

# RacingLine

September 2003 £4.50

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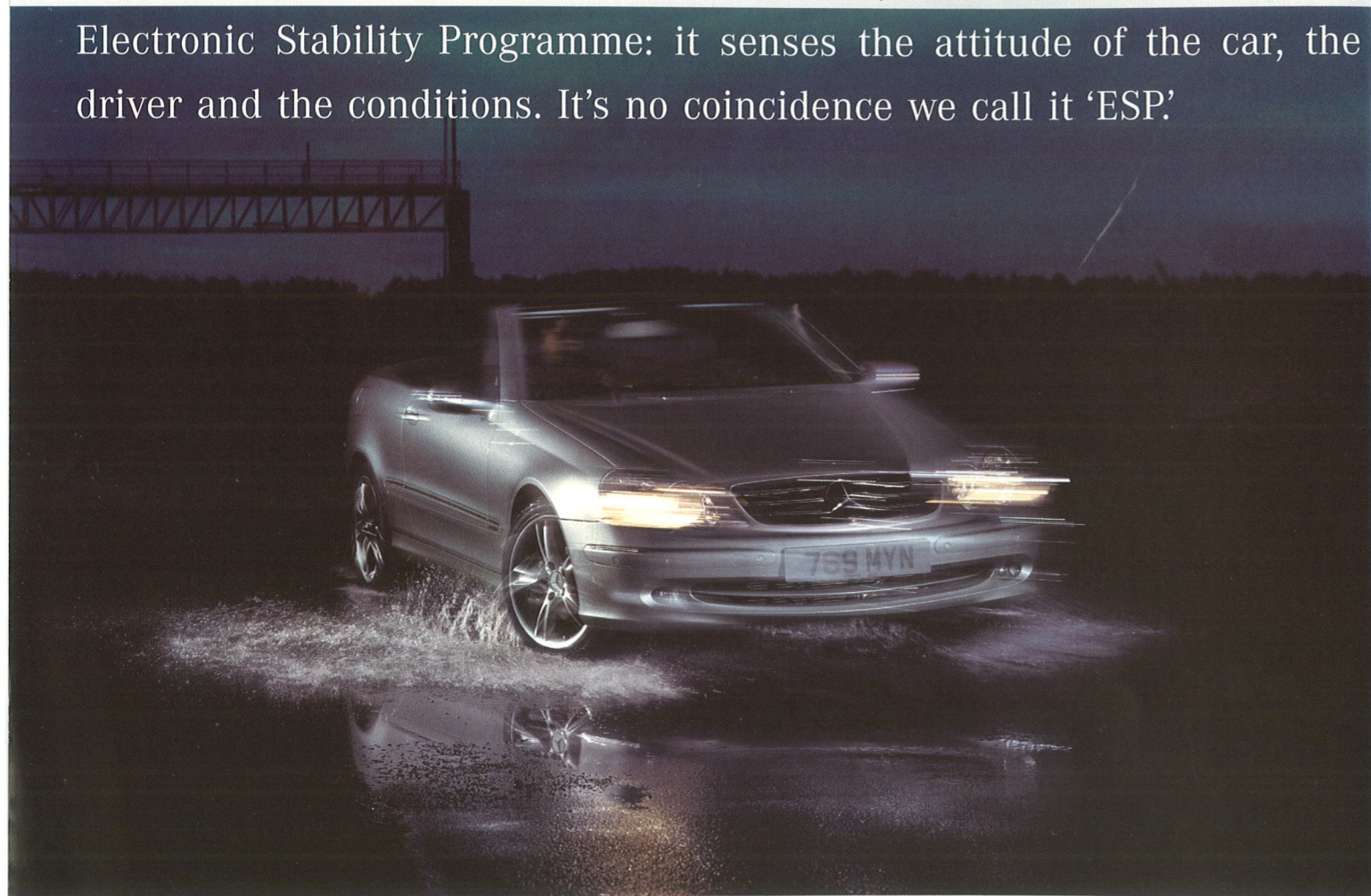
by **McLaren**



# TIME MANAGEMENT

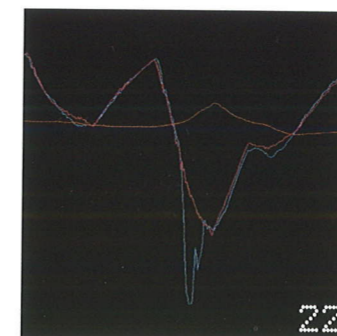
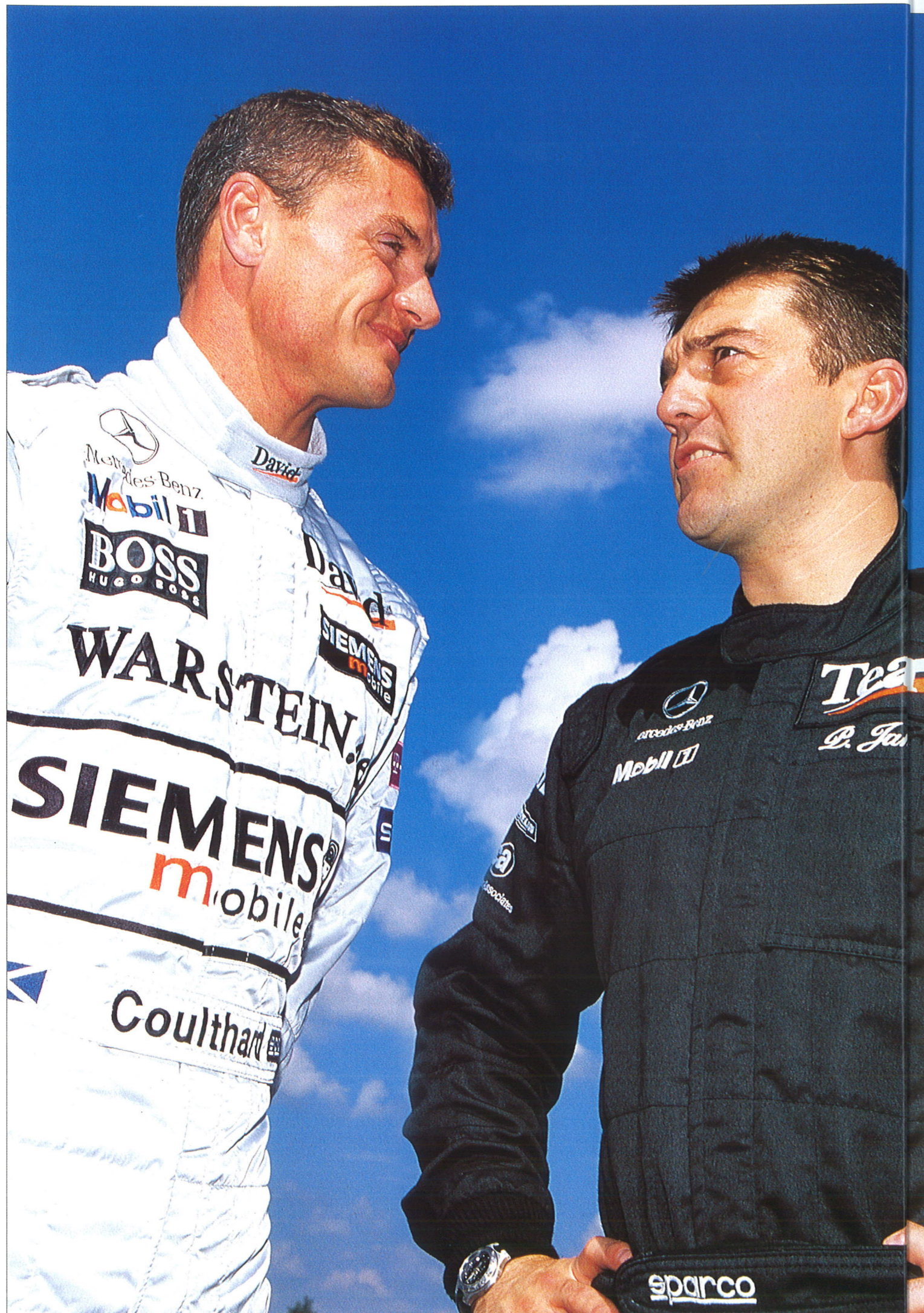
MINUTE-BY-MINUTE WITH DAVID COULTHARD AND HIS TEAM McLAREN MERCEDES MECHANICS AT THE MOBIL 1 FRENCH GRAND PRIX

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« 16

“WE HAVE A LIST OF THINGS THAT WE ARE ALLOWED TO DO, BUT IF WE WANT TO DO MORE, WE HAVE TO INFORM THE FIA SCRUTINEER IN ADVANCE, WHO WILL THEN SUPERVISE THE WORK.”

PAUL JAMES, DAVID COULTHARD'S NUMBER ONE MECHANIC

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## McLaren's Roll of Honour

**Eight Constructors' Championships**  
1974 - M23-Ford, 73 points  
1984 - MP4/2-TAG Porsche, 143.5 points  
1985 - MP4/2B-TAG Porsche, 90 points  
1988 - MP4/4-Honda, 199 points  
1989 - MP4/5-Honda, 141 points  
1990 - MP4/5B-Honda, 121 points  
1991 - MP4/6-Honda, 139 points  
1998 - MP4-13-Mercedes, 156 points

**Eleven Drivers' Championships**  
1974 - Emerson Fittipaldi - M23-Ford, 55 points  
1976 - James Hunt - M23-Ford, 69 points  
1984 - Niki Lauda - MP4/2-TAG Porsche, 72 points  
1985 - Alain Prost - MP4/2B-TAG Porsche, 73 points  
1986 - Alain Prost - MP4/2C-TAG Porsche, 72 points  
1988 - Ayrton Senna - MP4/4-Honda, 90 points  
1989 - Alain Prost - MP4/5-Honda, 76 points  
1990 - Ayrton Senna - MP4/5B-Honda, 78 points  
1991 - Ayrton Senna - MP4/6-Honda, 96 points  
1998 - Mika Häkkinen - MP4-13-Mercedes, 100 points  
1999 - Mika Häkkinen - MP4-14-Mercedes, 76 points

## 2003 GP Results

Australian GP: David Coulthard 1st; Kimi Räikkönen 3rd  
Malaysian GP: David Coulthard DNF; Kimi Räikkönen 1st  
Brazilian GP: David Coulthard 4th; Kimi Räikkönen 2nd  
San Marino GP: David Coulthard 5th; Kimi Räikkönen 2nd  
Spanish GP: David Coulthard DNF; Kimi Räikkönen DNF  
Austrian GP: David Coulthard 5th; Kimi Räikkönen 2nd  
Monaco GP: David Coulthard 7th; Kimi Räikkönen 2nd  
Canadian GP: David Coulthard DNF; Kimi Räikkönen 6th  
European GP: David Coulthard DNF; Kimi Räikkönen DNF  
French GP: David Coulthard 5th; Kimi Räikkönen 4th  
British GP: David Coulthard 5th; Kimi Räikkönen 3rd  
German GP: David Coulthard 2nd; Kimi Räikkönen DNF

## RacingLine

Publisher: Karl Penn

Editor: Toby Waller

Art editor: Chris Barker

Assistant editor: Luke Hayter

Production managers: Stuart White/Ben Payne

Group editor: Andrew Golby

McLaren editors: Rachel Rumsey/Ellen Kolby

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Portrait by Hugo Burnand



# InsideLine

After the Mobil 1 German Grand Prix at Hockenheim, the Formula 1 community has had something of a mid-summer pause for breath as we prepare for the six-week spell through to the Italian Grand Prix at Monza, punctuated only by the Hungarian Grand Prix at Budapest.

Over the past few months I have tended to use this introduction to review and discuss the performance of and the prospects for Team McLaren Mercedes, but perhaps this break offers a timely opportunity to make some observations and remarks about the way the Formula 1 business as a whole has been progressing.

There has been much debate about the sport's current levels of popularity - in particular speculation as to how television viewership is holding up. I think it is positive to be able to report that two specially-commissioned reports have confirmed that, despite an apparent drop in television audiences in some European markets, the 2003 FIA Formula 1 World Championship is still performing strongly at a time when most sports are registering fewer viewers.

Taking one specific case, we can consider the transmission of the 2003 Spanish Grand Prix in Germany. Although the total 'overnight' audience showed a reduction from 11.8 million to 8.4 million viewers, the actual audience share for this same race increased by four percent. For this race, almost six out of 10 German television sets that were in use were tuned to the grand prix coverage.

I think most readers of *Racing Line* will agree that the 2003 season has been the best for some years. Although I have my own reservations about some of the new rules which have been implemented, particularly the requirement for the cars to be held in parc fermé overnight prior to the race, there is no doubt that the variable grid orders have pushed people into different strategies, which in turn has enhanced the spectacle. Above all, however, it has been the closely matched competitiveness of the three leading teams which has created an exciting championship for the fans.

Yet I believe we should all be totally flexible in our attitudes about what it takes to improve the show in the future. We will support any logically framed suggestions, and are prepared to race anywhere at any time, if it can improve the Formula 1 package in terms of value for money for the paying spectator and enhanced entertainment for the television viewer.

**Ron Dennis CBE**

TAG McLaren Group Chairman and CEO

Official launch of Mercedes-Benz SLR McLaren at Frankfurt Motor Show; Chinese football star pays visit to team at British Grand Prix

# MERCEDES-BENZ SLR McLAREN TO STAR AT FRANKFURT SHOW



The Mercedes-Benz SLR McLaren sports car is set to make its official public debut at the Frankfurt Motorshow in Germany on September 9.

The car blends classical styling elements from the legendary Mercedes-Benz SLR cars of the 1950s with the modern design of both the latest Mercedes-Benz passenger car models and the Team McLaren Mercedes Formula 1 cars.

The Mercedes-Benz SLR McLaren is the first roadcar to be conceived jointly between the two companies, and as such represents the very latest

in sportscar design and technology.

Indeed, a number of the car's design elements are lifted from the world of grand prix racing, including the twin-fin spoiler in the front bumper and the arrow-like domed bonnet nose.

There are also many subtle references to the long tradition of Mercedes-Benz SL models inherent in the design packaging of the car, such as the finned side air grills in the front wings and, of course, the dihedral doors, which recall the gull-wing design of the classic earlier models that first bore the SL name.

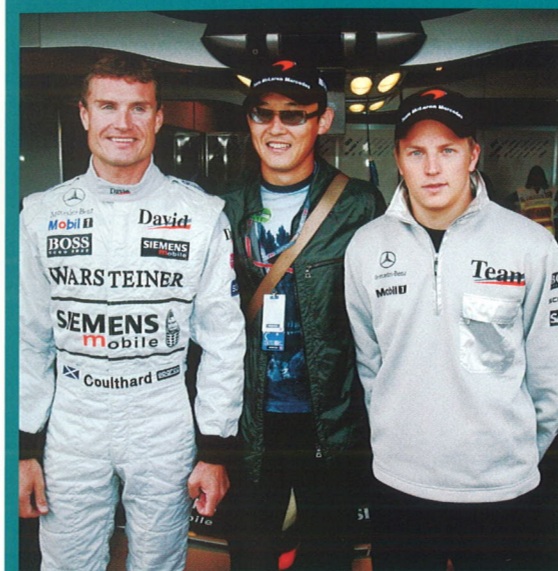
## SLR – THE SPORTING HERITAGE

By naming the new car SLR, Mercedes-Benz and McLaren are re-living the past glories of the Silver Arrows racing cars.

The famous 300SLR roadster won on its debut in the 1955 Mille Miglia race, with Sir Stirling Moss leading home a Mercedes-Benz one-two finish in the event. The car also triumphed in the Tourist Trophy in Northern Ireland, as well as the Eifelrennen, held at the Nordschleife in Germany.

In addition to Moss, legendary drivers including Juan Manuel Fangio and Karl Kling drove the car to one victory after the next, and it is this great racing heritage that is realised as a 21st century vision by the new Mercedes-Benz SLR McLaren car.

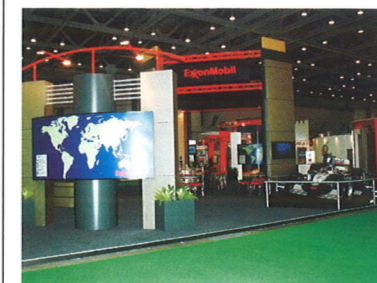
## CHINESE FOOTBALL STAR VISITS TEAM AT BRITISH GRAND PRIX



Chinese football star Sun Jihai was a special guest of Team McLaren Mercedes at the British Grand Prix. Jihai, who plays for the Chinese national team and England's Manchester City, was greeted by David Coulthard and Kimi Räikkönen, who took the time to show him around the garage and explain the functions of their race cars.

The appearance followed on from Jihai's recent visit to the team's HQ in Woking, England. "I think it's excellent that Shanghai will be hosting a grand prix in 2004," he said. "From what I have seen today, I am sure the Chinese public will be as excited as I am about Team McLaren Mercedes and Formula 1."

## EXXONMOBIL ON SHOW AT WORLD GAS CONFERENCE



Team McLaren Mercedes Technical Partner ExxonMobil recently participated as a presenter and exhibitor at the 22nd World Gas Conference, held in Tokyo, Japan.

The international conference, which was opened by the Crown Prince of Japan, hosted over 230 exhibitors and 5,200 people from 78 countries.

Along with a variety of industry-related exhibits in its 300 square metre exhibition space, ExxonMobil had a Team McLaren Mercedes showcar and simulator on display to reinforce the global nature of the company's Partnership with the Formula 1 team.

Many of the attendees took the simulated challenge of driving the Suzuka circuit, home of the Japanese Grand Prix.

# SAP HOLDS SAPPHIRE EVENT IN ORLANDO

Team McLaren Mercedes Corporate Partner SAP recently held its annual customer engagement event, SAPPHIRE 2003, in Orlando, Florida.

The exhibition provided an opportunity for senior executives, business managers and decision makers to come together and discuss information technology strategies which are designed to move their businesses forward in the ever-changing landscape of Information Technology.

Delegates also discovered how the latest SAP

Business Suite software can allow them to deepen customer relationships and achieve profitable growth.

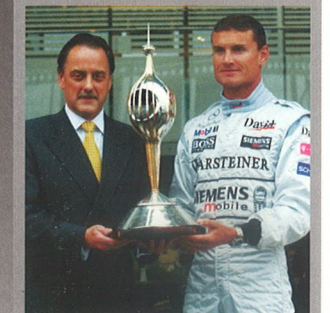
The company's strong links with Team McLaren Mercedes were highlighted by the use of a showcar as well as a race simulator and the animated mannequin, Anibod, demonstrating SAP's commitment to leading-edge technology and fast-paced solution delivery, and reflecting a joint desire to win.

PICTURE CREDITS  
DAIMLERCHRYSLER, LAT, HOCH ZWEI

Team McLaren Mercedes' Official Supplier, Yamazaki Mazak, has recently relaunched its website. It is billed as the 'Official Mazak Global Home Page' and visitors are able to access all websites managed by Mazak affiliated companies located across the world.

The McLaren F1 road car which is currently on display in McLaren's prestigious Park Lane showroom is being replaced. The new occupant will be XPs, one of the original F1 prototypes, which in March 1998 became the world's fastest production car when it recorded a speed of 240.1 miles per hour. The record still stands.

Team McLaren Mercedes featured on British broadcaster ITV's 'Meet the Team' special during the station's coverage of the Mobil 1 German Grand Prix. Highlights for the viewers included a behind the scenes tour of the Team Communications Centre, an extensive interview with Team Principal Ron Dennis and a chauffeur-driven ride with Kimi Räikkönen.



Team McLaren Mercedes driver David Coulthard has been presented with the Mike Hawthorn Memorial Trophy for the fourth time. The Scot was honoured at the British Grand Prix, where the award was presented to him by Colin Hilton, the boss of the British Motor Sports Association (above). As a four-time winner, David joins former Formula 1 World Drivers' Champions Jackie Stewart and Damon Hill.

McLaren and Mercedes-Benz-backed protégé Lewis Hamilton continued his winning run in the British Formula Renault Championship the at UK Donington Park circuit with his third win of the season. Having qualified on pole position for both of the two races over the weekend, Lewis failed to finish the opening race, but won the second by over seven seconds. Lewis retains his lead in the championship standings. Fellow McLaren and Mercedes-Benz protégé Cheng Congfu made his race debut at the event.

Mercedes-Benz has busy Mobil 1 German Grand Prix weekend; Sun Microsystems host technology forum

## MERCEDES-BENZ HOSTS GERMAN GP EVENTS



Mercedes-Benz held several special events during the run-up to the Mobil 1 German Grand Prix at Hockenheim, including a visit by Team McLaren Mercedes drivers David Coulthard and Kimi Räikkönen to the SMART factory at Boblingen, near Stuttgart.

The two drivers spent time with SMART employees, signing autographs and talking with them about the season so far and the forthcoming race. Kimi and David were then given a tour of the SMART facility, before the media present were given the opportunity to drive the latest SMART roadsters.

There was also a special appearance by the drivers at the Maybach Centre of Excellence, which offers purchasers of these exclusive cars the opportunity to discuss and fine-tune their purchase in luxury surroundings. The new Mercedes-Benz SLR McLaren will also be housed and sold at this innovative facility.

In addition, Mercedes-Benz held a special lottery exclusively for spectators who had purchased seats in the Mercedes-Benz grandstand at the Hockenheim circuit, with the prize of a SMART 'Crossblade' car for the winner. The winning number was drawn by Alex Wurz, with David Coulthard handing over the prize to the lucky winner on Sunday after the race.

## EXXONMOBIL HOLDS BRITISH GP GARDEN PARTY



Team McLaren Mercedes Technology Partner ExxonMobil held its annual British Grand Prix garden party on the Saturday evening before the race.

The event, which was attended by over 400 guests – including ExxonMobil employees and customers, as well as other team Partners – was held under bright sunlight at Fawsley Hall, close to the Silverstone circuit.

The attendees enjoyed a traditional barbecue while they were entertained by live music and a firework display. Team McLaren Mercedes drivers David Coulthard and Kimi Räikkönen flew in to the event by helicopter to meet and greet the guests.

## SUN HOLDS TECHNOLOGY CONFERENCE

Team McLaren Mercedes Technology Partner Sun Microsystems recently held their annual Technology Forum Briefing and Golf Marathon at the St Andrews golf course in Scotland.

The event offered a chance for Sun's potential and current customers to learn about the company's vision for the changing Information Technology landscape, as well as the strategic initiatives that will shape technology and business over the coming years.

TAG McLaren Group Chairman

and CEO Ron Dennis talked about Team McLaren Mercedes' innovative partnership with Sun Microsystems and the challenges of running a Formula 1 team with Sun Microsystems' CEO and Chairman, Scott McNealy.

Sun Microsystems also hosted a charity golf marathon the following day in which forum attendees were invited to take part. A charity auction was also held in which lots, including a pair of David Coulthard's race overalls, raised £145,000.

## TAG HEUER HOLDS GP RECEPTION

Team McLaren Mercedes Official Supplier TAG Heuer held a reception for its leading UK retailers and a group of journalists on the morning of the British Grand Prix.

Jean-Marc Lacave, the Managing Director of LVMH UK, the luxury goods house, hosted the event on the balcony of the Team Communications Centre.

Jean Christophe Babin, President and CEO of TAG Heuer, was also present, along with Team McLaren Mercedes driver David Coulthard, who met with the guests and talked about his race weekend. The group went on to watch the race as guests of TAG Heuer and the team.

## THE McLAREN TECHNOLOGY CENTRE [www.mclaren.com/technologycentre](http://www.mclaren.com/technologycentre)



## INSTRON EXHIBITS AT TESTING SHOW



McLaren Technology Centre

Partner Instron recently exhibited at the 2003 Testing Expo Show, held in the German city of Stuttgart.

The fair is one of the premier trade events for those companies who are involved in the vehicle test and evaluation industry – a major aspect of the automotive

manufacturing sector.

The industry's top decision makers had the opportunity to view first-hand the very latest products, development techniques, applications and services that enhance automotive test development and proving.

In order to highlight its Partnership with the McLaren

Technology Centre, Instron had a Team McLaren Mercedes Formula 1 showcar on its exhibition stand.

The stand also displayed testing equipment similar to that which it has supplied for the new TAG McLaren Group HQ, specifically the End of Line and racecar developmental test rigs.

## SCHÜCO SET FOR KART FINAL

The annual karting challenge run by McLaren Technology Centre Partner Schüco continues, with the winners of the regional heats heading for the final at Silverstone's Stowe circuit in the UK.

The event will be supported by Team McLaren Mercedes, who will send a race simulator to the circuit, as well as creating special trackside banners for the race. The overall winner will attend the British Grand Prix in 2004 as a guest of Schüco and the team.

## McLAREN CARS STAFF MOVE INTO TECHNOLOGY CENTRE

The second wave of staff from McLaren Cars have completed their move into the McLaren Technology Centre.

They will be joining 100 of their colleagues who have already completed the move, bringing the total amount of staff permanently occupying the building to approximately 300.



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## REPORT – ROUND 11

### SILVERSTONE, JULY 18-20

# BRITISH GRAND PRIX

In an incident-packed British Grand Prix, Team McLaren Mercedes drivers Kimi Räikkönen and David Coulthard once again managed to bring home their cars in the points in third and fifth places.

Race strategy for all the teams was heavily dictated by on-track incidents, which led to two safety car periods, but Team McLaren Mercedes were able to quickly adapt their plans and keep both cars in the thick of the action to the end.

From the start, Kimi was in contention for a strong result, leaping up from third off the line to take second from Rubens Barrichello. The Finn ran comfortably behind Jarno Trulli in the early stages, during which there was a brief safety car period as the fixings on David's head restraint broke, causing the part to fly off and leave debris on the track.

David's pitstop to replace it dropped the Scot down the order, but the race turned on its head on lap 12 when a spectator scaled the high safety fences and walked onto the track. The safety car emerged again as the demonstrator was restrained, but all the teams quickly brought their cars in ahead of their planned pitstops. As a result, the field was now headed

## “CONSIDERING MY START POSITION, WE CAN BE PLEASED WITH THE RESULT”

### DAVID COULTHARD

by the early-stopping Toyotas of Cristiano da Matta and Olivier Panis, with David in third and Kimi fifth behind Trulli.

After the restart, Kimi passed the Renault at Copsse to take fourth, before overtaking his team-mate for third. The Finn was clearly on the move and also got past Panis before moving into the lead on lap 30 when da Matta made his second pitstop. Kimi made his own second pitstop on lap 35, and was just able to retain his lead when Barrichello pitted on lap 39.

Unfortunately, despite a hearty defence, Kimi was unable to keep the Ferrari behind him for long. “I knew that Rubens had better traction out of Club,” Kimi explained. “I held him off for two corners, but he got beside me at Bridge. I tried to go around the outside, but I ran slightly wide and he got past.”

The Finn also lost out to Juan Pablo Montoya's Williams whilst struggling with a lack of balance, but his third place allowed him to close back in on Michael Schumacher in the Drivers' World Championship by one point. “I probably could have finished second, but in my final stint I was really struggling,” Kimi said. “I touched the brakes and just lost the rear completely. I was lucky to get back on the circuit.”

David, who had pitted on laps 28 and 47, went into the closing stages in seventh position, but was able to pass da Matta and Trulli to take fifth at the chequered flag.

“Considering my start position, we can be pleased,” he said. “Obviously, it was an unusual race, and things looked difficult when the fixings on my head restraint broke, but the team changed my strategy and the car's balance became better during the race, which enabled me to do some quick laps and ultimately helped me take fifth place by the end.” ■

#### TRACK FACTS SILVERSTONE

Lap length 5.141km

Race distance 308.355km

Number of laps 60

#### RACE RESULTS SILVERSTONE

1 Rubens Barrichello 1h28m37.554s

2 Juan Pablo Montoya +5.462s

3 Kimi Räikkönen +10.656s

4 Michael Schumacher +25.648s

5 David Coulthard +36.827s

6 Jarno Trulli +43.067s

7 Cristiano da Matta +45.085s

8 Jenson Button +45.478s

#### DRIVERS' STANDINGS

1 Michael Schumacher 69pts

2 Kimi Räikkönen 62pts

3 Juan Pablo Montoya 55pts

4 Ralf Schumacher 53pts

5 Rubens Barrichello 49pts

6 Fernando Alonso 39pts

#### CONSTRUCTORS' STANDINGS

1 Ferrari 118pts

2 Williams 108pts

3 Team McLaren Mercedes 95pts

4 Renault 55pts

## TO MAKE A POINT

Kimi Räikkönen was pragmatic about the outcome of the British Grand Prix. As he pointed out, at least he finished one point ahead of Michael Schumacher – a point that could prove valuable in the Drivers' World Championship.

History certainly proves this attitude correct. Five of the last 10 Drivers' World Champions have been decided at the final round and, with the current state of competitiveness, it looks like it could be a similar story this year.

In both 1998 and 1999, Team McLaren Mercedes driver Mika Häkkinen carried a four point deficit into the final race, but his work in earlier races, often claiming points in difficult circumstances, enabled him to be in a position where he had a chance – a chance he seized both times.

Spare a thought, though, for Alain Prost. Going into the 1984 season finale, he was 3.5 points behind McLaren team-mate Niki Lauda. Despite winning the race, second place was enough for Lauda to take the title by just half a point – the narrowest winning margin in Formula 1 championship history.

## LAP-BY-LAP

1

Kimi moves into second place off the line, while David moves up from 12th place to ninth

6

David suffers a head restraint fixing failure and has to pit for repairs. The safety car comes out

12

A demonstrator on track brings the safety car out again. Most of the field pits. David is now in third, with Kimi in fifth

16

Kimi gets by Trulli, before passing his team-mate. He then passes Panis for second place

28

David makes his second pitstop of the race

30

Kimi moves into the lead when da Matta makes his second pitstop

35

Kimi makes his second pitstop and builds up enough of a lead to keep it when Barrichello stops

42

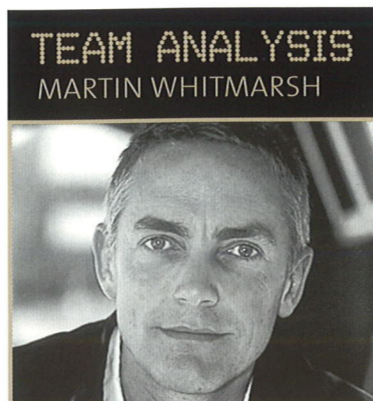
Despite a stern defence, Kimi loses the lead to Barrichello in Bridge corner

47

David makes his third stop, rejoining in seventh. Kimi then loses second to Montoya when he slides wide at Stowe, but David passes da Matta for sixth

60

Kimi finishes in third, while David is fifth after passing Trulli three laps earlier



### TEAM ANALYSIS

MARTIN WHITMARSH

The British Grand Prix was certainly an exciting race for the spectators, and the safety car periods and consequent adjustments to strategy that necessitated, certainly made it an interesting event for the teams.

At Team McLaren Mercedes we were disappointed, however, that we didn't come away from Silverstone with a victory, which was certainly a distinct possibility. Having said that, we can take satisfaction from the fact that both cars finished in the top five.

Kimi in particular looked like a strong contender for the race win, but there was a concern about his first set of tyres which forced us to increase the pressure in his final set. This, in turn, led to a handling imbalance in his car, which prevented him from pushing hard during the final sector of the race.

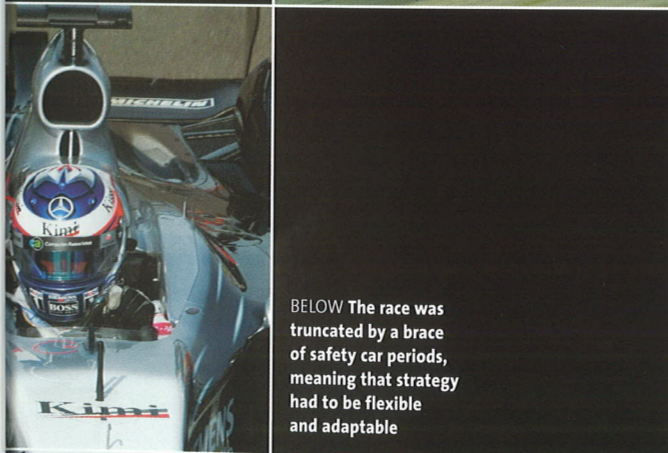
However, with the tyre competition very much the focal point of this year, everyone at the team appreciates the fine balances involved in tyre selection, and it is very enjoyable for us to be continually developing a strong relationship with Michelin.

We are sure that the situation between the rival tyre manufacturers will see-saw over the remainder of the season, and it's our job to make sure that we are ready to exploit any tyre-performance advantage that may come our way. The continued performance of MP4-17D will help us to do this, as it proved at Silverstone that it is still a car that is capable of winning grands prix.

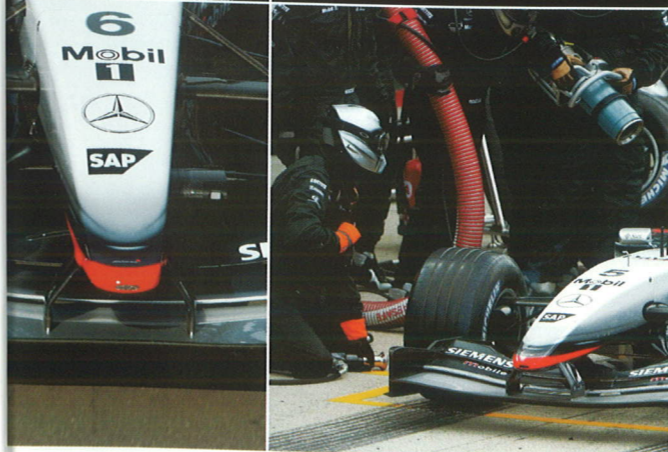
Ultimately, even though we are disappointed at not having won the British Grand Prix, at least we understand why we didn't win, and that will enable us to move forward over the coming races and continue our push for the World Championship.



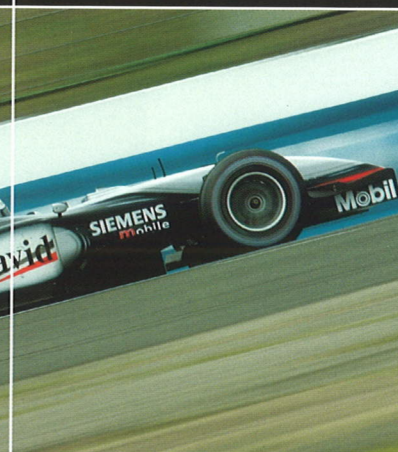
BELOW It could be argued that the British Grand Prix was the most exciting of the season so far, and Kimi was in the thick of it from the start



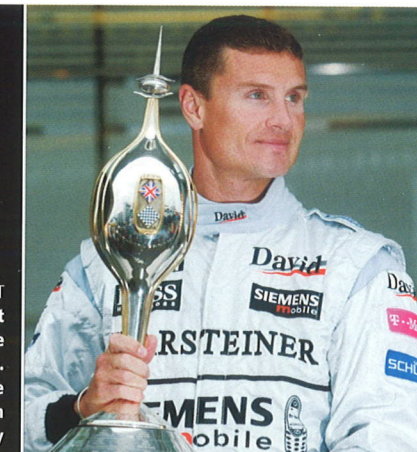
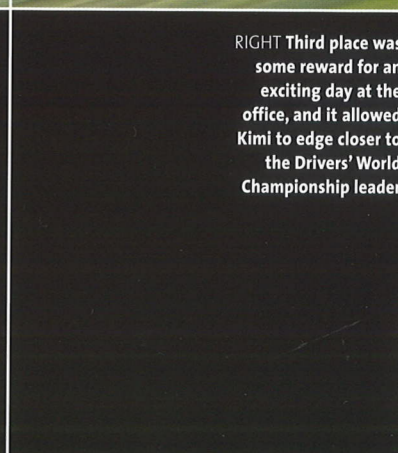
BELOW The race was truncated by a brace of safety car periods, meaning that strategy had to be flexible and adaptable



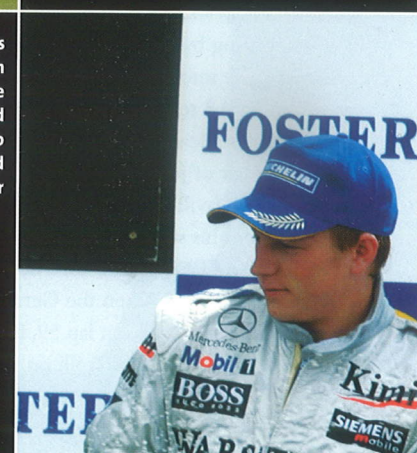
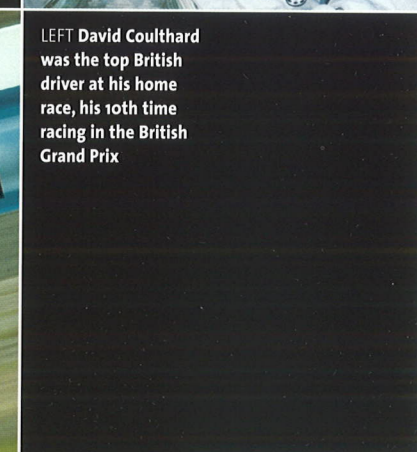
RIGHT David managed to get his hands on some silverware yet again. This time it was the Mike Hawthorn Memorial Trophy



RIGHT Third place was some reward for an exciting day at the office, and it allowed Kimi to edge closer to the Drivers' World Championship leader



LEFT David Coulthard was the top British driver at his home race, his 10th time racing in the British Grand Prix





## REPORT – ROUND 12

### HOCKENHEIM, AUGUST 1-3

# MOBIL 1 GERMAN GRAND PRIX



The 2003 Mobil 1 German Grand Prix was a race of mixed fortunes for Team McLaren Mercedes, with David Coulthard claiming his second podium finish of the season, and his team-mate Kimi Räikkönen retiring at the first corner.

On a baking hot day at the Hockenheim circuit, with track temperatures in excess of 50 degrees centigrade, Kimi and David lined up fifth and 10th on the grid.

Making up places at the start was always going to be crucial, and so it turned out – but with bleak consequences for Kimi. During the run to the first corner, he made a move on the outside of a slow-starting Rubens Barrichello, but was the victim of a first corner squeeze when Ralf Schumacher tried to protect his line.

The result was that Kimi had nowhere to go, making contact with the Ferrari and running straight off the track into the tyre wall, his MP4-17D all but destroyed. Luckily, the Finn was able to walk away from the accident.

In the melee following the incident David moved up from 10th to sixth behind Mark Webber, and, when the safety car

## “I’M VERY PLEASED WITH MY RESULT AFTER A DIFFICULT WEEKEND”

### DAVID COULTHARD

came in on lap six, the Scotsman was right on the Australian’s gearbox, getting by with a slick passing move on lap seven.

David came into the pits for his first scheduled pitstop on lap 18, and a 9.3 second time suggested that the Scot was on a two-stopper, meaning that he would pit one less time than the leading car of Juan Pablo Montoya.

By lap 39, David was still in fifth place, but when he emerged from his second and final pitstop on lap 42, he was well poised to make a move on Michael Schumacher, who was occupying third. When the German made a move on Jarno Trulli and got past on lap 59, David was right behind, making a similar move on Trulli on the very next lap.

This set up a classic confrontation with the reigning Drivers’ World Champion over the closing stages. When Schumacher pitted with a tyre failure on lap 62, though, David was left with a clear road to take second place – his second podium finish of the season.

“I’m very pleased with my result after a difficult weekend,” said the Scot. “My car was well balanced for most of the race and I could conserve my tyres, so when Michael and Jarno had problems with their tyres I was able to attack. I want to build on today’s result and I’m looking forward to the next race in Hungary in three weeks time.”

Kimi, meanwhile, was philosophical after a disappointing end to his race. “I don’t know who’s to blame for the accident, but it doesn’t really matter, because there is nothing I can do about it,” he said. “We lost a place in the World Championship standings, but there are still four races to go and lots of points still up for grabs.” ■

#### TRACK FACTS HOCKENHEIM

Lap length	4.574km
Race distance	306.458km
Number of laps	67

#### RACE RESULTS HOCKENHEIM

1	Juan Pablo Montoya	1h28m48.769s
2	David Coulthard	+65.459s
3	Jarno Trulli	+69.060s
4	Fernando Alonso	+69.344s
5	Olivier Panis	+1 lap
6	Cristiano da Matta	+1 lap
7	Michael Schumacher	+1 lap
8	Jenson Button	+1 lap

#### DRIVERS’ STANDINGS

1	Michael Schumacher	71pts
2	Juan Pablo Montoya	65pts
3	Kimi Räikkönen	62pts
4	Ralf Schumacher	53pts
5	Rubens Barrichello	49pts
6	Fernando Alonso	44pts

#### CONSTRUCTORS’ STANDINGS

1	Ferrari	120pts
2	Williams	118pts
3	Team McLaren Mercedes	103pts
4	Renault	66pts

## INTO THE FIRE

The Mobil 1 German Grand Prix was one of the hottest races of recent years, making life hard not only for the drivers, but also the teams, as it rendered tyre choice even more vital than usual.

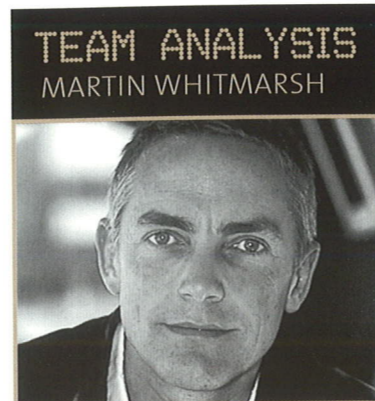
There were two factors on which tyre choice would be based – pitstop strategy and track temperature. The high track surface temperatures meant that a softer compound tyre, though faster, stood a chance of blistering, causing a drop-off in performance.

Strategy, would, in turn, dictate how long each set of tyres had to last. In balancing these two factors, the team decided to place David Coulthard on a two-stopper, with the harder of the two compounds available. They could not have done this, however, if it wasn’t for the strong hot-weather characteristics of their Michelin tyres.

“I must congratulate Michelin,” said Team Principal Ron Dennis after the race. “They provided us with some brilliant tyres that had to cope with extremely high temperatures – the likes of which are rarely seen in Formula 1.”

## LAP-BY-LAP

**1** An incident at the first corner marks the end of Kimi’s race. The safety car is deployed



### TEAM ANALYSIS MARTIN WHITMARSH

The start of the Mobil 1 German Grand Prix was obviously disappointing from the team’s point of view, but these things happen in motor racing.

Kimi had made an excellent start, and had good momentum on the approach to the first corner. Ralf Schumacher tried to protect his line from Rubens Barrichello and this, in turn, left Kimi with nowhere to go.

While this was happening, the team had already started the procedure of preparing the spare car for Kimi, as it was set up for David. We did this in case the race was restarted, but it turned out to be unnecessary as the safety car was deployed. Our attentions were then focused fully on David and his race strategy.

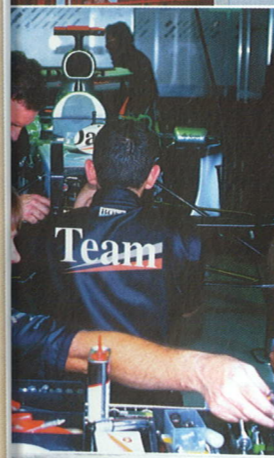
We were aware that the majority of teams had chosen to run a three-stop race, and, with the exceedingly high track temperature, tyres – in particular tyre wear – would be influential in the outcome of the event.

On David’s car, we had chosen to run the harder of the two compounds available to us from Michelin, as we felt that this would give us more options for the race. This turned out to be the case, as we switched David from a three- to a two-stop strategy.

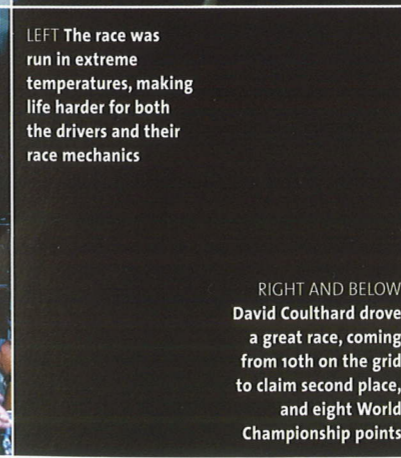
It was a very impressive drive from David, especially considering that he spent much of the event racing purely against the clock. After his second stop, David was right in the thick of the battle for second place, and his excellent overtaking manoeuvre on Jarno Trulli showed the kind of pace he was capable of.

Heading into the summer break, the battle for the World Championship is still very tight, we’ll certainly be doing all we can over the coming weeks and races to ensure that we are there in the final analysis.

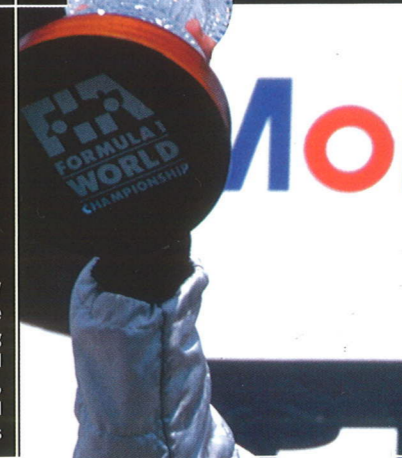
**6** The safety car returns to the pits as David Coulthard passes Mark Webber to fifth place with a manoeuvre



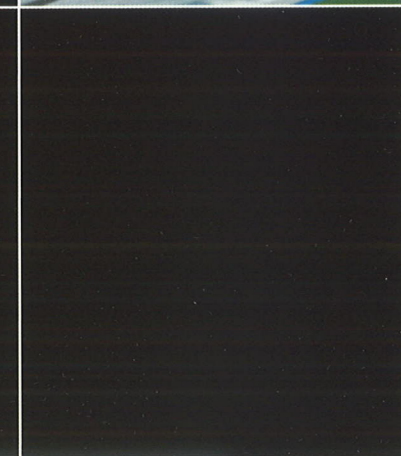
**18** David comes in for the first of his two stops, emerging back in fifth place behind Michael Schumacher



**42** David emerges from the second of his pitstops right behind Michael Schumacher



**59** David passes Jarno Trulli for third place



**62** Third place becomes second as Michael Schumacher pits with a tyre failure

**67** David Coulthard finishes the Mobil 1 German Grand Prix in second place, scoring eight points

ABOVE AND LEFT Kimi Räikkönen went into the Mobil 1 German Grand Prix weekend looking to consolidate his position in the Drivers’ World Championship standings, but his was to be a short race

LEFT The race was run in extreme temperatures, making life harder for both the drivers and their race mechanics


RIGHT AND BELOW David Coulthard drove a great race, coming from 10th on the grid to claim second place, and eight World Championship points

# RACING AGAINST TIME




 11:09



 11:25

A Formula 1 team's pit garage is a secretive place, rarely seen by the rest of the world – a blur of frenetic activity, where every second truly counts. *Racing Line* followed David Coulthard and his Number One Mechanic, Paul James, at the Mobil 1 French Grand Prix to find out what goes on when the clock starts ticking

WORDS LUKE HAYTER PHOTOGRAPHY STEVEN TEE/LAT

 It's 9:30 on Saturday morning at the Magny-Cours circuit in central France. The second set of free practice sessions for the Mobil 1 French Grand Prix are seconds away from starting, and the Formula 1 pitlane is alive with activity.

David Coulthard, Team McLaren Mercedes driver, is in the team's garage

– booted, suited and helmeted-up. His Number One Mechanic, Paul James, is overseeing the final fettling of the car before it hits the track.

This is the last real chance for them to optimise the car's set-up before qualifying and the race, and both men know there is much to be done if they are to get the best from the weekend.

As David's Number One Mechanic, it is Paul's job to supervise all the work that is carried out on his car. It is a role that, like David's, requires a paramount level of preparation, focus and attention to detail. Put another way, if Paul and the team don't do their job correctly, then David cannot fulfil the ultimate potential of his car – it is that simple.



SATURDAY,  
JULY 5

09:36 Paul motions to David, who pulls on his trademark Saltire-swathed helmet and lowers himself into the cockpit. His gloves await him, resting on top of the removed steering wheel on the car's nose.

Paul stands with his foot resting gently on the MP4-17D's front wing. He takes a quick glance around the car to check that all is well before he raises his hands up at his sides in a circular motion. At once, the mechanics move away from the car with almost balletic precision, and Paul signals to David that all is ready.

The car is fired up, the tyre-warmers removed and Paul runs backwards into the pitlane, all the time motioning for David to follow him. David turns the wheel to the left and is gone, leaving a trail of tyre smoke in the humid air.

09:52 At the end of the first practice session, David brings his car back to the pitlane and cuts the engine as his mechanics push the car back into the garage. He extricates himself from the

cockpit and removes his helmet and fireproof balaclava.

The car is then raised at both ends, as Paul and his team go to work – removing front and rear wings along with the engine cover. The wheels are also removed, replaced by set-up wheels, which keep the car at the correct height.

David is feeding back information on the car, and the adjustments he would like made in preparation for the second practice session at 10.15. Paul orchestrates the activity around the car, making sure that the systematic and rigorous post-run procedures are adhered to.

11:07 The second free practice of the day is over and David has made his way to the race trucks which back on to the garage exits. There he will pore over the data that the two morning sessions have created, as there is strategy to be decided for Sunday's race.

Debrief over, David heads back to the Communications Centre and relaxes over lunch, beginning the process of focusing his energies on the imminent qualifying session. Paul is still at work in

the garage, making sure that every part and system on David's car is in tip-top order. Once done, Paul and his fellow mechanics also have time to grab a spot of lunch.

14:01 Qualifying is under way, with David the eighth man to take to the track. Conditions are perfect. Opposite, in the main grandstand, thousands of fans are starting to agitate themselves, as the tension surrounding the appearance of the leading cars begins to rise.

Paul is, again, standing with his foot resting on the car's front wing, whilst his colleagues work on the portions of the car allotted to them. Then he moves his hands together in a twisting motion – as if uncorking an invisible bottle of wine – and lowers them to his sides. This seems to be a signal to detach the car from its various umbilical cords, readying it for motion.

14:20 While David is out on track, getting ready for his one and only flying lap of the session, Paul heads the gaggle of mechanics staring intently at the timing monitors. It's a quick lap, and



the smiles and looks of appreciation are warm and genuine. No time for basking, though, as Paul runs into the pitlane ahead of David's arrival, shepherding him back into the garage.

For Paul, and indeed all the mechanics in the pitlane, the 2003 season represents something different, thanks to the new regulations that require cars to be put under parc fermé conditions after qualifying, preventing the mechanics from making any non-essential set-up changes prior to the race.

"It's very strange," Paul admits. "After the second qualifying session has ended, there's not really a lot we can do – it's the exact opposite of how it's always been in the past, when the period of time after qualifying was our busiest."

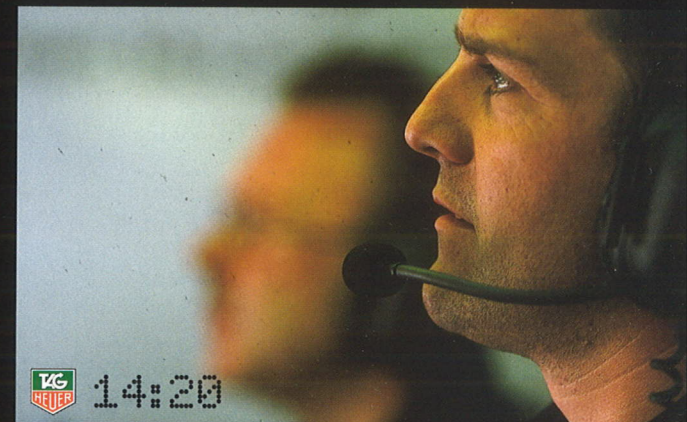
Paul and his colleagues are limited only to checking that systems are in working order. Any more detailed work that is required must be verified and given approval by the FIA, motorsport's governing body, and there are official

scrutineers on hand at all times to make sure the rules are adhered to.

"We work very closely with the FIA," he continues. "We have a list of things that we are allowed to do, such as checking fluid levels, connections and so on, but if we want to fix anything else, we have to inform the FIA in advance. They will then supervise the work."

14:32 After his qualifying run, David walks to an area of the paddock that is cordoned off to allow television crews from around the world to speak to the drivers post-qualifying. He emerges, beads of sweat glistening on his brow, and walks around the roped-off section, answering the questions of each crew in turn. Job done, he heads back to the race trucks, where again he will be debriefed. The garage, meanwhile, is eerily still, as the cars of both David and Kimi Räikkönen sit motionless.

14:47 David arrives in the Team Communications Centre where his girlfriend, Simone, greets him.



TOP LEFT It's an early start for Paul James, David's Number One Mechanic, as there is a lot to get through

LEFT Communication between the two men ensures that each is aware of what the other is doing

BOTTOM The talking is finished, and it's time to get out on the track and see what happens



"It's nice to have a chance to relax and just take the whole session in," confides David. "There's still a lot of work to be done before the race but, for me, it's now just a question of focusing and making sure I'm as prepared – both physically and mentally – as I can be."

15:07 David spots some friends and sits with them, talking about his weekend. Over at the garage, meanwhile, it is time for a clean. Paul and the mechanics ensure that their pit is immaculate, with the result that it ends up looking more like an operating theatre than a place in which cars are prepared – such is the way in Formula 1.

16:38 David has a Paddock Club engagement where he will greet the guests of the team's Partners and explain his weekend so far. He then meets a group of journalists, who have been granted a special audience on the rooftop balcony of the Team Communications Centre. Their questions are delivered in baking sunlight, and David thoughtfully considers each one before replying. This done, he returns to his quarters. Now is the calmest time of the weekend.

TOP The work that Paul and his team carry out on David's car means he can push hard. The result? Fifth position on the grid for the race

ABOVE Once the car is out of the garage, Paul can only look on and hope that it will be fast enough

BOTTOM The private balconies of the Team Communications Centre are perfect for group interviews by the media fraternity

SUNDAY,  
JULY 6

08:41 Paul James, who has been at the circuit for over an hour, comes into the Team Communications Centre to catch up with his colleagues. He is joined, severally, by his fellow mechanics, who arrive and leave with a beat all their own.

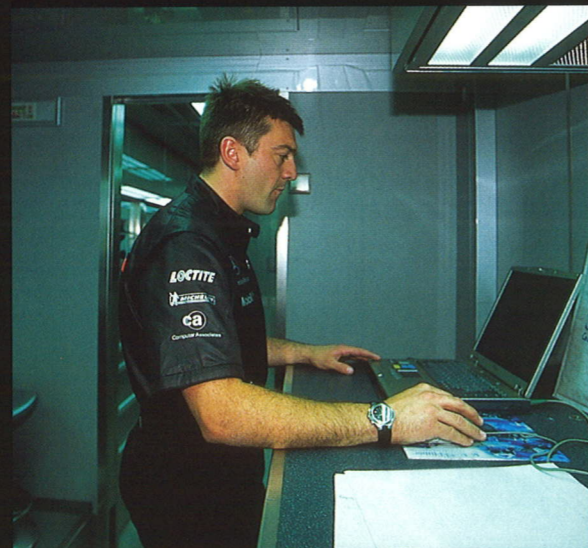
David Coulthard, by contrast, has just eaten breakfast and is inside his own motorhome receiving a massage from his personal trainer. This activity is designed to relax David, helping to put him in the best possible state of mind prior to the weekend's main event – the race.



TOP Working with the media is a large component of any grand prix driver's weekend and, as David is one of the sport's leading drivers, this role takes on extra significance

RIGHT In modern Formula 1, mechanics have to be as adroit with laptops as they are with wrenches

BOTTOM The time has come for the practice to stop, as David and his crew ready themselves for the trip to the grid for the start of the grand prix



09:10 Paul is showing an FIA scrutineer around David's race car, pointing out what work has been carried out where necessary. This takes time, as anything that has been touched by the mechanics – in the space between qualifying and the race – must be gone through to ensure that the car complies with the FIA's strict rules governing work on the car. David, meanwhile, is still in his personal motorhome, which serves as his base at each grand prix in Europe.

The Formula 1 Drivers' Parade is scheduled for 11:15, so David and his fellow pilots gather at the entrance to the pitlane, attracting a plethora of spectators and journalists as they do so.

The parade itself takes 15 minutes, and it offers the spectators in the grandstands and around the track a special glimpse of their heroes out of the car. Afterwards, David returns again to his motorhome to relax and get himself in the racing frame of mind, for in under three hours he will be sat on the grid, waiting.

12:00 The mechanics are doing all that they are allowed to do to the car – checking, preparing and checking again. "There's not really much that we can alter at this stage," admits Paul James. "It's really just a question of making sure that everything is in order and that the car is clean and ready to go."

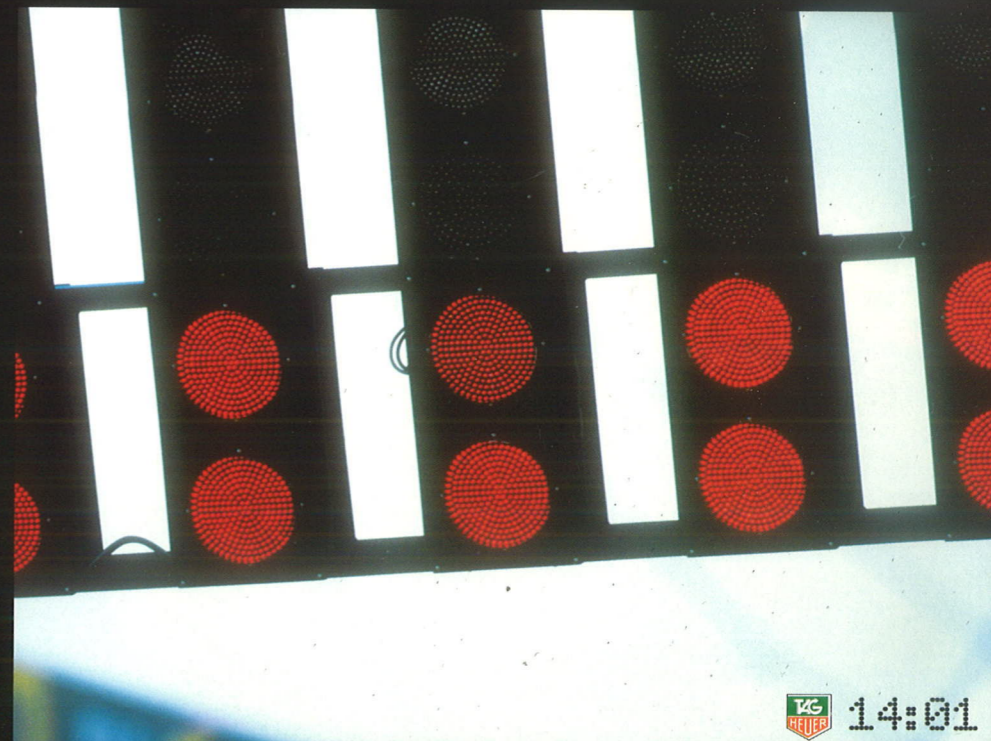
David has made his way back to the



Team Communications Centre, where he meets again with Simone, before retiring to his private quarters. Back in the pits, Paul and his team are checking the fuel rig that they will use this afternoon. This is vital work, as these systems can make or break the team's race performance.

13:24 David pulls out of the garage and makes his way to the grid along with all the others. Once there, David sits, expressionless, focusing on the start which is now mere minutes away.

Both David and Paul are now in The Zone, knowing that the team's fortunes rely on their combined efforts – and those of their colleagues – for the next two hours. Paul leads the gang of mechanics as they scurry from the grid back to the garage. Now they wait. David stares straight ahead, narrowing his eyes, as the five red lights go out one by one. ■



# HEARTBEAT

Formula 1 telemetry is the technological lifeblood of the sport, helping the drivers and engineers to better understand how a car functions and how they can optimise its set-up. But how does it all work? *Racing Line* found out

WORDS MARK SKEWIS PHOTOGRAPHS LAT PHOTOGRAPHIC ILLUSTRATION PETER LIDDIARD



“Information,” said former US President Ronald Reagan, “is the oxygen of the modern age.” Nowhere does that statement ring more true than in Formula 1, where a staggering flow of information has fanned the flames of a technological revolution.

Formula 1’s key figures exist in a bubble of publicity. Covered from every conceivable camera angle, their every move is broadcast to an audience of over 366 million people each race. Yet despite all of that interest the black art at the very centre of the grand prix drama, the use of telemetry data, remains shrouded in mystery.

Even one of the media’s most common phrases – ‘the drivers are studying the telemetry’ – betrays how little we know about the subject.

Telemetry is the wireless transmission and reception of data for the purpose of remote monitoring. But, telemetry is merely the mechanism of the system. The numbers it carries, the data, are the precious figures that unlock the secrets of what is happening within the car’s central nervous system.

The roots of today’s complex telemetry systems can be traced back to the late 1960s. Engineers craved data with which to understand and develop the cars they were racing. Back then, the height of technical sophistication amounted to asking the driver to look down at the rev counter and other instruments on the dashboard at various stages of the lap. This information would be relayed to engineers when the car returned to the pits, whereupon they would attempt to reconstruct the lap.

Tyre manufacturers were among the pioneers of data collection. The

movement gathered momentum in the early 1980s when the turbo era brought an even greater demand for quantitative data, and also better resources with which to pursue it.

These were heady times. Suddenly, top Formula 1 teams found themselves monitoring data with powerful mobile computers that, with hindsight, weren’t very mobile at all. Or that powerful.

“The capacity that these units had was probably less than that of a personal digital assistant now,” reveals Steve Hallam, Head of Race Engineering for Team McLaren Mercedes. “But these computers caused a ripple of excitement to run down the pit lane. Suddenly, engineers had vision – they weren’t just relying on what the drivers told them”

Where early data recording devices featured a handful of inputs from rudimentary sensors attached to the car, today’s complex telemetry systems allow the transmission of over 6000 parameters. These include detailed feedback on all aspects of the engine, transmission, suspension and wheels.

But why do we need telemetry data at all? After all, these drivers are the best in the world. If they can’t detect what’s going on within a car, who can? The problem, of course, is that while drivers may be good at conveying the ‘feel’ of a car, they can’t possibly know what’s going on in the heart of its sophisticated components.

The sensors’ ability to detect details more efficiently than the driver himself was demonstrated as recently as the British Grand Prix. Engineers watching the data screens noted that one of David Coulthard’s tyres was losing pressure in free practice. The team was able to recall him to the pits instantly, therefore averting the possibility of a

sudden tyre deflation and accident.

Where 'seat of the pants' was once king, the set-up of cars is now largely dictated by data relayed from 120 sensors attached to the car. Initially, this technology was imported from other industries. Today, companies such as TAG Electronic Systems – which supplies Team McLaren Mercedes – are market leaders in their own right.

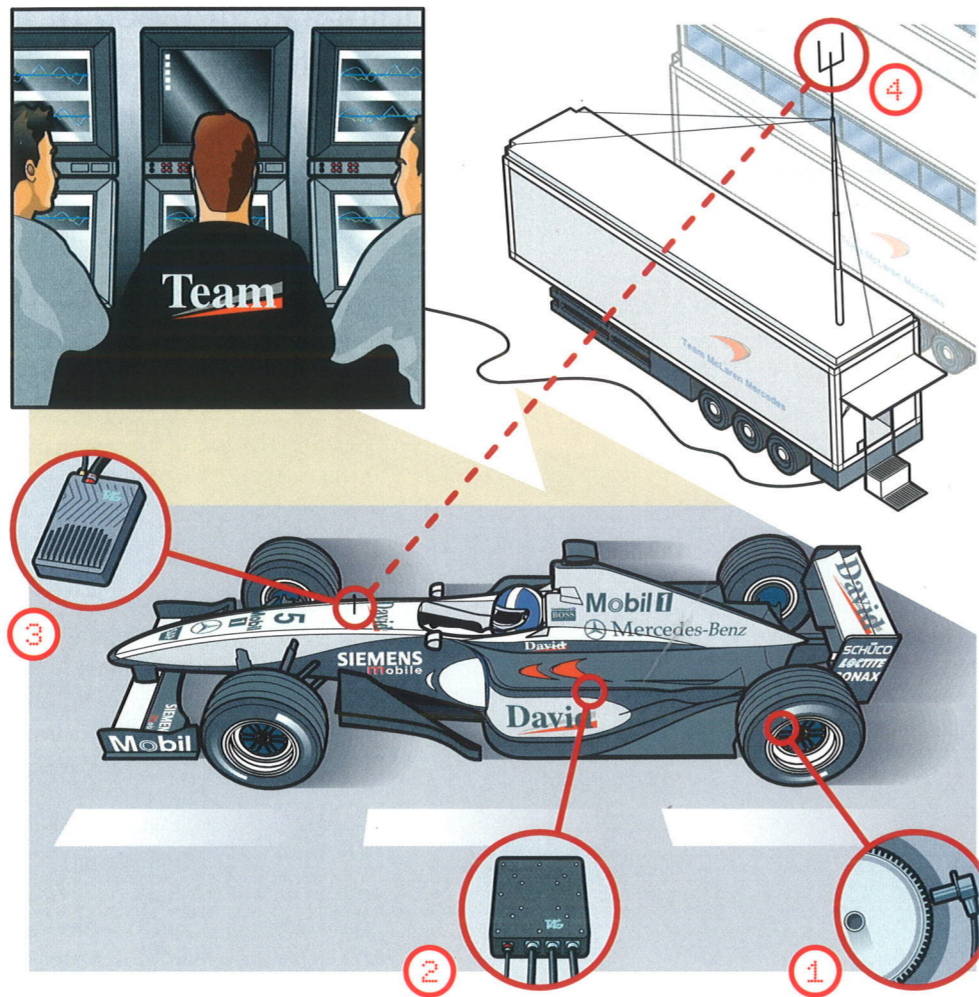
The information received by each sensor is harnessed simultaneously for many functions. For example, a simple wheel speed sensor determines far more than how fast the wheel is going. In conjunction with other sensors, it reveals how fast the car is going, its position on the circuit, and input to traction and launch control systems. Consequently, an enormous amount of information is generated: Team McLaren Mercedes engineers in the pits receive 50 Megabytes of data per car, per lap. That's an astounding 3.5 Gigabytes per car, per race – enough to fill five CD-Roms.

Phill Asbury, Head of Team McLaren Mercedes Systems Engineering, puts those figures in context. "If we were to type the information on sheets of A4," he says, "the paper would stack to the height of the Empire State building!"

The sensors' electrical pulses are processed on-board the car and beamed, via a digital radio signal, to an antenna mounted on the team's truck. The signal is sent in the L-band microwave frequency range, around 1.6GHz. This range is used for ease of licensing, given the number of borders Formula 1 crosses, but also because it meets the team's required bandwidth.

With five million single bits of information sent back from the car every second, Formula 1 is redefining the boundaries of data transmission. The high frequency required to handle that volume comes with some drawbacks.

Reception is very much line of sight. If the car goes through a tunnel, as in Monaco, or around the back of a hill, 100 percent coverage is lost. Monza, a tree-lined circuit in Italy, is the most challenging event for telemetry engineers. As you can imagine, few tears were shed when Hockenheim was reconfigured without its forest sections!



ABOVE Data recorded by devices such as the wheel speed sensor (1) is processed by the car's ECU (2) and transmitted to a receiver on top of the race transporters by the aerial (3) on the front of the car. This is then relayed to the engineers working on the Sun Microsystems Battlestations.

TOP RIGHT The data received by the team can be invaluable for helping pinpoint any technical problems before they occur, as well as helping the drivers and the race engineers optimise the car's set-up

"As systems have evolved, 'sleight of hand' techniques have been developed to cope with the temporary loss of signal," explains Asbury. "The new TAG Electronics system has a level of intelligence within it. When the car is in plain view we can re-transmit information that we know was not received previously when out of sight."

Once received by the antenna, the signal is converted into 'real' figures. This data is distributed through a server on a 1Gb back-bone Ethernet system that utilises both fibre-optic and copper connections. It is sent simultaneously to each driver's race engineer, to seven computer workstations, christened Battlestations, in the rear of the garage and to 11 terminals on the pitwall timing stands. In addition to a number of other track-based support personnel, data can also be relayed back to the factory in Woking via multiple ISDN lines.

The benefits of telemetry data are

two-fold. Its careful analysis offers the chance to achieve the designer's Holy Grail of improved reliability and performance. At a race, the Battlestation technicians are concerned primarily with diagnostics – checking that all the car's systems are functioning correctly and providing early warning of a potential mechanical failure.

It was this application that detected and rectified the onset of a fault in the engine oil system of David Coulthard's car in Monaco last year. The Scot's victory was hailed as a groundbreaking moment in the development of bi-directional telemetry. Sadly, this two-way feature has been a casualty of the 2003 rule changes.

Having accurate information enables engineers to fine-tune a car's set-up. The graphic presentation of throttle, brake and steering traces also provides a tool with which drivers can maximise their own performance. During the course of a test or a grand prix, they

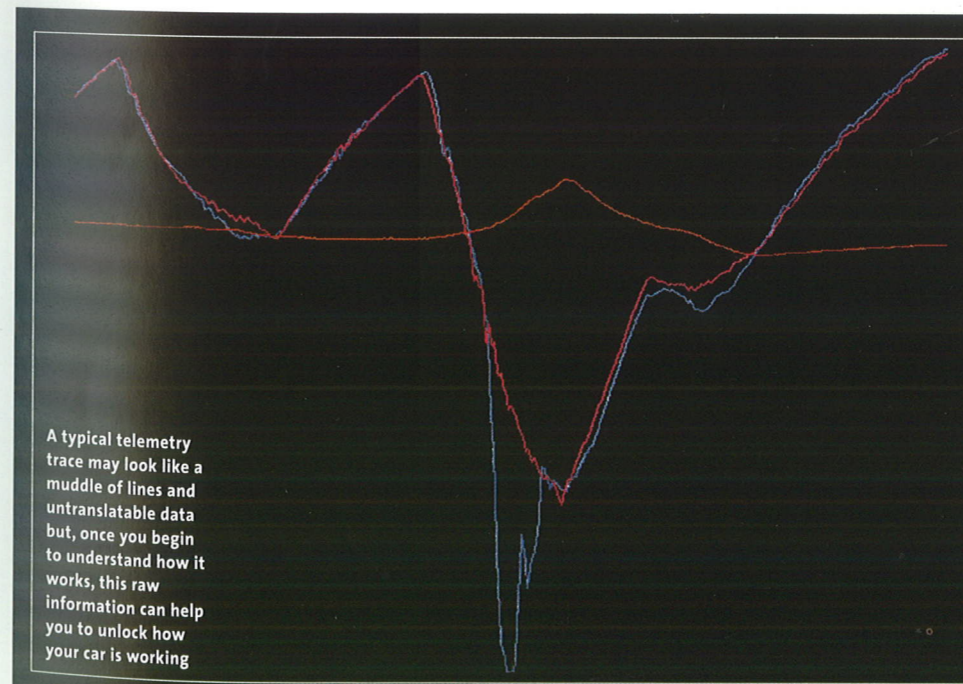
will spend hours analysing such details.

The biggest leap forward in recent years has been the advent of real-time data. "Originally, all engineers had to download data after the event had happened," explains Hallam. "When data was downloaded after an engine failure, engineers would say, 'The crankcase pressure went up. If only we could see that as it was happening, we could tell the driver to shut the engine down before it failed and we then wouldn't be looking at a pile of bits and trying to work out what broke first'."

Their prayers were answered by the advent of the data 'burst', triggered when the car passed the pit wall each lap. Even that wizardry has now been rendered obsolete by the latest TAG Electronic Systems technology, which offers continuous real-time coverage.

The example of the wheel speed sensor puts that into context. The time delay between successive teeth on the car's target wheel passing the sensor, and the sensor measurement appearing as a speed value in the pit garage, is an incredible 0.1 seconds.

With the stakes so high, Team McLaren Mercedes' IT infrastructure receives the same meticulous attention to detail as that for the race cars. Computer Associates provides a range of software to protect the data from



A typical telemetry trace may look like a muddle of lines and untranslatable data but, once you begin to understand how it works, this raw information can help you to unlock how your car is working

## TRACING THE FACTS

This example of telemetry from a front wheel speed sensor on Kimi Räikkönen's MP4-17D allows us to demonstrate how telemetry can be used for a driver to evaluate his own driving performance and for the whole team to understand where time is being lost.

The red line is a regular lap for Kimi, while the blue line is a lap on which he locks the wheel in question. As a result, the speed of the wheel drops significantly more than before.

Even more valuable information is contained in the orange line which extrapolates this information and allows the engineers and Kimi himself to judge exactly how much time has been lost.

Thus, when the drivers admit after a qualifying session that they probably lost "half a second" with an on-track mistake, they may actually have a more accurate idea of how much time that cost them than you may think.

SIEMENS

TAG HEUER



ABOVE Getting the data to the drivers as quickly as possible is vital – often they will be handed a data trace of their best lap just seconds after they have been pulled back into the garage

corruption. It is also responsible for a backup system that is on 'hot standby' in the event of failure. Technology Partner, Sun Microsystems, provides vital hardware for the Battlestations to help with the distribution and storage of data.

Team McLaren Mercedes uses two separate programmes to process data into an understandable format. The Advanced Telemetry Linked Acquisition System, or ATLAS, a TAG Electronic Systems programme, lends itself well to engineers making judgements about complex diagnostics issues. MIDAS, a programme written in-house, has been tailored primarily for the viewing of performance-related data.

Recent restrictions on Formula 1 testing have served only to increase the importance of telemetry data.

"Every minute waiting is a minute wasted," suggests Asbury. In this respect, the introduction of TAG Electronic Systems' new CBX600 couldn't have been better timed.

Boasting improved coverage and more data than rival systems, it has raised industry benchmarks.

"Twelve months ago, the cars would have to be physically connected to the system after a run and the high resolution data required for performance analysis uploaded," explains TAG Electronic Systems Support Engineer Ed Gibson. "Often, a driver would be about to go out for his next run by the time the 'overlay' from the previous one could be put in front of him. This year all the data is transferred while the car is on the circuit. The print-out is ready for a driver even as he rolls to a halt and pulls his visor up."

Only when you witness the Team McLaren Mercedes telemetry system in operation at the racetrack do you realise exactly how advanced it is. When the car changes gear on the circuit, the action registers on the data traces quicker than the sound of the gearchange reaches your ears... ■

### LOW-TECH, HIGH-TECH

You would probably die of embarrassment if confronted with a picture of your first mobile phone. The same rosy-cheeked reaction is evident when Ed Gibson, support engineer for TAG Electronic Systems, views an image of the company's first telemetry system.

In fact, there's no need to wince. The system, complete with a formidable battery of monitors, was actually state of the art when it was devised for the Mercedes-Benz C291 World Sportscar programme in 1991. The comparison with the current system, introduced by Team McLaren Mercedes for this season, reveals how far the technology of telemetry has progressed in so little time.

Twelve years ago, the 20 screens displayed only engine diagnostics. Today, that technology could be accommodated on the screen of a single laptop computer. If all the parameters measured on this year's Formula 1 cars were to be displayed on that 1991 system, it would require so many monitors that it's unlikely there would be any room left in the garage for the cars.



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# HEADMASTER

A Formula 1 driver's crash helmet is one of the most vital parts of his safety equipment, protecting him from impact and injury. *Racing Line* went behind the scenes to find out what goes into their production

WORDS LUKE HAYTER PHOTOGRAPHS LAT PHOTOGRAPHIC



We have all seen the grainy, black and white film footage of Formula 1's yesteryears, in which sepia-tinted drivers wear leather caps, their faces blackened by racing grime and their eyes shielded from on-track debris by aviation goggles.

In those times, safety in the sport was limited to a couple of straw bales at each corner and a small wooden fence protecting the spectators. Fortunately, times have certainly changed since then.

Today's Formula 1 drivers are highly protected from all the dangers inherent in their job. This has been the result of numerous changes instigated by both the drivers themselves and the sport's governing body, the FIA, over the years. One of the most important of these is the mandatory use of crash helmets, introduced in the mid-1960s.

Of course, the helmets worn by today's grand prix drivers represent the very pinnacle of safety technology and their evolution has been carefully plotted to provide the best possible protection to the driver. To ensure this, each helmet has to undergo a strict series of scientific tests, designed to explore every aspect of the helmet's design and construction, to validate its worthiness for use on the race track.

To produce a helmet, a mould must first be made. This is done only after a thorough research and development process, in which helmet manufacturers

seek the opinions of the drivers in addition to that of their own design teams. It is the drivers, after all, who will be wearing the finished product.

This process is applied to every single model that specialist helmet manufacturer Arai Helmets of Japan produce, from karting through to Formula 1. All this data is considered when a new helmet is produced and the manufacturer then makes several samples before a mould is made. From there, the production process begins.

"There are four basic components that make up the modern racing helmet," explains Peter Bürger, Formula 1 Co-ordinator at Arai. "The first of these, and the most visible, is the outer shell, which is constructed using a combination of fibreglass and Kevlar."

This outer shell must protect the driver against four key elements – penetration, abrasion, impact and weather. The next component is the inner shell, which is manufactured from polystyrene.

"This acts as a safety cell to protect the head against impact," Bürger explains. "It also acts to reduce the energy of any impact, and is ventilated to ensure the driver is kept cool."

Thirdly comes the lining, or comfort material, which is made from urethane foam covered with nomex webbing. This helps to provide a snug





TOP AND ABOVE Each time that David and Kimi strap on their helmets before qualifying, a practice session, or the race itself they can be confident that their heads will be well protected

comfortable fit, which is vital if the helmet is to be safe. This lining is constructed from a breathable mixture which also disperses moisture.

Finally comes the chin strap, which has the most vital job of all – to keep the helmet on the driver's head. This is constructed from a tightly-woven Kevlar webbing, with a double 'D' ring buckle for fastening. The strap is mated to the shell by stainless steel rivets.

Once the helmet is constructed it must be tested. This process is carried out by the Snell Memorial Foundation, based in the United States, under the guidance and approval of the FIA. Various tests are performed under laboratory conditions in order to determine the helmet's performance and ability to stay on the driver's head in a variety of circumstances.

First comes the impact test, in which the helmet is positioned on a dummy head and dropped onto sundry steel anvils, which simulate different impact surfaces. In all cases, if peak acceleration imparted to the head exceeds 300g, the helmet is rejected.

A dynamic retention test stresses the chin strap of the helmet, fastening it under a dummy jaw and then loading that jaw with weight. This will then be subject to an abrupt guided fall in which the chin strap must not stretch

by more than 30 millimetres.

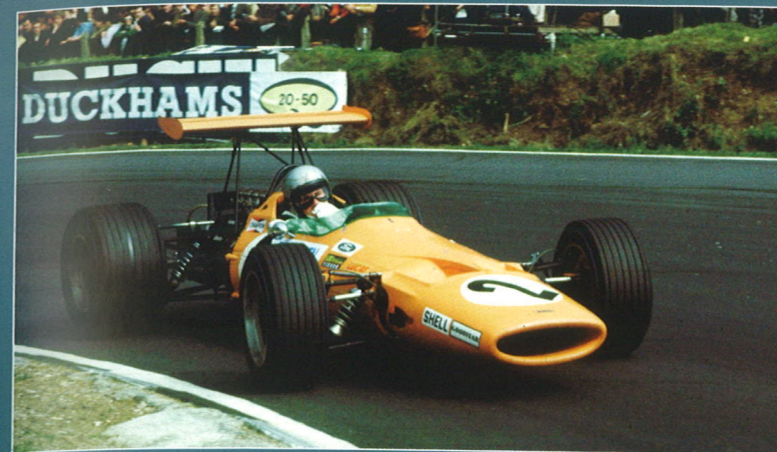
The chin bar at the front of the helmet is also tested by affixing the helmet to a rigid base and dropping a five-kilogramme weight so that it strikes the central portion of the chin area. A similar test is also applied to the outer shell of the helmet, but in this instance the weight is sharply pointed. In order for the helmet to pass this examination, the spike must not penetrate the helmet or even achieve momentary contact with the inner shell, such is its stridency.

One of the more startling test procedures is applied to the visor – the shield between the driver's face and any impact – to ensure that it is 100 percent safe. The visor is fixed to a helmet and shot along its centre line in three separate places with an air rifle, which fires lead pellets.

The speed of this pellet is 500 kilometres per hour. If the visor is to pass, it must not be penetrated and any intrusions onto its inner face must not exceed 2.5 millimetres in length.

"These tests may seem a little extreme," explains Peter Bürger, "but they are entirely necessary to ensure that anyone who wears a crash helmet is as protected as they can be."

Of course, in the modern era of Formula 1, in which refuelling stops



ABOVE AND BELOW In the 1960s, Formula 1 drivers were starting to realise the importance of adequate head protection, even though the designs they wore were still a long way from offering the protection enjoyed by current racers

are a critical aspect of the sport, flame resistance is one of the most vital qualities a helmet can possess.

To ensure this is the case, a propane flame of approximately 790 degrees centigrade is applied to the shell, chin strap and visor for a specified period of time, and any resulting fire must extinguish itself within a further specified time after the flame has been removed. During the whole of this process the temperature of the interior lining of the helmet must not exceed 70 degrees centigrade.

Each helmet manufacturer has to send a sample of each of its helmets to the Snell Foundation for testing. In addition, though, the Foundation will randomly go out and buy helmets from the high street to test them. This helps ensure that the helmets that are being sold to the public are as safe as the ones sent to the Foundation by the manufacturer for initial testing.

Once the Foundation has given its seal of approval, the helmet can be

forwarded on to the painters, who painstakingly apply the driver's unique design, which serves as his identification when on the racetrack.

Then the helmet is ready to be used and this is where Peter Bürger's chief role comes in.

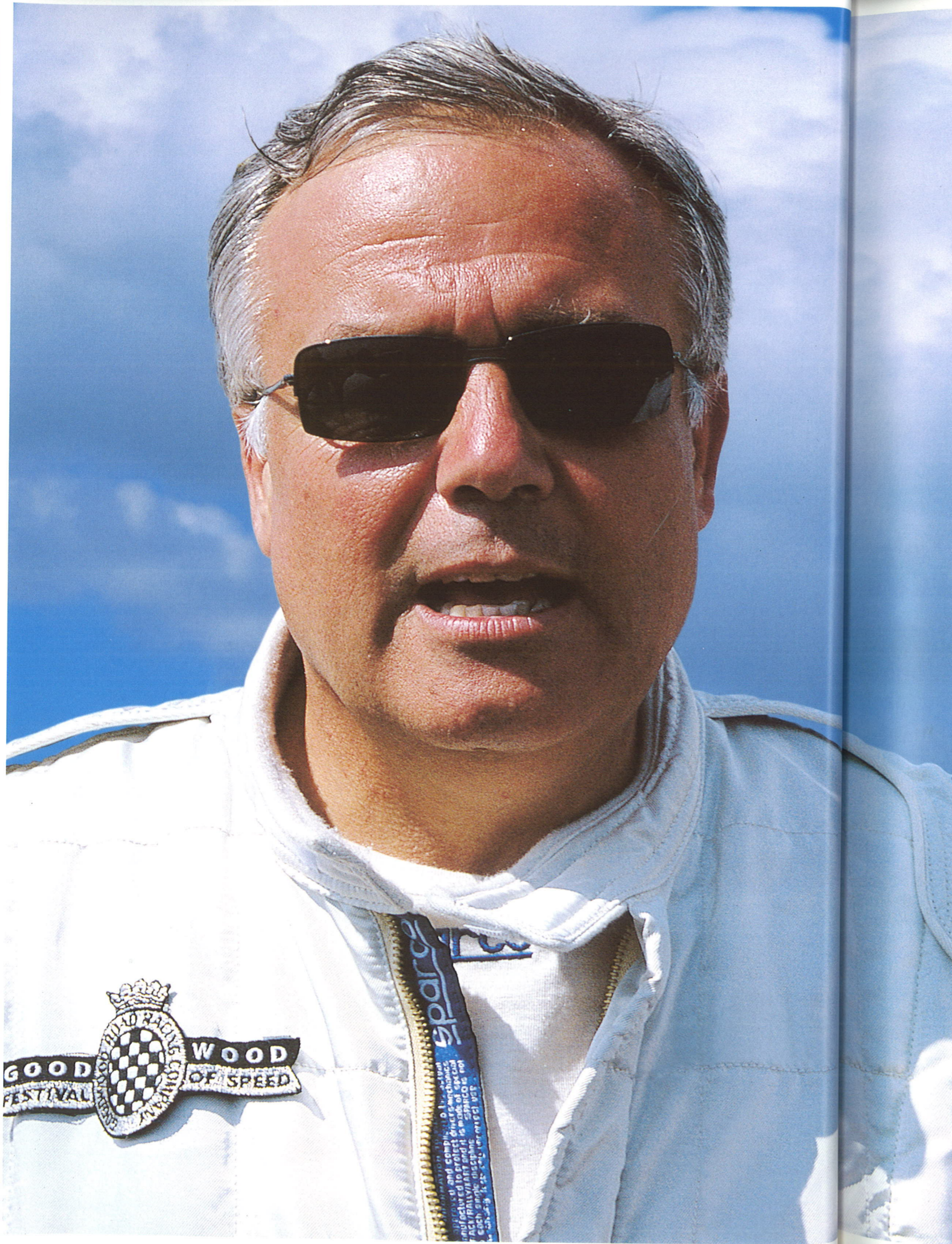
"My job is to service all the grand prix drivers who wear our helmets over the course of a race weekend," he explains. "Essentially, I make sure that all the helmets are in tip-top condition for each session. This involves cleaning them, lubricating the visors, making sure the seals are in good order and so on."

As with any aspect of race preparation, each driver has his own particular requirements.

"I also look after other details, such as visors," continues Peter. "Kimi Räikkönen, for example, has a tinted iridium visor which he uses for both wet and dry conditions, while David Coulthard likes to use a clear visor in the wet and a tinted one in the dry. David also has an additional seal at the bottom of his visor because he likes to keep it a little bit open, and the additional seal eliminates the draught that this opening creates."

So, the next time you're at a grand prix, and you catch a glimpse of Kimi or David whizzing by, try to get a close look at their helmet, and remember how it got there... ■





Frenchman **Patrick Tambay** drove for two seasons with the McLaren team in 1978 and 1979. Since leaving the sport he has gone on to become both a Formula 1 commentator and a regional politician. *Racing Line* talked to him at the Mobil 1 French Grand Prix

WORDS ADAM COOPER PHOTOGRAPH LAT

**You drove for McLaren in 1978 and 1979, in between two successful eras for the team. What are your memories of those days?**

I would have loved to have been with the team in the current Ron Dennis era, with all the changes that he has implemented. But I enjoyed the relationship I had with [former Team Principal] Teddy Mayer at the time, and also with [Team Manager] Alistair Caldwell. Some of the old boys from those days are still in the team, although mainly at the factory, but [Chief Designer] Neil Oatley and [Team Manager] Dave Ryan still come to the races.

**What was James Hunt like as a team-mate?**

He was very glamorous, and very far from the approach that young and upcoming drivers have today! I came in fresh from the 1977 season with the Ensign team, where I was the upcoming star who showed well in a few races with bad equipment. But then I ended up in a very different kind of atmosphere, and maybe I wasn't concentrating very much on the work.

**But it was a good time?**

I have a lot of good memories, but unfortunately we didn't produce the results together that we should have done. I managed to get some success later on in my career, but I look back on my time with the McLaren team with great fondness.

**You're still enjoying a bit of historic racing, though, such as at the UK's Goodwood Revival meeting...**

When there's an opportunity, I'll go for it. I still love to race, and the Goodwood Revival is the perfect event to go to – so many great cars and drivers.

**Do you still keep in close touch with Formula 1?**

I'm not doing television commentary this year, but I'm doing the same thing on radio, for a station in Monte Carlo. We have a half-an-hour show in the evening, live coverage for qualifying, three-hour live coverage for the races, and a talk show on the Monday night for one hour. We do it remotely, from the studio in Paris, except for the Monaco and Mobil 1 French Grands Prix.

**Are you enjoying Formula 1 now more than last year, with all the rule changes for 2003?**

It's a difficult business in terms of commentaries. It's very tricky to be able to see through the different situations, different strategies, which makes it interesting. I still enjoy it very much – having to predict what's going on, what's happening – but you have to be very careful when trying to explain that to the audience. But we've had different winners, different teams, and a Drivers' World Championship that's getting very open.

**Do you enjoy seeing the new drivers, such as Kimi Räikkönen?**

We have new, young upcoming drivers with a lot of guts and maturity for their age, and I like that. I hope other people like it, so I'm trying my best to tell everyone how good Formula 1 racing is at the moment! It's very difficult, because a lot of people for quite a long time have been seeing the branch on which they are sitting – I mean, saying that the sport is dull, professional and so on. There has always been this element to the sport, and I think the emergence of young guys such as Räikkönen will ensure that the future is bright for Formula 1.

**You were elected as a regional politician in the south of France earlier this year. What's that like?**

It's a hobby! It's very time consuming, but I'm trying to do my best for my local constituents. It's another form of competition, let's put it that way. You don't have the clock running, and you don't have your competition close by to see where you're standing. It's another game. You've got to do your stuff, you've got to be clear and precise, and you have responsibilities – and you have to be honest. All of those things are difficult to put together, but you have to have put your values in place and stick to them.

**How different is it from the life you were used to in racing?**

Today I'm very close to the real world, very close to people in need, because this is what political work is about. You don't have only the glamorous aspect of politics. You have to be in social commissions, and you're talking about trying to help families with food needs and low incomes, and old people, and we spend a lot of time on that aspect of things. With what I'm discovering now, about the way things are well run or not so well run, and the difficulties in transforming things that are going wrong into something that's going right, I have a feeling that I was in a total dream before. It was a completely different world, completely away from the reality, living in a cocoon, doing our own stuff in a sort of golden ghetto! Of course it was a fantastic privilege, but sometimes I have the feeling that I'm two different people. Reflecting on the racing, I'm happy with everything that I had the opportunity to do, but even then I didn't do as well as I thought I should have done! ■



## Model Performance

Style and appearance are just as important in the business world as a head for figures and commercial savvy. When a free fashion show for the London business community was recently held in the heart of the City, Team McLaren Mercedes Corporate Partner HUGO BOSS was naturally involved at the heart of it

WORDS TOBY WALLER PHOTOGRAPHS HUGO BOSS

A good-looking, sharply dressed office worker is hardly an unusual sight for the heart of London's financial community. It's certainly not a head-turner. But a Team McLaren Mercedes Formula 1 car and a group of mechanics as well? That's a different story. To see both in the same place at the same time, you'd likely get good odds from your local bookmaker.

For the office workers who occupy the Broadgate Arena complex, near London's Liverpool Street Station, whether popping out to grab a sandwich for lunch or visiting clients for a meeting, there is always

bound to be something to catch the eye in the locale.

After all, during the winter months, the 25-metre wide amphitheatre in the centre of this modern shopping, restaurant and office facility houses an outdoor ice-skating rink, while throughout the summer months it regularly hosts musical performances, displays, street theatre and sports events.

Today is no exception, for the Broadgate Arena is playing host to the first fashion show ever held in the City of London's Square Mile.

This event is unusual in other ways as well. Unlike other fashion shows and events in the centre of London,

this is open to the general public, and, with 150,000 people working in just the Broadgate Arena complex alone, it has proved to be a great draw for a casual crowd unused to seeing a fashion show just a few steps away from their company's foyer.

The free three-day event, organised by international business magazine *Business Week* and its supplement *Fashion Week* has been put together to promote the idea of mixing high fashion and big business.

It must have seemed entirely logical, then, to get Team McLaren Mercedes Corporate Partner HUGO BOSS involved. After all, the company has >>



“FORMULA 1, AS A HIGH-PROFILE, EXCITING AND DYNAMIC SPORT, HAS A SIGNIFICANT AUDIENCE IN THE BUSINESS COMMUNITY”

been leading the world in fashion – particularly high-end business and formal wear – for countless years.

But how did Formula 1 and Team McLaren Mercedes get involved? The link between HUGO BOSS and McLaren – long-term Partners in grand prix racing – is well-known, but when the team behind this fashion event visited the HUGO BOSS office to discuss their plans, the Team McLaren Mercedes showcar elevated over the company’s lobby was a natural conversation piece.

Why not place a Formula 1 car as the centrepiece to the whole fashion display? Formula 1, as a high-profile, exciting and dynamic sport has a significant audience in the business community, and any Formula 1 car –

**ABOVE** When Team McLaren Mercedes Corporate Partner HUGO BOSS got involved in the free fashion show in Central London, it seemed only logical to heighten the Formula 1 link as well

particularly one from Team McLaren Mercedes – is a natural draw for a crowd and a big boost to any event.

The link between the latest fashion and the stylish world of Formula 1 – which HUGO BOSS maximises through its links with Team McLaren Mercedes – was also a significant factor in the thinking behind the concept.

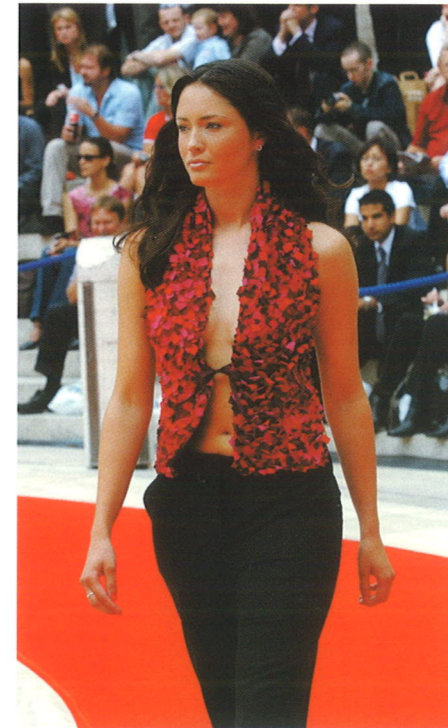
One quick call to Team McLaren Mercedes, and the idea grew even further. Since HUGO BOSS has helped design and develop the team’s official work clothing at races, why not feature this as part of the show as well?

It has all certainly proved to be a big draw, with regular, large crowds watching each of the shows that takes place. The combination of good looks and great design – both in the

Formula 1 showcar in the centre of the arena and in the clothes that are being modelled – are definitely great eye-catching material.

It’s a tough choice – lunch in front of your computer, or lunch at a fashion show, and many of these unlikely visitors have become rapid converts to the idea of watching real-life models in the flesh rather than seeing them in the adverts and photoshoots of their lunch-time magazines and newspapers.

HUGO BOSS has used this opportunity to model its Fall/Winter 2003 collection for both the BOSS Black Label men’s and the BOSS Woman ranges. As the models parade around the red carpet that encircles the Team McLaren Mercedes car, it’s once again easy to see why HUGO



BOSS often leaves the rest of the fashion world standing.

Both ranges are cutting-edge, blending formal and informal relaxed looks to perfection, with different mixes of styles, fabrics and textures creating a stunning effect.

The tailoring on the BOSS Black Label collection is sharp, dark and chic, with slim-fit, two-button single-breasted and double-breasted jackets backed up by elegant slimline cashmere coats, luxury parkas,

double-face leather jackets and tight, low-rise trousers.

The BOSS Woman range proves equally intriguing, combining narrow and lean coats, long fluid dresses and fitted cropped jackets with cargo pants and knitwear, all blended in a sophisticated range of browns, greens, spicy reds and purples.

Finally, on come the models sporting the overalls of the Team McLaren Mercedes mechanics. Each holds a helmet of the one of the

**ABOVE** The range of styles on-show from HUGO BOSS was both wide-ranging and eye-catching in equal measure. The clothes from the BOSS Black Label and BOSS Woman collections certainly got the local office community talking

Formula 1 team’s drivers under their arms and, as they come to a halt in a pose, the large crowd erupts in a rapturous roar of applause and cheers.

If the conversation of the departing office workers is to be believed, then the event has been a huge success. They’re all talking about the clothes and the latest look. It could well be that sharply dressed, good-looking office workers will soon be an even more common commodity here in central London. ■

## THE REAR WING

WORDS JOHN LEACH PHOTOGRAPH TED HUMBLE-SMITH

Formula 1's constant quest for higher cornering speeds led 1960s designers to experiment with wing technology. An aircraft's aerofoils are shaped so that air travelling over their top surfaces moves faster than that underneath, creating an area of low pressure. The higher pressure below then forces the plane skywards.

Now the last thing you want a racing car to do is take off, but if you invert the wing, the upward pressure becomes downward pressure, or downforce, clamping the car onto the track. So effective is current Formula 1 wing design that at speeds of more than 100mph they generate enough downforce for the car to stick to the ceiling.

The rear wing's job is simple – to keep the back wheels of the car firmly on the track. It consists of a maximum of three carbon fibre aerofoils. These are stacked one above the other, like an outsize razor blade, and are individually adjustable through three different planes to cut the air at whatever angle is required.

Running along the full width of the trailing edge of each element is a small trim tab, known as a Gurney flap, which can be adjusted vertically to aid aerodynamic efficiency when the wing is run at a high angle. The aerofoils are held in place by upright vanes, or endplates. These are also made of carbon fibre, but sheathing a fire-retardant Nomex core.

The bottom edges of the endplates are mated to another winglike device, the lower main plane, which in turn is attached to the rear crash structure – a carbon fibre cone bolted onto the gearbox.

To comply with the technical regulations of motorsport's governing body, the FIA, the whole wing assembly must fit within an area

measuring 1000mm wide by 350mm long and 200mm deep. It has to be strong enough to withstand a load test of 1000 newtons.

The rear wing starts life as a mathematical equation, which needs to balance downforce against drag. It is resolved using Computational Fluid Dynamics and other number-crunching computer programs.

The final design finds physical form as part of a scale model of the car, destined for the wind tunnel, where it will give a clear indication of whether or not the engineers have got their sums right.

"Testing the rear wing in situ is crucial," says Senior Aerodynamicist Doug McKiernan. "In isolation, it may perform well, but we need to see how it reacts in the more turbulent airflow generated by the car's bodywork and wheels, and as part of the rest of the rear aerodynamics created by the lower main plane and underbody diffuser.

"We make high, medium and low-downforce rear wing packages to cater for the different circuits. Monaco, for example, is high downforce. The need for grip outweighs drag, so we put on every square centimetre of wing we can. By contrast Monza, in Italy, is the only true low-downforce track left on the calendar. There we remove one of the aerofoils altogether to reduce drag to a minimum on the long, fast straights."

Whatever the wing package, there is no doubt that Team McLaren Mercedes' cars will be flying come race day.

### **i** TECHNICAL SPEC

**DIMENSIONS** Width 1000mm, depth 350mm, height 200mm

**MATERIAL** Carbon Fibre/Nomex

**NUMBER USED PER SEASON** 30-60





# LEARNING CURVES

Knowing the subtle secrets of a Formula 1 circuit can mean the difference between being a frontrunner and a tail-ender, but how do you catch your rivals in terms of knowledge when you've never even seen the track?

Team McLaren Mercedes Third Driver Alex Wurz explains all

WORDS TOBY WALLER PHOTOGRAPHY LAT, HOCH ZWEI, ALLSPORT



How well do you know your journey to work?

Given that you probably make the trip there or back twice a day for the majority of the year, you probably know it pretty well. It's likely, in fact, that you will tread on or drive over the same piece of asphalt well over 600 times a year. You probably know every bump on the road, every sharp turn, or the potholes that catch other drivers out, in fine detail.

Pity, then, a typical grand prix driver. He is likely to arrive at each of the 16 circuits that make up the current Formula 1 calendar without having visited the place for a year. He then has just several practice sessions – probably less than 70 high-speed laps – to ensure he knows every corner of the track intimately, and that he has

the best possible lines and pace for qualifying and the race.

This is a task that's made more difficult when on a circuit that has been substantially changed, such as the radically different Hockenheim layout that was completed in time for last year's Mobil 1 German Grand Prix, or the revised first corner complex at the Hungaroring that will host this year's Hungarian Grand Prix. It's even worse with a completely new circuit, such as the tracks in Shanghai and Bahrain that will host grands prix for the first time in 2004.

But master it they must, and that means that drivers are likely to do a significant amount of homework before they even get in the car. After all, 200mph is not the ideal speed for finding out that the fast-looking curve

is actually a tightening hairpin.

As Team McLaren Mercedes driver Alex Wurz admits, there is only so much you can do before you arrive at a circuit but every bit helps.

"I tend to look at a map of the circuit first and memorise the corners," he explains, "knowing which ones go left and right, noting the chicanes, fast corners and so on. If the team has existing data about a circuit, they'll send me the information about the speeds and gears and you can learn from that, too. But, with experience, you only have to look at a corner to know what gear to use and spot where the braking point is."

All this helps the driver gain an appreciation of the shape of the track, but a two-dimensional map can only explain so much. When a driver visits >>



ABOVE A road car can be a helpful tool with which to learn a new circuit, but it is only the starting point, as it can never reveal all of the track's secrets

a track for the first time, one of the first things he will likely do is walk out onto the circuit, or drive out in a road car, to have a closer look. Here he can get an idea of the undulations of the track – after all, the handling

although imperceptible to most people, will feel like driving over a washboard in a Formula 1 car.

“Driving a road car gives you the best impression and it helps you learn where the bumps are,” Alex explains.

bit like stepping straight from a hang-glider to a military fighter jet. Thankfully, a Formula 1 driver’s experience of learning different cars and new circuits throughout his progress up the junior single-seater

“DRIVING A ROAD CAR GIVES YOU THE BEST IMPRESSION AND IT HELPS YOU TO LEARN WHERE THE BUMPS ARE”

ALEX WURZ, TEAM McLAREN MERCEDES THIRD DRIVER

of a Formula 1 car can change considerably from the high grip obtained in compressions and the comparatively loose handling that can be experienced when the car crests the brow of a hill.

The driver will be looking much closer at the track surface, though. Kerbs often have areas of grassed-over concrete that extend behind them, or there may be a slippery white line that is not so easily visible from the tight confines of a Formula 1 cockpit. The driver will also be looking out for bumps or joints in the asphalt that,

“But it is also good to walk around the circuit because then you can see what is behind the gravel traps in case you spin off, so you get a good idea of which way you can drive out if there is grass or a service road on the other side.

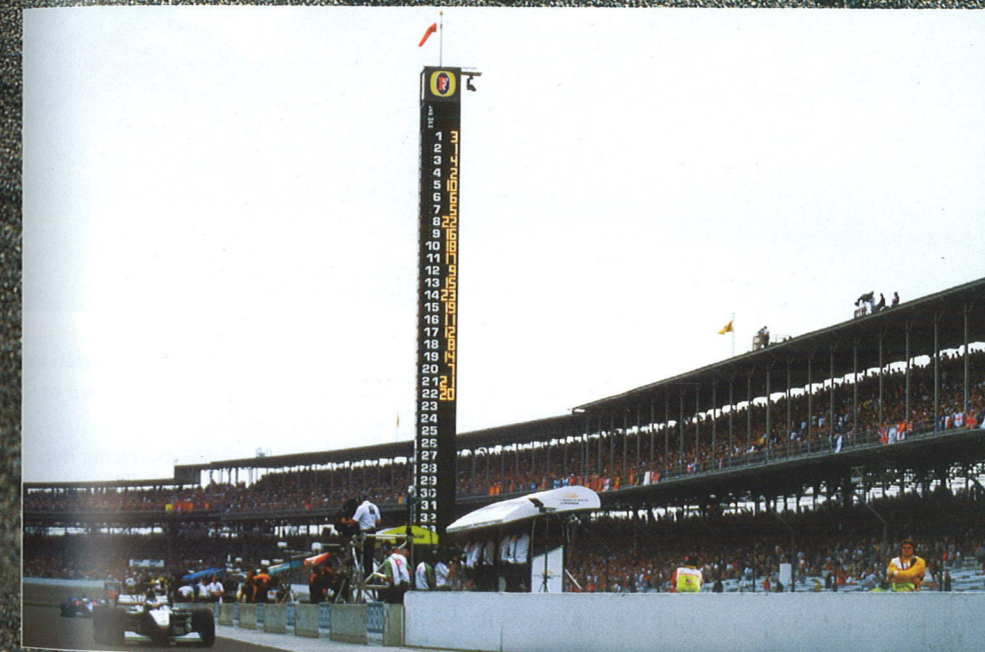
“After that, you only need two or three laps to have it memorised and pick out some marker points to help you and spot if there are any changes in the track surface.”

All sounds easy, right? Well, the next step is actually going around the circuit in the Formula 1 car itself – a

ladder helps him make that transition with comparative ease.

“Usually, I’m the sort of guy who goes for it pretty early,” Alex says. “I don’t spend much time doing slow laps. All the tracks now have standard braking distance boards, which indicate how far you are from the corner, but you develop a kind of feeling for different types of corner and you often don’t need a marker.

“If you know the car is fine and the track is in good condition and not slippery, then you know that, for a second gear corner, you can brake at



MAIN Japan’s Suzuka circuit is one of the trickiest on the calendar and has been revised prior to the 2003 Japanese Grand Prix

LEFT The Indianapolis Motor Speedway boasts an infield that was created expressly for Formula 1 cars as recently as 2000

BOTTOM LEFT Even a driver as experienced as David Coulthard will take time to walk around the circuit

BELOW Malaysia’s Sepang circuit was opened in 1999, proving that a modern circuit need not be a dull one





**MAIN** Kimi Räikkönen has had to learn many circuits since his arrival in Formula 1, but it hasn't proved a problem for the talented young Finn

the 100-metre mark. There might be a slight variation but, unless the team makes major changes to the car, from then on the braking point doesn't change much.

Again, it all sounds relatively easy, but in some corners – particularly ones that are either particularly quick or even flat-out – it can take time for a driver to build up his confidence. “In those situations, before going quickly, you need to build up confidence in the car first, then you try to set the car up as well as possible to take the corner,” Alex explains.

Once the basics of a circuit are mastered, which can often take less than 10 laps, the driver can then spend his time finding the small secret areas that could make the difference between pole position and a place in the middle of the grid. Some kerbs may be kinder to the car than others; some little-used areas of tarmac may have more grip than others.

Note, for example, how most cars actually start braking for the Adelaide hairpin at the Magny-Cours circuit in central France in the middle of the track, or how cars will use the inside kerb of the Senna hairpin at the

Circuit Gilles Villeneuve in Montreal to literally drag the car around the corner. The Imola circuit in Italy is one on which drivers must attack the kerbs to gain time, while the first few corners of the Suzuka circuit in Japan have different lines that can help those drivers with local knowledge gain a position in the most unlikely of places.

“Jumping kerbs is particularly important to learn,” Alex explains. “Each track is different and you have to know how hard you need to attack the kerbs. In some places it completely upsets the car if you just clip the kerb, but it's fine if you drive over them completely. These are the sorts of things that you have to experiment with to find a quick lap.”

As Alex points out, though, some circuits can be easier to learn than others. “The hardest circuits are ones like Suzuka in Japan, which are long and have fast, sweeping corners,” he says. “For example, the long series of S-bends at the start of the lap are particularly interesting because your entry into the first part conditions how you are going to tackle the rest of it. The theoretical perfect line for the first part might not be the quickest

way to get through the whole section, and knowing that is simply down to personal experience.

“On some circuits, the racing line comes naturally. From the outside of the car it is hard to spot the difference but, when cornering, you might turn in half a metre earlier or later on one lap. Even on circuits where I have done thousands of laps, such as at Barcelona in Spain, the car is never on the same line – no one lap is the same, although the difference might be just a few centimetres.

“When it's going well, you get into a rhythm, which can take between three laps and half a day. It depends mainly on the car, rather than the driver. But that is why we are employed to do this job, because we're supposed to be good at it and get it right as soon as we step in the car.”

It all sounds easy enough but, as anyone who races as a hobby will know, all the experience in the world cannot change you into a David Coulthard or a Kimi Räikkönen overnight. Learning circuits for us mere mortals is a little more tricky. Spending time on the theory could make that journey to work a bit more interesting, though. ■

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## BRIAN ALMOND MACHINE SHOP DEPARTMENT

WORDS BRUCE JONES PHOTOGRAPH STEVE ORINO



### When did you join McLaren?

In April 1977. I saw an advertisement for a job at McLaren in my local newspaper, with a vacancy for a centre lathe machinist. This was what I was trained in, having served a six-year apprenticeship as an instrument maker in Maidenhead in southern England, with machining being part of this.

I was aware of motor racing back then, but not to the level of going to the tracks to watch it. However, once I'd joined, my interest grew, especially as we started to get a bonus if the cars went well at a race!

### You've been here a long time. How has the machine shop changed in those 26 years since you joined?

There wasn't much of a machine shop back then. In fact, there were only two specialist machinists at the company in 1977, and that was why McLaren were advertising for new recruits. The team wanted to take on four more so that a greater number of parts for the car could be made in-house.

There were only 30 people in the entire company then. Today, there are around 950, with 30 in the machine shop alone – such has been the rate of progress. The key difference is that we do much more in-house now. We'd like to be able to make every part in-house, but this is difficult as we tend to want all the parts produced at the same time.

### What does your job entail?

I'm one of two people who work the manual lathes alongside the CNC machines. We tend to make one-off parts, either fine-tuning parts made on the CNC machines, or making parts which we don't need to set up the CNC machines to produce. This morning, for example, we were making suspension parts.

The machine shop is a 24/7 operation these days, with half of us working night shifts. In the early days, we'd work nights when it was required in the run-up to the season, but not with a separate crew. Of course, we didn't have a new car each new season back then. For example, we ran the M23 for around four years, with only minor modifications. Today's cars are much more technical, and so is the machining required to produce them.

### What moment stands out in your time with the McLaren team?

There are many, but I really enjoyed one in my first year, 1977, when Gilles Villeneuve had a one-off outing for us at the British Grand Prix.

We went to Silverstone and operated out of a garage at the end of the pitlane, away from where the regular team was running cars for James Hunt and Jochen Mass. There were no refuelling stops then, but Gilles called at the pits during the race as he was sure that he had blown the

engine. Luckily, he'd merely blown the oil pressure gauge. So, the person who was running the car at the time told him to get back in and sent him out again. It was just wonderful to watch him pass car after car as he fought his way back up the order.

### How has McLaren changed as a team during your 26 years with them?

You'd think from the fact that the team has grown by 30 times since I joined that it would be completely different, but it isn't, as the teamwork ethic is still very much apparent.

Sure, I don't know everyone in the team, but I still know everyone in manufacturing. On top of that, we still have a meeting after each grand prix at which Ron Dennis or Martin Whitmarsh keeps us informed as to what has been going on, thus keeping us focused on the job we're doing.

I'm really looking forward to moving to the McLaren Technology Centre, as I like what I've seen. I'm sure we can keep the same atmosphere, as all of the guys that I work with at McLaren really get on well. In fact, that's 90 percent of the job – having a good workroom environment and working on a product whose progress is visible. You'd never get the same thrill if you built washing machines! ■

>RETRO

# 1981

McLaren boasted a new team management, a new attitude and, perhaps most importantly, a revolutionary carbon fibre chassis for the 1981 Formula 1 season. It would prove to be the catalyst that eventually propelled the outfit to the very top of the World Championship rankings

WORDS ALAN HENRY PHOTOGRAPHS LAT PHOTOGRAPHIC/ALLSPORT



The 1981 Formula 1 World Championship was a transitional season in more ways than one. That summer will be remembered by many as a time in which the sport was bouncing around in the eye of a pseudo-political storm, a battle between the sport's rule makers and the competing teams over who ran the Formula 1 business.

Yet for McLaren, 1981 proved to be an absolutely crucial year – a turning point in which a new management team laid the foundations of the diverse and wide-ranging group that the company has grown into today.

Ron Dennis had amalgamated his Project 4 organisation with McLaren the previous summer in a bid to stem the declining fortunes of one of the most famous names in motorsport. In management terms, this was a quiet revolution, rather than a process of evolution, but, between them, Dennis and designer John Barnard would produce a car which started a revolution within Formula 1.

From the touchlines, the McLaren MP4 did not, at first glance, look

very different. It didn't have radically different aerodynamics. It was powered by a Ford Cosworth engine, and had nothing which was outwardly striking to distinguish it from its rivals. Yet, under the skin, the new McLaren was revolutionary, as its chassis was made from carbon fibre composite materials.

Ironically, Dennis had thought about going it alone with his own Formula 1 team a few months before the alliance with McLaren was born. Either way, he wanted Barnard – or a similarly qualified top designer – on the staff. He ultimately made an approach to John who, as Ron recalls, didn't seem to be terribly interested at first.

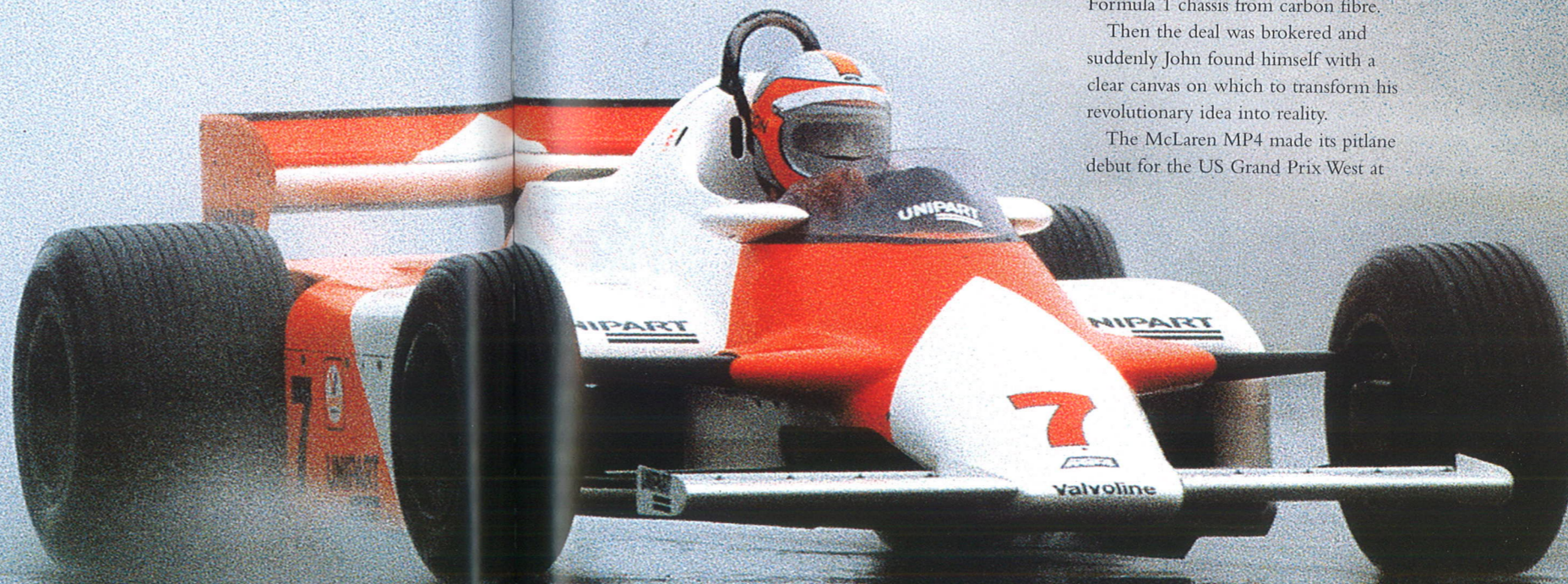
"When I made it quite clear that he would have an absolutely free hand on the technical side, John and I began to make progress," he admits.

Ron Dennis showed Barnard a carbon fibre rear wing – super stiff and very light – which Project 4 had made for the sportscar they had been racing the previous year. It set Barnard thinking and, within weeks, he was back discussing with Ron the possibility of building a complete Formula 1 chassis from carbon fibre.

Then the deal was brokered and suddenly John found himself with a clear canvas on which to transform his revolutionary idea into reality.

The McLaren MP4 made its pitlane debut for the US Grand Prix West at

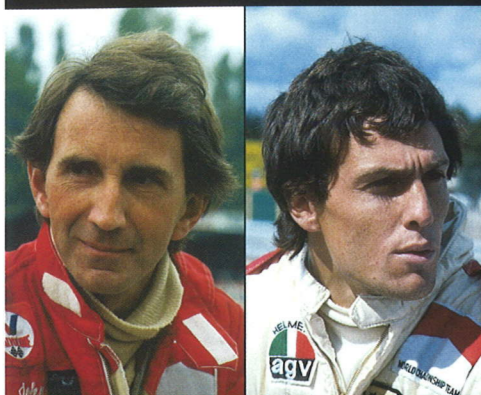
**MAIN** The MP4, built by McLaren for the 1981 Formula 1 season, was probably the sport's most revolutionary car at the time. It won only one race that season, but it helped to re-establish McLaren as a leading team



# 1981

>THE DRIVERS

## JOHN WATSON, ANDREA DE CESARIS



ABOVE The experienced John Watson (left) and rookie Andrea de Cesaris were at different ends of their careers

John Watson was 35 years old and in his third season with McLaren in 1981 but it was a frustrating spell for the team which had last won the Formula 1 World Championship with James Hunt back in 1976.

Watson was a highly skilled driver with a gentle touch. Although imbued with natural talent, his downside was a curious lack of self-confidence outside the car and a lack of aggression, which sometimes sat uneasily with his great skill in the heat of battle. John made his Formula 1 debut driving

a private Brabham BT37 in the 1973 British Grand Prix and, prior to his Silverstone victory, his best placing in his home race had been in 1978 when he finished third at Brands Hatch.

Watson would drive through to the end of 1983 with McLaren, partnering Niki Lauda in his latter two seasons. For 1984, the Ulsterman was replaced by Alain Prost, newly dismissed from the works Renault squad. Apart from a guest outing for McLaren in the 1985 European Grand Prix at Brands Hatch, that was the end of Watson's Formula 1 career.

Andrea de Cesaris was 21 years old when he signed on for McLaren at the start of 1981. As an accomplished karter and Formula 3 racer, the wealthy young Italian was extremely quick, but he was also incredibly erratic. He had an unfortunate nervous tick, which left many of his rivals in an extremely apprehensive mood.

When the chance came to sign up former World Drivers' Champion Niki Lauda for the 1982 season, the new McLaren management didn't think twice about taking the Austrian on board. De Cesaris was shown the door, but he would race on in Formula 1 for more than a decade after his freshman year with the McLaren team.

RIGHT The McLaren team boasted new management for the 1981 season, with Ron Dennis in charge as Team Principal and John Barnard on board as the team's chief designer

Long Beach, California, but the car did not race and the team's two drivers, John Watson and Andrea de Cesaris, had to use a development of the previous year's McLaren M29 for the first few races of the season.

Watson finally gave the MP4 its race debut in the Argentine Grand Prix. Luckily for McLaren, even though this was the fourth race of the year, it was the third round of the title chase. The season-opener in South Africa was subsequently deemed a 'pirate' event thanks to the war between the teams and the sport's governing body, and the event did not count for title points.

Watson ran strongly in eighth place at Buenos Aires before a severe chassis vibration caused him to pull up, but it was not until the Monaco Grand Prix that the team felt sufficiently confident in the novice de Cesaris to entrust him with one of the new cars. He unfortunately collided with Mario Andretti's Alfa Romeo on the first corner of the event.



This was a highly competitive season, with the championship being effectively fought out between the emergent, turbo-powered Renaults and Ferraris, plus the British-based Williams and Brabham teams, which used Ford Cosworth V8 engines like McLaren, and were therefore the prime targets for the new MP4.

In the Spanish Grand Prix Watson

finished a strong third behind Gilles Villeneuve's Ferrari and Jacques Laffite's Ligier-Matra, part of a five-car train which crossed the line covered by just 1.24 seconds.

The following race, the French Grand Prix at Dijon-Prenois, was where Watson demonstrated the MP4's real potential by battling for pole with René Arnoux. He just lost out on pole, but started the MP4 from the front row of the grid all the same.

Unfortunately the race was flagged to a halt after 58 of its 80 laps due to heavy rain and the cars later raced the event's balance over a 22 lap re-start which produced an aggregate result. Watson had finished third in Spain and now took second in France, behind Alain Prost. The British Grand Prix at Silverstone was coming. Could he make it a win on home soil?

Watson and de Cesaris qualified fifth and sixth to finish up on the third row, but it almost ended in tears at the end of lap four when Gilles Villeneuve spun at Woodcote.

Cars spun in all directions to avoid the Canadian. De Cesaris hit the catch fencing and was out on the spot, while John slowed to a crawl before blasting back into the pack once again. He resumed ninth, but thanks to some bold overtaking and several retirements the MP4 edged into the lead with seven laps to go and stayed there.

The British Grand Prix represented the high spot of McLaren's year. The MP4 worked well on the super-smooth Silverstone tarmac but, for the balance of the season, the new car suffered badly with a tendency to porpoise, or oscillate, heavily on bumpy tracks. This made the drivers' lives hell and, apart from Watson's excellent second place in the rain-soaked Canadian Grand Prix, there were only a few more points to be garnered by the team.

McLaren finished the Constructors' World Championship in sixth place on 28 points, with Watson taking fifth in the Drivers' World Championship, on 27 points. It had been a patchy season, but the revitalised McLaren team had established a firm foothold as it began its climb back to the top of Formula 1. Just as Ron Dennis had predicted. ■

## >THE CAR McLaren MP4

The bulk of the MP4 was manufactured from carbon fibre – a significant departure for the cars of the time. This reduced the number of parts in the chassis to around 10 percent of that for a conventional aluminium design

The McLaren MP4 was the first of a long line of grand prix winners to carry this distinguished prefix, and in 1981 it was almost certainly lighter, stiffer and stronger than any other car in Formula 1.

This was down to the fact that its monocoque was manufactured from carbon fibre composite materials.

Carbon fibre had its conceptual roots in the aerospace industry in the early 1960s when the British, US and Japanese governments funded complex research programmes investigating the prospects for developing new ultra-light, extremely stiff materials which could be used for highly demanding aerospace applications.

The carbon fibre manufacturing process involves heat treating a special acrylic fibre to produce filaments of almost pure carbon. Tightly-packed bundles of these filaments are then saturated with a small amount of resin before being oven cured at around 120 degrees centigrade, transforming them into the stiff, light material which laymen would identify as carbon fibre sheet.

The MP4's monocoque panels were manufactured in the USA then flown to Britain where they were bolted and glued together at McLaren's headquarters.

John Barnard reckoned that this method of construction reduced the number of components used to make the MP4 chassis to 10 percent of those needed to build a

conventional aluminium alloy monocoque. The MP4 still had a conventional chassis configuration, though, with inboard spring/dampers activated by rocker arms.

"The underbody and side panels of the new car are also made from carbon fibre honeycomb and the radiators are mounted on either side, abreast the dash panel in carbon fibre boxes which double as ductings and mountings," explained Barnard. "Apart from the suspension, there isn't a lot of metal in the chassis at all."



>RETRO  
**1981**



MAIN AND INSET  
John Watson's victory in the British Grand Prix owed a little bit to luck, but also demonstrated the potential to come from McLaren



>THE CRUCIAL RACE  
**BRITISH GRAND PRIX**

When John Watson dropped to ninth place on lap four of the British Grand Prix at Silverstone, it looked as though his third-row starting position had been squandered and all his chances of victory evaporated.

Yet it proved just the sort of stimulus to motivate the Ulsterman and from then on he really piled on the pressure. Aided by several retirements and accidents, plus some bold overtaking manoeuvres of his own, Watson found himself promoted to fifth place when Nelson Piquet crashed his Brabham BT49 just 11 laps into the race.

Two laps later he outbraked Carlos Reutemann to take fourth at the chicane, and soon after squeezed ahead of Didier Pironi's Ferrari, which promptly retired with engine failure, removing any prospect of a counter-attack.

Now he was up to third behind Alain Prost and René Arnoux, but Prost retired after just 17 laps, leaving a stalemate for the next 30

laps as his team-mate Arnoux continued to circulate, seemingly untroubled, at the head of the field.

Then the leading Renault's exhaust note started to sound ragged. Watson made up a four seconds in a single lap. On lap 58 just 2.5 seconds separated the two cars. On lap 61 they were wheel-to-wheel and the crowd erupted in delight as John slipped through into the lead as they braked for Becketts.

As Arnoux fell away to retire, so Watson stormed away to score that momentous win, his first since the 1976 Austrian Grand Prix and only the second of his Formula 1 career.

"I just can't get used to the idea it's me they're cheering for," he said as he celebrated his win on the victory rostrum. "Sure, it's a justification for all the bad years, but I'm not totally satisfied. It wasn't a win from the front. I was slightly lucky, even though I worked pretty hard to make up the ground that I'd lost at the start."

>1981 SEASON RESULTS

	WATSON	DE CESARIS
1 USA West (Long Beach)	Q: 23rd; R: DNF	Q: 22nd; R: DNF
2 Brazil (Rio)	Q: 15th; R: 8th	Q: 20th; R: DNF
3 Argentina (Buenos Aires)	Q: 11th; R: DNF	Q: 18th; R: 11th
4 San Marino (Imola)	Q: 7th; R: 10th	Q: 14th; R: 6th
5 Belgium (Zolder)	Q: 5th; R: 7th	Q: 23rd; R: DNF
6 Monaco (Monte Carlo)	Q: 10th; R: DNF	Q: 11th; R: DNF
7 Spain (Jarama)	Q: 4th; R: 3rd	Q: 14th; R: DNF
8 France (Dijon)	Q: 2nd; R: 2nd	Q: 5th; R: 11th
9 Britain (Silverstone)	Q: 5th; R: 1st	Q: 6th; R: DNF
10 Germany (Hockenheim)	Q: 9th; R: 6th	Q: 10th; R: DNF
11 Austria (Osterreichring)	Q: 12th; R: 6th	Q: 18th; R: 8th
12 Holland (Zandvoort)	Q: 8th; R: DNF	Q: 13th; R: DNS
13 Italy (Monza)	Q: 7th; R: DNF	Q: 16th; R: DNF
14 Canada (Montreal)	Q: 9th; R: 2nd	Q: 13th; R: DNF
15 USA East (Las Vegas)	Q: 6th; R: 7th	Q: 14th; R: 12th

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## LETTERS

Send your letters to **Team McLaren, Admail 622, Woking, Surrey GU21 1WH** or email us at [racingline@mclaren.com](mailto:racingline@mclaren.com)

### GERMAN JOY

I've just come back from attending the Mobil 1 German Grand Prix at Hockenheim and I felt compelled to write in and congratulate David Coulthard on his excellent drive. It was the first time I had seen a grand prix in the flesh and, as a huge fan of Team McLaren Mercedes, it was a fantastic weekend. Please pass on my congratulations to DC and the team.

*James Kennedy, Birmingham, UK*

### PLEASING PROFILES

I think the Team McLaren 'Member Profiles' feature has proved to be a really fascinating addition to *Racing Line*. It's great for us Team McLaren Members to be able to find out more about our fellow Team McLaren Mercedes enthusiasts, and to hear their interesting stories and anecdotes. Keep up the good work!

*Kenneth Ho, London, UK*

### CHAMPIONSHIP CHASE

What an exciting title battle 2003 is proving to be! I just cannot believe how many close and exciting races we have had this year, especially after some of the processional affairs we witnessed last year. I think this season's Drivers' World Championship is going to go right to the wire and I for one will be hoping that Kimi can go all the way.

*Christopher Finch, Slough, UK*



Second place on the podium for David Coulthard in the Mobil 1 German Grand Prix at Hockenheim made James Kennedy's day when he attended his first live race

## Team McLaren Member Profiles

The Team McLaren Member Profiles continue to pour in to the *Racing Line* offices. This month we introduce Michael Harris from the United Kingdom, and fellow Team McLaren member Mugurel Pipas, from Spain.

- What is your name? Michael Harris.
- How long have you been a Team McLaren Member? Eight years.
- How old are you? 40 years old.
- What is your most prized piece of McLaren merchandise or memorabilia? My most treasured item is my trusty TAG Heuer Kirium Ti5 McLaren watch. This stylish timepiece was an impulse purchase but worth every penny.
- Who is your favourite McLaren driver of all time? My favourite McLaren driver would have to be Ayrton Senna but Mika Häkkinen, Kimi and David follow closely behind.
- What is the best race you have seen? The best race is always the next race! Never knowing how the qualifying and race may develop is what keeps me gripped.
- What is your favourite McLaren memory? My favourite McLaren memory, without doubt, was winning a *Racing Line* competition. The prize was three laps in the Team McLaren Mercedes MP4-98T two-seater at Silverstone, and it was a real once-in-a-lifetime opportunity to experience the power and precision of a Formula 1 car. Amazing!

- What is your name? Mugurel Pipas.
- How long have you been a Team McLaren Member? From March 2003.
- How old are you? 21.
- What is your most prized piece of McLaren merchandise or memorabilia? My collection of autographs from various Team McLaren Mercedes drivers and management.
- Who is your favourite McLaren driver of all time? For me it is Mika Häkkinen.
- What is the best race you have seen? Without a doubt, the 2000 Belgian Grand Prix at Spa-Francorchamps.
- What is your favourite McLaren memory? Attending a Team McLaren tour of the team's headquarters in Woking, England. It was such a special experience to see where the racing cars are made, and to see so many great machines and trophies!

Send your profiles in to [racingline@mclaren.com](mailto:racingline@mclaren.com)

Answers to questions must be a maximum of 50 words long. *Racing Line* reserves the right to edit all contributions

## ALEXANDER WURZ

### ONLINE CHAT



Team McLaren Mercedes Third Driver Alex Wurz went online to respond to questions from Team McLaren members. Here are some of his answers...

**QUESTION FROM FERDZ...**  
I find it amazing the way a Formula 1 car accelerates. At that speed how do you manage to adjust those buttons on the steering wheel and stay on the road?  
I would put that down to talent!

**QUESTION FROM BALAJI SREENIVAS...**  
What physical attributes are needed to be a good Formula 1 driver?  
It is a very tough sport. Average heartbeat is 150bpm which is obviously very high. Plus you need to be 100 percent concentrated all the time. In order to be able to do this, you need to train every day.

**QUESTION FROM THOMAS HOONAN...**  
What is it about driving a Formula 1 car that appeals to you?  
The mixture of thrills, speed and excitement.

**QUESTION FROM MATTIAS PERSSON...**  
Hello Alex! I wonder who your favourite driver of all time is?  
There are a lot of drivers who have done great things. I have never had a special favourite because I think it is wrong to copy someone, but it is good to learn from them.

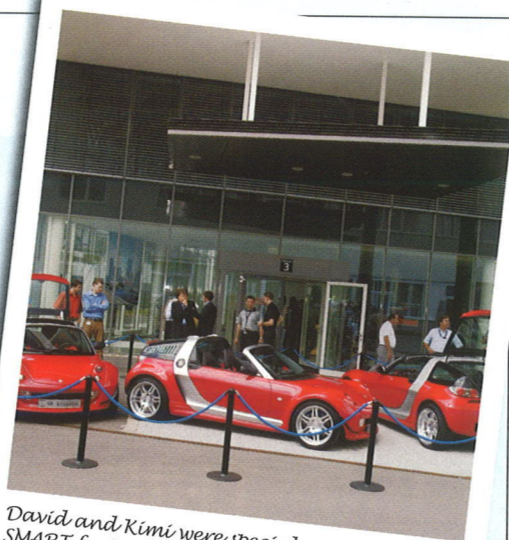
**QUESTION FROM TRENT...**  
Alex, your helmet design is unique and one of the most colourful helmets I've seen in Formula 1 for a long time. Explain to me please the design and how / why you chose that particular pattern?  
The top of the helmet is blue which stands for the sky. The bottom is green and is meant to represent the grass (the earth). On the front you have yellow which is the sunrise and on the back is a yellow sunset. On the side I have red and white which are the Austrian national colours. The zig-zag design means that everything is floating around in unison. I had this idea in school in a maths lesson!

The full transcript, including more questions, can be found online at [www.mclaren.com](http://www.mclaren.com)

# POSTCARDS FROM GERMANY

IN ASSOCIATION WITH CANON

The Mobil 1 German Grand Prix is the third of Team McLaren Mercedes' 'home' races and, as such, there is always a lot going on, particularly for Mercedes-Benz. *Racing Line* caught up with events in and around the Hockenheim circuit



*David and Kimi were special guests at the SMART factory in Stuttgart, where they were introduced to the company's design process*



*The drivers also visited the Maybach Centre Of Excellence, where they had a chance to look over this most prestigious of luxury cars*



*David and Kimi were only too happy to taste the world's most luxurious transport for themselves, and they certainly enjoyed having a little more space to relax than in their MP4-17Ds!*



*The SMART Roadster was shown to the assembled crowds outside, where its modern, streamlined looks seemed to find favour*



*The Maybach brand operates within the top strata of the limousine market - it certainly has a fair amount of leg room!*

# IN THE NEXT ISSUE



## MERCEDES-BENZ SLR McLAREN

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