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AUTOSPORT

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SEPTEMBER 6 2018

Hamilton hits Vettel where it hurts

How Lewis humbled Ferrari at home



'HE DIDN'T LEAVE ME ANY SPACE'
VETTEL

'I'M SO PROUD OF THAT MANOEUVRE'
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'ALL COMERS' AND SINGLE MAKE GRIDS





GAP GOES UP WHEN IT SHOULD HAVE GONE DOWN

Ferrari and Sebastian Vettel must be beginning to wonder what they have to do to erode Lewis Hamilton's championship lead. Ferrari again looked like it had the edge over Mercedes at Monza last weekend and yet found itself falling further behind in the points.

Rain was Vettel's undoing – or, rather, provided Hamilton with the chance to turn the tables – earlier in the year, but this time it was wheel-to-wheel racecraft. As with wet-weather driving, Vettel is good, but Hamilton is currently better. Lewis's first-lap move at the second chicane was bold, brilliant and *fair*. It's when the tide turned against Ferrari – or was that when Kimi Raikkonen beat Vettel to pole on Saturday?

Autosport has not been shy to point out Raikkonen's constant underachievement in recent years, but the Finn looked racy throughout the Italian Grand Prix. He locked up defending from Vettel at the first corner and it was good to see him fight back and repass Hamilton after the Mercedes jumped him at the restart.

The battle between Hamilton and Raikkonen was one of the best of the year. It's difficult to know how much Valtteri Bottas's delaying tactics hurt Raikkonen's chances (and tyres), but there can be little doubt that it was one of Hamilton's finest F1 wins.

Ferrari still looks fast and Vettel *should* be able to close the 30-point gap to Hamilton, but he has to stop throwing points away. And stop giving Hamilton half-chances, which the reigning champion has been very good at converting this season.

● Congratulations to 2016 McLaren Autosport BRDC Award winner Lando Norris on his McLaren deal (see page 4). Norris has been one of the most exciting talents in recent seasons and his F1 graduation is well-deserved. We just hope it's not the the last we've seen of Stoffel Vandoorne in F1. Over to you Toro Rosso or Sauber...



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Dunbar/LAT; Gorla/Sutton Images; Motorsport Images

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FREE INSIDE

ENGINEERING SUPPLEMENT



Porsche's failed Indycar project, suspension design, and windtunnels all come under the spotlight in this issue.



FORMULA 1

McLaren will give Lando Norris his Formula 1 debut next season after announcing that the 18-year-old will replace Stoffel Vandoorne in its driver line-up.

Norris has been part of the McLaren young-driver programme since 2017, having won the McLaren Autosport BRDC Award the previous year. He will become the first Award winner since Paul di Resta, who made his grand prix debut in 2011, to make it to F1.

The Formula 2 title contender described the move as a “dream come true”, and McLaren’s decision to place Norris alongside Carlos Sainz Jr fills in a key piece of Formula 1’s driver-market puzzle.

Norris was picked ahead of Mercedes junior Esteban Ocon, Sergio Perez and the outgoing Vandoorne. Of those Norris defeated to earn his grand prix graduation, only Perez’s place on the 2019 grid looks secure. He claims to have a contract signed already and the expectation is that he will remain at Racing Point Force India to partner the incoming Lance Stroll, whose father Lawrence is now one of Force India’s main backers.

Missing out on McLaren means that Ocon has lost a major option, while the axed Vandoorne is damaged goods after two miserable seasons in F1.

Mercedes has worked tirelessly to find a

home for Ocon since his planned move to Renault was derailed by Daniel Ricciardo joining the team. Williams is the only other Mercedes-engined squad on the grid and its financial requirements mean an engine discount is unlikely to be enough to place Ocon there.

Ocon’s Mercedes ties are limiting other teams’ interest, but Mercedes is willing to drop its juniors if necessary. That would immediately make Ocon more appealing to Red Bull, whose junior team Toro Rosso has not confirmed either of its 2019 drivers.

Daniil Kvyat is on course for a surprise third chance. Pierre Gasly’s move to Red Bull means Toro Rosso will have at least one vacancy next season, and Red Bull faces a lack of qualified candidates in its own junior programme.

Kvyat was dropped by Toro Rosso and the Red Bull driver programme late in the 2017 season. But the feeling in the Red Bull camp is that he has benefited from taking a break and experiencing life at another team – Ferrari, where he has worked as a development driver – after

“OCON’S MERCEDES TIES ARE LIMITING OTHER TEAMS’ INTEREST FOR 2019”

Who is the new chief at Ferrari?

FORMULA 1

First impressions mean a lot in Formula 1, especially when you've just taken up one of the sport's most important jobs, at perhaps its most important team.

That's why the F1 media pack was intrigued to see how new Ferrari CEO Louis Camilleri came across during his first appearance in front of the press at Monza last Friday. Despite Camilleri's long connections with Maranello and its title sponsor Philip Morris, he was relatively unknown outside the team, and his succession of the larger-than-life Sergio Marchionne has increased the fascination surrounding him.

Marchionne was known for a brutally aggressive approach to management and business, and was combative when it came to dealing with opponents. This no-nonsense approach was well known to F1's chiefs, who had been on the receiving ends of Marchionne's threats to pull Ferrari out of grand prix racing if he didn't like future rule changes.

The contrast to Camilleri could not be clearer. He praised team principal Maurizio Arrivabene, heaped plaudits on Sebastian Vettel and Kimi Raikkonen, wound back on F1 quit threats, and made clear that with "momentum" behind Ferrari there was no need for a revolution.

But it would be a mistake to underestimate Camilleri. "Sergio and I clearly have very different styles, however I think we have the same ambition," he said. "I miss him, and he clearly was an amazing individual. A huge brain, boundless energy, and very ambitious, as am I."

Camilleri is already suggesting a more conciliatory approach from Ferrari, but we will not have to wait long to see whether this public calmness flows over to hard behind-the-scenes business practice.

JONATHAN NOBLE



MOTORSPORT IMAGES/GORIA/SUTTON

2019 F1 LINE-UPS AS THEY STAND

TEAM	DRIVER 1	DRIVER 2
Mercedes	Hamilton	Bottas
Ferrari	Vettel	<i>Leclerc/Raikkonen</i>
Red Bull	Verstappen	Gasly
Renault	Ricciardo	Hulkenberg
Haas	Magnussen	<i>Grosjean/Ocon/Vandoorne</i>
McLaren	Sainz	Norris
Racing Point Force India	Stroll	Perez
Toro Rosso	Kvyat	<i>Hartley/Ocon/Russell/Vandoorne</i>
Sauber	Giovinazzi	<i>Leclerc/Raikkonen/Ericsson/Vandoorne/Ocon</i>
Williams	<i>Sirotkin/Markelov/Kubica/Russell/Ocon/Ericsson/Rowland</i>	

Bold = already confirmed, **Regular** = probable *Italics* = possible

P12 OPINION

struggling to get over his demotion from Red Bull four races into the '16 campaign.

Kvyat is now top of Red Bull's list, and the second Toro Rosso seat is still up for grabs. Brendon Hartley could be retained, but does not share the attraction of an unattached Ocon or George Russell, or even Vandoorne, who came to F1 with a stunning junior record.

Haas is also yet to name either of its 2019 drivers. Kevin Magnussen is expected to stay, while Romain Grosjean has regained his form after a bad start to the season. Ocon and Vandoorne could fight the Frenchman for a place there.

One driver no longer in the Haas frame is Charles Leclerc. As revealed by Autosport earlier this year, the late Sergio Marchionne's support of Sauber driver and long-term Ferrari protege Leclerc meant the Monegasque had a serious chance of gaining promotion to Ferrari after just one season of grand prix racing.

That move seemed to have cooled in the wake of Marchionne's death, as his Ferrari CEO replacement Louis Camilleri is a close friend of Kimi Raikkonen's and wanted to see if the Finn's recent upturn in form would continue. But suggestions over the Italian Grand Prix weekend indicated that Ferrari's new hierarchy has elected to stick to the original plan and honour Marchionne's idea of putting in Leclerc as Raikkonen's replacement. It is

understood that talks about the situation advanced at Monza, where Ferrari chairman John Elkann briefly met Leclerc.

Ferrari has also considered placing another protege, Antonio Giovinazzi, in an F1 seat next season. Haas is not interested in a rookie, which makes Sauber a better option as Ferrari has an option on one of the Swiss team's seats.

Sauber is also one of the strong bests for Vandoorne, who was run by team principal Frederic Vasseur's ART squad to the 2015 GP2 title, and his manager is also involved in Sauber's ownership structure. It is understood that the prospect of bringing the Belgian to Sauber has been discussed, but long-time Sauber driver Marcus Ericsson is backed by a team director.

Williams appears the final hope for several drivers. Sergey Sirotkin brings funding and has impressed the team in his rookie season, but fellow Russian Artem Markelov has been linked and reserve driver Robert Kubica still wants an F1 return.

Mercedes junior George Russell has also targeted Williams, but a 2019 F1 graduation now looks difficult for the Formula 2 championship leader, with others ahead in the queue.

That means that at least 10 unsigned drivers are in the mix to race in F1 next season, but only six seats realistically remain available.

SCOTT MITCHELL



German GP safe as F1 reveals 2019 calendar

2019 CALENDAR

RD	RACE	DATE
1	Australian GP	March 17
2	Bahrain GP	March 31
3	Chinese GP	April 14
4	Azerbaijan GP	April 28
5	Spanish GP	May 12
6	Monaco GP	May 26
7	Canadian GP	June 9
8	French GP	June 23
9	Austrian GP	June 30
10	British GP	July 14
11	German GP	July 28
12	Hungarian GP	August 4
13	Belgian GP	September 1
14	Italian GP	September 8
15	Singapore GP	September 22
16	Russian GP	September 29
17	Japanese GP	October 13
18	Mexican GP	October 27
19	United States GP	November 3
20	Brazilian GP	November 17
21	Abu Dhabi GP	December 1

FORMULA 1

Formula 1 has revealed a draft 2019 calendar, featuring 21 races with the German Grand Prix getting a place on the schedule.

Although it still needs to be formally approved by the FIA World Motor Sport Council on October 12, there are unlikely to be many changes made. The season will begin in Australia on March 17 and finish on December 1 in Abu Dhabi.

The order of some races has been shuffled around compared to this season. The Singapore GP will now form a back-to-back

with Russia on September 22/29, while the Mexican GP will take place the weekend before the United States GP.

Speaking after the release of the calendar, F1 commercial chief Sean Bratches said he was delighted that contracts had been extended with Germany and Japan in the past week.

“The renewal of the Japanese Grand Prix and the confirmation of the German Grand Prix are both examples of our direction to place fans at the heart of Formula 1, a vision shared with all our promoters,” he said.

JONATHAN NOBLE

It's Roborace – and it's ‘Humanrace’

ROBORACE

The inaugural ‘Season Alpha’ of the Roborace series is to commence in spring 2019, according to CEO Lucas di Grassi, but races will now feature human drivers ‘teaching’ the artificial intelligent systems.

Each team – the series is aiming to attract OEMs, tech companies and universities – entering the series will use a spec LMP-based rear-wheel-drive car powered by two independent motors. It is set to weigh approximately 1000kg and produce 400bhp. Teams will produce their own software systems.



➔ SUPPLEMENT P11: DI GRASSI COLUMN

“The essence of the racing will be of humans and intelligent machines working together for the best racing outcome,” di Grassi writes in his column in this week’s Autosport

Engineering. “Yes, there will be a human professional driver, ‘teaching’ the machine for part of the race. The rest will be taken over by the machine learning algorithms, or an

‘AI driver’. The winner will be the best combination of both.”

It is not yet clear how the cars will look compared to Daniel Simon’s Robocar design (above).

ALEX KALINAUCKAS



Gronholm eyes comeback

WRC

For a Finn, he's as close to a Swede as they come. Born close to the border, Marcus Gronholm is a natural Swedish speaker. He named his restaurant 'Sagen' after his favourite stage in the World Rally Championship... in Sweden. And now he's eyeing a possible WRC return in a Toyota Yaris WRC at next year's Rally Sweden.

Had the stars aligned, two-time world champion Gronholm would have celebrated his 50th birthday this year at the wheel of a factory Yaris WRC, but ultimately Toyota Gazoo Racing couldn't make it happen. TGR team principal Tommi Makinen is keen to put that right in 2019.

"It would be fantastic to see somebody like Marcus in the car," said Makinen. "He could be very fast. We need this kind of story – it's good for the people and the fans to have this kind of thing to talk about."

Five-time Sweden winner Gronholm (left of pic, with Makinen) told Autosport he was disappointed to miss out on a Yaris seat in February. "This year it would have been fantastic to do Sweden with so much snow; I would have been starting in the perfect place on the road – I could have been back in the game," he said.

Gronholm is interested in revisiting the discussions for next year, especially after he drove the Toyota Yaris WRC for the first time at Jyvaskyla's Harju street stage of last year's Rally Finland.

"Harju was good," said Gronholm. "I only did a five-kilometre test in the car before I jumped in and drove it, and the last time I did the stage I was actually quite close to the best time. I was happy with that

because I was not driving like crazy. I was thinking, 'I cannot smash Tommi's car when I have to give it back...'

"I would like to go to Sweden again next year. And if you promise big [snow] banks and heavy snow, I will be back in the game!"

Sainz back to Dakar Rally

Gronholm is not the only former WRC champion looking at more competition next season, with Carlos Sainz expected to sign with X-raid to defend his 2018 Dakar victory at the wheel of a Mini. The Spaniard will be joined by fellow former Peugeot drivers Stephane Peterhansel and Cyril Despres. Sainz (below) is expected to make his debut in the German team's buggy in next month's Morocco Rally.

Next year's Dakar regulations have confirmed a rule change downsizing the restrictor (from 38mm to 37mm) and reducing the power output from petrol-engined cars such as Toyota's Hilux.

DAVID EVANS



IN THE HEADLINES

PIRELLI HAS F1 RIVAL

The FIA has confirmed that "more than one" company has bid for the 2020-23 Formula 1 tyre contract, with sources suggesting that Hankook is the main rival to current supplier Pirelli. The South Korean company already supplies tyres to the FIA's Formula 3 European Championship, as well as the DTM. Michelin confirmed that it would not bid for the contract after previously signalling an interest in returning to F1.

MARKELOV GETS FP1 RUN

Renault F1 test and development driver Artem Markelov will make his FP1 debut for the squad at his home race, the Russian Grand Prix. Markelov, a multiple Formula 2 race winner, will replace Carlos Sainz Jr for the run at Sochi.

AUDI'S WRX PULLOUT

Audi has dropped a bombshell on the World Rallycross Championship, which will switch to electric cars in 2021, by confirming that it will withdraw at the end of this season. Marque sports boss Dieter Gass said that Audi's commitment to DTM, at board level, is the reason. "We are involved in Formula E so we already have a programme in electric motorsport, even though we were very interested in the EWRX," he said. "It came down to a choice between DTM and EWRX."

VERGNE BACK IN WEC

Formula E champion Jean-Eric Vergne will return to the World Endurance Championship in the LMP2 ranks next month at Fuji. Vergne will replace Loic Duval, who has clashing Audi DTM commitments at Hockenheim, with TDS Racing's ORECA.

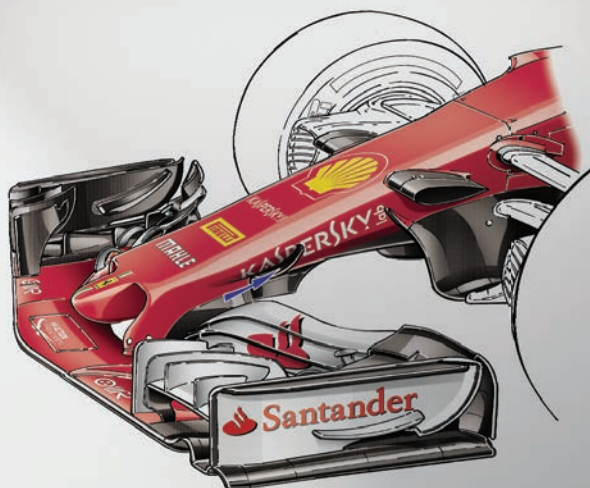
LMP2 PEGGED BY IMSA

The latest-generation LMP2 cars have been pegged back under Balance of Performance for the first time in the IMSA SportsCar Championship ahead of this weekend's Laguna Seca round. This follows a run of three consecutive victories for P2 cars over the Daytona Prototype international machinery. All LMP2s have been given an additional 10kg, bringing their minimum weight to 940kg, and had their fuel capacity reduced from 75 to 72 litres. All DPis have had their fuel capacity increased by two litres and the Mazda RT24-P given a 10kg weight break.

HINGELEY'S DEBUT WIN

F3 European Championship racer Ben Hingeley won on his debut in the Asian F3 series at Ningbo last weekend. Hingeley, who raced with Hitech GP, added a second and a DNF due to gearshift problems. The other winners were new series leader Raoul Hyman and American Jaden Conwright.

THE ART OF RACING




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MERCEDES BARGEBOARD DEVELOPMENTS

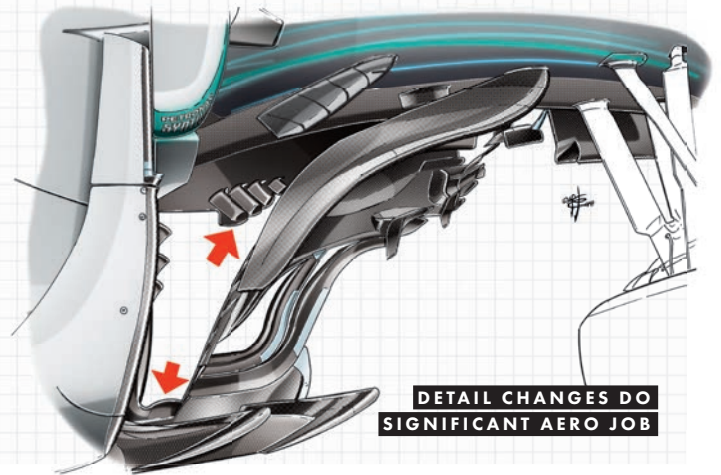
When you look at a Formula 1 car going through the corners and bouncing across the kerbs, you have to wonder if all these small bits can actually make any difference. But the answer is they do. It's what happens when the car lands that gives the driver the confidence to attack the corner, and if a car lands and grips then the driver will push harder.

These small details (red arrows) that Mercedes has added to its

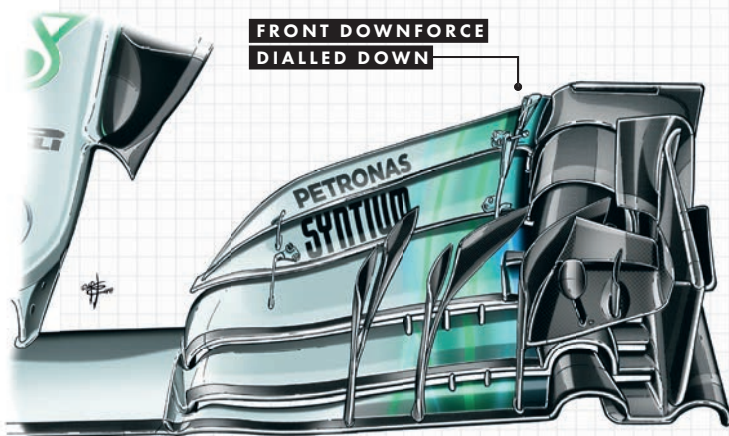
already incredibly complicated bargeboard area will just improve consistency and reattachment of the airflow in a certain area. This will mean the underfloor will recover faster from a vertical acceleration.

In the longer, more stable corners such as the two Lesmos and the Parabolica, this will improve the overall downforce from the underfloor.

GARY ANDERSON



DETAIL CHANGES DO SIGNIFICANT AERO JOB



FRONT DOWNFORCE DIALLED DOWN

MERCEDES FRONT WING

To balance the car with Monza wing levels, teams have to find the best way to reduce front downforce. Because the front-wing assembly is so complicated and affects the airflow around the rest of the car so dramatically, this is no easy task.

Mercedes chose to run a reduced-chord-length front-wing trailing-edge flap. This means that the wing angle will stay close to its optimum, with the result that the airflow characteristics coming off the

trailing edge will be very similar, just that little bit less powerful.

It also fitted a trailing-edge gurney flap. These changes are designed to have controllable and well-understood airflow-separation areas to help the balance of the car move rearwards with speed. This flap helps with airflow reattachment on the wing's undersurface and also improves front-wing performance in lower-speed corners.

GARY ANDERSON

RED BULL REAR WING

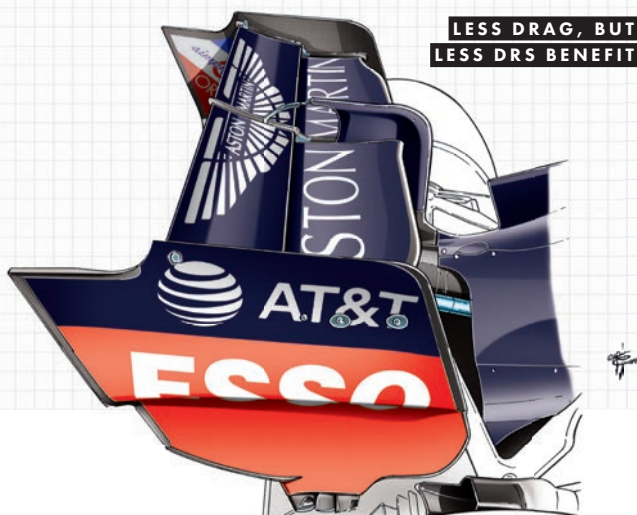
Monza is the highest-speed track on the calendar and requires the most trimmed-out rear-wing assembly. This Red Bull version is the smallest in the pitlane. It still retains the gurney flap across the trailing edge as this improves the driver's feeling for braking stability and helps the airflow to

reattach when the DRS is closed.

With a small wing section like this you have less overall drag but get less of an advantage when you operate the DRS – basically you are producing less downforce and drag, so have less to give away when the DRS is opened.

GARY ANDERSON

LESS DRAG, BUT LESS DRS BENEFIT

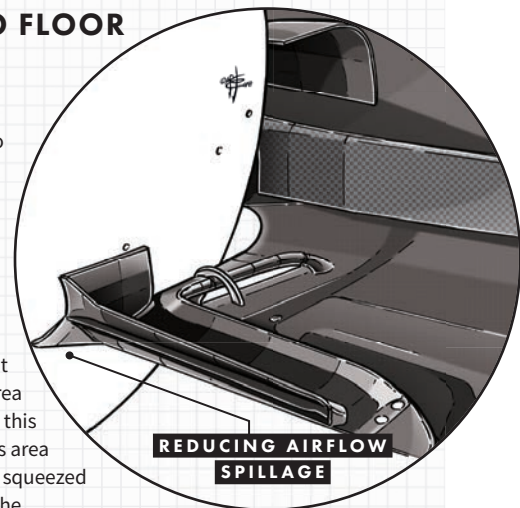


TORO ROSSO FLOOR

Reducing the amount of airflow that would normally be pulled into the low-pressure area of the underfloor and diffuser is critical to the overall performance of the underfloor.

The detail of the floor design just in front of the rear tyre is the area that has most effect on this airflow. Connecting this area to how the airflow gets squeezed around the outside of the tyre-to-track contact patch is what the teams are trying to do.

This vertical right-angle on the outer extremity of the floor will reduce the spillage off the top surface, meaning that the air displaced by the tyre will pull



REDUCING AIRFLOW SPILLAGE

more of the airflow off the top surface through the floor slots to make it act like a seal. This detail gets more important when you run higher rear rideheights.

GARY ANDERSON



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ALL CHANGE, PLEASE

Fernando Alonso's complaint that Formula 1 is too predictable may carry some weight because the competitive order rarely changes. But how do we change that?

EDD STRAW

Fernando Alonso made it very clear that the predictability of Formula 1 has played a big part in his decision to step away from grand prix racing in 2019. It sounds like a reasonable claim, even if it's clear that the overriding factor is that he doesn't want to waste his time messing about in the F1 midfield and would stay on were he to have a title-contending car. But setting aside the fact that we've just enjoyed a thrilling Italian Grand Prix, has F1 really become that predictable?

Alonso made his grand prix debut for Minardi in 2001, and save for a season as Renault test driver in '02 has been ever-present on the grid since. So to interrogate Alonso's assertion, it's logical to look at his 18-season span in F1.

This season, four drivers spread across three teams have won. The only drivers from the ranks of Mercedes, Ferrari and Red Bull yet to claim a victory are Kimi Raikkonen and Valtteri Bottas. In Alonso's 18 seasons, that combination of four drivers from three teams is close to the average of 5.1 drivers from 3.3 teams.

Another way to look at the predictability of winners is the average winning streak. This is created by assigning a number to each win streak – a one if it's one race, two for two, etc, and

"IT'S THE SAME THREE TEAMS THAT HAVE WON SINCE THE V6 TURBOS WERE INTRODUCED"

then averaging them out.

This season comes out seventh in this list, with an average streak of 1.27 – not far off the best (ie the shortest) of 1.17 in 2008. The worst seasons by some margin are 2004 (2.78) and '13 (2.89). The former was dominated by Michael Schumacher and Ferrari, the latter by Sebastian Vettel and Red Bull.

The closeness of the qualifying battle stacks up pretty well when it comes to the gap between pole position and second place. Expressed as a percentage (to ensure each race carries equal weighting, which would not be the case if the time itself was used), the average gap between first and second this year is 0.21% – the fourth best of Alonso's time in F1 and only 0.01% off the best figures, achieved in 2003, '07 and '09.

But it's not just about the gap from first to second. Much has been made of the chasm between the big three teams and the midfield this year that has created a de facto 'Class B'

championship. This year, the gap between first and seventh is the biggest it has been during Alonso's career.

One thing that is clear is that within the top three teams, the competition is fierce. The average qualifying-pace gap from first to fifth in qualifying is the fifth best of Alonso's time in F1.

The clearest problem grand prix racing currently has is the chasm between the top three teams and the rest. And we are seeing more stability from year to year than was once the case. When Alonso was in his first season with Minardi, the Renault team that held his contract (then in its final year competing under the Benetton name) was only 10 points better off in the championship.

Yet when Alonso went to Renault in 2003, it had evolved to the point where he could win a race and take a couple of pole positions. Two years later he won the world championship. As Bob Bell, then as now part of Renault's technical leadership, said recently, to get to the front for a team that isn't already there is harder than ever – to the extent that the marque has softened its original five-year timeline for getting to the front.

"My quotation of five years was based on historic evidence with what happened when Red Bull took over Jaguar, Mercedes took over Brawn, and when Renault came in after taking over Benetton," he said. "Formula 1 is significantly more complex, the teams involved are significantly bigger now than back then, so I would say now that five years is a minimum."

This is why, from year to year, not so many teams win. Three different teams may have won races this year, but it's the same three teams that have won every single race in the four and a half years since the 1.6-litre V6 turbos were introduced.

Williams chief technical officer Paddy Lowe has been around F1 for three decades. He has no doubt that the fact that there are only three strong teams and little prospect of anyone – save perhaps Renault – joining them is the reason for Alonso's departure. He points emphatically to one reason for this.

"It's because of the distribution of funds from the commercial-rights holder [Liberty Media]," he told Autosport. "It's completely distorted at the moment. Everything else drives from there. With income you generate more incomes because you attract more sponsors – it's self-fulfilling."

Even if it's not necessarily that predictable in terms of who wins, what F1 does not give to many is hope. Regardless of how jaded Alonso is by his many seasons in F1 and poor results in recent years, it's that lack of hope that is most concerning. Even if Alonso stayed in F1 with McLaren for the next couple of years, it's unlikely that the results would change significantly.

The problem is, things stay largely the same from season to season. Changing that is F1's biggest challenge. #



PULLING UP THE LADDERS

Being part of a manufacturer's young-driver programme ought to be a golden ticket to success – but for Esteban Ocon it's become an obstacle to progression

ADAM COOPER

The hectic Formula 1 silly season has been dominated by one recurring theme – the complexity of the relationships between teams and their junior drivers, and how they can either help or hinder career progression.

In one way or another nearly every development we've seen has been connected to a driver programme, and it's also tied to the bigger picture of collaborations between teams.

On the positive side, we've seen several drivers moving up the ranks as a direct result of long-time support from a team paying off. Pierre Gasly and Lando Norris have both been elevated thus, while Charles Leclerc is expected to be confirmed at Ferrari, which will in theory open a Sauber seat for fellow Maranello protege Antonio Giovinazzi.

On the other hand we've seen drivers stuck because they are attached to a team that can't offer them a seat, while at the same time those links make them unattractive to rivals. That's the conundrum faced by Mercedes F1 boss Toto Wolff as he tries to find 2019 drives for Esteban Ocon and F2 star George Russell.

For obvious reasons teams don't want to invest in developing a driver who ultimately 'belongs' to someone else and will go back

“WILLIAMS IS ONE OF THE FEW DOORS STILL OPEN FOR ESTEBAN OCON OR GEORGE RUSSELL”

there upon request. On top of that, deep-seated rivalries mean that certain parties will simply never work together.

McLaren boss Zak Brown sums the situation up perfectly: “You have Red Bull with two teams and a junior programme. And they don't have any junior drivers. Then you've got Mercedes who have too many drivers. And something is wrong there. In theory those drivers should slide into the Toro Rosso seats. The seats are available, but because of politics, governance and the way the sport is, people don't want to do business with each other.”

Knowing that, under its new owners, Force India was heading for a Lance Stroll/Sergio Perez line-up in 2019, Wolff long ago started looking for alternative options for Ocon. He thought he had a deal at Renault, but it evaporated when Daniel Ricciardo signed, and McLaren also didn't work out.

Williams is one of the few doors still open for Ocon or Russell, in theory. But the discount Wolff can give on an engine supply

is a relatively modest amount, compared with what a pukka pay driver can bring. Meanwhile, an unusual lack of qualified in-house talent has led Toro Rosso to look outside the Red Bull programme, and give serious consideration to drivers who have done their learning elsewhere. But, as Helmut Marko made clear last weekend at Monza, there are limits: “We are not keen to take a Mercedes driver...”

Christian Horner says it's not surprising that teams don't want to run someone who is tied to a major rival. “For what is relatively little investment by Mercedes, it's been to their merit that they've helped these guys to get into F1,” he says. “But now it seems to be almost an anchor being a Mercedes driver. Being on a recall mechanism isn't attractive to a vast majority of teams.”

“The crazy situation is you've got a driver like Ocon who might end up without a seat next year. If he was to be contractually free he'd be an obvious candidate for Toro Rosso. But Red Bull aren't going to invest in a Mercedes driver, understandably. And I wouldn't expect the same to happen the other way round.”

Mercedes could have addressed the problem by putting Ocon into a works race seat next year, at the expense of Valtteri Bottas. Wolff admits that, notwithstanding Leclerc's widely expected promotion to Ferrari, the sport's two major players have been overly cautious.

“I think the big teams are not going to take risks with young drivers,” he says. “Now you can say that is boring. I think it is boring. I think we should take risks, we should put 18 or 19-year-old top talents in a top car, and give them a chance.”

“But the problem is that if you lose a drivers' championship or a constructors' championship because they are on a learning curve, that is obviously not great. We have not done it and Ferrari has not done it in the past. So we need to question it.”

Wolff suggested at Monza that third cars would solve the problem, but that hornet's nest has been stirred up before. Midfield teams have no desire to be fighting for scraps behind three Mercedes, three Ferraris and three Red Bulls.

One simple solution could fast-track Ocon to a seat – he could be allowed out of his contract, and be free to go wherever, with no future ties. Wolff admits that it's something that he may have to give consideration to, but it would surely be a last resort.

“Fundamentally why we do this is we take great enjoyment in helping young talent that lacks finances,” says Wolff. “But if our support works until F1 but then it is detrimental for these guys having the right seats, you need to consider these things.”

“My long-term perspective for him is still very optimistic. He can drive, and he has a great personality and eventually he is going to be in a car that can win races, and maybe a championship.” #

YOUR SAY

*Another display of petulance from Sebastian Vettel in the Italian Grand Prix.
I guess we still have to wait for him to grow up.*

NEIL DAVEY

Vettel soured the taste of a great race

Oh dear, another display of petulance from Sebastian Vettel at Monza. He grumbled about being beaten to pole by his 'team-mate', he didn't want to talk about why he wasn't happy, then of course it was Lewis Hamilton's fault that they collided at the chicane because he was squeezed!

Strange that the rest of the world clearly saw Vettel running wide and into Hamilton's sidepod, then spinning. I guess we still have to wait for Vettel to grow up.

However, it was a great race, and a fabulous drive from Hamilton to chase down and pass Kimi Raikkonen. Other good scraps down through the field – proper racing!

Neil Davey

Newport, South Wales

Everyone needs to ease the heat on Stroll

Why have people got the hump regarding the possibility of Lance Stroll going to Racing Point Force India?

So his dad has led a consortium to buy the team, but if you had a son racing in Formula 1 and you believed in him, wouldn't you want to put him in your team? Especially when it means putting him in a significantly better car.

As for people saying he's only in F1 because of his dad's money: didn't Michael Schumacher and Niki Lauda start off as pay drivers when they first arrived on the grand prix scene?

Stroll categorically has the talent to be in F1, he proved that with his podium finish in Baku last year. Also we all need to remember that he had won three titles before he got to F1 – that's three more titles than Max Verstappen.

Give Lance a break and let's see what he can really do.

Matt Lloyd

Wales

John Love is an unsung BTCC star

I read with interest the British Touring Car Championship supplement (August 15), and noted in the list of champions a man who has largely been unsung – John Love, who was the champion in 1962.



Of the eight races contested, he won Class A seven times (Christabel Carlisle won the other) and he beat the likes of Jack Sears, Graham Hill, Mike Parkes and John Whitmore, driving for the works Mini Cooper team – which was run at the time by Ken Tyrrell. He was the first non-Brit to win the championship, since he hailed from Rhodesia, and following an accident in a Formula Junior race, driving for Ken Tyrrell, he lost his chance to drive for a Formula 1 team.

A quiet man, he was a top bloke.

Peter Farnell-Watson

Byemail

Don't dismiss IndyCar as a talent graveyard

With regards to Paul Millward's letter (August 30), Mario Andretti didn't move to Indycars once past his peak. Yes he saw out his career there, but he was a two-time champion in that category before ever racing an F1 car. F1 should be for the best drivers, but too often it is not – I'd put forward Jeff Gordon, Rick Mears and Scott Dixon as just a few who didn't make it there, and Philippe Adams as one who did.

Darren Galpin

Bristol

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HOW HAMILTON FORCED FERRARI'S IMPLOSION

Ferrari looked to have the Italian Grand Prix sewn up, until a brilliant performance by the reigning world champion exposed its weaknesses

EDD STRAW





THIS WAS A GRAND PRIX LEWIS HAMILTON HAD NO BUSINESS WINNING. ON WHAT everyone expected to be a famous Monza day for the tifosi, Ferrari squandered a potential one-two and Sebastian Vettel lost vital ground in the world championship. To say Ferrari lost does a great race a disservice, for the Italian Grand Prix was a race won, emphatically, by Hamilton and Mercedes. It's a victory that ranks among the best of the four-time world champion's 68 Formula 1 wins.

At every turn, even in qualifying, Hamilton was right there on the shoulder of Ferrari's drivers, piling on the pressure. This was his victory, because he forced the errors and made the vital passes when he had to.

Things didn't look so encouraging at the start. Hamilton ran third out of the first chicane having watched Vettel's failed attempt to take the lead around the outside of Kimi Raikkonen. But when Vettel had another glance up the inside of his team-mate on the run to the second chicane, Hamilton seized his chance.

He took the outside line, outraking Vettel and turning in to the left/right flick fractionally ahead of the Ferrari. Mid-corner, Hamilton and Vettel made contact, with the Ferrari spinning to the back and suffering front-wing damage. Vettel's world had fallen apart, and as he cruised back to the pits he had good reason to rue Ferrari's decision in qualifying to place Raikkonen behind him rather than give a tow – potentially costing pole position.

"At the first chicane, I tried to pass him [Raikkonen] on the outside," said Vettel. "As is his right, he opened the brakes in defence. Then I had a late braking point and was deep into Turn 1 and had to give him room. He came back, and then I got squeezed.

"Fortunately, Lewis wasn't in a position to react immediately so I could get back. I had a poor exit out of Turn 2 and would've liked to be closer. I wanted to get down the inside into Turn 4 and had the space, but again Kimi opened the brakes, which is absolutely fine for him to do. I could have done the same, but the apex is coming very rapidly and it would've been a nasty one. I tried to get out and then Lewis saw his chance, but didn't give me any room and turned in."

Hamilton was, justifiably, delighted with a move that transformed the complexion of his race.

"He was on the limit, it's just by the time he got to the apex Kimi came across and he would probably have lost a bit of downforce," said Hamilton. "Obviously, he went in a bit deep, I gave him the right amount of space. I'm so proud of that manoeuvre."

The safety car was deployed to tidy up the debris, and the luckless Brendon Hartley's Toro Rosso that had been sandwiched at the start and suffered front-wing damage and twin blowouts. Calm briefly prevailed before the restart at the end of lap three.

Hamilton got a run on Raikkonen out of Parabolica and breezed into the lead on the start/finish straight.

But Raikkonen wasn't willing to settle for second best, repassing Hamilton around the outside into the second chicane. The legend of the Monza slipstreamers of yore lives on.

Hamilton stuck with Raikkonen throughout the first stint and never dropped further back than 1.5 seconds, which was what separated the two on lap 15. On laps 16 and 17 Hamilton took a combined total of half a second out of Raikkonen to ensure he was as close as possible as the pitstops approached. The question was, who would blink first?

Ferrari was rightly fearful of being undercut, and with an inviting gap for both of the leaders between Valtteri Bottas in fourth place and midfield leader Romain Grosjean's Haas in fifth, both crews





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Hamilton prepares to jump Raikkonen at the restart

SBLOXHAM/LAT motorsport IMAGES

headed into the pitlane as the duo completed the 20th lap.

Hamilton was instructed to do the opposite to Raikkonen, so when the leader peeled into the pits he stayed out. Some interpreted this as a ‘phantom stop’ designed to hoodwink Ferrari. But given Hamilton would have attempted the undercut had Raikkonen continued and pitted, it was perfectly legitimate.

Raikkonen was turned around in a sharp 2.2s and sent back out on softs, emerging 23s behind and in clear air in fourth place. Raikkonen took 0.4s out of Hamilton in the second and third sectors on his out-lap, but only 0.043s on the following lap.

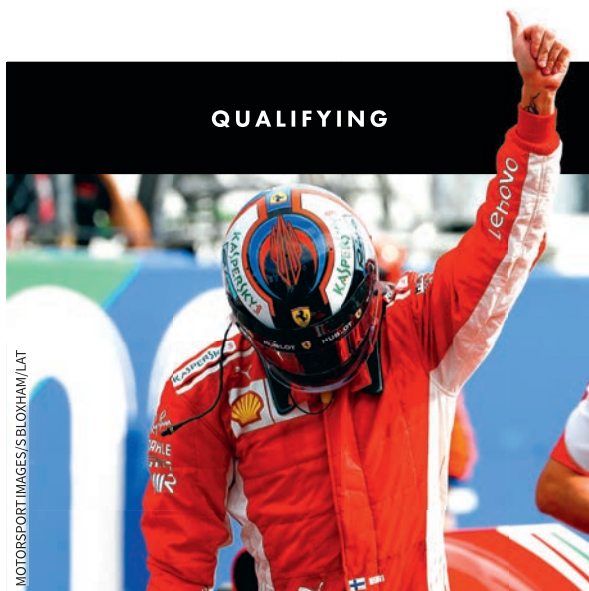
As he didn’t have enough of a gap to stop and retain the lead, Hamilton stayed out. His pace was good, but he just couldn’t quite eke out enough and Raikkonen started to close further. Mercedes had no choice but to leave Hamilton out in the hope of a safety car.

It came so close to happening. Daniel Ricciardo started 19th and had made his way up to 11th when the rear of his Red Bull emitted a puff of smoke after a clutch problem. He parked between the second chicane and the first Lesmo, and unfortunately for Mercedes his car was recovered under double waved yellows.

Raikkonen chipped away at Hamilton’s lead, and when Hamilton came in after extending his stint to lap 28 – eight laps longer than the Ferrari driver – the gap was down to 18s. Hamilton rejoined in third place, 5.7s behind Raikkonen. But Mercedes still had a card to play, >>



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QUALIFYING

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ONE OF THE MOST FRUSTRATING CERTAINTIES OF THE 2018 Formula 1 season was finally shattered at Monza, with Kimi Raikkonen taking his first pole position of the season. Time after time, Raikkonen has had underlying pace to challenge for pole but made errors or been too conservative at key moments in Q3. But at Monza, he made no such mistake to take pole by 0.161 seconds.

Two seconds before Raikkonen finished his lap, it seemed Ferrari team-mate Sebastian Vettel had delivered the goods. He knocked first-run leader Lewis Hamilton off top spot with a lap of 1m19.280s and had started to celebrate over the radio when he was told Kimi had beaten him.

Later, Vettel blamed a scruffy lap and resisted any temptation to blame the team for what happened. He also confirmed that it was Ferrari's standard procedure to alternate who runs first in qualifying, with it rightfully being Raikkonen's turn. But Vettel did have a tow available from Lewis Hamilton – who had Mercedes team-mate Valtteri Bottas ahead – that was squandered by dropping too far back late in the out-lap. He finished his flying lap six seconds behind, which was too far to capitalise.

“To be honest it was not a tidy lap,” said Vettel. “I lost a bit at the first chicane, second chicane, the Lesmos, pretty much a bit everywhere. The last sector was OK but not fantastic, so just not a good lap and not good enough.”

“IT WAS NOT A TIDY LAP. I LOST TIME PRETTY MUCH EVERYWHERE”
VETTEL

Despite that, the places where he lost time relative to Raikkonen – in the first and second sectors – suggested the tow did make all the difference.

Hamilton admitted that his second run wasn't perfect, as he was 0.085s off his ideal lap, which would have been enough to split the Ferraris had he nailed it. Team-mate Bottas ended up 0.537s down. The lack of a proper tow held him back, although he set the fastest time in the middle sector that features the two Lesmos.

Max Verstappen was in no-man's land between the top four and the rest, with the midfield pack led by Haas driver Romain Grosjean. In a tight session, Pierre Gasly and Lance Stroll aced it in Q1 and Q2 to get into the top 10.

With Daniel Ricciardo and Nico Hulkenberg both carrying hefty grid penalties and not attempting to set a time in Q2, the big surprise of the session was Sergio Perez falling in Q1, after the Racing Point Force India team misjudged the cut-off time and didn't send him out for a second run.

EDD STRAW



MOTORSPORT IMAGES/ANDRE/SUTTON

Bottas played his part by holding up Raikkonen, reaping podium reward



Hamilton's battles for the lead with Raikkonen gave the race a thrilling edge

for Bottas now led. Raikkonen was, at this point, just 1.5s adrift.

Under instructions to keep Raikkonen behind, Bottas was also embroiled in a battle for third with Red Bull's Max Verstappen and running long in pursuit of a late-race tyre advantage. On a weekend where Red Bull was well off the pace of the leaders, but also comfortably ahead of the rest of the pack, Verstappen had passed Bottas around the outside into the first corner to hold third throughout the first stint after Vettel's spin.

Verstappen made his pitstop on lap 26, while Bottas went all the way to the end of lap 36 before stopping, by which time Hamilton had long since latched back on to the back of Raikkonen.

But it was already clear that Raikkonen was in serious trouble. The rear-left was suffering from major blistering, thanks to a combination of the Finn needing to attack at the start of his stint when there was the most tread on the tyre and overheating is a more serious problem, and the fact that the rear end of the Ferrari seemed a little loose. In fact, hints of rear-end instability had been there all weekend – notably when Vettel spun into the Parabolica gravel during FP2 – and while not a problem most of the time, that might have accentuated the blistering.

Vettel had struggled a little on the set of softs he took after his first-lap incident, but not as much as Raikkonen – likely because he had to be even more cautious owing to the extra fuel weight and the amount of time he spent in traffic.

Monza places a big demand on the tyres longitudinally. The heavy braking zones and hard accelerations ask a lot of the rubber, and Raikkonen was desperately trying to manage the situation. The fact that FP1 was wet, FP2 shortened by 20 minutes thanks to Marcus Ericsson's massive accident, and that Raikkonen spent time stuck behind Bottas and Ferrari had a grand total of one set of softs between its two drivers for use in practice – used by Raikkonen – created a perfect storm. In the first stint, things had been fine for Raikkonen on supersofts.

Behind, Hamilton had a minor problem with front blistering.



“IT WAS CLEAR RAIKKONEN WAS IN BIG TROUBLE, HIS LEFT-REAR SUFFERING MAJOR BLISTERING”

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Car balance can have a big impact on whether the fronts or rears have problems, but for Mercedes the trouble wasn't only at the other end of the car, it was also less severe.

“Lewis, this race will be won or lost with tyres, just look after them,” Hamilton's race engineer, Pete Bonnington, told him on lap 35 – warning his charge not to do the same. He was bang on the money.

Once Bottas was out of the way Raikkonen's pace picked up, but given his tyre situation he had no chance of pulling away from Hamilton. The Mercedes driver bided his time, but at the end of lap 44 he had his chance. With Raikkonen struggling for rear grip at the Parabolica and demanding over the radio that he needed all the power at his disposal, Hamilton got close enough to him to attack using the DRS.

Raikkonen took the inside line on the approach to Turn 1, so Hamilton moved to the left. On the brakes, he pulled alongside and ahead of Raikkonen. Hamilton had his car in just the right

place, with Raikkonen having to wait before he could take the left-hand part of the chicane and accepting his lead was lost.

If there was any doubt before this that Raikkonen was in big trouble, Hamilton underlined it by disappearing at the rate of a second per lap. He crossed the line after 53 laps 8.705s clear of Raikkonen, who had his hands full making sure his rear-left didn't give out completely.

Bottas finished third. Having made his stop, he rejoined 3.2s behind Verstappen with soft Pirellis 10 laps younger and quickly began to close. Having not had a serious shot at passing Verstappen in the first stint, save perhaps for a vague look that resulted in Verstappen cutting the first chicane, Bottas had to make something happen.

On lap 43 he made his move to the outside. Verstappen defended, but as the chicane approached he moved to the left and made wheel-to-wheel contact with Bottas. Bottas took to the escape road and Verstappen stayed ahead, but stewards then hit the Red Bull driver with a 5s penalty. This was entirely proper given the rule stating >>



Verstappen's stout defence against Bottas earned him 5s penalty

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TRACKSIDE VIEW

The approach to Monza's first corner seems simple enough: a long, fast straight leading into a slow right/left chicane. But with cars travelling at over 200mph before hitting the brakes, all running ultra-low-downforce set-ups with skinny rear wings, this is no ordinary braking zone. And not just because, as Marcus Ericsson found out during FP2, if something goes wrong it's a very short, high-speed journey to the barriers.

Heading down to Turn 1 for Saturday's free-practice session (FP3), which allows a quick look at the legendary banking on the way, there's an immediate reminder of just how trimmed-out these cars are. That makes a huge difference when drivers hit the brakes from more than 200mph – doubly so when there's still a little dampness on the track, which catches out both McLaren drivers early on. In Stoffel Vandoorne's case the result is a massive flatspot.

After Ericsson's huge accident the day before, he starts the session closing the DRS significantly earlier than the rest. This is a wise precaution, giving time for the airflow to reattach and the downforce to return in time for the braking zone. And, as Ericsson later admits, he wanted to ease himself back into it after his wild ride.



Early in the session Sebastian Vettel has a lock-up into Turn 1, but this is a legacy of the start of the braking phase. Immediately the rear becomes unstable and is 'pushing' the car into the braking zone, loading up the fronts more. But otherwise the Ferraris look strong.

It's then time to move around to the middle of the chicane to compare the traction of the Mercedes and the Ferraris – a weakness for the former at Spa. The exit of the first chicane should expose this most dramatically, but

interestingly Lewis Hamilton finds a way to counteract this. While both Ferrari drivers take a conventional line through the chicane, straight-lining it as much as possible and relying on the strong traction of the Ferrari to pull them out of the turn on top of the speed already carried through it, Hamilton rotates the car more in the first part of the chicane and squares off the exit slightly. This allows him to be more progressive on the throttle and elongate the traction phase to counteract this weakness,

mitigating any potential losses.

It sounds easy, but team-mate Valtteri Bottas is struggling. He is less precise at rotating the car on entry and more variable in his lines – but usually far closer to a more conventional line.

To make an unorthodox line demands real precision. It's Hamilton's mastery of the braking and entry phase that allows him to do this consistently.

As for the Ferraris, both drivers look superb through here.

EDD STRAW

Hamilton counteracts his car's weakness with an unconventional line





Hamilton's victory at Monza extends his lead in the title chase to 30 points

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that a driver defending can move back towards the outside of the track provided they leave enough space for their rival.

While Bottas slipped over four seconds behind, this moment secured him third place. He closed back up on Verstappen and did attempt to pass him on the road, with Verstappen coming close to repeating his error in defence but not overstepping the line this time, but was content to finish behind and head to the podium thanks to the penalty.

Considering Bottas had endured a tough weekend on which he didn't quite have Hamilton's pace (although the lack of a tow in qualifying exaggerated the deficit significantly), he delivered a podium finish and contributed to Hamilton's victory. But Mercedes boss Toto Wolff was keen to underline that, while it was convenient Bottas parked in front of Raikkonen mid-race and Mercedes used that tactic to perfection, it also played a part in securing third.

"It not only worked for Lewis, keeping Kimi behind, but it also worked for Valtteri," said Wolff. "We knew that we had to keep him out long because we lost a position to Verstappen and we needed to create the largest possible tyre offset at the end of the race. That was his best shot at a podium."

Verstappen's penalty also dropped him behind Vettel, who recovered to fifth on the road before being promoted to fourth. After taking the restart on fresh softs in 18th he cleared the midfield to climb to fifth by the end of lap 24. Of the 13 places he gained, all but three were with on-track passes thanks to the combination of the Ferrari's strength on the straights and the lack of interest in fighting

from the midfielders. But his car wasn't in good shape.

"I was surprised when I got out," said Vettel. "The whole sidepod was missing; the forward edge of the floor to the outside structure of the floor was gone. The car was quite horrible to drive and I had a lot of snaps and moments that surprised me. Then I got sort of used to it and drove around it a bit. With all the traffic, it was quite messy but our pace was actually quite decent given the damage."

His recovery was complicated by a second stop to take fresh supersofts on lap 29 and he rejoined 10th. In the closing stages he passed the two Williams drivers, Sergey Sirotkin and Lance Stroll, as well as Renault's Carlos Sainz Jr and, with both Force Indias having to pit, he got back up to fifth. Fourth, once Verstappen was penalised, was a good salvage job.

But the damage was done, even if it was limited. Hamilton extended his world championship lead to 30 points, the first time this season any driver has had an advantage worth more than the 25 available for victory.

Ferrari unquestionably had the quicker car in qualifying, and while Mercedes proved to have the edge in the race this very likely might have been down to circumstances. After all, we never saw how quick an undamaged Vettel really was. But for Mercedes it was just reward for some serious analysis after its Spa defeat that helped it to mitigate what Wolff described a weekend earlier as "many deficits". It was certainly stronger relative to Ferrari on Sunday than on Saturday.

Mercedes did an impeccable job at Monza, but the brilliance of Hamilton was the key ingredient that made all the difference. Whenever he was needed, he was there hassling, asking Ferrari tough questions it couldn't answer. And crucially for the world championship, for the fourth time this season Vettel made a misjudgement that cost him dearly.

Perhaps even the tifosi that gathered below the podium, many of them booing the man who vanquished their beloved Ferraris, will have grudgingly accepted that Hamilton had the measure of everyone. #

"MERCEDES DID AN IMPECCABLE JOB, BUT HAMILTON'S BRILLIANCE WAS THE KEY INGREDIENT"



Ericsson escapes spectacular accident

Marcus Ericsson escaped a massive accident on his first flying lap two minutes into FP2, caused by the DRS failing to close when he braked for the first chicane.

The Sauber driver tripped the speed trap 212 metres before the corner at 201mph, moments before the car snapped to the left when he hit the brakes. It hit the

barrier head on, then as it spun down the grass was tipped into a series of four rolls before coming to rest the right way up.

Ericsson said that he endured several impacts of more than 25g during the accident. “Normally, when you crash, it’s a corner where you carry too much speed or you hit someone so you see it happening before it

happens,” he said, “whereas this was just so sudden and unpredictable.

“I just touched the brakes and suddenly the car spins at that speed, and it starts rolling and flying around. I had no idea what was going on. I think it was three impacts that were more than 25g while rolling and flying in the air.”

Team-mate Charles Leclerc had a similar

Ricciardo’s retirement not down to ‘Spec C’ engine



Red Bull and Renault say Daniel Ricciardo’s retirement from the Italian Grand Prix was caused by a suspected problem with his car’s clutch, rather than an engine failure.

Ricciardo had just passed Sergey Sirotkin’s Williams for 11th place, having worked his way up from a back-row start at Monza, when he was forced to pull off the circuit between the second chicane and the first Lesmo with smoke pouring out of his Red Bull.

The Australian driver had Renault’s new Spec C engine fitted ahead of the weekend, which the French manufacturer said would be worth 0.3 seconds in lap time but carried a reliability risk.

Although Ricciardo’s failure looked initially like an engine problem,

Renault said subsequent inspections indicated this was not the case. “We can confirm that his retirement was not linked to the engine,” a Renault statement said. “It was rather a clutch issue.”

Red Bull team boss Christian Horner added: “We are still not entirely sure on the cause but it is a suspected clutch issue.”

Both Ricciardo and Max Verstappen ran the Spec C Renault engine, but only Ricciardo was hit with a grid penalty because he had previously used his maximum allocation of three internal-combustion engines.

The Renault works team did not use the Spec C engine because of concerns about reliability, not in the short term, but taking into account the need to complete significant mileage to avoid penalties.

STAT
25g
 The force of the impacts
 that Ericsson endured



PIC SEQUENCE: SUTTON
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Magnussen hits out at Alonso

Kevin Magnussen hit out at Fernando Alonso following their clash in Q3, saying he “laughed in my face” and “thinks he’s a god”.

Alonso’s McLaren tried to pass Magnussen’s Haas round the outside into the first chicane on the final lap in Q2, but the pair ended up scrapping for position and ruining each other’s laps as they both missed out on a berth in the top 10 shootout. Alonso had been running ahead of Magnussen on the out-lap, but appeared frustrated that Magnussen passed him on the run to Parabolica.

“I don’t care to speculate why he did it. I think it was just pretty stupid and not necessary,” said Magnussen. “He thought he could have the perfect slipstream and overtake me. He gained – I don’t know how many tenths – but you gain a lot if you do that. But I’m not going to let him pass me, and sacrifice my own lap. No way. I know he thinks he’s a god, but no way.”

Alonso was critical of Magnussen for making the original pass on the run to the Parabolica. “We were all running together at the end of the out-lap and one of the Haas cars decided to overtake and start the lap in the middle of all the cars that were more or less in position,” said Alonso. “So we started the lap together and we reached the first corner together and we ruined both our laps.”



MOTORSPORT IMAGES/HONE/LAT

problem with his DRS but, because he prefers to close the rear wing manually rather than using the automatic system, it did not have the same consequences.

The team corrected what FIA race director Charlie Whiting described as a “small design flaw” for subsequent running. This did not involve changing the rear wing or the DRS system, but not opening the DRS to the

maximum width the rules permit. This counteracts the fact that the low-drag Monza wing was generating lift when the DRS was open thanks to positive pressure on the undersurface.

Ericsson finished 15th after escaping contact with Brendon Hartley off the startline, while Leclerc was 11th on a weekend when Sauber was puzzled by its lack of pace.

Q & A VALTTERI BOTTAS

Mercedes driver

Valtteri Bottas finished third at Monza after qualifying fourth, 0.362 seconds off team-mate Lewis Hamilton. He took third place after Max Verstappen was given a 5s penalty for his illegal defending against Bottas.

Any explanation of where the differences were to Lewis Hamilton this weekend?

In the wet it was all fine. In practice two, I just didn’t get enough clean laps – I had a few mistakes here and there. Practice three definitely was lacking pace. We made set-up changes from FP2 to FP3, to try to improve off the corners and the balance, but that set-up made braking much more difficult. We had to change the set-up again for qualifying, to go back to

what I had on Friday. It was getting better and better through qualifying, and in the end in the corners – all the corners – I saw no difference between me and Lewis [implying the time loss was due to Hamilton getting a tow].

You played your role in Lewis’s victory, and you seem to be playing your role well...

Before the race we went through all the scenarios strategy-wise, and honestly there’s a minimal difference in terms of where you stop because the tyres can last so long. So, it wasn’t really like I was sacrificing my race, as long as I was keeping Kimi [Raikkonen] behind – if he overtook me then for sure I would lose time. I was happy to do it, because I knew I’d

still get a chance to attack Verstappen, so I don’t think we compromised my result.

Were you surprised Verstappen moved under braking?

I was trying to race him hard. I was trying initially to go on the inside, which was maybe a bit far [back], but he locked up, went straight, kept his position. I know he is one of the more aggressive in terms of defending and attacking, but I still wanted to race hard and expected him to race fair. He covered the inside, I braked on the outside, we were pretty much side by side and he just started to drift to the left. The rule is very simple – when you defend on the inside it doesn’t cost you anything if you leave a car’s width, and it’s for the guy on the outside.



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STAT

163.785MPH

Kimi Raikkonen's record-breaking pole speed



Raikkonen breaks qualifying record

Kimi Raikkonen's pole position time set a new record for the fastest average speed for a Formula 1 World Championship lap at 163.785mph.

This breaks the record set by Williams-BMW driver Juan Pablo Montoya (above) in first qualifying at Monza in 2004 – 162.950mph.

This is only the third time the record has been broken in 33 years since Keke Rosberg's 160.925mph pole lap in the Williams-Honda at the 1985 British Grand Prix at Silverstone. Montoya initially broke the record at Monza in 2002, before setting his longstanding mark there two years later.



Haas excluded for floor infringement

Romain Grosjean was excluded from sixth place at Monza after the floor of his Haas was found to be illegal following a protest by the Renault team.

The stewards ruled that the reference plane – the lowest point of the car other than the wheels – did not comply with Article 3.7.1d of the technical regulations. This states: "The surface formed by all parts lying on the reference plane must have a 50mm radius (+/- 2mm) on each front corner when viewed from directly beneath the car, this being applied after the surface has been defined."

The stewards also referenced a subsequent technical directive, issued on July 25, that clarified the regulation because it was "being applied differently by several different teams". This required Haas to modify the floor, which has run in this configuration since June's Canadian Grand Prix, by the Italian GP.

Haas had informed FIA head of single-seater technical matters Nikolas Tombazis in an email that

it aimed to do so for September's Singapore GP, arguing that the mandatory summer shutdown delayed production of a new floor.

Stewards confirmed Tombazis did not respond to that specific point, replying to technical details in the same email, which Haas took to mean it could continue on its timeline. But as Tombazis confirmed he had told Haas head of aerodynamics Ben Agathangelou in conversation that this would leave Haas open to a protest, the stewards accepted no such extension had been granted.

The infringement relates to the T-tray at the front of the floor, which must be shaped in a certain way. The 50mm radius was adhered to for the floor itself, but the connection of a new footplate design to the splitter changes the way in which the radius was viewed from directly beneath the car, as stipulated by the rules.

Haas served notice of its intent to appeal on Sunday night, but as Autosport closed for press had yet to confirm it was proceeding.

'New' Force India up to seventh

The 'new' Racing Point Force India team moved up to seventh in the constructors' championship after Esteban Ocon and Sergio Perez finished sixth and seventh at Monza.

It has taken the team, which is technically new after a consortium led by Lawrence Stroll bought the old squad's assets but not its F1 entry, ahead of Sauber and Toro Rosso, having passed Williams at Spa.

Ocon qualified eighth, and ran seventh after Sebastian Vettel's spin. He then passed Carlos Sainz Jr for sixth and rejoined ninth after his lap-38 pitstop. He moved up to seventh when Sainz and Perez stopped. That became sixth when Romain Grosjean was excluded.



Perez had a tougher path to his seventh place thanks to the team misjudging the time cutoff to advance from Q1 to Q2, meaning he did not attempt a second run and was eliminated by 0.001s.

He started 14th and got into the top 10 on lap eight after passing Fernando Alonso. He subsequently passed Sergey Sirotkin and Lance Stroll, before slipping back to ninth behind the recovering Vettel. He then passed Sainz on lap 24 to run behind Ocon. Perez also stopped late, emerging eighth and taking seventh on Grosjean's exclusion.



FREE PRACTICE 1

POS	DRIVER	TIME
1	Perez	1m34.000s
2	Raikkonen	1m34.550s
3	Ocon	1m34.593s
4	Hartley	1m35.024s
5	Ricciardo	1m35.207s
6	Gasly	1m35.438s
7	Verstappen	1m35.665s
8	Sainz	1m35.995s
9	Hulkenberg	1m36.107s
10	Bottas	1m36.238s
11	Hamilton	1m36.546s
12	Leclerc	1m36.648s
13	Magnussen	1m37.066s
14	Alonso	1m37.426s
15	Grosjean	1m37.683s
16	Ericsson	1m37.790s
17	Vettel	1m37.867s
18	Sirotkin	1m37.929s
19	Stroll	1m38.253s
20	Norris	1m38.282s

WEATHER 19C, damp

FREE PRACTICE 2

POS	DRIVER	TIME
1	Vettel	1m21.105s
2	Raikkonen	1m21.375s
3	Hamilton	1m21.392s
4	Bottas	1m21.803s
5	Verstappen	1m22.154s
6	Ricciardo	1m22.296s
7	Ocon	1m22.930s
8	Perez	1m22.942s
9	Leclerc	1m22.965s
10	Hulkenberg	1m23.063s
11	Grosjean	1m23.077s
12	Sainz	1m23.193s
13	Magnussen	1m23.233s
14	Gasly	1m23.402s
15	Sirotkin	1m23.514s
16	Hartley	1m23.531s
17	Stroll	1m23.566s
18	Alonso	1m23.741s
19	Vandoorne	1m24.084s
20	Ericsson	no time

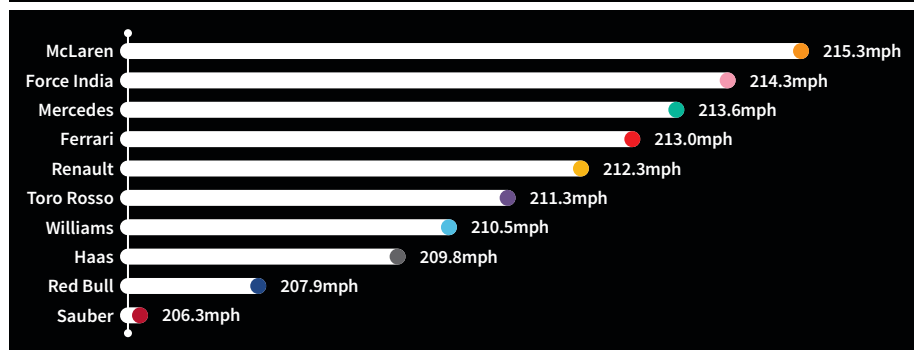
WEATHER 22C, cloudy

FREE PRACTICE 3

POS	DRIVER	TIME
1	Vettel	1m20.509s
2	Hamilton	1m20.590s
3	Raikkonen	1m20.682s
4	Bottas	1m21.112s
5	Verstappen	1m21.388s
6	Magnussen	1m22.011s
7	Ocon	1m22.055s
8	Ricciardo	1m22.310s
9	Leclerc	1m22.313s
10	Grosjean	1m22.357s
11	Perez	1m22.486s
12	Gasly	1m22.631s
13	Sainz	1m22.737s
14	Sirotkin	1m22.778s
15	Stroll	1m22.860s
16	Ericsson	1m22.882s
17	Alonso	1m22.892s
18	Vandoorne	1m22.987s
19	Hulkenberg	1m23.149s
20	Hartley	1m23.164s

WEATHER 22C, sunny

SPEED TRAP



QUALIFYING 1

POS	DRIVER	TIME
1	Vettel	1m20.542s
2	Raikkonen	1m20.722s
3	Hamilton	1m20.810s
4	Ricciardo	1m21.280s
5	Bottas	1m21.381s
6	Verstappen	1m21.381s
7	Ocon	1m21.570s
8	Sainz	1m21.732s
9	Magnussen	1m21.783s
10	Hulkenberg	1m21.801s
11	Sirotkin	1m21.813s
12	Gasly	1m21.834s
13	Stroll	1m21.838s
14	Alonso	1m21.850s
15	Grosjean	1m21.887s
16	Perez	1m21.888s
17	Leclerc	1m21.889s
18	Hartley	1m21.934s
19	Ericsson	1m22.048s
20	Vandoorne	1m22.085s

QUALIFYING 2

POS	DRIVER	TIME
1	Vettel	1m19.629s
2	Hamilton	1m19.798s
3	Raikkonen	1m19.846s
4	Verstappen	1m20.333s
5	Bottas	1m20.427s
6	Grosjean	1m21.239s
7	Ocon	1m21.315s
8	Stroll	1m21.494s
9	Sainz	1m21.552s
10	Gasly	1m21.667s
11	Magnussen	1m21.669s
12	Sirotkin	1m21.732s
13	Alonso	1m22.568s
14	Hulkenberg	no time
15	Ricciardo	no time

QUALIFYING 3

POS	DRIVER	TIME
1	Raikkonen	1m19.119s
2	Vettel	1m19.280s
3	Hamilton	1m19.294s
4	Bottas	1m19.656s
5	Verstappen	1m20.615s
6	Grosjean	1m20.936s
7	Sainz	1m21.041s
8	Ocon	1m21.099s
9	Gasly	1m21.350s
10	Stroll	1m21.627s

WEATHER 21C, cloudy

SEASON STATS

DRIVERS' CHAMPIONSHIP

1	Hamilton	256
2	Vettel	226
3	Raikkonen	164
4	Bottas	159
5	Verstappen	130
6	Ricciardo	118
7	Hulkenberg	52
8	Magnussen	49
9	Perez	46
10	Ocon	45
11	Alonso	44
12	Sainz	34
13	Gasly	28
14	Grosjean	27
15	Leclerc	13
16	Vandoorne	8
17	Stroll	6
18	Ericsson	6
19	Hartley	2
20	Sirotkin	1

CONSTRUCTORS' CHAMPIONSHIP

1	Mercedes	415
2	Ferrari	390
3	Red Bull	248
4	Renault	86
5	Haas	76
6	McLaren	52
7	Racing Point Force India	32*
8	Toro Rosso	30
9	Sauber	19
10	Williams	7

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

QUALIFYING BATTLE

Hamilton	9	5	Bottas
Vettel	11	3	Raikkonen
Ricciardo	2	11	Verstappen
Perez	3	11	Ocon
Stroll	6	8	Sirotkin
Hulkenberg	8	6	Sainz
Gasly	9	3	Hartley
Grosjean	5	8	Magnussen
Vandoorne	0	14	Alonso
Ericsson	3	11	Leclerc

WINS

Hamilton	6
Vettel	5
Ricciardo	2
Verstappen	1
Raikkonen	1
Ricciardo	1

FASTEST LAPS

Bottas	4
Ricciardo	4
Hamilton	2
Verstappen	2
Raikkonen	1
Vettel	1



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STARTING GRID



RACE RESULTS ROUND 14/21 53 LAPS - 190.60 MILES

POS	DRIVER	TEAM	FINISHTIME	LED	TYRES
1	Lewis Hamilton (GB)	Mercedes	1h16m54.484s	18	SSu, Sn
2	Kimi Raikkonen (FIN)	Ferrari	+8.705s	28	SSu, Sn
3	Valtteri Bottas (FIN)	Mercedes	+14.066s	7	SSu, Sn
4	Sebastian Vettel (D)	Ferrari	+16.151s		SSu, Sn, SSu
5	Max Verstappen (NL)	Red Bull-Renault	+18.208s		SSu, Sn
6	Esteban Ocon (F)	Force India-Mercedes	+57.761s		SSu, Sn
7	Sergio Perez (MEX)	Force India-Mercedes	+58.678s		SSn, Sn
8	Carlos Sainz (E)	Renault	+1m18.140s		Sn, Sn
9	Lance Stroll (CDN)	Williams-Mercedes	-1 lap		SSu, Sn
10	Sergey Sirotkin (RUS)	Williams-Mercedes	-1 lap		SSn, Sn
11	Charles Leclerc (MC)	Sauber-Ferrari	-1 lap		Sn, SSn
12	Stoffel Vandoorne (B)	McLaren-Renault	-1 lap		SSn, Sn
13	Nico Hulkenberg (D)	Renault	-1 lap		SSn, Sn, SSn
14	Pierre Gasly (F)	Toro Rosso-Honda	-1 lap		SSu, Sn
15	Marcus Ericsson (S)	Sauber-Ferrari	-1 lap		Sn, SSn, SSn
16	Kevin Magnussen (DK)	Haas-Ferrari	-1 lap		Sn, Mu
EX	Romain Grosjean (F)	Haas-Ferrari	+56.320s		SSu, Sn
R	Daniel Ricciardo (AUS)	Red Bull-Renault	23 laps-clutch		Sn, SSn
R	Fernando Alonso (E)	McLaren-Renault	9 laps-electrical		SSn
R	Brendon Hartley (NZ)	Toro Rosso-Honda	0 laps-collision		SSn

FASTEST LAPS

POS	DRIVER	TIME	GAP	LAP
1	Hamilton	1m22.497s	-	30
2	Vettel	1m22.505s	+0.008s	51
3	Bottas	1m22.907s	+0.410s	39
4	Raikkonen	1m23.515s	+1.018s	28
5	Perez	1m23.529s	+1.032s	43
6	Verstappen	1m23.609s	+1.112s	41
7	Ericsson	1m23.768s	+1.271s	44
8	Sirotkin	1m23.768s	+1.271s	52
9	Sainz	1m24.056s	+1.559s	52
10	Hulkenberg	1m24.059s	+1.562s	47
11	Ocon	1m24.179s	+1.682s	44
12	Grosjean	1m24.243s	+1.746s	48
13	Leclerc	1m24.504s	+2.007s	52
14	Stroll	1m24.580s	+2.083s	39
15	Gasly	1m24.767s	+2.270s	46
16	Vandoorne	1m24.772s	+2.275s	47
17	Ricciardo	1m25.229s	+2.732s	18
18	Magnussen	1m25.692s	+3.195s	46
19	Alonso	1m27.009s	+4.512s	6
-	Hartley	no time	-	-

WEATHER 21C, cloudy

TYRES n - New set u - Used set Available | SH - Superhard H - Hard M - Medium S - Soft SS - Supersoft US - Ultrasoft HS - Hypersoft I - Intermediate W - Wet

WINNER'S AVERAGE SPEED 148.69mph FASTEST LAP AVERAGE SPEED 157.09mph

RACE BRIEFING

FP1 DRIVERS

LANDO NORRIS replaced Vandoorne at McLaren

GRID PENALTIES

HULKENBERG 10-place

penalty for causing a collision in the Belgian GP, and required to start from the back for additional power units used

RICCIARDO required to start from the back for additional power units used
ERICSSON 10-place penalty for additional power units used

RACE PENALTIES

VERSTAPPEN Five-second penalty and two penalty points for causing a collision
GROSJEAN Excluded for an illegal floor

STAT

100

Raikkonen became the fifth driver to score his 100th F1 podium

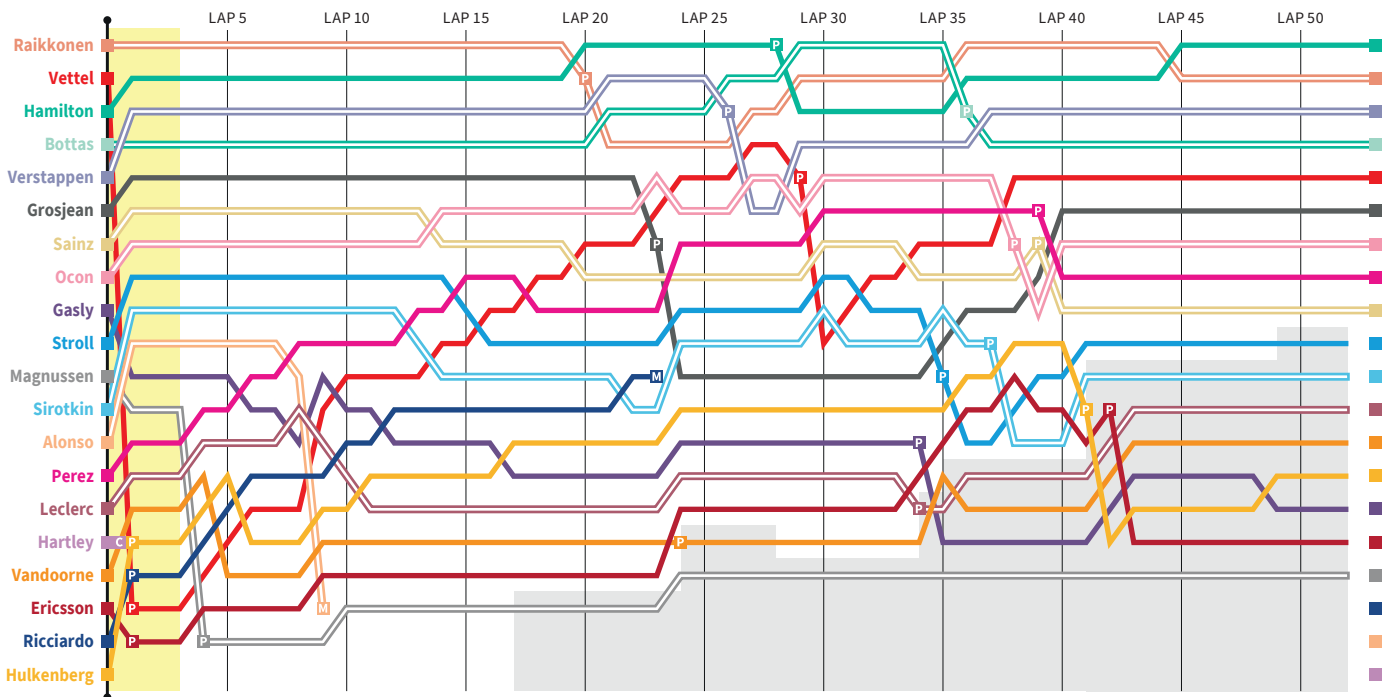
NEXT RACE

**SEPTEMBER 22
SINGAPORE GP**

Marina Bay



LAP CHART What happened, when



ONE OF THE FINEST WINS SEEN FROM HAMILTON

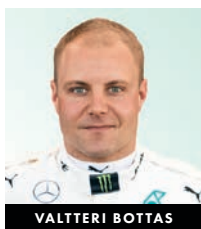
Ferrari had been on the front foot, but Lewis Hamilton was at his effervescent best as he drew a mistake from Sebastian Vettel and broke Kimi Raikkonen's resistance

EDD STRAW

MERCEDES



LEWIS HAMILTON

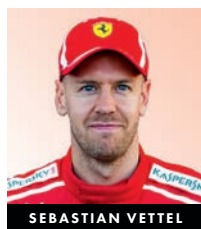


VALTTERI BOTTAS

10 This stands among Hamilton's finest wins, reliant on him making two key overtakes and piling the pressure on Ferrari. Although Vettel spun after contact, the pass on the opening lap was legitimate, and Hamilton's pace over Bottas confirms that he was at his irresistible best.

7 Bottas's deficit to Hamilton in qualifying was partly thanks to the lack of a tow, but through the weekend he didn't look to have the speed of his team-mate. He did a good job to keep Raikkonen behind him and drew a penalty-inducing error out of Verstappen. Dogged rather than dynamic.

FERRARI



SEBASTIAN VETTEL

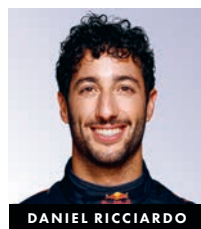


KIMI RAIKKONEN

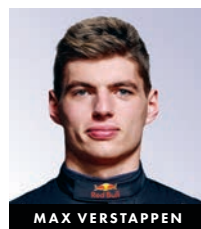
7 Missing out on pole position was down to the lack of a tow, which was excusable. His recovery in a damaged car in the race was excellent, but the bottom line is he allowed Hamilton to force him into another of the misjudgements that have cost him so much this year – hence the rating.

9 Raikkonen deserves huge credit for finally taking a pole position after wasting so many previous opportunities – and by a very healthy margin. He failed to turn the lead into victory but, given the tyre blisters and Hamilton's strength, he was always fighting a losing battle.

RED BULL



DANIEL RICCIARDO

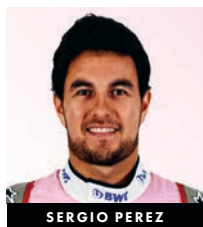


MAX VERSTAPPEN

6 Ricciardo knew he was going to be starting at the back, and that inevitably meant qualifying wasn't a priority, although he did outpace Verstappen in Q1. He made good progress in the race before he retired, climbing to 11th when he stopped with what was claimed to be a clutch failure.

7 Since Canada, Verstappen has shown few signs of the capacity for misadventure that ruined his first part of the season. But at Monza, where he was close to beating Bottas, he reverted to his old tendency to move twice in the braking zones and earned a penalty that cost two places.

FORCE INDIA



SERGIO PEREZ

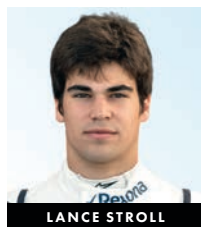


ESTEBAN OCON

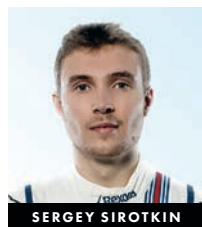
9 It wasn't Perez's fault that Force India misjudged the Q1 cutoff and condemned him to an early qualifying exit. In fact, Perez's first-run pace advantage over Ocon actually bit him in this case. But he drove a superb race, save perhaps for the clash with Magnussen at Lesmo 1, and made it look easy.

9 A minor fuel-pump problem held him back in Q3, but other than that this was a very straightforward weekend for Ocon. He was close enough to Grosjean on track that you could legitimately question whether he should have beaten him, but this was made moot when the Haas was excluded.

WILLIAMS



LANCE STROLL



SERGEY SIROTKIN

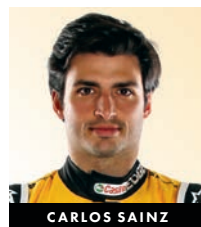
9 Stroll worked a miracle to haul a Williams through to Q3 for the first time this year, even with the help of a tow from Gasly. That laid the foundations to score points. While his pace on Sunday wasn't dramatically better than Sirotkin's, he handled himself well in traffic and drove a strong race.

8 Sirotkin didn't match his team-mate in qualifying, albeit without the benefit of a tow. That proved to be the main difference between the two all weekend, although Sirotkin did end up 5.4s behind at the finish. The fact that he set his fastest lap on the final lap showed what he could do.

RENAULT



NICO HULKENBERG



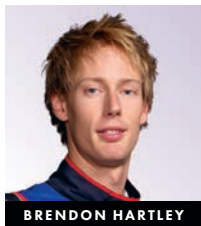
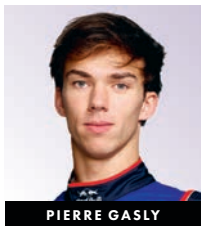
CARLOS SAINZ

7 A second consecutive weekend of hefty grid penalties, albeit primarily caused by his own error in Belgium. Hulkenberg's pace was good, but Renault gambled on him stopping early and trying to get to the end on a set of softs. Anonymous but not because of his own performance.

9 This wasn't an easy weekend for Renault, but Sainz got the best out of the car in qualifying and the race to start seventh and finish eighth. Those using Renault power were on the back foot, so while Sainz did slip behind Perez during the race it was always going to be difficult to stay ahead.



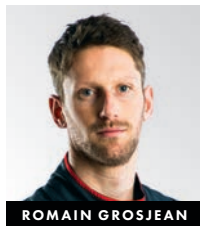
TORO ROSSO



7 Gasly's qualifying performance was outstanding, picking up a tow at all the right moments to end up ninth when he wasn't even confident of escaping Q1. But losing two positions at the start, then getting barged by Alonso at the restart and picking up damage, hastened the inevitable slide.

5 Hartley was only 0.1s behind Gasly in Q1, and slightly quicker for much of the lap after a mistake costing around 0.15s in the first chicane. That was the margin between success and failure, especially given being so far back meant he was squeezed at the start and didn't even reach the first corner.

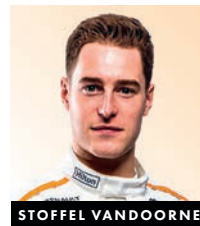
HAAS



9 Given the midfield battle in qualifying was so tight, to take 'Class B' pole position, even in the rapid Haas, was an achievement. He converted that into lights-to-flag 'victory', keeping Sainz behind early on then Ocon, on fresher rubber, at bay late on. Sadly it came to nought when his car was excluded.

6 Magnussen's weekend got away from him. The falling-out with Alonso in Q2 was largely down to Alonso's annoyance at being passed on the run to the Parabolica, but he had a stake in going off at the first chicane and clashing with Perez after the restart. But his pace mostly was good.

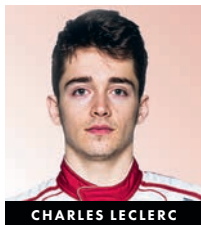
McLAREN



7 Vandoorne was struggling with a car running a mix-and-match set of parts after Alonso's Spa crash, and while he was last in qualifying it was understandable. He was unobtrusively good in the race, beating several drivers he shouldn't have. Good work from a man under pressure.

8 Alonso's highest-profile contribution to the weekend was getting into a needless spat with Magnussen in qualifying, but he still performed at a good level both in qualifying and, while it lasted, the race. He briefly ran in the points before retiring with a brake problem.

SAUBER

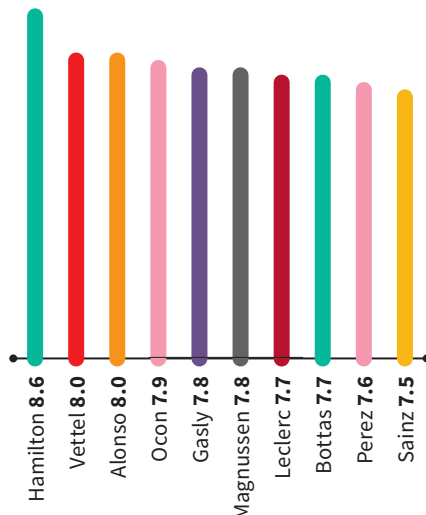


6 There's nothing Ericsson could have done about his massive FP2 accident, given it was caused by a DRS failure. That meant he was always playing catch-up. Contact with Hartley at the start gave him a puncture and he had an uphill battle from that point, but his pace was fine after that.

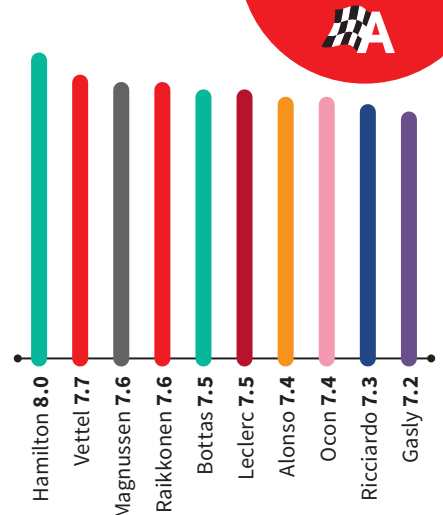
7 Leclerc was baffled by Sauber's struggle in qualifying, and things continued in the same vein in the race. He picked up some damage in a clash, but despite that managed to execute an undercut to get himself up to the edge of the points in what was eventually 11th place.

TOP 10 AVERAGE RATINGS

AUTOSPORT'S RATING AFTER ROUND 14



READERS' RATING AFTER ROUND 14



WORLD OF SPORT

ABBOTT/LAT
motorsport
IMAGES

Sato is winner as Dixon is reprieved

INDYCAR SERIES
PORTLAND (USA)
SEPTEMBER 2
ROUND 15/16

From 20th on the grid, Takuma Sato scored his third IndyCar win last Sunday and his first for Rahal Letterman Lanigan Racing. But the big winner in Portland was Scott Dixon, who somehow survived a first-lap pile-up to extend his points lead over his rueful rivals, two of whom had their hopes of title glory extinguished.

Things had looked difficult on Saturday for Dixon at Portland's scenic 1.964-mile road course, last used by Indycars in 2007. His title rivals had qualified 1-2-3, Will Power taking pole by 0.34 seconds on a 57s lap, team-mate Josef Newgarden giving Team Penske a front-row sweep, and Dixon's nearest title challenger, Andretti Autosport's Alexander Rossi, earning third. Chip Ganassi Racing star Dixon, meanwhile, was 11th and wary of potential incidents

in Turn 1, where drivers brake on the wide straight from 175mph and then funnel through a 55mph right-left-right sequence.

Most completed this task tidily on the opening lap, but exiting Turn 3 Zach Veach, who had impressed by qualifying sixth, failed to impress by aiming for the apex as if James Hinchcliffe was not halfway alongside him. Unfortunately he was, and the Canadian fell off the kerb and hit Veach, spun around and forced Sebastien Bourdais and Ed Jones onto the dirt on the outside. Marco Andretti slowed to avoid the wreck, but an unsighted Graham Rahal struck him and launched him over Hinchcliffe's stricken car, while Dixon ran into the back of Rahal.

Yet Dixon kept his engine alive and got going as the field trickled around under the full-course caution. He slowed on the pit straight to allow his crew to give the #9 car a visual checkover, got the all-clear, and hurried around to rejoin the tail of the field, still on the lead lap.

The next title contender to hit trouble

was Power, whose car had popped out of first gear and into neutral during the warm-up lap. He thought his emergency system reboot had cured the problem but, leading the field out of Turn 7 following the restart, his gearbox went to neutral and he also lost first gear. By the time he found drive (in second), he had fallen to 12th.

So Rossi and Andretti team-mate Ryan Hunter-Reay, both of whom had overtaken Newgarden on the original start, now ran one-two, with the Penske driver stuck behind RHR, who had started on the harder primary tyres and was thus losing time to the leader. Yet after the first round of stops by the leaders, Rossi ran primaries, Hunter-Reay switched to reds and still he lost second to Newgarden (also on reds).

Then out came the second yellow of the day. Banking on more caution periods, Power had been switched to a two-stop strategy and had made a very late first stop. But having climbed to ninth, he ran wide at Turn 11 and went headlong into the tyres. He'd lose a lap being towed out, then the gearbox issue would strike again and drop him seven laps down.

Four laps after the restart, Newgarden passed Rossi for the lead at exactly the same time as Jordan King (Ed Carpenter Racing) demoted Hunter-Reay to fourth. Like Power, the 2012 champion had been put on a two-stopper and couldn't afford to run full-rich fuel mixture. Yet when Veach spun at Turn 11 on lap 56 of 105, Newgarden, Rossi and King felt obliged to stop under caution, emerging in 16th, 17th and 18th and knowing that they, like all ahead, would have to stop one more time.





Attaboy! Bobby Rahal greets Sato after strategic victory



First-lap shunt ended with Andretti upside-down, and Jones and Rahal out

LePAGE/LAT motorsport IMAGES



Schmidt Peterson brought back #6 of injured Wickens, with Carlos Munoz driving

MOTORSPORT IMAGES/LePAGE/LAT

RESULTS ROUND 15/16, PORTLAND (USA), SEPTEMBER 2 (105 LAPS – 206.220 MILES)

POS	DRIVER	TEAM / CAR	TIME
1	Takuma Sato (J)	Rahal Letterman Lanigan Racing / Dallara-Honda	2h00m09.7537s
2	Ryan Hunter-Reay (USA)	Andretti Autosport / Dallara-Honda	+0.6084s
3	Sebastien Bourdais (F)	Dale Coyne Racing / Dallara-Honda	+1.8266s
4	Spencer Pigot (USA)	Ed Carpenter Racing / Dallara-Chevrolet	+4.5557s
5	Scott Dixon (NZ)	Chip Ganassi Racing / Dallara-Honda	+5.3215s
6	Simon Pagenaud (F)	Team Penske / Dallara-Chevrolet	+11.4605s
7	Charlie Kimball (USA)	Carlin / Dallara-Chevrolet	+12.0057s
8	Alexander Rossi (USA)	Andretti Autosport / Dallara-Honda	+13.3769s
9	Pietro Fittipaldi (BR)	Dale Coyne Racing / Dallara-Honda	+18.3753s
10	Josef Newgarden (USA)	Team Penske / Dallara-Chevrolet	+19.8044s
11	Tony Kanaan (BR)	AJ Foyt Enterprises / Dallara-Chevrolet	+22.1362s
12	Carlos Munoz (CO)	Schmidt Peterson Motorsports / Dallara-Honda	+22.7069s
13	Gabby Chaves (CO)	Harding Racing / Dallara-Chevrolet	+23.7138s
14	Matheus Leist (BR)	AJ Foyt Enterprises / Dallara-Chevrolet	+29.7958s
15	Jordan King (GB)	Ed Carpenter Racing / Dallara-Chevrolet	+32.1352s
16	Jack Harvey (GB)	Meyer Shank Racing with Schmidt Peterson / Dallara-Honda	+32.4191s
17	Alfonso Celis (MEX)	Juncos Racing / Dallara-Chevrolet	+48.8038s
18	Max Chilton (GB)	Carlin / Dallara-Chevrolet	+55.2123s
19	Zach Veach (USA)	Andretti Autosport / Dallara-Honda	-1 lap
20	Santino Ferrucci (USA)	Dale Coyne Racing / Dallara-Honda	-4 laps
21	Will Power (AUS)	Team Penske / Dallara-Chevrolet	-7 laps
22	James Hinchcliffe (CDN)	Schmidt Peterson Motorsports / Dallara-Honda	76 laps-retired
23	Graham Rahal (USA)	Rahal Letterman Lanigan Racing / Dallara-Honda	4 laps-retired
24	Ed Jones (UAE)	Chip Ganassi Racing / Dallara-Honda	0 laps-accident
25	Marco Andretti (USA)	Andretti Herta Autosport / Dallara-Honda	0 laps-accident

So that left Hunter-Reay up front, now with Sato in his mirrors. The RLLR driver had pitted under the first yellow and then again just before Power's incident. When Hunter-Reay made his second and last stop with 34 laps remaining, Sato hit the front.

Five laps later, rookie Santino Ferrucci stopped beside the track at Turn 6 with a fuel-pressure issue, and all teams anticipated a fourth caution, bringing their cars into the pitlane at racing speed. But not the #28 Andretti Autosport crew, who'd only recently serviced their man, who should therefore have cycled to the front. But Hunter-Reay was told there was a caution before the yellow actually flew, and dialled down his fuel mixture, and the time lost allowed Sato to emerge from the pitlane ahead of him. By the time RHR was let off the fuel 'leash', he couldn't quite catch Sato, passing the chequered flag 0.6s behind.

Bourdais finished a grateful third. His Dale Coyne Racing team had rebuilt his car after FP3 following a 130mph shunt, and he'd rewarded them with fourth on the grid. Now he'd justified their efforts to fix his car following the lap-one melee by bringing home a podium. Like Sato, his pitstop strategy fell neatly with the caution periods.

The same was true of Dixon, who had also endured a drivethrough penalty for speeding in the pitlane. Although he had to cede a spot to an aggressive Spencer Pigot soon after the final restart, Dixon was thrilled to have salvaged fifth, especially since Rossi, who had passed Newgarden following their final stops, was forced to settle for eighth.

DAVID MALSHER

Winner's average speed
102.971mph.

Fastest lap Munoz
58.7403s, 120.367mph.

Q3 1 Power 57.3467s;
2 Newgarden 57.6877s;
3 Rossi 57.7361s;
4 Bourdais 57.8881s;
5 Hunter-Reay 57.9699s;
6 Veach 58.1057s.

Q2 Power 57.3556s;
Rossi 57.4291s;
Bourdais 57.4632s;
Hunter-Reay 57.4696s;

Veach 57.5371s;
Newgarden 57.5619s;
7 Hinchcliffe 57.6429s;
8 Jones 57.6499s;
9 Andretti 57.7277s;
10 Rahal 57.7772s;
11 Dixon 57.8554s;
12 King 57.9010s.

Q1 - GROUP 1
Power 57.2143s;
Dixon 57.5496s;
Bourdais 57.5534s;
Hunter-Reay 57.5851s;
Newgarden 57.5911s;
Hinchcliffe 57.5980s;

14 Munoz 57.6748s;
16 Fittipaldi 57.7321s;
18 Ferrucci 57.7735s;
20 Sato 57.7848s;
22 Pagenaud 58.0983s;
24 Kanaan 58.2531s;
25 Kimball 58.3219s.

Q1 - GROUP 2
Jones 57.5698s;
Rossi 57.5718s;
King 57.6326s;
Veach 57.6874s;
Rahal 57.7349s;
Andretti 57.7480s;
13 Harvey 57.9620s;

15 Chilton 57.9865s;
17 Pigot 57.9939s;
19 Leist 58.0036s;
21 Chaves 58.1635s;
23 Celis 58.2735s.

CHAMPIONSHIP
1 Dixon 598;
2 Rossi 569;
3 Power 512;
4 Newgarden 511;
5 Hunter-Reay 462;
6 Pagenaud 428;
7 Robert Wickens 391;
8 Rahal 378; 9 Bourdais 369;
10 Hinchcliffe 361.



Maiden F2 win for Honda protege Makino

FORMULA 2
MONZA (I)
SEPTEMBER 1-2
ROUND 10/12

Honda protege Tadasuke Makino has quietly impressed in Formula 2 this year. But there was nothing understated about his maiden victory in the category – from 14th on the grid, something even his most avid paddock supporters couldn't have predicted.

An eventuality you would feel more confident in expecting is a George Russell win, which he secured in the sprint race. He now has a 22-point lead over Lando Norris as the F2 circus heads to Sochi.

Makino's win in the feature race was a perfect blend of speed and strategy as he started on the medium tyres, which were the faster tyre compared with the supersofts, and simply drove through the field. He motored past five cars at Turn 1 alone.

Makino's story is one of adversity and rapid learning. He started in cars in 2015 – as his current team-mate Artem Markelov was beginning his second season in GP2/F2 – by taking second in Japanese F4. A move to Super GT500 yielded a second-place finish in Buriram and the interest of Honda. He took the plunge into the deep end of the European scene in 2017 with a struggling Hitech Grand Prix in European Formula 3, but he missed the pre-Christmas test and broke his wrist at the Norisring, missing

races during the season, and ended up 15th.

Honda set Makino a huge task by switching him to F2 and Pirelli tyres, after only three years of car racing and with a fifth-season veteran in Markelov as his team-mate. But he has chipped away, aiming at top 10s all year, and is 12th in the points.

"A lot of the circuits he hasn't done a lot of running at, and he didn't know the Pirelli tyres, and it's a very steep learning curve for him," said his Russian Time engineer Geoff Spear. "But I think he's getting to grips with it. He's been very impressive."

While he was one of three cars to start on the medium, Makino was 13.6s ahead of Ralph Boschung, the fastest of the rest, after eight laps. The supersoft runners pitted on lap nine, and Makino's lap times on the used medium was comparable with the leading drivers after their stops. It was a brilliant drive from Makino, who has now set consistency as his target for the rest of the year. He had asked his engineer not to tell him his position during the race, so he "couldn't believe it" when he crossed the line in first place.

Behind him it was an epic race. Markelov took second, thanks in part to a bit of good fortune. As Russell was shaping up to pass him early on, Markelov got DRS from a backmarker and broke free, handing fans of F2 and future Formula 1 stars around the world what they had wanted all season: a Russell-versus-Norris duel.

The pair went wheel-to-wheel, but Russell came out on top. While Norris later described Russell's defence on the exit of Turn 3 as "dangerous" since he took to the grass, the pair appeared to fight fair and square. Norris did get ahead at two-thirds distance, but Russell was soon back through and held on to fourth.

Norris was left to rue a stuck wheelnut at his pitstop, which dropped him two places before his bout with Russell, and Nicholas Latifi heaped insult upon injury by demoting Norris to sixth on the penultimate lap. Alexander Albon claimed the final podium spot behind Makino and Markelov.

Albon looked set to re-enter the title fight after finishing ahead of Norris and Russell, but a suspected electronic issue meant his car kept skipping third gear in the sprint race, ruling him out of contention.

Latifi and Russell jumped from fourth and fifth on the grid respectively to go one-two into Turn 1 at the start of the sprint, as Norris got swamped and fell down the order.

Russell made his task harder at a quarter distance when he lunged past Latifi, but then locked up and dropped behind both him and Markelov. Latifi couldn't hold on to the lead for much longer, though, and both Markelov and Russell dispatched him – then, on lap 11 of 21, Markelov locked up at Turn 1 and had to use the escape road. Russell powered past at Curva Grande.

"I've been confident even after Bahrain



Russian Time's Makino climbed to victory after starting 14th at Monza

ALL PICS: MAUGER/LAT
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IMAGES



Makino's first F2 win was also his first top-five finish

when Carlin and Lando had a great weekend," said a bullish Russell, who has claimed five wins this season while Norris has failed to add to his success at the opening round. "I believe we have been the quickest at almost every single track and there's no reason why we can't be at the others."

Markelov took second ahead of Sergio Sette Camara, who got the start procedure wrong for race one and had to begin from the pits instead of second place. In a brilliant comeback he took seventh, which earned him a second-place start again on Sunday, but a poor getaway limited his chances. There's no doubt he was among the fastest over the weekend, but he was unable to convert that pace into big points.

Norris had to settle for fifth behind Latifi again, and he and his Carlin team now have some work to do if they are going to stop the Russell/ART juggernaut.

JACK BENYON

RESULTS ROUND 10/12, MONZA, SEPTEMBER 1-2 RACE 1 (30 LAPS - 107.796 MILES)

POS	DRIVER	TEAM	TIME
1	Tadasuke Makino (J)	Russian Time	49m10.197s
2	Artem Markelov (RUS)	Russian Time	+1.798s
3	Alexander Albon (T)	DAMS	+3.106s
4	George Russell (GB)	ART Grand Prix	+6.178s
5	Nicholas Latifi (CDN)	DAMS	+8.274s
6	Lando Norris (GB)	Carlin	+9.017s
7	Sergio Sette Camara (BR)	Carlin	+18.218s
8	Ralph Boschung (CH)	MP Motorsport	+27.131s
9	Nyck de Vries (NL)	Prema Racing	+27.203s
10	Luca Ghiotto (I)	Campos Vexatec Racing	+30.393s
11	Sean Gelael (RI)	Prema Racing	+43.580s
12	Maximilian Gunther (D)	Arden International	+45.373s
13	Louis Deletraz (CH)	Charouz Racing System	+45.492s
14	Nirei Fukuzumi (J)	Arden International	+48.839s
15	Alessio Lorandi (I)	Trident	+52.556s
16	Roy Nissany (IL)	Campos Vexatec Racing	-1 lap
17	Jack Aitken (GB)	ART Grand Prix	-2 laps
EX	Antonio Fuoco (I)	Charouz Racing System	+29.853s-technical
R	Dorian Boccolacci (F)	MP Motorsport	24 laps-tyres
R	Arjun Maini (IND)	Trident	22 laps-engine

Winner's average speed 131.538mph. Fastest lap Camara 1m35.296s, 135.982mph.

QUALIFYING 1 Russell 1m31.546s; 2 Camara 1m31.600s; 3 Albon 1m31.889s; 4 Markelov 1m31.922s; 5 Latifi 1m32.021s; 6 Norris 1m32.191s; 7 Maini 1m32.248s; 8 Ghiotto 1m32.346s; 9 Fuoco 1m32.159s*; 10 Deletraz 1m32.407s; 11 de Vries 1m32.566s; 12 Aitken 1m32.681s; 13 Fukuzumi 1m32.735s; 14 Makino 1m32.750s; 15 Nissany 1m32.801s; 16 Lorandi 1m32.803s; 17 Gelael 1m32.913s; 18 Boschung 1m32.965s; 19 Gunther 1m33.496s; 20 Boccolacci 1m48.586s. * Three-place penalty for failing to serve a time penalty at Spa.

GRID FOR RACE 2 Decided by result of Race 1, with top eight finishers reversed.

RACE 2 (21 LAPS - 75.400 MILES)

1 Russell 33m31.886s; 2 Markelov +1.056s; 3 Camara +4.347s; 4 Latifi +5.651s; 5 Norris +6.174s; 6 Ghiotto +17.452s; 7 Boccolacci +20.751s; 8 Aitken +24.216s; 9 Maini +25.188s; 10 Fuoco +28.453s; 11 Deletraz +31.875s; 12 Lorandi +34.792s; 13 Fukuzumi +38.322s; 14 Makino +1m04.378s; 15 Nissany +1m17.780s; 16 Gunther +1m18.848s; 17 de Vries -1 lap; R Albon 16 laps-electrical; R Boschung 4 laps-accident; R Gelael 3 laps-accident.

Winner's average speed 134.917mph. Fastest lap Camara 1m34.896s, 136.555mph.

CHAMPIONSHIP 1 Russell 219; 2 Norris 197; 3 Albon 176; 4 Markelov 160; 5 de Vries 155; 6 Camara 142; 7 Fuoco 112; 8 Ghiotto 94; 9 Latifi 73; 10 Aitken 62.



Russell bounced his way to victory in the sprint race



STANDINGS		
1	Anthoine Hubert (ART)	176
2	Nikita Mazepin (ART)	147
3	Callum Ilott (ART)	147

For more info: autosport.com/gp3

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Alesi and Piquet star in blast from the past

GP3 SERIES
MONZA (1)
SEPTEMBER 1-2
ROUND 7/9

Is Anthoine Hubert the first driver ever to be excluded and still extend his points lead in the process? It seems the Frenchman can do nothing wrong in his hunt for the GP3 Series crown, as a dominant Trident team won both races over the weekend for the first time in its GP3 history.

The second encounter was where all the action happened in what was one of the most exciting races of the season so far.

Richard Verschoor started on pole after a brilliant feature race in his second weekend with MP Motorsport, but faded quickly as Pedro Piquet and Giuliano Alesi came to the fore in the 17-lapper.

Shouts came from the pitwall as the Trident team-mates' fathers – Ferrari Formula 1 race winner Jean Alesi and

three-time F1 champion Nelson Piquet – laughed, joked and screamed in equal measure as their offspring battled.

Piquet had the initial advantage, but Alesi was robbed of the overtake of the season – around the outside of the Parabolica on a greasy track – as the safety car came out immediately after the corner on lap one and he had to back off.

The pair swapped positions many times as the field slipstreamed through the Monza scenery, but the decisive move came on the penultimate lap. After Alesi had the lead, Piquet got a strong run at Curva Grande and made a move stick into the Roggia chicane, and Alesi wasn't able to recover.

The top six were separated by just 2.8 seconds, and the leaders were 0.4s apart.

"It was exciting to battle with my team-mate Giuliano, who was very fast," said Piquet, who has jumped Leonardo Pulcini for fourth in the points. "The challenge with Alesi was strong but fair."

Behind, Callum Ilott had passed his fast-starting ART Grand Prix team-mate Hubert, but both were disqualified for having tyre pressures lower than allowed by the regulations. Nikita Mazepin's third – the exclusions promoted him from fifth – puts him second in the standings on a most-wins countback.

If you took the championship from Hungaroring, Spa and Monza – the past three rounds – David Beckmann would comfortably be topping the table. He's now

taken two feature-race wins in a row and Trident has really had a performance breakthrough. Beckmann has also enjoyed an upturn; he joined Trident for Hungary and has looked like a champion ever since. The credit for Saturday's win must go to Beckmann, for he simply drove into the distance on a wet track and Hubert couldn't live with him.

It was a tricky day for everyone, since the series' practice session had been cancelled owing to poor weather and qualifying was run on a mixed surface too.

Ilott was less than complimentary of Mazepin's erratic driving in the slippery conditions. On lap 11 of 22 Mazepin clipped the inside of the Roggia kerb and ran wide, as Ilott passed. He then inherited third when Pulcini suffered gearbox woe. That proved popular – Ilott is a Ferrari Academy driver.

Mazepin was jumped by Simo Laaksonen late on, for what was Laaksonen's best result of the year in fourth.

With two rounds left there are 96 points up for grabs, but that would rely on fastest laps in both races, a pole and two wins. Due to the reversed grid, that would be unlikely.

The most points scored on a weekend this season is 37, and Hubert's gap is 29 points. Ilott and Mazepin have a best score of 33 and 27 respectively.

That means Hubert is going to be tough to beat as the series heads to Russia for the first time since 2015.

JACK BENYON



MOTORSPORT IMAGES/MAUGER/LAT

Preining stuns on first lap

PORSCHE SUPERCUP
MONZA (1)
SEPTEMBER 2
ROUND 8/9

You won't see a more brilliantly executed first-corner pass than the one Thomas Preining pulled on Lechner Racing team-mate Michael Ammermuller on the first lap of the Porsche Supercup race at Monza. It was a move worthy of a victory, which was appropriate given that Preining didn't look back after taking the lead – save for a few glances in the mirror to ensure that Ammermuller didn't attempt to return the favour later on in the race.

Preining had already warned polesitter and championship leader Ammermuller that he was going to put him under intense pressure in the race. After all, while Preining has now won four of the eight races run this year he's still far enough behind in the championship to be only an outside contender. At Monza his chance came early, as he hooked up a perfect launch and latched onto the rear of Ammermuller's Porsche on the run to the chicane.

As Ammermuller stuck resolutely to the inside line, Preining moved to the outside and drew alongside him, inching ahead of the leader at the turn-in point. It seemed he wouldn't be able to pull off the move but, knowing Ammermuller would give him room, Preining squeezed around the outside, clambered over much of the kerb – but staying within track limits – and had his car in the perfect place to inhibit Ammermuller's momentum.

Ammermuller tracked Preining for lap after lap and consistently threatened on the outside into the Rettifilo chicane, but with the championship in mind he had no intention of attempting a risky move given victory was only worth two more points. As the race went on, he dropped back and crossed the line 1.7s behind.

Mattia Drudi pressured Ammermuller throughout, with Nick Yelloly banking valuable championship points as the final man in what was a four-car lead train for much of the race.

EDD STRAW



Ammermuller was passed by team-mate Preining (r) into Turn 1

PORSCHE



MOTORSPORT IMAGES/MAUGER/LAT

GP3 SERIES
MONZA

Race 1 David Beckmann
Trident

Race 2 Pedro Piquet (above)
Trident

PORSCHE SUPERCUP
MONZA

Thomas Preining
Lechner Racing

FORMULA RENAULT EURO CUP
HUNGARORING

Race 1 Yifei Ye
Josef Kaufmann Racing

Race 2 Christian Lundgaard
MP Motorsport

For full results visit:
motorsportstats.com

Title race swings back to Lundgaard

FORMULA RENAULT
EURO CUP
HUNGARORING (H)
SEPTEMBER 1-2
ROUND 7/10

Second place followed by victory in a treacherously wet final race at the Hungaroring meant Christian Lundgaard retook the Formula Renault Eurocup standings lead after a rare slip-up from main title rival Yifei Ye.

Ye showed composure to jump poleman Lundgaard at the start and record a lights-to-flag victory in the opener. The pair broke away from third-placed Max Fewtrell and the rest of the field, earning Ye a 17-point margin.

Not having been on a Eurocup pole before the Hungarian round, Lundgaard mastered the slippery conditions amid intermittent thunderstorms to top the second qualifying of the event. Ye



Lundgaard bagged two poles and wet race win in Hungary

RENAULT

managed just 10th on a circuit where overtaking is difficult. Lundgaard held off Fewtrell by 0.451s for an important victory, while Ye failed to score in 11th and is now eight points down.

Alex Peroni's sweeping move from ninth to third through the spray at Turn 1 seemed to have earned the Australian a return to the

rostrum. But Lorenzo Colombo's impressive late surge around the outside of the final corner was enough to seize the final podium slot.

Doueid Ghattas won both Formula Renault NEC contests and took the championship lead.

DAMIAN MEADEN



Meadows takes the flag on Sunday to level the score in the points

Marciello stars as ASP Mercedes is on top

**BLANCPAIN GT SPRINT CUP
HUNGARORING (H)
SEPTEMBER 1-2
ROUND 4/5**

Mercedes domination at the Blancpain GT Series Sprint Cup Hungaroring round was seemingly an inevitability rather than a possibility. But when the storm clouds gathered on both Saturday and Sunday, the AMG GT3s' seemingly sizeable advantage over the field threatened to evaporate.

Just seconds after the start of the first race this fear became reality when the Grasser Lamborghini of Christian Engelhart shot past a trio of Mercedes and the points-leading WRT Audi to take the lead of the race. Engelhart found far-superior traction in the wet conditions to storm into the lead of a race the Huracan never looked like losing from that moment on.

Arguably equally impressive was the way

in which the lead ASP Mercedes rose to second place. Michael Meadows drove a solid first stint, before handing over to Suzuka 10 Hours winner Raffaele Marciello, who continues to prove why he's one of the most exciting talents in GT racing.

Marciello immediately set a series of fastest laps and then pulled off a bold move on Will Stevens's WRT Audi on the inside of Turn 3 and series rookie Jack Manchester (in a sister ASP Merc) later in the lap. He then pressured another ASP car, that of Denis Bulatov, into spinning at the penultimate corner, handing him second place.

Marciello ran out of laps to catch Mirko Bortolotti, now in the Grasser Lambo, leaving Bortolotti and Engelhart to win for the first time since the season opener at Zolder in superb style. "I think the weather was the key today because even with a good start it would have been difficult in the dry," Engelhart admitted.

It also meant the wait for a Blancpain Sprint win this year continued for Marciello and Meadows. But only for 24 hours longer, as the duo dominated the Sunday race to draw level with Sprint Cup points leaders Alex Riberas and Christopher Miles, who endured a miserable weekend after their clean sweep at Misano.

Riberas's Audi R8 LMS was spun into the pit-straight wall after he made contact with the wet-tyre-shod BMW of Andrew Watson on the exit of the final corner. Watson had stormed from 11th to second on different tyres to the rest of the field.

Sunday's race was also a disappointing affair for Riberas and Mies, even though a late safety car seemingly handed a chance for them to pressure the Meadows/Marciello Mercedes. But Riberas's Audi ran wide at Turn 5, allowing the Sainteloc Audi of Simon Gachet and Christopher Haase into second place. Steijn Schothorst stole the last place on the podium from Riberas on the final lap in his Attempto Audi, after co-driver Kelvin van der Linde advised him over the radio how to take the position.

"He came over the radio during the last lap and said that there was grip on the inside of the last corner," said Schothorst. "I kind of forced Alex to defend, which washed him outside in the middle of the turn, and I dived up the inside to take the position." The #1 Audi was forced to settle for fourth, and now heads into the Sprint Cup decider level with Marciello and Meadows.

It was a poor weekend for WRT all round, with reigning champions Robin Frijns and Stuart Leonard retiring from the first race, and demoted from fifth to 16th place due to a pitstop infringement in race two.

JOSH SUTTILL



Engelhart and Bortolotti took an unexpected win in Mercedes territory



**BLANCPAIN GT SPRINT CUP
HUNGARORING**

- Race 1** Christian Engelhart/Mirko Bortolotti
GRT Grasser Racing Team
Lamborghini Huracan GT3
- Race 2** Michael Meadows/Raffaele Marciello
ASP Team Mercedes-AMG GT3

**WORLD RALLYCROSS
LOHEAC**

Johan Kristoffersson
PSRX Volkswagen Sweden Volkswagen Polo R

**INDY LIGHTS
PORTLAND**

- Race 1** Pato O'Ward
Andretti Autosport
- Race 2** Pato O'Ward
Andretti Autosport

**NASCAR CUP
DARLINGTON**

Brad Keselowski
Team Penske Ford Fusion (above)

**NASCAR XFINITY
DARLINGTON**

Brad Keselowski
Team Penske Ford Mustang

**SUPER TC2000
SANTA FE**

- Race 1** Leonel Pernia
Renault Sport Renault Fluence
- Race 2** Agustin Canapino
Pro Racing Chevrolet Cruze

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motorsportstats.com



Kristoffersson beats Audis

**WORLD RALLYCROSS
LOHEAC (F)
SEPTEMBER 1-2
ROUND 8 / 12**

Statistically, Johan Kristoffersson's seventh win from eight starts in the defence of his World Rallycross Championship title makes his 2018 run look like easy domination.

But for the second round in a row, this time at Loheac, the Swede had to work hard for his success, and he snatched victory from the hands of Andreas Bakkerud's Audi-backed, EKS-run S1 with two corners of the race to run.

PSRX Volkswagen Polo driver Kristoffersson qualified on pole position for semi-final one, having topped qualifying, but was beaten away from the line by Mattias Ekstrom. The former DTM star claimed victory in the knock-out race to line up on the front row for the final alongside EKS Audi team-mate Bakkerud.

The Audi duo then led the final from the front for the opening five and a half laps, until they took their compulsory joker lap, followed by Peugeot's Timmy Hansen.

Kristoffersson had taken his joker on lap two, in response to team-mate Petter Solberg having done so at the first opportunity, and he closed the gap to the leaders when Sebastien Loeb's Peugeot took the mandatory detour on lap three.

At that stage of the six-lap race, leader Bakkerud had a big enough gap to Kristoffersson to be able to joker and return to the lead, but the EKS squad elected to wait until the final tour to send both of its Audi S1s onto the long route. With a big push on the standard track, Kristoffersson was able to leapfrog Bakkerud for the lead, and crossed the finish line to score his fifth win in a row.

Solberg was third from Ekstrom, while Hansen and Loeb could manage no better than fifth and sixth at Peugeot's home round.

British driver Liam Doran returned to the series for the French round with the GC Competition squad and drove its Prodrive-developed Renault Megane RS RX to second best time in qualifying three. Doran appeared in contention to make a dream final with the privately run team but was slowed by a puncture in semi-final two.

HAL RIDGE



O'Ward forward as champ

**INDY LIGHTS
PORTLAND (USA)
SEPTEMBER 1-2
ROUND 10 / 10**

Pato O'Ward sealed the Indy Lights title with a decisive pass for the lead on Andretti Autosport team-mate Colton Herta in last Saturday's first race of the weekend.

Herta's Andretti Steinbrenner Racing entry had passed O'Ward into Turn 1 on lap five, but he couldn't escape. The push-to-pass boost on Lights cars works similarly to DRS – only operative for those behind and

within one second of the car in front. On lap 14 O'Ward dived down the inside of Herta at Turn 1, aggressively aimed for the Turn 2 apex, forcing Herta to launch over the kerbs, and ran away with the race.

The second race saw one of their team-mates, Ryan Norman, start from pole, but he relinquished that to Aaron Telitz (Belardi) and then suffered an aggressive move from Victor Franzoni. Telitz lost the lead to team-mate Santi Urrutia and then second to O'Ward, who eventually found a way around Urrutia for his ninth win.

DAVID MALSHER

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Onslow-Cole takes home GT Open win

INTERNATIONAL GT OPEN
SILVERSTONE (GB)
SEPTEMBER 1-2
ROUND 5/7

International GT Open's 25-car grid, split across six manufacturers, provided thrills and a home winner at a hot Silverstone.

Former British Touring Car Championship star Tom Onslow-Cole and his bronze-rated team-mate Valentin Pierburg took a popular victory in Sunday's race. Onslow-Cole started from pole in their SPS Automotive Performance-run Mercedes-AMG GT3, and over the course of a dominant opening stint pulled out a 15-second lead before handing over to Pierburg. The German then lost less than a second per lap against the chasing gold drivers, taking victory over Giovanni Venturini and Jeroen Mul's Imperiale Racing Lamborghini Huracan by 6.867s. Alex Frassinetti and Damiano Fioravanti's Ombra Racing Huracan completed the podium.

"I gave it everything," said Pierburg. "I did feel the pressure, so I really had to focus."

Allam Khodair and Marcelo Hahn spent most of the race in second in Drivex



School's Mercedes before Hahn was afflicted by a puncture on the penultimate lap.

Hungaroring winner Daniel Serra, who put the Luzich Racing Ferrari 488 GT3 he shares with Marco Cioci on pole for the Saturday race, made the initial running in that encounter. Imperiale Racing's Riccardo Agostini and Rik Breukers gave chase in the opening laps, but in the second stint it was another of Imperiale's Lamborghinis that provided the challenge for the Ferrari.

Venturini and Mul have been on the podium three times this season and a poor Hungaroring weekend meant they had no pitstop handicap for Silverstone. The Agostini/Breukers car, which won in

Hungary, had the full handicap of 25 seconds added to its minimum stop time, which normally sits at 70s.

The front row cars pulled away in the first stint of the race and, when Serra and Breukers handed over to their respective team-mates, the Lamborghini dropped to the bottom of the top 10. The Venturini/Mul car took its place in second, and its gold/silver rated driver line-up hunted down the gold/gold Ferrari but finished 0.471s short of victory.

Mikkel Mac retained the championship lead with a fifth and fourth alongside Alessandro Pier Guidi.

ELLIOT WOOD

WEEKEND WINNERS

INTERNATIONAL GT OPEN SILVERSTONE

Race 1 Marco Cioci/Daniel Serra

Luzich Racing Ferrari 488 GT3

Race 2 Tom Onslow-Cole/Valentin Pierburg

SPS Automotive Performance

Mercedes-AMG GT3

EUROFORMULA OPEN SILVERSTONE

Race 1 Felipe Drugovich

RP Motorsport

Race 2 Bent Viscaal

Teo Martín Motorsport

Fine margins deny points leader Drugovich's double

EUROFORMULA OPEN
SILVERSTONE (GB)
SEPTEMBER 1-2
ROUND 5/8

Felipe Drugovich continued his march to the Euroformula Open title at Silverstone, but was denied his customary double win.

In Saturday's race Drugovich followed the precedent he set at Estoril, Paul Ricard, Spa and the Hungaroring by taking an assertive

victory from pole, despite suffering oversteer. Teo Martín Motorsport's Bent Viscaal qualified and finished second, then went one better the next day to beat Drugovich to pole by 0.002 seconds. RP Motorsport had opted to use old tyres on Drugovich's car in qualifying, but the new set saved for the second race did not have the expected performance gain, and he spent the race stuck in Viscaal's wake.

Viscaal's maiden win puts him 93 points behind Drugovich, who could be crowned next time out at Monza. Lukas Dunner (Drivex) and Cameron Das (Carlin) completed the podiums.

Former GP3 driver Marcos Siebert disappointed in qualifying, but battled through to fifth and fourth in the races.

American racer Dev Gore joined Das at Carlin for his Euroformula Open debut, finishing 12th twice.

ELLIOT WOOD

Drugovich won race one but was later beaten for the second time in 2018



GOODWOOD REVIVAL'S GREATEST HITS

*From the awesome moment when Ray Hanna's Spitfire 'buzzed' Lord March's Bristol as it exited the chicane, opening Goodwood's second heyday in September 1998, the Revival Meeting has been unique on the world stage. Reporter and event commentator **MARCUS PYE** presents personal highlights from the first 20 editions*

ALL PHOTOGRAPHY J BLOXHAM; HAWLINS/LAT 



20

2001 In the immediate aftermath of the horrific 9/11 terrorist attack on New York's twin towers, nobody knew whether they were coming or going. With its rich US history and influence, Goodwood was numbed, like the rest of the civilised world. Having decided to run the event, rather than cancel, Lord March's team reacted tastefully. Stars-and-Stripes flags flew at half-mast over the pits to remember the victims, but the racing celebrated happier times. Winners included period racers Richard Attwood (BRM P261) and Gerry Marshall (above) who, while barely able to walk, raced a Lotus Cortina with customary gusto.



19

2009 Unfathomably, the Lola Mk1 that won the final race of Goodwood's contemporary era – driven by Christopher 'Dickie' Le Strange Metcalfe, who had competed at the opening meeting in 1948 – was initially not offered a Lavant Trophy entry. Owner Malcolm Verey went with my hunch that by repainting BR32 black (from red) and numbering it 57, as it was in July '66, it would get a late call-up if space became available. Thus it was that 43 years after it was unwittingly immortalised, in a Members' Meeting handicap, Verey and Barry Cannell took to the track, creating a snapshot from history.



18

2012 Every Revival Meeting has been packed with magical moments, but once in a while something extraordinary has occurred. Having driven his father's ex-Tazio Nuvolari Alfa Romeo 8C 2300 Monza to Goodwood, from Germany, the intrepid Max Werner earned an enthralling Brooklands Trophy race victory after a tough tussle with the rapid Gareth Burnett in one of John Ruston's Talbot AV105s. "I checked the oil and tyre pressures, in Dusseldorf, and was not worried about lap times," smiled Werner, before completing an 800-mile road trip in an 80-year-old masterpiece. Pure class that thoroughly deserved his Rolex Driver of the Event prize.



17

2016 English Racing Automobiles have dominated the Goodwood Trophy races for Grand Prix, F2 and Libre cars of a type raced there between 1948 and '52. R3A, R5B 'Remus', R9B, R4D, R11B 'Humphrey' and most recently R1B have won 15 of the 19 to date. Barrie Williams broke the Bourne supremacy twice running in David Wenman's yellow Connaught A4 in the early days, but not since Stefan Schollwoeck triumphed in 2006 had a Maserati emerged on top. Having served his apprenticeship in Sean Danaher's silver 6CM with third in '13 and seconds in subsequent years, Calum Lockie finally took gold to wide acclaim.

**GOODWOOD
EVENTS**

**MEMBERS' MEETING
MARCH 17-18**
Report issue March 22

**FESTIVAL OF SPEED
JULY 12-15**
Report issue July 19

**REVIVAL
SEPTEMBER 7-9**
Report issue September 13

16

2017 The Aston Martin DB3 that won the first of the three Goodwood Nine Hour endurance races in 1952, crewed by rising star Peter Collins and Pat Griffith, has graced many a Revival. Prepared by Hall & Hall for latest custodian Martin Melling, the gallant warhorse has punched above its weight in Rob Hall's skilled hands. Runner-up to lanky hotshoe Richard Woolmer in the unique HWM-Cadillac (which should have raced at Goodwood in the later 1950s) in 2016, the combo turned the tables on the Anglo-American hybrid to win the Freddie March Memorial Trophy prize 65 years after its frontline success.



15

2004 Homages to racing royalty, which the Goodwood team does like no other, are central to the Revival story. Over the years Jack Brabham, Tony Brooks, Jim Clark, Juan Manuel Fangio, Dan Gurney, Graham and Phil Hill, Stirling Moss, Roy Salvadori, Carroll Shelby, Jackie Stewart and John Surtees have been among the many names brought under the spotlight. With wonderful footage of their greatest successes, powerfully narrated, these moments bring silence to the former RAF Westhampnett before engines fire up and the cavalcades of sensational cars begin. Happily, some veterans presided over the celebrations. The sight of three-time F1 world champion Brabham at the wheel of BT19-Repco with designer extraordinaire Ron Tauranac at his side was pretty special for many.



14

2006 As classic duels go, the fight between three-time Indycar champion Bobby Rahal and fellow American Duncan Dayton for Glover Trophy honours was a stunner. The Brabham BT11 pair – Rahal on Roy Walzer's car more than in it – traded places several times, Climax V8s wailing in unison. Twenty years after he won the Indianapolis 500, Rahal bounced back after spinning but explored one piece of scenery too many, thus gentleman racer Dayton finally claimed that long-craved Revival win. That Phil Hill, the US's first F1 world champion, watched from trackside, 45 years after his Ferrari triumph, made the day extra special. Hill, who had bowed out of racing at the Revival, also watched son Derek win the Freddie March Trophy race in an Alfa Romeo 3000CM.



13

2007 Jean-Marc Gounon was top gun at the 10th Revival. Not only did the Frenchman pilot the JCB Aston Martin DBR2 (above) to victory over the Chevrolet

V8-engined monsters of Stuart Graham (Lister) and Blockley tyre supremo Julian Majzub (Sadler) in the Sussex Trophy sportscar showcase, but he also sowed the seeds of St Mary's Trophy success, winning the opening leg by beating a splendid variety of American V8s in Oliver Bryant's thunderous Plymouth Barracuda. A fruitless couple of bit-part roles on F1's fringes with Minardi and Simtek in the early '90s masked Gounon's ability. With an elegant style and car control aplenty, he went on to win Goodwood's TT Celebration in 2010 with Peter Hardman in Sir Anthony Bamford's Ferrari 250 GTO/64.

12

2008 Ferrari was the dominant force in the period Royal Automobile Club Tourist Trophy races run for closed-cockpit Grand Touring cars from 1960-64. The opposition's firepower had grown in the interim though, thus Jaguar E-types, AC Cobras and 250 GTO creator Giotto Bizzarrini's eponymous

Chevrolet V8-motivated machines outgunned the Ferraris over the Revival's first 10 editions. Then, wondrously, there was a scarlet patch as Tim Samways's engineers sharpened the Leventis family's 330 LM/B, previously a regular third-placed car. Regular driver Peter Hardman and Bobby Verdon-Roe came out with not just the headlights blazing, narrowly beating the Le Mans Lister-Jaguar coupe of Anthony Reid/Justin Law to the chequer. Forty-four years after Graham Hill's TT victory, a Prancing Horse was back in Goodwood's winners' circle.



11

2010 A surfeit of power over grip guarantees thrills at the Revival as the boldest competitors wrestle with cars of all shapes sizes on, and often beyond, the limits of adhesion. A spectator poll would doubtless have Welshman Grant

Williams close to the top for entertainment value in the ex-John Coombs/Roy Salvadori Jaguar Mk1 registered BUY 1 – which served his father Tony as one of Risca Garages' post-Goodwood period Special Saloons when I was a lad. Wreathed in Dunlop smoke (well, Williams is a tyre dealer), the grey machine's tail-wagging antics are priceless. Paired again with five-time Le Mans winner Derek Bell, victorious on his race debut at Goodwood in a Lotus 7 in March 1964, Williams was cheered to St Mary's Trophy gold for the third time.

10

1998 Dating back to 1936, when Prince Bira debuted it for cousin Chula's White Mouse Stable, ERA R5B's claim to be among the world's most continuously raced cars is well-founded. There was a sense of unfinished business at Goodwood though, because (in Peter Bell's tenure) 'Remus' broke in practice at the opening meeting in

September '48. The Lindsay family had owned the car since '59 when Ludovic – its custodian since '86 – came under starter's orders in the Woodcote Cup event, opening race of the first Revival. Quickest into his stride as the Union Jack fell, ending a 32-year drought, the sometime Formula Fordster needed all his skill and nerve to stave off the post-war Cooper-Bristols of Roddy MacPherson and Gregor Fiskens to the chequered flag. Ludo repeated the feat in '99, adding Goodwood Trophy victories in 2000, '05, '08 and '09 against the strongest ERA opposition, before selling his favourite warhorse in '10.



9

2002 When Lord March won the RACMSA's permission to stage the Freddie March Memorial Trophy as a 'night' race – it ran into darkness on the

Saturday evening – to bring a glimpse of the Goodwood Nine Hour races of 1952, '53 and '55 to new generations of enthusiasts and trigger memories in true Revivalists, he could only have dreamed of the result. Gearbox magnate David Brown's Aston Martins (a DB3 and two DB3Ss) had outlasted the faster Jaguar C-types in the dramatic period enduros and, almost as if scripted by a greater power, did so again. The DB3S of Frank Sytner and Willie Green, two of historic racing's quickest and most determined combatants, beat the HWM-Jaguar of Michael Steele/Julian Bronson and C-type of Ben Cussons/Gary Pearson – the latter now the event's top gun with 12 victories, four more than Richard Attwood – as the headlights came on. Adding priceless poignancy, Stirling Moss finished fifth in a C-type.



8

2003 Richard Attwood has particularly special memories of Goodwood, because the

West Sussex airfield circuit was the scene of his F1 debut for BRM on Easter Monday 1964. The Wolverhampton wanderer had served his venue apprenticeship in its 'second-tier' British Automobile Racing Club Members' Meetings, racing Standard 10 and Triumph TRs initially. He subsequently won a Formula Junior event there in 1960 at the wheel of a Cooper-BMC T56 entered by the Midland Racing Partnership, a consortium whose greatest victory Attwood would score in the '63 Monaco FJ GP race with a Lola Mk5A. In 2003 Attwood – immortalised in Porsche's history for landing its first Le Mans victory, sharing a 917 with Hans Herrmann – had the joy of watching Mark Hales convert his solid opening stint in a Chevrolet-engined Bizzarrini (above) to RAC TT Celebration gold. Then he turned back the clocks by jumping into his BRM P261 and winning the Glover Trophy F1 race.



7

2011 ERA R4D, the hallowed works development car in which Raymond Mays set the Shelsley

Walsh hillclimb record and won races pre-war, and is mighty fast still, has a dark side. Capricious and highly strung, the black beauty in which Mays won the 1947 and '48 RAC British Hillclimb titles has rewarded great drivers, but tried the patience of many, not least Alvis graduate James 'Mac' Hulbert. The supercharged two-litre unit's

prodigious power and savage delivery suits perfect conditions, thus few gave Hulbert a prayer on this horribly dreich day. Driving the race of his life, however, the indomitable Scottish professor slipped and slid to an extraordinary Goodwood Trophy win lauded by rivals. Compatriot Ron Flockhart – who owned R4D and, thus equipped, won a Goodwood handicap in '53 before winning Le Mans twice – would certainly have approved.



6

2014 Snarling AC/Shelby Cobras of various flavours (and parentage) had always been among the RAC Tourist Trophy Celebration favourites, indeed star drivers Danny Sullivan

(sharing with Historic ace Steve Hitchins) and Patrick Tambay/Henri Pescarolo won in 2000 and '02 respectively. Try as many did to repeat, there followed a painfully long fallow period for snake charmers until Kenny Brack/Tom Kristensen powerboated a Daytona Coupe to victory in 2011's monsoon, but flying Dutchmen David Hart and ex-F1 racer Giedo van der Garde's '14 success was up with the best. Ironically, they beat the Bryant family's ex-Roy Salvadori car that has – despite a couple of wipeouts, and mechanical failures while challenging – finished second, third, fourth and fifth with different guest co-drivers. Michael Gans/Andy Wolfe triumphed in another Cobra last year (after a penalty thwarted first-past-the-post Chris Ward/Gordon Shedden's Jaguar E-type hat-trick), but spectators are still rooting for Olly Bryant's luck to turn.



5

2000 For enthusiasts in the audience fortunate to have been at Goodwood in March 1960, the sublime skills of John Surtees needed no introduction. The then five-time motorcycle world champion (he would add two more) started his maiden car race, the first he'd seen, from pole position in a Ken Tyrrell-entered Cooper-BMC. Beaten only by the inimitable Jim Clark (Lotus-Ford 18) that day, his potential was clear. Impressed, Lotus boss Colin Chapman had hooked him into F1 within weeks, before the Scot! Thirty-eight years on, Ferrari's '64 world champion's lightness of touch in a 250 GTO wowed spectators at the inaugural Revival's RAC Tourist Trophy Celebration. The V12 icon's progress through St Mary's was peerless. Having raced Sir Anthony Bamford's '64-shaped GTO the following September, 'Big John', 66, excelled yet again in 2000, qualifying David Piper's bright green 275 LM on pole for the big race. He led it brilliantly too, but delays installing 71-year-old 'Pipes' enabled Danny Sullivan to pounce for victory in Steve Hitchins's Shelby American Daytona Cobra Coupe.



4

2005 Extrovert showmen have always been popular with the Revival faithful. Emanuele Pirro's love of racing history, and of Goodwood's events in particular, has earned the Roman legions of fans since his debut. Pirro's impromptu release of joy following his second RAC Tourist Trophy Celebration thriller win – this time sharing 4 WPD, the famous ex-John Coombs/Red Rose Motors lightweight Jaguar E-type raced by Graham Hill, Jackie Stewart and Brian Redman among other luminaries in period – with Dario Franchitti was the stuff of Italian boyhood dreams. Pirro popped his belts on the post-podium victory lap, propped himself out of the driver's door, waving rallycross style (Italian-rooted Scot Dario was doing the same to his left) and drinking in the atmosphere following his maiden (and sole) Goodwood win. While it earned rapturous applause from an already charged audience, the racing authorities were not amused. American car owner Bernie Carl was slapped with a £5000 fine as entrant, but countered graciously by paying double, just in case the victory celebration might be repeated in future years!



3

2015 Massive problems don't faze nine-time Le Mans winner Tom Kristensen, used to placing total faith in his skilled technicians, whether he is racing high-downforce prototypes or for fun. Alan Mann Racing's immaculate newly prepared 1964 Holman & Moody Ford Fairlane Thunderbolt arrived at Goodwood untried, thus TK drove it for the first time in Friday qualifying for the St Mary's Trophy race. Not for long. Carburettor issues stranded the monster at Lavant corner on his first flying lap. He'd start Saturday's race from the back if the AMR boys could fix it, and duly did so determined to win it. Having blasted past more than half the field on the opening lap, things predictably got tougher among world-class drivers in ever-quicker cars. British Touring Car champions Andy Jordan and Gordon Shedden in Lotus Cortinas and Audi star Frank Stippler (Alfa Romeo GTA) were the last to fall prey to Kristensen in an epic race won by just 1.2 seconds. "I hardly slept this night. The mechanics did an awesome job. It goes like a rocket," beamed Tom, a fan since his debut in 2010 – in a slab-sided Austin A105. Henry Mann's victory in Sunday's owners' leg gave them gold on aggregate.



2

2013 'There's no such thing as bad weather, just inappropriate clothing' is an old adage equally applicable to motor racing. In a September monsoon in West Sussex the best type of wear was a relatively heavy and softly-sprung Aston Martin which, in gifted hands, cut its way through standing water. Owned by German gentleman driver Wolfgang Friedrichs, the fabled Project 212 was raced by Graham Hill and Richie Ginther at Le Mans in 1962. Left behind in the TT arms race since '98, it has long been co-driven at Goodwood by ex-F1 mechanic-turned-restorer Simon Hadfield. Historic racing's king of the chase relishes tricky conditions. Relayed by Friedrichs as the pit window opened, Hadfield made up ground with relish. A grassy excursion at Lavant, in Tom Kristensen's wheeltracks, only increased his focus as car after car was passed. Eventually only Anthony Reid's Lister-Jaguar coupe remained ahead, but Hadfield clawed back 20 seconds in seven laps and growled past in front of the pits with two laps to spare. Reid, who believed the Aston was unlapping itself, then slid off trying to match him. The most unexpected win in Revival history was also the icing on Aston Martin's centenary cake.



1

1999 Stirling Moss's winning record at Goodwood – from victory in a Cooper-JAP 500

at the circuit's opening meeting on September 18 1948 (the day after his 19th birthday) to the '61 Tourist Trophy in a Ferrari 250 GT Berlinetta – was peerless. He was simply the best driver of his era, and the most versatile. Four successive TTs, two for Aston Martin in '58 and '59, took his tally to seven. Only by luck, determination and the skill of medics did his massive F1 Lotus 24 crash on Easter Monday '62 not claim his life as so many contemporaries lost theirs.

That would have robbed motorsport fanatics, then and now, of the opportunity to see the maestro in action, to appreciate the skills that set Stirling above the rest. But for a brief Audi touring car drive and some historic outings,

Moss had done little serious racing since his impact with the bank – between Fordwater and St Mary's – and the Revival era from 1998. Despite that life-changing crash, he was hugely supportive to Lord March (now the Duke of Richmond & Gordon) in campaigning to get Goodwood reopened.

Moss's 69th birthday was celebrated at the first Revival Meeting, in which he raced a Ferrari GTO to eighth in the TT Celebration with Mark Hales, an Aston Martin DBR1 to sixth in the Lavant Cup and a Lola Mk1 in the Sussex Trophy. It wasn't until the following year, though, that those spectators who had not seen Moss race in period became acquainted with his genius.

That Stirling was put on earth to drive racing cars was immediately evident when, reunited with a Maserati 250F – a later, sleeker evolution

of his '54 Goodwood Trophy winner – in suddenly wet conditions, the 70-year-old sliced through from 16th on the grid to finish a brilliant fourth in the Richmond & Gordon Trophy race, eight seconds behind Willie Green's similar car. Only John Harper, in a familiar BRM P25, and Derek Bell in a rear-engined Cooper, reached the chequered flag before them.

Moss raced many cars at subsequent Revivals – from Jaguar Mk7 to Ford Lotus Cortina – and demonstrated countless others, often chauffeuring illustrious colleagues on cavalcades. But that snapshot of his sublime relaxation in the Maserati's cockpit, undimmed reflexes and deft fingertip control provided a magical insight into a wonderful career that spanned 16 world championship grand prix wins and Mille Miglia victory for all who missed them.

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THIS YEAR'S REVIVAL

E-types lead the field in 2017 Kinrara Trophy

From the Ferrari, Aston Martin and Jaguar E-type-rich Kinrara Trophy race to dusk on Friday evening to Sunday's hot-blooded Sussex Trophy sportscar finale, there's something for everybody at Goodwood's 21st Revival Meeting.

Martin Hunt/Patrick Blakeney-Edwards and outright historic lap record holder Nick Padmore are chasing **Kinrara Trophy** glory in narrow-bodied AC Cobras, but the Ferrari 'Breadvan' of Niklas Halusa and Emanuele Pirro starts favourite.

The **Fordwater Trophy** brings a wide span of 1950s sportscars, from artisan marques Buckler, Connaught, Frazer Nash and Jowett to Aston Martin, Ferrari, Jaguar, Lancia and Porsche. Stuart Graham, Sam Tordoff and Darren Turner are star names.

Jason Plato and Tordoff (Ford Galaxies) face Gordon Shedden (Mercury Comet Cyclone), Mat Jackson (Plymouth Barracuda), Alfa GTAs, Lotus Cortinas, BMW 1800Tis and Nick Swift's Mini squadron in the **St Mary's Trophy** saloon set.

ERAs are in the **Goodwood Trophy** vanguard, but 2016 winner Calum Lockie (Maserati 6CM), Christian Glaesel (Alfa Romeo P3) and Gareth Burnett (Alta) could get among them.

The **Jack Sears Memorial Trophy** race celebrates 60 years of the British Saloon Car Championship with a plethora of early tin-tops. Justin Law (Jaguar Mk1) will take some stopping, but watch for Borgward Isabella and Jensen 541R in the mix.

Rob Huff (Lotus-Oldsmobile 19) and Indian F1 racer-turned-superpundit Karun Chandhok (McLaren M1A) will try to stop the quickest Lola T70s and Ford GT40s in the **Whitsun**

Trophy race, in which Darren Turner saddles Roland Lewis's Hamill.

Not since 2013's enduro-format edition has a Jaguar C-type won the **Freddie March Memorial Trophy** race, so maybe Gregor Fiske or Fred Wakeman can step up to the plate. Don't miss Richard Woolmer's bravado in the HWM-Cadillac.

Sunday's **Chichester Cup** Formula Junior race sees Goodwood debutants Michael O'Brien (Lotus 22) and Cameron Jackson (Brabham BT2) looking to unseat Andrew Hibberd, Jon Milicevic and Stuart Roach, and 'newcomer' Chris Goodwin.

Cooper men Will Nuthall (T53) and Rod Jolley (T45/51) should be pacesetters as the **Richmond & Gordon Trophies** race spans front and rear-engined GP eras. Ben Mitchell could give them a run in Robs Lamplough's BRM P48.

Nobody would begrudge AC Cobra duo Olly Bryant/Andrew Smith **RAC TT Celebration** victory, but Gary Pearson/Pirro and Simon Hadfield/Padmore (Jaguar E-types) and Michael Gans sharing last year's winning Cobra with Gordon Shedden promises another humdinger.

Can Andy Middlehurst (Lotus 25) make it six **Glover Trophy** victories as the 1500cc F1 cars come out, or will Nick Fennell (Lotus 25), Martin Stretton (Lotus 24), James King (Brabham BT7) or the evergreen Richard Attwood (BRM P261) return to the top?

Five Lotus 15s, led by Bryant, Roger Wills and Charlie Martin, look strong **Sussex Trophy** bets. Phil Keen (Lister-Jaguar), Sam Hancock (Ferrari 246S) and Pearson (ex-Moss Cooper Monaco) will make it tough.

TIMETABLE**Friday September 7**

0945-1815	Official practice
1845	Kinrara Trophy <i>Closed-cockpit GT cars over three litres, pre-1963</i>

Saturday September 8

1000	Fordwater Trophy <i>Production-based sports and GT cars in the spirit of original Members' Meetings</i>
1040	Barry Sheene Memorial Trophy, part 1 <i>Motorcycles, pre-1959</i>
1300	Rob Walker tribute
1330	St Mary's Trophy, part 1 <i>Saloon cars of the 1960s</i>
1420	Goodwood Trophy <i>GP and Voiturette cars, 1930-51</i>
1505	Jack Sears Trophy <i>Saloon cars, pre-1960</i>
1550	Revival winners' parade
1625	Whitsun Trophy <i>Sports-prototypes, up to 1966</i>
1715	Freddie March Memorial Trophy <i>Sports-racing cars, 1952-55</i>

Sunday September 10

1000	Chichester Cup <i>Rear-engined disc-braked Formula Junior, 1960-63</i>
1045	Richmond and Gordon trophies <i>2.5-litre GP cars, 1952-1960</i>
1150	Barry Sheene Memorial Trophy, part 2 <i>Motorcycles, pre-1959</i>
1240	St Mary's Trophy, part 2 <i>Saloon cars of the 1960s</i>
1345	Revival winners' parade
1410	RAC TT Celebration <i>Closed-cockpit GT cars, 1960-64</i>
1530	Glover Trophy <i>1.5-litre GP cars, 1961-65</i>
1610	Rob Walker tribute
1650	Sussex Trophy <i>World championship sportscars, 1955-60</i>



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Tandy fell short of Mansell's record by just 0.1s during last Sunday's Festival of Porsche

PORSCHE 919 EVO JUST MISSES OUT ON BRANDS INDY RECORD

FESTIVAL OF PORSCHE

The Porsche 919 Hybrid Evo that broke the unofficial Spa and Nurburgring Nordschleife lap records was just 0.1 seconds from adding another feather to its cap at Brands Hatch.

While it was only at last Sunday's Festival of Porsche to complete demonstration runs around the 1.2-mile Indy circuit, that didn't stop 2015 Le Mans winner Nick Tandy from coming close to the 38.032s benchmark on the post-'03 layout – set by the Benetton B197 of Scott Mansell in '04.

The Evo was built after Porsche withdrew from the LMP1 class of the World Endurance Championship –

“BY THE TIME YOU’VE DONE THE OUT-LAP THE TYRES ARE GONE”



Tandy: “It’s up there with the best things I’ve ever done”

the 919 winning Le Mans and the overall title three times. No longer constrained by rules, peak power increased to 1160bhp. Tandy hit 192mph before braking for Paddock Hill Bend, setting a best time of 38.16s.

It might have fallen short, but this was not a genuine attempt to break the record. The car's set-up was far from optimised: the hybrid system wasn't mapped for Brands and the bespoke Michelins the Evo normally runs were absent.

Nevertheless, Tandy was pushing. That he got so close begs the question, how fast could the Evo have lapped if an all-out effort had been made?

“That’s up there with the best things I’ve ever done,” Tandy told Autosport. “The thing is, by the time you’ve done the out-lap the tyres are gone. If we had the race tyres then we’d be in the 35s.”

Porsche Team test engineer Olivier Champenois continued: “Two seconds is a lot [to find] on this track but if we could spend some time to try to optimise it then I think you can probably reach that.”

He added that building cars faster than the Evo comes with the risk of going down a path of diminishing returns.

“The driver is now the limiting factor in how fast these kinds of cars will go,” he said. “There’s more potential in the car.”

Sadly, how much potential is likely never to be explored. An appearance at Laguna Seca later this month is the Evo's final on-track run before it is retired.

MATT KEW

Le Mans victor Attwood races Boxster after late call-up

PORSCHE RESTORACING

Le Mans winner Richard Attwood made a last-minute guest appearance in the Porsche Classic Restoracing Competition at Brands Hatch last Sunday, twice finishing in seventh place.

The series was launched this year to celebrate the 20th anniversary of the first-generation Boxster S. UK Porsche Centres have restored and prepared the cars for the three-round calendar.

Attwood, who scored the marque's first Le Mans 24 Hours victory driving a 917K in 1970 alongside Hans Herrmann, got the call to join the grid just three days before the Festival of Porsche.



Attwood (r) took two seventh places

Now 78, he qualified sixth and fifth for the two races in the Porsche Centre Leicester entry.

"A guy left the company and they were going to leave it on display, but then someone thought we might as well get it round the track and they called me," he said.

"I'd never driven it before but the car's fine as it's been sorted well. All modern Porsches are balanced anyway so there's not a lot to worry about."

Many of the Boxsters have been painted in famous liveries from the marque's racing success and Attwood finished the opener just 1.9s behind the red and white copy of his Le Mans winner.

MATT KEW

AMR Young Driver scheme to return

ASTON MARTIN

Aston Martin will open applications to join the relaunched AMR Young Driver Academy for 2019, with a prize of a junior factory contract on offer for the top applicant.

Open to drivers aged between 17 and 25 racing Aston Martin GT3 and GT4 machinery in national and international competition, the Academy aims to provide mentoring from Aston Martin Racing's pool of factory drivers, tailored fitness programmes and simulator training, as well as seminars covering marketing and engineering.

The first iteration of the Academy in 2015 resulted in a factory contract for Ross Gunn, who has since raced at Le Mans with Beechdean AMR and conducted development work on the brand's new-for-2019 GT3 car.

Vice president and chief special operations officer David King told Autosport that Gunn's work had been a factor in persuading Aston Martin to repeat the scheme next year.

"There are a lot of young people around with raw talent, which you need as a starting point, but what makes a person the full package is an analytical mind, calmness under pressure and the ability to represent the brand in a positive way, which the Young Driver programme aims to help young drivers do," he said.

"Ross has some of that naturally and picked up what we taught him in the programme as well, so we'll be looking for somebody else who responds well to that coaching.

"Obviously you don't want to create clones, you want people with their own personality and identity as well, but Ross has demonstrated himself to be a very mature, very quick young man and I would love to think we would be able to find another Ross, male or female."

JAMES NEWBOLD



Gunn raced at 2017 Le Mans after being chosen as AMR Young Driver



Top Clios found to be legal

RENAULT UK CLIO CUP

The cars of the top three drivers in the Renault UK Clio Cup have been found to be completely legal after extensive checks were carried out last month.

The Clios of Max Coates, Paul Rivett and James Dorlin were impounded by the series after the Rockingham races so that their eligibility could be thoroughly scrutinised.

"It's fantastic that Renault are doing this – I can't praise Renault enough for really checking them, and it's the first time I've seen it happen in all of my years in the Clio Cup," said three-time Clio champion Rivett, who trails leader Coates by seven points.

"With the turbo cars there's the possibility that people could cheat so it's

great Renault are doing what they can to prevent this from happening."

The next round of the championship takes place on September 15-16 at Silverstone, ahead of the Brands Hatch finale at the end of the month.

- Newly crowned double Michelin Clio Series champion Ben Palmer is targeting a full-time switch to the UK Clio Cup next season after making sporadic appearances over the past few years. "It's all gone to plan really and I've had a great run," said Palmer, who is also looking at the Mini Challenge. "Next year, the plan is to move to the UK Clio Cup. I think we'd be competitive, but it's all about finding the budget really."

STEPHEN LICKORISH & DAN MASON



Coronel will be fresh from his Alfa victory at Zandvoort

a head gasket failed, a performance for which he was named Driver of the Weekend. Not one to respect reputations, Hart Jr has yet to race the Alexander Furiani-built Alfa but that will not deter him.

Coronel is just one of a number of star names in an entry that is packed with quality. Other international racers include three-time Le Mans winner Andre Lotterer, who will make his Revival race debut in another GTA, while sportscar ace Nicolas Minassian and 1984 World Rally champion Stig Blomqvist will both race Minis.

Ex-Formula 1 racer Jochen Mass will be in another GTA while four-time Pikes Peak Hillclimb victor Romain Dumas will race a Ford Galaxie.

Wolfe/Rob Huff, Andy and Mike Jordan, Steve Soper/Andy Priaulx and Ambrogio Perfetti/Emanuele Pirro head the Cortina squadron, which also includes reigning British Touring Car champion Ash Sutton, Mark Blundell and Jackie Oliver in separate cars.

Multiple BTCC champions Matt Neal, Jason Plato and Gordon Shedden are each saddling American V8 monsters, as will Shedden's 2016 runner-up Sam Tordoff.

MARCUS PYE

← P40 GOODWOOD REVIVAL PREVIEW

International stars Coronel and Lotterer to Revival

GOODWOOD REVIVAL

The combination of 46-year-old World Touring Car Cup ace Tom Coronel and teenager Oliver Hart in an Alfa Romeo Giulia Sprint GTA could prove a thorn in the side of the Ford Lotus Cortina teams in the St Mary's Trophy Pre-1966 saloon car races at this weekend's 20th anniversary Goodwood Revival meeting.

Coronel, who is hotfoot from an opportunist victory over Andy Wolfe at Zandvoort's Historic GP event last weekend, finished second in 2012's Shelby Cup and fourth in '13's wet Royal Automobile Club TT Celebration, both times sharing David Hart's Cobra.

Hart's son Oliver was sensational in the DHG equipe's Cobra last September, leading the blue-riband GT event before

Winstanley is provisional champion

THRUXTON

Danny Winstanley left Thruxton last weekend as Caterham Seven 420R champion-elect after scoring a pair of wins to put himself out of reach in the standings.

The reigning champion was made to work for his victory in race one, as he swapped the lead with William Smith and Stephen Nuttall. Winstanley's task in the

second race was somewhat easier as he romped to a dominant 15-second victory, while a high-speed last-lap incident in the chasing pack exiting Church Corner left Sean Byrne taking second.

Another provisional champion is Steven Dailly, who is mathematically out of reach for a second consecutive BMW Compact Cup title. Dailly lost out to first-time winner Tom Griffiths in

the first race, but managed to hold his rivals back in the second.

Elsewhere, the first Seven 310R race had five different race leaders, with title contender Chris Hutchinson coming out on top in the end from a sensational second place for David Yates and third for Christian Szaruta. Reigning champion Lee Bristow won the safety-car-affected second race.

SCOTT WOODWISS



Two Caterham Seven 420R victories almost assure Winstanley of the title

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MGs/TFs took part in Cockshoot Cup after race was canned

Oulton MGF race cancelled

MGCC

The MG Car Club was forced to cancel its planned MGF/TF race at Oulton Park last weekend, but is hopeful it can generate numbers for next season.

With only six cars registered for the race before the meeting, the MGCC decided to cancel the race, and extended each qualifying session of the other categories by an additional five minutes.

“We got 13 cars at Silverstone for MG Live earlier this year and the opportunity came around for us to have another MGF/TF race here at Oulton,” said competitions secretary John Hutchison.

“The initial response was good but fell by the wayside due to date clashes with other championships and so on that diminished to the point that we

decided we wouldn’t put the race on.”

Despite the low turnout, the club is happy to try to arrange races for the 2019 season.

“There is always the idea of maybe putting on a series in the future if you could get as many cars as possible over the winter, and there are still cars that we know about in lock-ups and things like that,” said Hutchison.

“If we had 15 of them commit and want to do the racing next year, then yes we’d put something on, but currently we need to gauge interest over the winter.”

A 100-mile race at Oulton also attracted a small entry, with just nine cars taking part, but the club is still considering a similar event for 2019. “It’s not been as popular as we thought it might have been,” admitted Hutchison.

DOM D’ANGELILLO

New C1 venue sought

CITROEN C1 24 HOURS

The Citroen C1 series expects to find a new venue for its 24-hour races after it was announced that motorsport would cease at Rockingham next year.

Two C1 24-hour races have been held at Rockingham in 2018 but, with the track closing at the end of the year to become an automotive facility, a new venue is in the process of being found.

C1 series principal Philip Myatt says he is in talks with a number of circuits and that a return to Spa is planned.

“There will be the equivalent number of races next year,” he said. “We’re looking at Silverstone and Snetterton as potential replacements and anywhere that’s got a 24-hour licence, but there’s a limit on how many 24-hour races we do.”

“It’s a shame we won’t be at Rockingham anymore as I think we have grown to love it and, as a circuit, it’s a lot more challenging than people realise.”

Last weekend’s dramatic 24-hour race provided an entertaining farewell, with Citroen D’Equipe controversially winning.

STEFAN MACKLEY

IN THE HEADLINES



ONE-OFF MG RACES

The unique ‘1959 Milano MG’ made its UK race debut in Christian Jaeger’s hands at Mallory Park last weekend, finishing fifth in the HRDC Allstars encounter. The car was built originally in Australia as a 1933 MG J2, but in the late ‘50s was crashed and rebuilt. Its engine is a Holden V8, much of the chassis comes from an Austin 7, while the rear bodywork is from a Morris Minor. Jaeger bought the car earlier this year.

RABAGLIATI’S LANDMARK

Three years after he notched a landmark 500th race start in his omnipresent Alexis HF1 (‘The Flying Carrot’) at Zandvoort, Formula Junior Historic Racing Association founder Duncan Rabagliati reached the 600 mark in the BMC-powered car at the Dutch GP venue’s FIA Lurani Trophy round on Sunday.

EMPTY FRONT ROW

Officials made the decision to leave the front row empty for the CNC Sports/Saloons races at Anglesey due to safety concerns. Action was taken to prevent a repeat of a heavy startline shunt that occurred when the series visited the Welsh circuit last year, when Paul Rose’s Saker was rear-ended by the Porsche of Garry Wardle after the driver was unable to see the lights from his front-row position.

MSA APPOINTS NEW CEO

The Motor Sports Association has announced former Prodrive man Hugh Chambers (below) as its new CEO. Chambers, who worked on many of Prodrive’s programmes including the World Rally Championship with Subaru and Formula 1 with BAR-Honda, will replace Rob Jones. More recently, Chambers has served as chief commercial officer of World Sailing and the British Olympic Association.



After Furiani took the Alfa GTA (middle) through the gravel, he and Coronel had to fight through the pack



Coronel fights back for Alfa win at Zandvoort

**ZANDVOORT
HISTORIC GP
SEPTEMBER 1-2**

“I needed those cars. I’d got my nose ahead two or three times but wouldn’t have passed him without them,” beamed World Touring Car driver Tom Coronel. His audacious last-lap pass of Andy Wolfe, made possible by traffic, snatched victory in last Saturday’s Masters Pre-’66 Touring Car race – a gripping one-hour catchweight contest that delighted spectators at Zandvoort’s seventh Historic Grand Prix.

Andrew Haddon forged his Lotus Cortina ahead of the Ford Falcons of Mike Gardiner and Julian Thomas initially as Alex Furiani, having fired David Hart’s Alfa GTA through the gravel at the Tarzan hairpin, worked it back through the Mini Cooper Ss of Chris Middlehurst, Nick Swift, Jonathan Lewis and Ian Curley.

Into the Cortina jumped Mark Martin and he kept the lead, but the race’s complexion

changed when Coronel leaped aboard the DHG Alfa during a middle-third safety car interlude in which Middlehurst’s short (by four seconds) stop attracted a 21-second penalty, gifting Curley the class.

Coronel chased down leader Wolfe (in for Gardiner), and for a mesmeric 10 minutes they were locked in combat. Coronel repeatedly seized the initiative in the corners, where V8 grunt habitually kicked the Falcon’s tail out as Wolfe fed its power in gently with Dunlops past their best for the subsequent drag races.

Running out of options Coronel rounded Wolfe into Tarzan, exiting on the kerb as they accelerated towards the off-camber right-handed Gerlach kink and the plunge into the dished left Hugenholtzbocht, which magnifies momentum for the climb into the dunes. Ahead lay a duelling Mustang and Mini to be lapped. “As I chose left, I knew I was sunk,” said Wolfe. The pair wafted into his path and Coronel sailed imperiously round them all to lead.

Coronel duly steamed to victory over Wolfe, with Thomas/Calum Lockie a solid third. The Haddon/Mark Martin and John Spiers Cortinas were next, ahead of the top three Minis. Norbert Gross won the concurrent local Touring Car section, his Falcon 10th but lapping quicker than the leading Appendix K versions.

Wolfe’s glory came on Sunday morning, soloing Michael Gans’ AC Cobra in a scintillating 90-minute Gentlemen Drivers GT bout in which he hounded Nicky Pastorelli’s Ferrari 250 GTO for 30 laps until its clutch failed. “I was in my element, happy to let Nicky do the work [in traffic],” Wolfe said. “It was beautiful to watch, but I knew putting new rear tyres on at the pitstop would give me the traction I needed to pass the Ferrari, which I did straight after the pace car.” Following “the race of my life”, Wolfe took the flag 16s clear of Alexander van der Lof and Yelmer Buurman’s Cobra.

After an adventure-filled weekend the Head brothers, Dale and Aaron, finished a superb third in their new John Danby Racing-built Lotus Elan. Martin/Haddon’s 26R was fourth, ahead of Nurburgring winners Leo Voyazides/Simon Hadfield’s Cobra. A brake drama had forced Voyazides to start from the pits – where he was held until the separate Dutch grid (racing for an hour) was released – then the Greek stopped a lap before the window. Allard Kalff/Michiel Campagne dominated the subset in the latter’s magnificently unruly Tachyon-built Chevrolet Corvette Grand Sport clone.

Pastorelli’s turn for victory came in the FIA Masters Sports Car round in which he took over David Hart’s Lola T70 Mk3B and kept it 16 seconds clear of Hadfield, finishing Voyazides’ ex-Fittipaldi brothers



Olsen became the first winner in new-for-2018 Historic F3 European Cup



Snake versus prancing horse:
Wolfe (Cobra) hounded down
Pastorelli (250 GTO) in GT race

ALL PICS: J BLOXHAM

version. Henry Fletcher, whose Chevron B19's pace was blunted by a misfire following a gravelly spin, and Goncalo Gomes (Lola T212) kept the V8s on their toes. The Portuguese led well, but American Jason Wright completed a T70 1-2-3 with water temperature "off the clock". Thomas/Lockie's Chevron B8 ran metronomically to Bonnier-class honours.

All the single-seater classes resulted in double wins, none closer than Saturday's Lurani Trophy leg in which 2015 and '17 champion Bruno Weibel repelled Nurburgring king Mark Shaw by 0.021s, squeezing him over the pit-entrance line at the finish. "I wasn't going to back off," said Shaw, who crashed his Brabham BT6 in qualifying and suffered suspension failure while challenging on Sunday. Manfredo Rossi di Montelera moved up.

Christian Olsen won the inaugural FIA Historic F3 European Cup races, but having popped an oil line he had to be loaned the Alfa Romeo engine from father Tom's sister Martini MK39 to take up pole in his ex-Frederic Delavallade car. Slim Borgudd's teamster overcame 2017 Zandvoort winner Thomas Warken, fortunate to escape serious injury when his Ralt RT3 vaulted Francesco Macri's during lappery at Hunserud on Sunday. Despite lacking torque, Briton Tom Bradshaw scuttled his ex-Thierry Tassin Argo JM6 from 13th to a second on day two. Haddon topped the early class, loving his ex-Riccardo Patrese Chevron B34.

Because Mark Dwyer was sidelined from the Historic F2 races by clutch and gearbox issues, Matthew Watts outran a fabulous grid in his ex-Norman Dickson March 772. Enthusiastic series newcomer Rossi (in James King's car) and Robert Simac pursued



Watts like terriers in 1600cc March 712s each time. Star of Sunday's stanza was venue debutant James Hadfield, who shot his Formula Atlantic Modus M1 from the back to a class-winning fifth behind Matt Wrigley's younger March 79B.

Retro speedster George Shackleton won at the third attempt in 500cc F3. "Darrell [Woods] was on my tail the whole time," said Shackleton. He finished, hand aloft, 0.629s ahead of Woods' Staride-Norton as previous winner Brian Joliffe (Cooper-JAP) faded to third in Sunday's 21-car field.

From the back of Sunday's reversed eight-car FIA Historic Formula 1 grid – with Canadian Keith Frieser's Shadow DN1 on pole – Nick Padmore (Williams FW07C) took three laps to oust early leader Georg Hallau (Theodore N183). Greg Thornton (borrowing Katsu Kubota's March 761) blew a Cosworth DFV in qualifying and so was overjoyed with second ahead of the determined Jason Wright (Shadow DN8).

Klaus Ludwig – among four Le Mans winners present – shared German Tourenwagen Classics gold in Jorg Hatscher's 1996 DTM Mercedes.

MARCUS PYE

ZANDVOORT WEEKENDWINNERS

PRE-'66 TOURING CARS

Alexander Furiani/Tom Coronel
(Alfa Romeo GTA)

MASTERS GENTLEMEN DRIVERS

Andy Wolfe (AC Cobra)

FIA MASTERS HISTORIC SPORTS CARS

David Hart/Nicky Pastorelli
(Lola-Chevrolet T70 Mk3B)

FIA LURANI TROPHY FORMULA JUNIOR

Race 1 Bruno Weibel (Lotus 22)

Race 2 Bruno Weibel (Lotus 22)

FIA HISTORIC F3 EUROPEAN CUP

Race 1 Christian Olsen
(Martini-Alfa Romeo MK39)

Race 2 Christian Olsen
(Martini-Alfa Romeo MK39)

HSCC HISTORIC F2

Race 1 Matthew Watts (March-BMW 772)

Race 2 Matthew Watts (March-BMW 772)

500cc F3

Race 1 George Shackleton
(Cooper-Norton Mk11)

Race 2 George Shackleton
(Cooper-Norton Mk11)

FIA MASTERS HISTORIC F1

Race 1 Nick Padmore (Williams FW07C-14)

Race 2 Nick Padmore (Williams FW07C-14)

TOURENWAGEN CLASSICS

Jorg Hatscher/Klaus Ludwig
(Mercedes-Benz C-Class)

NKGTTC

Race 1 Daniel Schrey (Porsche 935)

Race 2 Daniel Schrey (Porsche 935)

For full results visit:
raceresults.nu



Hands (l) was in the thick of Vee action, along with Pollard (r) and Gant (behind)

JONES

Hands grasps a win after Vee thrillers

DONINGTON PARK
750MC
SEPTEMBER 1-2

In a pair of stunning Formula Vee races in which victory could have fallen to any one of five drivers, it was Graham Gant and Daniel Hands who came out on top at a bumper 750 Motor Club meeting at Donington Park.

A mammoth 28-race schedule to accommodate the cancelled event at the same circuit in March ensured action aplenty throughout as 34 Vee entries took to the track.

Points leader Craig Pollard brought home a third and second place after two thrilling encounters. Ben Miloudi started race one from pole and led for all of a corner and a half before Hands grabbed first place

approaching the Craner Curves.

The lead swapped seven times in the next four laps as Hands, Pollard, Gant and Miloudi all took turns at the front. Hands and Miloudi then made contact disputing the lead at McLeans with four laps remaining, holding up Tim Probert in the process.

Gant was passed by Hands into McLeans amid traffic, but superbly outbraked the GAC Vee at Roberts to steal the win by 0.21 seconds; Miloudi edged Pollard by 0.03s.

Race two looked to be similarly contested as Hands, Gant and Pollard swapped the lead before it was red-flagged after five laps, following Michael Richards's excursion at Roberts. Hands was declared the winner on countback, ahead of Pollard.

Close finishes were the order of the day in 750 Formula as championship rivals Mark Glover and Bill Cowley took a win apiece.

Bob Simpson made a lightning start from fourth to lead race one into the first turn, but lost out to Peter Bove and Glover as the race wore on. Bove had it sewn up until a clumsy final-lap spin at Redgate gifted Glover the victory.

Cowley started race one from 14th after a clutch master-cylinder issue halted him in qualifying. But the points leader made a terrific start to run third early on, then suffered further unreliability when he blew a head gasket on the approach to McLeans at half-distance.

Cowley made amends in race two

though, charging through the field trouble-free to claim his third victory of the season in his Cowley MkIV.

A near-capacity entry of 39 cars turned out for a pair of scintillating MR2 Championship races, after which Shaun Traynor outscored title rival Ben Rowe by a solitary point. Partial-season driver Paul Cook won both races, escaping a frenetic chasing pack that embraced side-by-side action throughout the pair of 10-lap events. Both Rowe and Traynor had chances to take victory in an epic second race, with Traynor losing out to Cook by just half a second.

"Embarrassing" was the word one Locost Championship driver used to describe the weekend as all three races were dogged by red flags. A multi-car pile-up pushed Saturday's opener to the end of the bill and also curtailed the running of six drivers. It was eventually cancelled. Things got no better on Sunday as three cars got beached at the Roberts chicane, halting proceedings, while an oil spill at Coppice brought an end to the third race.

Another victim of the snow-affected March meeting, Hot Hatch produced two hard-fought encounters as Ben Rushworth's Honda Integra DC2 proved the car to beat in both races. Class C's Michael Winkler also missed a chance to claim the overall title with a round to spare in race two when mechanical woes struck.



Rushworth took a pair of Hot Hatch victories

JONES

DONINGTON PARK WEEKEND WINNERS

FORMULA VEE

Race 1 Graham Gant (WEV FV01)

Race 2 Daniel Hands (GAC Vee)

750 FORMULA

Race 1 Mark Glover (Racekits Falcon)

Race 2 Bill Cowley (Cowley MkIV)

TOYOTA MR2s

Races 1 & 2 Paul Cook (Mk2)

LOCOST CHAMPIONSHIP

Race 1 Cancelled

Races 2 & 3 Mark Burton

HOT HATCH CHAMPIONSHIP

Races 1 & 2 Ben Rushworth (Honda Integra DC2)

M3 CUP/330 CHALLENGE

Races 1 & 2 Simon Walker-Hansell (BMW E46 M3)

BIKESPORTS CHAMPIONSHIP

Races 1 & 2 Joe Stables (Radical SR3)

MX-5 CUP

Races 1 & 2 Paul Bateman

Race 3 Ian Tomlinson

CLIO 182 CHAMPIONSHIP

Race 1 Patrick Fletcher

Race 2 Jack Kingsbury

BMW CLUB CHAMPIONSHIP

Races 1 & 2 Michael Cutt (E36 M3)

HISTORIC 750 FORMULA

Christian Pedersen (Austin 7)

Handicap Ian Grant (Austin 7 Pigsty Special)

ARMED FORCES CHALLENGE

Races 1 & 2 Mark Inman (Vauxhall VX220)

SPORT SPECIALS CHAMPIONSHIP

Races 1 & 2 Andy Hiley (Chronos Mk2)

For full results visit:
theresultslive.co.uk

Tom Coller secured the BMW M3 Cup title with a pair of podiums, but only after dominant race-one winner Paul Cook was excluded for breaching eligibility rules. Simon Walker-Hansell inherited the win and doubled up in race two.

Joe Stables moved closer to the Bikesports title by completing yet another brace of wins in his Radical SR3, fending off the Class A PR6s of Bill Henderson and Jon-Paul Ivey respectively.

A trio of second places ensured Paul Maguire wrapped up the MX-5 Cup title a round early. Maguire followed Paul Bateman home in the first two races before clinching the title in the red-flagged third encounter, won by Ian Tomlinson.

Jack Kingsbury snatched a last-gasp victory in the second Clio 182 contest from race-one winner Patrick Fletcher to ensure the pair head into the final round at Snetterton separated by one point.

STEPHEN BRUNSDON

EMM SHOWS HOW TO PROGRESS FROM LOCOST



As affordable, competitive racing goes, there isn't much better than the 750 Motor Club's Locost Championship. But while the grid's weekend action was plagued by a plethora of red-flag stoppages and a litany of inexcusable driving, one of its former competitors was certainly getting more bang for his buck in the club's Sport Specials.

"This whole season I've been the only one running this Mazda engine," says overall points leader Lee Emm.

Emm entered Sport Specials as a result of an oversubscribed Locost grid. Keen to find an alternative series that didn't break the budget, he elected to fit a 1.8-litre Mazda MX-5 engine into his existing car with the help of Locost team TSR.

Since then he's been a revelation – a runaway leader in Class B and a match for the overall frontrunners, as demonstrated by a fabulous third place at Cadwell Park earlier in the year.

"At Cadwell it managed to finish third overall," says Emm. "There's no aero to the car but it makes up for that in the corners; it's got very good handling."

Emm didn't have such a good time of it at Donington Park, however, as a misfire curtailed his qualifying, forcing him to start

the first race from the back. The issue reoccurred after just one lap on Sunday morning, but Emm recovered in race two to finish fifth in class and 16th overall.

It's the sort of misfortune you get being the only one running a specific engine. But ever a pragmatist, Emm sees the positives in an attempt to encourage more Locost entries to join Sport Specials next season, which he believes is a real possibility.

"There's no-one else running this engine this season. So to have issues like this, we're the first ones to encounter them and we've no reference point," Emm continues.

"Yesterday [after qualifying], I had to dash out to Tamworth to grab some extra parts because no-one's got any here.

"There's about seven or eight Locost guys who want to come over and do that, so I think it'd be good for Locost but also Sport Specials. That's a £90 scrap engine, so it's nice to show that you can put an engine in for nothing and be competitive."

750MC competitions manager Giles Groombridge agrees: "Lee has proven to people who have Locosts that if they do want to progress and race something quicker, they don't have to throw away their existing car. There's a relatively straightforward conversion and Lee has done a fantastic job this season."

For a standard engine to be at the sharp end of a highly competitive kit car series speaks volumes of the work done by TSR and Emm to get the car into a position where it can fight for top honours.

Emm may not be able to add the overall title to an almost certain class triumph, but his greater victory may prove there is a low-cost future beyond Locost.

Andy Hiley won both encounters in his Chronos Mk2, beating Matthew Booth (MK Indy RR) and Adrian Cooper (Procomp LA Gold) in races one and two respectively.

STEPHEN BRUNSDON



Wren flies to JSCC glory in Anglesey rain

**ANGLESEY
BARC
SEPTEMBER 1-2**

Fourteen-year-old Joel Wren, still in his first year of car racing, took a double Junior Saloon Car victory at Anglesey. "It's been such a mature performance," said proud father Ian after Wren streaked 11 seconds clear from pole position to win race one.

Wren took pole with a delicate performance in damp conditions, then in the race beat title rival Lewis Saunders, who pushed from fourth to second. Wren was made to work harder for his race-two victory by a flying Charlotte Birch, who found more grip in damp conditions. "It was an intense finish," said Wren after he frustrated a last-minute attack by Birch at Rocket. "That result has been coming," said Birch. "I like the wet, and almost had him."

A hat-trick of victories helped Ben Palmer secure back-to-back Michelin Clio Cup Series title wins and extend his

perfect win record to 13 this season. Palmer batted off a lap-one assault by Ronan Pearson, making a break to win after a sideways moment for Pearson sent him spearing into the luckless Tyler Lidsey.

The door damage incurred here would come back to haunt Lidsey the following day. Leading from pole in bleak conditions, Lidsey found his windscreen misting. Palmer tried to go past at Rocket and they collided, allowing Ben Colburn into the lead as Lidsey slowed with a damaged driveshaft.

The decisive move came at Target after Palmer braved it out around the outside of Colburn heading down the Corkscrew. Then, despite tracking damage, Palmer completed a "perfect weekend" with a lights-to-flag race-three victory to seal the title. Colburn finished runner-up for the third time.

In CNC Sports/Saloons, Paul Rose also celebrated a hat-trick of victories. The hairpin on the longer circuit was the scene of two incidents that reduced the opening contest to just four racing laps. Red flags waved on lap two when Philip Morris's Volkswagen Golf speared the tyre wall, and leaders Danny Bird and Andrew Southcott collided two laps into the restart at the same corner after Bird half-spun his Spire.

Rose evaded the chaos to win behind the safety car ahead of Saker team-mate Steve Harris, who briefly headed Rose after enduring a qualifying off. Rose doubled up in race two after an early pass on Bird, but saved his party piece until last. Both Sakers chose to start from the pits, and Rose scythed through and usurped leader David

Harvey's Locosaki by lap five. Team-mate Harris matched his every move to finish second in changeable conditions, which he described as akin to "being a dog on lino".

Clive Wood's dominant form continued in the Clubmans Sports Prototype Championship with two victories, but he was challenged by an inspired Michelle Hayward. In an early mishap, Wood's Mallock Mk23 – previously victorious in the hands of Mark Charteris – stalled in the pitlane heading to the grid, forcing him to start from the pits along with his daughter, Pippa Tanner-Wood.

Already third by lap four, Wood passed leader Hayward on lap six thanks to superior traction. Wet-weather specialist Hayward got revenge in race two, beating Wood into second to clinch a first overall win. Wood, who raced against the likes of Ayrton Senna and Nigel Mansell in his Formula Ford days, returned the favour to narrowly win the final race from Hayward.

In Caterham Graduates, experience paid off for seven-time champion Jamie Ellwood as he darted through the middle of the front row to beat Oliver Gibson in the first Sigmex race. Samuel Wilson won race two with a well-judged attack to seal the spoils from Jamie Winrow, with Ellwood third.

In British Superkarts, Dave Harvey's defence in a pulsating second race prevented a Paul Platt clean sweep of Division 1. Andrew Connor won an F125 race redolent of Monaco 1982, with three leaders dropping from contention on the final lap.

DAN MASON





ANGLESEY

JUNIOR SALOONS

Races 1 & 2 Joel Wren

CLIO CUP SERIES

Races 1, 2 & 3 Ben Palmer

CNC SPORTS/SALOONS

Races 1, 2 & 3 Paul Rose (Saker RAPX S1-400)

CLUBMANS

Race 1 Clive Wood (Mallock Mk23)

Race 2 Michelle Hayward (Mallock Mk27)

Race 3 Clive Wood (Mallock Mk23)

CATERHAM SIGMAX

Race 1 Jamie Ellwood

Race 2 Samuel Wilson

CATERHAM MEGA/CLASSIC/SIGMA

Races 1 & 2 Ben Winrow

BRITISH SUPERKARTS DIVISION 1

Race 1 Paul Platt (PVP/Gas Gas)

Race 2 Dave Harvey (MS Kart/VM)

Race 3 Paul Platt (PVP/Gas Gas)

SUPERKARTS F125

Race 1 Matt Robinson (Anderson/Redspeed TM)

Race 2 Andrew Connor (Anderson/Redspeed TM)

Race 3 Chris Needham (Anderson/IAME)

For full results visit: tsl-timing.com

SNETTERTON

GT CHALLENGE

Gleb Stepanov/Stephen Tomkins
(Aston Martin Vulcan)

JACK FAIRMAN CUP INC JEC XK & HAWTHORN CHALLENGES

Anthony Ditheridge (Cooper Monaco)

EQUIPE GTS

Tom Smith (MGB)

EQUIPE PRE-'63

Martyn Corfield (Austin-Healey 3000)

AMOC INTERMARQUE CHAMPIONSHIP

Robert Hollyman (Porsche 964)

PRE-WAR TEAM CHALLENGE

Duncan Wiltshire (Bentley 3 Litre)

For full results visit: tsl-timing.com



Aston Martin Vulcan stars in Snetterton victory trek

**SNETTERTON
MSVR
SEPTEMBER 1**

The biggest talking point of the Snetterton round of the Aston Martin Owners' Club series was the Aston Martin Vulcan making its first competitive appearance in the UK in the GT Challenge. The Vulcan, driven by Stephen Tomkins and owner Gleb Stepanov, won by over a minute, having been the only car to set sub-two-minute lap times all day. The sleek darkest-red machine was not even at full power; it had to be rev-limited so as not to exceed noise limits.

Even lacking its top 200bhp, Aston's trackday supercar was never seriously challenged after the first couple of corners, but a tense battle for second place developed towards the end of the 50-minute enduro between Grahame Tilley's Ginetta G55 and the BMW M3 of Richard and Sam Neary. The BMW took second after the driver changes and Sam Neary defended skillfully from a determined Tilley. The two cars remained close to each other for several laps and squabbled at Hamilton, but Neary pulled away slightly at the end. This was an impressive drive by a 16-year old who has only recently lost his novice plates.

Runaway wins were a theme of the day. Anthony Ditheridge's 1958 Cooper Monaco charged away from previous winner Steve Watton's distinctive yellow Turner Sports in the Jack Fairman Cup. The pedigree racer was too quick for the MG-based special. Martyn Corfield was third in his Austin-Healey 3000, and Tom Butterfield was the leading Mike Hawthorn Challenge competitor in his Jaguar Mk1 saloon, finishing fifth despite a messy spin.

Tom Smith recovered from a self-confessed "terrible start" in his MGB to



triumph in the Equipe GTS race by 38 seconds from Will Penrose's TVR Grantura. He continued to drive very hard, lifting a front wheel at Murrays, despite a well-timed pitstop and a sizeable lead. Smith said later he had no idea where his rivals were and was not taking chances. Mark Ashworth was a distant third in another Grantura, having taken advantage of a slip by Nick Matthews's Austin-Healey 100/4 at Murrays. Matthews recovered and finished fourth, having run third for most of the race.

The Equipe Pre-'63 race was won by Corfield in the same car he used in the Jack Fairman Cup. He started from pole but had to wait until just before the pitstops to claim the race lead, after Will Linley's Healey MkII and Paul Kennelly's Jaguar E-type fought over first place early on.

Linley lost out during the pitstops and dropped to fifth. Kennelly finished second on the track, but was demoted to 12th place by a three-minute penalty for coming into the pits 30s early. He admitted that it was an error by his pitcrew.

Kennelly's misfortune promoted Stephen Bond and the Healey 3000 of Bill and Jack Rawles to second and third. Bond's second place was well-deserved; he started his Lister Flat Iron ninth and steadily put himself in contention with some very fast laps, including the outright quickest.

RACHEL HARRIS-GARDINER



Burgess battles to hard-fought MG Trophy triumphs

Burgess (r) had close battle with Wetton in race one after seeing off Ross

OULTON PARK MGCC SEPTEMBER 1

Resolved with elbows out and a battle to be the last to hit the brakes, race one of the MG Trophy highlighted both the dos and don'ts of racing side-by-side through Oulton Park's notorious Old Hall.

Heading into the meeting with five wins in as many races, points leader Graham Ross looked as though he would extend

his 2018 advantage. He lined his ZR 190 up on pole alongside that of Jason Burgess, who was still looking for his first win since the opening rounds of the season.

Wanting to put a stop to the Scottish driver's excellent run of form, Burgess spent much of the opening lap battling with Ross, and each repeatedly seized custody of the lead. But as they headed through Old Hall for the second time, Ross took the outside line, clipped the grass, and that pitched him across the track

and into the tyre wall on the inside.

"Jason [Burgess] was at my door throughout the lap and I thought, 'He seriously wants to get past me,'" said Ross. "Next minute, I'm on the outside with not much room and heading straight off the track. There's lots of front-end damage, it's probably fifty-fifty if it's a complete rebuild. It's just the worst possible scenario."

Burgess had lost one challenger for victory, but Gary Wetton ensured that this

McArthur twice defeats a spirited Quartermaine

MALLORY PARK BRSCC SEPTEMBER 2

David McArthur and his Van Diemen LA10 dominated the Mallory Park Northern Formula Ford Championship double-header, claiming his third and fourth wins this season ahead of a spirited Adam Quartermaine.

It was only Quartermaine's second race meeting this year owing to his business commitments, and he was right on the pace in his RF99. He had a plan to hang on to McArthur using his slipstream and then attack him late on. For much of race one it appeared to be working.

Quartermaine led briefly into Gerards before McArthur passed back at the same corner. Then, following a late safety-car

restart – the caution was caused by an incident involving Neil Hannah and Edwin Hunt at the Esses – McArthur was able to break away by a vital few car lengths.

The second race was much more straightforward for McArthur as he quickly built a gap and beat Quartermaine (who was hobbled by a bent valve sustained at the end of race one) by 14 seconds.

"I'm really happy with that second race," McArthur said. "The first one was a bit messy and it shouldn't have been. I was really focused on getting into a rhythm in that second one. Short laps are all about banging out laps one after the other. We decided that 49.6s would be enough and that's what we did – we didn't try to do anything silly.

"I was preoccupied with Adam behind me [in race one] and I didn't concentrate



enough, and gave myself a mental telling-off for that one."

Rory Smith, the championship leader heading into the round, did not attend. Alaric Gordon – a point behind Smith beforehand – took a fourth and third place despite a qualifying off where he sustained only a broken mirror on his Swift. In race two Gordon prevailed in a frenzied battle with Nigel Dolan's Van Diemen.

Dan Lewis won the HRDC Academy/A-Series Challenge race in a 1965 Austin Mini Cooper S. He led all the way and beat Julian Crossley's 1959 Cooper by 3s. Crossley had to start at the back rather than his earned second-place slot after

race would not end with an easy run to the flag. They fought wheel to wheel until the end, but while Burgess crossed the line first he had an anxious wait before the stewards ruled his earlier collision a racing accident.

“I think you can see from my scraps with Gary [Wetton] that there was no intent with the Ross incident in the race,” said Burgess. “It’s great to get the win, but I’m never a fan of controversy and I’m glad the stewards have drawn a line under it.”

Wetton added: “Jason was on an absolute mission.”

And he certainly proved to be. Burgess took a comfortable win in race two ahead of Doug Cole and Wetton, managing to keep both at arm’s length – and more importantly avoiding any skirmishes.

The MGCC was also running an inaugural all-comers 100-mile race during the Oulton Park meeting, a race split into two equal-length sessions. During the first, Andrew Rath built a significant 54s lead to the MGB GT of Bernard Foley. But for the second half, Rath handed the Lotus Europa S2 – which had undergone a rebuild only a week earlier – to team-mate Chris Tilly for his first outing in the car.

While Foley took the lead and continued to chip away at the gap from the first half of the race, Tilly was busy familiarising himself with both the car and the track. He eventually found his feet and drew back Foley from the 45s deficit he had built, and finished only 21s behind the Irishman. More importantly though, he kept the overall race victory.



Jack Ashton finished ahead of his brother in Metros



Rath and Tilly’s Lotus took North West 100 victory

“All the hard work was done by Andrew [Rath] in the first half, and I didn’t want to let it go to waste. This is a great little car,” said Tilly.

Ashton brothers Jack and Andrew celebrated a respective first and second in the MG Metro Cup, though both suffered mechanical woes in qualifying. Jack had to replace a coil pack while Andrew was forced to start from the back after his gearbox breather broke in qualifying.

DOM D’ANGELILLO



Moore leads on way to HRDC Allstars win

failing to reach the assembly area on time. He came through the pack to second by one-third distance, but couldn’t bridge the gap to poleman Lewis.

Crossley was also denied what would have been his first-ever motorsport win in the HRDC Allstars race. It looked like he had prevailed in a classic handling-versus-power battle for the lead against Matthew Moore’s 1959 Austin-Healey Jamaican.

But Crossley then had a 10s penalty announced for rolling before the green light. Late on his CV joint failed, which first slowed him and then forced him to stop. This let Moore win comfortably even after a last-lap trip across the grass.

Charlie Johnson took a pair of Superkarting UK Championship wins in his KTM 540 Anderson, leading both races lights-to-flag from pole. Aaron Sifleet in his Gas Gas Anderson finished second in both races despite a mysterious engine cut-out in race one, resolved by letting the clutch back out. The glitch lost him nine seconds and briefly dropped him to third.

Nick Gwinnett in a Renault Clio won the opening Track Attack Nippon Challenge, Tricolore Trophy & Multi Marques race, while his fellow Clio pilot Russell Thomson claimed race two.

GRAHAM KEILLOH

WEEKEND WINNERS



McCarthy claimed the opening BCV8 spoils

OULTON PARK

MG TROPHY

Race 1 & 2 Jason Burgess (MG ZR 190)

BRITISH MOTOR HERITAGE

NORTH WEST 100

Andrew Rath/Chris Tilly (Lotus Europa S2)

MG METRO CUP

Jack Ashton (Rover Metro GTi)

BCV8 CHAMPIONSHIP

Race 1 Russell McCarthy (MGB GTV8)

Race 2 Neil Fowler (MGB GTV8)

MG CUP

Race 1 Richard Buckley (Rover 220 Turbo)

Race 2 Mike Williams (Rover Metro)

COCKSHOOT CUP

Ray Collier (MG ZR 190)

For full results visit: tsl-timing.com

MALLORY PARK

NORTHERN FORMULA FORD 1600 CHAMPIONSHIP

Race 1 & 2 David McArthur

(Van Diemen LA10)

HRDC ACADEMY/A-SERIES CHALLENGE

Dan Lewis (Austin Mini Cooper S)

HRDC ALLSTARS

Matthew Moore (Austin-Healey Jamaican)

SUPERKARTING-UK CLUB CHAMPIONSHIP

Race 1 & 2 Charlie Johnson

(KTM 450 Anderson)

TRACK ATTACK NIPPON CHALLENGE, TRICOLERE TROPHY & MULTI MARQUES

Race 1 Nick Gwinnett (Renault Clio)

Race 2 Russell Thomson (Renault Clio)

For full results visit: tsl-timing.com



Lewis led all the way in HRDC Academy/A-Series

FINISHING STRAIGHT

IN THE MEDIA • ARCHIVE • QUIZ



FROM A MOUNTAIN TO THE

CITY CENTRE MOTORSPORT RED BULL DRIFT SHIFTERS

If Formula 1 is motorsport's equivalent of the 100-metre butterfly in an Olympic swimming pool and rallying's akin to an open water race, then drifting is competitive diving. Timing is critical and it's meticulously judged. To some it's an artwork, but others would be loath to consider it a *proper* sport.

That didn't stop Red Bull from bringing drifting to the streets of Liverpool with Drift Shifters last month. Tyre smoke billowed to cloud the Liver Building from the skyline as heavily modified, 1000bhp cars slithered around the city's waterfront.

What makes Red Bull's take different to the normal, regulated drifting events is that the fizzy drinks company has tried to bring an arcade game to life. Much like with its Air Race Championship and the Cliff Diving World Series, this takes what you know of a discipline and turns it up to 11.

Instead of a strictly demarcated route, as in traditional events, Drift Shifters entrants freestyled their way around a closed-road obstacle course, including passing under a lorry trailer, navigating red phone boxes and, because it's Liverpool, a yellow submarine.

As the creator of Drift Shifters, New Zealander's 'Mad' Mike Whiddett explained to Autosport what makes the event that little bit more special.

"We've essentially created a giant pinball machine for pro drift cars that slide around

and the track scores the drivers," he said. "The track has radar guns for speed, proximity sensors for how close the cars get to the walls, angle sensors... all the stuff we're judged on in a traditional drifting format – only it's all automated. It's all in real-time on a big screen – the points counting up, the time counting down."

"Usually in drifting we're scored by three judges. What we've done is take out the human error or politics that can be involved with any judged sport."

While the order of the day is flamboyance, it'd be wrong to dismiss the cars as show ponies instead of taking them seriously as highly fettled machines. The smallest packs 500bhp from an engine that's happy to clatter into the rev limiter all day. Each has specialist suspension and differentials, plus a hydraulic handbrake to provoke the rear axle into stepping out of line.

Combination scores were on offer for anyone tripping all sensors on a particular section – up to seven of them. As well as the big screen readout, there were sound effects and lights shone to show the crowd which particular spots had been triggered by

**"DRIFT SHIFTERS HAS
TAKEN WHAT YOU
ALREADY KNOW AND
TURNED IT UP TO 11"**



CITY STREETS

a fiercely sideways car. Whiddett calling it a "pinball machine" isn't mere hyperbole.

What started on the mountain roads of Japan has since become a global export, with drifting events springing up across the globe. It's now a mainstay of the Goodwood Festival of Speed too, leaving black lines all the way up the Duke of Richmond's driveway. Times are changing with its popularity, and that means so too are the weapons of choice. While the three highest scorers in Liverpool used Japanese machinery, some of the most spectacular flame-spitting antics came from Dean 'Karnage' Kearney's Dodge Viper, which has a gloriously excessive 8.3-litre V10.

By comparison, winner Gaz Whiter was driving a Nissan Silvia that sported a modest 680bhp. He was the only driver out of the 12 to score over 6million points.

"When you're on the course, the adrenaline is crazy," Whiter told Autosport. "All the coloured barriers and the lights, it gets a bit much. You just have to pick a run and stick to it."

From inside the smoke-filled cockpit, he had little idea of how well he was scoring: "You hear the odd sound effect, but you're just driving what you've got in your head. Then you get to the end and see the crowd and someone tells you your score."

Liverpool grew as a vital port for the UK import-export industry and Red Bull Drift Shifters is the latest successful cargo to pass through, all the way from Japan.

RACHEL HARRIS-GARDINER



SUPER FORMULA: OKAYAMA RACE LIVESTREAM

This weekend we're touching down at Japan's Okayama international Circuit for round six of the Super Formula season. Livestreamed on Motorsport.tv, we'll watch as New Zealander Nick Cassidy tries to retain his title lead as he battles with the likes of Toyota's 2018 Le Mans 24 Hours winner Kazuki Najakima. Go to <https://bit.ly/2MGXvE3>

THIS WEEKEND'S EVENTS

INTERNATIONAL MOTORSPORT

MotoGP
Rd 13/19
Misano, San Marino GP
September 9
TV Live BT Sport 2, Sunday 1230

Super Formula
Rd 6/7
Okayama, Japan
September 9

Japanese F3
Rd 6/8
Okayama, Japan
September 8-9

Euro F3
Rd 8/10
Nurburgring, Germany
September 8-9
TV Live BT Sport 3, Saturday 1000. BT Sport 1, Sunday 1000. BT Sport 2, Sunday 1600

DTM
Rd 8/10
Nurburgring, Germany
September 8-9

ADAC GT Masters
Rd 6/7
Sachsenring, Germany
September 8-9

IMSA SportsCars
Rd 11/12
Laguna Seca, USA
September 9

Scandinavian Touring Cars
Rd 5/6
Rudskogen, Norway
September 9

NASCAR Cup
Rd 26/36
Indianapolis, USA
September 9
TV Live Premier Sports, Sunday 1830

Brazilian Stock Car Championship
Rd 8/12
Cascavel, Brazil
September 9

UK MOTORSPORT

Goodwood BARC
September 7-9
Revival Meeting: Classic and historic races (see page 47)

Croft BRSCC
September 8-9
TCR UK, FF1600, VW Cup, MX-5s, Fiesta ST-XRs, Northern Saloons/Sports

Donington Park MSVR
September 8-9
LMP3 Cup, GT Cup, Lotus Cup, Lotus Elises, Radical SR1s, Racing Saloons, Production BMW

Snetterton BARC
September 8-9

Truck meeting: Trucks, Britcar, Legends, Mighty Minis, Pickups

Brands Hatch BRSCC
September 8-9

Open Sports, TVRs, Porsches, Fun Cup, Civic Cup, Production GTI

Cadwell Park BARC

September 8-9
Mini Miglias, Mini Se7ens, Classic VWs, BARC Saloons/VTEC, Racing Fords, MGOC/ MaX5, Classic FF1600

Anglesey 750MC

September 9
Club Enduro, RGB Sports 1000





FROM THE ARCHIVE

The beautiful Ferrari 312P captured at rest in the bustling Le Mans pit in 1969, with driver Chris Amon in conversation behind its hinged doors. Our shot must

be from practice, because its race didn't last long... On the first lap Amon came across the devastating scene of British privateer John Woolfe's fatal accident at Maison Blanche. The Ferrari collided

with the Porsche 917's full fuel tank, which ruptured and exploded. Amon was unhurt, but he was forced to retire the car, which he had been due to share with Swiss hillclimber Peter Schetty.



TEST YOUR KNOWLEDGE

QUIZ

WHO, WHAT, WHERE, WHEN?



WHO IS THIS?

Hailing from the Quaker State, this little-town racer carried on a great legacy.

After squashing some beetles in emphatic style he set sail on the ocean and was a national champion.

He made it a family affair in the great race, but could not help to ease the curse. The obvious graduation followed and he went head to head with his old man, showcasing his great wheel-to-wheel racing skills as he racked up the wins and eventually the title.

This led to a big break alongside one of the greatest of all time at the peak of his powers. It was pretty much a disaster aside from one moment in the sun at the ancestral home.

He picked up where he left off when he went back to his roots, later switching from cockpit to pitwall with considerable success.

ON THIS DAY

1 Which Italian also-ran made his F1 debut for Osella on this day in 1987?

2 At which track did Clay Regazzoni claim his first F1 win on this day in 1970?

3 Will Stevens started from his highest F1 grid position on this day in the 2015 Italian GP. Which position was that?

4 Today is Jamie Whitham's birthday. Which bike did he ride during the 1999 500cc season?

5 Who scored his first home DTM win on this day in 2009?

NAME THE HELMET



LAST WEEK'S ANSWERS

Who, what, where, when Adam Carroll, Audi A4 DTM, Norisring, June 24 2007. **Who is this?** Heikki Kovalainen.

On this day 1) Force India. 2) March. 3) 11. 4) 4. 5) Alex de Angelis. **Name the helmet** Emerson Fittipaldi.

IN NEXT WEEK'S ISSUE



**LANDO NORRIS:
WHAT CAN MCLAREN'S
NEW STAR DO IN F1?**

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ENGINEERING

DESTINED TO FAIL?

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IMAGES

WEISSACH'S BLACK SHEEP AND THE PRIDE OF WARWICKSHIRE

Ots terrible Formula 1 effort with Footwork in 1991 aside, Porsche has very few black marks against its 70-year record in motorsport.

A byword for success at Le Mans with a record 19 wins to its name – only Audi comes close in that regard – Porsche has also claimed victories on the Monte Carlo (1968-70, '78), Dakar ('84, '86) and Tour de Corse ('60, '69, '80), powered Niki Lauda and Alain Prost to drivers' world championships from '84-86, and earned a solitary grand prix victory as a constructor with Dan Gurney in '62.

But the big exception to that record of glittering success is Indycar. Yes, Porsche did go Indycar racing, and even won a race – at Mid-Ohio in 1989 – but the programme was shortlived, lasting only three full seasons before Weissach pulled the plug, and didn't come close to emulating its domination of Group C. That the Indycar project had come at the expense of developing a new car to replace the ageing 962 in the battle for sportscar supremacy with Jaguar and Mercedes only made Porsche's failure to crack America all the more galling.

But while it would be tempting to imagine what might have been, there is a case to answer that the cards were stacked

against it from the very start, which you can read all about on page 12.

While Porsche was an uncomfortable fit as an underdog in Indycar, mostly running as a single-car team against multi-car operations from Penske and Lola, it's a different story for British Touring Car Championship outfit Power Maxed Racing.

Such has been its growth since the team was founded in 2015, becoming a fully fledged manufacturer entry last year and winning three times this term, that it would be easy to overlook the fact that PMR has but 10 full-time staff. The Martin Broadhurst-led outfit carries the weight of expectation that comes with being a manufacturer entity, but with few of the financial benefits that are normally associated with that.

PMR is doing things the hard way but, as Matt James explains on page 28, Broadhurst is wholly comfortable with that. The BTCC and Indycar aren't exactly comparable, but the stark difference in outcomes from Weissach to Warwickshire is a perfect illustration of what's possible when everyone pulls in the same direction.



James Newbold

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PETRONAS TO CALL ON UNIVERSITIES

Students could help Mercedes close the gulf to Shell-powered Ferrari in F1 lubrication battle

Mercedes fuel and lubricant supplier Petronas is turning to 'new chemistries' and radical ideas from universities to help the Formula 1 team in its world championship fight with Ferrari.

Mercedes boss Toto Wolff admitted his team was "deflated" after Sebastian Vettel's comfortable victory in the Belgian Grand Prix, despite upgrades to its chassis and engine.

Ferrari supplier Shell brought a new fuel to Spa, worth 20% of the performance gain in Ferrari's own engine update for that race, which only increased pressure on Petronas to respond after a run of events in which Mercedes has lagged behind its title rival on raw pace.

Andy Holmes, Petronas' head of group research and technology, said traditional avenues of fuel and lubricant development have been exhausted, so more radical concepts are now being chased.

"For us, what is critical at the moment is a pipeline of new ideas, new chemistries, and tuning the fuel properties to meet the challenges that are coming," he said. "The pressure is on us. That increasingly takes us in the direction of new chemistries. We are increasing our investment and innovation, looking to develop new components and new fluids that can keep giving us incremental gains."

"We think it is tough, but the reason we are in it is because we think those gains can be made."

Although Petronas employs highly skilled scientists, the company is also turning to university students for ideas to help make a breakthrough.

Eric Holthusen, Petronas' chief technology officer, said: "If you look into universities, a lot of research is done without the pressure that industries put on their own development teams."

"Andy and I are constantly under pressure and whatever we do we are asked: 'What is the value to the business?' If you are at university you have a lot more freedom and can play with new chemistries."

"We need to make sure we understand what is happening in universities and if we see something promising, ensure that we are part of the gang."

STEM SUBJECTS UPTAKE ON THE RISE AT A-LEVEL

This year's A-level results show entries into STEM (science, technology, engineering and mathematics) subjects continue to rise, an encouraging sign that the skills gap in the UK will be diminished in years to come.

Statistics show a 3.4% increase in STEM subject participation at A-level compared to last year, an increase of 24% since 2010. Encouragingly, there was also an increase in female entries to STEM A-levels, up 5.5% from last year and 26.9% since '10.

It comes at a pertinent time, as new

research conducted by STEM Learning suggests that a major shortage of staff with STEM skills is costing businesses £1.5 billion per year, while seven in 10 STEM employers have found it difficult to hire staff with the required skills in the past year.

Conducted by independent research agency PCP, the findings showed that businesses in R&D-intensive sectors are most affected. Almost half of STEM businesses (48%) are looking abroad to find the right skills, with a lack of meaningful work experience opportunities (35%) highlighted as a key barrier to young people finding employment.

Nearly half (46%) of employers believe that automation will increase demand for skilled roles.





Audi lent support to the University of Munich

MONASH WINS FORMULA STUDENT AT SILVERSTONE

Audi had a prominent presence on the University of Munich's TuFast Racing entry, but it was Monash Motorsport that triumphed against 128 other entries from 30 countries to win Formula Student at Silverstone, the first Australian victors since 2007.

The Monash team, which entered petrol and electric-powered cars in the 20th edition of the Institution of Mechanical Engineers-run event, claimed honours in the Endurance race with its combustion car and scored strongly across the Dynamic events to beat leading UK entrant



Rockingham closure will force Greenpower to go elsewhere in 2019

GREENPOWER IN NEW VENUE SEARCH FOR 2019

The demise of Rockingham Motor Speedway has forced the Greenpower Challenge to look for a new venue to host its International Final next year.

Run by the Greenpower Education Trust, the Challenge aims to address the national engineering skills gap by challenging school-age students to design, build and race an electric car.

The season-concluding International Final has been held at Rockingham since 2015, but this year's event on October 5-6 will be Greenpower's last before the circuit is closed.

Partnerships and development officer Gavin Woodruff told Autosport that a return to its former home at Goodwood for the 20th anniversary Final is being considered, with Silverstone also an option.

"Rockingham proved to be the perfect location for Greenpower to host its International Final and we were deeply disappointed to find out that the site would be closing," he said. "We are excited to make our last event at Rockingham one to remember and will leave with positive memories."

Greenpower plans to organise an invite-only regional heat on the streets of Hull next year, which is thought to be the first fully electric race on public roads staged in the UK.

Oxford Brookes to the top spot, with its EV finishing just 5.4 points behind in third.

Munich finished fourth, having prevailed in the skidpan, sprint and acceleration tests, but managed only 38th in the cost report.

Although defending winners Cardiff Racing slipped to 13th, five UK teams finished in the top 10 overall, while the University of Bath won Class 2 for the third time in four years.

The event also featured a demonstration of a fully autonomous vehicle for the first time, which was designed and built by regular hillclimb entrant DJ Engineering Services.

TCR OPENS SUPPLY TENDER FOR NEW ECU

The WSC Group behind the TCR touring car concept will introduce a standard ECU from 2020 in a bid to support the controversial Balance of Performance process.

Around 700 cars are believed to have been built to TCR regulations since the concept was drawn up in 2014.

The move is intended to help its technical department "check the performance of the engines of TCR cars and compliance with the TCR technical regulations".

The ECUs in all four Hyundais were seized at the Slovakia World Touring Car Cup round after three of the four cars were excluded from qualifying for boost issues. The parts were later found to be compliant.

TCR rules currently allow free ECU choice, but "manipulation, modification or disconnection" of an ECU sensor is not allowed in accordance with article 6.4 of its technical regulations.

The common supply tender will be open until September 17, and WSC will announce the successful party on September 30.



Hyundai ECUs were seized at Slovakia WTCR round

IN BRIEF



Lloyd beat 2000 applicants for FE role

FE INNOVATION MANAGER

Software engineer Barnee Lloyd has been selected from a 2000-strong field to become Formula E's first innovation manager, and will develop the championship's new software platform for the 2018/19 season. FE and its IT and engineering partner Modis picked 25-year-old Cambridge graduate Lloyd for a six-month internship in FE's technology department, starting this month.

V10 JUDD TO BONNEVILLE

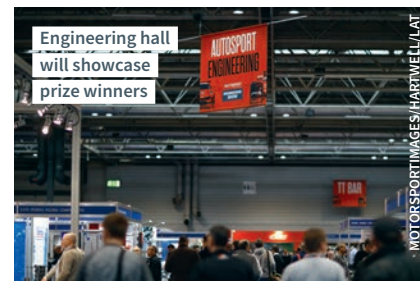
Amid a wave of electrification, a team of engineers from New Zealand wound the clock back to the 1990s by fitting a V10 Judd-Yamaha engine to its self-built Streamliner WAIRUA for the Bonneville Speed Week. Reg Cook's Team CMR achieved a top speed of 287.008mph (461.894km/h), exceeding the 256.753mph (413.204km/h) hit by Alan van der Merwe's adapted BAR-Honda 007 in 2006.

FAKE VEHICLE PARTS RISE

The FIA, Motor Sport Association UK (MSA), Audi and BMW have joined forces with the UK government's Intellectual Property Office (IPO) in a campaign to highlight the dangers consumers face from counterfeit car parts. A recent study from the European Union Intellectual Property Office estimated €2billion is lost every year due to counterfeit tyres and batteries alone. Brake pads, filters, lights, wheel rims and air bags are among the most common parts to be faked.

ASI PRODUCT SHOWCASE

Autosport International exhibitors will be able to enter their latest innovations for judging as part of a new Product Showcase Award in the Engineering Hall at Birmingham's NEC between January 10-11 2019. Entries will be judged by an independent panel of experts in categories including energy efficiency, safety and cross-industry application on consumer appeal, technical achievement, quality and marketability. Entries close on November 30.



Engineering hall will showcase prize winners



EXPERT VIEW
MARK WILLIAMS

WHY SUSPENSION RISKS AREN'T WORTH IT

The ex-McLaren Formula 1 engineer explains why conservative suspension geometry pays dividends

Shortly after McLaren partnered with Akebono to be its brake-equipment supplier, Martin Whitmarsh dropped by my desk and said: “There’s no lap time in brakes.” Being very familiar with Martin’s style of management, I knew this was definitely a challenge rather than a wind-up remark. And we delivered, but that’s another story. Suspension geometry would probably rank well below brakes in most people’s list of priorities. After all, the three major players in the lap-time domain are downforce, power and weight. In a sense those people would be right – there is no lap time in geometry. Until, that is, you get it wrong.

When I look back, I was very lucky to get my first job at Lola. It really was the university of racing-car design and engineering. I would open the drawing cabinets to file my drawings and there were the names of all the top Formula 1 designers who’d served an apprenticeship under Lola founder Eric Broadley.

The only thing that surprised me was a total lack of reports for windtunnel and track testing, and there were no engineering standards. The plain bush list ran to thousands. But kept in Eric’s office was a small cardboard box full of rolled-up strips of drawing film. They were about 400mm tall and up to two metres long, depending on the swing axle. This contained all the geometries and all their developments for every car



SUTTON/SUTTON
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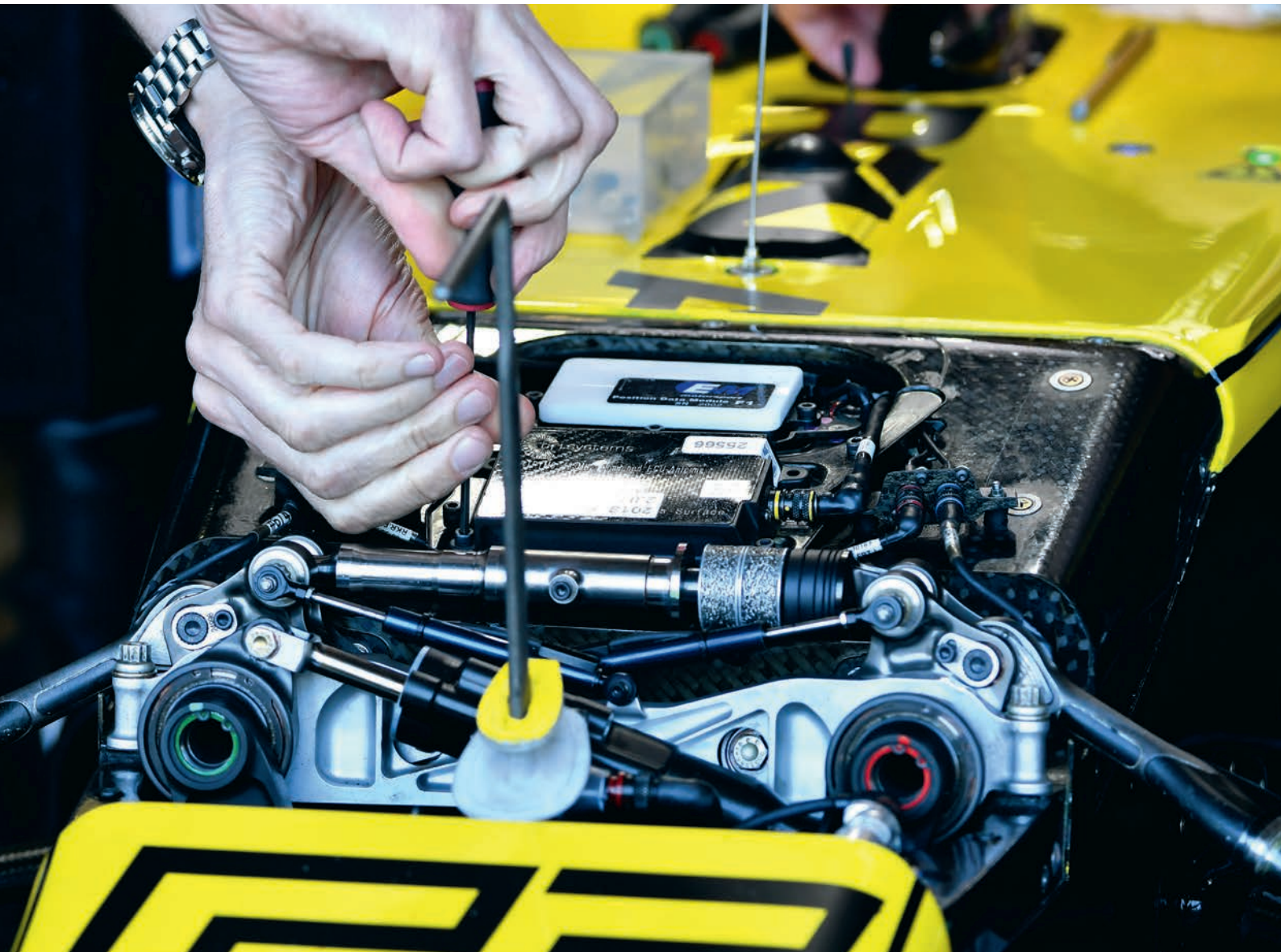
Lola’s Broadley (right) was a design maverick who kept geometries in a cardboard box

SUTTON
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that Lola had ever made. This was before computers and CAD, remember.

Every part of the car was drawn by hand and Broadley had specified all those geometries and recorded any changes on these scraps of film. He would often wander into the drawing office clutching one of these rolls and unroll it onto the layout table, pick up an extra-long ruler, draw out a new geometry, measure the pickup-point positions and hand them over to the respective designer with the words, “Let’s try this at the next test.” Then the roll of film would disappear back to the box in his office. Top-secret stuff. That’s the level of priority Eric put on suspension geometry.

Before I arrived at Lola, I’d acquired a Casio FX-702P pocket computer and had written a simple program in Basic to calculate geometries and their characteristics. I modified it to include Eric’s geometrical nuances and would thereafter always be questioning the accuracy of his up-to-1/10-scale geometry



drawings. But what a great learning opportunity. Eric's experience of tuning geometry was the stuff of legend.

A lot of people would say Eric put geometry above all else. That's not exactly true, although the sides of some of his gearbox cases did resemble Swiss cheese because there were so many pickup-point mounting options. He absolutely knew the benefit of a good windtunnel programme, but when a driver described a handling problem Eric would always produce a geometry he felt could fix it.

I would say all the slow Lolas I worked on, the Formula 3000 T950 and the F1 T93/30, were due to insufficient design and development time being allocated to them. This was because the deal was done so late.

Putting a car together from scratch in three months without a windtunnel isn't going to win you a championship. Then, when the car underperformed, out would come that box of geometries.

What was Eric trying to achieve? One

of the first things you do when laying out a car is settle on the front and rear geometries; roll-centre height, anti-dive, anti-squat, anti-lift, camber change, castor, scrub radius, trail and steering geometry.

Then when you know the range of possible wishbone positions, you can start putting this into the design of

the windtunnel model. At this point suspension pickup points aren't decided, just the envelope of possibilities.

Then, as the windtunnel concept matures, the suspension starts to take shape. But this is also a dangerous time. This is when aerodynamicists want to push you, the suspension ►





designer, out of your comfort zone.

I started this article by saying there is no lap time in geometry until you get it wrong. So if you're laying out a new car, play it safe. One development direction I like is to get the roll centres as high as I can before the onset of jacking. Jacking is when the roll centre is so high the vertical component of the lateral force acting through the roll centre tries to lift the car. The car feels weird and confusing to the driver.

By getting the roll centres high, you can run soft anti-roll bars, which gives you low warp stiffness and thereby good track contour-following ability for those all-important tyre contact patches. After all we are trying to achieve an *independent suspension* system and linking left and right wheels together does rather defeat this.

In fact, Gordon Murray always referred to a rear anti-roll bar as an anti-traction device. It's important to stay well away from the jacking threshold, so play safe to start with and then do some development testing. The same applies to all those other parameters: anti-squat and anti-lift on the rear, anti-dive on the front, camber change and roll-centre control. There is very little to be gained and a lot to lose.

At this point all the vehicle dynamicists are hating me for saying this, but let's put this into perspective. If your entire vehicle-dynamics team squeezes every last drop from geometry development, the most they can win is probably one tenth of a second. That same effort could win many tenths in the world of aerodynamics.

It's all about getting the best return from your intellect pool. That's why a

good vehicle dynamicist will specify a safe starting geometry and a sensible development direction, then spend the rest of their time on serious grip-generating projects all done to either optimise the aero platform or improve grip through ride.

If you do get your suspension wrong, you can spook your driver and they will lose confidence in the car. I've seen geometries work with one driver to the exclusion of all others and positively slow them down.

This particularly applies to roll-centre control. It's just not worth the risk. If you want to try something interesting – and I did a lot of this during my time at Lola – start with something you know will work and plan in a development programme around it.

This was easy when cars were relatively simple and wishbones were made of steel and used rod ends. But current F1 carbon

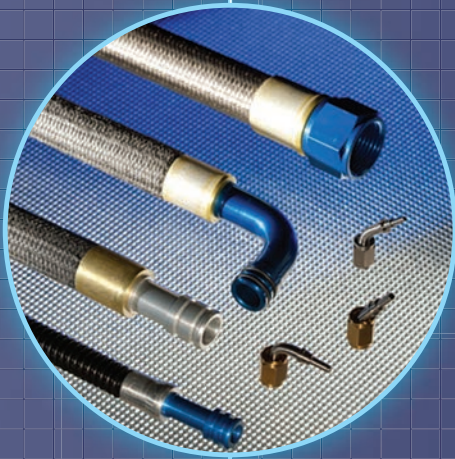
wishbone with flexures (the slender bendy bit at the inboard end of the wishbone carbon leg that replaces the rod end and allows the wishbone to bend without breaking), due to their limited range of movement, inevitably require new hardware. So new pieces have to be made and this starts to get expensive and time-consuming. As a result, it rarely happens.

But if you don't learn how things work, how do you improve? Tough call...

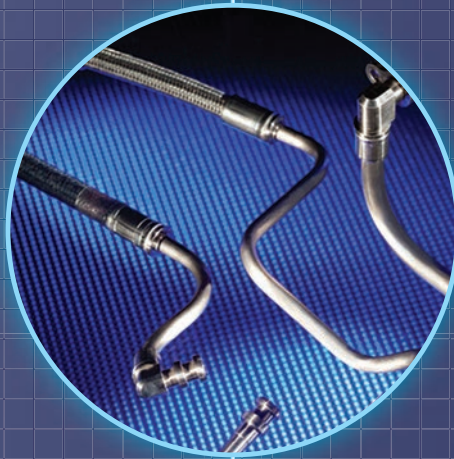
Oh, and don't develop suspension-geometry characteristics in the simulator. I haven't found one yet that has good enough cueing (a stimulus that provides feedback to the simulator driver as to what the car is doing – it could be movement or vibration or changes in steering weight) to facilitate this. If you want to try suspension things, use the real car. In the words of Norbert Wiener, the best model of a cat is a cat. ■



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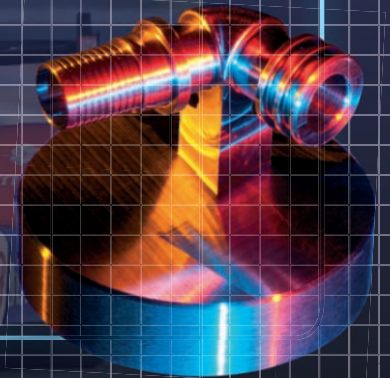
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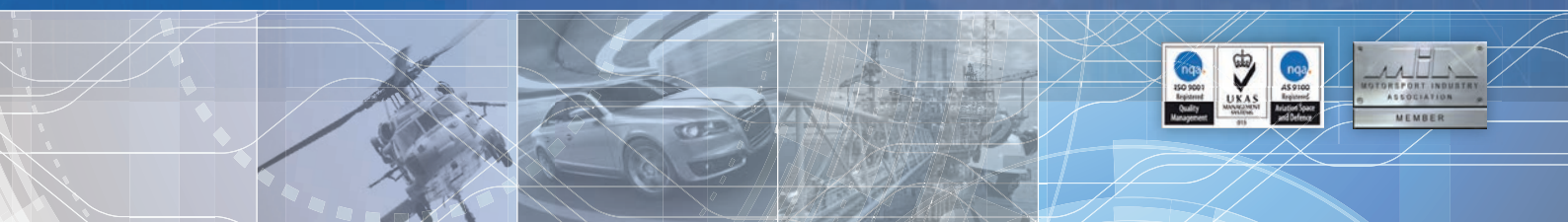
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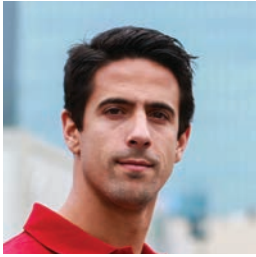
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**DRIVING CHANGE
LUCAS DI GRASSI**

**ROBORACE IS READY
TO PRESS PLAY**

Formula E started the ball rolling, but motorsport must be prepared for a seismic shift to keep OEMs interested



Roborace will keep motorsport relevant in a future world dominated by autonomous cars. For me, that is clear.

To start, I would like to make it clear that we don't want to reshape motorsport at all. We want to create an environment in which we can make an advance in driver software, which will happen much faster with competition. The teams – which can be OEMs, tech companies or/and university partnerships – will be able to showcase their abilities to control vehicles at extreme speeds.

Motorsport has been at the cutting edge of technology until now, but there is a difficult choice to be made when the automotive industry completely changes to driverless cars. This is just a matter of time – some people say five years, others 15, but automation of transportation is coming regardless of our own interests and passions.

Does motorsport completely focus on entertainment and decouple from large manufacturer interests? And how do we combine new technologies to a sport that will eventually become less relevant?

Look at Formula E, which has exceeded even the optimism of those of us who have been competing in the category since it was created four years ago. And don't forget,

I was one of a handful of people pushing for it at that time.

FE is a story of super success, which most people in the industry laughed at during its early stages. But FE – or, really, the switch to electric mobility – is just the tip of the iceberg. The true disruption of the automotive world will come with automation. This is because it has the potential to be a much larger change than electrification alone.

That's why we want to anticipate the future and give Roborace its debut racing season, Season Alpha, in 2019. Everything is on schedule for our first event.

The focus for the first year will be for every team to have a base of identical

of the racing will be of humans and intelligent machines working together for the best racing outcome.

Yes, there will be a human professional driver inside the car driving, 'teaching' the machine for part of the race. The rest will be taken over by the machine learning algorithms, or an 'AI driver'. The winner will be the best combination of both. You can think of it as two drivers sharing a car in an endurance race, but in this case one is the machine itself!

An important topic is that teams can keep their own intellectual property as it is developed. Roborace will be open source, but only on the domains relevant to keep

“There is a difficult choice to be made when the automotive industry completely changes to driverless cars. This is just a matter of time”

hardware – our own design of an LMP-based carbonfibre car with rear-wheel drive, controlled by two independent motors. It will weigh around 1000kg and produce 400bhp in total.

But we do want the teams to have some form of differentiation and so the investment they make will be on software. The essence

costs controlled and technologies updated.

We will definitely engage with universities as we think racing can attract a huge pool of talent and help companies to choose the best for their own. The market for highly sophisticated software engineers is only growing and we could provide a very exciting platform with which they can work.

Of course, all of it will be wrapped in a way to make the entertainment a key element of the series. Our recent success at the Goodwood Festival of Speed, with many millions of people watching and sharing the video of the car's run online, is a good example that this series can capture the attention of the general public.

In a nutshell, Roborace is here because the industry is migrating to automation and we want motorsport to stay relevant. The first race will happen in spring of 2019 with identical cars – the only difference being the drivers, both human and machine, which will be chosen and developed freely by teams. ■



Human drivers will be part of Roborace



WHY PORSCHE'S BLACK SHEEP WAS DOOMED TO FAIL

Green shoots of potential were visible when Porsche raced in Indycars 30 years ago. But politics and technical complexity proved its undoing

BY JAMES NEWBOLD



As Porsche celebrated its 70th birthday in lavish fashion at the Goodwood Festival of Speed with a sonorous parade of its most famous and successful cars – among them multiple Le Mans winners, the iconic Can-Am 917/30 and even the 804 Dan Gurney used to win the 1962 French Grand Prix – it was apt that the sole representative from the company's largely forgettable foray into Indycar racing remained on static display, silent and unloved.

The Norbert Singer-designed 2708 was the first in a (shortly) line of Weissach-blessed cars that summarily failed to take the US open-wheel world by storm between 1987 and '90, at which point Dr Ulrich Bez pulled the plug after a grand total of one win and three pole positions. In the wake of the marque's domination at Le Mans with the 956 and 962, the stats barely register as a footnote in Porsche's illustrious history, but it appeared destined for so much more when the project was commissioned by Porsche's German-born American CEO Peter Schutz,



who was sold on the idea of a Porsche in victory lane at the Indianapolis 500.

One of the instrumental figures who had sold that vision to Schutz was Al Holbert, director of Porsche Motorsports North America. An accomplished engineer/driver who had started out as a mechanic for Mark Donohue's Can-Am Porsche 917, Holbert won the Le Mans 24 Hours three times with the works Rothmans team and became the most successful driver in IMSA history, with 49 wins and five titles to his credit.

With the highly respected Holbert – who

had finished fourth at Indy in 1984 – in charge of running the team, three-time champion Al Unser signed to drive, and with the full engineering might of Weissach behind it, much was expected when Porsche rocked up at Laguna Seca for the penultimate round of the 1987 season. But it was soon evident that the 2708 was not up to the job.

Virtually untested and without any of the traits that made a successful ground-effect car, Unser could only carry it to 21st of 24 in qualifying, before a broken water pump ended his race after only seven laps. Holbert



then took over for the final round at Tamiami Park, but failed to qualify.

Mario Andretti was invited to a private test, but left in no uncertain terms that the project was headed in the wrong direction, a feeling exacerbated by Porsche's resistance to a rolling road windtunnel programme.

"Seeing Porsche as a factory coming to do Indycar was awesome, but they were too set in their ways," Andretti remembers.

"Their design for a ground-effect was not very advanced. Colin [Chapman] had been smart enough to come up with a moving road in the windtunnel that started to give some real-time information as to where the airflow was going, and this is something that I was trying to discuss with Mr Singer, the chief engineer there. He was a wonderful man, but he was not truly convinced as they had done such good work with the sportscar.

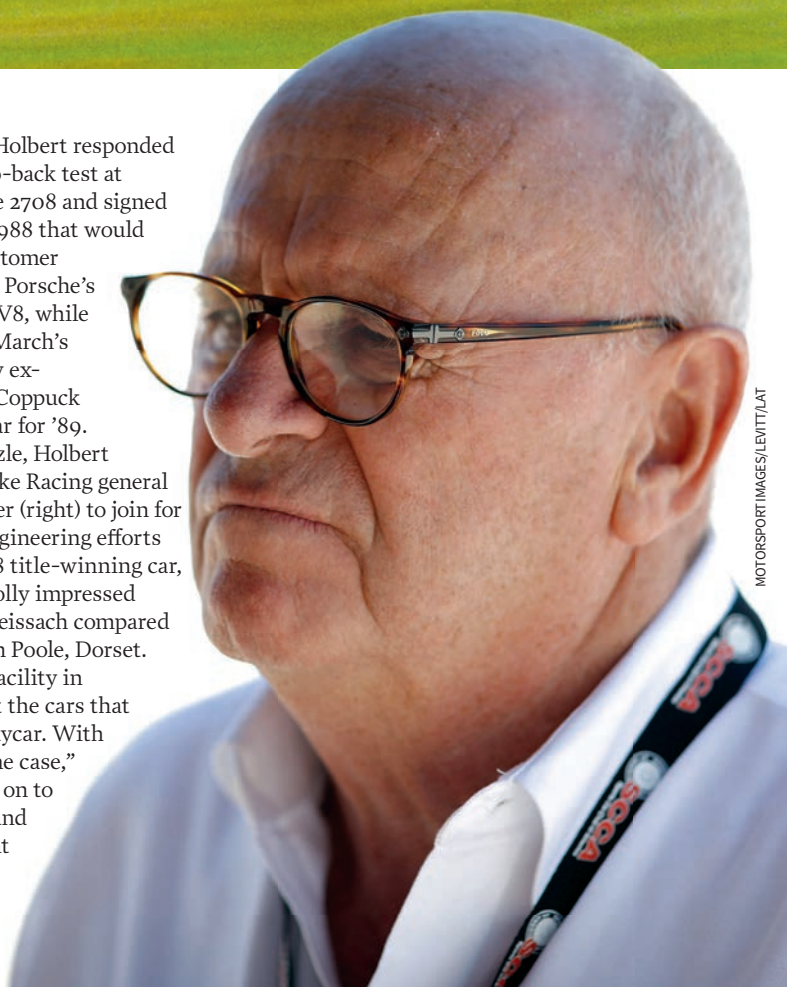
"They were at the very leading edge of everything to do with sportscars, but they needed to pursue a different way of dealing with the aerodynamics as we knew them then. There's where they missed the mark."

It was achingly obvious that Porsche needed more Indycar expertise to shortcut

its learning curve and Holbert responded quickly. After a back-to-back test at Phoenix, he ditched the 2708 and signed a deal with March for 1988 that would involve the use of a customer March 88C mated with Porsche's 2.6-litre turbocharged V8, while a team of designers at March's Bicester base headed by ex-McLaren man Gordon Coppuck worked on a bespoke car for '89.

To complete the puzzle, Holbert enticed long-time Penske Racing general manager Derrick Walker (right) to join for '89 after leading the engineering efforts on Danny Sullivan's '88 title-winning car, although he wasn't wholly impressed with the facilities at Weissach compared to Penske's operation in Poole, Dorset.

"Roger had a whole facility in England where we built the cars that was geared only for Indycar. With Porsche that was not the case," says Walker, who went on to become a team owner and eventually the president of IndyCar in 2013. ▶



MOTORSPORT IMAGES/LEVITT/LAT



Teo Fabi impressed in '89, finishing fourth in points

“March had suffered a lot of depletion and it was trying to be all things to all people”

“They had fallen on tough times with their sportscar programme, which had been slowed down and downsized. You’re talking about a racing involvement in the middle of a factory developing production cars. There was a lot of engineering there, but it wasn’t focused on Indycar.

“It was a long way to go, but they had the right idea of what they needed to do and Porsche was behind it, so it seemed like it was worth the gamble.”

But Porsche wasn’t Walker’s only concern. Although it was on a run of five straight Indy 500 wins and had claimed 10 races to Lola’s five in 1987, March was beginning to lose ground in the US, with Indycar project



manager Les Mactaggart and rising star Adrian Newey – following a short spell with Lola outfit Newman/Haas – among those assigned to its relaunched Formula 1 programme which, as well as talent, was draining funds that were needed to remain competitive in customer markets. This was only compounded by another Indycar project – led by John Baldwin – to design a chassis for Alfa Romeo for 1989, but the signs of rot had already begun. In '88, championship runner-up Al Unser Jr was the only driver to win in a March.

“March was not the March of old, it had suffered a lot of depletion and it was trying to be all things to all people,” Walker recalls.

Beneath Coppuck working on the Porsche was a talented but inexperienced design office, with Tino Belli – now Indycar’s director of aerodynamic development – as head of aero responsible for all windtunnel testing, David Scott on mechanical design and Will Phillips – Indycar’s vice-president of technology until 2016 – assisting with the chassis. A young Mark Smith, who would go on to be a technical director for numerous Formula 1 teams, was the only engineer working for Comtech, March’s composite facility in Brackley.

“At that point, most of the other players in the office had left or weren’t working on the Indycar,” says Scott, who followed Belli and March boss Robin Herd to subsequent projects with Fondmetal and Larrousse in F1. “The decline happened around '87. Adrian had left and the '88 car was clearly the least competitive in the field.”

Progress was slow at first, plagued by compatibility problems between the chassis and engine as Holbert’s stretched crew struggled to balance Indycar one week with IMSA the next, although diminutive Italian Teo Fabi made up for a disappointing retirement from the Indy 500 – an oil leak after losing a wheel in the pits was to blame – with a fourth place at Nazareth, leading Porsche’s first laps in the process.

But shortly after Holbert and Walker struck their deal, the team was rocked by

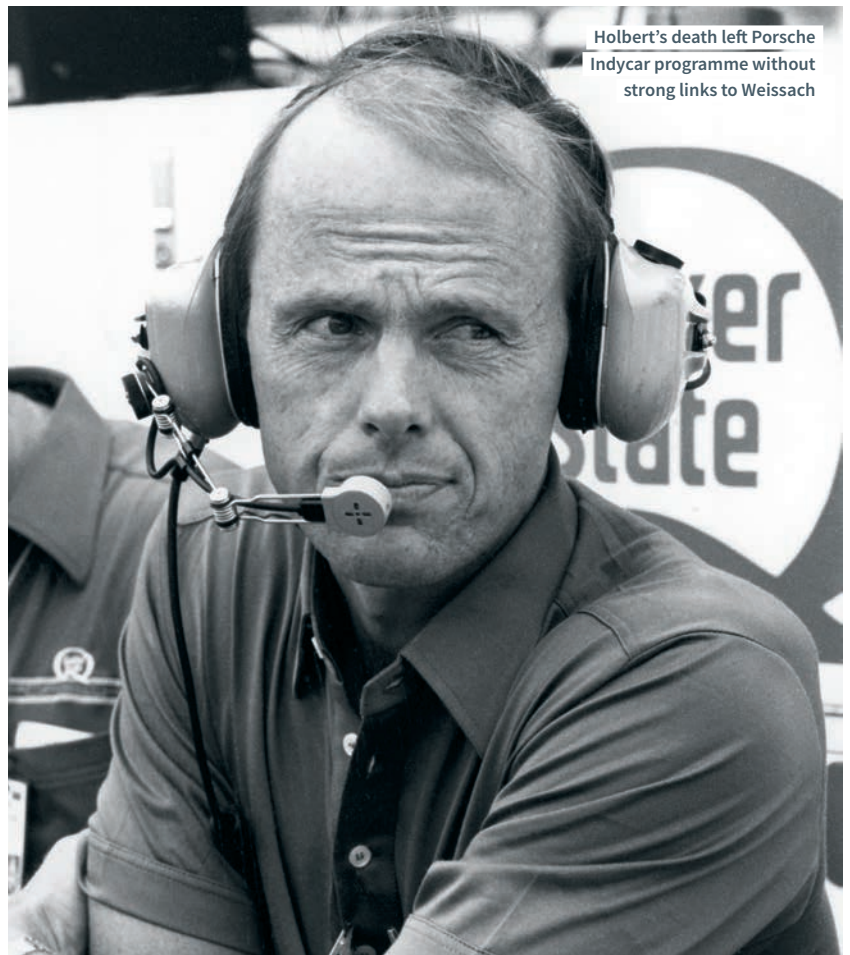


March F1 effort took money and talent away from customer projects



Fabi impudently takes the lead at Michigan in '89 from Mears (middle) and Fittipaldi

ALL PICS: LAT
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Holbert's death left Porsche Indycar programme without strong links to Weissach

AL HOLBERT'S LEGACY

Holbert's death in a light aircraft accident returning from an IMSA race at Mid-Ohio.

This coincided with a tumultuous period for Porsche in the US. Schutz was the first casualty of the economic crisis that brought a sharp decline in sales and left at the end of 1987, before a boardroom dispute in September '88 prompted his number two and fellow Indycar sympathiser Helmuth Bott to take early retirement. With Holbert gone and project manager Dr Helmut Flegl still finding his feet, it left a leadership chasm that Walker had to navigate quickly and ensure people were onside.

"There was dwindling support," he says. "Porsche sales in America had fallen and this was viewed as a way to revitalise the brand, but those people that made that decision were slowly being phased out or replaced and there was a sense that the new regime hadn't quite bought into this idea.

"The 917 was stuck in people's minds that they could build something advanced and make the competition obsolete. But the senior management had changed: there wasn't the same enthusiasm for America."

But despite the rumblings upstairs, with Bez – Bott's replacement as head of vehicle design operations – anxious to guide the company back to F1 for 1991, Porsche's trackside support led by Flegl was first-rate.

"It was what you would have expected, which in those days was a lot more than ►

A whole generation of drivers and fans have grown up without Al Holbert, who died in an air crash aged 41 in September 1988.

The son of prominent Porsche dealer and 1960s sports car ace Bob, Holbert's brand of mechanical sensitivity marked him out as a man to depend on, never more so than at Le Mans in 1983 when the engine on his overheating 956 seized on the final lap. Calmly, Holbert popped the clutch and nursed his car coughing and spluttering to the finish, expiring just after the line.

Thirty years later, those who raced with him are in no doubt about his standing.

"If the car was going to break with anybody but Al, I would be really worried, but he had a really good feel," recalls Hurley Haywood, Holbert's team-mate in '83. "Al was one of few guys that could not only drive, but would come in, say 'do this, this and this' and the car would be better.

"Al really set the benchmark for preparation of the cars and for driving manners. He was a very disciplined guy; he would never intentionally put another driver in danger to gain a car length and that reputation made him somebody that everybody respected. He was one of my favourite drivers to drive against."

Legendary Porsche engineer Jurgen Barth, who won Le Mans under similar

circumstances in '77 with an ailing car, also remembers Holbert fondly.

"Al I think did a good job beside Peter Gregg to keep American racing for Porsche quite successful," he says. "He was always on the ground and that's why he was easy to work with. He was a good engineer also, so when you had technical problems, you could discuss on real grounds with him."

Porsche's team principal on the Indycar programme, Derrick Walker, never got the chance to work alongside Holbert, but was suitably impressed by the man to turn his back on Penske.

"He was a people person, people worked for him for years and were desperately loyal to him because they liked and admired him," says Walker. "He was admired by the paddock, and everybody liked him as a nice guy and an honest guy."

The Scot remembers receiving an item in the mail after Holbert's accident that was telling of his character and left a marked impression on him.

"About a week later, a guy turns up at my door with a plant and a handwritten letter from Al attached to it," Walker recalls. "He'd arranged to have this sent to me before he went to Mid-Ohio and it basically said, 'Let's grow together'. It's rather faded now, but I've kept it; it was something special. That was Al."

PORSCHE'S TOP FIVE RACES

1 Mid-Ohio 1989 (1st)

Teo Fabi led the early stages from pole in the spare car following a practice accident, but lost out to Al Unser Jr (Galles Lola) in traffic at half-distance. He short-fuelled at the second stops to jump ahead and built a gap big enough to hold the lead after a final late fuel stop.

2 Michigan 1989 (2nd)

The 89P tended to work best on tight road and street circuits, but also showed well on the flat-out superspeedway. Fabi took the lead at the start, before Rick Mears (Penske) and Michael Andretti (Newman/Haas Lola) took control. But when Mears suffered a late suspension failure, Fabi picked up the pieces and narrowly held off a charging Mario Andretti (Newman/Haas Lola) at the line.

3 Road America 1989 (2nd)

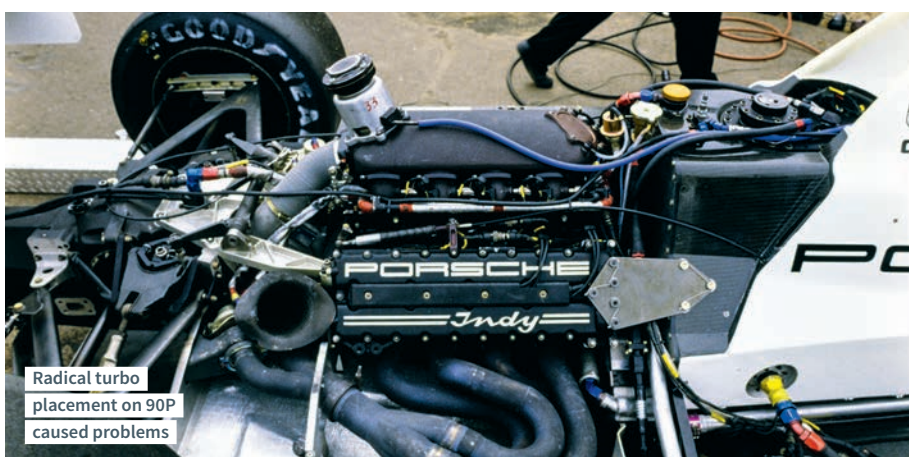
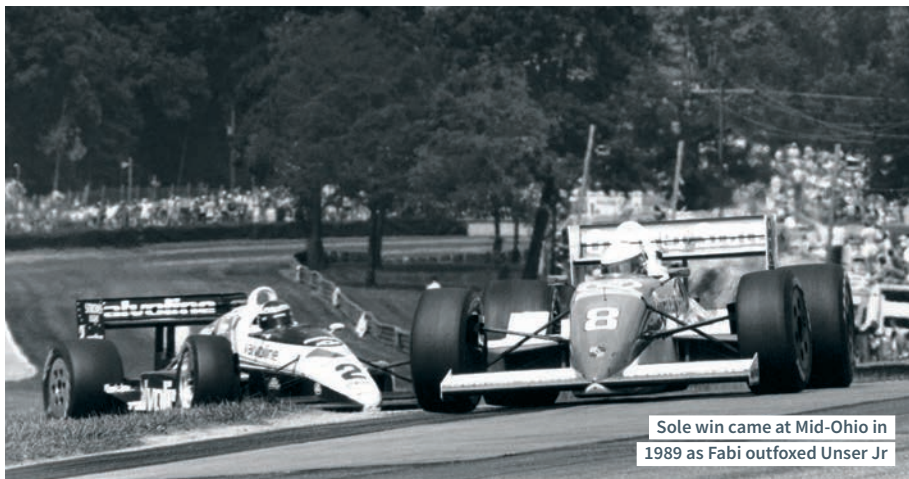
Rain in practice left teams unsure about the validity of their fuel calculations and with limited time to dial in set-up. Fabi grappled with understeer, but successfully managed a two-stop strategy to beat Mears to second, inheriting the position after leader Michael Andretti ran dry on the final lap.

4 Meadowlands 1990 (3rd)

Fabi claimed the team's best result of 1990 on the 1.2-mile street circuit, described by Autosport's Gordon Kirby as a "diabolically tight parking lot". Running fourth early on, he led for a period by running off-strategy, before fading to third behind Michael Andretti and Mears. John Andretti ran fourth in the second 90P before he lost feeling in his right leg – due to the cramped cockpit – and crashed.

5 Nazareth 1988 (4th)

Only 20 starters meant the 200-miler was run almost entirely under green. Fabi led laps for the first time and finished fourth in the last race before team patron Al Holbert's death. It was also Derrick Walker's last with champion-to-be Danny Sullivan (Penske), who took his third win of the year.



some other manufacturers might have been able to do," recalls Phillips, who had joined the Porsche team from fellow March customer Arciero Racing. "They were running their own data-acquisition system. Even back in those days they were GPS-mapping the track and it was way ahead of its time. It wasn't always perfect, but it showed the commitment that Porsche were putting into that programme."

With all-new transmission, Coppuck's updated 89P for 1989 was a big improvement – even if Belli concedes it was more an evolution than a ground-up redesign – and proved especially potent on the tight, twisty circuits. After another disappointing Month of May, cut short after 23 laps with ignition problems, Fabi took a first podium at Milwaukee and a first pole at Portland. He then repeated the feat at Mid-Ohio and duly won after outfoxing Al Unser Jr – "all hail a new race-winning force in Indycar racing" was Gordon Kirby's take in Autosport.

With Fabi finishing fourth in points and the Hans-Joachim Esch-developed engine established to be on a par with the near-ubiquitous Chevrolet V8s after finishing a strong second at Michigan, Porsche finally looked ready to challenge for regular success. A title challenge for 1990 looked likely.

"In '89 we had a good racing car that was very straightforward, and it had probably the best engine on the grid," says Walker.

"The engine management system and wastegate control was something other manufacturers didn't have, so it was a really good engine. But it was heavy because it was in essence an F1 engine with another couple of cylinders chucked on to the front of it.

"I think the signs were there that over time we could get it, and '89 really showed that we were coming."

Sadly, that optimism proved to be misplaced and by Vancouver in September '90, it was confirmed that Porsche's Indycar programme was no more. The problems started before the new car had even turned a wheel in anger, outlawed in a secret ballot of CART board members – made up of the team directors – on January 10, leaving March with a mad rush to be ready for the Phoenix season opener.

The row surrounded a proposed change in the regulations, spotted by Belli, that would allow constructors to build an all-carbonfibre monocoque, thereby saving weight, improving stiffness and facilitating a narrow bottom of the underwing below the fuel cell. It followed a ruling made by CART in 1986 that the lower portion of the tub had to be made from sheet aluminium or aluminium honeycomb for the next three seasons, following a spate of accidents that had resulted in serious leg injuries.

"For 1990, as long as we could prove that the monocoque was equal to or better than



“Between England and Germany, there were a couple of concepts that didn’t fit the real world”

cost the 90P much of its rigidity, having a disastrous knock-on effect to the handling.

On the car’s debut at Indianapolis, Fabi was only 23rd on the grid and completed 162 laps before the transmission gave up. He took pole at Denver, but the brakes failed after 15 laps, while the only other highlight was a third at Meadowlands. A second car entered for John Andretti fared little better.

“It never ran under the weight, we were constantly working to get it to the limit all season and we never achieved it,” Belli says. “That isn’t such a penalty on superspeedways, but on road courses, street courses and even short ovals it was significant.”

The question of just how good the car would have been without the shake-up is difficult to answer, but Phillips, who worked under March boss Robin Herd as Fabi’s assistant race engineer in 1990, felt the car could have got results in its original configuration “had a straight deck been played against it”.

“The car was almost one step ahead of where it needed to be in 1990,” he says. “It was fairly radical, but a lot of the main gains were thwarted before it had a chance to run. The regulation issues we came up against, the fact that it had all been approved and then was rescinded, they were the factors for me that explain why we struggled. Certainly the weight and reduction in chassis stiffness were outside influences that really shouldn’t have been there.”

However, the radical nature of the 90P – so cramped that it left Andretti with bloody knees after every road race – certainly didn’t help matters.

“We had our mouths open when we saw it!” chuckles Walker. “I get the idea of what they were trying to do, but somewhere between England and Germany, there were a couple of concepts that did not fit the real world we were operating in as a race team. I’ve still got my logbook to prove it: we did during that term over 400 modifications to that car in one year.”

The problems weren’t simply limited to the overweight chassis – and even came down to the wheelnuts. For example, positioning the turbocharger in front of the engine was on paper beneficial for weight distribution, but posed a serious fire risk during refuelling, while the fuel tank was too small and negated the advantage of its electronic engine management system.

The 90P was so far removed from the plug-and-play customer-friendly cars that ▶

the aluminium honeycomb or sheet aluminium construction, you could go back to making it out of whatever material you wanted to,” says Belli, who transitioned into the Porsche programme from engineering Michael Andretti at Kraco Racing.

Cranfield University was commissioned to devise an innovative double-impact crash test to prove to CART that an all-carbon construction car would reach the required safety standard, and with technical chief Kurt Russell satisfied, the result was the low-slung, radical 90P.

But once rival teams became aware of Porsche’s plans, they joined forces to ban it and called for further development of crash-test standards prior to all-carbon chassis coming in for 1991. To Belli, the case was clear-cut.

“They ganged up on us, mainly because Lola couldn’t do it,” he says. “To be hit at the end of January, when you’re testing like crazy trying to work out all the bugs with having to completely redesign the monocoque, was a massive blow. Realistically it put the programme behind by six months and at that point it fell apart. That was the end of Porsche in Indycar and they haven’t returned to this day.

“The ’90 car, correctly or incorrectly, was revolutionary, for sure. Maybe we got a bit over-ambitious and certainly we didn’t understand the politics; everybody other

than Gordon at the time was a very young engineer and didn’t realise that politics was part of the game. We thought it was all about technology, so it was a great shock to the system when suddenly it was about keeping the right people happy.”

Porsche was stunned – especially given the symmetry with Indy 1980. It had planned to enter the 500 with a Danny Ongais-driven Interscope, using an engine derived from its 935 sports car, but withdrew following a turbo boost dispute with USAC instigated by a protest from rival teams.

“The owners were very inward looking, that was part of the problem,” laments Walker. “They collectively protected their interests and I was really disappointed by the fact they had not seen the big picture.

“Here we have Porsche, a major manufacturer messing around in a tin-pot series: it’s really an advantage to have these guys come and have focus.

“Instead it was all about, ‘If they come out with this carbon car, they can beat us’. It was a dark day for sure. Porsche went away feeling totally betrayed and I thought they had every justification for feeling that way.”

Forced to return to the drawing board while the team used the ’89 car at Phoenix and Long Beach, March added a 1/8 inch aluminium skin to a reduced thickness, lower chassis that proved very heavy – Belli estimates it added around 35-40kg – and

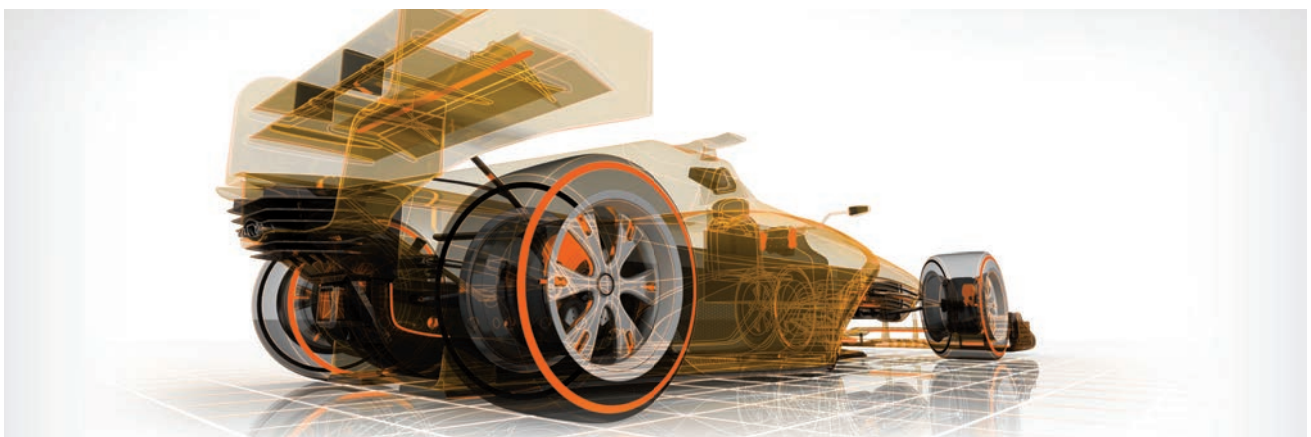


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had come before it that Walker believes Porsche would have been better off sticking with the '89 car.

"It was over-complicated and to make things even worse, it didn't work," he says. "The amount of work involved in maintaining all of that and just making it raceable was horrendous. We were fighting with one hand behind our back.

"There was such confidence within March that they could pull it off and it was convincing, but if we'd stayed with the '89 car, we would have had a better year by just optimising what we had. We hardly got to know it when we put that aside and suddenly we had this late-arriving future car that was not going to work."

Scott agrees that the March design office didn't deliver what was needed and "stretched too far" trying to incorporate elements such as vertical rocker pins – which were just being adopted by F1 – that only made the suspension less effective.

"We gave them a car that was too sophisticated – we were far too avant-garde and they were not ready for that," he says.

"The '89 car was closer to what the team needed. We went for the whole enchilada: the offset suspension, plenum blow-off valve trick, the carbon chassis, the integral floor-diffuser-gearbox. There was a lot of stuff pushed out of that car. You need a level of consistency and controlled innovation rather than uncontrolled innovation, that's the way you're going to have success."

Had the programme continued into 1991, Walker believes it wouldn't have been as sensible as redoing the bottom half of the

tub and that a comprehensive redesign would have been required, although whether Porsche's relationship with March had run its course anyway – or indeed whether March could have made the requisite improvements with its coffers dwindling – is another matter altogether.

In the end, Bez got his way and committed Porsche to supply its V12 engine to Footwork, which did far more damage to the marque's standing than its Indycar effort ever had.

As for whether Holbert would have made a difference to the outcome, that's a matter that could be debated indeterminably. Although he didn't have the same

when it came to sorting problems, a view echoed by Belli, who found the link to Weissach indelibly weakened.

"I have no doubt about it," says Belli. "The Weissach guys were very helpful, but it never quite got to that hand-in-glove trust that Al would have had. Any misunderstandings that did occur, I think he would have caught them earlier and helped the whole programme.

"Porsche Germany had complete and utter trust in his decisions and he had a great working relationship going back a long time with all of the upper management and engineers in Weissach. It was very hard to build that back up in a short period of time."

"If we'd stayed with the '89 car, we'd have had a better year optimising what we had"

relationship with Bez that he had enjoyed with Schutz and Bott, he had a good rapport with March, having used a Porsche-powered 83G prototype to win the IMSA title in 1983. However, Walker believes it is too simplistic to pinpoint his death as the moment at which the programme lost its way, citing the promise shown in '89.

"The programme went ahead and in some respects achieved what he wanted to see happen," Walker says. "Why it failed was not to do with the concept, effort, or lack of motivation because Al was not there. I think there was almost an attitude to not let Al's flame go out, to keep it going and to win, so it didn't suffer from that."

Yet Scott felt his gravitas was missed

Without the loss of its driving force, the self-preservation of CART team owners and the misplaced ambition of March, there is every chance that Porsche's Indycar project would have added another chapter of dominance to its sportscar successes. While each of the blows was survivable in isolation, all three mounted on top of one another in the space of two years and – set against the backdrop of Porsche's bitter experience in 1980 – made its position untenable.

On paper, the requisite ingredients were present for Porsche to revolutionise the Indy 500, but in three attempts it managed no better than 18th. Today it stands as a historical curiosity, the black sheep of the family destined to remain in the shadows. ■

HOW F2 IS LEADING WHERE F1 COULD FOLLOW

Adding downforce is usually a recipe for disaster when it comes to overtaking, but F2 has proved that it is possible

BY JACK BENYON

E

ach time a new rules cycle approaches in Formula 1, it faces a philosophical battle between following its heart – giving engineers the freedom to create

the fastest possible car for drivers to race – and its head: the need to make the spectacle entertaining for spectators.

In a dream world, F1 would present a rulebook full of blank pages and let the likes of Adrian Newey have their way. But in a future where F1 will have to fight even harder to attract new fans that aren't introduced to the sport by their parents, the head must increasingly overrule the heart.

Innovation should always have a prominent role in motorsport. Not only does F1 pioneer new mechanical feats, it also creates technology that feeds down as far as your local supermarket. Williams Advanced Engineering's work includes a pod designed to transfer fragile babies to and from Great Ormond Street, as well as a more energy-efficient open-front fridge.

Many conversations about modern sport come back to money, particularly in F1. For as long as the reinvestment of prize money is so heavily weighted towards the top teams, those lower down will struggle to match them. It's been a fact of the world championship for a long time, and will be difficult to change since some powerful voices benefit so much from it.



Focusing on the diffuser has given F2 aero boost

PORTLOCK/LAT



Left: F2 cars still manage to follow one another and put on a good show for fans. Above: Capietto (left, with Nyck de Vries) is a fan of new aero

the largely uninspiring Belgian GP.

The major reason cited for the lack of non-DRS overtaking is the complicated aero at the front of the cars. Airflow is disturbed by the leading car to such an extent that the one following finds itself running in turbulent, low-pressure air – meaning the closer you get, the bigger the performance drop-off.

But could the answer to this problem lie with F1's little brother, Formula 2?

For 2018, F1's main feeder category introduced a new car. Out went the

This funding discrepancy results in a huge gulf in performance, yet it remains tough for these unevenly matched cars to pass – at least without DRS – as proven by

engine on its new car, the one consistent factor this year has been the high quality of the racing and the many opportunities to overtake. That even included at Monaco, the tightest circuit on the calendar and the toughest to overtake on bar none.

The drivers have a lot to say about that. It's one of the championship's strongest-ever grids, but even drivers of this calibre wouldn't be able to race close and overtake without a compliant car.

You might have heard of last year's F2 champion Charles Leclerc, but his former engineer is a little less known, despite a glittering junior single-seater CV.

Guillaume Capietto has masterminded many GP2 successes at Prema Racing and previously ART Grand Prix over the past decade. Having worked with the F2 2018 car for half a season, he believes there's one key reason for the close racing.

"F2 and Dallara haven't put a lot more downforce on the wings, it's more in the

"F1 cars now run with very big rake and sophisticated aero. F2 is more simple, you don't have to have the wing so low"

normally aspirated four-litre V8 and in came a turbocharged 3.4-litre V6. A halo was added, while both the front and rear wings were widened and made more adjustable to create more downforce on a Dallara chassis that remained the same width as its predecessor.

When the design of the car was first revealed, there was cause for concern. Adding aero to a single-seater almost always means more turbulence, and less overtaking. But that hasn't proved to be the case.

Although F2 has suffered a number of problems with electronics, the clutch and

diffuser," Capietto explains. "It's not a drastic change, a lot of it is in the floor area.

"The downforce comes from the bottom and it means the cars are less affected by other cars. The Formula 1 cars now run with very big rake and sophisticated aero parts. Formula 2 is a more simple design. You don't have to have the wing so low in Formula 2 to create downforce because there's no rake.

"I think in F1 this is the major problem; in F1 when they follow it ruins the efficiency. It's difficult to get close."

When Capietto refers to rake, you'll see that looking at an F1 car in profile: ▶



most of them, the Red Bull especially, have a markedly nose-down attitude, with a higher rideheight at the rear end. Set up properly, this enables all of an F1 car's sophisticated aero components to work together to achieve a high amount of peak downforce.

But as Capietto explains, when running in traffic these elements lose efficiency in the disturbed air and their effectiveness is disproportionately compromised. It's largely a result of designers prioritising a car that is quick in qualifying; and because the effect has made the cars weak in traffic, qualifying performance has become even more vital. It's a vicious circle.

For all the new car's well-publicised gremlins, the F2 drivers who piloted last year's car have been complimentary

From left: innovators of Newey's ilk should be preserved, but the show is crucial too; Red Bull's high rake is less effective in traffic

follow. We have a lot more downforce, so I thought following would be affected heavily for us, but that doesn't seem to be the case."

Carlin driver Sergio Sette Camara adds: "Overtaking is never easy, but the car does feel good with the turbulence.

"It's good because it's always difficult to change a car that is working perfectly with no issues. But it had to be done to make

about the new-for-2018 chassis.

"These cars have more aero than last year," says DAMS's Alexander Albon, currently third in the F2 standings.

"I've been surprised by how well we can

the car more relevant. It was important to make the changes, but then you run the risk of the racing not being as good. But they have managed to maintain it. The racing is always exciting."

Autosport's technical consultant Gary Anderson agrees that less complicated aero and the use of the floor and diffuser help F2 drivers follow more easily.

"Because it is a one-make formula, the aerodynamics are fairly brutal," he says. "Take the front wing: it is a simple three-element wing assembly with simple endplates that still attempt to turn the airflow around the outside of the front tyre.

"The main thing is that the front wing itself has to be fairly adjustable so the downforce-producing surfaces have to be fairly robust – in other words, not working

WHY INDYCAR TOOK A SIMILAR ROUTE

IndyCar is the antithesis of Formula 1 in its car design. Beyond the obvious difference in IndyCar's use of largely spec cars, a rules u-turn for 2018 produced sleek, simple machinery that ended its reliance on downforce for the good of the racing.

That's a phrase you simply could not apply to the F1 cars that came in for

2017 and made its existing overtaking problem all the more difficult. As IndyCar's season opener celebrated 366 passes – albeit with the dubious inclusion of first-lap passes as well as lapped and unlapped cars – F1 featured just 22 in Australia.

But for IndyCar to get there, it required shedding a 10-year plan that had led to downforce-laden aerokits

from manufacturers that the teams initially resisted.

The scrapping of that plan began at Mid-Ohio late in 2016, as IndyCar and Dallara tried "nine or so things" to create a better racing package that looked more like a traditional IndyCar.

"We were evaluating different roads," explains Andrea Toso, Dallara's head of US racing operations.

"Then in the winter of 2016 IndyCar came here, Tino Belli [director of aerodynamics], Bill Pappas [vice president of competition], Jay Frye [president of competition and operations], and they said, 'Let's do it'.

"In general, there is more downforce produced by the underwing [on the new car], so you need less downforce

produced by the wings. The car can run with less wing and therefore you can run closer to the leading car."

The downforce reduction increased braking zones on road and street circuits and, with mistakes also being punished more, the IndyCar paddock believes the focus is back on the drivers.

"I was absolutely knackered after St Pete,"



anywhere near their optimal airflow separation angles.

“The rear wing is very similar, it has a much wider range of adjustment than any wing in Formula 1, so the surfaces aren’t working anywhere near the maximum.

“But one of the main things is the diffuser. It is bigger and longer, and is producing a reasonable percentage of the car’s overall downforce. The underfloor is not as critical to turbulent airflow as a wing profile, so the following car loses a smaller percentage of its overall downforce as a result.”

A big chunk of F1 aerodynamic design is about optimising the vortices generated from all the small turning vanes on the front wings and bargeboard areas. These vortices in turn affect the performance of

all the other aerodynamic components.

But in turbulence or when the car is in the low pressure ‘pod’ created by the leading car, the vortex structure falls down. Since each part’s role is interconnected, when one component is unable to perform its duty the other aero parts are affected as well, which compromises the aero efficiency of the car.

In truth, simpler wings and more aero from the diffuser and floor as a solution for F1’s problems is hardly news. Designers and engineers have made such arguments for years, and indeed McLaren lobbied hard for the 2017 rules cycle to emphasise downforce generated from the floor. Its efforts were ultimately unsuccessful, although simpler front wings are coming for ’19 and there is another big chance

to incorporate the philosophy in the next rules shake-up currently being discussed.

Of course, F1 must never become a single-make formula, but at the same time it will always require a degree of control on design for reasons of realistic economy. That blank piece of paper idea remains a dream for good reason. But as a starting point for the next generation of F1, perhaps better racing – the quality of the entertainment it offers – should take precedence over improving pure performance, the somewhat surprising driving factor behind the 2017 rulebook.

F1 is and always should be the pinnacle, but improving the racing spectacle has to be high on the agenda. Taking a leaf from F2 will sound retrograde to some, but it might be a good place to start. ■

says Marco Andretti. “This year you’re on the limit the entire time. That puts it way more in the drivers’ hands to wring it out; it makes it way harder for an entire race.”

But while it is tempting to claim the low-downforce approach of IndyCar has solved a racing conundrum, with even tricky ovals like Phoenix improving now drivers have to lift into the

corners rather than stay flat out, the Indianapolis 500 was its first failing.

After years of exciting draft racing, a single-file procession with experienced drivers spinning out made IndyCar’s refusal to tweak the package more questionable. It’s not perfect, but it’s easy to argue IndyCar is going in the right direction.

TOM ERRINGTON



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Andretti says new-spec
car puts more emphasis
on driver skill

LIGHT AT THE END OF THE TUNNEL

Making a racing car go quickly is a game of fine margins, not least when it comes to the shadowy world of windtunnels.

Three leading experts shine a light on how they work

BY KEVIN TURNER





Red Bull got its readings wrong in 2017 with move to wider cars

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All motorsport fans know that windtunnels are vital to success. They are the subject of strict use restrictions in Formula 1, and yet are still responsible for the myriad flicks and louvres on modern racing cars and, some would argue, are key to grand prix racing's addiction to downforce.

But how do they work and why do teams still get things wrong in the windtunnel?

Autosport visited Wind Tunnel Developments Limited's Technology Centre in Huntingdon to get some answers, along with our technical consultant, former Jordan and Stewart designer Gary Anderson, ex-Lola and McLaren designer and engineer Mark Williams, and the experienced Chris Saunders, who designed and operates the facility, used by Lola.

THE BASICS

Very simply, a windtunnel allows air to pass over objects in a controlled environment. Essentially the air and rolling road move while a model remains stationary, as opposed to a car moving through the air and over the road at a race track in the 'real' world.

The model is mounted on a strut with a load cell either in the roof of the tunnel or inside the model itself. The load cell measures key parameters of performance – as air passes over the model it creates forces on the load cell and from these forces the measurements for drag, downforce and centre of pressure can be defined.

In modern windtunnels such as Lola's, the model's rideheight, steering angle,

yaw, pitch and roll can also be changed so it is possible to map a lap of a circuit, charting how drag and downforce changes at different speeds and orientations.

"The windtunnel is designed to have perfect flow," explains Saunders. "On the floor there is a system to suck away the lazy, turbulent air, so that when the air reaches the model it is travelling in the right direction. There's also a big cooling system that allows us to keep the air temperature constant, which is critical when it comes to back-to-backing development components."

In the early days of windtunnel testing, in the 1970s and '80s, constructors would simply conduct straightline testing, but things soon got more complicated.

"People started to move on and wanted to look at cornering conditions, because that's where your downforce counts," says Williams. "What you do in a straight line is really about minimising drag.

"Then we started to investigate cornering and downforce, and the whole windtunnel thing started escalating. It's now part of your suite of tools. You have the windtunnel, the CFD analysis and on-track mapping, and you have to use all three."

CORRELATION

Teams often talk about correlation and it is absolutely vital if a windtunnel programme is to be successful. The windtunnel, CFD and on-track results need to tally. If a new aero part shows increased downforce in the tunnel, but doesn't when on the racetrack, then things can unravel quickly.

"If your correlation isn't right then you get lost and can't develop the car," says Saunders. "You need to be confident that



Saunders fits a model to the strut in 2003

MOTORSPORT IMAGES/JOY/SUTTON

if it works in the windtunnel it'll work on the track. It's an iterative design solution."

It sounds simple, but there are so many ways things can go wrong, from misinterpretation of the reams of data available, to problems with the models or even the windtunnels themselves. In the past, for example, some windtunnels have started to shake with the high forces involved, giving false readings, but the Huntingdon site has sizeable foundations – a larger steel frame and concrete piled 10 metres into the ground.

"We've not had anything out of the tunnel that's not worked on the track," reckons Saunders. "If it says it's better in the windtunnel, you build it." ▶



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Left: even Laurent Aiello's prodigious talents couldn't help Lola's F3000 win in 1991. Below: Gary Anderson (right) was the brains behind the svelte Jordan 191

WHEN WINDTUNNELS GO BAD

Despite decades of experience with windtunnels, teams can still get things wrong. One of the key issues is size. F1 limits the scale of models to 60%, but that is close to the limit of some windtunnels, which can cause problems when rules change.

It is thought the move to wider cars for 2017 caught out Red Bull. The wider cars meant the airflow around the outside of the tyres was affected by the windtunnel walls, which then gave false readings. Correlation then became a problem.

Over the years, designers have come across all sorts of problems. As downforce increased, the engineering of the models had to improve. If they flex or deform when they're not supposed to because they can't take the loads, then the results will be compromised. That's why the cost of windtunnel models is normally measured in eye-watering six figures.

"When we started we used incredibly basic models, but you couldn't do that now," says Williams.

"The only way to get a good correlation between windtunnel testing and the track is to have the model as exact as you can, so a lot of attention goes into them," confirms Saunders.

Things have moved on a great deal since Jordan entered F1 in 1991. "When we started windtunnel testing the Jordan 191 it was a 1/3rd scale model running at 40 metres per second, and the loads created by that size of model and wind speed were small enough to allow us to be fairly reactive and create parts at the tunnel out of cardboard sheet," says Anderson. "As the models got bigger and the loads got higher all that became impossible.

"I'm pretty sure that a current high-spec 60% windtunnel model probably costs more

than it cost us to produce the first Jordan 191, but that's what you need to get the information required to improve the performance. There is no point in spending all that money on car developments if they don't work when they get on the track."

Even the tyres on the model have to be right – as close to the real thing as possible. Tyres and wheels produce huge amounts of drag and turbulence on an F1 car – much of the work on wing endplates is to turn the air 'around' the wheels – so if the model tyres act differently to the real rubber, the turbulence will be different and the relevance reduced.

"In the 1990s we also used moulded carbon tyres; now Pirelli manufactures rubber windtunnel tyres for everyone," adds Anderson. "But with everything there is a positive and a negative. With our moulded tyre we produced a set of tyres that were in the lateral loaded condition – in other words, deformed as they would be mid-corner – you can't do that with the Pirelli rubber version."

Williams – and Lola – were caught out by problems with boundary layer control at the Cranfield windtunnel during the Formula 3000 days in the early 1990s. This is the system that sucks away the lazy or turbulent air described by Saunders and is crucial to ensure a clean airflow and accurate results.

"They decided to drop the rolling road to increase the tunnel cross-sectional area and



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the boundary layer didn't work," says Williams, whose Lola T90/50 had been the car to have in the 1990 International F3000 Championship before its successor failed to win a single race.

"We went into the tunnel one day and the technician said, 'I'm really sorry, you've got to ignore the last six runs because I've just realised the boundary-layer fans are switched off.' So we did another run, boundary layer on and boundary layer off, and the results were the same – it wasn't doing what it was supposed to do.

"That explained why our front-wing work failed to correlate with what we'd always known and why the diffuser wasn't working. It took longer because it affected the Indycar guys I think before of the stepped bottom, but it did eventually. It nearly sunk Lola."

For designers looking into the smallest of aero gains it is easy to overlook the importance of making sure the windtunnel is set up and working correctly.

But get that wrong and all the other work on the car itself is wasted. ■

Lola's Wind Tunnel and Vehicle R&D Centre is for sale. For more info, visit lolatechnicalcentre.com/sale-information/



THE BTCC'S UNDERDOG MANUFACTURER

Power Maxed Racing is one of the smaller teams on the grid, yet is a fully fledged manufacturer. The arrangement suits it well

BY MATT JAMES

The second round of the 30-race British Touring Car Championship this year is one that will live long in the memory. The wet but drying conditions meant tyre choice was tricky on the Brands Hatch Indy circuit, and it was the slick-shod Power Maxed Racing Vauxhall Astra of Senna Proctor that threaded its way through the frontrunners on their worn-out wets. He had started a lowly 27th on the grid, and only grabbed top slot with two laps remaining, before holding off a queue of cars snapping at his heels.

It was a sensational win for Proctor, and a first for Power Maxed Racing since it had reintroduced Vauxhall to the championship in 2017. Despite that breakthrough, team patron Adam Weaver was slightly irked as he left the meeting.

He knew the Astra had pace, and wanted a “genuine” win rather than one that could be described as fortunate. Fast forward to the latter part of the season and the car has proven just that – a winner on genuine pace, with Josh Cook twice grabbing the top spot.

Bringing the Vauxhall name back to the BTCC was a huge deal for Weaver and PMR. Since the creation of the one-class category back in 1991, the Luton firm’s cars have

usually been at the forefront. John Cleland took the title in ’95 at the height of the Super Touring era, but it was the Triple Eight Race Engineering-designed and built Astra Coupe that really mopped up, taking four straight titles from 2001 through to 2004. Once Triple Eight created the Vauxhall Vectra for Fabrizio Giovanardi, there were two more titles. Vauxhall is the third most successful marque in the BTCC, behind only Ford and Honda.

But the way factory teams operate in the British Touring Car Championship is changing. While some of the partnerships have proper old-school backing, such as Team Dynamics and Honda, there is a



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ROBERTS

Clockwise from top: PMR has its own sub-assembly area to test the life of parts; adjustments are made on the jig after a bruising race weekend; Cook leads the pack en route to victory at Thruxton



ROBERTS

fresh wave of deals. Power Maxed is first among them, and its alliance with Vauxhall is a mutually beneficial one.

Power Maxed Racing is owned and operated by Weaver, whose Automotive Brands umbrella firm can help Vauxhall access business opportunities in exchange for factory blessing of the two Astras that the team built at the start of 2017.

But that's not the only way in which Power Maxed is different from a number of other BTCC teams.

"Along with Team Dynamics, WSR and Motorbase Performance, we are one of the only teams that builds the entire car in-house," says technical director Martin Broadhurst, a former World Rally Championship engineer and Triple Eight Race Engineering employee. Most teams farm out the chassis build to other experts – usually Willie Poole Motorsport based near Coventry.

"The decision to do it all in-house was taken by Adam and I," continues Broadhurst. "It means we have more control over what we do and we can implement any changes that we want. From an engineering point of view,

it is an extremely helpful thing to do."

It is helpful in terms of preparing the cars between each meeting, too. If there is a multi-car accident in any rounds, many of the other cars that need big repairs have to go to Poole's workshop – which means there can be delays.

"We are able to react straight away, which is a bonus for us," says Broadhurst. "It has taken a while to get everything we need in place, because we don't have the bundles of cash that would have been around in the old days of works deals. But I think when you look at what we have done, it has saved us money in the longer term."

The car was designed by Broadhurst himself, and he recruited Kevin Berry to help. Berry has long been associated with

"We have more control over what we do and we can implement any changes we want"

Colin Turkington and has worked with him at WSR and at Team BMR, but was between roles and helped Broadhurst with some of the design around the rollcage.

The team has 10 full-time employees – plus a raft of weekend warriors at race meetings – and the scale of the operation is expanding all the time.

Back at HQ, Power Maxed Racing has a damper dyno room, sub-assembly room and its own jig to straighten the cars if needed, plus its own fabrication capabilities.

"We can't just go out and buy all the equipment we need straight away," says Broadhurst. "Like the damper dyno, for example: we had to wait until we could afford it, buy it and then wait until we had paid for it until we could look at the next bit of equipment we needed. That is how we have grown over the last two seasons."

The team has some experience at the helm as well, with Juan Pablo Montoya's former Formula 3000 engineer Mick Cook working with Josh Cook (unrelated) and Rob Peacey engineering for Proctor – he was the man who made the call for Proctor to start that race at Brands Hatch on the slick tyres.

The crew is now firmly established, but ▶



PMR has just 10 full-time staff but deploys them efficiently

ROBERTS

the creation of a team from the ground-up, and the in-house build of two new cars, has been a roller coaster for all involved.

“I would say that the cash situation is the biggest challenge we have had to bring this whole thing together,” says Broadhurst, who also acts as the team manager. “It is a different landscape than when the works teams were in before – there is a misconception that there are massive deep pockets at the factory teams, but that isn’t the case like it was when I was at Triple Eight Race Engineering. You just have to be careful about how and where you spend the money and use it wisely.”

As well as the engineers and staff, the team has a computational fluid dynamics specialist among its number. In a championship that has mandated a number of controlled parts, any advantage that can be gained from the aerodynamics of the car is a benefit to any team.

“That is something we are going to start on now,” says Broadhurst. “We have concentrated on making other parts of the car work first, and we have been a bit behind with the aero stuff to be honest. It can be quite time consuming and you can spend lots of money trying to gain a few tenths of a second so it can be frustrating.

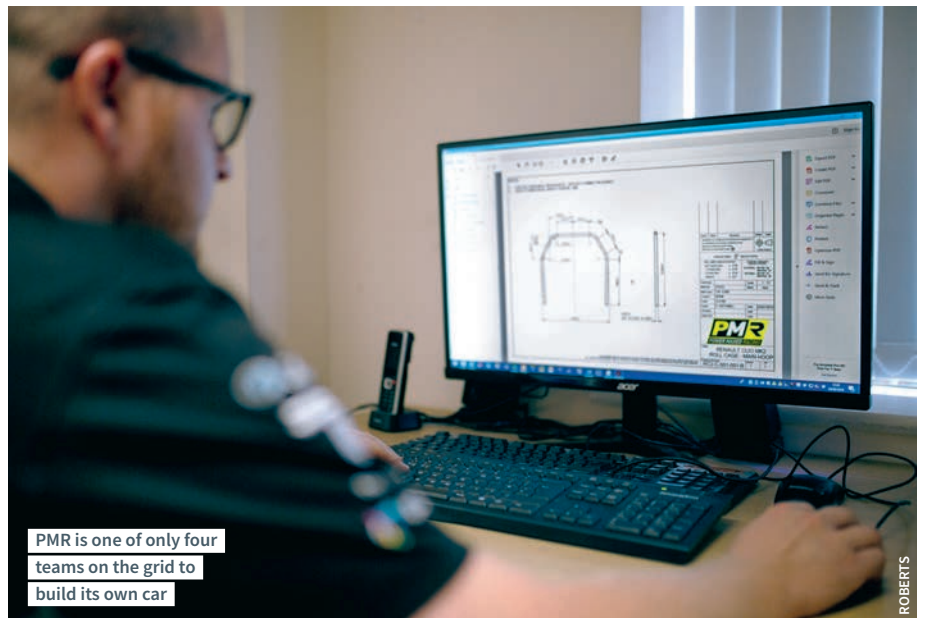
“But it is something we need to begin looking at more seriously and it is a job for us over the winter months.”

Those are the steps that will take the programme forward, but those three wins this season – one for Proctor and two for Cook – mean that the campaign can be regarded as a success already.

The deal with Vauxhall means it is in the manufacturer-constructors championship, and it is third and within touching distance of second-placed Honda. That is a strong achievement for a team that was essentially

only created three-and-a-half short years ago.

“We are making progress and we are adding things to the team in the background,” adds Broadhurst. “It was important when we set up the team and created how we operated that we looked ahead. We are building something sustainable for the future: this isn’t just for the here and now, this is something



PMR is one of only four teams on the grid to build its own car

ROBERTS

that we want to carry on for a long time.

“You can come into motorsport and throw all sorts of money at it – and lots of people have in the past – but you might not be successful. There are plenty of examples where people have tried to run before they can walk, and that means that lots of money can be wasted. That is not something we have done. We have had a plan in place and we are sticking to it.”

The company has customer programmes, too. Power Maxed Racing has built three Polos for the Volkswagen Racing Cup that were sold to customers, and PMR also runs three machines in the category for racers – one Polo and two Golfs.

That is only one hint to the fact that the business needs to stand on its own two feet if its ambitions for the long-term are to be achieved. Running cars for customers is one part of the plan, as is the capability to take on engineering programmes and projects for other people. The specialist

“We aren’t McLaren yet, but I’d like to think we could be in a position to be a match for RML”

skills that are contained within the four walls of the Bidford-upon-Avon base could be applied to other areas.

“We want to get to a position where we are able to take in projects from other people – although it is not something we are pushing right now,” explains Broadhurst. “We aren’t a massive team yet, and we are growing. We don’t have the capacity to do too much extra work at the moment because we are busy with our own racing programmes. But in the future, this is an area where we can develop and create more income streams.

“We aren’t quite McLaren yet, but I would like to think that we could be in a position to be a match for a firm like RML. That is the kind of operation we are aiming at and I honestly think we are getting there.”

But that is for the future. Right now, Power Maxed Racing is in the middle of a title fight and Cook has a decent shot of at least finishing in the top three of the standings – if not better if things go his way in the last two meetings at Silverstone and Brands Hatch later this month.

The team will stick with the Astras for next season and, with the learning that has already been racked up by the team in its short life, expectations will only increase. Given the solid foundations laid down by the team already, the intensity of that pressure is something it is perfectly placed to cope with. ■

EVOLUTION OF PMR



Technical director
Broadhurst has
WRC pedigree

The birth of Power Maxed Racing came in 2015, and it was all hands to the pump straight away.

Boss Adam Weaver had been involved with the British Touring Car Championship for several seasons, mainly as a backer to Rob Austin, Tony Gilham and Chris Stockton. It was the Stockton connection that led to the creation of PMR.

Weaver wanted more control and when Stockton decided to quit the category in 2014, it was his chance to pounce.

He bought the entry from BTC Racing and the Chevrolet Cruze that came with it. “We set about building up our own team,” explains the team’s technical director Martin Broadhurst. “But then Adam realised that it would be just as efficient to run two. He bought one of the United Autosports Toyota Avensis and I knew that there was a Chevrolet Cruze bodysell at RML, so we went and got that.

“The only problem was that this was in the January before the season started in March, and we were basically building a workshop at the same time.”

The team managed to pull everything together for 2015, with BTCC race winner Dave Newsham and Renault UK Clio Cup graduate Josh Cook both regular points

“ADAM REALISED IT WOULD BE JUST AS EFFICIENT TO RUN TWO CARS”

scorers. They were 15th and 16th in the table, but Cook had made a breakthrough with a podium at Rockingham.

Hunter Abbott and Kelvin Fletcher contested the following year (with cameos from Newsham at Knockhill and Rockingham in place of Fletcher). Abbott was the highest placed with 19th in the points – he had shown strong pace, but was caught up in incidents too often to rack up the big points.

The slog to the front of the field was a long one, but once the two-litre turbocharged Vauxhall Astras hit the track in 2017, things changed. Tom Chilton scored a podium in the car’s maiden meeting at Brands Hatch and the car was only narrowly beaten by Matt Neal when Rob Huff appeared at Silverstone.

Success for the four-year-old team would be just around the corner in 2018, with wins at Brands Hatch (Senna Proctor), Donington (Josh Cook) and Thruxton (Cook) putting the team in the heart of the championship battle.



Proctor took PMR's first
win at Brands Hatch
from 27th on the grid

JEP/LAT
motorsport
IMAGES



FROM FORMULA STUDENT TO FORMULA 1

Endorsement from a leading F1 technology supplier is a dream for Formula Student entrants. But what's in it for AVL RACING?

BY ADAM HALL

Innovation is the future of the engineering industry. In a world of ever-expanding corporations, overcomplicated software and jigsaw puzzle management structures, concern persists that the natural, instinctive engineering skill that motorsport was built upon will one day be lost. Think of Colin Chapman's ground-effect Lotus 79, Audi's four-wheel-drive Group B Quattro or Williams' active suspension FW14B – all of them pioneering, the result of left-field ideas that changed the status quo.

It is this pursuit of fresh ideas that makes participants in Formula Student highly attractive to engineering companies, naturally eager to employ the most innovative minds universities can offer to ensure their future competitiveness.

One prime mover in this regard is AVL, the world's largest independent company for the development, simulation and testing of powertrains. Its motorsport division, AVL RACING, combines all the strengths from these three pillars to service customers in premier series including Formula 1, Formula E and NASCAR, so has a natural interest in



Fresh ideas cultivated in Formula Student are valuable to F1

keeping tabs on the next generation of engineering talent coming through the ranks.

AVL is closely linked to its local FS teams, TU Graz and UAS Graz, and extends its involvement to sponsoring Formula Student Austria. It also has a presence in 11 different countries – including the UK – and helps outfits close to its affiliated sites.

“AVL is a home of innovation so it needs people who have this kind of philosophy,” says Antonia Tippel, responsible for managing AVL's Formula Student programme.

“The company has a high-spirited passion for technology and motorsport – this is why the philosophy of AVL aligns with Formula Student. It's the kind of mindset that AVL

needs for its clients and the challenges of its daily racing business.”

Having a partner such as AVL is a Formula Student team's dream, providing it with free access to test-beds, sensors and programmes that are key to F1 teams. TU Graz's engine had six to eight weeks in a state-of-the-art AVL dyno last year, so little wonder it has been the most efficient engine in Formula Student Italy, Austria and Germany this year. It's a partnership that an FS team couldn't put a price on.

But how does AVL justify giving up an important resource for almost two months? As it transpires, it isn't entirely altruistic, with a constant desire for innovation at the heart of the matter.

“Obviously the students' biggest target is to build the car, but that is not the only target we give them,” explains AVL RACING's director, Michael Resl. “They get another target to improve our software or run some tests for us, maybe using their car.”

“Every innovation since Formula Student became a part of AVL, irrespective of whether it was an engine mounting system, a dynamic cooling system, a test-bed, or driver telemetry, is integrated some way into the Formula Student programme.

“They're not a resource, but a guinea pig



AVL/DORISSPORER

Top: TU Graz benefits from AVL support beyond just sponsorship. Above (l-r): AVL innovators Michael Resl, Antonia Tippel, Gregor Griesser and Martin Matzer

that is important for an independent company. It's an additional team and an additional customer that we can try out with our low-risk innovations. If it goes wrong we can try another solution

and if it goes right we can use our results to promote our services."

The trade-off is simple – the more AVL gives to the students, the more unpolluted engineering thinking it gets in return.

It's not just the teams' cars that benefit from AVL's expertise but the students themselves, who have a platform to prove their ability to AVL. Resl estimates that AVL takes on 10-15 Formula Student graduates every year. This includes former TU Graz team leader Martin Matzer, who joined AVL in 2011 and is now the racing sales and key account manager for the UK.

"One thing not to be underestimated is that if you are good in a Formula Student team, you have direct access to people in the company at director level or executive vice-president level, even owner level," Resl says. "The network you get in a Formula Student team is something you would not have if you were a normal student.

"We know they work their nuts off, they're durable, they can party but can work too. That is the sort of person we need – not looking at the clock all the time, but just wanting to get the job done. Even if they don't come to us, they likely would go to a customer, take that knowledge into the racing world and promote AVL."

AVL's guidance isn't just limited to technical capabilities. It also offers team members the opportunity to practice creating presentations and pitching ideas to AVL experts, including Tippel and Resl.

For AVL engineer and former UAS Graz student Gregor Griesser, the experience of Formula Student was pivotal. "You have to organise yourself and your team," he says. "Working with a group of people in a project that is the real deal, that's what Formula Student prepares you best for.

"The best correlation is the race week itself. When you're in a Formula Student team, you have the race day and the car needs to be ready; the same thing applies with working in the racing industry."

Such skills, combined with the hard work required and experience of hands-on engineering can mould starry-eyed students into confident graduates with the world at their feet.

Partnerships such as this are exactly what the motorsport industry needs to protect its engineering future; encouraging smart, enthusiastic engineers to continue their ambitions of designing the next Williams FW14B, race-engineering the next Lewis Hamilton or managing the next unbeatable F1 team. ■

LIFE INSIDE FORMULA STUDENT

One year ago I was a Formula Student sceptic, convinced it was just another university gimmick. But first-hand experience as part of the suspension design team for the Queens University Belfast team showed me that I couldn't have been more wrong.

Ten months later, having started from a blank canvas, our Yamaha R6-powered Queen's Formula Racing car finished fourth of the UK entrants at the domestic finals in July and ninth overall among 129 international entries.

Formula Student is pure undefiled engineering. Designs are by no means held back by the fact that students are solely responsible – rather, it adds to the ambition and variety of designs on show around the paddock. With electric powertrains, four-wheel drive, multi-element wings and even DRS on display, it's an unrefined version of motorsport's Formula 1 pinnacle, making it the perfect stepping stone to turning the dream career into a reality.

The fruit of my labour was racing the car I had helped design around Silverstone in the endurance race.

To my relief, it handled like a dream!



'Our' man Hall pushing on in Queens' FS entry at Silverstone

HOW TO BE AN ACE ENGINEER

Tim Wright opens up on his remarkable career

BY JAMES NEWBOLD

'G

ood things come to those who wait' isn't just a well-worn advertising slogan, but accurately describes Tim Wright's career in motorsport. Having served his

apprenticeship as a draughtsman at several Formula 1 teams, he had to wait until he was 35 and in his second spell at McLaren to try his hand at race engineering, when he was entrusted with Alain Prost's car for the 1985 Brazilian Grand Prix in Rio.

"It was John Barnard who asked me if I would like to go and do race engineering, and he sat me down and talked me through it all," recalls Wright. "I knew the rudiments of it all, but bit by bit, and with Steve Nichols as well, I just started learning."

He won first time out, and Prost followed up with back-to-back world titles.

Now 69, Wright still hasn't stopped learning. He started his career building boilers for Babcock and Wilcox, and then helped design ejector seats at Martin-Baker. It was there that his passion for racing was ignited, becoming a regular frontrunner in Mini 7s until an accident at Mallory Park convinced him to stop.

He joined the March drawing office in 1973 and enjoyed an all-round education working on various projects, including the six-wheeled 2-4-0, then went to McLaren at the end of its '76 title year. But when chief designer Gordon Coppuck struggled to get to grips with ground-effect, McLaren's form took a downturn that prompted the merger with Ron Dennis's Project 4 concern.



JEP

"Not having the benefit of windtunnels as they do now, it was all a bit of a guess," says Wright. "It worked to an extent but it was never as sophisticated as [Colin] Chapman was doing. It was all very crude."

Unfulfilling stints at Fittipaldi and the tiny Spirit team followed – "Honda had a house just on the outskirts of the trading estate and they were building engines in the kitchen!" – before returning to McLaren for 1984 where, under Barnard's tutelage, Wright proved a fast learner.

After moving from Prost to Stefan Johansson in 1987, his work on the test team in Japan with Emanuele Pirro proved instrumental to McLaren's success in '88 and '89, which extended into '90 as Wright switched to Gerhard Berger's car.

At the behest of ex-McLaren driver Keke Rosberg, he joined Peugeot's Group C effort for 1991 and engineered the much-improved 905 to victory at Le Mans and the '92 World Sportscar Championship, then returned to F1 with spells at Jordan, Sauber and Benetton,

winning twice in '95 with Johnny Herbert, at Silverstone and Monza.

Focusing on the test team and on reliability thereafter, Wright left Enstone in 2009 and hasn't looked back. Now running Century Motorsport's Ben Green and Ben Tuck in British GT, he relishes a simpler approach to race engineering – "I remember Ayrton Senna once asking me what the tyre pressures were down to a quarter of a PSI" – and the close working relationship he enjoys with the young guns.

"I can use a computer and look at data, but when I started with Prost, we didn't have computers. It was just between the driver and the engineer to make decisions, which is how I like it now," he says.

"I'm working with young drivers who are learning, but you don't need to be looking at computers all the time to get an answer. They tell me what the car is doing and I can help them. Yes, it's useful to have that data, but ultimately it's about understanding how the mechanics of a car work." ■



Wright won back-to-back titles with Alain Prost in the mid-1980s

TOP TIPS FOR ENGINEERS

- It sounds obvious, but to get a feeling for how a car reacts to changes, you've got to understand the fundamentals of the mechanics and how cars work.
- It's never too late! I started proper race engineering when I was 35, so don't give up. If you have basic knowledge, then you'll find a niche.
- Go to a university or college that teaches you the fundamentals – it's much harder now to follow the path I took and get into Formula 1.

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