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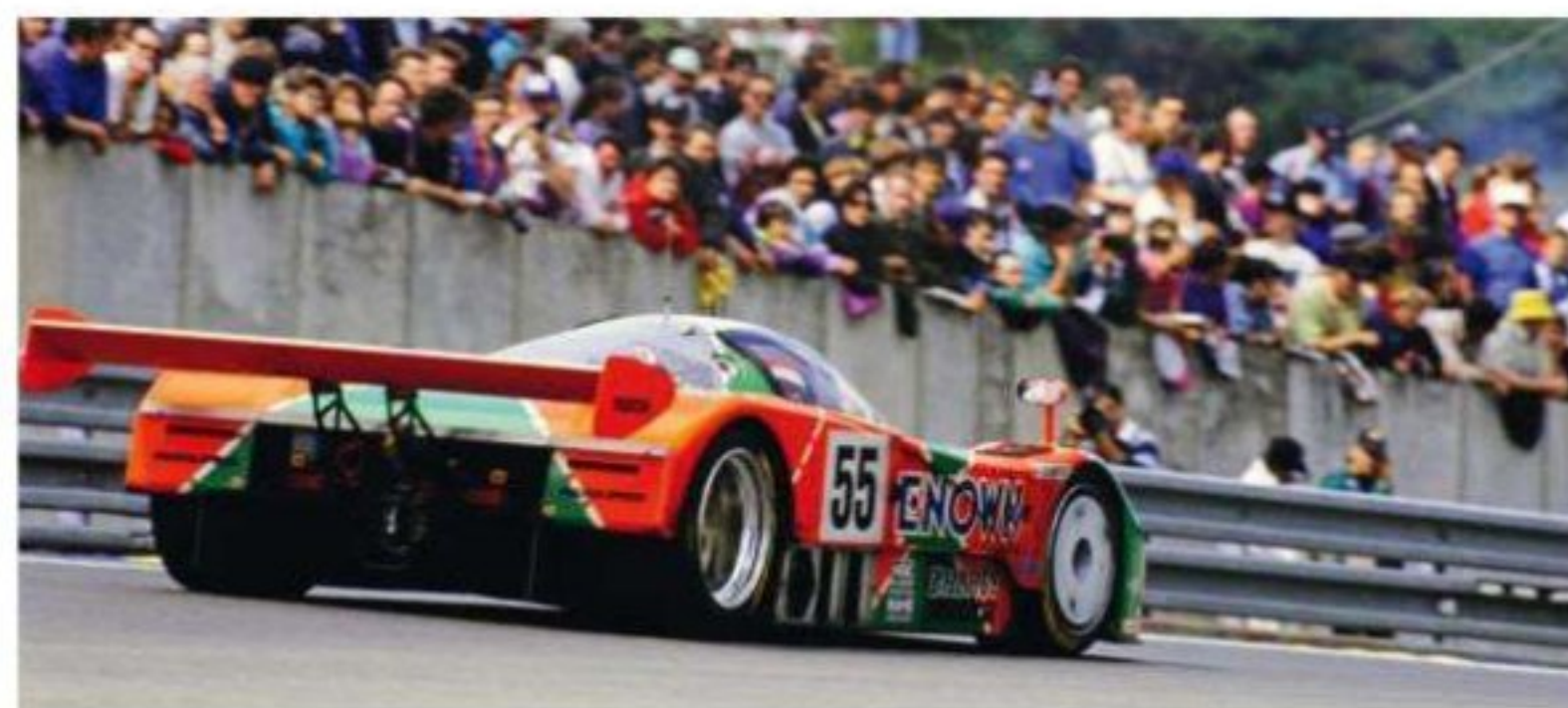
SECRETS OF THE
BRABHAM 'FAN CAR'



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MAZDA 787B ■ THE MERCEDES 'BEAST' ■ RENAULT 5 MAXI TURBO **AND MORE**



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The cars that shone brightly but briefly

IT'S NOT OFTEN WE GET TO PUT SUCH AN ECLECTIC mix of cars and categories on our cover. With the off-season upon us, we decided to take a look back at some of motorsport's one-hit successes – and the more we looked, the more interesting stories and machines we found.

Brabham's BT46B 'fan car' had to be on the list, and designer Gordon Murray and driver John Watson help tell the tale of one of Formula 1's greatest enigmas (page 6).

There are plenty more. The Mazda 787B is a Le Mans icon – it remains the only Japanese car to have won the French classic – and its lack of success elsewhere only goes to underline what a special day Johnny Herbert, Volker Weidler and Bertrand Gachot enjoyed in the 24 Hours in 1991. Chaparral's innovation and the secret Penske-Mercedes 1994 Indianapolis 500 project (above) are also incredible moments in motorsport history, but the one that really stands out is probably the oldest of this issue's subjects.

Despite all efforts to stop it, Mercedes' domination of the 1939 Tripoli Grand Prix stands as one of the great examples of engineering excellence overcoming organisers' attempts to undermine those at the top of their game. Sound familiar?

• Those wondering where our World Endurance and World Touring Car reviews are, fear not. They will form part of our first issue of 2017, in which we will also take our first in-depth look at Formula 1's new rules. What impact will they really have?



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McKlein; LAT

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ONE-HIT WONDERS



The stories of motorsport's greatest cars – the multiple race winners – are often well known. But those of fleeting victors can be just as compelling, if not more so.

Following on from our Fast Failures special last year, we decided to turn the spotlight on cars that did manage a brief moment of success.

We've considered two main types of one-hit wonder. The first consists of cars that appeared once or twice, won

(and in some cases dominated) but then were never seen again. There are different reasons for their departures, but the cars in this list include some tremendous engineering successes that were retired purely for off-track reasons, such as the iconic Brabham BT46B 'fan car'.

The second type is less statistically impressive, but still just as interesting. It includes those machines that competed for a while, generally without much success, but which had one day in the sun. Either through luck or a

combination of factors, cars such as the loud-and-colourful Mazda 787B defeated otherwise stronger rivals just once, sometimes at the most important event of the season.

There were scores of potential candidates, so we've made a selection based on the most interesting stories and impressive cars. Formula 1, sportscars, rallying and American motorsport are all represented, with the oldest entry being from 1939 and the newest 2003. And we're sure that there are plenty more to come...

AGREE? WHICH ONE-HIT WONDERS ARE YOUR FAVOURITES?

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THE WINNER THAT SUCKED

It's arguably grand prix racing's most famous one-hit wonder, but there was a lot more to the Brabham fan car than met the eye

By Gary Watkins, Special Contributor

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It suddenly dawned on Brabham as the 1978 Formula 1 season was beginning that it had a problem. No-one had quite cottoned on to what Lotus had found with the previous season's type 78, but the lightbulb came on with the appearance of the 79 in winter testing. There began the thought process in the fertile mind of Gordon Murray that spawned one of the most controversial grand prix cars ever in the Brabham BT46B, the fan car of one-race, one-victory fame.

The problem the British team had was the flat-12-cylinder powerplant that came with its Alfa Romeo deal. Brabham designer Murray knew it was, quite literally, an obstacle to generating the same kind of downforce as the latest ground-effect Lotus. Just where the venturi underwings should have been sweeping upwards, Murray had immovable objects in the form of Italian four-valve cylinder heads.

"By the time Lotus did the 79, everyone was starting to suss what they had discovered," explains Murray. "If you had a Cosworth, you just swept the exhaust pipes up where you wanted the diffusers to start, but we were stuck with a flat-12 engine."

"I said to Bernie [Ecclestone, then Brabham's boss], 'We've had it. Lotus are going to walk away with this unless we do something.'"

The first solution to the problem studied by Murray was arguably even more creative than the fan-car concept. The immovable object moved courtesy of an innovative car layout.

"I drew up a twin-monocoque car that had one very short tub with the flat-12 strapped immediately behind the driver," says Murray, "and then a second smaller and narrower tub on the back of the engine. That was where the fuel tank was, and the propshaft went through a tube in the middle to the gearbox. The plan was that it would come out in the middle of the season."

"I came up with this idea and drew it all out, and then I did a weight calculation. Already our flat-12 was much heavier than a Cossie and the Ferrari engine as well. It was really, really heavy. I thought, 'No, the weight is going to kill us.'"

"I remember thinking that we had to find another way to get the downforce, and that's where the fan car came in."

A year previously, a fan car that sucked itself onto the track – rather than a ground-effect machine that was sucked – would not have been possible. Moveable aerodynamics were banned, but over the winter of 1977-78 there was an addendum to the rulebook that opened the door. The new clause stated that a moveable aerodynamic device was permissible so long as that wasn't its primary purpose.

Exactly why the rule change was made isn't entirely clear, but it appears to have been introduced to cover the widening use of underbody skirts, which had been creeping into F1 even before the arrival of the Lotus 78. Skirts were clearly moveable, although what purpose they had that wasn't aerodynamic isn't clear.

Murray took the new regulation to a lawyer: "I asked him, 'If you have got something that says primary function, what does that mean?' The lawyer said, 'How many functions are you talking about?' When I replied, 'Two', he explained that the primary one was the one that was more than 50%."

Murray knew there was a loophole to exploit. Hatching the idea of the fan car was one thing – "a 10-year-old could have thought of that," says Murray; making it work quite another.

The Chaparral 2J Can-Am car of 1970 was barely an inspiration. "That was >>



Murray (left) in discussion with Brabham boss Ecclestone (centre). Murray designed fan car in response to ground-effect Lotus 79

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WHY WE CHOSE IT

One of the most brilliantly outrageous moments of innovation, the BT46B probably had to be stopped, otherwise F1 would have gone in an entirely different direction, with ridiculous cornering speeds, no passing and g-suits for the drivers!

Kevin Turner



“I remember thinking we had to find another way to get downforce and that’s where the fan car came in”

ONE-HIT WONDER
1978

BRABHAM
BT46B



entirely different," he reckons, "because it had an extra engine running the fans.

"Our fan car had four different clutches and a very complicated drive system, which all had to be designed, and then built and tested in three months," explains Murray.

Keeping the skirts on the road to maintain the seal around the underside of the car so the fan could suck the car down and draw air through the radiator sitting atop the engine was one problem to overcome.

"The skirts were mounted on long leaf springs, a bit like the hinge on the lid of a piano, which we could tune. If they were too stiff the skirts would wear out and if they were not stiff enough the fan would suck them off the road," says Murray. "It was the transfer skirt at the front of the car that was more difficult because it had two forces working on it: the suction from the fan and the pressure of the airflow."

Murray's solution to the problem

was somewhere between the ingenious and Heath-Robinson.

"We had a couple of sailcloth sausage bags behind the front skirt and there were a series of holes drilled in the front skirt that allowed them to inflate," he explains. "At a certain speed holes started opening in the first bag and blew it up like a balloon so that it added pressure to the back of the skirt to keep it down, and then eventually more holes aligned to inflate the second bag."

The fan itself was derived from one used for cooling on a Centurion tank, "or at least," thinks Murray, "from some kind of tank". The issue was making it stay together.

"The fans were nylon with glassfibre reinforcement," he continues. "They kept bursting, so we cast magnesium blades, but the hub in the middle was still glass-reinforced plastic."

Murray remembers carrying out initial development running with the BT46B at Alfa Romeo's Balocco test

Brabhams started second and third in Sweden, and Lauda would go on to win

track in northern Italy. That was followed by a final session at Brands Hatch in the run-up to the car's appearance at the Swedish Grand Prix at Anderstorp in June.

"Now the hubs were exploding because they were heavier and had more centrifugal force," adds Murray. "With a week to go we machined the hubs out of solid aluminium. I think only one was complete when the cars left for Sweden, and we sent the others out separately and assembled them there. When we got to Anderstorp, we hadn't actually tested the final configuration, not at all."

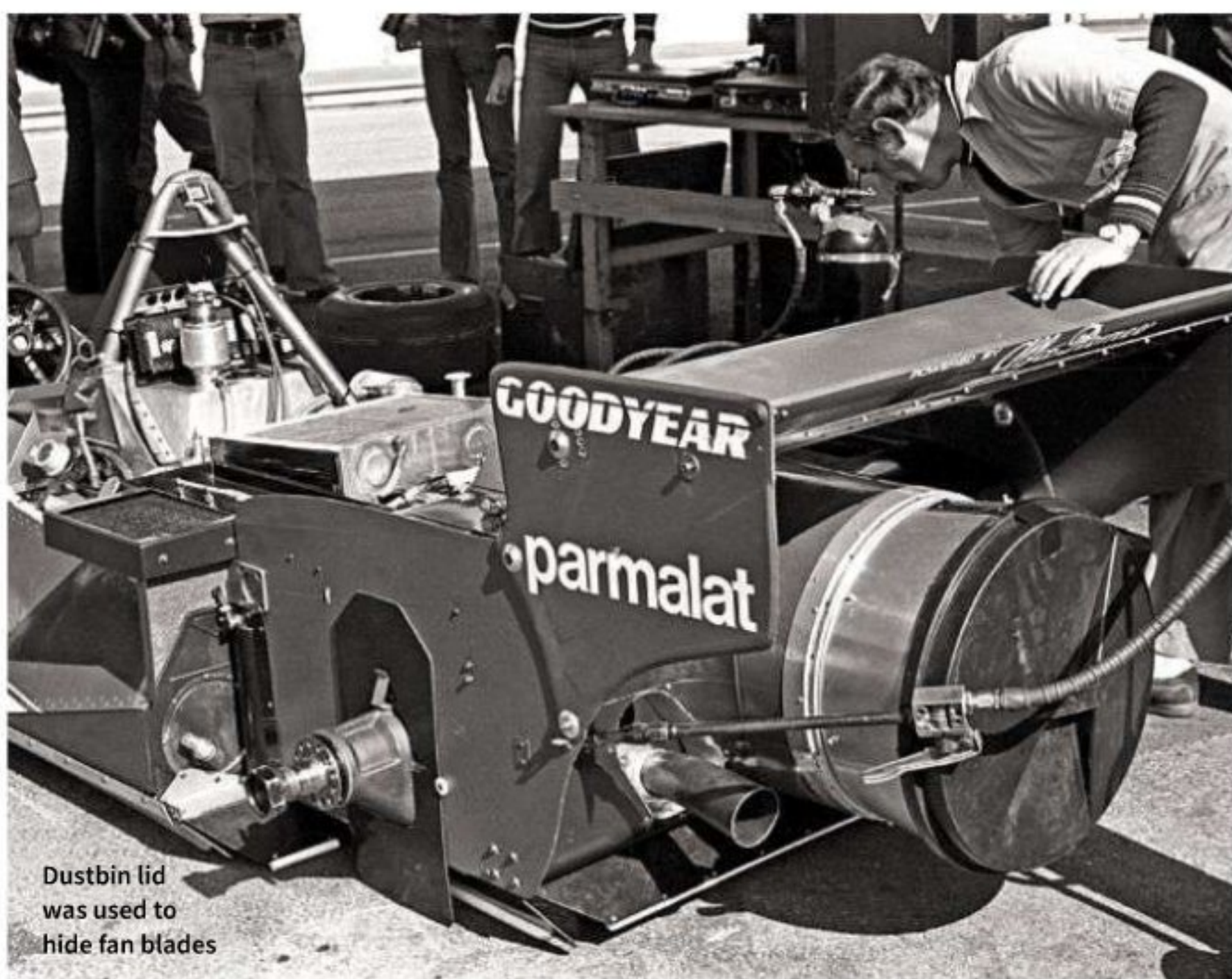
The F1 world went apoplectic when the BT46Bs were rolled into scrutineering in the paddock in Sweden.

"There was pandemonium," remembers Brabham driver John Watson. "Ken Tyrrell was frothing at the mouth and [Lotus boss] Colin Chapman was going crazy."

It probably didn't help that Brabham opted to conceal the fans on the two >>



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Dustbin lid
was used to
hide fan blades

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PENSKE'S SPECIAL MOMENT



LAT

THERE IS A DIRECT LINK BETWEEN PENSKE'S TWO MOST competitive showings of the 1976 F1 season. John Watson claimed a first and only F1 victory for the US team in the Austrian Grand Prix and then followed it up by hustling race winner James Hunt for much of the way in the Netherlands. Remarkably, the Penske-Cosworth PC4 raced both times on the same set of Goodyear tyres.

The latest Penske, which had raced for the first time at Anderstorp in June, had already collected a pair of podiums at the French and British grands prix. Yet the car wasn't an entirely competitive proposition either time. The third at Paul Ricard came when Ronnie Peterson's March hit trouble in the closing stages, while the same finishing position at Brands Hatch had yet to be confirmed with the disqualification of James Hunt's McLaren by the time the grand prix circus rolled up the Styrian hills to the Österreichring in August.

The game changed with what turned out to be a magic set of tyres given to the team in Austria, although, admittedly, Watson had been quick in pre-event testing.

"It is difficult to give a rational explanation, but the bottom line is that when we went there, the car worked," recalls Watson. "One of the tricks back in those days of hand-made crossply tyres was getting a set that were well matched in terms of diameter side to side. We got one set of tyres, and the car was absolutely fantastic on them."

Watson led the first couple of laps on a damp-and-drying track and briefly dropped as low as third before pushing on to an 11-second victory over Jacques Laffite's Ligier. And with the win went Watson's trademark beard, team boss Roger Penske insisting that his driver honour his promise to shave it off should they ever win a GP.

Two weeks later in Zandvoort, a clean-shaven Watson and Penske were in all sorts of trouble.

"We put set after set of new tyres on the car, and none of them were any good," he recalls. "Then Roger asked if we had the old tyres from Austria. We put them on the car, and it was transformed. I don't know if it was the compound, the construction or just because they were well matched, but the car came alive again."

Watson spent much of the race trying to find a way past Hunt's McLaren M23, which became increasingly wide as understeer set in. Fifth gear failure eventually put Watson out of the grand prix with 28 of the 75 laps to go. There would be no more silverware for Penske that weekend or any other before the team bowed out of F1 at the end of the season.

SIX-WHEELED SUCCESS

THE TYRRELL P34 MADE A FLYING START TO its F1 career in 1976. The six-wheeler that had silenced the world's media at its London launch in September '75 notched up seven podiums in its first six grands prix, including its one and only win in Sweden. Soon after, the car began a downward slide.

The Ford-powered P34 arrived on the F1 grid at Jarama in May after an intensive development programme, which had begun the previous October, to prove its credentials. Patrick Depailler – a fan of the car, unlike team-mate Jody Scheckter – qualified third and ran in that position prior to brake problems. Two races later, Scheckter and Depailler finished two-three around Monte Carlo in P34s and a race later they finished one-two at Anderstorp.

That winter-test programme had paid dividends, reckons Neil Trundle, Tyrrell's development man at the time. Not only did he build the first P34s – the first around the rear three-quarters of a 007 – but he undertook its maiden test too, up and down the Club Straight at Silverstone.

"Goodyear made a really good front tyre for us initially," he explains. "I would go as far as to say that we had better rubber on our four little 10-inch wheels than the others had at the front."

That advantage disappeared into the car's second campaign in 1977, while the weight of an already heavy design began to creep up. A magnesium plate was bolted atop the chassis midway through '76 and then a lengthened wheelbase added more weight for '77.



BT46Bs behind convenient, neatly fitting dustbin lids.

"We found a dustbin lid that fitted perfectly," explains Murray. "We didn't want anyone to get close-up pictures of the blades and the pitch when we were running them up, but, of course, Bernie loves a wind-up."

The anger of Brabham's rivals was fuelled by the fact that the BT46B had already been declared legal by the Commission Sportive Internationale (CSI), then the sporting arm of the FIA. It had signed off the car at a meeting in Madrid earlier in the month, the day after Andretti had taken a second consecutive victory aboard the 79 in the Spanish GP. The CSI had not so much as seen the car.

Watson and new Brabham team-mate Niki Lauda were under instructions not to show what the car was capable of, even before it made it onto the 2.5-mile Scandinavian Raceway.

"Bernie kept telling us not to rev it in the pitlane," remembers Watson,

"because every time we did, the thing sucked itself down onto the ground. The team didn't want us going too fast in qualifying, so they sent us out on full tanks."

Even so, Watson and Lauda qualified second and third respectively behind Mario Andretti's Lotus. Reigning world champion Lauda jumped to second at the start, trailed the American for 38 laps, and ended up winning by 30s after the subsequent retirement of the Lotus. Easy.

Lauda reveals in his 1986 autobiography *To Hell and Back* that he "let Andretti go to play cat-and-mouse with him". He explains that, whereas the Lotus driver had to back off over a patch of oil left by Didier Pironi's Tyrrell, he was able to ignore it and "overtook him with embarrassing ease".

Murray has no doubts about what the BT46B was capable of: "We would have won every race we finished and taken the championship easily."

There probably wasn't much to

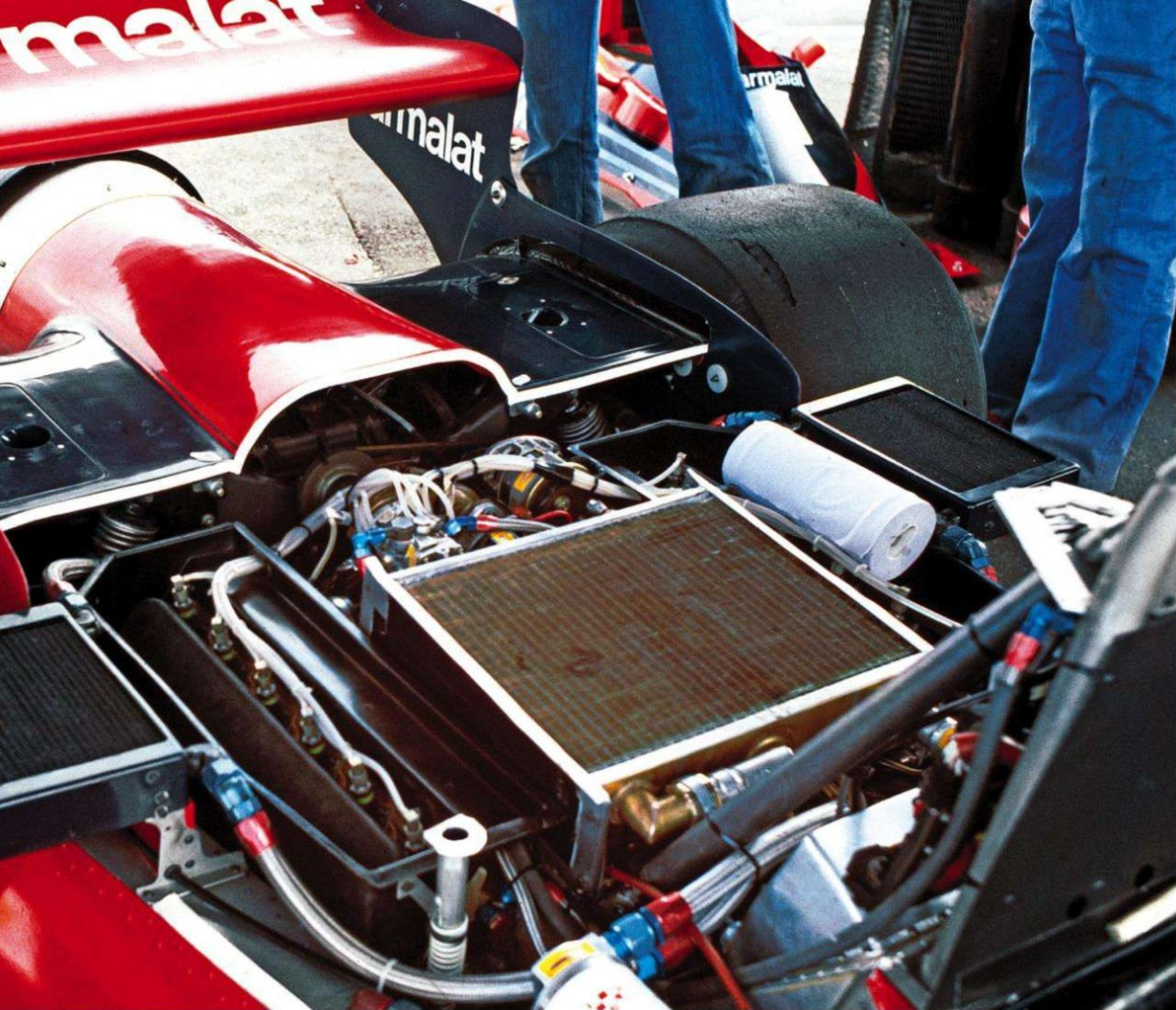
Fan solved problem of wide Alfa flat-12 blocking airflow by sucking air through radiator above engine

choose between the Brabham and Lotus in the fast corners, but the fan car came into its own in the slow and medium-speed sections.

"We had maximum downforce in a first-gear corner and probably twice the downforce they had in a third-gear corner," he explains. "But we had to be quicker in the corners, because we lost 30bhp running the fan."

There was inevitably a protest after the grand prix, but the Swedish federation under whose auspices the event was run merely threw it out, pointing to the CSI's declaration of the design's legality. The challenge – led by Tyrrell and Lotus – did, however, result in Brabham's cars and trucks being sealed ahead of a full technical inspection by the CSI at the team's Chessington base back in the UK.

"They came with a handheld anemometer to measure the airflow through the radiator," recalls Murray. "Sure enough, it was more than 50%. I never said that the fan didn't suck



the car down, just that more of it cooled the car.”

Murray says he still has a letter from the CSI’s technical committee confirming the legality of the car. “They said they agreed with my reading of the regs and there was a loophole, so good for you. But be warned, we will be changing the relevant rule – article 37, I think it was – at the end of the season.”

The BT46B would never race again, however. But was it banned or was it simply parked by Brabham? It has come to be accepted that Ecclestone chose to withdraw the car to avoid a fight with fellow members of the Formula One Constructors’ Association, the organisation through which he was laying out his power base in F1. That is absolutely the case, although Brabham’s reversion to standard BT46s for the French GP at Paul Ricard in July was presented by the CSI as a ban.

Yvon Leon, then secretary-general of the CSI, was one of a three-strong

delegation that inspected the BT46Bs at the Brabham factory on the Tuesday after the race. He confirms that the test with the anemometer did take place and was carried out by Robert Choulet, the famed Matra aerodynamicist who was retained by the CSI as a consultant.

“We made a report in which we said that the fan was not solely a cooling device,” recalls Leon, “but there was no possibility of proving that it was counter to the regulations. I remember a discussion with Ecclestone in which he said he would withdraw the car so long as he could keep the Anderstorp victory. He had the other constructors against him, and I think that was very important in his decision.”

Watson reckons that Ecclestone saw the bigger picture: “There was going to be a major confrontation and any split might take a long time to repair. His position of strength in F1 was founded on the unity of the constructors; without unity he didn’t have a position of strength.”



The Brabham designer wasn’t best pleased. “Bernie came to me saying that the car was going to be the end of FOCA,” says Murray. “He asked if I would mind withdrawing the car. I was spitting blood.”

The decision resulted in two trips to the drawing board. Alfa Romeo had to begin work on a new V12 and Murray had to tear up plans for an optimised fan car to be known as the BT47. ❧

ONE-HIT WONDER
1991

MAZDA
787B

SPORTSCAR SOLO SUCCESS

Winning Le Mans takes a special set of strengths. And sometimes cars succeed in the 24 Hours despite failure elsewhere.

Here are three of the best

By Gary Watkins, Special Contributor

🐦 @gazzasportscars





WHY WE CHOSE IT

The 787B is one of Le Mans' most striking winners and yet it's easy to forget the car's lack of success elsewhere. The Mazda really is an example of a car having its day of days.

Kevin Turner

The seeds of Mazda's 1991 Le Mans 24 Hours triumph were sown in the trials of its campaign of the previous year. It wasn't just that the failures of 1990 resulted in ORECA being brought in as the Japanese manufacturer's European partner. Perhaps even more importantly, an abject showing meant both rule makers and rivals failed to spot the potential of its new four-rotor powerplant.

Nor was the potential of the reworked 1991 rotary-engined contender evident when it made its debut at the opening round of the Sportscar World Championship at Suzuka in April. The 787B didn't look anything special on the way to sixth, three laps down on the winning Peugeot 905 and two behind Le Mans favourite the Mercedes-Benz C11.

And that's all Mazda's rivals for Le Mans glory got to see of the car before the 24 Hours. Mazda's SWC campaign was at best half-hearted: ORECA ran a solo, year-old 787 in the races outside Japan. The 787B did see service in the All-Japan Sports-Prototype Championship, but that was too far away for anyone to notice even if it had been winning. And it wasn't.

That explains why the FIA rule makers effectively gave the Mazda a 50kg weight break for Le Mans. The 1991 season was the first for the new 3.5-litre Group C formula that spawned the Peugeot and Jaguar's XJR-14. The old fuel-formula cars were allowed to race on with draconian weight penalties. The older piston-engined cars had to race at

1000kg, while the rotary Mazda was initially scheduled to run 50kg higher than its regular 830kg minimum at the French enduro.

The reason it didn't lay in the diplomatic skills of the late Takayoshi Ohashi, boss of the Mazdaspeed competitions department.

"It was definitely Mr Ohashi getting close with the official bodies," recalls long-time Mazda driver Pierre Dieudonne, who was transitioning into a sporting role in 1991. "But the second factor was that the other manufacturers didn't see us as a threat — we weren't on their radar."

The lower minimum weight gave Mazda a chance, but it needed the reliability that had been missing when the new R26B powerplant came online in 1990. ORECA, brought in to replace Alan Docking Racing, played its part.

The first planned endurance simulation in February had been cancelled due to the Gulf War and the second, in April, was a disaster. It was at ORECA boss Hugues de Chaunac's insistence that they go again a few days later. New parts were flown in, and the test was a success. The tide had turned.

Mazda also had a new mentality in 1991. It had brought in young single-seater guns Johnny Herbert, Bertrand Gachot and Volker Weidler in 1990, but the next year it let them off the leash — thanks to six-time Le Mans winner Jacky Ickx, now a consultant to Mazda.

"We'd always been pushing to run faster, but the Japanese had traditionally been so conservative," recalls Nigel Stroud, designer of a line of Mazda prototypes up to and including the

787B. "I remember the big strategy meeting, and Jacky said, 'Let's go balls out.' Once they'd heard it from him, it sealed it. To them, he was God."

The new breed of 3.5-litre cars were always going to be fragile, so much so that Mercedes and Jaguar never had plans to race theirs. Mazda's opposition was the C11 and Jaguar's well-proven XJR-12. The 787B could keep pace with a Jag hamstrung by poor consumption, but the German car was out of sight.

The lead C11 shared by Jean-Louis Schlesser, Jochen Mass and Alain Ferte was three laps to the good when an alternator bracket — a well-proven item weakened because it had been anodised for the first time — broke and took the water-pump belt with it. Herbert, Gachot and Weidler came through to give Mazda perpetual bragging rights as the first Japanese manufacturer to win Le Mans.

The 787B could finish no better than third in any subsequent Japanese appearances, but it sealed its place in history on its one and only competitive appearance on European asphalt. 🏆

The iconic C11s were the quickest cars at Le Mans in 1991 but all three hit trouble



ONE-HIT WONDER
1998

PORSCHE
911 GT1-98



“The car was good where high and medium-speed corners predominated – it was conceived for Le Mans”

Mercedes 10, Porsche 1. That's how the sportscar score line read in the battle between the German manufacturers at the end of 1998. But the victory that mattered, the one at the Le Mans 24 Hours, went to the marque that was vanquished 10 times in a row in the FIA GT Championship.

The all-new, carbon-chassis Porsche 911 GT1-98 was designed for Le Mans, and the Circuit de la Sarthe also played to its strengths – or rather didn't play against its weaknesses.

The car's flat-six was hamstrung by the engine air-restrictor rules that season. It wasn't so much the diameter of the restrictors as their positioning.

The Porsche powerplant lacked torque

as a result, handing the advantage to the normally aspirated Mercs. Once the V8-engined Mercedes CLK LM replaced the CLK GTR, Porsche was in trouble, but it had a chance at Suzuka and Laguna Seca in August and October respectively.

“We weren't very good at places that were stop-start, but where you could keep the momentum, we were in the game,” recalls Allan McNish, who claimed the Le Mans victory with Laurent Aiello and Stephane Ortelli. “The car was good where high and medium-speed corners predominated, and that's because it was conceived for Le Mans.”

Porsche also had an ace up its sleeve. The 911 GT1-98 ran with a sequential dog 'box transmission in FIA GTs, but for Le Mans there was a new synchromesh sequential that had been validated in the back of a 911 GT1 Evo at the Daytona 24 Hours in February. The weak link of Toyota's GT-One, the fastest car

WHY WE CHOSE IT

Bad luck prevented the GT1-98 winning before the new Merc appeared, but Porsche probably doesn't care given that it came good at the most important endurance race in the world.

Kevin Turner

at Le Mans in 1998, was its transmission.

The 911 GT1-98 should by rights have more than a single victory to its name. Porsche had the pace to beat the Mercedes while its rival was relying on the previous year's V12-engined CLK-GTR at the first two rounds. Driveshaft failures did for the Porsches at the Oschersleben opener and engine problems hit McNish and stand-in team-mate Bob Wollek at Silverstone. A 30-second stop/go for avoidable contact left Uwe Alzen and Jorg Muller an agonising eight seconds behind the winning Merc in the second car.

The 911 GT1-98 wouldn't race again after the end of the season, but it wasn't idle in 1999. Porsche had taken what was meant to be a one-year sabbatical from top-flight sportscar racing and the car became a test bed for parts and ideas destined for the still-born LMP2000. ❧



Le Mans was Porsche's only win in 1998

ONE-HIT WONDER
2003

BENTLEY
SPEED 8



“We were as confident as we could be
– we’d proven reliability in testing
and it was so much easier to drive”

Bentley had a three-year plan to win the Le Mans 24 Hours when it made its factory motorsport comeback after a 70-year hiatus in 2001. In that time it participated in just four races, notching up a third, a fourth and another third in the events leading up to its victorious assault on the French enduro in 2003.

Team Bentley, set up around a core formed of Richard Lloyd’s Apex Motorsport squad, competed only at Le Mans in 2001 and ’02 with the EXP Speed 8, but for the year of its intended Le Mans victory there was also an assault on the Sebring 12 Hours in March. Its participation was more about preparing the car, rather than the team, for the challenge that lay ahead in June.

That was because sister marque Audi became much more involved in the project in 2003 after temporarily ending its factory involvement in the prototype arena. And Audi had already made Sebring an essential part of its Le Mans preparations. The two all-new Bentley

Speed 8s, one essentially run by a crew from Joest Racing, would take part in the race and then stay on to undertake a pair of 12-hour runs.

The new Bentleys had been quick at Sebring and had shown their pace in qualifying. They ended up one-two in the times, only to be relegated to the back of the grid when deviations were found in their flat-floors. They had the one-lap pace in the race, too, although they weren’t quite living with the Joest and Champion Audi R8s in the rough and tumble of the 12 Hours when both cars lost time after minor dings in traffic.

Testing the week after the race went well. As did two Le Mans simulations at Paul Ricard in April and then May. That resulted in an air of confidence going into Le Mans.

“We were pretty much as confident as we could be,” recalls Guy Smith, who went on to win the 24 Hours with Tom Kristensen and Rinaldo Capello. “We’d proven the reliability in testing and the 2003 Bentley was so much easier to drive than the previous car.”

Job done, the Speed 8s were parked after Le Mans, although there was

WHY WE CHOSE IT

A project executed with clinical precision. It’s a shame Bentley didn’t return to Le Mans in 2004, but if it had it’s likely the Speed 8 wouldn’t be on this list...

Kevin Turner

an inevitable push to return in 2004.

“We did try, saying that we could win Le Mans again with the same car,” recalls Team Bentley technical director John Wickham. “But Franz-Josef Paefgen [who had taken over the reins of Bentley in 2002] said no. The money was there for three years and then they were investing in the new Continental GT.”

And that is the car with which Bentley made another sportscar comeback in the GT3 ranks this decade. ✱



ONE-HIT WONDER
1939

MERCEDES
W165

THE GREATEST MERCEDES?

It only raced once, but the 1939 W165 could be the finest of all Silver Arrows

By Kevin Turner, Editor

[@KRT917](#)

WHY WE CHOSE IT

Could this be the ultimate one-hit wonder? A tight timeline followed by a dominant one-two and then never raced again. It's one of the great stories in motorsport history.

Kevin Turner



Lang's W165 was untouchable once the race got under way

The Italians were fed up. Having seen off Ettore Bugatti – an Italian working in France anyway – Alfa Romeo had dominated grand prix racing in the early '30s, occasionally challenged by Maserati. Then things changed in 1934.

When German squads Mercedes-Benz and Auto Union arrived, they brought new levels of professionalism and technical prowess with them, not to mention the power of Nazi state funding. Nobody was able to stand in their way.

There was some resistance. Louis Chiron won the 1934 French Grand Prix for Alfa Romeo as the new silver wundercars failed, and the great Tazio Nuvolari scored perhaps his finest victory in Alfa's P3 Tipo B at the 1935 German GP on the famed Nurburgring.

These were merely blips, however, as the Silver Arrows marched to success after success. In 1936 and '37, Mercedes and Auto Union won all the major GPs. Other nations had to look to other areas of the sport, like the Le Mans 24 Hours.

The switch to new regulations in 1938 only briefly gave French firm Delahaye a look in at the Pau GP and even Italian Nuvolari was an Auto Union driver by then.

Alfa Romeo's extreme efforts to respond included the Bimotore, which combined two eight-cylinder engines to produce 500bhp, but increasingly Italian success was limited to sportscars and the Voiturette class, akin to the F2/GP2 of its day.

And so the organisers of the GP in Tripoli, an Italian colony, elected to make changes for the 1939 race, held on May 7. It is possible that the need for 30 cars due to the annual lottery associated with the race contributed to the decision, but, after the 1938



Lang takes an early lead, while the polesitting Maserati of Villorosi (in fourth) is already trailing oil

Italian GP in September, it was announced all Italian races would be run for 1500c Voiturettes in any case.

The Tripoli event, which was one of the most prestigious and lucrative in terms of prize money, had been won by German cars for four years. The switch from the then current three-litre GP formula to the Voiturette regulations left Mercedes and Auto Union with no eligible cars less than eight months before the event.

An Italian victory, probably for Alfa Romeo's gem of a new 158, thus looked assured. Except Mercedes decided to develop a brand new car over the winter specifically for the race, perhaps encouraged by the possibility that GP racing could switch to supercharged 1500cc rules from 1940. Work began in November, in complete secrecy.

"The Italians thought that we couldn't possibly build new machines in such a short space of time, but by working day and night the Mercedes engineers built two cars especially for the Tripoli race," recalled Mercedes driver and former chief mechanic Hermann Lang in Chris Nixon's book *Racing the Silver Arrows*.

Quite what the organisers and competitors thought when the two new W165s broke cover at the super-fast 8.14-mile Mellaha circuit can be imagined...

The W165 looked like a scaled-down version of Mercedes' successful 1939 three-litre V12 W154 grand prix car, but used a new 1.5-litre V8 producing around 250bhp.

Famed technical director Rudolf Uhlenhaut, one of the key figures behind Mercedes' successes before and after the Second World War, believed the W165's similarity to its bigger brother was key. "We only just got them ready in time for the race, but we were able to do so because the design was similar to our three-litre machines,"

he said in *Racing the Silver Arrows*.

"The valve gear, pistons and chassis were the same, only smaller.

"We only made three engines – two for the race and one spare for testing. We tested all the parts of the engine first on separate test beds, so when we assembled the engine every part had been tested and it worked properly straight away."

GP stars and rivals Lang and Rudolf Caracciola were on hand to drive the two baby Mercs and both were comfortably under the class lap record in practice, despite a lack of track testing and the fact that one car

All smiles here, but both Lang (l) and Caracciola (r) felt disadvantaged by team boss Neubauer's (centre) race orders

"Only 12 of the 30 starters finished. Inevitably, two of those were the Mercedes, in first and second"



was completed on the ship en route.

"The V8 Mercedes has an ear-splitting crackle, goes like a rocket and holds the road amazingly well," said *The Motor* at the time.

Nevertheless, Luigi Villorosi's streamlined Maserati qualified on pole, followed by Lang and Caracciola, with future inaugural Formula 1 world champion Giuseppe Farina completing the four-wide front row in his Alfa.

Each W165 had slightly different gear ratios, giving one better acceleration and the other a higher top speed. Predictably, both drivers thought the other had the advantage.

"My orders were to try to break the opposition by going really fast and then changing tyres," explained Lang, who admitted to being angry about his team-mate having the W165 with better acceleration. "Caracciola was to take things easier and go through the whole race on one set."

Amid the intra-team tension, Lang – winner of the race in 1937-38 in GP machinery – jumped into the lead at the start, having established with team boss Alfred Neubauer that the race began when the lights went out, not when local governor Marshal Balbo dropped the flag.

Villorosi's rapid Maserati was trailing oil immediately and gearbox problems put it out of contention. The hard-trying Farina urged his Alfa ahead of Caracciola for a few laps, but there was no catching Lang and the Italian machine wilted under the strain anyway. Many of them did in the sweltering heat – only 12 of the 30 starters finished.

Almost inevitably, two of those were the new Mercedes. After the pitstops Lang completed his Tripoli hat-trick at an average speed less than 5mph down on his 1938 effort in the three-litre V12. To put the speed of the circuit into perspective, he completed the two-hour event at an average of just under 123mph, almost identical to Nico Rosberg's winning speed in this year's European GP at Baku.

Underlining the W165's superiority was that Caracciola, already past his considerable best, beat the leading red machine – Emilio Villorosi's Alfa – by more than four minutes.

Caracciola tried to run one of the cars at the 1946 Indianapolis 500, but that plan failed. The Tripoli one-two was thus the W165's only race appearance.

"There is no doubt the race was the greatest 1500cc race we have had for many years," reckoned *The Motor*, but in truth it had been a rout.

Once again, the Germans had put one over the Italians. ❧

ONE-HIT WONDER
1985RENAULT 5
MAXI TURBO

TAKING IT TO THE MAXI

The ultimate evolution of the Renault 5 Turbo took its one and only triumph on the dry roads of Corsica

By David Evans, Rallies Editor

[@daveevansrally](#)

Jean Ragnotti is Renault in rallying. The mop of thick black hair has thinned down the years, but the enthusiasm remains. And every time he fires up a 5 Maxi Turbo, 'Jeannot' can't help but grin.

This was the one. And it was just one. One win: the 1985 Tour de Corse.

Unfortunately for Ragnotti, that event will forever be remembered as the rally that claimed the life of Attilio Bettega, after the Italian lost control of his Lancia 037 on a fast, fourth-stage right-hander and clattered into the trees on the outside. He died instantly.

The event continued with a field weakened by the withdrawal of the Turinese firm's sister cars, driven by Markku Alen and Miki Biasion.

Corsica was Renault's only factory outing in 1985 and it was keen to capitalise on the pace the car had shown on French national events. The predecessor, the 5 Turbo, was

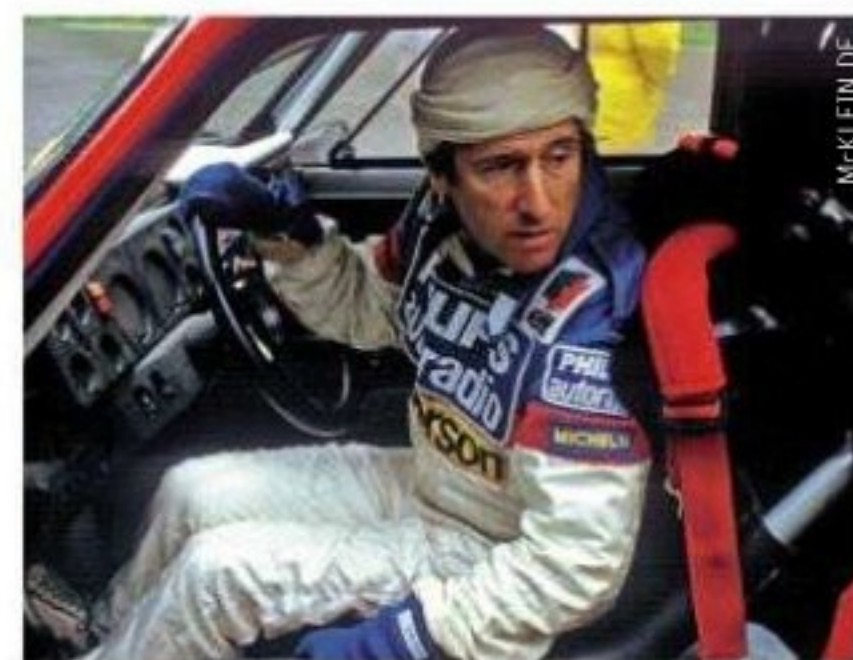
a car with undoubted asphalt pedigree – Ragnotti used one to win in Monte Carlo in 1981 and Corsica a year later.

The onset of Group B had, however, raised the stakes above and beyond the 250bhp the 5 had on tap. Recognising the struggle it was about to face, Renault went back to the drawing board and came up with a cunning plan.

Increasing the capacity of the mid-mounted motor from its Group 4 1397cc trim to 1527cc moved it into the two-litre homologation class, once the forced induction from the whopping Garrett blower was taken into consideration.

That made a world of difference. It meant the car could run in much wider trim, with wider tyres, more front and rear aero and the opportunity to overhaul the front suspension geometry. All of this combined to make the Renault 5 Maxi Turbo a much more compelling force in Group B.

"When you were driving the Turbo," says Ragnotti, "all the time



you were a little bit like this..."

What follows is a Frenchman waving his arms around and wiggling his rear while wearing a rather apprehensive look on his face. The 5 always was a bit nervous.

"The Maxi was more easy," he adds of the ultimate, more powerful evolution. "You knew where it was going."

And he certainly knew where it was going on a flat-chat run around Corsica in 1985.

At the conclusion of what was a tragic opening leg, the Maxi Turbo was already more than six minutes ahead.

The opposition was falling like flies on the season's most demanding asphalt encounter. Walter Rohrl's Audi Quattro didn't make it to the second stage. Shattering its brake discs at the end of the opener, the German firm decided pursuing this event might not be the safe option. After a sublime debut for Peugeot's 205 at this rally 12 months earlier, there had been high hopes for the T16. Ari Vatanen suffered a brace of early punctures, then went off, while his team-mates Timo Salonen and Bernard Darniche were ruled out with an electrical problem and broken fuel pumps respectively.

Running as the sole Renault factory entry, Ragnotti was supported by a couple of semi-works cars for Didier



Almost 400bhp was deployed though the 5's fat rear Michelins

WHY WE CHOSE IT

Audi, Lancia and Peugeot were the Group B benchmarks, but it's worth remembering Renault managed what Ford and MG Rover could not: win. And it did so with rear-wheel drive

Kevin Turner

“Renault’s temperamental beast delivered a near-faultless, dominant performance in Corsica”



Renault 5 Maxi was uncatchable on Corsica's asphalt

Auriol and Francois Chatriot. Or he was for a while. Chatriot's Maxi stopped with an engine problem and Auriol's car caught fire.

Ragnotti, however, kept on pushing. In the dry, nothing and nobody could touch the Maxi with its vast quantities of torque and close to 400bhp running through its sticky, fat Michelin rears.

Bruno Saby's 205 T16 E2 was the only remaining four-wheel-drive Group B car in the top 10, but by the finish the second-placed Frenchman trailed his countryman by more than 12 minutes.

Against the odds, Renault's often troublesome and temperamental beast

delivered a near-faultless and dominant performance.

More than 30 years on and Renault's definitely got the Maxi sussed. Year on year, it makes an annual pilgrimage to Goodwood's Festival of Speed where 'Jeannot' fizzes up the hill on full boost and full beans.

"I love it," he says, "driving this car takes me back to that time and that win."

Unfortunately for Renault, it was just that one victory for the Maxi. As Group B progressed, total traction – even on bone-dry asphalt – took over and the Renault rear-drive rocket's time was done. ❄

DRIVING ONE-HIT WONDER: FRANCOIS DUVAL

FRANCOIS DUVAL HAD THE WORLD AT HIS FEET AS THE 2004 season drew to a close. But the decision he took in the autumn of that year cemented his place on this page rather than rewriting a chapter in the sport's history.

In 2004, Duval was the one everybody wanted. He was the youngster on the verge of greatness. Having spent two years at Ford, the Belgian was afforded the luxury of learning his craft alongside such greats as Colin McRae and Carlos Sainz. And when those two moved to Citroen, Duval stepped up to the sharp end of Malcolm Wilson's operation, where he joined Markko Martin.

For two years, Duval got quicker and closer to victory – which is how he was offered a four-year deal by Wilson to stay at Ford. The Cumbrian was quite clear: 'Stick with me and we'll be world champions together.'

But no. Instead, he signed the other contract. The one on Citroen-headed paper. Forsaking four years of stability in a Focus, he saw his chance to shoot for the star. The star being Sebastien Loeb.

This was back in the day when Loeb only had the one world title and some saw what they thought were chinks in the Alsatian armour. Duval was one of those. He was confident he could go to Seb's team and topple him.

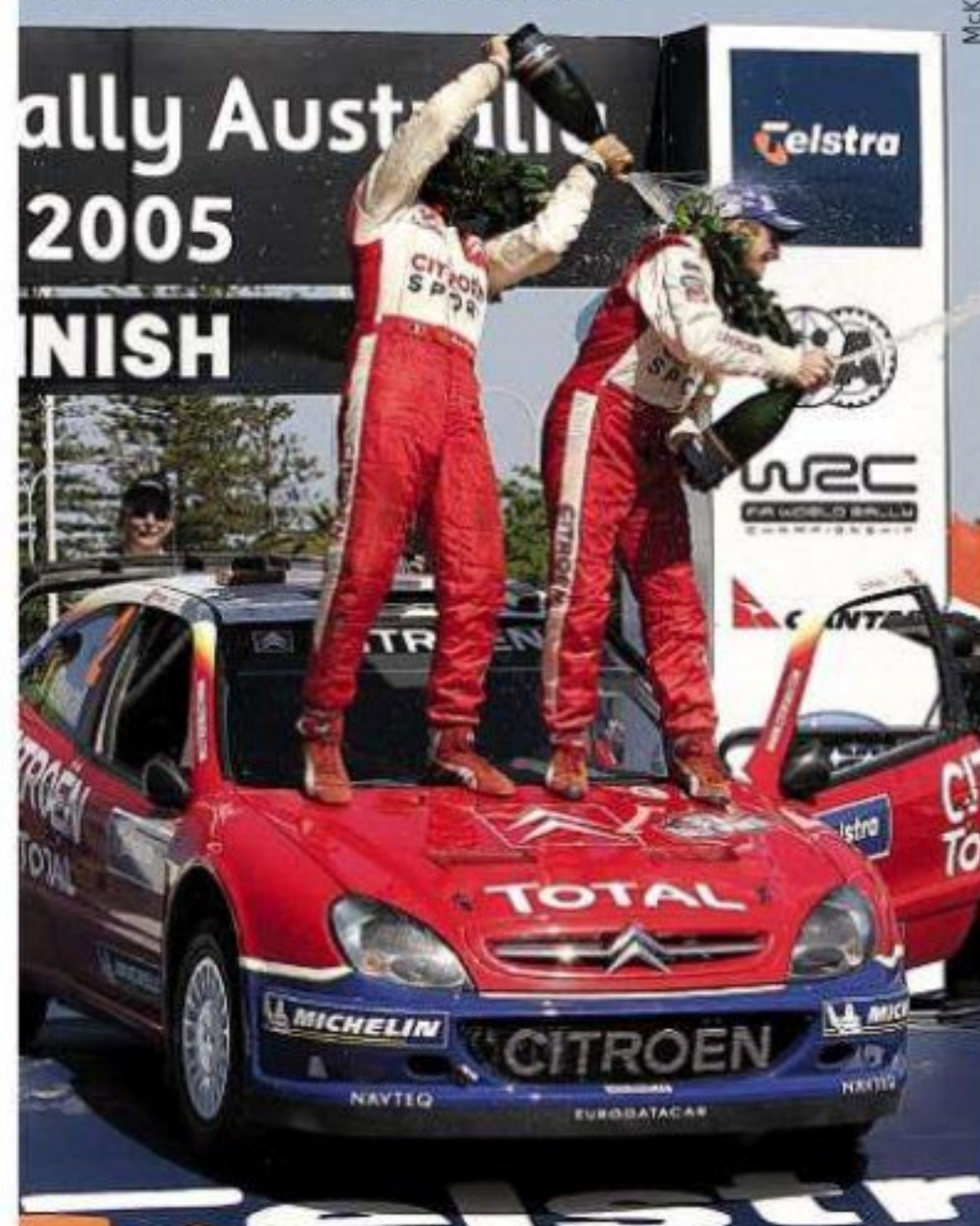
How wrong he was.

He crashed, then struggled to find his feet in the Xsara. Then he crashed again. Going off the road in Cyprus was too much for team principal Guy Frequelien, who benched him for the next two rounds.

When he came back, his attitude was considerably different. Loeb had another title virtually won and Duval accepted his place as number two. He wasn't about to be asked back for another year, so the 2005 finale in Australia was an uneasy swansong for the partnership. And, against all expectations, he won. Loeb crashed into a tree, Petter Solberg crashed into a kangaroo and that left Duval out in front for his one and only world championship win.

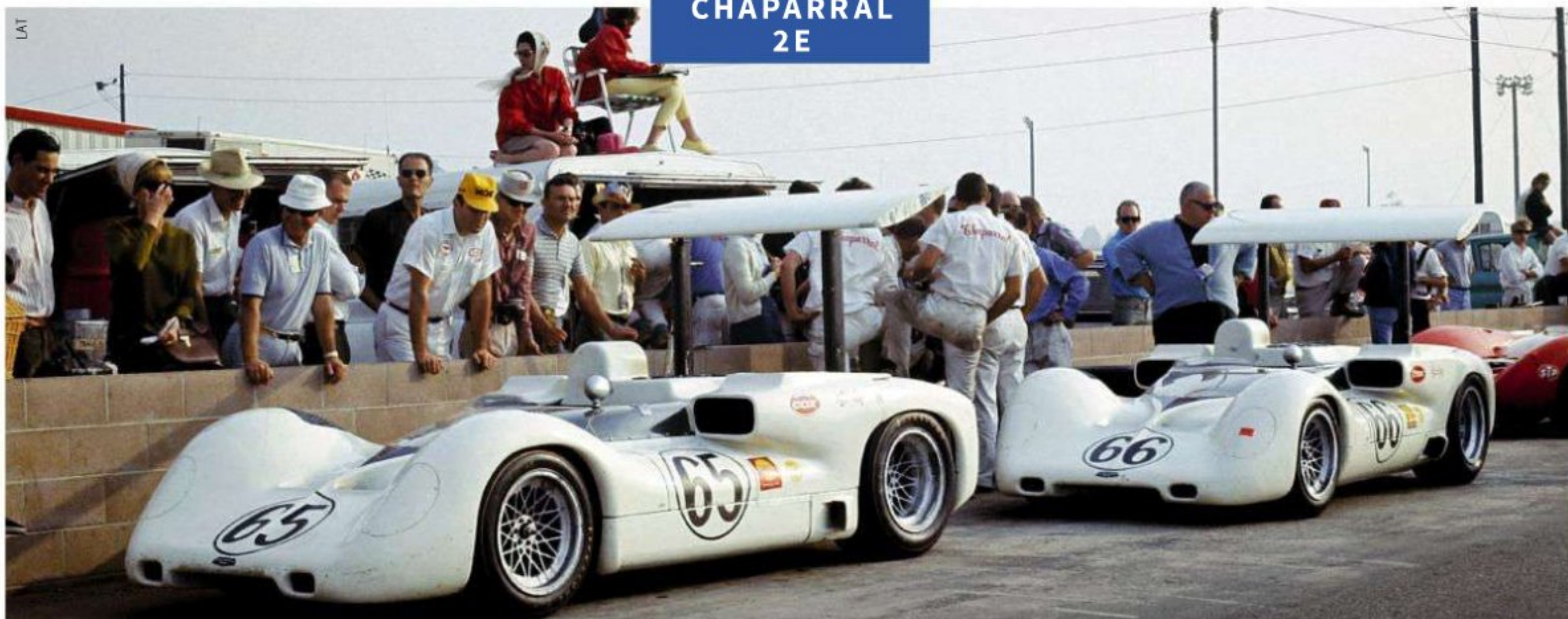
Standing in the queue at Perth airport at the start of the long trip home, Duval conceded for the first time that he might have backed the wrong horse.

Duval's Oz victory for Citroen in 2005 was his only triumph in a fraught year



ONE-HIT WONDER
1966

CHAPARRAL
2E



WINGED WONDERS FROM THE WEST

Chaparral's 2E was revolutionary, but not the game-changer it should have been

By Paul Fearnley

🐦 @paulpunter

Fifty years ago, the sands of motor racing time paused amid the sand hills of Long Island. Then reset. For its final parameter had arrived, in the startling shape of Chaparral 2E.

Chaparral's owner/designer/driver Jim Hall dressed, and walked and talked, like a cowboy – but possessed a 10-gallon talent. Independently wealthy and minded, geographically and personally remote, his blend of Caltech engineering degree and hot-rodder's ingenuity – in conjunction with a private pilot's licence – generated the perfect performance storm.

His super-successful 2A of 1963-65 had already pushed the envelope in terms of: aerodynamics – bibs, dams, ducts, fins and flaps; chassis construction – aerospace reinforced glassfibre; data-acquisition – cables attached to pencils on graphs, reel-to-reel tape; drivetrain – hydraulic torque converter mated to single-speed transaxle; and tyres – softer compounds, stiffer constructions and

a doubling of the footprint, all within 18 months of testing for Firestone.

But then, in September 1966, his new car was unveiled. Ivory white, shrink-wrapped and pretty despite being crammed with science and boasting a skyscraper rear wing, 2E was a synthesis of everything he had learned – and all that his rivals had yet to come fully to grips with. Future grand prix driver Howden Ganley, then a mechanic for Bruce McLaren, noted that every other car became obsolete the moment Chaparral swept into Bridgehampton for round two of the inaugural Canadian-American Challenge Cup.

The accompanying rumour of back-door involvement by General Motors was true: 2E's aluminium Chevy 'small block' V8, limited to 5354cc (450bhp on carbs) because of iron liners but 150lb lighter, was a perk unavailable to others. Ideas and info, bits and pieces had for several years been swapped between Frank Winchell's GM R&D skunk works in Motown and Chaparral's private Rattlesnake Raceway in scrubland south of Midland, TX. Yet team newcomer Phil Hill had no clue

Hill's and Hall's 2Es before the 1966 Los Angeles Grand Prix at Riverside. Both cars would suffer from fuel vaporisation in the race

that Chaparral might be a front. For this was Hall's show. And Hill was in thrall to the advantages of his 2E.

Snicking its dog-clutch 'box, a prototype Chevrolet item, into the first of three ratios – those wider tyres could no longer be spun at will to alter the gearing – only then was the engine fired and foot brake released. The converter provided an initial disconcerting feeling of slip – 2E lacked bite off the line – but thereafter allowed for the two-pedal balancing act recognisable from today's Formula 1. Otherwise shifting normally through an H-pattern (with reverse), lifting or blipping through neutral, the driver was able to massage 2E's attitude, minimise unsettling load transfers, with his left foot, on either the brake pedal – a metal shield separated it from the accelerator – or adjustable rear wing.

Chaparral 2C, seen briefly in late 1965, had featured a full-width low-mounted wing that could be trimmed hydraulically via a third pedal/footrest. Its direct connection to the bodywork, however, caused the nose to lift and the outside rear to crush its bump rubbers.



CHAPARRAL'S EUROPEAN ONE-HIT WONDERS

CHAPARRAL CARS INC SPREAD itself thinly in 1966 by also contesting the International Manufacturers' Championship with coupe versions of its 2As.

Co-driven by Phil Hill and Jo Bonnier, 2D qualified second and led the opening lap of the Daytona 24 Hours but retired after 318 laps. Two cars also retired in the Sebring 12 Hours.

A single-care effort at Le Mans resulted in disappointment, but it won the Nurburgring 1000km. Hill, again co-driven by Bonnier, was holding a four-minute lead

when rain began to fall in the closing stages. The team gambled by carving wide drains in the ineffective Firestone wets and he rejoined still leading.

Conditions became so bad Hill had to lean through an open gully to wipe mud from the screen after the wipers failed.

The high-winged 2F would also take a single major victory the following year, Hill and Mike Spence triumphing in the six-hour race at Brands Hatch, the car's final big outing before rule changes made it obsolete.

"The dare-to-be-different 2E was the quintessential Can-Am car"

Hall compensated with stiffer springs but disliked the unyielding ride.

As a result, 2E's wing was mounted higher, in cleaner air, and was connected to the hubs so as not to adversely affect the sprung element and allow for more compliant suspension. Its default position, with the driver busy on the brakes, was 'high downforce': an incidence of 17-18 degrees. On the straights, the third pedal was depressed to feather it for 'low drag': at 4-5 degrees.

Simultaneously, to better balance downforce – 240lb rear, 160lb front at 100mph – an aerofoil-shaped damper closed the venturi that channelled air under, up and through a nose section voided by relocating radiators and coolers to the car's hips; it reopened automatically when the driver moved to brake. Perforations in the bodywork above the front wheels also reduced pressure beneath the car.

Hill reckoned the wings wiped off 25mph and that 2E could outbrake all rivals while maintaining a shallower line that enabled it to drive underneath before getting on the power earlier.

With its dare-to-be-different approach – moonshot confidence with a happy dash of hippy innocence – it was the quintessential Can-Am car: no maximum capacity, no minimum weight – hell, yeah! And, as 'America's Team', Chaparral caught the public imagination.

Yet 2E won just once. (OK, twice if you include a minor score at Nassau Speedweek in December 1966.)

The team scratched before the opening Can-Am round after a wing strut broke on the long tow north to

Quebec's St Jovite. It failed again in practice at Bridgehampton. Twice. The first cut a tyre and caused Hill a big crash; his spotting the wing's collapsing shadow in the afternoon sun forewarned him of a second. Hall set fastest practice time – 6.6 seconds better than his previous best – but ceded to Hill, who chased the winning Lola-Ford of Dan Gurney for 150 (of 200) miles before the wing jammed in high-downforce mode and dragged him back to fourth.

Hall set the practice pace at Mosport, too, but he and Hill were hampered by problems. 2E featured 2C's aluminium semi-monocoque, which was narrower, shorter and simpler than its thermoplastic predecessor. The suspension was also unremarkable, as were the brakes: outboard solid discs by Girling. The latter took a pounding with left-foot braking and, despite lace-spoke cast-magnesium wheels and air-braking, would often cook. The novel side radiators and coolers improved weight distribution, traction and cockpit comfort, but tight packaging also caused heat retention.

Hall retired early at Mosport because of engine failure, while Hill nursed his car, oil pressure fluctuating, to a distant second. Later, in the Californian heat of Riverside, fuel vaporisation blighted both: Hill retired – but Hall, using top gear only, battled John Surtees' Lola T70 for the lead. They passed and repassed six times until the Chaparral's problem worsened and it fell back.

Between times, the Texan 'Road Runners' had run away with it at Laguna Seca. Wing widened and fitted with



Chaparrals chase winner Donohue's Lola at Mosport

WHY WE CHOSE IT

Chaparral's innovations are sometimes overlooked in Europe.

The 2E is less well-known than the 2D and 2F but was arguably more important, so gets our nod here.

Kevin Turner

endplates for this twisty 1.9-mile circuit, Hall beat Hill to pole by nine-hundredths – but followed him home in the first 53-lap heat. They finished the second in the same order, albeit behind the Lola of Parnelli Jones, who posed no threat for aggregate victory because of an earlier retirement.

Hill, who had topped the points after Laguna, arrived at the finale at Stardust Raceway in Las Vegas holding the joint championship lead with Surtees. And when he lined up alongside Hall on the front row, the stage seemed set.

But the Chaparrals would be left in the wings again: Hall retired when his actuator failed, but Hill, who sustained frontal damage in an early tangle with Jones, persisted after a long stop to replace his broken wing with a spacer (with spoiler). After another collision, this time with Norm Smith's Lola, he finished out of the points in seventh.

But the genius of 2E – and Hall – lay in the fact that not winning didn't seem to matter so much. This car was his favourite – "Easy to drive and set up, predictable and as fast as hell!" – and that was fine by him. ✽

ONE-HIT WONDER
1994

MERCEDES
500I TURBO

THE SECRET THAT STORMED INDY

The Penske PC23 was already a successful car, but it turned into an icon when it got a special engine for America's biggest race

By Bruce Martin, IndyCar Correspondent

[@BruceMartin_500](#)

WHY WE CHOSE IT

Keeping a secret this big is pretty impressive and the result was spectacular. With such an advantage it was inevitable the 500I would be banned.

Kevin Turner



More than two decades after Penske dominated the 1994 Indianapolis 500, they still talk about “The Beast”.

It was a 209-cubic-inch engine developed by Ilmor, badged by Mercedes-Benz and built by Penske Racing in such secrecy that team members not involved in the project had no idea what was going on.

Team owner Roger Penske decided to exploit a rule in the United States Auto Club (USAC) rulebook for the Indy 500 that gave pushrod engines 55 inches of turbocharger boost pressure instead of the 45 inches of boost for the overhead-cam engines that every team used in CART competition.

Team owner John Menard took advantage of this rule by using the Buick ‘stock block’ engine throughout the ‘80s and ‘90s. The Buicks had great speed and took pole at Indy in 1985 and ‘92 (and would again in 1995-96), but they rarely lasted the distance on race day.

In 1993, Penske met with Ilmor’s Paul Morgan and Mario Illien, telling both about his grand idea. Illien assured him he could design an engine and the secret 500I project began. The ‘unfair advantage’ would be pursued.

Back then, Chuck Sprague was the general manager, Clive Howell the team manager and Karl Kainhofer — one of Penske’s first employees — the director of the engine and dyno department. They put together a secret team that set up an engine shop in a Penske Truck Rental warehouse, away from the race team. They would start once the people working the day shift had left, working through the night and disappearing without a trace by 7am.

The race came down to a straight battle between Unser and Fittipaldi. Unser won



“It wasn’t until a very short time before the Indianapolis 500 we actually did 500 miles at Michigan during a test. That was a huge relief”

“It was kept secret for quite a while,” recalls current Penske team manager Jon Bouslog. “Nobody knew what was going on. When you came in the next day at the engine shop it was like a normal day. There were no extra parts lying around. There were no signs of any overnight activity. They did a very good job of making sure nobody knew.”

When the time was right, Mark Swavely was brought in to develop special pieces for the engine.

“The development curve was steep,” Swavely says. “We would build an engine, dyno-test it through the night, disassemble the engine in the daytime, communicate back to Ilmor and develop that engine over the phone. We flew parts back and forth. A lot of times, we bought seats on Concorde to get pistons and other engine parts to the shop from England.

“My speciality was the valve followers and the arrangement with the pushrods and the rockers. It involved many, many needle bearings to take all the friction out of that assembly.

“The pushrods were 6-8 inches where a standard pushrod is 12 inches long.”

When it was finally time to reveal the engine, Penske flew in and called the team together. Engineer Nigel Beresford recalled that conversation.

“Roger gathered everybody together in the small dining area and talked about the importance of maintaining the secret,” Beresford said. “He warned everyone that if the secret got out then it would be like ‘cutting your pay cheque in half’ – everyone would stand to benefit if the project was a success (ie we won Indy) but we would all lose a lot if it got banned.”

Of course, during the short development phase there were problems. The engines had trouble synching the



triggers and often would not start. The initial tests were held in the cold, icy conditions of winter. Ice scrapers and snowplows had to clean the track before Paul Tracy could test the engine in sub-freezing conditions at Nazareth Speedway. Often, the engine would blow up after six or seven laps.

“It wasn’t until a very short time before the Indianapolis 500 we actually did 500 miles at Michigan during a test,” Bouslog says. “That was a huge relief.”

When the team arrived at Indianapolis, Penske urged his drivers not to unleash the full potential of the

“The Beast” didn’t have a long career, but made an unforgettable impact at Indy

engines out of fear of being pegged back for the race. But the competition knew if the engine did not break, the other 30 drivers had no chance against the Penske trio of two-time Indy 500 winner Emerson Fittipaldi, 1992 winner Al Unser Jr, and Tracy.

“They used to give us reports that had the trap speeds of each car at certain points of the track,” says Bouslog. “I remember looking at the times and you would see 238mph, 235, 237, 234. Then one of our cars would go by and you would see 255. When everybody saw that, their eyes popped out.”

The three drivers had to be delicate with the engine, however, because it produced well over 1000 horsepower – nearly 200bhp more than the other engines.

“Our reliability during the month of May was remarkable,” says Swavely. “The one sensitive thing about this engine is it had a lot of torque and if a driver wasn’t anticipating that he could break the tyres loose and over-rev the engine very quickly.”

Penske also discovered during practice that its tyres were turning on the wheel rims during a run, which caused a handling imbalance. With the help of a local sandblasting facility, the team applied coarse masking strips to the wheels and tyres to increase the strength of the bond and prevent the tyre-slip.

The race was no contest from the green flag as Fittipaldi and Unser charged away at the front, with Tracy starting in the pack due to a crash in practice before retiring with turbocharger failure.

Fittipaldi was cruising to victory when he decided to pass Unser with 16 laps to go to put his team-mate one lap down. That proved costly as he lost control coming out of Turn 4 and crashed into the wall. Unser went on to win the race, with only rookie Jacques Villeneuve remaining on the lead lap.

A few months after this spectacular success, USAC changed the rules, effectively outlawing the engine for the 1995 Indy 500 – a race Penske would remarkably fail to qualify for.

“They reduced boost by five or six inches [and with it, horsepower] the next week, then the next week they outlawed the engine,” Penske said. “If you do too well, typical, you get slapped.”

The Mercedes 209-cubic-inch engine became one of the greatest one-offs in the colourful history of the Indy 500. Even Andy Granatelli’s famed STP-Turbine engine competed in two Indy 500s in 1967 and ’68 before it was banned.

Turbocharged engines were outlawed when the Indy Racing League’s new rules package came in for 1997, and loopholes like the one exploited by Penske in ’94 have not featured since. ❄

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THE ULTIMATE REVIEW OF 2016

Whilst rival F1 annuals come and go, AUTOCOURSE - The World's Leading Grand Prix Annual - is proud to have reached its 66th year of publication as the indisputable leader in its field.

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

The 2016 season once more saw the continuing domination of Mercedes-Benz as a championship-winning force, as Lewis Hamilton and Nico Rosberg took their world Championship battle to the final round of a marathon season.

As ever, politics cast a long shadow over the sport, and the many crises that erupted throughout the year are assessed, along with the implications for the future well-being of Formula 1.

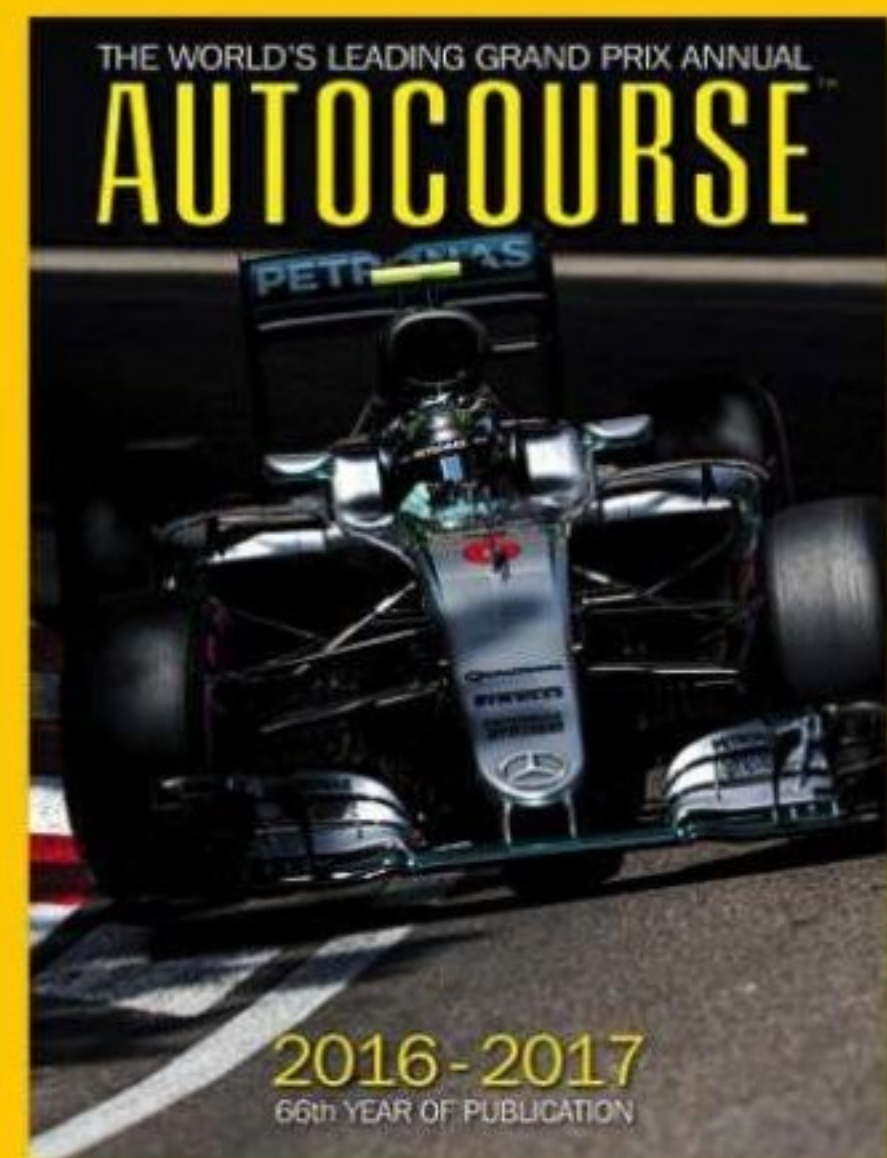
Mark Hughes once more analyses the successes, frustrations and failures of each of the constructors in his Team-by-Team review, which includes key personnel, sponsors and technical specifications of the F1 cars, highlighted by the specially commissioned F1 car illustrations of Adrian Dean.

The sport's other leading categories are also given ample coverage, including the single-seat ladder from Formula 3 up to GP2, which showcases the pool of rising talent, all aiming to make their way into Formula 1.

Also described is the continuing rise of Formula E, sports car racing with Audi's battle against Porsche and Toyota for the World Endurance Championship, and the typical door-banging combat that is Touring Cars, in all their respective categories. Veteran scribe Gordon Kirby gives his usual no-holds-barred assessment of the racing year in the United States.

AUTOCOURSE traditionally wraps up the year with the most complete record of results published anywhere in a single volume.

With a whopping 408 pages, this lavish yearbook - the largest ever - is essential reading for all fans of global motor-sport.



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ONE-HIT WONDER
1997

CHEVROLET
MONTE CARLO

THE DAY T-REX ATE NASCAR

It only appeared once, but the car Jeff Gordon used to win the 1997 All Star Race made a big impression. And, he says, was never actually banned

By Jack Benyon, Group National Editor

[@Benyon24](#)



T-Rex acted as a test-bed for future race cars

NASCAR is full of stories about controversial cars that pushed the boundaries and shook the regulations, none more so than Hendrick Motorsports' Chevrolet Monte Carlo built for the 1997 All Star Race. In the hands of Jeff Gordon, it romped to win the race – called 'The Winston' – and the \$1million prize.

Rumours spread months before the event that the Hendrick team was building something special. A T-Rex.

That's what it was christened, thanks to an engineer named Rex Stump and a one-off sponsorship with the movie *The Lost World: Jurassic Park*, which adorned the car and Gordon's overalls.

Since bursting onto the scene in 1993, Gordon, along with Hendrick and crew chief Ray Evernham, had pioneered professionalism in NASCAR. Hendrick

wanted to build the best and fastest car it could possibly build.

"What I remember is a lot of buzz and excitement about a new car that had a lot of innovative features," explains Gordon. "Different from how we had built cars in the past. It wasn't extreme or crazy, it was just trying to package everything in a better way and to create more speed."

The event went down in folklore. The pace of the car wasn't shown as Gordon fluffed the qualifying run, but all eyes were on the T-Rex as it carved through each segment of the race, passing cars on every part of Charlotte Motor Speedway. The event had a final 10-lap shootout to decide the winner, where – as soon as he had the lead – Gordon drove off into the distance to take the jackpot.

Supposedly – as was reported in the media – NASCAR banned the car from returning but, as Gordon tells Autosport, that wasn't strictly true.

"NASCAR definitely saw some

WHY WE CHOSE IT

NASCAR isn't known for its technical innovation, but pushing the boundaries of what is acceptable is still part of the game. T-Rex is perhaps the most famous of NASCAR's recent 'specials'.
Kevin Turner

things they weren't crazy about," he explains. "They wanted some changes, and we did that."

"But we could only run this car at the All Star Race. There were certain things that weren't practical for a normal race weekend. So it really was a test car and if it showed speed we'd try to implement some of the ideas into our normal race cars. We went and won 13 races in 1998 with basically what was the T-Rex car and the implementations we'd made on it."

The car featured some developments not suitable for a 400-500-lap standard NASCAR race. To change gears, you had to remove the rear end of the car because of where the fuel tank was situated. The car was built with the aim of winning the Winston and developing parts to see what could work.

"It stands out a lot because I'm constantly reminded about that car!" adds Gordon. "When I'm signing a diecast model for a fan, they often ask, 'What about that T-Rex car?'"

Where do F1 teams get their money from?

On the surface, Formula 1's global revenues are on an upward trajectory: the recent Liberty Media deal placed an enterprise value of \$8 billion (£6.15bn) on the sport via 2015 annual revenues of around \$1.8bn/£1.39bn. Of that, 10 teams shared approximately half (though it wasn't divided equally); their collective slice amounts to \$883million/£680m, paid in 10 monthly instalments during 2016.

The Liberty transaction should result in the US-based, NASDAQ-listed entity with interests in sport, events and media acquiring control of F1's commercial rights after completing the second phase of a stock-purchase agreement by mid-2017. But the bullishness surrounding the deal deftly camouflages real concerns about F1's sustainability unless it moves away from a creaking business model still rooted in the 1980s.

The fact is that television eyeballs, and, by extension, the ability of teams to attract meaningful sponsorship are plunging (30% over five years). At the same time F1's calendar doggedly hiccups at the 20/21-race mark despite talk of 25 fixtures. In addition, there is increasing pushback from promoters over their hosting fees-versus-income equations.

That Sauber, a team with a long F1 history stretching back to 1993, was pushed to the brink before being saved by wealthy benefactors is indicative of F1's malaise. Unless Liberty pushes through swingeing changes this situation is expected to deteriorate through to 2020, when the current team agreements expire.

In certain instances, Brexit has hit F1 as hard as it has the real world. In others, though, the teams (and Formula One Management) benefited enormously, particularly in terms of dollar-derived income, despite euro-invoiced expenditure for items such as engines and tyres increasing markedly.

Indeed, much of the black ink that replaced 2015's red numbers in team balance sheets can be attributed to the favourable dollar-to-pound exchange rate. It even prompted the tongue-in-cheek comment from Red Bull Racing boss Christian Horner that "Brexit was probably our biggest sponsor..."

It's not all doom and gloom. Renault's desire to re-establish itself as an F1 team owner rather than continue solely as an

engine supplier gave grids a welcome French flair, while the arrival of Gene Haas with his eponymous team not only boosted entries, but built the F1 brand in the world's largest market, the USA.

Then, during 2016, Heineken entered F1 as event and signage partner with plans to boost awareness via social media and marketing campaigns aimed at the younger audiences the sport so desperately needs to attract.

For further signs that F1 continues to enjoy a robust global following, look no further than the frenzy created by Nico Rosberg's retirement within a week of lifting the title. If ever proof were needed that F1 has not lost its media relevance, that snippet of bad news provided it.

Methodology

Since eight out of the 11 teams are based in Britain, Companies House filings facilitate financial comparisons between UK-domiciled operations. In addition, the race-team arm of Haas is based in England, providing a glimpse of the US team's operations.

But such accounts are at least nine months in arrears. So this information is supplemented by interviews, analysis and educated estimates. Various sources were consulted and cross-referenced, including filings, known variables, informed assumptions and inside information. The same methodology was applied for non-UK-domiciled operations.

Development costs ahead of major technical changes for 2017 were incurred during the current season, and these have been widely estimated by team bosses to have inflated budgets and headcount levels by approximately 5% over 2015.

Autosport's 'Bang-for-Buck' (B4B) table, whereby team budgets – excluding engine divisions – are divided by championship advances made by teams over the season has been revised to provide a more accurate index. Less is more – and this proves it (see [page 33](#)).

It's important to note that our analysis focuses on 2016 team budgets, and not 2015 financial filings. So considerable differences between the two sets of numbers may exist.

Budgets exclude engine divisions where applicable, with assumption made that the FIA's guideline charge of £18m for an annual two-car supply is applied internally.

Currencies have been converted from euros (Ferrari/Toro Rosso), Swiss francs (Sauber) and US dollars (FOM, plus team sponsor contracts) to sterling.

Rates: £1=€1.20/\$Fr1.30/\$1.30 >>



The £1,720,000,000 question

Our annual study of Formula 1 team budgets reveals that despite income struggles, the teams have been spending more in 2016 than they did in 2015

By Dieter Rencken, Special Contributor

🐦 @RacingLines





MERCEDES GRAND PRIX

BRACKLEY, BRITAIN | GERMAN CONTROL

2016 BUDGET MGP £265m (excluding engines)

2016 INCOME £265m

● £50m Daimler | ● £82m sponsors | ● £133m FOM 2015
(including £56.5m bonus)



EMPLOYEES

850

(excluding High Performance Powertrains, 450 estimated)



2016 PROFIT / LOSS

break even

(after £50m underwrite by Daimler)

DAIMLER'S F1 ACTIVITIES ARE SPLIT INTO TWO SEPARATE UNITS: Mercedes Grand Prix (race operations) and High Performance Powertrains (engines), which operate autonomously. The former is held 60/30/10 by Daimler, team boss/director Toto Wolff and non-executive chairman Niki Lauda.

While headcounts and average salaries increased after 2015's title, sponsor/FOM incomes followed suit, including double-championship bonuses worth approximately £30m. That enabled Daimler's contribution, in effect viewed as a global advertising expense by the car maker, to reduce.

No significant sponsor deals were announced this year, with Petronas remaining as title backer in exchange for naming rights and technical support believed to amount to £35m.

A worry, though, is the number of key contracts expiring by the end of 2018. These include those of Wolff, Lauda and Lewis Hamilton, while Paddy Lowe is already off to Williams. World champion Nico Rosberg retired immediately, so the team faces potential disruption.

Motorsport director Toto Wolff

“In Formula 1 there are a number of key factors: drivers, chassis, power unit, the right technology, the necessary budget and the best people. You need to make the right decisions in these areas and make sure they are aligned”

RED BULL RACING

MILTON KEYNES, BRITAIN | AUSTRIAN-OWNED

2016 BUDGET £215m

2016 INCOME £220m

● £55m RB | ● £55m sponsors | ● £110m FOM 2015
(including £56.6m bonus)



EMPLOYEES

740

(purified figure)



2016 PROFIT / LOSS

profit £5m

(after £55m underwrite by Red Bull)

RED BULL'S UK-BASED operation draws on two interlinked companies: Red Bull Technology, which produces cars for Red Bull Racing, the race-team management entity. RBT also provides gearbox/hydraulics/other permitted technologies to Scuderia Toro Rosso and various services to other group companies, so RBR's purified budget is £215m.

Despite being an engine customer – it uses Renault power units, albeit badged 'TAG Heuer' – RBR continues to hold its own against manufacturer operations, mainly on account of tight commercial controls that direct the sport's third-

largest budget towards crucial areas: chassis design and racing operations.

During 2016 the team, which earns most of its revenues in dollars (FOM) and euros (sponsors), lost title sponsor Infiniti to Renault. This was largely offset by TAG Heuer income and the effect of Brexit on the dollar exchange rate. Thus the parent company was able to reduce its support.

For the rest it was, though, pretty much a 'straightlining season', with budgets and incomes broadly remaining at 2015 levels bar incremental '17 development costs – yet the team won two grands prix.





Team principal Christian Horner

“Year on year it’s been fairly consistent, and once again we expect to turn a modest profit through our tight financial controls”



FERRARI

MARANELLO, ITALY

2016 BUDGET £330m (including engines; estimated £225m without)

2016 INCOME £300m

● £150m sponsors (including Fiat/Ferrari) | ● £150m FOM 2015 (including £80m bonus)



EMPLOYEES

900
estimated

(excluding engine operation, estimated 400)



2016 PROFIT / LOSS

break even

(after Group contributions)

FERRARI IS UNIQUE IN PRODUCING ITS ENTIRE CAR WITHIN ONE complex. It does so by sharing facilities with its road-car operation, which supports Gestione Sportiva in lieu of advertising. This complicates things since accurate revenues/profits for the F1 operation are not available, and the October 2015 New York Stock Exchange IPO has served to provide further excuses not to provide numbers for ‘fear’ of insider trading...

On the revenue front, the team benefits from the largest share of FOM’s revenues – raking in almost a quarter of FOM’s team ‘pot’ – with Shell, Santander and UPS complementing the £75m provided by Philip Morris in exchange for nominating the cars’ hue and exploiting the team for promotional purposes.

Despite having the largest headcount, the biggest overall budget and two world champions aboard, Ferrari placed third after failing to win a race. Indeed, had Williams and McLaren not punched markedly below their weights, Ferrari could well have finished fifth, which should surely alarm investors – the share price has already proved jittery for a protracted period between March and May.

President Sergio Marchionne

“I’m going to tell you something honestly: I’ve thrown all the money I’d like to throw at [the F1 team]. We need to use that funding better”

FORMULA 1/TEAM BUDGETS



FORCE INDIA

SILVERSTONE, BRITAIN | INDIAN-OWNED

2016 BUDGET £90m

2016 INCOME £90m

● £30m sponsors | ● £10m other (including shareholder/driver-linked income) | ● £50m FOM 2015



DESPITE ITS MINUSCULE BUDGETS, FORCE INDIA HAS INCHED forward year by year since 2007 to sit one place behind Ferrari on a budget a third of the size of the Scuderia's. It wins the B4B contest hands down.

Sponsors and Sergio Perez's Mexican backers contribute to the £30m commercial portfolio, with companies owned by patron Vijay Mallya making up the bulk of the rest. FOM income accounts for 50% of the budget even though the team receives no bonuses.

The effects of Brexit on the exchange rate assisted Force India in breaking even for the first time since Mallya acquired control in 2007, which is good news indeed for the beleaguered liquor tycoon.

McLAREN RACING

WOKING, BRITAIN

2016 BUDGET £185m

2016 INCOME £185m

● £120m sponsors (including £60m from Honda) | ● £65m FOM 2015 (including £25m bonus)



DESPITE DISAPPOINTING on-track performances since 2012, the strength of the McLaren brand (and the support of associate companies such as McLaren Automotive/McLaren Applied Technologies), beneficial FOM bonuses and the depth of Honda's pockets have carried the struggling team through lean times. Its base 2015 FOM revenues (pre-bonus) were lower even than Sauber's...

The budget is split approximately one-third each between Honda contributions, FOM revenues and commercial

income (Mobil/Johnnie Walker/Chandon), with a variety of 'smaller' names such as Hilton and KPMG further contributing to the bottom line.

The team lost TAG Heuer for this year and is losing ExxonMobil for 2017 – both to Red Bull. But the recent appointment of commercial guru Zak Brown as executive director, in the wake of Group CEO Ron Dennis not having his contract renewed, should be the catalyst for change at McLaren. First on Brown's to-do list will surely be the signing of title sponsorship.

Group COO Jonathan Neale

“2016 has been a very challenging 12 months, but I'm optimistic that, in terms of the brand strength and continued improvement of the team, we have everything we need to rebuild that confidence”



WILLIAMS F1

WANTAGE, BRITAIN | FRANKFURT STOCK EXCHANGE-LISTED

2016 BUDGET *£105m

2016 INCOME *£110m

● £50m sponsors | ● £60m FOM 2015 (including £7.5m bonus)





TORO ROSSO

FAENZA, ITALY | AUSTRIAN-OWNED

2016 BUDGET £100m



2016 INCOME £100m

● £40m Red Bull | ● £15m other | ● £45m FOM 2015



EMPLOYEES

350

(excluding High Performance Powertrains, 450 estimated)



2016 PROFIT / LOSS

break even

(including £27m underwrite by Red Bull)

COMMERCIALLY, 2016 PROVED MUCH THE SAME AS THE PREVIOUS year for Williams, with income and budgets remaining constant, although the team expects to turn a modest profit this year off the back of finishing third in the constructors' championship in 2015 – and the associated FOM income of £60m.

On the sponsor side, Martini and Rexona contributed half of the team's commercial income, with the balance sourced from a variety of backers. The team also benefited from a test programme with Lance Stroll, who steps up to a race seat in 2017, while R&D credits contributed to the revenue stream.

Clearly, 2016 on-track performance was disappointing, which will in turn impact on 2017's financials.

***Note** As a listed company Williams stresses that, for legal reasons, the info provided is indicative, and does not constitute forward projections.

CEO Mike O'Driscoll

“Although it's been a tougher year than we envisaged, we have continued to make good progress commercially and across the organisation as a whole”

TORO ROSSO EXISTS THE finishing school for Red Bull's cadre of development drivers and came of age with the elevations of Sebastian Vettel, Daniel Ricciardo and Max Verstappen to Red Bull Racing, boding well for Carlos Sainz. Daniil Kvyat's return coincided with the arrival of backing from the software firm Acronis as a replacement for lost Abu Dhabi funding.

The team's expanded Faenza base now runs to capacity, as

does the Bicester (UK) windtunnel. It operates on a break-even basis, being funded by FOM income (around 50% of budget), with the balance split between the parent company, commercial sponsors such as Casio (inherited when RBR went with TAG Heuer) and a variety of minor sponsors.

A return to Renault power in 2017 should deliver more grunt than the team's current old-spec Ferrari arrangement, further improving prospects.

Team principal Franz Tost

“We continue to support cost-saving initiatives that will enable us to further develop Red Bull's young drivers. We have also completed our Faenza expansion programme”

HAAS

KANNAPOLIS, USA/BANBURY, BRITAIN | US-OWNED

2016 BUDGET £100m



2016 INCOME £100m

● £90m Haas | ● £10m sponsors (No FOM payments – new team)



EMPLOYEES

210



2016 PROFIT / LOSS

break even

(including Haas underwrite)

AGAINST THE ODDS, NEWCOMER HAAS SCORED POINTS ON ITS debut, propelling it up the order and securing it an FOM contract and a slice of 2016's revenues – limited in value until the team finishes in the top 10 in the constructors' championship twice in three years to qualify for a larger share of the pot.

Haas operates to a unique model in that it sources technology (as permitted) from Ferrari, has its cars built by Dallara in Italy, and operates its race team out of a base in Banbury, UK. A complex arrangement, but thus far it works.

Team principal Gunther Steiner

“2016 enabled us to find our Formula 1 feet and in 2017 we intend to consolidate our place in the top 10 to ensure we qualify for the full spectrum of FOM revenues”



XPB IMAGES

RENAULT F1

WITNEY, BRITAIN | FRENCH-OWNED

2016 BUDGET £150m



2016 INCOME £150m

● £80m Renault | ● £25m sponsors | ● £45m FOM 2015



EMPLOYEES

570



2016 PROFIT / LOSS

break even

(excluding engine operations in Viry-Chatillon, France, estimated 400)

(including Renault underwrite)

RENAULT REACQUIRED ITS ailing former team, then set about returning it to health. Funding is derived from three sources: the main Renault company, which funds its motorsport division to the tune of £130m per annum across all categories, half of which is earmarked for F1; FOM income; and commercial/driver funding.

Sponsors such as Infiniti and Total contributed the bulk of commercial support, with drivers Kevin Magnussen and Jolyon Palmer believed to have provided further funding. But such is the magnitude of the task ahead that the team is not targeting podiums before 2018, which will impact on FOM revenues.

Managing director Cyril Abiteboul

“This year has been great at the factory, a bit frustrating on-track. A lot of work, a lot of effort, a lot of investment in recovering and restarting the company, and I think we've achieved that”

MANOR, BORN OUT OF THE remnants of Marussia, started the year in high spirits, having two revenue-providing drivers in the forms of Mercedes junior Pascal Wehrlein and Rio Haryanto, plus a new car powered by Mercedes engines and tended to by experienced ex-McLaren personnel.

Wehrlein scored a point for the team in Austria and all looked rosy, then Sauber came good and displaced Manor from 10th, which cost the team an estimated £10m. At season's end team owner Stephen Fitzpatrick confirmed a consortium was finalising the purchase of a majority share in the team, but provided no further details.



DUNBAR/LAT

SAUBER

HINWIL, SWITZERLAND

2016 BUDGET £95m



2016 INCOME £95m

● £30m drivers/sponsors | ● £25m third-party | ● £40m FOM (2014)



EMPLOYEES

320



2016 PROFIT / LOSS

break even

SAUBER FACED TWO CHOICES coming into 2016: find a benefactor or go bankrupt despite having two pay drivers on its strength. Fortunately for the team, the former materialised in July in the form of a Swiss private-venture company (with links to driver Marcus Ericsson) known as Longbow Finance. It pumped

money into the team, enabling Sauber to up its game and score two crucial points in Brazil, plus design a new car for 2017.

A measure of the new-found funding is that, where Sauber previously requested advances from FOM to construct and test its new cars, it has had no need to do so for 2017.

MANOR

BANBURY, BRITAIN

2016 BUDGET £85m



2016 INCOME £85m

● £30m shareholders | ● £20m drivers and sponsors | ● £35m FOM (2015)



EMPLOYEES

225



2016 PROFIT / LOSS

break even

(after estimated £12m injection to pay debts by shareholders)



CONCLUSION

UP AND DOWN THE GRID, THE OVERRIDING COMMENTS WERE OF stability or 'straightlining' in 2016, which, on the face of it, suggests commercial stability – essentially no bad state to be in. But it is a truism in F1 that to stand still is to go backwards – and that is precisely what the teams did: stagnate (the independents), or edge forwards (the corporates).

Therefore, the earlier Liberty completes the purchase from the sport's current controllers (venture house CVC Capital Partners), the sooner it will set F1 free from the '80s shackles that impede a global activity, which, until the turn of the last decade, prided itself enormously on its rate of development in all areas: commercial, technical and sporting.

The biggest challenge facing Liberty remains the task of levelling F1's commercial playing field, for teams with £85m budgets are scrapping in the same league as teams with four times that spend. Crucially, half that advantage is provided by bilateral contracts. Scrap those and 90% of F1's commercial challenges are cured in one swoop.

BANG-FOR-BUCK INDEX

IN CALCULATING A TEAM'S BANG-FOR-BUCK INDEX FIGURE, THE simplest formula is to divide budget by the number of points scored in any given season, which provides a cost per point scored. But since the points system is weighted in favour of wins and podium places, this measure favours frontrunners.

An alternative is to divide points scored by headcount, which provides an efficiency index. But this fails to take into account outsourcing, so teams such as Force India and Manor, which outsource where possible, are unduly flattered, while Williams (with its massive factory) is unfairly penalised. Combining purchase ledgers and payrolls simply provides a similar measure to the above.

The only fair metric is to measure championship-position advances made by teams over a season, expressed as a function of their budgets. This formula assumes all teams start from an equal position at the start of the season (11th where there are 11 entrants), with the leader progressing 10 places, and the bottom team making zero progress. Force India, for example moved up seven places to finish a fine fourth.

Using the latest budget estimates, Autosport's bang-for-buck index is as follows:

BANG-FOR-BUCK INDEX

POS	TEAM	BUDGET(£)	ADVANCE	COST/POSITION(£)
1	Force India	90m	7	12.9m
2	Williams	105m	6	17.7m
3	Red Bull	215m	9	23.9m
4	Toro Rosso	100m	4	25.0m
5	Mercedes	265m	10	26.5m
6	Haas	100m	3	33.3m
7	McLaren	185m	5	37.0m
8	Ferrari	330m	8	41.25m
9	Renault	150m	2	75.0m
10	Sauber	95m	1	95.0m
11	Manor	85m	0	-

As expected, Force India is F1's most cost-effective team by a margin of 50% over Williams. Intriguingly, both use Mercedes power, so the challenge is mainly down to chassis, drivers, management and operations: the latter favours in-house manufacture, including transmissions; the winner relies on an outsourcing model.



So bad they're good

With so much emphasis on winners, the fascinating and endearing stories of motorsport's greatest failures tend to get overlooked

By Edd Straw, Editor in Chief

[@eddstrawF1](#)

EVERYONE LOVES GREAT RACING CARS. SOME OF the one-off successes featured in this issue, despite their short-lived spells in the sun, are genuinely iconic. But there's another type of racing car that has eternal appeal for diametrically opposed reasons. Namely, the bad one.

This is not just the mediocre car, the gentle underachiever, but the genuinely dire. Such cars are the curiosities, the heroic failures, the oddities, the misguided, the fatally flawed, the risible. They all have their own fascinating stories that make them, in their own way, every bit as big a part of the fabric of the history of the sport as the winners.

For anyone with a love of such lack-of-success stories, there are plenty of cars that have a special place in the heart. A personal favourite from grand prix racing is the Eifelland 21, a Cosworth-engined machine that contested eight world championship races in 1972.

The Eifelland ticks several boxes in my good-for-bad-reasons car checklist. Firstly, it shares its name with a caravan brand. Actually, scrub that, it effectively is a caravan brand, for the team was created by bank-holiday-rolling-roadblock manufacturer Gunther Hennerici.

Secondly, it is at heart another car, as it was built around the monocoque of a March 721, a design that was (let's be generous) moderately successful in the hands of Ronnie Peterson (although this was a chassis – number four, for the record – that did not race before it was transformed into the Eifelland). The concept to improve on these foundations was to get a designer – Luigi Colani, who had plenty of road-car experience and an eye for the outlandish – to come up with the bodywork.

There remains debate about whether the Eifelland should even be considered a car in its own right, as some consider it nothing more than a March. That's the kind of contentious detail that just adds to the fun.

Thirdly, it looked ridiculous. It was that rarest of things – a grand prix car with a rear-view mirror rather than wing mirrors. To achieve this, a centrally mounted pillar, aero-profiled, of course, elevated it to the height that likely gave an excellent view of the rear wing. But the most obvious modification to the original March was the addition of a tank-turret-style section shrouding the driver.

Fourthly, its performance was poor and it was no fun to

drive. That the unfortunate Rolf Stommelen, a handy pilot, lapped 8.1s off the pace in qualifying in Monaco tells you everything you need to know.

It was quicker at other tracks, but it was not by any definition fast. The closest it ever qualified to the front was at the much-hated Nivelles circuit, hosting that year's Belgian Grand Prix, when Stommelen lapped a respectable two seconds off pole. The car had a decent enough finishing record, but was never higher than 10th in its world championship appearances.

But, for all those faults, it's a car that has always been a favourite, simply for its oddness. Were I ever to own and race an historic F1 car (unlikely on cost grounds, even more unlikely on the basis of cockpit capacity), then it wouldn't be something successful; it would be something like the Eifelland.

Asking around the Autosport office throws up plenty of similar beloved cars. The Toleman TG181, which qualified for a grand total of two races in 1981 in the hands of Brian Henton and Derek Warwick; the Offenhauser-powered Scarab of 1960;

the Osella FA1 of 1980; the desperately short-lived Lola T97/30 that failed to qualify on its sole appearance in 1997; the Andrea Moda S921 that Roberto Moreno somehow dragged onto the Monaco grid in 1992; and the various Makis of the mid-'70s all got mentions. And there are countless others, even before looking beyond grand prix cars

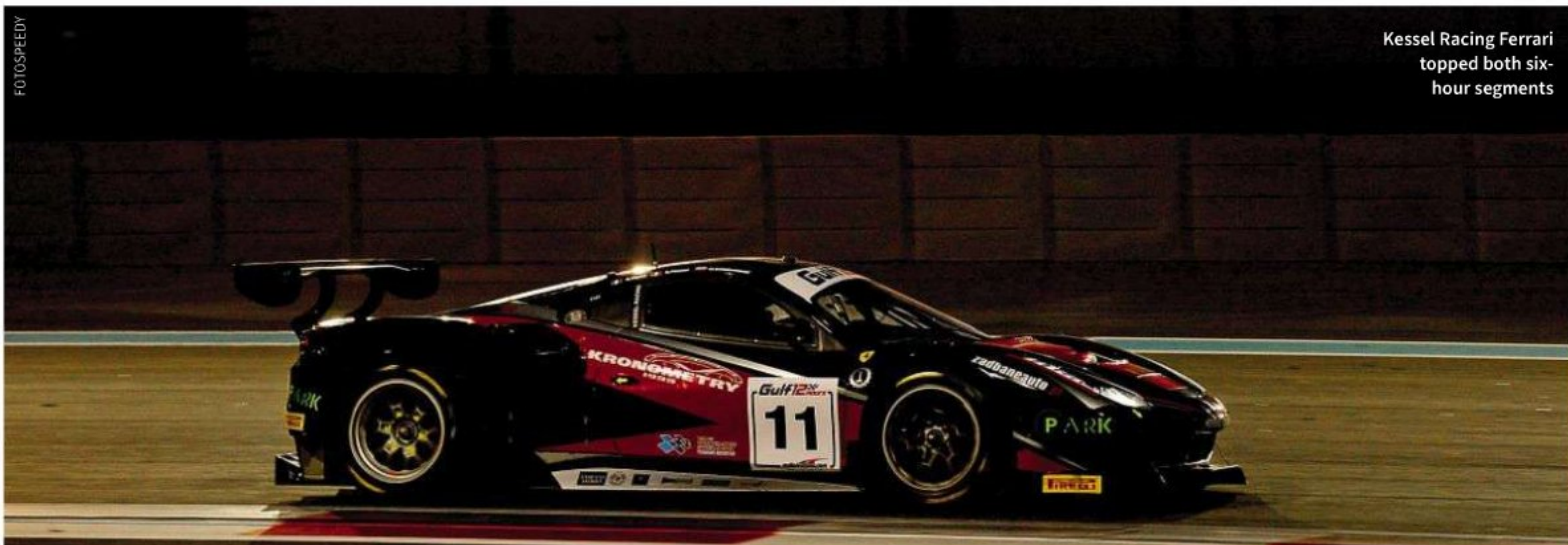
(in sportscars, for example, the BRM P351 always fascinates).

There are good reasons behind F1 shutting the door to chancers these days, by putting clear financial constraints on entering grand prix racing to show that any operation has the economic clout at least to have a chance of surviving. The most shambolic team of the past two decades to make the grid is probably HRT. But, while it got nowhere and was run on a shoestring, HRT contested 56 races and lasted three seasons.

But F1 has lost something with the passing of the 'heroic-failure' teams. Their stories hold a timeless fascination. They are testimony to the ambition and vision – and sometimes the ineptitude – of those who thought they could conquer grand prix racing on a wing and a prayer. They also serve as a counterpoint to remind us all of the excellence even of what may be termed the 'bad' F1 teams of today.

So spare a moment to think of your own favourite failure. In sport, the story of disaster can be just as engaging, sometimes even more so, than success. ✱





Kessel Racing Ferrari topped both six-hour segments

Rigon leads Kessel to more Gulf glory

GULF 12 HOURS
YAS MARINA (UAE)
DECEMBER 17

KESSEL RACING CLAIMED HONOURS FOR the second year running, with Ferrari factory star Davide Rigon joining Giacomo Piccini and top amateur Michal Broniszewski to win by over a minute in their 488 GT3.

With LMP3 cars joining the field this year, GP2 ace Alex Lynn comfortably topped qualifying in the United Autosports Ligier he shared with his father Shaun and Richard Meins. But it was the Graff Racing JSP3 of Alexandre Cougnaud that burst out of the blocks with a very fast first stint, Lynn Jr then taking the lead before his own first stop.

The LMP3s were spending roughly five minutes longer in the pits than the GT3 cars in each

six-hour segment. Rigon, Piccini and Broniszewski moved to the fore, and finished the first part 37 seconds ahead of the similar Ferrari of Dragon Racing, which was piloted by Nicolas Minassian, Matt Griffin and Rob Barff. Just clinging onto the lead lap at the end of the first six hours was the GP Extreme Renault RSO1 of Stuart Hall, Nicky Pastorelli and Jordan Grogor.

There was little trouble for the Kessel Ferrari in the second segment, while the Dragon machine was similarly secure in second place. The Renault fell a lap behind in the early stages and then engaged in a tussle for third with the Optimum Motorsport Audi of Joe Osborne, Ryan Ratcliffe and Flick Haigh, although suspension problems for the R8 LMS just past half-distance dropped the all-British line-up out of podium contention. That also lost them the Pro-Am class honours to

AF Corse Ferrari trio Francesco Castellacci, Andrea Rizzoli and Thomas Flohr.

Suspension failure in the second segment for the Cougnaud Ligier, as well as a delay for the Lynn machine, handed Prototype honours to the other Graff car of James Winslow, Gregory Taylor and Neale Muston. GTX (GT4) honours went to Villorba Corse's Maserati driven by Patrick Zamparini plus Piotr and Antoni Chodzen.

RESULTS

1 Davide Rigon/Giacomo Piccini/Michal Broniszewski (Ferrari 488 GT3) 303 laps in 12h02m50.237s; 2 Nicolas Minassian/Matt Griffin/Rob Barff (Ferrari) +1m19.570s; 3 Stuart Hall/Nicky Pastorelli/Jordan Grogor (Renault RSO1 GT3); 4 Francesco Castellacci/Andrea Rizzoli/Thomas Flohr (Ferrari); 5 David Perel/Marco Zanuttini/Jacques Duyver (Ferrari 458 Italia GT3); 6 Joe Osborne/Ryan Ratcliffe/Flick Haigh (Audi R8 LMS).

Grosjean back with a bang

ANDROSTROPHY
ALPE D'HUEZ (F)
DECEMBER 16-17
ROUND 3/7

ROMAIN GROSJEAN JOINED FELLOW Formula 1 star Olivier Panis as a winner on a one-off in France's ice-racing series.

Panis hit form in Friday's event, just about getting the edge in qualifying – which provides most of the points – in his WRT-run Audi from Jean-Philippe Dayraut (BMW) and Jean-Baptiste Dubourg's Renault. Panis also topped super pole, then led the final all the way. Dayraut got a good

launch but was on the outside line, so Dubourg slipped into second. Dayraut as well as Grosjean were then sucked into incidents that meant neither of them finished, Benjamin Riviere taking third.

Grosjean, who'd been off the *glace* for two years before his return in the Dubourg team's other Clio, dominated on Saturday. He headed qualifying from Dayraut, then claimed super pole honours and finally soaked up the pressure from Dayraut on his way to victory. Panis engaged in a fierce fight for third with the Mazda of Adrien Tambay – a last-corner clash put Panis out, allowed Riviere through and resulted in Tambay being excluded from fourth on the road.

RESULTS

Final 1 1 Olivier Panis (Audi A1 Quattro) 8 laps in 6m28.772s; 2 Jean-Baptiste Dubourg (Renault Clio 3) +3.789s; 3 Benjamin Riviere (Mini Countryman); 4 Adrien Tambay (Mazda 3); 5 Bertrand Balas (Peugeot 3008); 6 Olivier Pernaut (Mazda).
Final 2 1 Romain Grosjean (Renault) 8 laps in 6m30.931s; 2 Jean-Philippe Dayraut (BMW M2) +0.918s; 3 Riviere; 4 Dubourg; 5 Franck Lagorce (Mazda); 6 Balas. **Points 1 Dayraut 341**; 2 Dubourg 332; 3 Panis 318; 4 Riviere 317; 5 Lagorce 296; 6 Tambay 282.



IN BRIEF

UAE FORMULA 4

South African Jonathan Aberdein continued his domination of the world's newest FIA F4 series by winning all four races at the second round, supporting the Gulf 12 Hours at Yas Marina. In each race Aberdein headed home Motopark team-mate Logan Sargeant. American David Malukas was third in race one on his debut, before Sean Babington completed the podium in the other three races.



How Gasly and Prema turned GP2 on its head

Twelve months after Prema joined the GP2 fold, Pierre Gasly clinched the 2016 title and Antonio Giovinazzi finished as runner-up

By Marcus Simmons, Deputy Editor

[@MarcusSimmons54](#)

This was turning into an annoying and unwelcome distraction. Just over 12 months ago, Formula 3 dominator Prema stepped into the GP2 Series field at the post-season Abu Dhabi test. The team took over the old cars of

Lazarus, which was moving out of the category, and started fettling the machinery. There were a few reliability issues, Lazarus heard Chinese whispers that Prema was complaining about the kit it had inherited and issued a statement criticising the team, and Prema was drawn into a controversy five months before it was due to even start its first race...

A year on, Prema Racing stood

as teams' champion in its debut GP2 season, its drivers Pierre Gasly and Antonio Giovinazzi were ranked first and second respectively, and the Italian team's biggest post-season Abu Dhabi problem was sore heads after deservedly letting its collective hair down at the GP2 party (has team boss Rene Rosin found his phone, which disappeared during the festivities, yet?).

So, with the trusty old Dallara GP2/11



continuing for its sixth season of use, and the established teams all up to speed with its strengths and weaknesses, how did Prema come in and steal their thunder? Well, the recruitment of Guillaume Capietto, formerly the ace in the hand of GP2 top dog ART Grand Prix, as technical director was a good start. And so too was the early signing of Red Bull Junior Gasly, who had come off an impressive – if winless – maiden full season in the category with ART's fellow French GP2 class act DAMS. "I wasn't worried [about joining a new team], but of course in GP2 all the top teams are really strong and have been in the series for many years," admits Gasly. "It was a big challenge for us, even if Prema have won many championships in other series.

"But with the team's support and Guillaume's philosophy of working I

knew we would be strong. I went to Italy to see how they work before signing, and saw the workshop, talked with Rene and Guillaume. They didn't underestimate the challenge and I felt they had everything to perform, but you're never sure before you get to test the car."

Gasly had already encountered Capietto anyway. Since he was a youngster he'd been close to ART, using the team's simulator in his French Formula 4 days and also testing with the squad's GP3 line-up. Joining him in the sister car would be 2015 European Formula 3 runner-up Giovinazzi. Carlin had been pushing to retain him for a crack at the 2016 F3 title, but the FIA's imposition of a maximum-three-seasons limit for any driver in that series left the Pugliese high and dry. Discussions began in the New Year with Giovinazzi's career-long backer Ricardo Gelael, and

Gasly leads Giovinazzi in Baku. The latter scored a thrilling double win in the Azerbaijani event

the flamboyant Indonesian businessman agreed to take care of the budget under his familiar Jagonya Ayam banner. With Gasly engineered by Capietto, Giovinazzi would work with Daniele Rossi, who had most recently been on Prema's F3 team but had plenty experience of GP2.

Also instrumental in Prema's preparation was the appointment as team manager of ex-RBM BMW man Jonathan Moury, who switched from the DTM but also heads the M2 Competition team in New Zealand's Toyota Racing Series, and had taken Prema's Lance Stroll to the 2015 TRS title. "There were plenty of things to manage at the beginning of the year," attests Gasly. "For example, Prema never did any pitstops in the past. They wanted the best equipment so they had to really think about all these little things that all the experienced teams don't have to think about. I really liked Jonathan." >>

GP2/REVIEW

Unfortunately, family commitments took Moury away from the team after the Barcelona opener, and from then on the team management was shared between Capietto and the workaholic Rosin, who also had an F3 title to win. "It wasn't easy," says Gasly, "but it's always difficult to put someone in after the first race in the middle of the season, so they shared it."

That Prema succeeded in this being scarcely noticed by the outside world says a lot for its matrix-like 'Prema Way'. Engineering is all well and good and, as one rival chortled, with Capietto on

board "I guarantee you that Gasly and Giovinazzi started the season with the exact same set-up as [champion] Stoffel Vandoorne had in 2015". But so much performance is carried in the driver's head and confidence, and this is where Prema has always excelled. It's run on Italian family lines: Rosin's father Angelo co-founded the squad in 1983 and is still there as a team patriarch; mum Grazia is team manager of the Formula 4 line-up; and wife Angelina is heavily involved on logistics and communications.

"Honestly I think that was the main thing," agrees Gasly. "You really feel

you're part of a family. The second time I saw Rene he invited me to his house and we had dinner with his kids. Of course there is work, but also time to get to know each other and relax. The Rosin family is very good with the driver, makes you feel really comfortable in the team, so you can focus performance on yourself. That's really impressive. It's like the feeling I had with Tech 1 Racing in Renault 2.0 [Gasly won the 2013 Eurocup title with the team of husband-and-wife Simon and Sarah Abadie], and after that in Renault 3.5 and GP2 I hadn't felt that."

This played its part in getting Gasly's



Sirotkin jinks around behind Nato. Both were a force in 2016

MAUGER/LAT

ROUND BY ROUND

Barcelona

R1 Norman Nato

R2 Alex Lynn

Gasly gives Prema pole on the team's GP2 debut. He leads the race, but can't stop Nato and then Latifi going past when he switches onto the option tyres. Marciello gets reversed-grid pole, but Lynn gets past to win, with Gasly and King also on the podium. Giovinazzi has a dramatic crash with Gelael.

**Monte Carlo**

R1 Artem Markelov

R2 Nobuharu Matsushita

Confusion reigns as Markelov, who started 15th, profits from a VSC-plagued race to defeat a shocked Nato. Sirotkin crashes while chasing Nato, so Rowland takes third. Matsushita wins the sprint from Kirchhofer and Marciello. Gasly shunts in race one.

Baku

R1 Antonio Giovinazzi

R2 Antonio Giovinazzi

Giovinazzi claims his and Prema's first GP2 win. From pole he makes a poor start, but passes Marciello late on to win. Sirotkin pips Marciello to second, while a Nato/Gasly tangle triggers a pile-up. Giovinazzi stuns Gasly with a late pass in race two, as Matsushita earns a ban for causing two restart accidents.

**Red Bull Ring**

R1 Mitch Evans

R2 Jordan King

Evans leads Gelael in an unexpected Campos one-two as they cash in on a different strategy and a mid-race heavy shower. Gasly throws it off, Giovinazzi breaks down in the pits and Marciello is on the wrong tyres to catch the Campos duo. King beats Rowland and a charging Lynn in a wet sprint race.

Silverstone

R1 Pierre Gasly

R2 Jordan King

Finally... Gasly ends his jinx with a great drive. Poleman Nato and King lead him early on, but Gasly has the right strategy in stopping early. Giovinazzi beats Rowland in an epic scrap for second. King judges a late shower to beat Ghiotto on Sunday, as third for Rowland lifts him to the points lead.



season back on track. He was a little too hard on his option tyres at the Barcelona opener, costing a win, although two podiums gave him the points lead. In Monaco it went wrong from the beginning with a shunt in practice, and Racing Engineering's Norman Nato, denied a second-successive feature-race win when Artem Markelov somehow gained 34 seconds under a late virtual safety car, moved into the series lead. In Baku Gasly's tentative racecraft allowed him to be outfumbled by an inspired Giovinazzi, and now Markelov led the points. At the Red Bull Ring Gasly threw

this year. But it was important to stay calm, and the team helped me a lot."

Gasly buried his demons with a superbly executed win – his first since his FR2.0 days of 2013 – at Silverstone and from now on it always looked like the title would boil down to an intra-Prema fight with Giovinazzi. OK, Oliver Rowland had moved to the top of the points at Silverstone, while Sergey Sirotkin popped to the head of the standings at Hockenheim, where GP2 had another contentious race to rival that in Monaco. Once again it was a VSC fiasco, officials ruling that Sirotkin had pulled



Even the old Prema blokes know how to celebrate. Looks like Helmut Marko (left) has had enough though

“At Red Bull Ring I pushed like hell and ended up in the gravel – that was the worst feeling”

away victory by spinning into the gravel trap when rain fell, and Markelov's Russian Time team-mate Raffaele Marciello was now top of the standings.

“The good thing was the support of the team stayed really consistent,” says Gasly. “We could see the performance was good – we expected to struggle a bit more than we did at the beginning of the season, so we knew as a starting point it was good. I overpushed a couple of times, which cost me a lot. I wanted to do so well – it's difficult to control that; you just want to be the best and win, and you push and make mistakes. In Monaco free practice, my first lap was one second quicker than the next guy. I didn't need to push but inside you think, ‘I need to be the best’. So it took a couple of races to find that balance. Red Bull Ring I pushed like hell and ended up in the gravel – that was the worst feeling I had

into pitlane for his mandatory stop to change onto prime tyres just after the race had gone under caution. That meant the ART driver had broken the rules, and he was instructed to stop again. This he did, but there was nothing in the regulations in such a situation to prevent him getting a second stint on option rubber... Predictably, he quickly hauled in race leader Marciello to win. A good call from ART; not a good call for GP2.

The biggest organisational blunder occurred at Monza, robbing Gasly of a win in favour of Giovinazzi. The Italian had been stripped of his qualifying times for illegal tyre pressures, but was one of three drivers to effectively get a late pitstop onto option tyres for free because the safety car had been in the wrong position. Combined with Monaco (the debates continued long after this) and Hockenheim, such instances are not

really acceptable in a series so vital to the careers of its drivers.

Giovinazzi's Monza win came via a last-lap pass on Marciello, and it was only the Swiss-born Italian who had a forlorn hope of wresting the title from the Prema drivers at the Abu Dhabi finale. But, like the other teams, his Russian Time squad hadn't found consistent season-long pace on a par with that of Prema and, to a lesser extent, ART. One important factor was the change from Hitco brakes to Carbone Industrie for 2016. This meant a big change in the sensation and feedback to the drivers through the whole car and created difficulties in carrying braking into a corner, leading to understeer and then snap oversteer on the exit. That also affects the tyres, leading to speculation in some quarters that Pirelli had changed the spec, although opinion was >>



Hungaroring

R1 Pierre Gasly
R2 Sergey Sirotkin
Gasly moves into the series lead by beating team-mate Giovinazzi from pole, while Sirotkin completes the podium. From sixth on the grid, Sirotkin carves through early on in the sprint race, and passes King with a great manoeuvre on a restart. Nato completes a Racing Engineering two-three.

Hockenheim

R1 Sergey Sirotkin
R2 Alex Lynn
More VSC confusion. Sirotkin makes an illegal stop for prime tyres, so has to pit again. ART bolts on fresh options and he passes Marciello to win. Marciello's tyres wilt, so Ghiotto and Gasly pass him, but Gasly is excluded for an empty fire extinguisher. Lynn beats Sirotkin, who takes the series lead, on Sunday.



Spa

R1 Pierre Gasly
R2 Antonio Giovinazzi
Malja leads early on, but can't hold off Gasly, who moves back into the series lead. King and Lynn complete the podium, as Giovinazzi makes a poor start from pole and fades to sixth. Malja leads again on Sunday and this time takes second behind Giovinazzi, with Ghiotto beating Gasly to third.

Monza

R1 Antonio Giovinazzi
R2 Norman Nato
Poleman Gasly looks set to win after weathering early attacks from Markelov and Pic. Then the safety car picks up the wrong car. From a back-of-grid start after illegal tyre pressures in qualifying, Giovinazzi is third, then passes Malja and Marciello to win. Nato wins the sprint race from Gasly and Giovinazzi.



Sepang

R1 Antonio Giovinazzi
R2 Luca Ghiotto
Gasly makes a dodgy start from pole. Giovinazzi wins an early scrap with Marciello but is jumped by Sirotkin during the stops. He fights back to beat the Russian with a mega pass, with Nato third. Ghiotto holds off Marciello on Sunday, as Gasly beats new series leader Giovinazzi to third.

Yas Marina

R1 Pierre Gasly
R2 Alex Lynn
From pole, Gasly wins the first race to take the points lead as Giovinazzi labours to fifth. Matsushita makes a late stop and on fresh tyres overhauls Markelov for second. Sixth in the finale isn't good enough for Giovinazzi, so Gasly is champ. Up front, Lynn drives away as Cecotto takes Sirotkin for second.



DRIVERS' CHAMPIONSHIP

POS	DRIVER	TEAM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Pierre Gasly (F)	Prema Racing	3	2	15	13	DNF	2	DNF	7	1	7	1	7	EXC	6	1	4	4	2	11	3
2	Antonio Giovinazzi (I)	Prema Racing	18	DNF	11	18	1	1	DNF	5	2	4	2	17	8	DNF	6	1	1	3	1	4
3	Sergey Sirotkin (RUS)	ART Grand Prix	DNF	11	DNF	DNF	2	3	12	6	18	21	3	1	1	2	9	16	14	DNF	2	DNF
4	Raffaele Marciello (I)	Russian Time	8	5	6	3	3	11	3	4	9	6	4	8	3	7	4	5	2	14	6	2
5	Norman Nato (F)	Racing Engineering	1	16	2	6	DNF	DNF	7	12	7	22	7	3	DNF	18	DNF	8	5	1	3	DNF
6	Alex Lynn (GB)	DAMS	6	1	4	5	DNF	9	11	3	16	14	12	DNF	7	1	3	10	12	5	4	12
7	Jordan King (GB)	Racing Engineering	7	3	DNF	16	12	4	8	1	8	1	8	2	15	11	2	12	7	4	5	14
8	Luca Ghiotto (I)	Trident	DNF	12	DNF	14	9	12	4	9	5	2	17	DNF	2	4	7	3	6	DNF	7	1
9	Oliver Rowland (GB)	MP Motorsport	10	6	3	7	4	15	6	2	3	3	11	6	5	5	10	6	9	9	12	8
10	Artem Markelov (RUS)	Russian Time	4	4	1	8	DNF	5	DNF	11	10	12	9	4	DNF	9	5	21	10	10	DNS	13
11	Nobuharu Matsushita (J)	ART Grand Prix	11	8	8	1	6	DNF	-	-	6	5	6	DNF	9	12	11	11	11	6	DNF	7
12	Mitch Evans (NZ)	Campos Racing	12	14	5	4	5	DNF	1	8	4	13	10	5	DNF	10	16	13	8	DNF	8	6
13	Gustav Malja (S)	Rapax	9	10	14	12	10	DNF	13	16	22	19	13	14	6	8	8	2	3	7	9	5
14	Arthur Pic (F)	Rapax	13	DNF	10	9	DNF	8	9	18	14	11	5	DNF	4	3	14	22	DNF	11	-	-
15	Sean Gelael (RI)	Campos Racing	17	13	13	DNF	7	DNF	2	DNF	21	18	22	10	DNF	19	18	15	EXC	16	16	DNF
16	Nicholas Latifi (CDN)	DAMS	2	7	DNF	DNF	DNF	13	10	DNF	11	10	16	12	14	17	13	9	15	15	14	10
17	Marvin Kirchhofer (D)	Carlin	15	15	7	2	DNF	10	DNF	19	12	8	14	13	10	14	DNF	14	17	8	15	11
18	Johnny Cecotto Jr (V)	Rapax	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	9
19	Sergio Canamasas (E)	Carlin	5	9	12	10	DNF	6	DNF	10	13	9	18	9	-	-	12	7	DNF	13	10	15
20	Jimmy Eriksson (S)	Arden International	16	19	DNF	15	11	DNF	5	13	15	17	21	DNF	12	13	15	20	18	18	-	-

21 Daniel de Jong (MP Motorsport) 6; 22 Nabil Jeffri (Arden International) 2; 23 Rene Binder (ART/Carlin) 0; 24 Philo Paz Armand (Trident) 0; 25 Emil Bernstorff (Arden International) 0; 26 Louis Deletraz (Carlin) 0.

AUTOSPORT'S TOP 10 DRIVERS



PIERRE GASLY

There were never any question marks over his speed, but Gasly had a few rough edges that needed smoothing before he hatched mid-season as a fully fledged title contender. The desire – which led to mistakes or being too hard on the tyres – was tempered and, once he broke his duck at Silverstone, he was tough to stop. That was also the weekend when he ended three successive outqualifyings by Giovinazzi and he finally pipped his team-mate 5-4. Title-clinching pole and win in Abu Dhabi was a masterclass. Deserving champion.



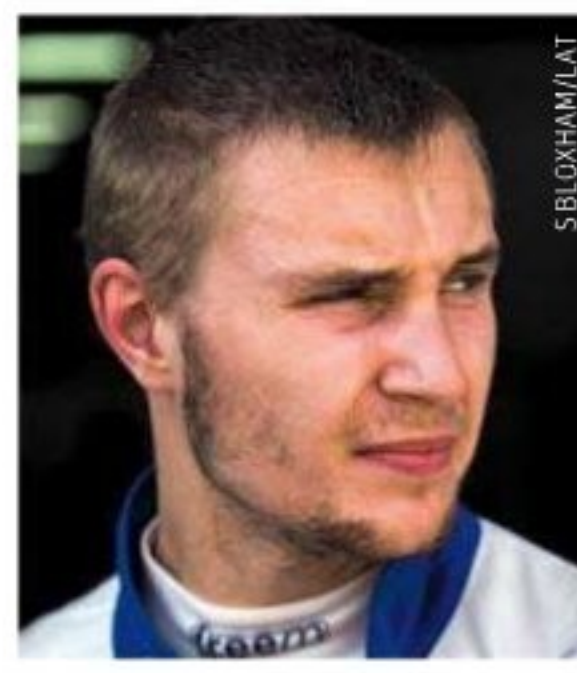
ANTONIO GIOVINAZZI

If you took all the positive stereotypes of an Italian racing driver – passion, charm and aggression – that would be Giovinazzi. And he doesn't exhibit the negative clichés such as flakiness or unpredictability. Don't underestimate his contribution to Prema's success. Sure, Gasly's experience helped Giovinazzi, but the rookie's speed also pushed Gasly on. He was the most exciting driver out there, as brilliant wheel-to-wheel stuff with Rowland at Silverstone and Sirotkin at Sepang attest, plus his brilliant mugging of Gasly in Baku.



RAFFAELE MARCIELLO

He was error-prone when he won his F3 title in 2013, but since then Marciello has matured into an extremely rounded, solid and rapid contender. He didn't win a race in 2016 with Russian Time, but his 19 points-scoring finishes from the 22 races is a wonderful record in a series as unpredictable as GP2. There were perhaps a couple of times when he could have taken a win, but he did seem to suffer with tyre degradation and perhaps, with an eye on endurance racing, he knew he wasn't driving for his career to the same extent as others.



SERGEY SIROTKIN

He pipped Marciello to third in the points at the final round on countback (Sirotkin had two wins to the zero of Marciello) but in reality, with an ART car, he should have finished closer to the Prema guys. Three pole positions (a higher tally than Giovinazzi) prove his speed, and his early-laps fight to take the win in the Hungaroring sprint race proves he has the racecraft. But there were also costly errors, such as his crash in Monaco while chasing Nato for what should have been the win. Impressive, but needs one more year at this level.



NORMAN NATO

Since his very strong season of 2012 this Frenchman had slipped below the radar firmly into journeyman territory. But with Racing Engineering he looked a proper talent, taking two wins and robbed of a third in Monaco, a place where he always shines. He also outscored the very capable King in the intra-team qualifying battle by the margin of 10-1, including a very well-worked pole at Silverstone. A nice guy who can have a very strong future as a professional driver.

21 22 PTS

1 9 219

5 6 211

4 3 159

10 12 159

6 5 136

8 1 124

13 13 122

11 19 111

DNF 10 107

3 7 97

2 4 92

15 8 90

DNF 14 53

- - 36

DNF 21 24

9 11 23

- - 21

7 2 18

12 16 17

- - 10

divided on this. Whatever, part of the reason for the change in competitive order can be put down to who got their heads around this the quickest. One team that notably lost performance this year was DAMS, which also had importantly lost technical director Remi Decorzent to the DS Virgin Formula E team.

"It was much more challenging to drive," says Gasly. "They [the Carbone Industrie brakes] were much more sensitive and the window of temperature was much smaller. It was easy to get it wrong and you had to be much more precise with the warm-up, because it was easy to glaze the discs. We worked a lot on that to improve the performance. The efficiency was not as good as the Hitco – we had to tune the car a bit."

Prema's performance on brakes was notably superb, rivals flabbergasted by Gasly's and Giovinazzi's ability into Turn 1 in Baku – just another illustration of this team's excellence. It culminated in Giovinazzi being carried to the Abu Dhabi finale with a small advantage over Gasly, which was overturned at the last gasp. Gasly had been allowed an engine change after Spa in late August, but the new powerplant gave oil-pump and fuel-pump problems and he was losing two and a half tenths on the straights at



Marciello, leading Lynn, was winless but super-consistent

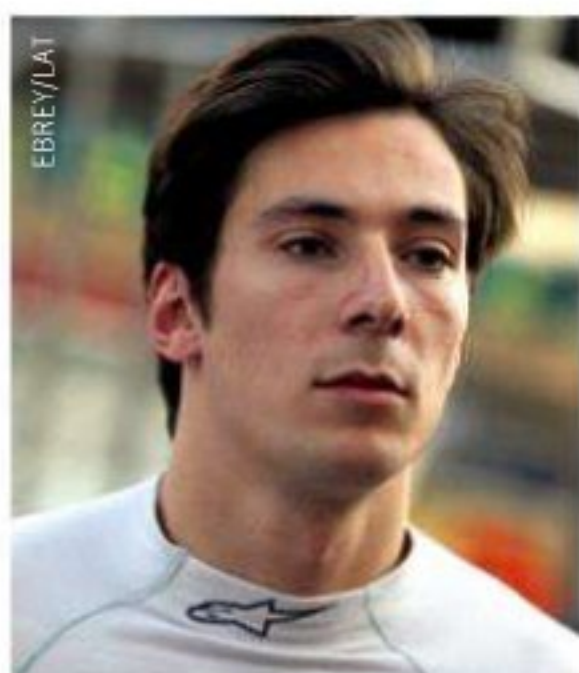
both Monza and Sepang. After another reliability scare in free practice at Yas Marina, GP2 agreed to one more engine change in time for qualifying. This unit was better – still lacking slightly, but Gasly pulled out "probably my best lap in GP2" to slash the points deficit to Giovinazzi. And that provided the foundation for his feature-race win that, ultimately, netted him the title.

While Giovinazzi had been competing in the World Endurance Championship with his Jagonya Ayam pals, Gasly

had just one focus.

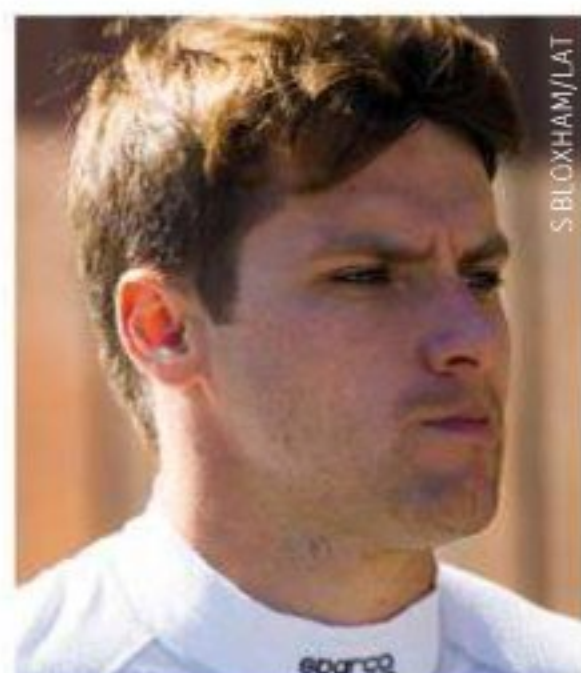
"It was a long two-month break after Sepang and really I was waiting for it all that time," he says. "After Malaysia, on the Sunday night, I was thinking only about Abu Dhabi, about all the little things I could prepare. I've never been that ready for a race weekend."

It proved the most important weekend of the most important season of his career, and the crowning glory of Prema's 2016 achievements. No wonder the hangovers were severe. ❄



6 ALEX LYNN

His season – which ended with a third reversed-grid win that enabled him to equal his 2015 points position of sixth – was a lot stronger than it appears on paper. DAMS faded dramatically this year after a promising start at Barcelona, and it was Lynn's perception that suffered the most. But he comfortably won the intra-team qualifying battle 10-1 with Latifi (a driver who is capable of great speed on his day). And when he got the opportunities to win – Barcelona, Hockenheim, Yas Marina – he converted them extremely well.



7 JORDAN KING

Against the highly rated Rowland and Lynn, not many would have predicted him to be the top Brit in GP2, but that's exactly what King was heading for until the very last race of the season. He's not the fastest qualifier but seems unflappable and calm in the races. This resulted in a great mid-season run of first-first-second in successive sprint races and left him only two points shy of Gasly (and joint second with Giovinazzi) on points scored in reversed-grid events. Showed greater speed later in the season and would shine with one more year.



8 LUCA GHIOTTO

Not much went right for the 2015 GP3 runner-up in the early races, but by July he was showing the kind of form that had Esteban Ocon seriously worried last year. His performance at Silverstone, charging from the back of the grid after electronic problems to fifth, and then pressing King hard for sprint-race honours on Sunday, was superb. Ditto Hockenheim, where he went from 13th to second behind only Sirotkin, who had his controversial tyre change. Perhaps not the greatest qualifier, but repeated his terrific racecraft from GP3.



9 OLIVER ROWLAND

The season started brightly enough with MP Motorsport, with Rowland strong in Monaco and looking like he could win in Baku, then topping the points after a double podium at Silverstone. Then it fell apart. There seemed to be a breakdown in communication between the driver and the team. MP went back to basics on its preferred set-up for the Abu Dhabi finale and Rowland's form improved, only to be undone by an error in his pitstop. When King tested the MP car post-season, he rated it at least as strong as any he'd driven this year.



10 NOBUHARU MATSUSHITA

Honda's man took a lot of brickbats for the way he fumbled the restarts in Baku, resulting in a chain of accidents and his ban from the following weekend in Austria. OK he screwed up, but it was a very long flat-out run to the startline and it would have been interesting to see if any calamities would have broken out if the F1 field had gone under caution. Other than that he was a decent competitor, qualifying four times in the top five with ART. He romped the Monaco sprint race but his best drive was probably second in the Abu Dhabi feature race.

Reign of King Charles

Leclerc proved the master initially, then sealed the deal despite pressure from Albon and Fuoco

By Marcus Simmons, Deputy Editor

[@MarcusSimmons54](#)



The first championship win in his three years of car racing came in the most uncharacteristic fashion you could imagine for Charles Leclerc. Here is a driver brimming with talent, arguably the most exciting – in terms of what he may achieve one day in Formula 1 – of anyone following in the wake of Max Verstappen. Yet the manner in which he operates is the polar opposite. Let's make a lazy comparison: if Verstappen is a dynamic, thrilling fighter of a new Senna; it's entirely possible that Leclerc is a new Prost – smooth, classy, elegant, unruffled.

So for Leclerc to clamber out of his ART Grand Prix Dallara as GP3 Series champion, not in the top-three parc ferme in the Yas Marina pitlane, but on the far side of the track after a tangle with Santino Ferrucci, seemed a bit... Well, something of an anti-climax.

But let's take a look at the characteristics of GP3. Reversed grids and the idiosyncrasies of the Pirelli tyres make this a particularly random series. Look at 2015, and the labouring of Esteban Ocon – the superior of Verstappen in the previous year's Formula 3 European Championship – to impose himself over Luca Ghiotto, a good driver and potentially a very strong professional in the future, but generally

not considered among the absolute top drawer of single-seater talent.

GP3 in 2016 featured new cars and new Pirellis, but those characteristics of the series remained. Leclerc, graduating from a hugely impressive rookie F3 campaign, was an almost like-for-like replacement for Ocon at ART, and around him the French squad assembled arguably the best line-up seen at any junior single-seater squad in several years. McLaren junior Nyck de Vries would surely be a force, stepping down from Formula Renault 3.5; Honda protege Nirei Fukuzumi had proved a huge thorn in the side of Nick Cassidy in his rookie Japanese F3 campaign; and Alexander Albon was another Euro F3 graduate, and possibly the most underrated driver around.

Not anymore. It was Albon who posed the stiffest challenge to Leclerc throughout most of the season. The Anglo-Thai initially did this via a win and a podium in the first two reversed-grid races, in both of which Leclerc failed to score. Then he took advantage of Leclerc enduring a grid penalty and a qualifying tangle (again with Ferrucci) at Silverstone to take his first win in a Saturday race.

By this time, Leclerc was spreading himself a little thinner by undertaking Haas F1 Friday practice duties. From taking pole at the Red Bull Ring by 0.526 seconds – a stunning achievement on a 79s lap – by the following weekend the



Top: Leclerc leads Albon in Hungary. Above: desolation (left) for Albon in Abu Dhabi; joy for Leclerc (right)

Monegasque was on double duty. He didn't think that the F1 activities would hamper his GP3 campaign – first practice in F1 is, after all, several hours before GP3's teatime free-practice slot. But from here on Leclerc rarely looked quite as supreme as he had in the first couple of rounds. OK, he grabbed three poles later in the season, but just one more win to add to the brace collected from the opening couple of rounds.

There's another aspect of Leclerc's driving that possibly delayed what had initially been viewed as an inevitable coronation as GP3 champion. There was a glimpse of this mid-season in his F3 campaign of 2015 – just before his severe Zandvoort crash – where as the points leader he perhaps was a little tentative in the heat of battle, particularly at the Norisring. Those memories came back at



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Monza, where he seemed reluctant to get stuck in and then paid the price when he was removed from the second race by an error from his own team-mate, Fukuzumi.

Leclerc's remaining win came at Spa, a victory built upon the foundations of a superb qualifying lap on a circuit where, for once, ART didn't seem to have its usual advantage on single-lap pace (between them, Leclerc, Albon and de Vries hoovered up eight of the nine pole positions this year). Albon's Sepang victory brought him back into play for the Abu Dhabi finale, but his title aspirations were scuppered when his race lead was eradicated by a safety car, and a subsequent clumsy collision with Jack Aitken as they fought for the lead – one for which, to his credit, the courteous and immensely likeable Albon apologised.

It was easy to sympathise with >>

ROUND BY ROUND



Barcelona

Race one Charles Leclerc Race two Alexander Albon

Hughes and Jorg give DAMS a qualifying one-two on theirs and the team's GP3 debut, but Leclerc gets the jump on both of them to win the main race untroubled. Hughes fend off Fukuzumi for second. Sixth gives Albon third on the reversed grid on Sunday and he squeezes past Tunjo at Turn 1 to win. Tunjo keeps the pressure on, while Fuoco defends third from Dennis.

Red Bull Ring

Race one Charles Leclerc Race two Ralph Boschung

After dominating qualifying, Leclerc makes a poor start and has to dive past Albon and Boschung on the opening lap to lead. Leclerc, Albon and de Vries complete an all-ART podium, despite all skating off in a sudden rain shower. Boschung wins a chaotic wet reversed-grid race from Albon and Fuoco, while a spun-out-of-control Leclerc takes out two cars – and himself.



Silverstone

Race one Alexander Albon Race two Antonio Fuoco

Albon claims an all-the-way win on Saturday. Leclerc, with a five-place grid penalty for his Austria crash, charges through from seventh to second after a stunning move on Fuoco, who takes third. On a slippery track, Fuoco repays the compliment with his own mega-move on Leclerc to win on Sunday. He takes the lead when Palou runs wide near the end.

Hungaroring

Race one Matt Parry Race two Alexander Albon

De Vries takes pole, but wastes it by stalling on the formation lap. Second on the grid, Parry leads all the way to win from Fuoco and Dennis. Maini is on reversed-grid pole for the second successive event, but can't hold off Albon at the start. The Thai stays out front throughout, while Leclerc, tagged by Boschung early on, can't pass Maini and loses the series lead to Albon.



Hockenheim

Race one Antonio Fuoco Race two Jake Hughes

Fuoco is the sharp-shooter after an early virtual safety car, getting the jump on de Vries and poleman Albon to take a decisive lead. Albon runs wide and Leclerc moves up to second. Then Leclerc runs wide and de Vries takes second from Parry. Hughes beats Aitken and Leclerc on Sunday, Leclerc retaking the points lead as Albon retires with damage.

Spa

Race one Charles Leclerc Race two Jack Aitken

Leclerc takes pole and leads all the way, but is being hauled in at the end by Dennis, who has soared from 13th on the grid. De Vries completes the podium, as front-row man Hughes is eliminated in a first-corner tangle with Maini and Parry. Aitken wins on Sunday from Fuoco and Ferrucci. A disaster for Albon, with an off in qualifying and a near-roll in race two.



Monza

Race one Jake Dennis Race two Nyck de Vries

Dennis leads an Arden one-two from Aitken, with Hughes charging to third from poleman Leclerc, whose contact with Fuoco relegates the Italian to eighth and reversed-grid pole. De Vries wins on Sunday after a fight with Albon, with Fuoco third. Leclerc retires after a clash with Fukuzumi.



Sepang

Race one Alexander Albon Race two Jake Dennis

Albon outdrags poleman Leclerc, who is then hit by de Vries. Aitken takes second, with Leclerc recovering to third. Dennis wins on Sunday, slipping into the lead as front-row men Fuoco and Fukuzumi run wide. Fukuzumi is second ahead of Aitken, as Fuoco pits for new tyres.



Yas Marina

Race one Nyck de Vries Race two Jake Hughes

Albon boosts his title hopes with pole, but collides with Aitken as they fight for the lead, and Leclerc is champion, despite his own crash with Ferrucci. De Vries wins from Dennis and the recovering Aitken. Hughes, after engine failure in qualifying, wins the finale from Aitken and Fukuzumi.

DRIVERS' CHAMPIONSHIP

POS	DRIVER	TEAM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Charles Leclerc (MC)	ART Grand Prix	1	9	1	DNF	2	3	6	3	5	3	1	6	4	DNF	3	5
2	Alexander Albon (T)	ART Grand Prix	6	1	2	2	1	14	7	1	4	DNF	9	10	6	2	1	8
3	Antonio Fuoco (I)	Trident	4	3	5	3	3	1	2	10	1	18	4	2	8	3	8	DNF
4	Jake Dennis (GB)	Arden International	7	4	DNF	DNF	12	9	3	7	12	6	2	5	1	4	6	1
5	Jack Aitken (GB)	Arden International	20	19	9	5	13	6	9	6	6	2	5	1	2	5	2	3
6	Nyck de Vries (NL)	ART Grand Prix	9	5	3	4	5	8	20	13	2	8	3	8	7	1	13	6
7	Nirei Fukuzumi (J)	ART Grand Prix	3	13	7	DNF	11	7	4	4	DNF	11	DNF	15	5	DNF	7	2
8	Jake Hughes (GB)	DAMS	2	8	8	6	DNF	17	23	19	8	1	DNF	DNF	3	10	DNF	12
9	Matt Parry (GB)	Koiranen GP	12	20	6	7	4	16	1	5	3	7	DNF	DNF	9	17	9	4
10	Arjun Maini (IND)	Jenzer Motorsport	-	-	-	-	8	19	8	2	7	5	DNF	16	14	6	4	7
11	Ralph Boschung (CH)	Koiranen GP	10	10	4	1	6	12	5	22	15	DNF	-	-	18	9	-	-
12	Santino Ferrucci (USA)	DAMS	15	11	15	10	18	4	15	11	9	4	7	3	19	11	DNF	DNF
13	Steijn Schothorst (NL)	Campos Racing	DNF	22	20	12	14	5	22	20	DNF	17	6	7	13	13	5	10
14	Kevin Jorg (CH)	DAMS	5	7	13	14	15	11	10	9	14	10	11	DNF	DNF	12	12	11
15	Alex Palou (E)	Campos Racing	19	14	16	11	10	2	11	14	16	19	13	11	11	7	14	19
16	Oscar Tunjo (CO)	Jenzer Motorsport	8	2	14	13	-	-	-	-	-	-	15	DNS	-	-	-	-
17	Matevos Isaakyan (RUS)	Koiranen GP	11	6	DNF	DNF	21	18	12	8	DNF	13	8	4	DNF	DNF	15	14
18	Sandy Stuvik (T)	Trident	18	15	10	8	7	10	18	18	DNF	12	DNF	17	12	15	10	20
19	Konstantin Tereschenko (RUS)	Campos Racing	17	21	18	DNF	20	13	16	17	DNF	15	17	DNF	17	14	17	17
20	Artur Janosz (PL)	Trident	16	12	11	9	9	15	14	12	11	DNF	12	9	16	8	DNF	16

21 Tatiana Calderon (Arden International) 2; 22 Giuliano Alesi (Trident) 1; 23 Alessio Lorandi (Jenzer Motorsport) 0; 24 Akash Nandy (Jenzer Motorsport) 0; 25 Richard Gonda (Jenzer Motorsport) 0; 26 Niko Kari (Koiranen GP) 0; 27 Mahaveer Raghunathan (Koiranen GP) 0.

AUTOSPORT'S TOP 10 DRIVERS



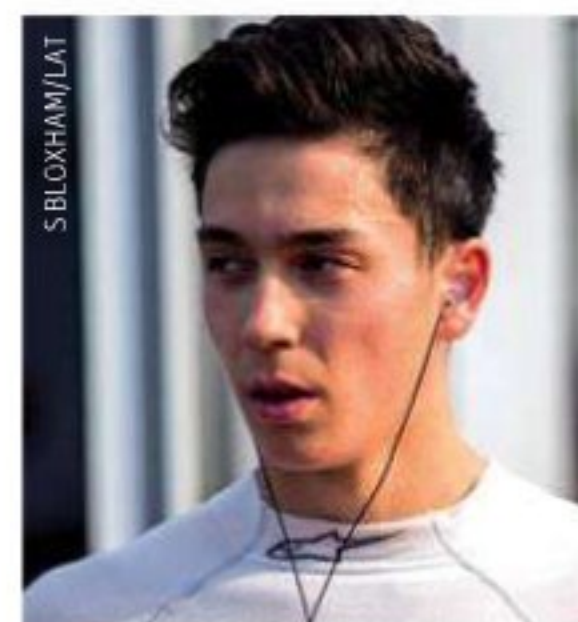
1 CHARLES LECLERC
‘Saturday statistics’ – which comprise qualifying and race one in GP3 – are interesting because they remove the skewing effect of the reversed-grid races. On this basis, Leclerc is a more-dominant champion on 162 points to the 120 of Albon and 100 of Fuoco. That paints a more-representative picture of a season in which Leclerc was four times on pole, six times in the qualifying top two. He joins an illustrious list of GP3 champions and if he doesn't follow predecessors Gutierrez, Bottas, Kvyat and Ocon to an F1 race seat there's no justice.



2 ALEXANDER ALBON
Many who've worked with Albon reckon he's one of the brightest prospects on the single-seater scene and, after a scratchy year in F3, he finally got the chance to show that. That he made the top two in qualifying five times proves he was only a shade behind the very highly regarded Leclerc, his team-mate at ART. And he actually won more races than anyone else. KTR, his old Formula Renault 2.0 team, reckoned he was close to par with Stoffel Vandoorne, who that team also ran, so he'll get a chance to prove that with his likely move to GP2 with ART.



3 JAKE DENNIS
The lanky Brit would have pressed Leclerc quite hard for the title if he'd scored the points he should have done over the first half of the season – some of that was his fault, but he was also pretty short on luck. As the campaign wore on he was usually someone who would be on the move, partly due to his racecraft, partly thanks to Arden's great race set-ups. In a way he was the star of the end of the season, so it would be a loss to single-seaters if his talent is to be siphoned off into the sportscar world. Deserves to go a lot further.



4 JACK AITKEN
Once the 2015 Formula Renault Eurocup champion got his head around the transition from Michelins to the GP3 Pirellis he made big steps forward. He lost the qualifying fight within Arden 8-1 to Dennis, but he usually wasn't far behind and was in the top four qualifiers at each of the last three rounds. The Scottish-Korean Londoner was also a very strong racer, often advancing in company with Dennis, and deserved more than his solitary reversed-grid win at Spa. Yas Marina, for example, should have been his but for an Albon mistake.



5 ANTONIO FUOCO
After trouncing the field in Formula Renault ALPS in 2013, Ferrari protege Fuoco proved a bit disappointing in F3 in '14 and his rookie GP3 campaign last year. He looked much better this season, especially on a gloomy British GP Sunday morning, where he carved through from an early eighth place to win on a slippery track, and pulled off an exquisite outside pass on Leclerc at Stowe on the way. His season tailed off badly after the summer break, although he still vanquished the Arden duo. May find it tough alongside Leclerc at Prema in GP2.

17	18	PTS
DNF	9	202
DNF	DNF	177
16	17	157
2	4	149
3	2	146
1	11	133
5	3	91
7	1	90
DNF	12	82
14	14	50
-	-	48
9	15	36
6	7	36
4	8	26
10	5	22
-	-	18
DNF	16	17
15	18	9
8	6	8
DNF	19	3

Albon, because any safety car that brought an Arden car into contention was always going to be ominous. Once more the British team proved the master of consistent pace in races where others' tyres were wilting. Never was this better illustrated than at Spa, where Jake Dennis charged from 13th to second and likely would have had a crack at Leclerc's lead had there been one more lap.

Racing Steps protege Dennis was another to hop over from Euro F3 and had able back-up from double Formula Renault 2.0 champion – and new Renault F1 development driver – Aitken. A glance at the points table would suggest that Arden didn't get its act together until after the mid-summer break: over the last four weekends, Dennis scored 110 points, Aitken 108 and Leclerc 76. But in reality Dennis could have scored a stack more than the 39 points he had up until this point.

At Barcelona he lost places when he got on the grass in a fight with Fukuzumi; at Silverstone he and Aitken were among those poleaxed by a red flag in qualifying just as they put on new tyres – and then it rained; at Hockenheim he was on the front row and stalled on the grid. Aitken, meanwhile, took time to get his head around the tyres, but once he did he was flying. Both young Brits profited from



Arden lads Dennis (nearest camera) and Aitken fight at Monza

SBLOXHAM/LAT

Arden's excellent long-run set-ups and the team's cajoling of the drivers into taking it easy to look after the rubber, and then capitalising later on.

In the end, both got beaten by Antonio Fuoco, who effectively replaced Ghiotto as the spearhead of Trident. The Calabrian Ferrari protege looked a far-more-rounded prospect than he had in his rookie GP3 campaign with Carlin, and his dramatic wins at Silverstone and Hockenheim brought out some racecraft he'd hitherto been hiding under a bushel.

Other Brits to win in a tremendously competitive year were Jake Hughes and Matt Parry. Hughes joined Ferrucci and Renault F1 prospect Kevin Jorg for the first GP3 campaign of DAMS. The team recruited former Carlin man Matt Callaghan (who engineered Alex Lynn to

title glory in 2014 and ran Jorg this year), and when Hughes took pole for the Barcelona opener and Jorg joined him on the front row it looked as though this would be a great season. But DAMS suffered a mysterious inability to switch on its tyres at circuits with new surfaces – Red Bull Ring, Hungaroring, Sepang – and had to make do with two reversed-grid wins from the feisty Hughes.

Parry and Ralph Boschung both looked strong at Koiranen GP, and Parry had a purple patch of form in July. Desperately unlucky at Silverstone, he then took a great win at the Hungaroring. But Koiranen was another to have inconsistent pace and it can't have helped that Boschung's budget ran out, the Swiss missing three of the last four rounds of the season. ❧



SBLOXHAM/LAT

6 NYCK DEVRIES

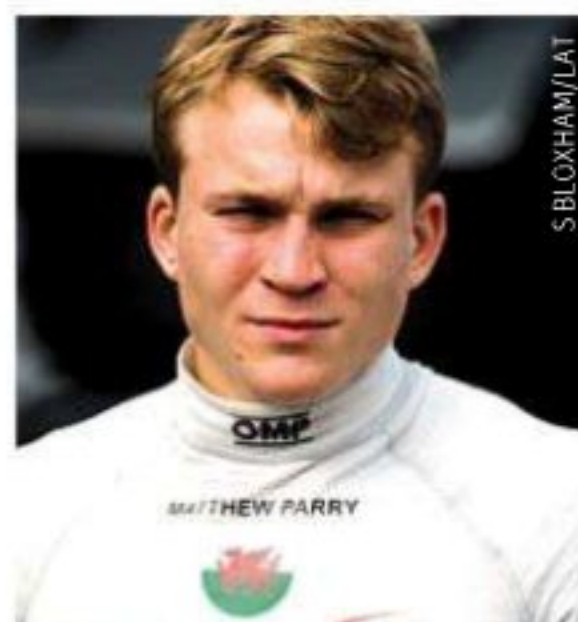
Apart from his superb third season of Formula Renault 2.0 in 2014, the diminutive Dutchman still hasn't quite lived up to the reputation he carried with him from karting. The McLaren junior can be super-fast – he claimed a pole at the Hungaroring – and he can pull off some spectacular overtaking moves, but such an adventurous spirit could sometimes lead him into trouble too. Bearing in mind his experience and speed, he shouldn't have been so far adrift of ART team-mates Leclerc and Albon in the points.



SBLOXHAM/LAT

7 JAKE HUGHES

He was part of an all-rookie GP3 line-up. And they were all driving for DAMS – new to GP3 but utterly mega in GP2 and Formula Renault 3.5. What could possibly go wrong? Well, quite a bit. Hughes grabbed pole on his debut but after that it was a struggle as the team suffered from inconsistent form. What was impressive about the 'Banzai Brummie', however, was that he was six times the fastest DAMS driver in qualifying, and usually its best racer. Against FR2.0 star Jorg and F3 graduate Ferrucci that was highly impressive.



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8 MATT PARRY

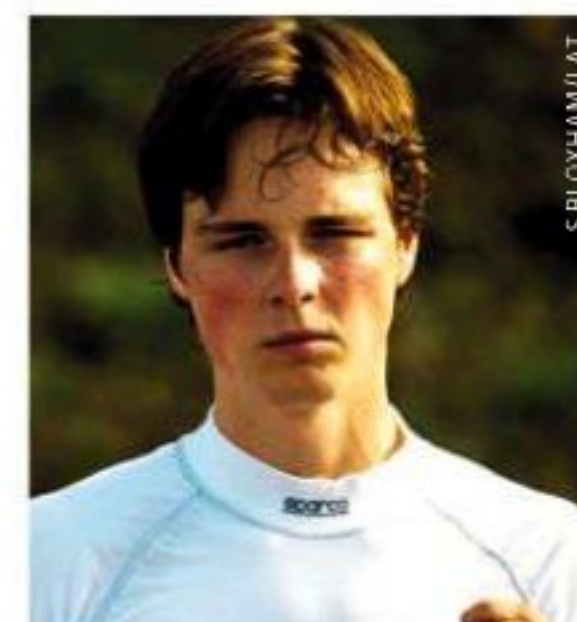
What happened at Silverstone pretty much summed up his season. Parry set a time good for the front row, but his onboard was being shown on TV and a very minor track-limits offence – indiscernible trackside – got him penalised. Then there was front-wing damage and an enforced pitstop in race two. Parry was a proper contender through July and August and usually top-six on the grid in that period, but was often out of luck. A Hungaroring win and podium at Hockenheim were the highlights of his second GP3 season.



SBLOXHAM/LAT

9 NIREI FUKUZUMI

So, you're a 19-year-old European who's sent to the alien culture of Japan to be part of a four-car team alongside three future superstars who know most of the tracks. That would be tough, and it works the opposite way too. Honda-backed Fukuzumi had great equipment at ART and generally made good use of it, learning strongly in his first season out of his homeland. He was only once out of the top 10 in qualifying and, although he got involved in a couple of incidents, he had a good run of results at the end of the year.



SBLOXHAM/LAT

10 RALPH BOSCHUNG

The Swiss was Koiranen's quickest qualifier at the first two rounds – against Parry – and was well in the mix at the Red Bull Ring, where he battled hard with the ART guns before settling back in fourth. He took a win the following day, but that rain-soaked race was a bit of a non-event with very few laps of actual competition. Still, Boschung did enough to suggest that he'd have been in the mix for seventh in the championship had he not been forced to miss most of the late-season races due to budgetary problems.

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PB Phil Branagan
KC Karun Chandhok
SC Stuart Codling
AC Adam Cooper

JC Jack Cozens
RD Russell Douglas
TE Tom Errington
DE David Evans
PF Paul Fearnley
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2. Hungaroring (May 5)
3. Spa (May 26)
4. Paul Ricard (June 30)
5. Silverstone (July 28)
6. Red Bull Ring (Sept 15)
7. Monza (Oct 6)
8. Jerez (Nov 3)
9. Barcelona (Nov 10)

From the paddock

Accentuate the positive (Jan 7-**BA**)
Haas aims high in rookie year (Jan 14-**IP**)
Power of publicity (Jan 21-**LB**)
The pros and cons of a growing GP schedule (Jan 28-**DR**)
Power of publicity (Feb 4-**BA**)
F1 still tied up in details over 2017 rules (Feb 11-**IP**)
F1 needs to tap into young talent (Feb 18-**LB**)
Haas F1 starts out from solid foundations (Feb 25-**DR**)
Why meddle with F1 qualifying? (Mar 3-**BA**)
Welcome unpredictability in F1 2016 (Mar 10-**IP**)
Is Merc right to let its drivers race each other? (Mar 17-**LB**)
Qualified success (Mar 24-**DR**)
Change at the top (Apr 7-**IP**)
Rosberg on a roll (Apr 14-**LB**)
Is F1 making up the rules as it goes along? (Apr 21-**DR**)
The importance of mental strength (Apr 28-**BA**)
Pascal Wehrlein justifies Mercedes' faith (May 5-**LB**)
F1's corrosive conspiracy theories (May 12-**IP**)
F1's engine 'agreement' (May 19-**DR**)
Why Monaco is special (May 26-**BA**)
Why F1 drivers need to race elsewhere (June 2-**LB**)
Time for Renault to step up

(June 9-**IP**)
CVC's commercial challenges (June 16-**DR**)
Bernie-watching in Baku (June 23-**SC**)
F1 silly season in full swing (June 30-**BA**)
Can Button beat his Silverstone jinx? (July 7-**IP**)
Bernie talks about F1 'subsidies' (July 14-**DR**)
Max Verstappen – a future F1 great? (July 21-**BA**)
Why F1 needs a dose of common sense (July 28-**LB**)
Missing Max Mosley? (Aug 4-**IP**)
Time to scrap F1's Strategy Group? (Aug 11-**DR**)
Think the unthinkable (Aug 18-**BA**)
Ricciardo v Verstappen: the story of 2017? (Aug 25-**LB**)
Brickbats for Verstappen (Sept 1-**IP**)
The deal is on (Sept 8-**DR**)
Drivers still without a drive (Sept 15-**BA**)
Is Rosberg now an unstoppable force? (Sept 22-**LB**)
Renault is all at sea (Sept 29-**IP**)
Will there now be more grands prix in the US? (Oct 6-**DR**)
Don't write Renault off (Oct 13-**BA**)
Is the Ferrari/Vettel love affair over? (Oct 20-**LB**)
F1's self-made mess (Oct 27-**DR**)
Hamilton's inner steel (Nov 3-**IP**)
Stick or twist – the perennial driver gamble (Nov 10-**BA**)
Hamilton and Verstappen – the new Prost and Senna? (Nov 17-**LB**)
Should F1 spread the money around? (Dec 1-**DR**)
A world without Mercedes (Dec 8-**BA**)
Honda's second team (Dec 15-22-**LB**)

GP2

Season preview (May 12-**MB**)
1. Barcelona (May 19)
2. Monte Carlo (June 2)
3. Baku (June 23)
4. Red Bull Ring (July 7-**MS**)
5. Silverstone (July 14-**MS**)
6. Hungaroring (July 28)
7. Hockenheim (Aug 4)
8. Spa (Sept 1-**MB**)
9. Monza (Sept 8)
10. Sepang (Oct 6)
11. Yas Marina (Dec 1)

GP3

Season preview (May 12-**MS**)
1. Barcelona (May 19)
2. Red Bull Ring (July 7-**MS**)
3. Silverstone (July 14-**MS**)
4. Hungaroring (July 28)
5. Hockenheim (Aug 4)

6. Spa (Sept 1-**MB**)
7. Monza (Sept 8)
8. Sepang (Oct 6)
9. Yas Marina (Dec 1)

Grand prix features

F1 2016 revealed (Jan 7-**BA/ES**)
Rebirth of Williams (Jan 14-**LB**)
The fall and rise of Sergio Perez (Jan 14-**BA**)
Schumacher and Ferrari – how it all began (Jan 21-**AC**)
Damon Hill's championship year (Jan 28-**BA**)
Can Ferrari beat Mercedes? (Feb 4-**BA**)
Building a better Ferrari (Feb 4-**GA**)
The best F1 drivers never to win (Feb 4-**GW/AC/SM/PF/ES**)
Jolyon Palmer: Britain's newest F1 hope (Feb 11-**LB**)
Meet the new Renault team (Feb 11-**LB/IP**)
Aussie legend Alan Jones looks back (Feb 11-**AR**)
Minardi: F1's greatest minnow (Feb 11-**LB**)
F1 testing 2016: the big questions (Feb 18-**KC**)
Barcelona track guide (Feb 18-**PR**)
How teams go testing (Feb 18-**GA**)
F1 testing war special (Mar 3-**IP/GA/BA/CS**)
Mark Smith Q&A (Mar 3-**LB**)
Is Mercedes really unbeatable? (Mar 10-**BA**)
F1 2016 guide (Mar 10-**IP/GA/BA/CS/LB/DR/KC**)
Australian GP: the big questions (Mar 17-**BA**)
TAG Porsche retrospective (Mar 17-**GW**)
Gerard Lopez – buying and selling Renault (Mar 24-**IP**)
Red Bull and Aston Martin (Mar 31-**BA**)
Carlos Sainz – Toro Rosso's other driver (Apr 14-**BA**)
What is F1? (Apr 28-**BA**)
Verstappen's big break (May 12-**BA**)
F1 2016's winners and losers (May 12-**KC**)
Eddie Jordan looks back (May 19-**LB**)
Healing the scars of Spain (May 26-**IP**)
What's wrong at Ferrari (June 9-**BA**)
How to spend £220m on an F1 car (June 30-**LB**)
F1 2000 special: Schumacher ends Ferrari's wait (Aug 11-**AC**)
F1 2000 special: Hakkinen's greatest pass (Aug 11-**ES**)
F1 2000 special: Button's rookie campaign (Aug 11-**BA**)
F1 2000 special: Williams and

BMW join forces (Aug 11-**AC**)
F1 2000 special: Barrichello's crazy first win (Aug 11-**LB**)
How good is Jenson Button? (Aug 18-**BA**)
Why this isn't goodbye from Button – yet (Sept 8-**ES**)
The man behind Manor's rise (Sept 15-**DR**)
Who will be Britain's next F1 star? (Oct 13-**MS**)
Why homegrown heroes are important (Oct 13-**KT**)
What's so special about Verstappen? (Oct 20-**BA**)
Hamilton's 50 F1 wins (Oct 27)
Driving styles of the F1 stars (Nov 10-**BA**)
Why McLaren-Honda will win again (Nov 24-**BA**)
Why Rosberg has retired (Dec 8-**ES**)
Season review: Rosberg – worthy or lucky? (Dec 8-**BA**)
Season review: top 10 drivers (Dec 8-**BA**)
Season review: team bosses' top 10 drivers (Dec 8-**LB**)
Season review: the rise of Max Verstappen (Dec 8-**BA**)
Season review: Ferrari's woes (Dec 8-**LB**)
Season review: Honda strikes back (Dec 8-**LB**)
Season review: Palmer proves his worth (Dec 8-**ES**)
Season review: Haas's first F1 season (Dec 8-**ES**)
Season review: Wehrlein versus Ocon (Dec 8-**BA**)
Season review: goodbye Button and Massa (Dec 8-**BA**)
Season review: tech insight (Dec 8-**GA**)
Season review: how Sauber survived (Dec 8-**LB**)
Season review: political round-up (Dec 8-**DR**)
Season review: vital stats (Dec 8)
The F1 draft (Dec 15-22-**SM**)
10 of the worst F1 winners (Dec 15-22-**ES/KT**)

Grand prix reports

Ben Anderson
1. Australia (Mar 24)
2. Bahrain (Apr 7)
3. China (Apr 21)
4. Russia (May 5)
5. Spain (May 19)
6. Monaco (June 2)
7. Canada (June 9)
8. Europe (June 23)
9. Austria (July 7)
10. Great Britain (July 14)
11. Hungary (July 28)
12. Germany (Aug 4)
13. Belgium (Sept 1)
14. Italy (Sept 8)
15. Singapore (Sept 22)
16. Malaysia (Oct 6)

17. Japan (Oct 13)
18. US (Oct 27)
19. Mexico (Nov 3-ES)
20. Brazil (Nov 17-ES)
21. Abu Dhabi (Dec 1)

Guest column

Matt James – why veterans still hold the upper hand in the BTCC (Sept 1)
Gary Watkins – the shock of Audi's WEC-withdrawal announcement (Nov 3)
Scott Mitchell – reality bites for Jaguar in Formula E (Nov 24)
Jack Cozens – can a gimmick from rallycross boost the WTCC? (Dec 15-22)

Have-a-go hero

Wayne Gardner, F1 flirtation (Jan 28-MA/SM)
John Watson on an oval (Feb 25-JN/TE)
Derek Warwick in a Porsche (Mar 24-KT)
Kris Meeke on two wheels (Apr 21-DE)
Nelson Piquet Jr at Le Mans (May 26-SM)
Mike Conway in V8 Supercars (July 7-SM)
Damon Hill at Le Mans (Aug 4-BA/SM)
John Watson in Formula Libre (Sept 22-JN/SM)
Nick Tandy in the Walter Hayes Trophy (Oct 20-KT)
Jorge Lorenzo in an F1 car (Dec 15-22-LB/SM)

IndyCar

Bruce Martin

Max Chilton interview (Feb 4-ES)
Season preview (Mar 10)
1. St Petersburg (Mar 17)
2. Phoenix (Apr 7)
3. Long Beach (Apr 21)
4. Barber Motorsports Park (Apr 28)
5. Indianapolis (May 19)
Scott Brayton remembered (May 19-MG)
Stefan Wilson's Indy 500 debut (May 26-SS)
6. Indianapolis 500 (June 2)
7 & 8. Detroit Belle Isle (June 9)
9. Road America (June 30)
10. Iowa (July 14)
11. Toronto (July 21)
12. Mid-Ohio (Aug 4)
13. Pocono (Aug 11)
14. Texas (Sept 1)
15. Watkins Glen (Sept 8)
16. Sonoma (Sept 22)
Season review (Sept 29)

Introducing

Charlie Eastwood (Jan 21-MS)
Alessio Picariello (Feb 18-MS)
Ashley Sutton (Mar 17-MJ)
Jordan Cane (Apr 14-SL)
Callum Ilott (May 12-MS)
Billy Johnson (June 9-GW)
Petru Florescu (June 23-SL)
Sam Lowes (July 28-MA)
Jules Gounon (Aug 25-GW)
Jehan Daruvala (Sept 8-MS)
Gus Greensmith (Sept 29-DE)
Harrison Scott (Oct 27-JC)
Richard Verschoor (Nov 17-PS)
Max Fewtrell (Dec 8-SL)

McLaren Autosport BRDC Award

Award finalists named (Oct 6)
Palmer's prize F1 drive

(Dec 1-SM)
The Award's revamp (Dec 1)

MotoGP

Mitchell Adam

Season preview (Mar 17)

1. Losail (Mar 24)
2. Rio Hondo (Apr 7)
3. Austin (Apr 14)
4. Jerez (Apr 28)
5. Le Mans (May 12)
6. Mugello (May 26)
7. Catalunya (June 9)
8. Assen (June 30)
- Suzuki: MotoGP's sleeping giant (July 7)
9. Sachsenring (July 21)
10. Red Bull Ring (Aug 18)
11. Brno (Aug 25)
12. Silverstone (Sept 8)
13. Misano (Sept 15)
14. Aragon (Sept 22)
15. Motegi (Oct 20)
16. Phillip Island (Oct 27)
17. Sepang (Nov 3)
18. Valencia (Nov 17)
- Season review (Dec 1)

NASCAR

Sprint Cup preview (Feb 18-BM)

Obituaries

Tyler Alexander (Jan 14)
Maria Teresa de Filippis (Jan 14)
Mike Salmon (Jan 21)
Michael MacDowel (Jan 28)
John Horton (Mar 3)
Alan Henry (Mar 10)
Picko Troberg (Apr 21)
Neil Cunningham (June 2)
Chris Meek (June 2)
Carl Haas (July 14)
Alfonso Toledano (July 21)
Jack Sears (Aug 11)
Chris Amon (Aug 11)
Fred Opert (Aug 18)
Tony Adamowicz (Oct 20)
Clive Hodgkin (Oct 20)
Marc Haynes (Oct 20)
Bill Henderson (Nov 3)
Paul Rosche (Nov 24)
Peter Foubister (Nov 24)

Pit+Paddock

Nissan's WEC pullout;
Ford's WEC line-up revealed;
Dakar's tough start (Jan 7)
Daytona 24 Hours test;
Jag sparks Formula E concerns (Jan 14)
Capito's McLaren move delayed; Huff on WTCC hopes (Jan 21)
Latvala's ban; what Channel 4 needs to do with F1; Villeneuve's Formula E dropout (Jan 28)
Why Magnussen deserves his chance; Toyota eyes Loeb and Solberg for WRC; LMP1 tyre war (Feb 4)
F1's token system dropped; Le Mans ups entry; regional F3 plans (Feb 11)
Euro F3's drop in entry levels; is Alfa Romeo coming back to F1?; Ford's GT fixes (Feb 18)
Rallying gets tough on safety; Schumacher set for F4 title push; WEC tyre war (Feb 25)
F1's 2017 rules analysed; why VW doesn't need F1 (Mar 3)
Channel 4's F1 coverage; Blancpain GT lives up to expectations; Formula E's tech plans (Mar 17)
How F1 got qualifying so

wrong; safety fears over MotoGP winglets; Nissan and BMW aim for Formula E (Mar 24)
GPDA attacks F1 governance; UK loses live terrestrial F1; Porsche tops WEC test (Mar 31)
Why Alonso didn't race in Bahrain; F1 qualifying row rumbles on; Michelin's tyre troubles (Apr 7)
Qualifying agreement at last; F1 teams' payments revealed (Apr 14)
Controversy over WRC 2017 pace; Lorenzo seals Ducati switch; Formula E concepts revealed (Apr 21)
How Formula E hit the Paris streets; angry scenes in F3 (Apr 28)
How F1 reached an engine cost cap; deadline set for F1 head protection; Rally GB doubts (May 5)
Plan to boost LMP1 privateers; F1 performance analysis (May 12)
Merc-crash fallout; IndyCar back to Watkins Glen; new home for Rally GB? (May 19)
Hinchcliffe takes Indy pole; 'doing a Haas' is not F1's new model'; Paddon and Li escape big shunts (May 26)
Bianchi family takes legal action; Nurburgring 24 Hours booms (June 2)
Rally GB back to England; Silverstone plans Stowe arena; Salom killed in Moto2 accident (June 9)
What to expect from Baku; aeroscreen fails FIA safety test; IndyCar race postponed (June 16)
Rule breaks to help LMP1 privateers; Baku passes F1 test (June 23)
What Brexit means for motorsport; MotoGP bans winglets (June 30)
FIA aims to boost motorsport worldwide; Formula E's new manufacturers (July 7)
Why Ferrari retained Raikkonen; Newey's super-Aston revealed (July 14)
Secrets of VW's 2017 WRC challenger; Stroll excluded from F3 qualifying (July 21)
Sauber saved by investment firm; FIA evaluates track-limits sensors for F1; Spa 24 Hours blunted by new rules (July 28)
Halo delayed until 2018; Perez key to F1 driver market (Aug 4)
Bryan Clauson dies after Midget car crash (Aug 11)
Manor sets up Ocon v Wehrlein duel; no third cars for Porsche and Audi in 2017 (Aug 18)
WRC duo hospitalised by monster smash; Rosenqvist to Formula E (Aug 25)
What's going on with Jaguar in Formula E; Audi finds LMP1 aero problem (Sept 1)
New McLaren deal for Award winners (Sept 8)
What Liberty deal means for F1; Macau F3 confusion (Sept 15)
IndyCar abandons aero

competition; problem of full-course yellows in WEC; Zanardi takes two more Paralympic golds (Sept 22)
Palmer makes bid for Silverstone; Yvan Muller calls time on WTCC career (Sept 29)
New threat to British GP; Mercedes secures Formula E entry (Oct 6)
F1 teams row over pre-season testing; Rosenqvist on Macau; Montoya's IndyCar future uncertain (Oct 13)
Mark Webber to retire; BTCC ace Jordan leaves Motorbase (Oct 20)
Dennis to be ousted from McLaren?; Kvyat's deal and the F1 driver market (Oct 27)
Audi's shock WEC pullout; VW drops WRC; drivers battle for Haas seat; BTCC rule change could peg Subaru (Nov 3)
What VW's withdrawal means for Ogier; Stroll to Williams; Lopez to Toyota (Nov 10)
Palmer secures 2017 F1 seat; Button closes on racing plan (Nov 17)
F1 title showdown; LMP1 rule changes delayed (Nov 24)
Rosberg's road to the title; Ogier tests M-Sport Fiesta (Dec 1)
Hyundai's new rally challenger; Porsche's LMP1 line-up (Dec 8)
Mercedes and the F1 driver market; Ogier joins M-Sport (Dec 15-22)

Race/rally of my life

Marco Apicella, Autopolis Japanese F3000 1992 (Jan 1-SC)
*Chris Amon (Aug 11-KT)
*previously published

Reports – miscellaneous

Daytona 24 Hours (Feb 4-GW)
Bathurst 12 Hour (Feb 11-PB)
Sebring 12 Hours (Mar 24-JI)
Goodwood Members' Meeting (Mar 24-MP)
Nurburgring 24 Hours (June 2-JC)
Goodwood Festival of Speed (June 30-MP)
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Masters of Formula 3 Zandvoort (Aug 25-DA)
Goodwood Revival (Sept 15-MP)
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Petit Le Mans (Oct 6-GW)
Bathurst 1000 (Oct 13-PB)
Macau Grand Prix (Nov 24-MS)

Special features

Lance Stroll – more than crashes and cash (Jan 7-MS)
Jack Aitken – British rising star (Jan 21-MS)
Brabham BT52 book extract (Jan 28)
Ronnie Quintarelli – Nissan GT star (Jan 28-MS)
Ford's sportscar return (Jan 28-GW)
Daytona 24 Hours preview (Jan 28-GW)
What driverless cars mean for motorsport (Feb 11-SM)
The greatest racing movie

never made (Feb 18-PF)
Nick Cassidy: New Zealand's latest star (Feb 18-MS)
Mark Winterbottom: champion at last (Mar 3-MA)
How good is Mick Schumacher? (Mar 3-MS)
Return of the British Rally Championship (Mar 3-JBE)
Motorsport speed comparison (Mar 17-MS)
Goodwood Members' Meeting preview (Mar 17-MP)
Jonathan Palmer profile (Apr 14-SM)
Sebastien Loeb – rallycross driver (Apr 21-DE)
Bruce McLaren: the man behind the team (May 5-PF)
Dan Wheldon book extract (June 2)
Inside Petter Solberg's rallycross team (June 2-DE)
Nelson Piquet Jr profile (June 9-SM)
Goodwood Festival of Speed preview (June 23-KT)
Remembering Jeff Krosnoff (July 14-AC)
50 people who changed motorsport (July 21-LB/DE/PF/BM/SM/DR/AR/MS/ES/KT/GW)
Is WRT the world's best 24-hour GT team? (July 28-GW)
Silverstone Classic preview (July 28-KT)
2000 special: the big stories in a year of motorsport (Aug 11-MS)
F1 2016: a massive step forward in gaming (Aug 25-GF)
Why motorsport is harder now than ever (Sept 1-BA)
Goodwood Revival preview (Sept 8-MP)
Ferrari's last front-engined F1 winner (Sept 15-KT)
Making historic racers faster (Sept 15-KT)
Can Jaguar win in Formula E? (Sept 29-SM)
Why Jaguar failed in F1 (Sept 29-GA)
Great car: Jaguar D-type (Sept 29-KT)
Jaguar's Le Mans return (Sept 29-GW)
Goodbye Daytona Prototypes (Oct 27-GW)
Macau GP preview: Teddy Yip Jr (Nov 17-MS)
Top 50 drivers of 2016 (Dec 15-22-BA/PB/JC/DE/BM/SM/MS/ES/KT/GW)
Pictures of the year (Dec 15-22)
The UK's fastest laps of 2016 (Dec 15-22-MS)
Christmas gift guide (Dec 15-22)
Audi's greatest sportscar races (Dec 15-22-GW)
Macau 1990: the finest junior field ever? (Dec 15-22-MS)
The stories behind racers' pseudonyms (Dec 15-22-CG)
Race centre season review (Dec 15-22)
Christmas quiz (Dec 15-22)

Supplements

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Performance (May 26)
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Engineering (June 30)
Performance (Aug 25)
Rally GB (Oct 27)
Performance (Nov 24)

Top 5

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Brits in Indycars (Feb 4-SM/ES)
Iconic Formula 1 liveries (Mar 3-ES)
BTCC car debuts (Mar 31-MJ)
F3000 aces who should have made it (Apr 28)
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Driver line-ups in bad cars (June 16)
Forgotten Henri Pescarolo cars (July 14)
Aston Martin race cars (Sept 1)
Jaguar racing moments (Oct 6)
Porsche sports-racers (Nov 10)
Active sons of drivers (Dec 1)

WEC

Gary Watkins

2015 season review (Jan 7)
Toyota's new LMP1 challenger (Mar 31)
Audi's new R18 e-tron quattro (Apr 7)
Season preview (Apr 14)
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2. Spa (May 12)
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Toyota's turbulent Le Mans history (June 16)
The end of open cars at Le Mans (June 16)
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5. Mexico City (Sept 8)
6. Austin (Sept 22)
7. Fuji (Oct 20)
8. Shanghai (Nov 10)
9. Bahrain (Nov 24)

WRC

David Evans

Hayden Paddon's big break (Jan 14)
Season preview (Jan 21)
1. Monte Carlo (Jan 28)
2. Sweden (Feb 18)
3. Mexico (Mar 10)
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6. Italy (June 16)
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8. Finland (Aug 4)
Group B special: rise and fall (Aug 18)
Group B special: Markku Alen's memories (Aug 18)
Group B special: all the winners (Aug 18)
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Group B special: Polo WRC v Quattro (Aug 18)
9. Germany (Aug 25)
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11. Catalunya (Oct 20)
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WTCC

Jack Cozens

Volvo's return (Jan 14)
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2. Slovakia Ring (Apr 21)
3. Hungaroring (Apr 28)
4. Marrakech (May 12)
5. Nurburgring (June 2)
6. Moscow (June 16)
7. Vila Real (June 30)
8. Rio Hondo (Aug 11)
9. Motegi (Sept 8)
10. Shanghai (Sept 22)
11. Losail (Dec 1)

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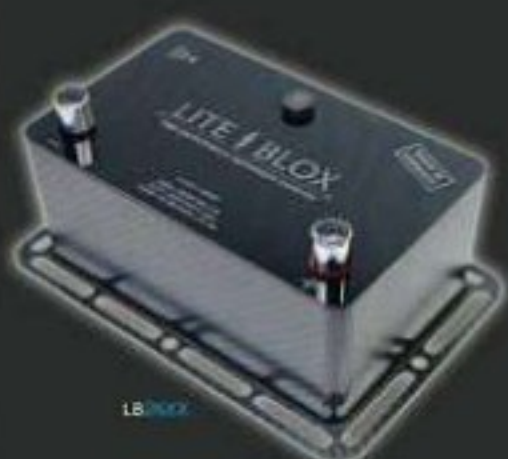
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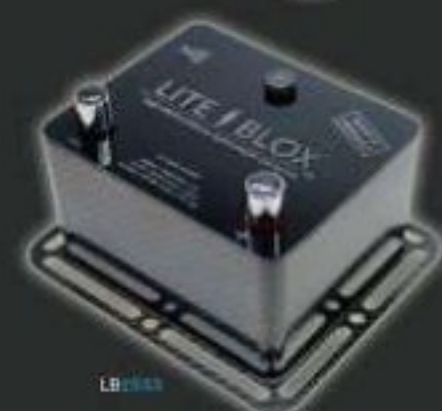
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Weight: (gross) 1.8kg
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dimensions



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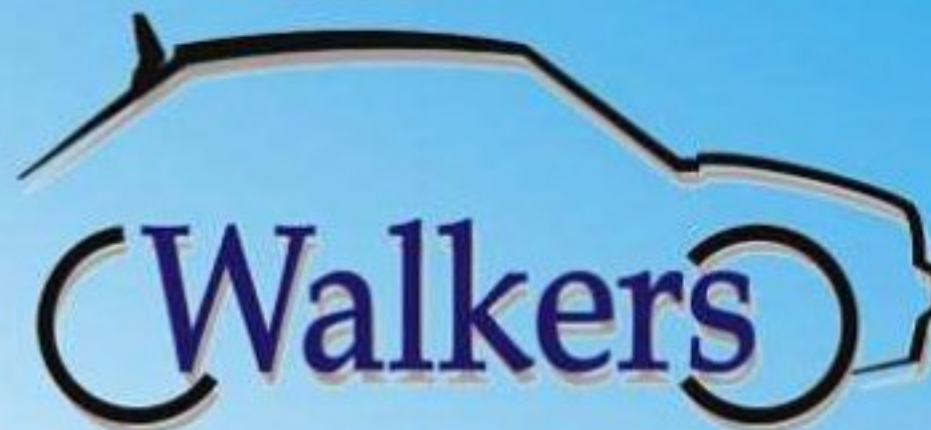


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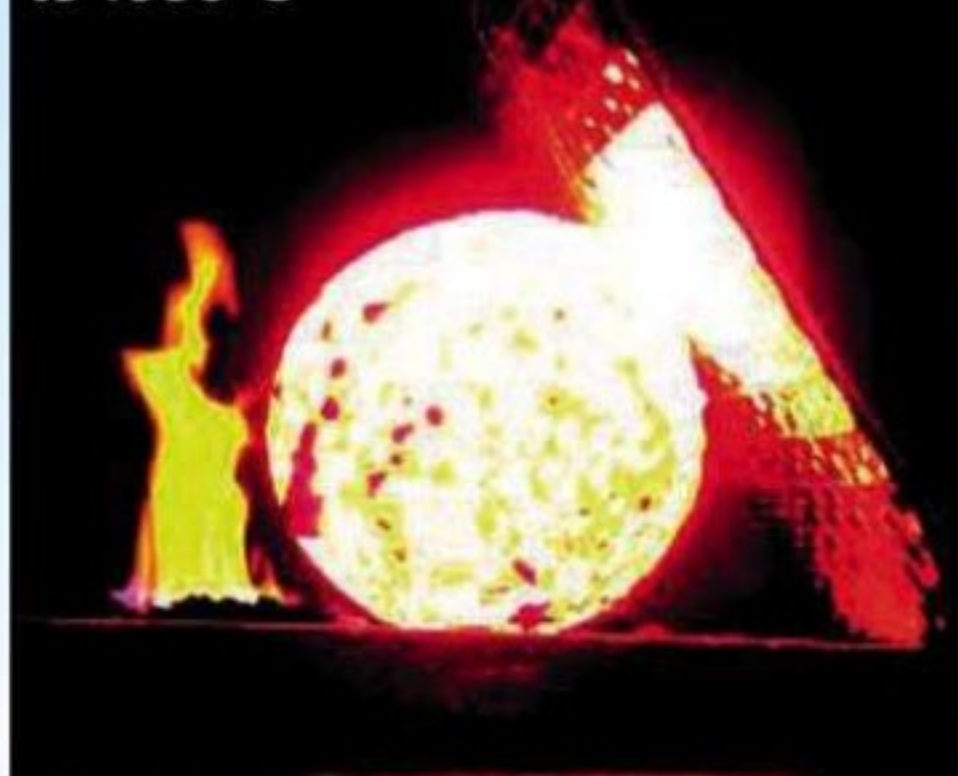
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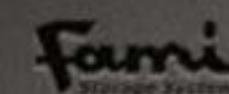


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Systems Engineer

Reporting to the Head of Electronics, the successful candidate will support all on car set-up and the calibration of sensors. The role will involve working closely with the Electronics Trackside Team Leader, Race Engineering and other entities ensuring the chassis is built and set-up correctly and to an extremely high standard. Duties include:

Have an excellent understanding of Data Acquisition Systems and able to use System Monitor to set up all on car systems associated with the SECU.

Monitor Atlas telemetry during running and ensure all sensors are operating correctly and within expected ranges and reporting on all issues in and out of sessions.

Work closely with the Control and Performance Engineers ensuring the correct datasets are used, and with the electricians and wider car crew to ensure all electrical components are allocated as per the build specification, are functioning correctly and available in readiness for car build and set-up.

Actively progress allocated Development and Reliability projects, liaise with the FIA, and generate fault reports and proactively investigate issues on and off car.

Degree or equivalent in electronic/electrical engineering. Previous experience of working with data logging and telemetry systems in a high level motorsport environment is essential.

IT Systems Engineer

Reporting to Director of IT, the IT Systems Engineer is responsible for the development, deployment and support of IT systems and services for Haas F1 Team. They will play a key part in ensuring the delivery of best-in-class IT to the company and its users. Duties include:

Assist in the support and administration of storage, servers, networking, windows domain and security devices across the Haas F1 global estate.

Complete project work, from conception and requirement gathering to deployment, documentation and hand-over.

Assist with planning upgrades and changes to infrastructure both in and out of the racing season, adhering to change control and risk management policies.

Provide support and basic administration for HPC/cluster compute.

Ensure up-to-date documentation and accurate reporting as required.

BSc or MIS in Computer Science required, or equivalent work experience. Typically requires at least 3-5 years' experience in the IT field. Exposure to a racing environment preferred.

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Electrician

Reports to the Head of Electronics. Works closely with and takes direction from the Electronics Trackside Team Leader during race and test events. Supporting all on car and garage electrical systems at race and test events. Responsible for set-up and pack-up of all equipment before and after an event. Factory roles will include service and maintenance of sensors, harnesses and garage electrical equipment. Duties include:

Actively progress allocated Development & Reliability projects under the direction of the Head of Electronics where required.

Continually provide car build decisions, status and issues to the Systems Engineer.

Install and maintain all electrical equipment and wiring in the garage/trucks and offices before an event.

Fit electronic boxes, wiring harnesses and sensors on the race cars, ensuring only parts that have been allocated to the car are fitted.

Keeping records of the life numbers of parts fitted to the car communicating all changes before the start of a session.

Work closely with the number one mechanic to ensure parts are available and fitted to timescales.

Electrical Training – HNC level. Knowledge of Raychem systems 25 and previous experience work in high level motorsport are essential. Ideally would hold a 17th edition IEE wiring regulations certificate.

Trackside IT Systems Tech

Reporting to Director of IT, this position is responsible for the deployment, support and development of trackside IT systems for Haas F1 Team. They will play a key part in ensuring the delivery of best-in-class IT solutions and services to the company and its users. Duties include:

Deploy, support and pack away IT systems at all race and test events.

Plan and perform upgrades and changes to infrastructure both in and out of the racing season.

Maintain and troubleshoot the trackside LAN and WAN, experience with Cisco networking and confident with TCP/IP networking and layer 3 routing.

Support server hardware, storage platforms (SAN) and security appliances.

Support and administer Windows based services such as AD, Group Policy, DNS and DHCP.

Support, administer and develop virtualisation platforms from both VMware and Microsoft.

Configure and deploy Cisco IP telephony & wireless systems.

BSc or MIS in Computer Science required, or equivalent work experience. Typically requires at least 2-3 years' experience in the IT field. Exposure to a racing environment preferred. Working in an international environment desirable.

Successful candidates for all of the above positions will be self-motivated and proactive with the ability to work within a team environment with tight deadlines. Excellent communication skills and working with minimal supervision are also required.

Visit www.HaasF1Team.com for details and requirements, to see other available positions, and to submit your CV and relevant documentation. **NOTE: No agencies, please.**



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Ticktum has been testing FR2.0, here with Tech 1 at Silverstone

Ticktum poised for Renault Eurocup

DAN TICKTUM IS LOOKING ALMOST certain to contest the Formula Renault Eurocup next season.

The 17-year-old returned to racing in October in the Formula 3 European Championship at Hockenheim after serving a 12-month ban for an incident during his 2015 MSA Formula campaign. He then contested the F3 Macau Grand Prix, finishing eighth in the qualification race but getting involved in a race-ending accident in the final.

Ticktum had looked likely to go F3 full-time next year, but has been testing with FR2.0 teams R-Ace GP, Tech 1 Racing and Arden Motorsport and is weighing up options for 2017.

His manager, Infinity's Harry Soden, said: "Renault are pushing hard as a manufacturer, and the championship is looking fantastic. There are 10 rounds, a lot of grand prix tracks, and they go to Monaco and Pau. It's half the money of F3 and a great stepping stone from

MSA Formula [now British F4].

"It took him a few days to get used to the car with different downforce and tyres, but he's adapted to it well."

Meanwhile, the team that carried Lando Norris to the 2016 Eurocup title has announced three drivers for next season. Josef Kaufmann Racing will run Red Bull Junior Luis Leeds, the Australian stepping up after finishing third in the British F4 Championship this season. He will also contest the Toyota Racing Series in New Zealand.

He will be joined by Sacha Fenestraz, who switches from Tech 1 after scoring two wins – including Monaco – during his rookie campaign, and Yifei Ye, the Chinese driver who dominated this season's French F4 Championship.

Another Red Bull Junior looking set to compete in the Eurocup next season is Dutch schoolboy Richard Verschoor, who scored 28 wins in 2016 while claiming the SMP and Spanish F4 titles.



Red Bull Junior Leeds forms a potent Kaufmann line-up with Fenestraz and Ye

Verschoor has been testing with MP Motorsport, which returns to FR2.0 next season. Others testing with MP include Jarno Opmeer, who was runner-up to Verschoor in the SMP points, and 15-year-old USF1600 title winner Neil Verhagen.

Fortec Motorsport has also confirmed a driver for the Eurocup: Russian Alexey Korneev switches from JD Motorsport.

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SMRC

Audi offers prize to top Scottish talent

AUDI WILL OFFER A DRIVER FROM THE Scottish Motor Racing Club a fully funded test with its customer-racing programme in Europe as part of a new prize set up by Le Mans 24 Hours winner Allan McNish.

With the aim of promoting Scottish motorsport talent, the SMRC will nominate one driver from its championships next year to take part in one of Audi Sport's group test sessions before the 2018 season. The winner, who must be a full SMRC member, can be chosen from any of the club's championships.

Audi ambassador McNish and Audi Sport Customer Racing head Chris Reinke have put the prize together, although full details are still to be

finalised. The TT Cup machine, which races in its own series on the DTM support bill (above), is expected to be the car of choice while Audi's TCR machine – the RS 3 LMS, which will be released next year – is also being considered.

"Scotland did a lot for me in my career in terms of support," said McNish. "And it's not just money and sponsorship – it's picking up the phone to the right people and making sure there was always an opportunity around the corner."

"I had that in my career with help from people like Sir Jackie Stewart, and SMRC chairman Hugh McCaig bought me my first kart engine. Scotland has always been great at shouting about its talent, and we want to keep that going."

"We wanted to give something to the SMRC as a lot of dedication has gone in to making sure we have a stable racing platform in Scotland."

"Audi Sport has a great customer racing ladder, with the TT Cup and TCR right up to GT3 racing, so it makes sense to be showcasing new talent there as there are opportunities to progress."

McNish added that the award would not necessarily go to one of the SMRC's champions. "It could be someone who just does a few rounds as they lack budget," he said. "As long as the driver displays the right qualities and the desire and work rate, why shouldn't they get the chance? It gives the club the chance to decide who it would like to give a leg-up in their career."

MOTORSPORT IRELAND

Carey to race F3 in UK after scooping Motorsport Ireland award

BOSS IRELAND CHAMPION CIAN CAREY has won Motorsport Ireland's prestigious Sexton Trophy and will use his cash prize to compete in the F3 Cup in the UK next year.

The 22-year-old won €50,000 after the award's prize was changed for this year to a cash reward rather than a fully funded season in National Formula Ford 1600.

Carey, who won the BOSS title

in his Tatuus Formula Renault, will step up to the F3 Cup with Chris Dittmann Racing. He has bought an ex-Van Amersfoort Racing Dallara F311 and raced it for the first time at the Walter Hayes Trophy in the Open Wheel Allcomers race, finishing second despite spinning to last early on.

He beat FF1600 racer Jordan Dempsey and Supercars driver Andy O'Brien to win the award.

"I'm delighted – I wasn't expecting it at all so when my name was called out I thought they had made a mistake!" said Carey. "It's massive for me. The financial support from Motorsport Ireland will help me to do F3 Cup next year. The class seems quite good next year so it's going to be competitive."

"F3 Cup is a good clubman series but it's still getting recognised. It's a two-year plan – the first year, I'm

hoping to win a few races and then aim to win the championship the next. We ran at Silverstone and got within a couple of tenths of the Cup lap record."

The award previously offered a seat in a Van Diemen run by Bernard Dolan and proved successful in the hands of Jonny McMullan, who won the BRSCC Championship in 2015. Jake Byrne was the winner last year, but left the programme mid-season.

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PORSCHE SUPERCUP

Sharp moves to Porsche Supercup

PORSCHE CARRERA CUP GB RACER TOM Sharp will step up to the Porsche Supercup next season with his family IDL Racing squad.

The 25-year-old, who finished sixth in the GB standings this year, has contested the British Grand Prix-supporting Supercup race for the past two years, taking seventh in the Silverstone event in 2016.

"It's something I've always wanted to do,"

said Sharp. "I remember watching it from a young age and I never really aspired to be an F1 driver – I was focused on racing sportscars.

"We know what to expect, but from an organisational point of view it's very different. I'm going to have to learn a lot of tracks, which is something I haven't done for a long time."

Sharp joins two-time Carrera Cup champion Dan Cammish in graduating to the Supercup.

IN BRIEF



SYCAMORE EYES GT CUP AFTER TEST

Mazda MX-5 Cup frontrunner Jack Sycamore has tested a Ginetta G50 as he plans to switch to the GT Cup next year. Sycamore would race in the series with AB Motorsport – with which he competed in Mazdas (above) – alongside fellow MX-5 racer Darren Standing. He tested the G50 for the first time at Snetterton earlier this month, but the test was ended early after a crash.

MASTERS CHAMPION LITTLEJOHN TO GT

Radical European Masters champion James Littlejohn will race in the British GT Championship next year with GT3 newcomer Generation AMR MacMillan Racing. Littlejohn will race alongside Jack Mitchell in the MacMillan team's new Aston Martin Vantage GT3. It will be Littlejohn's second spell in British GT, having raced a Dodge Viper GT3 in a one-off appearance for Brookspeed 10 years ago.

HANKEY AND YOLUC AT TF FOR LE MANS

Euan Hankey and Salih Yoluc will form part of TF Sport's line-up for its first attempt at the Le Mans 24 Hours next year, in a GTE-class Aston Martin. The squad won a slot on the grid courtesy of its victory in the GT3 Le Mans Cup teams' championship this year with its Aston Martin Vantage. The Somerset-Turkish line-up of Hankey and Yoluc will also contest the full European Le Mans Series with the Tom Ferrier-run team.

KIDSTON TROPHY BACK AT CLASSIC

The Kidston Trophy for pre-war cars will return to the Silverstone Classic schedule in 2017. First run in 2015, the event was kept off the bill of this year's Classic but will run once again next year in its 40-minute form. The trophy is named after 1920s 'Bentley Boy' Glen Kidston.

CHARSLEY'S CHRISTMAS SWITCH-ON

Formula Ford racer Andy Charsley gave shoppers in Petts Wood a surprise when he drove his Ray GR15 through the high street of his hometown. Charsley's outing was part of the town's Christmas lights switch-on event.



FORMULA FORD 1600

Melrose joins Brunton for FF National

GRAHAM BRUNTON RACING will field a multi-car attack on next year's National Formula Ford 1600 Championship, and has signed Seb Melrose as its first driver.

Melrose, 18, finished third in this year's Scottish FF1600 points and also contested the Walter Hayes Trophy. His performances also won him Knockhill's Young Driver of the Year accolade.

Melrose, who is the godson of four-time IndyCar champion Dario Franchitti, will race a brand-new Ray in his first year in the British National series.

"Seb has progressed so much this season and he's ready for the move into the National championship," said team head Graham Brunton. "He doesn't come from the traditional background of loads of karting experience and has

learned his trade in FF1600 since day one. He's the first guy to arrive in the morning and the last to leave each night and he's so determined to succeed. It'll be a big year for him."

Brunton is expected to field a second car for Super One karting graduate Michael Macpherson, who became the youngest driver ever to pass his ARDS test at the Scottish track back in January, then aged 14.



'Lydden Master' Connor retires

LYDDEN HILL REGULAR AND FORMULA Ford stalwart Dave Connor has retired from motorsport at the age of 70.

Connor started racing in 1982 and is best known for his extended stay in the Formula Ford Kent County Championship.

During that season he was struck down by a rare neurological virus that left him paralysed, but he returned to racing the following year,

and continued to race his Royale RP26 at Lydden and Brands Hatch until 1987.

The Brentwood driver then made a second comeback eight years later, and in an ex-Chris Hall Jamun M92 enjoyed a run of success that earned him the 'Lydden Master' nickname.

Recently, Connor bought and raced a Jedi-R1 Yamaha that had formerly been driven by Autosport Grand Prix Editor Ben Anderson.

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Donington start for MRL's famous five

By Marcus Pye, the voice of club racing

@Autosport

THAT GREAT BRITAIN LEADS THE WORLD IN THE field of historic motorsport events is indisputable, with major 'home international' racing fixtures at Donington Park, Silverstone and Brands Hatch backing up the spectacular theatre that has been Goodwood since Lord March reincarnated his family's hallowed brand, dormant since the summer of 1966, with the inauguration of the Festival of Speed back in '93.

Like Goodwood's triumvirate of world-class events and the Silverstone Classic, which fill news pages the world over, the Donington Historic Festival does a great job in bringing racing to enthusiasts, yet is less loudly trumpeted. If you want to get close to some sensational cars in 2017 – then see them race on a demanding, flowing circuit with superb elevation changes – head to England's heartland on April 28-30 for your first 'fix' of the season. One which leaves Bank Holiday Monday free!

Duncan Wiltshire – a vintage-Bentley racer with a discerning palate for historic cars – not only co-promotes the DHF with Christopher Tate and the circuit management, but also heads the Motor Racing Legends team that organises five race series that embrace automobiles of the '20s to the '90s.

This wonderful miscellany naturally forms the bedrock of the Donington showcase, with Pre-War Sports Cars (Mad Jack race), Royal Automobile Club Woodcote Trophy and Stirling Moss Trophy (pre-1956 and pre-'61 sportscars) and Historic Touring Car Challenge with Tony Dron Trophy (Group 1) set to attract big grids.

The sportscar competitions all feature at the Silverstone Classic (July 28-30) while, following a splendid first 'raid' on this year's Zandvoort Historic GP, the pre-war machinery heads back into the Dutch dunes on September 1-3. Two

weeks later – after the 20th Goodwood Revival – the Woodcoteers and Moss contingent, also set to run at Masters Historic Racing's Brands showpiece on May 27-28, combine to form their annual grid at the 25th Spa Six Hours (September 15-17) and Algarve Classic Festival (October 27-29).

The tin-tops will be largely domestic, with Masters' Brands, Snetterton (July 8, with Aston Martin Club Racing) and a return to the Historic Sports Car Club's Oulton Park Gold Cup (August 26-28) hopefully building momentum towards another finale in Portugal, which offers one of Europe's finest circuits, much of it already resurfaced for 2017.

Of course, the HSCC's star-studded national championship calendar, spanning Donington on April 8 to Silverstone on October 21-22, centres on the Legends of Brands Hatch Superprix on July 1-2, with Formula Ford's 50th anniversary a massive draw. Headed by Grahame White, the club that has long been contracted to run the DHF and Silverstone Classic also hosts its own 'cornerstone' events on the Silverstone GP circuit (International Trophy, May 20-21), Croft Nostalgia Festival (August 5-6) and Oulton, plus the season-ending Walter Hayes Trophy for FF1600 stalwarts.

Masters, which has big commitments in the USA too, has trimmed its home rounds of the FIA Historic Formula 1 and Sportscar championships to May Brands and the Silverstone Classic, which balances the programme. That the photogenic GT & Sports Car Cup's third British race has found a mini-enduro slot at the Castle Combe Autumn Classic, though, is exciting news. The event has become many competitors' favourite over the past five seasons and with the potential to party afterwards, on the Saturday night, should add to the charisma of the calendar we are privileged to enjoy. 🏁



ANDREW'S RGB MITTELL SWITCH

Danny Andrew, the 2015 750MC Locost champion who finished third last year, is graduating to the club's RGB category with the ex-Oliver Hewitt Mittell MC-53. Scott Mittell, who plans to race a BikeSport/OSS derivative of father Ian's design, will start '17 in RGB pending the sale of his current car.



GTSCC TO COMBE CLASSIC

The GT & Sports Car Cup has landed a slot at the sixth Castle Combe Autumn Classic. Flavien and Vanessa Marcais' high-profile competition for pre-1966 GT and small-capacity pre-'63 sportscars will bring AC Cobras to the October 7 event, which joins Donington, Silverstone and the Algarve circuit on its '17 calendar.



CARS IN THE CLAYDONS DOUBLES UP

Following the success of September's inaugural event, the Cars in the Claydons motoring festival expands to two days in 2017. The joint venture between James Beckett and landowners the Verney family will bring classic cars, motorcycles and personalities to the grounds of Claydon House in Buckinghamshire on September 2-3.



Autosport's perfect club meeting

What would make a top weekend of club racing?
We dream up a thrill-packed timetable of the
country's most exciting championships

Compiled by Jack Benyon

Entries by Jack Benyon, Rob Ladbrook, Stephen Lickorish,
Ian Sowman and Kevin Turner



The UK is full of vibrant club championships, each with its own unique appeal that brings (or hopes to bring) competitors back each year. Picking the best club championship is nigh on impossible. But picking a few isn't. We started with a blank sheet of paper and asked: 'what would make the best hypothetical club meeting?'

Our venue is Brands Hatch, which came out on top in our best club circuits feature (Autosport, October 13).

We've picked 12 championships, three with double-headers and one as a one-hour endurance race, and we've done our best to narrow them down to the perfect bill of entertainment.

The categories have been picked based on grid numbers, quality of racing, tracks visited, cost and fairness of regulations to ensure our meeting provides the best possible show. We haven't taken into account championships that no longer exist, or cost eight trillion pounds to compete in each year.

Do you agree with Autosport's choices?

Have your say at autosport@autosport.com

SPECIAL SALOONS AND MODSPORTS

Crazy cars that produce terrific noise. What's not to like about the Classic Sports Car Club's Special Saloons and Modsports category?

Admittedly, the racing may not always be the closest but with multiple classes there are usually some decent battles somewhere in the field. However, in terms of pure spectacle there are very few series that can match this one. The sight of scores of heavily modified classic cars streaming through Paddock Hill Bend is certainly not to be missed.

The series is based on the popular Thundersaloons and similar ilk of the '70s and '80s and was first revived by the CSCC in 2011, originally as a one-off. But it proved so well supported that a full series was created for the following year.

Among the cars you can find on the grid are Ricky Parker-Morris and Danny Morris's unique ex-Thundersaloons Peugeot 309 GTi, while Steven Moss's bonkers spaceframe Ford Anglia can often be found towards the front.

Some truly iconic cars from the modified world can also be found competing, with Baby Bertha and an ex-John Cleland Thundersaloons Vauxhall Carlton among the machines to have been seen on track.

And that's another part of the appeal – you never quite know what the next mindboggling car to turn up will be. Unpredictable is certainly a word that can be used to describe the series, especially considering the age and modified nature of the cars does lead to reliability issues, so races can easily completely turn around in a flash.

As it's so different to virtually all of the other categories out there, the Special Saloons and Modsports series is definitely worthy of a spot in Autosport's ideal club meeting. Special just about sums it up.



WALKER



MAIN PICS: JONES; WALKER



LEGENDS

A scaled-down car with a 1200cc Yamaha motorbike engine. Hardly sounds like the formula for a great racing series, does it? But don't judge a book by its cover. The cover in this case is 5/8-scale fibreglass replica of a 1930 Ford Coupe, the kind of car you associate with Bonnie and Clyde or moonshine delivery.

Despite the small engine, the cars still produce 125bhp and weigh nothing, reaching 120mph. And then there's the aero. There's something about the shape of these racers that leads to drafting – like their American cousins in NASCAR – where a car can sit in the slipstream of the one in front and slingshot past. It creates great racing, especially down Brands Hatch's Grand Prix loop where lead

changes would almost be uncountable.

Couple that with healthy grids and you've got a winner. There's always plenty of action.

The regulations also help. Rookies must start at the back for every race, teaching them the ins and outs of racecraft and forcing them to drive to the front to contend. And it can be done. Also, at each meeting the driver with the most points of the weekend starts at the back for the last race. The best at the back. That can create real drama.

Aside from producing great racing, the Legends give Autosports' perfect race weekend a different look to the single-seaters, tin-tops or GTs you'll see elsewhere.

British Touring Car race winner Rob Austin has given the series a shot, and he loved it.

MAZDA MX-5 SUPERCUP

Based on how many MX-5 championships there are in the UK alone, we had to find room for the loveable Mazdas on our list. Regularly considered among the best budget sportscars in any car magazine's list, the Japanese roadsters also offer close and cost-effective racing.

We've gone for the BRSCC's Mazda MX-5 Supercup. The grids are fantastically supported, and produce a number of drivers who head off to bigger and better things on a national level, as well as providing a home for Britain's regular club racers. The fact that Steve Roberts will join the series next year is a credit to its strength. Roberts is a champion in the 750 Compact Cup, one of the closest fought championships of any during his reign.

The MX-5 Supercup receives support from multi-car teams, too, which is a relative rarity in club categories. Paul Sheard regularly runs three cars or more, and Tom Roche's Blendini outfit brings a couple of cars to the forefront, too.

The championship runs for the Mk3 version of the popular classic, with the club's website estimating running costs of around £17,000 for a season's racing. And that's with the £8000-10,000 cost of a car included. For a relatively new package, it's a good price and there's a reason so many drivers compete in it regularly.

This entry was one of the hardest on the list given the quality of the MX-5 championships in the UK. It could have easily been another of the series, including the BRSCC's MX-5 Championship, for Mk1-spec cars, and BARC's MAX5 Championship, which caters for Mk1 and Mk2 machines. The 750 Motor Club also provides a home for the cars.

TIMETABLE

SATURDAY

TIME	EVENT
0900-0920	Qual: MX-5 Supercup
0935-0955	Qual: Legends
1010-1030	Qual: Special Saloons/Modsports
1045-1105	Qual: Historic FF1600
1120-1140	Qual: Classic Stock Hatch
1155-1240	Qual: Swinging Sixties
1240-1325	Lunch
1325-1345	Race 1: MX-5 Supercup
1400-1420	Race 2: Legends (R1)
1435-1455	Race 3: Special Saloons/Modsports
1510-1530	Race 4: Classic Stock Hatch (R1)
1545-1605	Race 5: Historic FF1600 (R1)
1620-1640	Race 6: Legends (R2)
1655-1755	Race 7: Swinging Sixties enduro

SUNDAY

TIME	EVENT
0930-0950	Qual: Mini Se7en
1005-1025	Qual: Production BMW
1040-1100	Qual: National FF1600
1115-1135	Qual: Junior Saloon Cars
1150-1210	Qual: RGB
1225-1245	Qual: Civic Cup
1245-1330	Lunch
1330-1350	Race 8: Classic Stock Hatch (R2)
1405-1425	Race 9: Historic Formula Ford (R2)
1440-1500	Race 10: Mini Se7ens
1515-1535	Race 11: Production BMW
1550-1610	Race 12: National FF1600
1625-1645	Race 13: Junior Saloon Cars
1700-1720	Race 14: RGB
1735-1755	Race 15: Civic Cup





HISTORIC FORMULA FORD

We've not been shy about our enthusiasm for the Historic Sports Car Club's Formula Ford Championship and it's not hard to see why.

The first is the racing. No slicks or wings means cars can follow each other closely, slipstream and overtake regularly. But not to the point that makes each move pointless.

To actually make the most of that, though, you also need a competitive field, and this is where Historic Formula Ford scores highly at the moment. In 2016, four races were decided by less than 0.01 seconds, with cars crossing the line side by side, and this year the racing actually got closer.

The average gap between first and second on the grid was 0.17s, while the average winning margin across the 16 championship races (excluding post-race penalties) was 2.1s.

If you take out champion Callum Grant's unusually dominant Croft performance, that falls to 1.1s. Eight races were won by less than half a second.

Not only does that make the races exciting to watch, it demonstrates a high level of driving. The frontrunners are a mix of young chargers and experienced drivers from elsewhere, while there are invariably plenty of other skirmishes further down the field. So popular has it become that the HSCC has had to start running heat races at some venues.

The Merlyn Mk20 is the car of choice, but there are plenty of other chassis available, and drivers of three different marques filled the championship podium positions in 2016.

Close racing, proper drivers and multi-make competition make this an easy choice for one of our double-header slots.

CLASSIC STOCK HATCH

The 750 Motor Club's Stock Hatch was one of the best series in the country, but it has faded in recent years after becoming a one-model benefit for the Citroen Saxo. To give the cars that used to populate the series a new lease of life, the 750MC introduced Classic Stock Hatch in 2011. It is now one of the Club's most popular series – 36 drivers scored points this year. It's close, too: the average winning margin in 2016 was 1.8 seconds.

Peugeot 205 driver Matt Rozier secured his second successive crown, but the Ford Fiesta XR2i, Citroen AX and Vauxhall Nova also took victories. And it doesn't cost a fortune.

"Classic Stock Hatch is one of my ideal series," agrees Rozier, who estimates he spent £4500 on his campaign. "It's the mix of cars – one-make series usually bore me."

Success ballast helps keep things close, but fine-tuning of the technical rules help too. "The club has such a lot of experience in balancing the cars," adds Rozier. "For example, the Novas now have slightly wider tyres because you can't get the originals, so they have a little more grip, but they have to carry extra weight. We've managed to prevent one type of car running away with it."

"The scrutineering is very good, too – we push for that because we all want to compete on a level playing field."

"For the budget we don't want to go and race anything else."



SWINGING SIXTIES

A significant number of club meetings feature some form of endurance race. However, the longer race format means they aren't always popular with spectators and if a modern GT3 car turns up to contest an enduro full of older GT machinery it can lead to very dominant winners. So Autosport had to think carefully about which series to select for the endurance slot at its perfect club meeting.

The chosen one is the Classic Sports Car Club's Swinging Sixties series. As an historic category, the issue of newer machinery trumping the rest of the field is negated. And where Swinging Sixties has the advantage over other historic endurance races (the series is usually run as a 40-minute mini-enduro) is in its grid sizes.

The category regularly needs to have its grids split into two groups because the tracks simply aren't big enough to cater



for its large number of entries. A field of around 40 cars is not unusual for the series.

Another area where it holds an advantage is in its variety. It is open to all sport, saloon and GT racers from the '50s and '60s, and is then split into 11 different classes based on engine capacity. With such a huge pool of cars to draw from, the likes of the Triumph TR5,

Lotus Elan, Ford Lotus Cortina and MGB are joined by cars seen far less often on track these days, such as the Reliant Scimitar GTE, Lancia Fulvia and Diva GT.

Eclectic is an over-used word but that can certainly be applied in this case. And the racing is often close, too. A perfect combination for an entertaining enduro.



MINI SE7EN

When it comes to purity of racing, it's tough to beat the Mini Se7en Championship.

Running for the less powerful 998cc A Series-engined cars, the Se7ens pack far more of a punch than you'd expect – 0-60mph times of over six seconds and top speeds barely nudging into three figures don't sound too extreme, but they offer classic entertainment.

Technical regulations are very strict, meaning only minimal modifications are allowed to the engine and suspension, which keeps costs down and also evens out the performance gap across the field. The little cars literally handle like go-karts, regularly sideways at every corner. Drivers rarely get out without a smile.

We've rarely seen a Se7en race that didn't excite. The lead battles are often played out in packs instead of just between individuals. Due to the Mini's blockish design, slipstreaming is the order of the day, meaning whoever starts the last lap in first place better be prepared for a fight if there's another car within a second or so.

As well as the on-track action, Se7ens liven up a race paddock wonderfully. There's a great camaraderie between the competitors. They're not just rivals, most are great friends, too, and there are regularly parties and fun to be found around the spanners.

The more powerful Miglias may steal the show in terms of performance, but the simpler and more accessible Se7ens get our vote.

PRODUCTION BMW

For sheer, uncluttered bang-for-your-buck motorsport, the Production BMW Championship is a shining light in British club racing.

Single-make series are commonplace in British motorsport, but few are quite as accessible as PBMW.

The German giant built hundreds of thousands of its best-selling E30 3 Series model between 1982 and 1991, meaning there's a multitude of cars available in the UK and they're widespread around Europe, too. PBMW allows both the 318i and 320i models, wrapped into one class with performance equalled out with weight. It makes the racing simple to follow, and easy to get into.

A quick trawl of eBay reveals a plethora of solid cars for around £1200, or ready-to-go-racing versions can be bought for as little as £4000.

Grids are often at capacity, and PBMW is

arguably the most accessible form of rear-wheel-drive circuit racing going.

The cars race well, with their stocky design aiding slipstreaming. They have a good blend of grip and power and their rather tail-happy nature makes them a hoot to watch and fun for the drivers.

A lot of credit must also go to the organiser, the Project 8 Racing club, which operates on a not-for-profit basis.

They are competitors themselves, meaning any cream off the top goes back into helping grow the championship and there are no membership fees. And with the backing of MSVR, the championship gets a great range of circuits to race on.

The championship also has strict driving standards – including a yellow card system that hands out race bans to repeat offenders – meaning drivers race close and hard, but also with respect.



JUNIOR SALOON CAR CHAMPIONSHIP

This may appear to be an odd addition to our race meeting if you haven't followed the Junior Saloon Car Championship this year. And don't forget, we are judging championships mainly on this year.

The Junior series really came of age in 2016, with the Saxo-based championship providing epic races in its third full year.

The joyous thing about adding this championship to our perfect club racing bill is the development factor. While many racers in our other championships have found their ceilings in terms of ability or finances, the JSCC entrants are just getting started. And there's something special about identifying talented drivers at the start of their careers and pondering how they might develop.

The championship is open to drivers aged 14-17 and aims to bridge the gap between

karting and senior car racing. There are thrills, spills but ultimately learning along the way, and the championship is coming on leaps and bounds with each season. Next year, the series will be televised at Silverstone and Donington, which will open the appeal of the Junior championship even further.

The cars are as standard as it gets, with the championship requiring you to run its camshaft. Everything else in the powertrain is stock. Because the cars are so similar to road cars, they're cheap to run and this makes the championship more accessible. With more and more drivers heading down a GT path, the JSCC offers an opportunity to learn in a standard car rather than compete in karting or single-seaters. And at a fraction of the cost.

If you haven't started paying attention to the Junior Saloon Car Championship, then add it to your New Year's resolutions.



“Close racing with plenty of lead changes and dices”

NATIONAL FF1600

A stalwart of club racing, the BRSCC's National Formula Ford 1600 was a lock-in for our perfect club meeting.

The only difficult part was not awarding it a double-header. With the series moving to a three-race-per-weekend format next year, it seemed harsh to award it only one race, but the decision was based solely on this year, and the Historic Formula Ford 1600 championship had a rampant and

down-to-the wire fight for the title.

This year's BRSCC National campaign was an anomaly, as Niall Murray strolled to success and wrapped up the title before the final round – a near impossible prospect before the season started given the titanic bouts of recent years. Brilliant and close racing – with plenty of lead changes and dices – underpins the championship, while an eclectic variety of old and new, and a range of manufacturers, ensures an entertaining

display. That marques continue to build new cars only furthers the appeal. It has produced some of the best talent in the country, and past entrants often return for events like the Formula Ford Festival or Walter Hayes Trophy, proving the category's appeal.

The only black mark on the championship's otherwise clean record is a tendency of those trailing in the championship to accuse the frontrunners of cheating. But that's a given for many club championships.

HONDA CIVIC CUP

One-make series have a reputation for producing some exciting racing. But there are a plethora of one-make championships for hatchbacks in the UK at the moment. You could quite easily fill an entire meeting with them alone, so narrowing it down to one is tricky.

One of the newer introductions is the Civic Cup. First formed in 2011, it gained traction in 2014 when it switched to the 750 Motor Club and then attained championship status two seasons ago. Entries have since rocketed to approaching 30 cars for many events.

But we chose it because it is essentially two competitive series in one. Although it will become single-class for 2017, the category has until now been split into two divisions: Class A for the older fourth, fifth and sixth-generation cars, Class B for seventh and eighth iterations.

The cars are heavily regulated and standard parts mean the racing is often very close in both classes. This year, while Carl Swift bossed Class B, much of the attention was on Class A, with the top three separated by just seven points. Such thrilling conclusions seem to be regular now and demonstrate the competitiveness of the series.

Attracting British Touring Car title contender Sam Tordoff for a guest appearance at Croft was a major coup for the category and he didn't win! With close racing, packed grids and well turned-out cars, it's easy to see the appeal.



RGB

Only a few years ago, the reason the RGB Championship might have made it onto this race card would have been to provide spectators with a slot during the day in which to stroll around the paddock: the races, more often than not, amounted to processions.

All that has changed in recent seasons, fuelled in particular by an intense battle for supremacy between two rival constructors.

Created more than 15 years ago for roadgoing bike-engined sportscars – at that time a burgeoning element of the kit car market – RGB now is unrecognisable from the category that then 750 Motor Club supremo Robin Knight instigated, resembling instead a 1000cc superbike-engined sports-prototype series. With the increasing popularity of that niche of racing, it is a box ticked in terms of race day nirvana. Yet its roots are protected by the formula's active committee: regulations have been redrafted to ensure new cars are genuine two-seaters, a reaction to 2016 designs by opposing outfits Spire and Mittell.

Spire, under the wing of the shrewd Paul Nightingale, held the upper hand in 2016, but family concern Mittell are fighting back and have recruited Locost champion Danny Andrew to the ranks for next term, to race alongside Scott Mittell, who hails from the same background. This follows the trend of hauling in winners of other 750MC titles: Spire last year brought in 750 Formula graduate Billy Albone, who produced some sublime drives but was edged out in the rear-engined championship by team-mate John Cutmore, who had to raise his game to do so.

Several competitive entries are expected to join the sharp end in 2017 too, lapping in times that are remarkable considering the tyres are treaded: Mittell's lap record on the Indy circuit is a shade under 48 seconds. But there will be action all the way down the field, with the front-engined division providing visual variety. Matt Higginson romped to the title in 2016 (his third in RGB), but there's no reason why a well-driven MNR chassis cannot match the Andy Bates-developed Arion.

FINISHING STRAIGHT/WHAT'S ON THIS WEEK

WHAT'S ON

C4's F1 review leaves a little to be desired

CHANNEL 4 BROUGHT ITS FIRST season as the UK's free-to-air Formula 1 broadcaster to an end with a traditional season review entitled *Lewis vs Nico: F1 2016*. And the show, set inside the walls of Mercedes' Brackley HQ, perhaps lived up to that title too precisely for specialist fans.

Presenters Steve Jones, David Coulthard and Mark Webber maintained the smooth-talking, humorous style that has been one of C4's main selling points during its debut year. Nico Rosberg and Toto Wolff joined them, although Lewis Hamilton's contribution came via a separate interview with Lee McKenzie.

The show's format was an accurate narration of how the title battle unfolded, punctuated with brief highlights of every race of the 2016 season and insight from Ben Edwards and Karun Chandhok.

The focus was naturally the battle up front. And although some incidents further back featured, there was little insight into the rivalries deeper in the pack. The intra-team title battle at the champion squad was always going to be the main story and locating the

review at Mercedes' base was a coup, but the programme became guilty of being one-sided towards the top team.

While the exclusive interviews with Hamilton, Rosberg and Wolff were all compelling and the location allowed the presenting team to reel off interesting facts about the factory, many storylines that enriched F1 in 2016 were left out. Of the 24 drivers who contested at least one race this year, only 14 were mentioned in the 90-minute programme.

One notable absence was a fitting tribute to two men leaving the grid – Jenson Button and Felipe Massa. The pair have contested 31 seasons between them, and C4's lack of credit was disappointing. Button was only mentioned in a short montage containing the best moments of his career, and Massa's guard of honour in his final Brazilian GP featured, being described as a "beautiful show of emotion" in a similarly short video summary.

Also, there were no hints as to what we could expect from next season, giving the casual or undecided fan little incentive or reason to tune in again next March.

C4's review was presented by Webber, Jones and Coulthard



Button's farewell was largely ignored, unlike Verstappen's maiden victory (below)

One non-Mercedes storyline that did feature strongly ended up with too much airtime as the qualifying farce that haunted F1 for the first two races was discussed at length. While recognising this as a travesty was certainly warranted, the C4 programme dragged out a story that now seems like yesterday's news and ended up having little effect on the season, to



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HOT ON THE WEB THIS WEEK

YouTube PORSCHE BIDS FAREWELL TO AUDI

Search for Our way to say goodbye – Thank you, Audi
In 2014 Audi welcomed sister marque Porsche back to the Le Mans 24 Hours in warm, wry style (search: Race car on the road – “Welcome back”). Now it's the turn of Porsche to respond in kind to its rival's withdrawal from the World Endurance Championship with a rather touching sentiment.



the expense of more relevant topics.

Emotive and comprehensive segments were devoted to Max Verstappen and Daniel Ricciardo, and led on Verstappen's superlative Red Bull debut victory in Spain and Ricciardo's season low point in the Monaco GP. But the programme overlooked other commendable performances from drivers such as Sergio Perez, Carlos Sainz Jr and Fernando Alonso.

Ferrari's campaign was discussed at length as its high hopes of a title-contending year yielded not a single win. But there was little insight given here – the team's torrid season was recapped but not analysed.

C4 had an opportunity to create something outside the box with a more comprehensive overview of what has been an exciting year overall. Instead it took a safe approach and let the interviews do much of the talking.

As the free-to-air broadcaster chasing a more casual audience, that was perhaps understandable, and you



F1 review was a bit too relaxed

couldn't fault the style or camaraderie of the show. But with an ample 90-minute slot and a captive audience of racing diehards with little to watch in December, the overall scope and depth of C4's first F1 season-review show left a little to be desired.

JORDAN HARVEY



CHATEAU IMPNEY

MOTORS TV

Monday 2100

Christmas TV is well known for its plentiful repeats and it's no different in the world of motorsport. But this review of the Chateau Impney hillclimb is something that you may have missed first time around. The sprint in the grounds of the Worcestershire hotel was first revived in 2015 and grew in popularity this year. Tune in to this review to find out what it's all about.

INTERNATIONAL MOTORSPORT

DAKAR RALLY

Asuncion, Paraguay to Buenos Aires, Argentina

January 2-14







THE ARCHIVE

In 1970 the wide, open sweeps of the Thruxton lap ended in a tight sequence where 'track limits' were closely defined in hard steel. Jackie Stewart almost brushes the barrier en route to second place in the 46-lap F2 race, his Brabham BT30 trailing winner Jochen Rindt's Lotus 69 by 12.4 seconds.

PHOTOGRAPH BY
DAVID WINDSOR

TOP FIVE

AUTOSPORT.COM STORIES OF 2016

Let's clarify this straight away: this lists the top stories in five different categories on the website. Otherwise it would be dominated by Formula 1, and we wanted a bit of variety. Once a category appeared in the list, we looked for the next one, and came up with a nice mix: Formula 1, World Rally Championship, MotoGP, World Endurance Championship and gaming. Thanks for reading, and see you in 2017.



1 NICO ROSBERG RETIRES

The motorsport world was stunned. Shockwaves rippled through the internet. Autosport.com's live traffic analytics went up like Christmas lights in central London. Nico Rosberg had announced his retirement from Formula 1, five days after winning the world title in Abu Dhabi.

The Mercedes man's shock news was read more than 100,000 times. Our subsequent follow-up stories were popular too, with Lewis Hamilton's reaction to his team-mate's announcement ending the year at #13 on the list with more than 50,000 views.



2 VOLKSWAGEN TO PULL OUT OF THE WRC

Another shock departure got people excited (or disappointed) late in the season. After four all-conquering campaigns in the World Rally Championship, Volkswagen's imminent departure was flagged up by our rallies correspondent David Evans. A board decision confirmed the marque's exit in the wake of the emissions scandal that is ravaging the VW Group – and also ended Audi's LMP1 programme.

3 MEDICAL TEAM'S EFFORTS TO SAVE SALOM

On the Friday of MotoGP's round at Barcelona, Moto2 rider Luis Salom died in a crash in second practice. The Spaniard crashed at Turn 12 and died approximately 90 minutes later at Hospital General de Catalunya. As thousands paid their respects online, the publication of the medical team's report of their efforts to save Salom became the year's most-read story covering the two-wheeled world.



4 PORSCHE SNATCHES LE MANS WIN FROM TOYOTA

Toyota looked set to finally end its win drought. And then, the unthinkable: the TS050 HYBRID slowed, and came to a halt just as Kazuki Nakajima reached the main straight to start the final lap. Toyota hearts sank as joyous expression turned to despair. Porsche inherited victory, while the Toyota was not even classified: heartbreak and one of the most incredible ends to a Le Mans race in history.



5 NEW MOTORSPORT MANAGER GAME REVEALED

Autosport's readership has shown an ever-increasing desire for gaming content, and this was most in evidence when the European arm of gaming giant SEGA announced the expansion of the popular mobile game Motorsport Manager to computer platforms. After two decades of motorsport management games with a few minor peaks but quite a lot of troughs, this news was immensely appealing.



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