th	11th	17th	R	17th	14th	12th	R	17th	13th	9th	14th	15th	17th	14th	12th	18th	13th	6
19	Brendon Hartley	15th	17th	20th	10th	12th	19th	R	14th	R	R	10th	11th	14th	R	17th	R	13th	9th	14th	11th	12th	4
20	Sergey Sirotkin	R	15th	15th	R	14th	16th	17th	15th	13th	14th	R	16th	12th	10th	19th	18th	16th	13th	13th	16th	15th	1

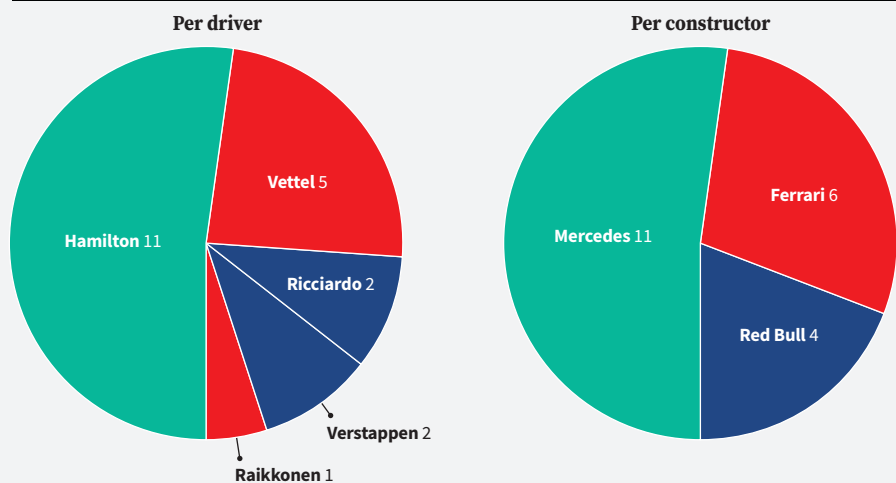
Constructors' standings

POS	CONSTRUCTOR	AUS	BRN	PRC	AZ	E	MC	CDN	F	A	GB	D	H	B	I	SGP	RUS	J	USA	MEX	BR	UAE	PTS
1	Mercedes	22	33	30	25	43	25	28	31	0	30	43	35	30	40	37	43	43	25	22	35	35	655
2	Ferrari	40	25	19	30	12	30	33	25	33	40	15	33	25	30	25	27	18	37	33	23	18	571
3	Red Bull	20	0	35	0	25	27	27	30	25	10	12	12	15	10	26	18	27	18	25	30	27	419
4	Renault	7	8	10	10	6	5	10	6	0	8	10	2	0	4	5	0	1	14	8	0	8	122
5	Haas	0	10	1	0	8	0	0	8	22	2	8	7	10	0	0	4	4	0	0	6	3	93
6	McLaren	12	10	6	8	4	0	0	0	4	4	0	4	0	0	6	0	0	0	4	0	0	62
7	Racing Point Force India	0	(1)	0	(15)	(2)	(8)	(2)	0	(14)	(7)	(10)	0	18	14	0	3	8	4	0	1	4	52*
8	Sauber	0	2	0	8	1	0	1	1	3	0	2	0	1	0	2	6	0	1	8	6	6	48
9	Toro Rosso	0	12	0	1	0	6	0	0	0	0	1	8	2	0	0	0	0	2	1	0	0	33
10	Williams	0	0	0	4	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	7

* Team lost its 59 points scored in rounds 1-12 (shown in brackets) as Force India due to its name change.



Wins

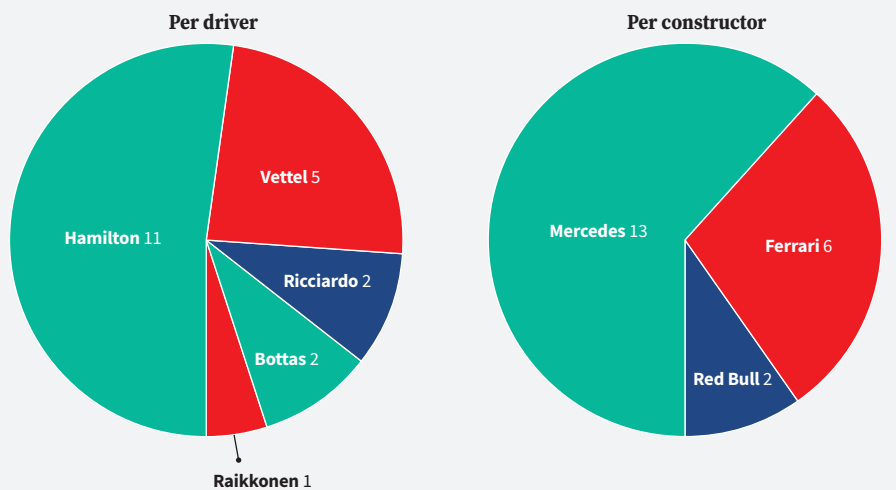


Driver supertimes

Vettel	100.247
Hamilton	100.284
Bottas	100.375
Raikkonen	100.509
Verstappen	101.000
Ricciardo	101.138
Grosjean	102.162
Hulkenberg	102.331
Ocon	102.350
Magnussen	102.367
Sainz	102.369
Perez	102.444
Leclerc	102.630
Gasly	102.915
Alonso	102.923
Ericsson	103.315
Hartley	103.325
Vandoorne	103.468
Sirotkin	103.703
Stroll	103.826

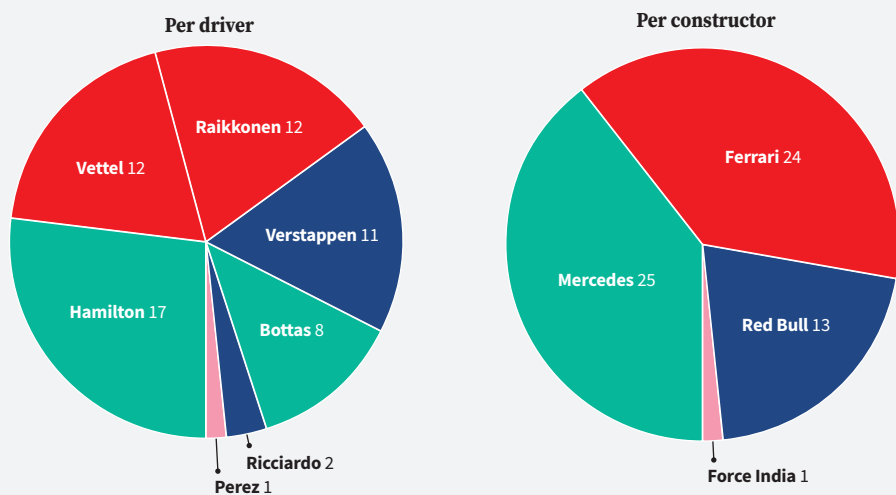
Driver supertimes are based on taking each driver's fastest single lap of each weekend, expressed as a percentage of the overall fastest time, averaged over the 21-race season.

Pole positions



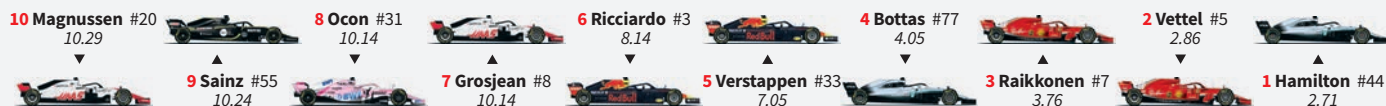
20
Only 20 drivers competed in F1 in 2018, the lowest number in world championship history. There were no driver changes during the year

Podium finishes

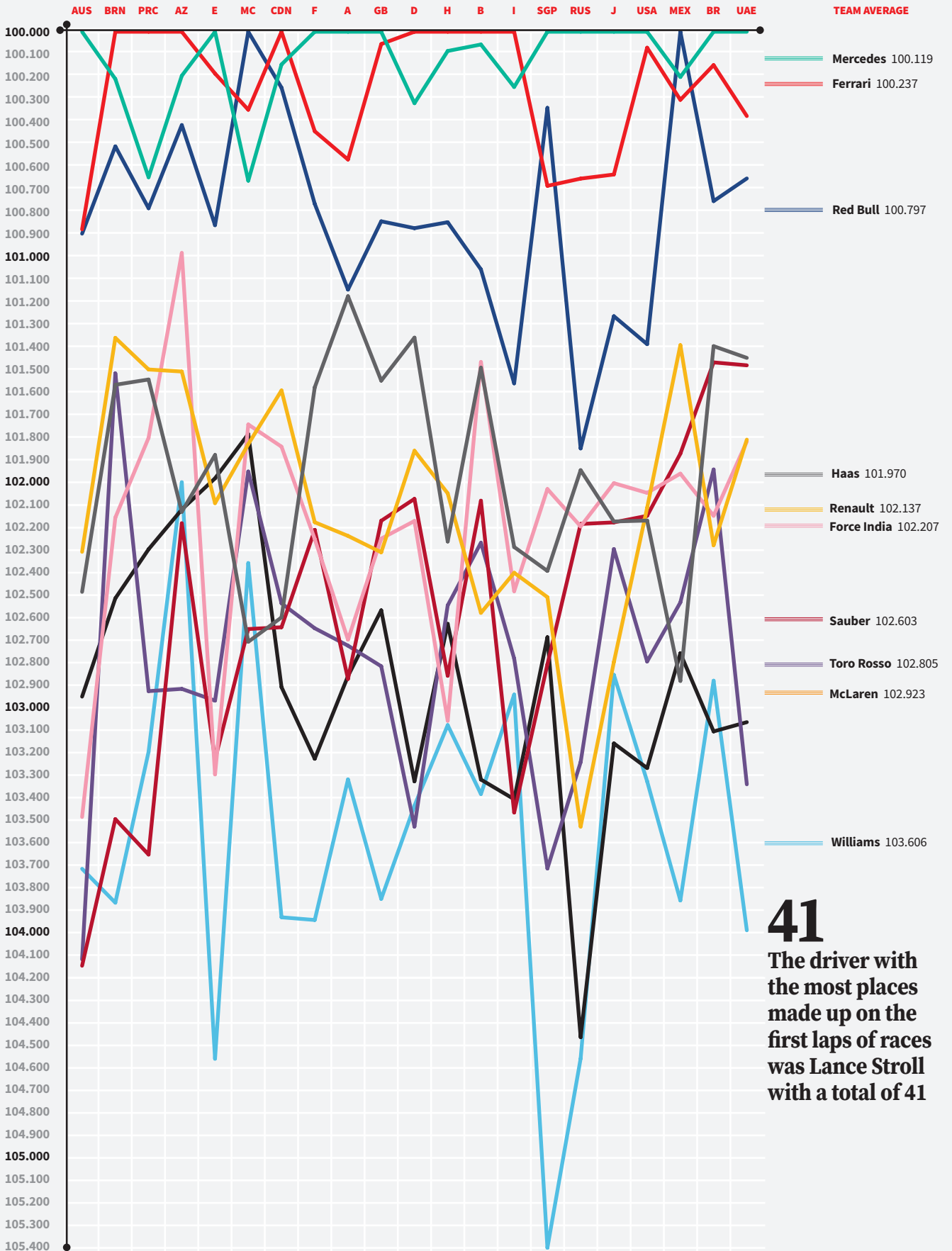


400
Lewis Hamilton is the first driver to score 400 points in an F1 season

AVERAGE GRID POSITION

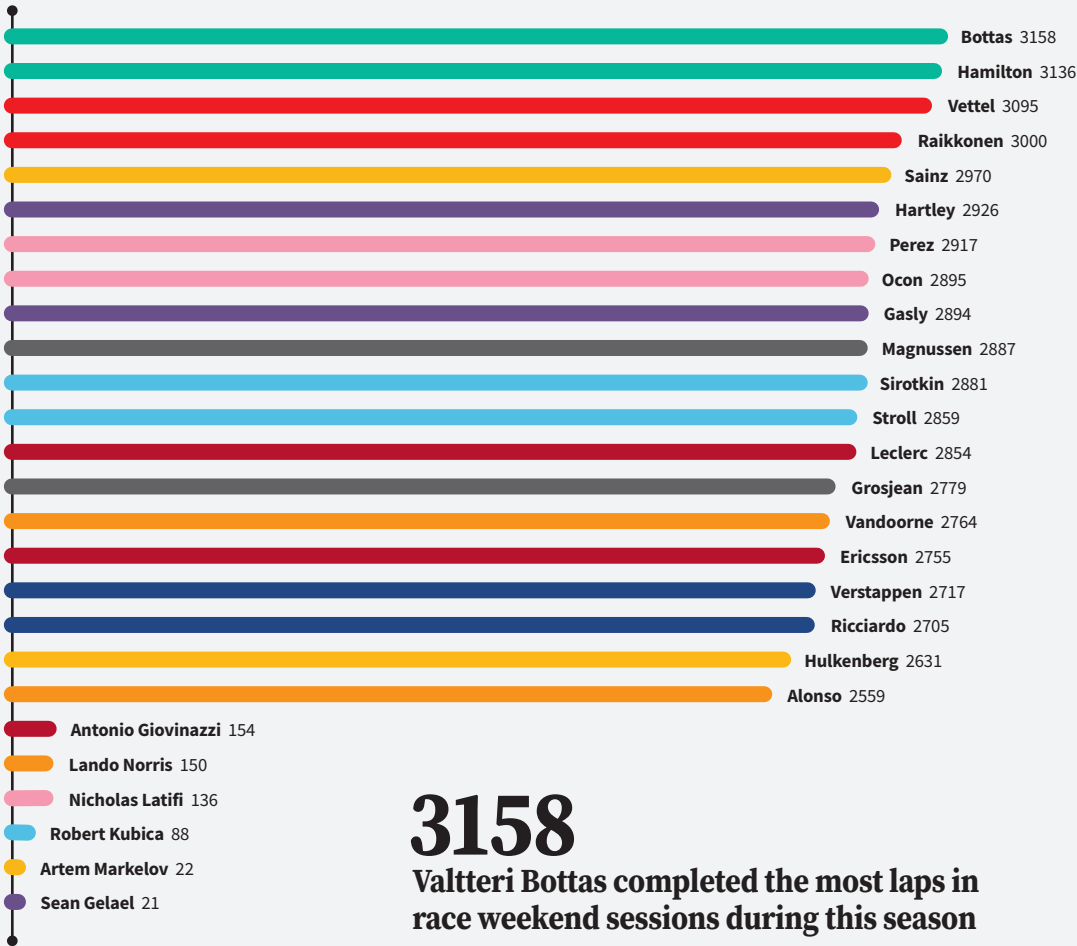


Team supertimes



41
 The driver with the most places made up on the first laps of races was Lance Stroll with a total of 41

Total race-weekend laps completed per driver



3158

Valtteri Bottas completed the most laps in race weekend sessions during this season

Fastest laps

DRIVER	
Bottas	7
Ricciardo	4
Vettel	3
Hamilton	3
Verstappen	2
Raikkonen	1
Magnussen	1

CONSTRUCTOR	
Mercedes	10
Red Bull	6
Ferrari	4
Haas	1

Laps led

DRIVER	
Hamilton	458
Vettel	345
Verstappen	169
Ricciardo	116
Raikkonen	92
Bottas	84

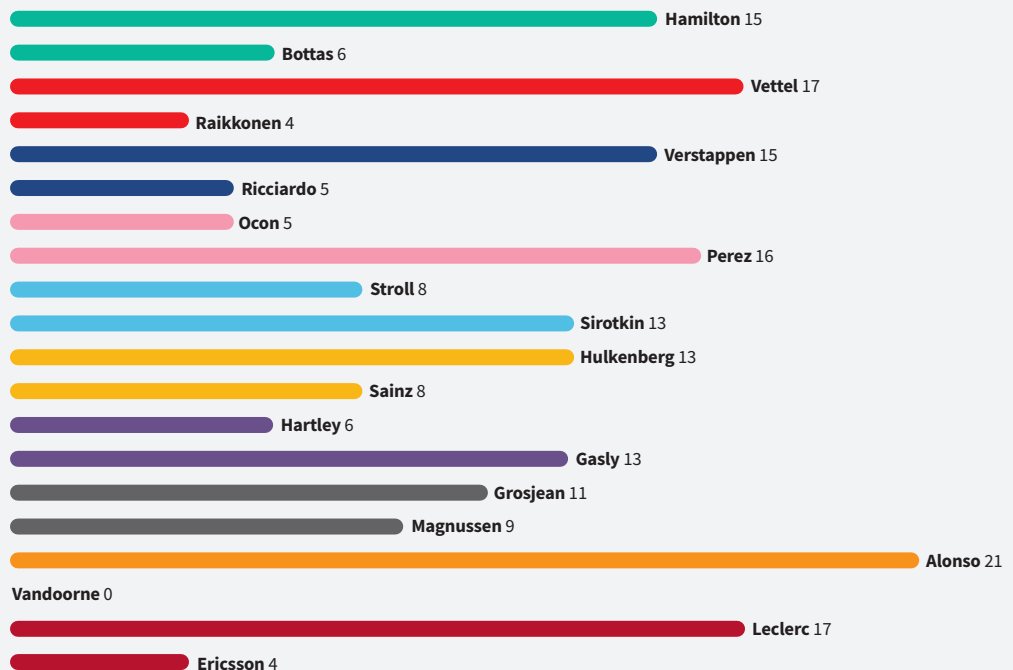
CONSTRUCTOR	
Mercedes	542
Ferrari	437
Red Bull	285

Qualifying segments

DRIVER	Q3	Q2	Q1
Bottas	21	0	0
Vettel	21	0	0
Raikkonen	21	0	0
Hamilton	20	1	0
Verstappen	17	3	1
Ricciardo	16	5	0
Grosjean	16	1	4
Sainz	13	5	3
Ocon	12	7	2
Hulkenberg	11	8	2
Perez	10	8	3
Magnussen	10	8	3
Leclerc	8	8	5
Gasly	6	9	6
Ericsson	3	7	11
Alonso	2	13	6
Hartley	2	6	13
Stroll	1	5	15
Vandoorne	0	6	15
Sirotkin	0	5	16

Qualifying head-to-head

*Anomalous occurrences, such as when mechanical problems intervened, are disregarded.



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BAHRAIN GT FESTIVAL
BAHRAIN
FIA GT NATIONS CUP
 Ayhancan Guven/Salih Yoluc
 Team Turkey Ram Racing Mercedes-AMG GT3

GT4 INTERNATIONAL CUP
 Pierre Sancinena/Pierre-Alexandre Jean
 CMR Alpine A110 GT4

BAHRAIN CLASSIC CHALLENGE
 Oliver Bryant/Grahame Bryant
 Shelby Cobra

For full results visit:
motorsportstats.com



Turks claim inaugural GT Nations Cup

BAHRAIN GT FESTIVAL
BAHRAIN (BRN)
NOVEMBER 30-DECEMBER 1

Ayhancan Guven and Salih Yoluc led Turkey to victory in the first-ever FIA GT Nations Cup at the Bahrain International Circuit.

The Mercedes-AMG GT3 pair started the race from pole after a win and a second in the two qualifying races. But this was not to be a straightforward triumph since they had to fight off Team UK and Team Russia.

Yoluc maintained his lead at the start as a string of first-lap incidents required a safety car. One of the high-profile casualties of the melee was Mike den Tandt in the WRT-run Team Belgium Audi R8 LMS, which he had shared to victory with Charles Weerts in the first qualifying race. He crashed out after contact with the Russian and Mexican entries, with Australia,

Belarus, Germany and Sweden out too.

Yoluc then lost his lead to the Ferrari 488 GT3 of Team UK's Chris Froggatt, and Rinat Salikhov in the Russian Ferrari also surged past. The pitstops initially failed to change the order as Chris Buncombe – now in the UK Ferrari – held on to the lead, but once Guven took over from Yoluc he started to reel in the leaders.

Guven, the French Porsche Carrera Cup champion, eventually passed Buncombe for the lead with 12 minutes remaining, and went on to win by 3.311 seconds. Danish pair Nicklas Nielsen and Johnny Laursen completed the podium in their Ferrari after starting 15th, while Salikhov/Denis Bulatov were fourth from China's Ye Hong Li and Li Chao (Porsche) and Italian Ferrari pair Matteo Cressoni and Piergiuseppe Perazzini.

In the GT4 International Cup, CMR pair Pierre Sancinena and Pierre-Alexandre

Jean drove a thrilling race from the back of the grid to win the feature race in their Alpine A110 GT4. The team struggled in qualifying, which consigned the Alpine to 18th at the start. But Sancinena – a former French F4 rival of Pierre Gasly – and Jean staged an epic comeback to win by 5.677s over the pole-sitting Phoenix Racing Audi R8 LMS GT4 of Nicolaj Moller-Madsen and Milan Dontje.

Dontje led the opening stint, but the A110's advantage was telling as Jean clawed back place after place. Sadly the battle for the lead was resolved in the pitstops as the Alpine emerged ahead with Sancinena at the wheel. The 3Y Technology BMW M4 GT4 of Enzo Guibbert and Gilles Vannelet was third.

Potent historic-racing father-and-son duo Oliver and Grahame Bryant completed a perfect weekend in the Bahrain Classic Challenge, driving their 1964 Shelby Cobra to the top of the timesheets in practice, as well as to pole position and both race wins.

They were dominant in race two and won by 55.128s, adding to their 42.023s cushion in the qualifying race win. In both encounters they won over Guillermo Fierro in his 1960 Maserati T61 'Birdcage'.

Shelby Cobra Daytona duo Edwin Stucky and Ludovic Cholley came home third ahead of Peter Muelder and Christian Traber in a 1965 Bizzarrini 5300 GT and Malte Muller-Wrede's Marcos 1800 GT.

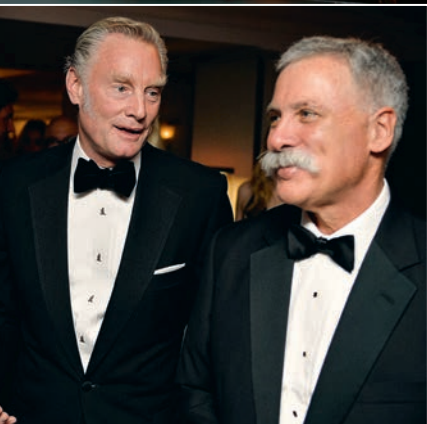
KHODR ROWI



CMR bagged GT4 honours with its Alpine A110



Oliver and Grahame Bryant (leading) blitzed Classic



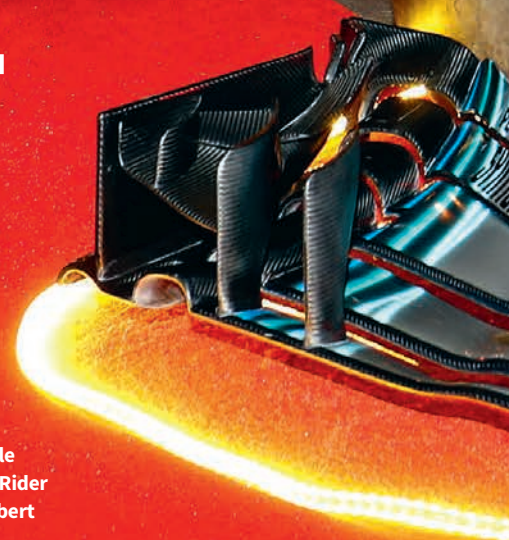
AUTOSPORT AWARDS 2018

The 20th anniversary of Mika Hakkinen storming to the first of two Formula 1 world titles was honoured at the 37th Autosport Awards at Grosvenor House on Park Lane last Sunday. He received the Gregor Grant Award for lifetime achievement, as did six-time Le Mans winner Jacky Ickx in recognition of a career spanning five decades.

But as motorsport legends and legacies were honoured, the evening climaxed with a celebration of Britain's next generation of superstars. Tom Gamble was showered in confetti when he was revealed as the 30th recipient of the prestigious McLaren Autosport BRDC Award, which has launched the careers of Jenson Button, David Coulthard, Dario Franchitti, Paul di Resta, Lando Norris and George Russell.

Autosport readers voted Lewis Hamilton as both their International and British Competition Driver of the Year, while Sebastien Ogier collected his sixth Award to match his six World Rally championships. MotoGP's unstoppable force Marc Marquez continued his clean sweep of Rider honours and injured IndyCar rookie sensation Robert Wickens made an appearance on the big screen.

The ceremony, presented by Sky Sports F1 commentator David Croft and Formula E pitlane reporter Nicki Shields, was watched by the racing world's top brass, including Jean Todt, Chase Carey, Sean Bratches and Alejandro Agag. They had front-row seats as Mercedes F1 boss Toto Wolff took to the stage in tartan, and overtakes on Ricardo Zonta were re-enacted by Hakkinen and Martin Brundle...





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INTERNATIONAL RACING DRIVER
OF THE YEAR

LEWIS HAMILTON

There are few records Lewis Hamilton doesn't own in Formula 1, and the argument for him being considered the greatest driver of his generation is now almost completely one-sided.

In 2018 he joined an exclusive club alongside Michael Schumacher and Juan Manuel Fangio, becoming a five-time world champion. That has helped elevate him another level beyond his peers. It was therefore little in the way of a surprise when Autosport readers voted him International Driver of the Year for the sixth time.

Hamilton won 11 of 21 races, equalling his personal-best season haul during a campaign in which Mercedes faced its sternest

challenge since the start of F1's V6-turbo-hybrid era in 2014.

"I want to say a big thank you to Autosport and the fans who voted for me," said Hamilton in a video message as his brother Nicolas accepted the award on his behalf. "Thank you so much for your support throughout the year. Hopefully it has been an amazing year for you as it has been for me."

Hamilton beat fellow F1 drivers Sebastian Vettel, Max Verstappen and Fernando Alonso, plus respective IndyCar and Formula E champions Scott Dixon and Jean-Eric Vergne to the award.

Presented by



"Thank you so much for your support throughout the year"

LEWIS HAMILTON



ROLL OF HONOUR

- | | | |
|--------------------|-------------------------|-----------------------|
| 1982 Keke Rosberg | 1995 Michael Schumacher | 2007 Lewis Hamilton |
| 1983 Nelson Piquet | 1996 Damon Hill | 2008 Lewis Hamilton |
| 1984 Niki Lauda | 1997 Jacques Villeneuve | 2009 Jenson Button |
| 1985 Alain Prost | 1998 Mika Hakkinen | 2010 Sebastian Vettel |
| 1986 Nigel Mansell | 1999 Mika Hakkinen | 2011 Sebastian Vettel |
| 1987 Nigel Mansell | 2000 Michael Schumacher | 2012 Sebastian Vettel |
| 1988 Ayrton Senna | 2001 Michael Schumacher | 2013 Sebastian Vettel |
| 1989 Jean Alesi | 2002 Michael Schumacher | 2014 Lewis Hamilton |
| 1990 Ayrton Senna | 2003 Juan Pablo Montoya | 2015 Lewis Hamilton |
| 1991 Ayrton Senna | 2004 Jenson Button | 2016 Nico Rosberg |
| 1992 Nigel Mansell | 2005 Kimi Raikkonen | 2017 Lewis Hamilton |
| 1993 Nigel Mansell | 2006 Fernando Alonso | 2018 Lewis Hamilton |
| 1994 Damon Hill | | |

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"I know it's an incredible event and it gets better every year"

BRITISH COMPETITION DRIVER OF THE YEAR

LEWIS HAMILTON

Much like the Formula 1 season, Lewis Hamilton swept all before him at the Autosport Awards. And much like Mercedes' world championship success, the trophies came in pairs. Hamilton's international triumph was complemented by a sixth British Competition Driver Award. The five-time world champion beat his ex-McLaren F1 team-mate and 2018 Super GT champion Jenson Button, Formula 2 title winner George Russell, DTM title combatants Gary Paffett and Paul di Resta, and Formula E championship

contender Sam Bird to the prize.

"Autosport has been something that I've followed for so many years," said Hamilton. "I remember my first time there in 1995 and getting to meet so many great people, and I know it's an incredible event and it gets better every year.

"To all the other nominees and contestants, and winners, congratulations. I want to wish everyone an amazing Christmas with the family, hope you stay focused for 2019. I wish you all the best."

GREGOR GRANT AWARD

JACKY ICKX

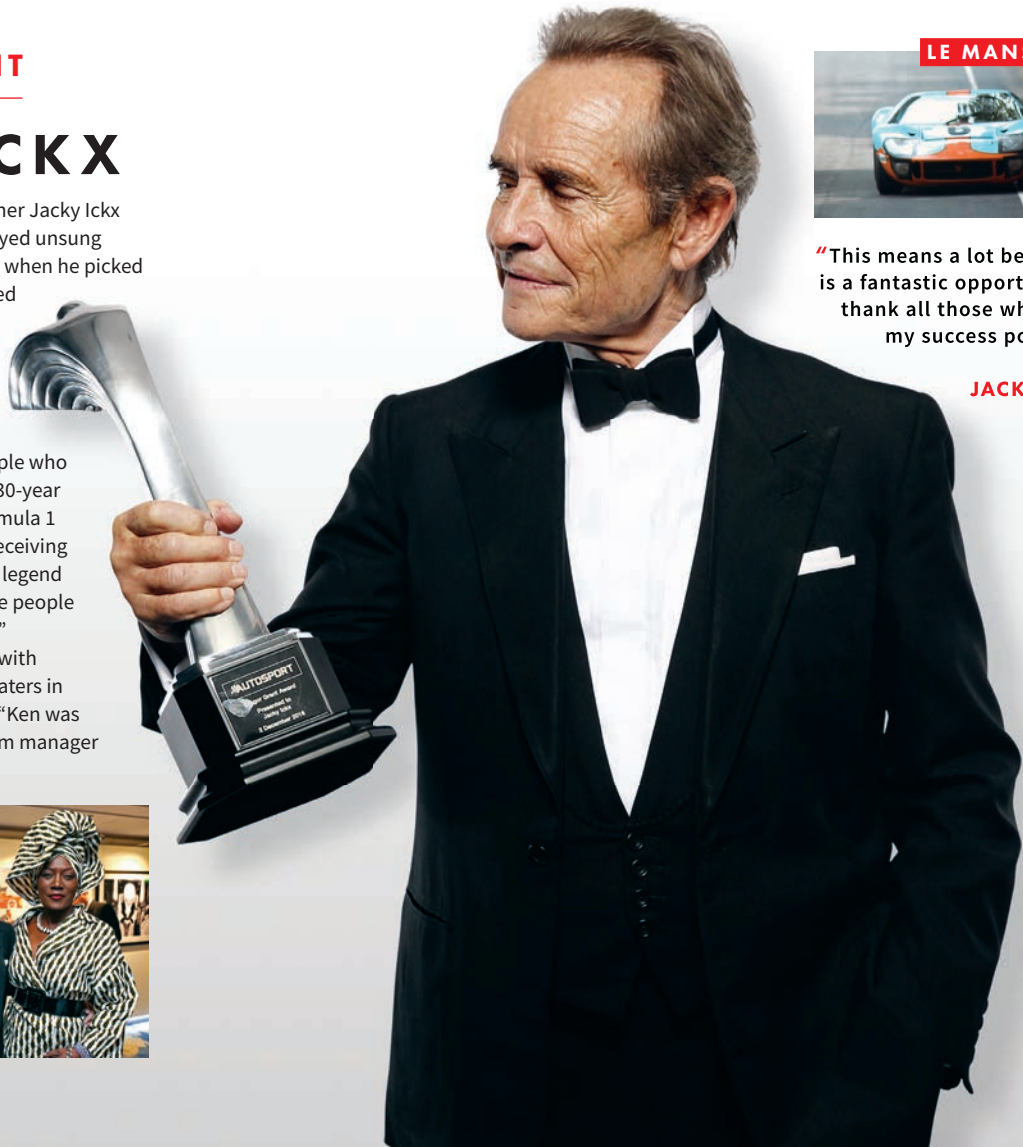
Six-time Le Mans 24 Hours winner Jacky Ickx paid tribute to those who'd played unsung roles in his phenomenal career when he picked up a Gregor Grant Award, named after Autosport's founder, for lifetime achievement.

"This means a lot because it is a fantastic opportunity to thank all those who made my success possible, all those people who didn't get the glory during my 30-year career from bikes, through Formula 1 and sportscars," he said after receiving the award from fellow Le Mans legend Tom Kristensen. "They were the people who made the world go round."

Ickx singled out Ken Tyrrell, with whom he moved into single-seaters in 1966, and Tyrrell's wife Norah. "Ken was the best example of what a team manager has to be," he said.



Ickx with his wife, singer Khadja Nin



LE MANS 1969



"This means a lot because it is a fantastic opportunity to thank all those who made my success possible"

JACKY ICKX

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GREGOR GRANT
AWARD

MIKA HAKKINEN

"If we really want to re-enact this, you'll need some clean underwear," joked Mika Hakkinen to David Croft as he placed the F1 commentator and Martin Brundle to replicate his 2000 pass on Michael Schumacher and Ricardo Zonta at Spa.

Marking 20 years since his first Formula 1 title, the Gregor Grant Award recipient amused the audience with anecdotes about his pet tortoise, and how his favourite

memories of dueling with fierce adversary Schumacher were when "I saw him in my mirrors".

But he was not there to make light of being recognised.

"This just doesn't happen every day or every year," Hakkinen said. "I'm standing in front of the motor racing world and it's giving me this award. That means a lot to me. I'm just a racing driver; I'm just a guy from Finland."



"This just doesn't happen every day or every year"

MIKA HAKKINEN

GREGOR GRANT
AWARD

STEPHANE RATEL

Stephane Ratel's significant contribution to GT racing was also honoured with a Gregor Grant Award. The Frenchman joked that he had expected to be a lot older before receiving such an accolade.

Through his eponymous Stephane Ratel Organisation, the 55-year old has been a prolific race organiser for the past 25 years.

He is also responsible for the ultra-successful GT3 formula

that has spread worldwide since its inception in 2006.

After being presented with the Award by McLaren Formula 1 boss Zak Brown, who has competed in the Ratel-organised British GT and Blancpain GT Endurance series with his United Autosports team, Ratel acknowledged how the image of GT racing has "completely changed". It is now seen as a viable career path for young drivers.

"When you have your head down working hard to make it happen you don't realise, then one day you look in the mirror and say, 'Wow, I've made it'"

STEPHANE RATEL



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JOHN BOLSTER
— AWARD —

TOTO WOLFF

Toto Wolff's achievement in leading the Mercedes F1 team to five consecutive world championship doubles earned him a John Bolster Award.

Appropriately, this was presented by FIA president Jean Todt. The Frenchman led the only other team ever to have achieved this milestone: Ferrari, during Michael Schumacher's pomp in 2000-04.



"It means a lot to receive the award from you – you have been an inspiration from your time at Ferrari," Wolff told Todt. "Actually, you were the first one to call me after we won the fifth championship and I will never forget the sentence you said to me, 'It's an honour to be in the five-time double world championship club with you!'"

Wolff then revealed that Todt called him again three days later, having remembered that Ferrari actually won six consecutive titles, having also taken the constructors' crown from under McLaren's nose in 1999...

"It means a lot to receive the award"

TOTO WOLFF

RACING CAR
— OF THE YEAR —

MERCEDES F1 W09

The margin Mercedes enjoyed over the opposition wasn't as great as in previous seasons, but the car of the year still amassed 655 points and 11 wins. In the hands of Lewis Hamilton, the W09 gave Mercedes its fifth successive drivers' and constructors' titles.

While Ferrari had the edge at various stages over the year, the sheer relentlessness of the engineers at Mercedes-Benz High Performance Powertrains in Brixworth and the team's HQ in Brackley kept the W09 competitive.

"As the season progressed we got stronger and stronger," said Phil Prew (below, right), chief engineer at HPP. "Towards the end of the year we did enough to win the championship, but with this car we were always learning."

"As the season progressed we got stronger and stronger"

PHIL PREW

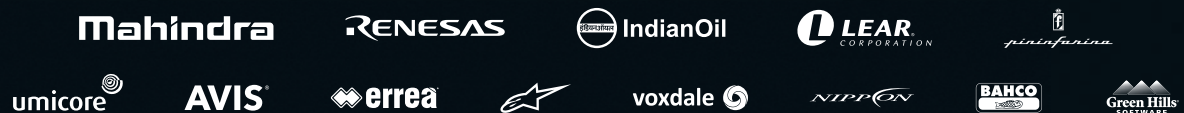
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RICHARD MILLE ROOKIE
OF THE YEAR

CHARLES LECLERC

Charles Leclerc claimed the Rookie of the Year award for the second year in succession.

The Monegasque driver created a stir in his first season in Formula 1 with the Sauber team, after dominating Formula 2 in 2017. Following a "very difficult" first three races he was sixth in Azerbaijan and then scored nine further points finishes to end the year 13th in the drivers' championship.

"The second time in a row is something pretty special," the 2019 Ferrari driver said

Presented by
RICHARD MILLE



NATIONAL DRIVER
OF THE YEAR

DAN TICKTUM

A flight to Japan for this week's Super Formula test meant Macau Grand Prix winner and Formula 3 European Championship runner-up Dan Ticktum couldn't accept his National Driver award. How appropriate, then, that Derek Warwick – an uncle figure to Britain's best young drivers and whose late brother Paul's name is commemorated on the trophy – accepted it for him.

"Dan deserves to be in F1,"

of the Rookie award, which was presented by 2017-18 Formula E champion Jean-Eric Vergne.

"It has been two great years, last year in F2 and especially this year as a rookie in F1. I'm extremely proud and grateful to have been part of this journey this year."



2017 AWARDS

"It has been two great years, last year in F2, and especially this year as a rookie in F1"

CHARLES LECLERC



PIONEERING & INNOVATION AWARD

JEAN TODT

FIA president Jean Todt accepted the Pioneering and Innovation Award on behalf of the governing body for its work in implementing the halo cockpit-protection system.

Having committed to improving cockpit safety, the FIA identified the halo as the most effective solution from a number of different concepts. It then rigorously developed and tested the design, both on track and in crash simulations, ahead of its introduction in the 2018 season.

Sauber Formula 1 driver Charles Leclerc,

who escaped injury in a frightening first-lap accident with Fernando Alonso's McLaren in Belgium this year, presented the award to Todt.

"I saw the images [of the collision] and it was quite shocking," said Leclerc. "I don't know what would have happened without the halo. It has been extremely useful."

"I have had a lot of resistance, but if you believe it goes in the right direction you must fight for it," said Todt. "We saw the loss of Henry Surtees because of one wheel hitting his head. It is worth fighting the resistance to save a life."

Presented by
Mahindra RACING

"It is worth fighting the resistance to save a life"

JEAN TODT



AUTOSPORT WILLIAMS ENGINEER OF THE FUTURE AWARD

OWEN HEANEY

Imperial College London student Owen Heaney won the fourth Autosport Williams Engineer of the Future Award, earning a two-year placement with the Formula 1 team.

Heaney beat four other finalists to the prize after intensive evaluations at Williams F1 in October. The award was presented by Williams chief technical officer – and chairman of the judging panel – Paddy Lowe.

"They got across all engineering, all the different areas," said Lowe of the structure of the placement. "This award is about finding a leader of the future. They are not put straight into a specialist area – it's all about getting breadth of experience in the first two years."

"Williams has such a great history"

OWEN HEANEY

Presented by



ROLL OF HONOUR

- 2015 Elizabeth Thompson
- 2016 Sam O'Neill
- 2017 Martins Zalmans
- 2018 Owen Heaney



INTERNATIONAL RALLY DRIVER

OF THE YEAR

SEBASTIEN OGIER

Mirroring his six World Rally Championship titles, the readers of Autosport voted Sebastien Ogier as their Rally Driver of the Year for the sixth season in succession.

But these crowns aren't getting any easier to come by. M-Sport crew Ogier and co-driver Julien Ingrassia were pushed all the way by Hyundai's Thierry Neuville and Toyota Yaris WRC driver Ott Tanak for the 2018 crown.

Handed the trophy by fellow World Rally champion, former co-driver and now Motorsport UK chairman David Richards,

Ogier said the novelty of winning at the Autosport Awards hadn't worn thin.

"It never gets boring to come here, especially to come and pick up this award," he said. "It's been an incredible season and I've had a fantastic two years with M-Sport. I will move to a new team for next year [Citroen], but this time with Malcolm [Wilson] and his team, it will stay with me in my heart forever – he's the best boss I ever had. I will never forget what we achieved together."



"I will never forget what we achieved together"

SEBASTIEN OGIER



RALLY CAR

OF THE YEAR

FORD FIESTA WRC

M-Sport and the Ford Fiesta WRC provided the hardware for Sebastien Ogier's sixth drivers' title, but the Cumbrian firm missed out on back-to-back manufacturers' crowns in a tightly contested season. The Ford Fiesta WRC was, however, right at the very sharp end of the field throughout 2018.

Collecting the award for the second year in succession, M-Sport team principal Malcolm Wilson said: "It's been an incredible year for us, so exciting all the way through, and Seb and Julien [Ingrassia] came good at the end. What they did to win in Wales [Rally GB] and the result in Spain was so special. It's been a privilege to have them in our car."



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RIDER Presented by **TATA COMMUNICATIONS**
OF THE YEAR

MARC MARQUEZ

Three years in, there is still only one winner of the Rider of the Year Award presented by Tata Communications: Marc Marquez.

The newest of the Autosport Awards accolades, added to the roster in 2016, has been won every year by now five-time MotoGP world champion Marquez. He swept to glory once again this time in our reader poll, despite a strong roster of opposition including his record-shattering World Superbike counterpart Jonathan Rea.

A clash with motorcycle racing governing body the FIM's annual prizegiving in Andorra meant Marquez was only present in spirit, receiving his trophy in a video transmitted from the FIM Gala.

"I'm very, very happy to receive this special award," said Marquez. "And of course I'm very, very sorry I cannot be here with all of you because we are in Andorra for the FIM Gala."

"I'm happy, it's time to enjoy it. See you in 2019. Full gas."



MOTORSPORT HEROES FILM

Mika Hakkinen, Felipe Massa, Tom Kristensen and Michele Mouton.

No, this is not some racing hipster's ultimate pub-quiz team. These are four influential, top-level talents brought together to dig into the humanity of one of Formula 1's legends: Michael Schumacher.

Motorsport Heroes is a major film project that will combine narratives of top-class drivers – announced at this year's Autosport Awards as two-time F1 champion Hakkinen, 2008 runner-up

Massa, nine-time Le Mans 24 Hours winner Kristensen and World Rally Championship rally winner Mouton – with archive footage. *Senna* film director and BAFTA winner Manish Pandey is driving the project.

An exclusive first look at Sunday's Awards showed Hakkinen, Massa, Kristensen and Mouton embarking on an overnight trip. This, Pandey explained, was a bonding exercise designed so they would feel comfortable enough with each

other to reveal real, human stories of seven-time champion Schumacher as a driver and as a person.

Schumacher has not been seen in public since suffering a serious head injury in a skiing accident in late 2013. The *Motorsport Heroes* feature will partner the Institut du Cerveau et de la Moelle Epiniere (ICM), one of the world's leading brain and spine-research institutes, which has enjoyed an enduring relationship with F1. Schumacher helped found it in 2006.





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"Now I've done it, there's only one person I can think of to nominate next"

CHRISTIAN HORNER



INDUSTRY LEADERS CHALLENGE

Red Bull team principal Christian Horner passed the Industry Leaders Challenge baton to Toto Wolff, his counterpart at Mercedes, during the Autosport Awards.

Horner acted as the guinea pig for the inaugural Industry Leaders Challenge, undertaking a high-profile stunt to raise funds for the **Grand Prix Trust**, a charity that supports Formula 1 personnel who have fallen upon hard times. His task was to learn to drive a car on two wheels.

Guests at the Autosport Awards were entertained by a video of Horner



attempting the feat under the tutelage of renowned stunt driver Terry Grant.

"I taught Sir Chris Hoy to do it," said Grant. "But it took him 10 days – we only had a couple of hours..."

Red Bull's ties with Aston Martin meant that Horner had to achieve two-wheeled equilibrium not in any old car, but in a Vantage. After several spine-crunching touchdowns, Horner successfully coaxed the growling 1600kg beast onto its rims.

"Now I've done it, there's only one person I can think of to nominate

next," said Horner. "It's got to be Toto Wolff. I don't know what we'll get him to do – maybe swimming with sharks, or something."

"I think Christian is a decent enough team operator, but not a very good driver," joked Wolff as he accepted the Industry Leaders Challenge.

"I think the whole concept of this was to injure me somehow, so they were thinking of sending me down the slope of the Kitzbuhehl downhill [ski] race. Unfortunately I tore a ligament last week so I can't do that, but we'll think of something and find another challenge."

FOR DONATIONS TO THE INDUSTRY LEADERS CHALLENGE

Please visit: www.justgiving.com/campaigns/charity/grandprixtrust/industry-leader-challenge-2017-christian-horner



THANK YOU

McLaren, Autosport and the BRDC gratefully acknowledge the support of the following: Arai, Base Performance Simulators, CRS GT, Grand Prix Racewear, Ligier, McLaren, MotorSport Vision, Pirelli, Silverstone Circuit and TSL.

The McLaren Autosport BRDC Award judging panel: Andrew Kirkaldy, Amelia Lewis, Scott Mitchell, Jason Plato, Alexander Sims, Ian Titchmarsh, Kevin Turner, Mark Williams. **Chairman of the judges:** Derek Warwick



McLAREN AUTOSPORT BRDC AWARD

WINNER 2018

TOM GAMBLE

There's no trace of bravado about Tom Gamble. His quiet demeanour, plus the fact that he has just one season of single-seater racing under his belt, means it's easy to underestimate the 17-year-old.

The purposeful way he inserted himself into MotorSport Vision Formula 2, McLaren 650S GT3 and

"It's been my dream to win this. I'm lost for words"

TOM GAMBLE

Ligier JSP3 LMP3 machinery across a two-day shootout at Silverstone, and the astonishing pace he demonstrated in each car, spoke volumes though. So much so that last Sunday he became the 30th recipient of the McLaren Autosport BRDC Award.

Gamble made the significant step up from winning the Ginetta Junior title in 2017 to competing in BRDC British Formula 3 this year. He headed the Fortec team's assault, racking up

two race wins to end the season fifth in the points standings. He was also the highest-ranked Briton, helping to earn his place among the Award finalists.

But it was his blistering speed, particularly in the LMP3 car – which is new to the judging process this year – that made him a clear winner. The prize includes the chance to test a McLaren F1 car, full British Racing Drivers' Club membership, and an Arai crash helmet.

"I can't believe it," said a shocked Gamble. "It's been a dream since I was a kid to win this. I'm lost for words."

"I wanted to get nominated for the final four of the McLaren Autosport BRDC Award. But to be stood here now, talking as the winner, is fantastic!"

Head judge Derek Warwick added: "Tom did a brilliant job on the first day. He was extraordinary in the LMP3 car, he was brilliant in the McLaren and he was there or thereabouts with everybody in the F2."

"He was 100% at number one by the end of the second day."



ROLL OF HONOUR

1989 David Coulthard	2000 Anthony Davidson	2010 Lewis Williamson
1990 Gareth Rees	2001 Steven Kane	2011 Oliver Rowland
1991 Oliver Gavin	2002 Jamie Green	2012 Jake Dennis
1992 Dario Franchitti	2003 Alex Lloyd	2013 Matt Parry
1993 Ralph Firman Jr	2004 Paul di Resta	2014 George Russell
1994 Jamie Davies	2005 Oliver Jarvis	2015 Will Palmer
1995 Jonny Kane	2006 Oliver Turvey	2016 Lando Norris
1996 Darren Turner	2007 Stefan Wilson	2017 Dan Ticktum
1997 Andrew Kirkaldy	2008 Alexander Sims	2018 Tom Gamble
1998 Jenson Button	2009 Dean Smith	
1999 Gary Paffett		

THE AWARD

Every year the McLaren Autosport BRDC Award aims to find the best of young British driving talent.

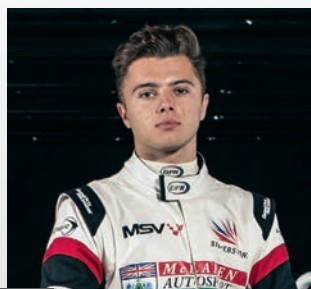
The winner of the 30th edition of the Award has joined a long list of illustrious names, including 2009 Formula 1 world champion Jenson Button, 13-time grand prix victor David Coulthard, triple Indy 500 winner Dario Franchitti and '14 World Endurance champion Anthony Davidson. Next year, '14 Award winner George Russell and '16 victor Lando Norris will join the F1 grid with Williams and McLaren.

Tom Gamble, the 2018 winner, will receive a McLaren F1 test and full membership of the BRDC.

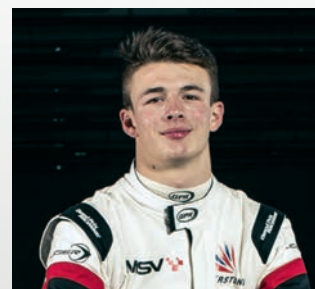


THE VANQUISHED FINALISTS

JAMIE CAROLINE Age 19
After winning the 2017 British Formula 4 title, Caroline struggled to put together a full budget this season. But he starred in occasional appearances in BRDC F3, taking two victories and two second places driving with Carlin.



MAX FEWTRILL Age 19
Having been top rookie in the 2017 Formula Renault Eurocup, Fewtrell switched to R-ace GP. The Renault junior took six wins on his way to the crown and was chosen as an Award finalist for the second year in a row.



KIERN JEWISS Age 16
Another star rookie, Jewiss stepped into British F4 from Ginetta Junior. With Double R, he was a contender from the start and ultimately won six times on his way to the crown, beating more-experienced drivers.



THANK YOU

Louise Beckett, British Racing Drivers' Club, Giles Burris, David Croft, Grosvenor House Hotel, Highland Spring, McLaren Group Ltd, Julia Piquet, SEAT UK, Nicki Shields, Silverstone Circuit, Andy Spellman, Velocity Experience

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Chairman of the judges Derek Warwick

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Patrick Head, Nicola Salter, Edd Straw
Chairman of the judges Paddy Lowe

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AUTOSPORT WOULD LIKE TO THANK Velocity Experience for the production of the 2018 Autosport Awards.

We would also like to thank Duck and Weave for filming the McLaren Autosport BRDC Award test, Motorsport Images for content imagery, Motorsport Studio for video content





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Catch up on all the highlights from last weekend's Autosport Awards at Motorsport.tv. Swoop down the red carpet at the Grosvenor House Hotel as we bring the curtain down on another epic racing season in the company of the star drivers, riders, engineers and cars that made it so spectacular. Settle in for an hour and spot the Formula 1 champions, multiple Le Mans winners and rallying greats among the audience. Go to <http://bit.ly/18SAwards>



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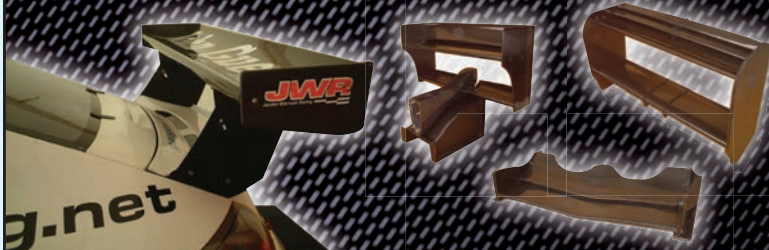
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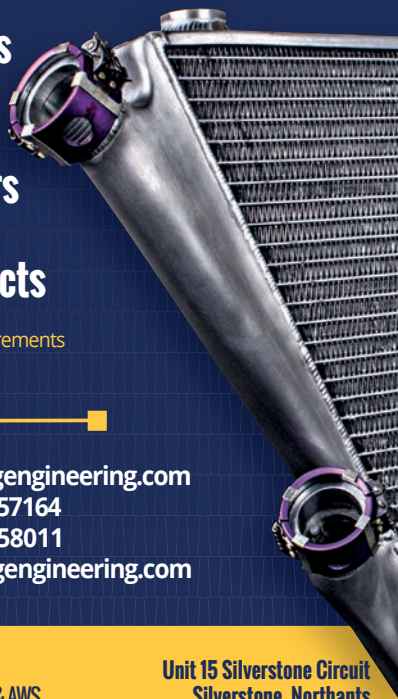
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Here at Red Bull Racing we have a wide range of employee benefits. From clothing and unlimited free drinks to a championship bonus and an on-site gym.

So you've heard a little of what we can offer you – here's what we would like from you.

The following competencies are a prerequisite for this role:

- Ideally you will be Degree qualified in an Electronics discipline, combined with the relevant experience of Motorsport Electronics.
- A high level understanding of Electrical and Electronic systems used within the Motorsport, Aerospace or Automotive industries.
- You will be experienced in producing robust design solutions for small batch, prototype, Analogue and Digital circuits and have experience of working as part of a small multi-skilled engineering group.
- You will be competent in producing Technical documentation and specifications.
- You will have a good knowledge of sensor technologies.
- You will be process driven with a tremendous level of self-motivation and initiative, and are an excellent verbal and written communicator.
- Experience in the use of PCB design tools and Computer Aided Design Harness packages (ideally Unigraphics NX8.5 or above) would be advantageous.

The role involves working on a wide variety of projects within our Electronics Design function and alongside our team of Engineers. You will be responsible for the specification, design, test and calibration of our Electrical and Electronic components and their associated equipment, allowing us to meet the requirements of our Engineering function. You will work on our on and off car systems, test rigs and equipment as well as producing the required documentation and procedures to suit. You will be required to carry out fault investigation and resolution of allocated issues. You will be working with various disciplines across RBR and RBT.

If you'd like to explore our benefits further and discuss the challenge this role presents, then get in touch, send us your CV and get ready to start winning with us.

To apply for this vacancy, please visit the Careers page of the Red Bull Racing website www.redbullracing.com.

Closing date for applications is 16th December 2018.



ELECTRONICS SUPPORT ENGINEER R0000725

The Role

We are currently looking for an Electronic Support Engineer to join our Electronics Support Group.

As part of our Travelling Team, you will be responsible for all aspects of Electrical and Electronic support of our on and off car installations at a variety of events including Race, Test and PR events.

- You will be accountable for the system and controls set up, failed component reporting and fault diagnosis and resolution.
- You will ensure that the assigned chassis is electrically set up and configured fully, and that it is correctly built and tested to fulfil the requirements set out within the event build specification.
- You will monitor and assess the Electrical Systems' health alongside the other main systems on car during track running.
- You will also assist with the control and maintenance of the spares and equipment required to fulfil the role at Race, Test and PR events as required.
- When attending support team events you will be the accountable team member within the Electronics department responsible for ensuring that the master set-up and documentation for the show car Electronics system is fully maintained.

Skills & Experience

- Applicants should have current experience of F1 Electronics and Control Systems, including ATLAS and System Monitor.
- Experience using MATLAB will also be advantageous.
- Applicants should also have experience in all types of Electrical and Electronic installations, including MIL specification wiring installations and sensor technologies.
- As a prerequisite for this role you will be degree qualified or equivalent in an Electronics discipline, combined with relevant experience of Motorsport Electrical and Electronic Systems.
- The ideal candidate will be able to demonstrate a high level of self-motivation and be able to work within a high-pressure environment.
- Good communication skills and the ability to work within tight timescales are an essential requirement for this position.

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MINI SE7EN & MIGLIA

The Mini Se7en and Mini Miglia categories will support the British Touring Car Championship at Thruxton next year as part of a special calendar to celebrate the 60th anniversary of the Mini.

Both Mini 7 Racing Club categories will get two races around the Hampshire circuit at the first of two BTCC visits over the May 18-19 weekend and are set to benefit from live or delayed-as-live TV coverage.

The club's 2019 schedule also includes its popular visit to Zandvoort for the British Race Festival in July, a return to the MG Live event at Silverstone, and being part of a revamped Mini Festival at Brands Hatch.

The BTCC support slot is a significant coup. Not since the Super Touring Car Challenge appeared at Rockingham in 2015 has a 'club' racing category had the honour of making a guest appearance alongside the UK's premier series. The opportunity has arisen because both the



WALKER



JONES

Ford Fiesta frontrunner Gooding moves to Minis

MINI CHALLENGE

Ford Fiesta star Harry Gooding will step up to Mini Challenge JCW title-winning team Jamsport for 2019.

Gooding won the Fiesta Junior title with Jamsport in 2016, and claimed a class crown in the BRSCC Fiesta series this season with the team, which also carried Ant Whorton-Eales to JCW honours in the Mini series.

Gooding tested an ex-Louis Doyle Mini JCW run by Jamsport at Donington Park last month.

“It’s a bit different to what I’ve been used to, but it was a really great experience,” said the 16-year-old.

“They are a bit of a handful, especially through the Craner Curves. You want to push it to its limits and have those sorts of sideways moments

to know how the car reacts when it’s been pushed too far.”

Gooding, who missed out on the overall Fiesta title at the final round, intends to test at each Mini Challenge venue over the winter. “You’ve got to be prepared,” he said. “It’s a bit of a step up from what I’ve been used to, so I’ve got to step everything up and just work a bit harder for it.”

Gooding will be joined on the grid by Volkswagen Racing Cup driver Matt Wilson. The 23-year-old was third in the VW standings and will race with new team JWB Motorsport.

Jac Maybin will also compete in the series again next year after finishing eighth this season, and will remain with the Excelr8 squad.

MARK PAULSON

Renault UK Clio Cup and Porsche Carrera Cup GB are skipping that event.

The two Mini categories provided some dramatic racing at the Thruxton 50th anniversary meeting this year and Mini 7 Racing Club commercial manager Colin Peacock is excited to return.

“The club’s been going for 52 years and it’s the 60th year of Mini next year, so we have put together a bit of a special calendar,” he said.

“It wasn’t easy to do it with Rockingham closing down. We are very lucky that Alan Gow [BTCC series director], Dunlop and BARC have given us a helping hand to be with the touring cars at Thruxton. We do put on some great racing there and we are really excited about that.

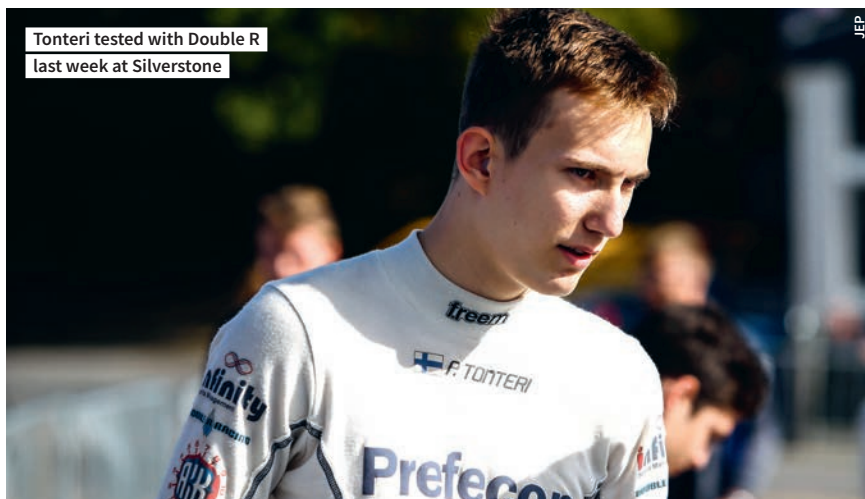
“We feel it’s an honour and recognition of the grids we’ve had over the years. It’s a real breakthrough for us at the club in terms of attracting members. It’s very exciting and we’re looking forward to being live on television.

“MG Live is a big event and we haven’t been there for about 20 years, so we’ve got some really good events. Last year we had some good grids and took nearly 60 to Brands Hatch for the Mini Festival. We’re also thrilled to go back to Croft. It’s a long way, but it’s a cracking circuit.”

As well as the main seven-event schedule, a winter series is also planned.

“We are doing a winter challenge, starting in March at Silverstone for the first two rounds, and holding the last three rounds at Brands Hatch in November, which again is about getting more people on track,” said Peacock.

STEPHEN LICKORISH



JEP

Tonteri tested with Double R last week at Silverstone

Rookies test British F3 car

BRITISH F3

British Formula 4 race winner Paavo Tonteri was just one of several drivers to get their first taste of BRDC British Formula 3 machinery on track last week at Silverstone.



JEP

Zendeli tested but won't race in British F3 next year

Finn Tonteri tested with Double R Racing, the team he raced with in British F4 and which carried Linus Lundqvist to the 2018 F3 title.

German Formula 4 champion Lirim Zendeli tested with Fortec Motorsports, but won't race in the series. “He was just learning the circuit for FIA Formula 3 next year,” said team boss Richard Dutton. “He was very quick though.”

Fortec also tested IMSA Prototype Challenge champion and Pro Mazda Series driver Kris Wright.

Elsewhere, Chris Dittmann Racing ran recent Formula Ford 1600 race winner Tommy Foster, while Carlin tested Kaylen Frederick, who finished sixth in this season’s USF2000 series.

STEFAN MACKLEY

Mallory Park oval return for Pickups

PICKUPS

Pickup Truck racing is set to return to the Mallory Park oval next year after Motorsport UK granted a licence for the circuit to be used again.

Pickups last raced there in 2005, but the closure of Rockingham prompted the series to work with circuit officials to bring the oval back into competition.

Oval racing has been an important part of the Pickup championship, which was the only category to use the Rockingham oval in recent years. It now has two meetings scheduled at Mallory next year and series boss Sonny Howard hopes to add more in future seasons.

“With the demise of Rockingham, everybody said it would be the end of Pickup racing but that is not the case,” said Howard. “After Rockingham [closing] we want Pickups to still put on a show. We are going back to racing on the circuits again and we’ve got six rounds with the British Truck Racing Championship.



Pickups last raced on Mallory Park oval in 2005

But I believe the icing on the cake is the return to Mallory Park’s oval.

“Twenty-two years ago Pickups started racing under Eurocar. It will keep that part of the series going and that’s important – it makes Pickups unique.

“We’re going to try to make those events into something special and will work with Mallory Park to promote the events, and we’re hoping to bring in other products so it ends up being a whole day [of entertainment]. It won’t just be a clubbie race meeting with trucks on the oval.”

Only the Pickups will be allowed to compete on the oval in 2019 and they won’t

run anti-clockwise as they did previously.

The Pickups will be one of three series that Howard’s SHP concern will run next season. The British Automobile Racing Club has handed SHP a three-year contract to operate the Intermarque championship, which Howard has renamed Super Silhouettes for 2019.

The final part of the so-called ‘Power of Three’ is a new series for US-style Sprint racers, which Howard says was originally designed with the Rockingham oval in mind but has now been adapted for regular tracks.

STEPHEN LICKORISH

Endurance prologue open to all G40s

GINETTA

A new pre-season 24-hour event solely for the Ginetta G40 is planned for next year.

The Ginetta Prologue at the Guadix circuit in Spain, organised by want2race, will be open to Ginetta Junior, G40 Cup and GT5 Challenge cars.

As the March event is classed as a prologue rather than a race, under-16s are set to be allowed to compete.

“It’s not been done before and we like to innovate a little bit,” explained organiser Ben Hyland. “Originally it was going to be one class only, but it makes sense for it to be open to everyone and be quite inclusive.

“Because it’s the first time, we have no idea if it will be more popular with Juniors, GT5 or G40 Cup drivers.

“It’s a competitive test essentially, but there will be prizes for doing the most laps. It’s a prologue test so it’s



not run under a race licence – we are governed by the circuit and our insurers as to how we form the event.

“We’ve been testing there

for the past four years with the [W2R Motorsport] team and the track is absolutely perfect for the G40.”

STEPHEN LICKORISH

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Johnson/
O'Brien will drive
Balfe's McLaren
570S GT4

Johnson joined by O'Brien

BRITISH GT

Former British GT4 champion Graham Johnson has rejoined Balfe Motorsport to drive a McLaren 570S GT4 next year, but has split with long-time co-driver Mike Robinson and will team up with McLaren Driver Development Programme graduate Michael O'Brien.

It ends a long partnership between Johnson and Robinson, who raced together in endurance karting events in the early 2000s and have paired up in British GT since '15, winning the '16 GT4 title before adding the Pro-Am crown in '17. They took one win this year at Brands Hatch.

"I would be surprised if we didn't team up again in the future," said Johnson. "We're great friends and we have fun racing together, but at some point you

have to set yourself new challenges.

"I've got to learn how to work with someone new. I've worked so long with Mike that to work with someone else is going to be a real challenge, but it's genuinely exciting to partner with McLaren and work with one of their rising stars."

Historic Formula Ford graduate O'Brien moves across from Tolman Motorsport, where he finished third in his debut season with fellow Silver-graded driver Charlie Fagg. In addition to the Pro-Am title, O'Brien is targeting another run at the outright championship, having missed out by just two points to Jack Mitchell.

"Coming so close this year was very disappointing, so hopefully we can go those couple of places better next season," said O'Brien.

JAMES NEWBOLD

Mustang entry planned

BRITISH GT

The Multimatic squad that masterminds Ford's World Endurance Championship assault is planning a British GT campaign in 2019.

Multimatic Motorsport, which races under the Ganassi banner in the GTE Pro class of the WEC, expects to run the Ford Mustang it has developed for the GT4 category in the British GT Championship's secondary class next year. A pair of cars would be run from its workshops near Silverstone with

Multimatic drivers Billy Johnson and Scott Maxwell part of the line-up.

Multimatic racing boss Larry Holt said he wanted to compete with the Mustang GT4 in Britain to try to boost sales of the car in Europe.

"We've sold around 40 cars, but not many in Europe and only one in the UK, so we want to get the car out there to show it off," he said. "We sold the car in the UK after we came up with the plan, but we're pushing on with it because we like going racing."

GARY WATKINS

IN THE HEADLINES

MEYRICK'S SUPERSTARS

Sportscar regular Andy Meyrick is the new director of the British Racing Drivers' Club's SuperStars programme. Meyrick is a former member of the scheme and will take over from Tim Harvey, who has been part of the programme for 11 years. Formula 2 champion George Russell and runner-up Lando Norris are the latest of five SuperStars to graduate to F1 under Harvey's watch.

GT5 CHALLENGE MOVE

Ford Fiesta frontrunners Danny Harrison and Josh Steed will graduate with Mutation Motorsport to the Ginetta GT5 Challenge next season, racing under the Altima Academy banner. Steed, who was third in this year's Fiesta Junior Championship, tested a Ginetta G40 at Bedford Autodrome last month, with coaching from British GT4 race winner David Pittard. Multiple Fiesta Championship race winner Harrison is also set to have a run in the rear-wheel-drive machine imminently.

FORTEC'S BRAZILIAN

Brazilian karter Roberto Faria has been announced as Fortec Motorsports' first signing for British Formula 4 next season. He graduates into single-seaters having achieved domestic and European success in karts. "This year will be a massive learning curve for Roberto," said team manager Ollie Dutton, "but I am confident he will mature into a competitive driver challenging for the podium and, with hard work and determination, a strong contender for the Rookie Cup."

LUNDQVIST MOVING UP

Reigning BRDC British Formula 3 champion Linus Lundqvist experienced his first taste of GP3 machinery last week at the series' official post-season test in Abu Dhabi. The Swede, who claimed seven wins this season, took part in two days of driving with Campos Racing ahead of a possible move to the new-for-2019 FIA Formula 3 Championship – a merger of GP3 and European F3. He finished third fastest on the second day.

HISTORIC F2 CALENDAR

The Historic Sports Car Club has announced an extended calendar in 2019 for the Historic Formula 2 FIA International Series, with an increase from five to six double-header race weekends following the addition of the Silverstone Classic to the calendar. Hockenheim, Brands Hatch GP, Magny-Cours, Zandvoort and Dijon are all on the schedule to place Historic F2 at significant historic racing festivals across Europe.

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IMAGES

BACK ON TRACK The BMW M1 Procar Championship will be celebrated at next year's Goodwood Members' Meeting, which will include high-speed runs. The series supported European Formula 1 grands prix for two seasons between 1979 and '80, and featured active F1 drivers – Niki Lauda and Nelson Piquet won the titles. The 470bhp cars were built by Osella and the Project 4 Formula 2 team, which was headed by soon-to-be McLaren boss Ron Dennis.

Britcar changes format

BRITCAR

The format of the Britcar Endurance Championship will change next year as the series reverts to two one-hour races.

For the past two seasons Britcar has taken the form of two championships racing concurrently. The Endurance category had one 50-minute race and one two-hour race, while contenders in the Sprint category ran in the same events but took the chequered flag after 50 minutes of the two-hour race.

The package will now comprise just one championship category.

"Britcar has been listening to what the customer wants," said championship co-ordinator Claire Hedley. "We plan to have a cheaper price-per-minute of racing, it will be less than this year.

"We want to make sure we're offering a better package."

The provisional eight-round calendar consists of Silverstone – on both the International and Grand Prix layouts –



Donington Park, Snetterton, Oulton Park (two rounds), and two visits to Brands Hatch. The final round will be at Brands for the Into the Night Races across two days, with the final race on Sunday lasting two hours.

Reigning Britcar Endurance champion Sarah Moore has confirmed she will return to defend her crown next season. Moore became the first female to win the title after racing for her family team Tockwith Motorsport alongside rookie Matt Greenwood.

STEFAN MACKLEY

Rushworth joins Power Maxed Racing

VW RACING CUP

Reigning 750 Motor Club Hot Hatch Class A champion Ben Rushworth will move into the VW Racing Cup next season with Power Maxed Racing.

Rushworth, who also won the MG Metro Cup title in 2016, will drive a VW Polo in the series and will have his first test in the car this Sunday at Silverstone.

"To be honest it [the VW Racing Cup] wasn't on my radar at all, I didn't have any plans to do it," said Rushworth, who raced a Honda Integra DC2 this year.

"I wanted to defend the [Hot Hatch] title but I didn't want to defend the title in a series that might have a downturn [in grid numbers].

"I was at Motorsport Days and Power Maxed was there, and I started having a nose around the Polo."

STEFAN MACKLEY

FINISHING STRAIGHT

IN THE MEDIA • ARCHIVE • QUIZ



Jim Clark retains enduring popularity in the motorsport memorabilia firmament

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MOTORSPORT MEMORAB

Specialist motorsport memorabilia shops are rare. So Helensburgh – a coastal town 25 miles from Glasgow – may seem an unlikely location for an example of this rare breed. Yet there you'll find Auch Aye, which opened earlier this year. Its location has a motorsport link, albeit an uncanny one: it's on the street where Jackie Stewart met his wife Helen on a blind date.

John Black, who runs Auch Aye, has his own motorsport history. He attended Chirnside Primary School at the same time as Jim Clark. He had a racing career too, after moving to Vancouver in 1964. Black has, among other things, competed against Mike Hailwood on two wheels and against future Indycar racers Mike Hiss, Tom Gloy and Dennis Firestone.

He quit racing in 1975 and moved into

motorsport retail. First he worked as a photojournalist at north-west American race meetings, primarily selling photos directly to drivers. So that his customers could browse the images whenever it was convenient, Black set up an awning in the centre of the paddock. With that came a temptation to diversify. "I started selling T-shirts, model cars, books," he says.

And Black was in a fruitful place. "It was the golden era of sportscar racing in North America," he continues. "All the British stars tended to come across and there was also Formula Atlantic. We had Keke Rosberg competing, Gilles Villeneuve was a star. I was mingling with these folk as they were developing their racecraft."

That was particularly true of Rosberg, who took a shine to one particular



Black's shop revisits his paddock presence during 1970s and '80s



motorsport.tv

HIGHLIGHT OF THE WEEK



AUTOSPORT AWARDS 2018

Head over to Motorsport.tv to catch up on all the highlights from last weekend's Autosport Awards. Check in at Grosvenor House Hotel as we bring the curtain down on the mammoth 2018 motorsport season by celebrating the achievements of the star drivers, riders, engineers and cars. Settle in for an hour and spot the Formula 1 champions, multiple Le Mans winners and rally greats among the audience. Go to <http://bit.ly/18SAwards>

ILIA'S ENDURING CHAMP

publication. "I got Autosport airmailed from London and he was immediately interested in buying it, because it reported what he'd been doing the week before," Black says.

But as tracks started charging more for retail space, Black had to move his catalogue and contacts and switch over to mail order, facilitated by the internet. In 2000 he sold his business and enacted his long-time

"I CAN'T THINK OF ANY OTHER PERSON WHO GENERATES AS MUCH INTEREST 50 YEARS ON"

aim to return to Scotland. He moved to Helensburgh, where he'd lived before and briefly gone to school, to be near his father.

Recently a chance arose to get into retail again, for the first time in a shop. "There was a property available and I'd maintained contact with people," Black explains. "I've still got the interest."

The breadth of those contacts is reflected in an impressive array of items for sale, including photos by Pete Lyons, who covered Formula 1 for Autosport in the 1970s, prints by Michael and Graham Turner, and Brumm and BBR model cars. Black also has many

books including those rare and out of print — one framed Clark book, *Life at Team Lotus* by Peter Darley, is priced at £1500.

Black also showcases his wares in a newsagent in Duns, where The Jim Clark Room is being rebuilt to mark the 50th anniversary of his death. "People will still come to visit Duns looking for some memento of Jim Clark," he says.

Black selects items to display in Helensburgh based on his reading of the Scottish market — and this also mostly relates to Clark. "People that are interested in buying something, it's been motorsport fans — people who remember Jim Clark or knew about Jim Clark.

"There's an ongoing fondness for the man. I can't think of any other public personality who would generate that sort of enthusiasm 50 years after their death."

There's also Stewart interest, particularly since JYS is a local boy. But Black attracts clientele from far and wide — he's had customers from Seattle and the Netherlands.

For the most part, he resists having an attachment to his items, but he does admit a fondness for one particular group.

"The Jim Clark photographs of Pete Lyons," he says when asked to name a favourite. "They reflect their era. One of the photographs has Keith Duckworth who designed and built the Cosworth DFV. It's also got Colin Chapman, his wife Hazel, and Jim Clark on it. That's a very iconic image."

GRAHAM KEILLOH

WHAT'S ON

INTERNATIONAL MOTORSPORT

Asian Le Mans Series

Rd 2/4
Fuji, Japan
December 9



REWINDIMAGES

Brazilian V8 Stock Cars

Rd 12/12
Interlagos, Brazil
December 9





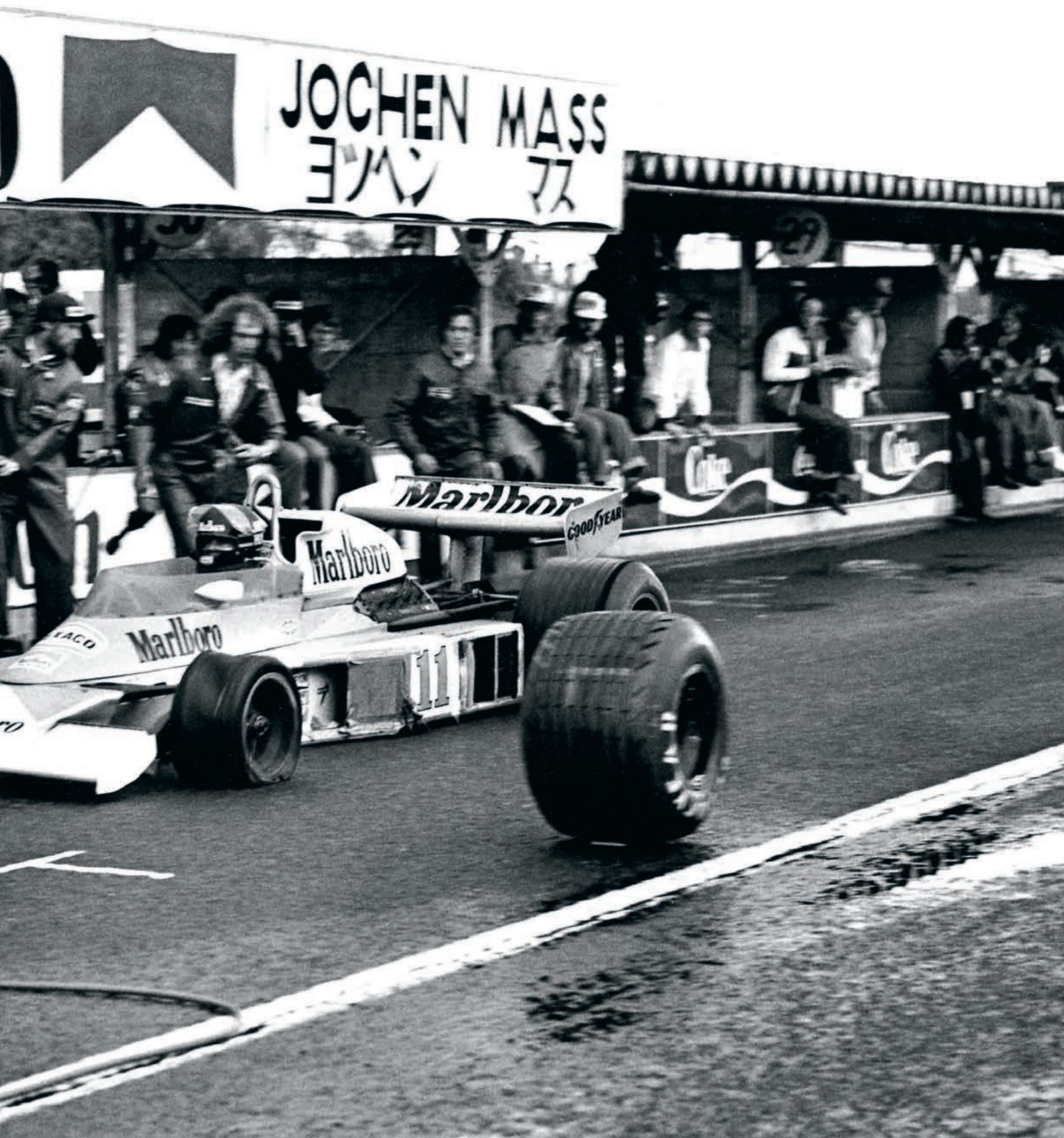
LATIMAGES

FROM THE ARCHIVE

James Hunt's battle-worn McLaren-Ford M23 skitters to a halt in the Fuji pitlane in urgent need of fresh Goodyear wet-weather rubber after suffering a

puncture in the closing stages of the tumultuous, rain-lashed 1976 Japanese Grand Prix. Hunt rejoined the race in fifth place, a position in which he would fail to clinch the

world championship despite the withdrawal after only two laps of title rival Niki Lauda (Ferrari 312T2), but fought back to cross the line third, surprising even himself.



TEST YOUR KNOWLEDGE

QUIZ

WHO, WHAT, WHERE, WHEN?



LAT IMAGES
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WHO IS THIS?

This incognito racer went on to form a dynasty and become one of the most famous faces of a golden generation.

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This gave him the signal to move into the big time, but he would have to fabricate his chances before he slithered into a top drive.

Success came quickly and his high-stakes gamble paid off. Never one to shy away from something new, he was the first of his kind as things became explosive.

He took a king's ransom to triple up, but a wilted flower almost kicked him into the weeds before the colours united into a final flourish.

A big one in the big race brought it all to an end and ushered in a convoy of off-track success.

ON THIS DAY

1 Today is Susie Wolff's birthday. At which race did she secure her only top 10 starting position on a DTM grid?

2 Keke Rosberg turns 70 today. Where did he claim his only podium for McLaren?

3 It's also Manuel Reuter's birthday. With whom was he sharing a car when he finished third in class in the 1992 Bathurst 1000?

4 What prevented a GP2 Asia race from taking place in Dubai on this date in 2008?

5 Which Japanese driver made his F1 test debut on this day in 2006 for Toyota?

NAME THE HELMET



LAST WEEK'S ANSWERS

Who, what, where, when Fabio Carbone, SLC-Opel R1, Lausitzring, September 17 2005. **Who is this?** Rickard Rydell. **On this day** 1) Chuck Daigh. 2) Anderstorp. 3) Interlagos. 4) Ari Vatanen. 5) 0. **Name the helmet** Thierry Boutsen.

IN NEXT WEEK'S ISSUE



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WHEN WAS F1'S GREATEST ERA?

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