

## FORMULA FOR CHANGE

How F1's new engine rules will force the sport to go green

## URBAN SPACE MAN

Designer Gordon Murray on solving the expanding problem of urban mobility

## TOWERS OF POWER

An exclusive look inside Formula One Race Control

## DOPING DANGERS

How the FIA is educating drivers on drugs in sport

# INMOTION

The international magazine of the FIA



## PLUGGED INTO THE GRID

Can top level motorsport really go electric?



# INSIDE

## Dear Friends,

Welcome to the latest edition of InMotion, which as you can see has been redesigned to make it a more relevant and modern read.

As you can also see from our cover, the issue of sustainability is key to motor sport, as it is for mobility, and in this edition we tackle this issue head-on with an examination of just how close we are to making an electric racing series a reality and we also look at the mould-breaking designs of a former F1 design guru who is now solely focused on intelligent mobility.

Elsewhere, the adoption of new engine regulations for the 2014 Formula One season by the World Motor Sport Council is a significant step forward in using the sport as a hothouse for development of ecologically sound, road relevant, technologies. Inside we look at how the regulations will drive innovation and we examine the challenges ahead for the sport's finest minds.

The WMSC also ratified the FIA Endurance World Championship, which will take place over six races next year, including the legendary 24-hour race at Le Mans. We also welcome back the Monte Carlo Rally to the FIA family.

On the topic of road safety, I am pleased that after writing to a number of the world's leading sporting federations, we have had a strong and vibrant response to our Action For Road Safety Programme from the International Olympic Committee, the IAAF (athletics), FIM (motorcycling), UCI (cycling) as well as from judo and other sports. We are now examining ways we can collaborate so that sport can become an effective and life-saving force.

Finally, I would like to extend my deepest condolences to the family and friends of Mr Walid Sarris, the mobility director of the Automobile and Touring Club of the United Arab Emirates who died recently. Mr Sarris was also the secretary of the Arab Council for Touring and Automobile Clubs and in both these roles he performed a valuable and important role for the development of safe and sustainable mobility in the region.

Best wishes,

COVER IMAGE: JOHN RIGBY



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# INFOCUS

FIA NEWS AUGUST 2011

“By joining our efforts under the FIA’s umbrella we can make motor racing a real display of the most advanced road safety systems and technologies without any harm to its breathtaking beauty.”

General Viktor Kiryanov,  
President, Russian  
Automobile Federation



**Motorsport, by getting involved in electric vehicles, can showcase the real potential of this technology and I’m delighted the FIA is taking a lead in this.**  
Lord Paul Drayson, FIA Alternative Energies Commission

**“Monte Carlo should always be in the championship. It’s part of the history of rallying.”**  
FIA President  
Jean Todt



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## WRC now more spectacular, says FIA Vice President

**ENGLAND** FIA Vice President, Mohammed Ben Sulayem, has said current generation rally cars make the sport better for spectators, being more of a challenge for drivers to handle and thus more spectacular for fans.

Fourteen-time Middle East Rally champion, Mohammed Ben Sulayem, was speaking after he had a test drive in the new MINI John Cooper Works WRC at Prodrive's Warwickshire test track.

The FIA Vice President, who has won more international rallies than any other driver, spent 30 minutes familiarising himself with the MINI WRC and building up his confidence and pace around the 1.5 km adverse handling circuit.

"It's the first time I have had a chance to drive a new World Rally Car," he said. "Now, without the clever diffs but with the smaller, lower-boosted engines you have to work the cars harder, making them much more fun to drive and more spectacular for the fans. It's good to drive a proper rally car again and I think MINI will add value to the WRC and vice versa," he said.

The MINI John Cooper Works WRC made its competitive debut in May at Rally Italy in Sardinia, where Dani Sordo scored a sixth place. Sordo and Kris Meeke will return to championship action later this month at the MINI WRC Team's next outing in Finland. The team is competing in six 2011 WRC events in readiness for a full season in 2012.



## Mobiles and motoring don't mix says Schumacher

**MONTREAL** Michael Schumacher has strongly endorsed a campaign to discourage sending mobile phone text messages while driving.

The seven-times Formula One world champion was participating in a Canadian Automobile Association event designed to educate road users to the dangers of texting and driving as part of

Canada's launch of the FIA's new global campaign, Action for Road Safety.

"I think it is a common disease," said Schumacher, who was joined at the event by Ferrari Formula One driver Felipe Massa. "We all have mobile phones and we all think driving a road car is pretty easy and straightforward but then we see the increasing number of fatalities and that's why we are here for today, to open everybody's eyes to that."

"Yes, we (F1 drivers) are going very fast but we are trained for that situation," added the Mercedes GP driver. "We have no oncoming traffic, no people crossing the road, no trees, so we're doing what we do in a very safe environment. In normal road circumstances we have a lot of

situations we have to deal with and not only with (regard to) our own lives but the lives of others. We have to be as aware as possible and put all our concentration into what we are doing - driving."

To test the effects of sending text messages while driving, both F1 drivers were invited to drive on a simulator, at first with full concentration on the road and then while typing a text message on a mobile phone. While Schumacher was attempting the latter he lost control and went off the road.

"Can you imagine the consequences to any of us if we were involved in a road accident and killed somebody," he said. "Not only would you end one life but it would greatly influence your own, how to deal with it and how

you live your life in the future.

"This is why it's such a big passion for me to emphasise this point and to get people to be aware of this important issue. A mobile phone is a mobile phone, you drive a car, and those two don't match together and that's the message of today."

Yvon Lapointe, Director of Traffic Safety for CAA-Quebec confirmed the dangers.

"Although it may seem obvious to say that texting while driving is dangerous, far too many drivers are ready to run the very potent risk of causing an accident," he said. "According to studies on the subject, it seems that the risk of being implicated in a serious or fatal accident is 23 times likelier for drivers using text messaging while driving."

## Royal Dutch Touring Club introduces charge points

**NETHERLANDS** Holland is small, flat and heavily populated and suffers from problems with its air quality as a result of dense traffic on the crowded roads. However, its cities are close together and there is an extensive electric grid. In short, the Netherlands is the perfect place for electric cars.

That fact was the impetus behind the Royal Dutch Touring Club ANWB looking at how it can help electric motorists in the future, and at the same time increase its revenues.

"For the ANWB it is not clear where the future lies and what our role will be," a club spokesperson said. "Nor is it clear if fully electric cars will be the cars of the future or whether an intermediate form will be produced. What is clear, however, is that it is impossible to halt the electrification of mobility and that the need for independent information will grow in the years ahead."

Seeking to explore the possibilities of electric mobility the ANWB began to look into the installation of its own charging poles on the road network and the introduction of an electric Road Services vehicle.

The club has now introduced six ANWB fast-charging stations between the major Dutch cities and has also set up a new website to inform members about the programme's progress. The club sees a future for itself as a service provider for electric motoring and while many parties have similar ambitions, the club believes it has an advantage - the full confidence of its four million members.





## ADAC calls for mandatory use of emergency braking systems to be speeded up

**GERMANY** The Allgemeiner Deutscher Automobil-Club (ADAC) has called for the more rapid inclusion of autonomous emergency braking systems (AEBS) on passenger vehicles of all classes after it recently conducted a series of positive tests on currently available systems.

ADAC has long been an advocate of active safety systems on road cars but while it has in the past championed the use of anti-lock braking systems and electronic stability control, it is AEBS that the organisation has chosen to focus on in recent times. Having been involved with the technology since 2006, when it tested Europe's first such system, Mercedes' Pre Safe, ADAC recently decided to put a number of newer systems through their paces with a rigorous battery of tests in a bid to determine the systems' efficacy.

Six vehicles were tested using a complex and stringent procedure that scrutinised the benefits of AEBS following an ADAC-developed catalogue of different driving and traffic scenarios. And the final result was universally

positive, with all the tested systems able to significantly reduce rear-end collisions or even prevent collisions entirely if speed was low enough.

Although ADAC found the systems to vary in quality, from very good to satisfactory, it concluded that all the systems are a step in the right direction.

The tests were the latest in a series the German organisation has conducted this year. Along with passenger vehicle test, the ADAC programme has included a test of HGV systems and of the impact rear-end collisions have on rear-seat passengers.

Since AEBS systems will be mandatory in Europe for new HGVs from 2013, ADAC has now demanded that AEBS availability on passenger cars of all vehicle classes be speeded up.

However, ADAC spokesman Hans Kahl repeated that despite the positive findings from the tests such technology "can never replace an attentive driver. Motorists who maintain a safe distance and prefer defensive driving make a great contribution to road safety."



## Institute continues safety development workshops

**CARTAGENA** The FIA Institute is to host workshops in Colombia and South Africa as part of its outreach programme to help FIA National Sporting Authorities (ASNs) develop safety projects in Africa and Latin America.

The Colombia event, in the city of Cartagena on 29 July, will coincide with the 13th FIA American Congress.

Chaired by FIA Institute Executive Committee member Enzo Spano (below), the workshop will offer a platform to discuss the work of the Motor Sport Safety Development Fund and how it can be used to help grassroots motor sport. The panel will include representatives from regional bodies NACAM and CODASUR.

This will be followed by a similar event in Cape Town on 19 August, run in partnership with the Confederation of African Countries in Motor Sport (CACMS). Chaired by FIA Institute Executive Committee member Allan Dean Lewis, the event will feature talks from experts in training and development. The workshop will focus on how to maximise the resources of the fund and how best to utilise the Regional Training Provider network.

Richard Woods, FIA Institute Director General, said: "The Institute is hosting a series of global events which encourage ASN's to share their safety knowledge and experience. It underpins our commitment to not only promote safety, but also to support ASNs in implementing safety development projects."



## President visits Russian Federation

**MOSCOW** FIA President Jean Todt recently undertook a journey to Moscow to meet with representatives of the Russian Automobile Federation to discuss opportunities for improving road safety in Russia. The President was greeted by General Viktor Kiryanov, Deputy Minister of the Interior of Russia and President of the Russian Automobile Federation, whom Mr Todt thanked for the invitation to attend the State Traffic Safety Inspectorate of the Russian Federation on its 75th anniversary.

Todt later emphasised the importance of the commitment of the Ministry of Interior and the State Traffic Safety Inspectorate of the Russian Federation to increasing road safety awareness in the territory.

Following that meeting, Todt, accompanied by David Ward, Director General of the FIA Foundation and Emma MacLennan of the Eastern Alliance for Safe and Sustainable Transport, then met with the Minister of the Interior, Mr Rashid Goumarovich Nourgaliev and General Kiryanov for a discussion regarding road safety and the possibility of creating a working group to invite Russian police officials to visit countries such as the UK, France and Germany, to learn how to promote road safety issues in Russia and to encourage Russian drivers to use technologies such as ABS, ESP and night vision systems.

## UAE Mobility Director mourned

**DUBAI** Mr Walid Sarris, Mobility Director of the Automobile And Touring Club of the UAE, passed away suddenly at the end of June, the ATCUAE has reported.

"He had been with the club for over 30 years and his dedication and commitment have been integral parts of our success. He was a professional to the core and we will all miss him," read a statement from the Club.



## Todt honoured by Sarkozy

**PARIS** On Bastille Day, July 14th, FIA President Jean Todt was awarded the Grand'croix de la Légion d'honneur by the President of France, Nicolas Sarkozy.

President Todt was made a Chevalier of the order, France's highest award, earlier in his career and in January 2007 was elevated to the rank of Grand Officier, the fourth most prestigious rank of the five making up the order. The Grand'croix is the highest rank and just 62 people currently hold the award. The FIA President is the youngest civil recipient of the honour.

"This prestigious distinction is recompense for your faithful service to France and is a crowning achievement for your dedication and your brilliant career," said President Sarkozy.

In response, Todt said: "This high distinction represents a moment of particular importance in my life. It is a great reward to have bestowed upon me."



## Mumbai's smart licensing option

**MUMBAI** The Western India Automobile Association (WIAA) has announced that in conjunction with the country's Transport Department it will issue driving licences in smart card form to its 80,000 members.

The biometric smart card facility was launched at WIAA's Churchgate office in Mumbai on June 29 in presence of Chief Minister of Maharashtra state, Prithviraj Chavan. Members of WIAA can now get their licence directly from the Association.

"Such a facility will ensure that driving licences are genuine. Unlike previous instances where anybody could get a fake driving licence or learner's licence made, smart cards will be genuine," said Chavan of the card, designed to replace paper versions. "The process of getting a smart card driving licence will also be made easier as people don't have to go to the Regional Transport Offices (RTO) anymore."



## Vettel champions e-Safety revolution

**TEESDORF** Electronic Stability Control (ESC) is the most important safety innovation since the seatbelt, according to current Formula One World Champion Sebastian Vettel. The Red Bull Racing driver was speaking at this year's eSafety Challenge (co-funded by the European Commission, the FIA, FIA Foundation and eSafetyAware) at the ÖAMTC driving centre in Teesdorf, Austria recently.

In a spectacular demonstration of the latest eSafety technologies on the market, Vettel was joined by eight-time Le Mans 24-Hour winner Tom Kristensen, former F1 driver Alexander Wurz, and Moto GP rider Marco Simoncelli. Each sportsman showcased a different technology, while there were also opportunities for the public to try the systems for themselves.

Following his demonstration of ESC, which stabilises the car in a skid, Vettel said: "The speed with which the system reacts is very quick - much quicker than any driver can be."

He added that he believed every car should be equipped with the system because it can



prevent accidents happening in the first place.

Moto GP star Simoncelli tested the Anti-Lock Braking system for motorcycles and stressed the importance of raising awareness among young people.

"Despite the risks on our roads, many people don't believe that they will be the victim of a road traffic accident," he said. "It is especially important to educate young riders, who can sometimes feel like they are invincible. If they are aware of the dangers they face then they can better equip themselves with the knowledge and understanding of how to avoid accidents, as well as making sensible choices, like buying an ABS equipped bike."

Former F1 driver Alexander Wurz demonstrated the benefits of Eco-Driving saying: "It's not only to save money in terms of fuel and very good for the environment but it's also very stress-free driving".

Meanwhile, Le Mans 24 Hour Champion, Tom Kristensen, explained how Warning and Emergency Braking can help reduce the risk of accident.

"Many people when they hit the brakes, with their reaction times, hit it too soft, but now the car can compensate for that. Break Emergency Systems are a must for any car," he said.

The session concluded with a dramatic demonstration of the eCall system, which included a helicopter and an ambulance at the rescue, all performed by the host club ÖAMTC.

FIA President, Jean Todt, was on hand to offer his support to the eSafety Challenge event, and said it is now vital the e-Safety systems are better promoted to the motoring public.

"Every time we step into a car we run the risk of a life-threatening incident," he said. "As in motorsport, we need all the help we can get from technology to compensate for human errors. It is vital that those most at risk, in particular families and young people, understand the tremendous impact eSafety systems can have on safer driving."

More on the eSafety Challenge project can be found at [www.esafetychallenge.eu](http://www.esafetychallenge.eu)

## Improving rally safety in Africa

**TANZANIA** Seven people have died in rally accidents in Tanzania in recent years, including driver Khalid Bakhresa who was killed on the Rally of Zanzibar in 2007 when he swerved to avoid children crossing the road. Two years later four children were killed and nine others injured during the Pathfinder Logistics event in Morogoro when a car went into the crowd after hitting a tree.

In an effort to improve safety the Automobile Association of Tanzania (AAT) conducted a two-day motorsport safety seminar in the northern port of Tanga. This symposium was attended by three members of the United Kingdom's Motor Sport Association and by more than 50 stakeholders in the sport from all over the country, ranging from drivers, motor sports club officials, media members, rally officials, police officers and paramedics. The event also attracted participants from the neighbouring Kenyan city of Mombasa.

The AAT has also been active in distributing crash helmets to motorcycle riders in Tanga, following a critical upsurge in road deaths in the country in just one year, the figure nearly doubling between 2009 and 2010, largely due to an increase in deaths in motorcycle and three-wheeler accidents, which increased by 70 percent.

The visit of the three British officials was funded by the FIA Institute/FIA Foundation.



## Four women take on Desert Challenge

**ABU DHABI** Four women took part in this year's Abu Dhabi Desert Challenge, an event which features some of the world's toughest and most spectacular terrain. The field this year included 20-year-old student Brittany Erasmus, a South African based in Dubai and the rather more experienced Italian racer Camelia Liparoti (pictured right), who is regular competitor on desert rallies.

"I love taking part in the Abu Dhabi Desert Challenge. The organisation is great and friendly, and it has outstanding stages in the magnificent desert," said Liparoti of the event. "Taking part in rallies has been a dream of mine since childhood - I am living my dream! I hope that my presence will inspire more ladies to enter the Abu Dhabi Desert Challenge and other races."

Sheila Hutton-Barker, originally

from the United Kingdom but now based in the UAE, co-drove her husband Ian in a Nissan while the Czech Eva Vykydalová was co-driver for Jiri Janacek in the Czech Dakar racing team's Toyota LC120.

"Last year, the FIA established the Women and Motor Sport Commission, a body which is designed to promote the involvement by women in all aspects of motorsport. The

participation of Erasmus and Liparoti in the Abu Dhabi Desert Challenge demonstrates that, for many women, the passion for racing is there," said Mohammed Ben Sulayem, president of the Automobile and Touring Club for the UAE (ATCUAE) and vice-president of the FIA. "Their participation proves that cross-country rallying is not a sport reserved only for men."



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## WMSC announces Monte Carlo return

**BARCELONA** June's meeting of the World Motor Sport Council (pictured left) was a success on a number of fronts but two coups in particular stood out.

The first was the confirmation that the Monte Carlo Rally will return to the calendar of the World Rally Championship in 2012 and secondly, the FIA and the Automobile Club de l'Ouest (ACO) announced that a FIA World Endurance Championship will be launched next year based around a calendar mirroring the existing Intercontinental Le Mans Cup series, of which the 24 Le Mans race will be the highlight.

"I am delighted to welcome the return of the FIA Endurance World Championship, especially with a promoter like ACO," said FIA President Jean Todt. "I am also very pleased to have a legendary race like the 24 Hours of Le Mans as part of it."

A delegation from FIM, headed by President Vito Ippolito, was also invited to attend as observers.



driver,” said Wurz. “When you are in Malaysia, with 35 or 40 degrees ambient, in an Adrian Newey-designed car, which has the radiator really close to the driver, and zero airflow around the cockpit, it’s useful to know you’ll be able to concentrate.”

For the second workshop, the drivers headed to the Alpine town of Chamonix for a five-day programme, where the emphasis switched to preparation and planning – two key tools in a race driver’s locker. During sessions of rock climbing and high-altitude trekking, both of which require planning and attention to detail, Reid and Wurz helped by imparting the knowledge they had learned throughout their careers, taking the students through a minute-by-minute timetable of a Formula One meeting and World Rally Championship event, to help them prepare for top-level motorsport.

Every task was related back to motor sport safety and development. As Reid said: “There was a lot of planning work going in Chamonix. A lot of the tools you would use in planning, you would also use in problem-solving and motorsport is inherently about finding solutions for things which can – and often do – become problems.”

One month later and the drivers were in Austria with the focus of the five-day course on the technical aspects of driving. Utilising the Road Safety Training Centre in Teesdorf, just south of Vienna, the drivers were guided through a succession of theory and practical training sessions.

Road safety is a core principle of the Academy and with aquaplaning causing a significant number of road accidents in the developed world annually, the drivers were given a practical demonstration of how to deal with the hazard by TTI’s chief operating officer Norbert Filippits, who safely guided a BMW road car through a 50-metre stretch of flooded track at 120kph.

Driving on low-grip circuits helped the drivers understand the importance of the friction circle and getting as close to the edge of it as possible to find maximum performance from the tyre. A slalom course provided the perfect environment to demonstrate the importance of transferring the car’s weight to the front wheels to assist turn in, while using minimum steering input in order to avoid excessive tyre wear.

“This programme is safety-based and that safety message was running through all workshops,” said Reid. “There is a commonality of approach to making a safe driver and a performance driver and we’ve seen plenty of evidence of that.”



## The Pursuit of Excellence

**FIA INSTITUTE** Halfway through a programme of six workshops and the participants in the FIA Institute Young Driver Excellence Academy have already been put through their paces with intensive learning and safety training at events in Edinburgh in Scotland, Chamonix in France and Teesdorf, Austria.

Academy Performance Managers Alex Wurz and Robert Reid, who have led all of the workshops, have ensured that the young drivers meet the exacting standards needed to make it to the top level of the sport and to do so with safety always at the forefront of their minds.

The hard work began the moment the drivers arrived in Edinburgh for the first workshop, where they were tested in every area of fitness, including intensive workouts both in the early morning cold and in high temperatures in the heat chamber. The drivers also faced some pretty stern tests about their technical knowledge and nutritional awareness. Improvements in concentration and technical expertise are key factors in developing driver safety and techniques and these have been running themes throughout the Academy programme.

One of the toughest elements of the physical training was the use of the heat chamber on the final day. The drivers were given a series of exercises using bikes and rowing machines to complete at room temperature. Their hydration and concentration levels were taken afterwards, with the process then repeated at 40 degrees in the chamber.

This graphically underlined the need for the right kind of hydration, with concentration levels dropping dramatically in the heat.

“Heat chamber training is very useful for a top



## RACE launches new road safety app

**MADRID** The Royal Automobile Club of Spain (RACE) has launched a new road safety application to provide useful mobility services in real-time with all the information needed for a safe journey.

Information made available at your fingertips include radars, petrol stations, routes, traffic incidents, the weather and useful telephone numbers.

Highlights include real-time information on traffic incidents, which can help users change their route to improve mobility and reduce risk levels, as well as training videos on how to fit tyre chains or change a wheel quickly and safely.

What’s more, with the search engine for local petrol stations, information on the latest fuel prices can help save money each time you refuel.

Modern mobile devices now include functions such as cameras that make it possible to send information in real-time, together with the location of the problem and any comments. As a result, mobile devices have led to the permanent development of applications and instruments that can assist drivers.

With the RACE application, drivers can find all the information they need to start their journey safely and, in the event of any incident, they have the training and telephone numbers they need to continue their journey problem-free.

The application is compatible with the iPod and iPad and is available to download now.



# Service stations are in the slow lane

Overpriced, unsanitary and inaccessible for the disabled – Europe’s motorway services have not been covered in glory by a new survey, but there are beacons in the darkness...

How do Europe’s motorway filling stations compare with one another? Where are motorists offered the best services and charged fair prices for petrol, food and other goods? Are we paying too much for our petrol on motorways? And do filling stations meet basic sanitary standards?

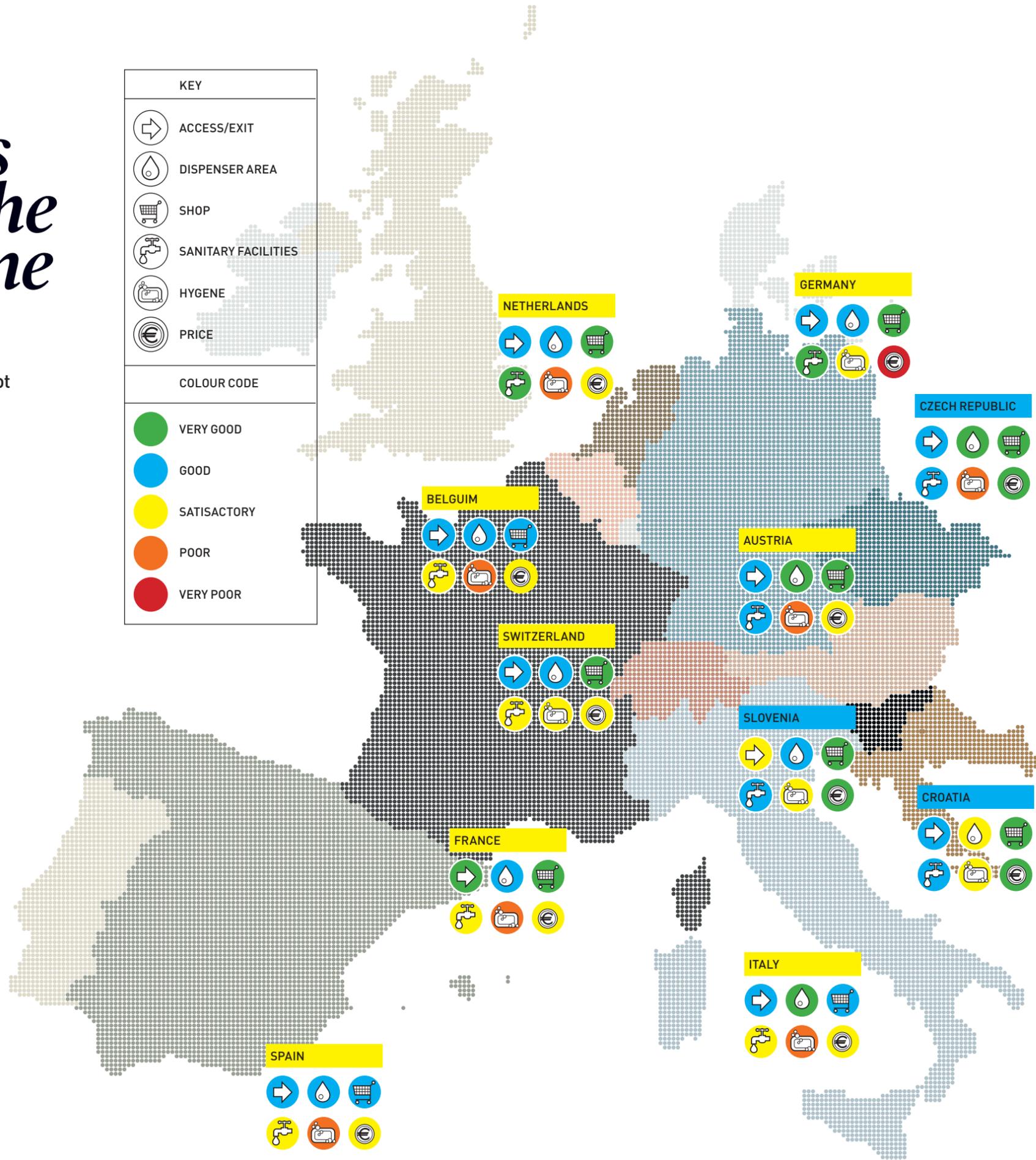
These were some of the questions that EuroTest experts set out to answer between September 2010 and April 2011, as they travelled 34,000km in order to inspect a total of 77 motorway filling stations along the most important European travel routes. And not one station could manage to achieve the top ‘Very Good’ rating across the board.

Slightly less than a third of the stations were rated as ‘Good’, with the majority being ranked only as ‘Acceptable’. Six were reckoned to be ‘Poor’, but none received the lowest rating of ‘Very Poor’.

So, in what areas did the service stations fall down?

“Lack of help for the disabled, unclean sanitary facilities, high prices in shops and petrol price displays not visible on motorways are all areas where Europe’s motorway filling stations need to

KEY	
	ACCESS/EXIT
	DISPENSER AREA
	SHOP
	SANITARY FACILITIES
	HYGIENE
	PRICE
COLOUR CODE	
	VERY GOOD
	GOOD
	SATISFACTORY
	POOR
	VERY POOR



## THE PRICE ISN'T RIGHT

No-one expects prices at a motorway filling station to be on par with prices at supermarkets, but EuroTest inspectors were shocked by some of the prices they encountered, and a third of the filling stations were given a ‘Poor’ or ‘Very Poor’ rating in this category.

The inspectors used a shopping list consisting of 0.5l bottles of cola and mineral water, a cappuccino, a standard-sized chocolate bar from a particular brand and an adult safety vest. The results were wildly different with the cheapest vest costing €2.10 (in France) and the most expensive costing €18.36 (Switzerland).

In Austria, a cappuccino cost €3, but one could get the same beverage in Croatia for just €0.54. At the Kozlov Černá Studánka in the Czech Republic, one could buy four bottles of mineral water for the price of one in Switzerland, while a chocolate bar elsewhere in the Czech Republic cost €0.53, compared to €1.60 in Spain and Italy. The price of cola ranged from €0.95 in Croatia to €2.65 in Spain.

On average it was Germany that proved to be the most expensive country and that cannot be blamed on purchasing power, as according to the price index from Eurostat, the statistical office of the European Union in Luxembourg, the most expensive country should be Switzerland, followed by Austria. Although these two nations did prove to be expensive, they were clearly outdone by the Germans. Three Dutch filling stations distinguished themselves by demanding €0.50 for drivers to use a tyre pressure gauge, while four stations charged €0.70 for toilet facilities.

do more”, says Jacob Bangsgaard, Director General of the Fédération Internationale de l’Automobile (FIA) Region I.

It was not all bad news, however, as EuroTest did conclude that most filling stations were operating at a high level when it came to signposting on motorways, safe entry and exit points, service amenities (including items such as disposable gloves and tyre pressure gauges) and when judged on the range of goods on offer in station shops.

Somewhat unexpectedly Eastern Europe claimed the top five rated service stations, with the Kozlov-Černá Studánka facility on the Czech Republic’s A1 motorway between Prague and Brno topping the list. The Czechs also won the second best rating and two filling stations in Slovenia and one in Croatia completed the top five.

France and Austria each had three ‘Good’ ratings, while Switzerland could claim only two and Italy, Spain, Belgium and the Netherlands had only one apiece. Germany also had one but this was rated only 19th overall, the primary problem being the high prices charged. The worst rating went to the Dutch facility at De Buunderkamp on the A12 between Utrecht and Arnhem.

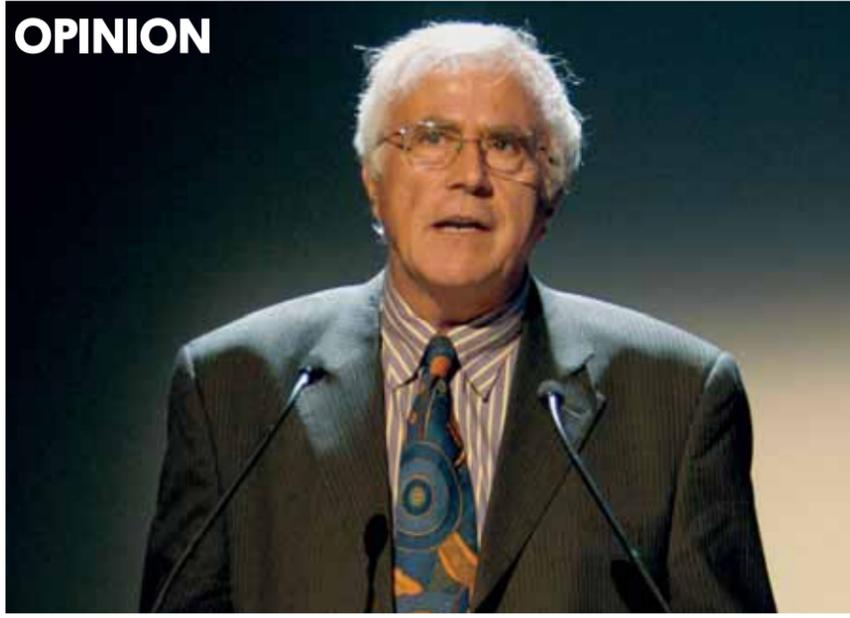
The survey concluded that the biggest shortcomings were the condition and cleanliness of the toilets, which were often neglected by operators. Poor hygiene results caused 35 of the 48 facilities to gain only a rating of ‘Acceptable’ and more than a quarter of the stations had no toilet facilities for people with disabilities.

Motorway shops were found to have a wide array of items, but they came at a cost and one often deemed unacceptable by testers, who witnessed bottles of mineral water being sold at four times the normal price, and chocolate bars carrying a 300% mark-up.

The survey concluded that while many aspects of motorway service stations are operating at a high level, there is considerable room for improvement.

*EuroTest is an international testing programme for consumer protection, involving 18 automobile clubs in 17 countries, all members of the FIA. It has been in existence since 2000. For more information click on [www.eurotestmobility.net](http://www.eurotestmobility.net)*

## OPINION



## Peter Wright Overtaking

The FIA technical advisor on why the Federation has made the right choice in aiding overtaking in F1 and why the detractors are wrong

At least everyone agreed there was a problem in F1, namely that it had become somewhat boring due to a lack of overtaking. Now that the FIA has introduced measures to address the problem, and there is overtaking, there are still those who criticise with the complaints encompassing: lack of purity; virtual racing; too complicated, too much overtaking; too many pit stops and so on. Many of the detractors claim: "I'm not an engineer or a scientist, but..." Well, this brings to mind the well-known saying: There is science, and then there is opinion. And the less well known one: Anyone who is not a scientist, mathematician or engineer should not be allowed to have an opinion.

The measures that have been wrought in 2011 and have succeeded in making F1 so exciting this year, are highly technical and should be understood to appreciate why they are needed, the reasoning behind them, and why they work.

When the FIA started studying overtaking in 2004, the question of what entertains was addressed first and foremost. People like to be entertained; it makes them feel good. One need look no further than the joke to understand the process. When someone tells a good joke, they lead the listener down a path, which is predictable enough for them to

think they know where it is leading them. The joker then turns abruptly though ninety degrees, delivering the punch line. The listener is totally caught out and neurologists have shown that the mind empties at this moment; the spontaneous reaction is laughter and the natural release of dopamine in the brain - the body's drug of choice.

Entertainment comes with unpredictability. We motor racing fans like shock and awe, whether from daring manoeuvres on the track, or indeed (injury-free) accidents. Sure, many of us appreciate the sublime skill of driver and machine at the limit, but that is a rare and different form of satisfaction.

When overtaking between cars of similar performance becomes almost impossible, the result becomes dull and predictable and entertainment wanes. This is what happened to F1 - for two fundamental reasons.

Firstly, every aspect of the cars' performance - engine, weight, tyres, brakes, transmission, aerodynamics,

**Many detractors claim: "I'm not an engineer or a scientist, but..." Well, there is science, and then there is opinion.**

driver, team - was optimised and perfected. Although the performance of the cars was not the same, it became predictable as technologies were perfected and the technical resources of teams grew, with the result that the unexpected - missed gear changes, engines overheating, tyres and brakes deteriorating, driver errors due to exhaustion, seldom occurred. The cars lined up for the race in performance order, and stayed that way.

Secondly, the aerodynamic characteristics of the cars developed in such a way that the following car acquired a performance deficit to the car in front, due to that car's wake.

Back in the days before wings and ground effect, when cars had inherent lifting characteristics, the following car not only experienced less drag, but also less lift due to being in the wake of the car in front. Thus the wake had two performance benefits and led to the great slipstreaming contests on the high-speed circuits of old - the car behind always enjoying an advantage over the car ahead, from the corner before the straight to the braking point for the next one.

However, as downforce developed, the drag reduction advantage was eroded by the loss of downforce in the wake, and eventually the car behind became unable to get close enough in corners to take advantage of the drag reduction. The effect is easy to simulate, and totally predictable mathematically.

The first measure to be introduced was the Kinetic Energy Recover System. KERS is a technology fundamental to all electric vehicles, from rickshaws to trains. The addition of an electric motor/generator to the powertrain, or indeed an all-electric powertrain, enables kinetic energy to be recovered for future use, when decelerating the vehicle.

It's a complete no-brainer to include regenerative braking, for that is what KERS is, but not so easy on a car where stability under braking is affected. It was the simplest sustainability technology to introduce quickly into F1; see how long it took to change the engine itself.

However, once all the cars have it and it works reliably, it sort of disappears and no one notices. For this reason the regulations were written to highlight KERS as an overtaking assistance to compensate for the loss of performance of the following car, and get it talked about. The fact that only some teams took it up in 2009, thereby gaining a demonstrable advantage, and then all of them dropped it for 2010

doesn't detract from the success it achieved.

It is well known that Honda, Toyota and BMW have all gained from their F1 KERS development programmes, and that they have since deployed the engineers involved in their F1 KERS endeavours on road car programmes. The technology transfer has also taken place with those manufacturers who have remained in F1. KERS is back in 2011, and contributes to overtaking through its strategic use. It requires driver brainpower.

The change in tyre supplier has been widely seen as the most significant change to affect the entertainment value of F1. In the past it was noticed that when it rains, F1 comes alive, but there are misconceptions about why. Some observers are of the opinion that this is because the grip level is reduced. True, but that is not the main issue. More significant is the consequence of the rain - that drivers end up on different tyres at different moments, and often they turn out to be on the wrong tyre for a number of laps.

This causes wide differences in performance at different times, mixing up the order and enabling unpredictable racing as drivers recover once they are

**In rain, adaptable drivers excel. As Ayrton Senna said: "We're all quick but only some are quick all the time."**

on the right tyre again. This is what the FIA requested Bridgestone to provide in the two compounds supplied to each event. When they did do so, usually, it has to be said, by mistake, the effect was similar to a wet track, with different relative performances between cars at different stages of the race, allowing real racing and overtaking to take place throughout the field.

Unfortunately, some drivers complained, describing the tyres as "rubbish". Bridgestone inevitably reacted to the bad publicity by ensuring the two tyre compounds were close in performance to each other, and both being up to the task. Once again, predictability returned.

The same request was made to Pirelli, and they responded in spades. By some stroke of fortune, they were lauded by commentators before the drivers could complain too much. Martin Brundle even publicly thanked Pirelli for saving F1!



Rain, and varying tyre performance both bring out another factor. When it rains, the grip changes from lap-to-lap, even corner-to-corner.

Circuit racing drivers tend to work up, lap-by-lap, to a best lap time somewhere near the limit. In rain this is not possible, and it is the adaptable drivers who excel, being able to explore the limit on an ever-changing basis - a task rally drivers are adept at. As Ayrton Senna once said: "We are all quick, but only some of us are quick all the time". He had it, as he so often demonstrated.

The varying performance of the Pirelli tyres has brought out this skill in a number of the drivers, so the tyre characteristics not only enable overtaking, but also test driver skill more than consistent tyres. That's good.

Finally, there is the Drag Reduction System (DRS). This device, which reduces the drag of the following car according to carefully defined sporting regulations, simply sets out to compensate for the aerodynamic shortcomings of being in the wake of the leading car, when it is activated.

The rules for its use are carefully worked out by simulation, to enable an equal or slightly superior car to get alongside at the braking point. Who wins the corner is then down to the drivers, as it should be.

Provided the conditions of use and the DRS lines are correctly set, this will not automatically allow a slower car to overtake. To date Charlie Whiting and his experts have done a remarkable job in getting this right, and they continue to refine their knowledge of how to apply the new system.

Before DRS was introduced, it was common to see a faster car/driver, who for some reason found himself at the back of the field, carving his way through the field until he came upon cars that were 1.5 to 2 seconds per lap slower than him. Then he becomes stuck for lap after lap, until either the slower car pits or its driver makes a mistake. Now, we can enjoy formidable and exciting drives such as Mark Webber's in China earlier this year.

The combination of KERS, Pirelli tyres and DRS has transformed F1 from, whispier it, "boring", into a sport which really excites and entertains those who follow and watch it. It may be harder to follow, but a sporting activity, which demands attention from those involved in following it has far greater rewards than one in which the outcome is almost totally predictable from the start.

Purity is most admirable, but action and the unexpected are much more entertaining.

# Clearing the road to Japan's recovery

How the Japanese Federation is helping to rebuild the country's fractured transport system in the wake of the Tohoku earthquake



The Tōhoku earthquake that hit the eastern part of Japan on 11 March was the most powerful ever to hit the country, causing loss of life and destruction on an almost unimaginable scale. Measuring 9.0 on the Richter Scale, the undersea 'quake not only caused a great deal of instant damage on land, but also created massive tsunami waves measuring up to 38 metres in height. The tsunami hit the Tōhoku region's coastline minutes after the earthquake and swept away entire towns, with waves travelling up to six miles inland. Some 22,000 people were killed or are missing across 18 prefectures and approximately 570,000 houses were lost, destroyed or damaged. More than four months after the earthquake some 130,000 people are still living in temporary shelters.

The impact on the road infrastructure was colossal with roads being torn up over long distances as the ground moved beneath them. In one case an 18-mile stretch of road suffered damage along its entire length. Bridges were swept away, while landslides blocked other roads. In the event of such devastation the question was: what could an automobile club do to help?

In 2004, the Japanese Automobile Federation (JAF) created its Special Support Team (SST), an organisation specifically designed to respond to large-scale natural disasters, in addition to helping out during busy seasonal periods, such as when there is heavy snowfall. The organisation consists of 100 specially selected, highly-qualified members of the Road Service Department from offices across Japan and each team member participates in regular training sessions with the police and fire departments as well as with government agencies.

In times of crisis the government or the local JAF Security-General can request help and the SST is deployed to clear away damaged cars and helps all motorists, even non-JAF members.

In the Iwate Prefecture, unable to contact the local dispatch centre for four days after the 'quake, one JAF patrolman began helping out on his own. He voluntarily helped locate missing people and disconnected batteries

in cars submerged by seawater, where there is a danger of short circuit caused by salt and which can result in cars catching fire after being taken from the water.

The scale of the destruction was unprecedented. It is believed that as many as 140,000 vehicles were lost, destroyed or damaged in the Miyagi Prefecture alone. Some were lifted by the waves and deposited on top of buildings or on piles of unstable debris. Batteries, car doors and brakes were all affected by the sea water.

The first SST went into the earthquake zone on 18 March to help clear access roads for emergency vehicles. In the worst hit areas patrolmen had to deal not only with wrecked cars, but also with the bodies of victims found inside. Although this was difficult, the patrolmen received great support from the local population, who saw from their number plates that the team had come from all over Japan.

Over the next three months six SSTs were in action, with 156 patrolmen recovering a total of 4,554 vehicles. Each was given a free check-up. The teams spent days covered from head to foot in mud, but continued their task in a calm and professional manner.

The SSTs were then requested by the government's Nuclear Emergency Response Headquarters to assist in the evacuation of cars from the 20km no-go area around the crippled Fukushima No 1 nuclear reactor. It was the first time that JAF had been called upon to respond to such a request, and it decided to fulfil the responsibility after consultation with the government about the possible effects of radiation.

JAF patrolmen were taught about radioactive materials and the effects, and to ease their fears had a Q&A session with doctors familiar with radiation. In the course of June a total of 79 patrolmen recovered 557 vehicles from the no-go zone, with their exposure being limited to 10 minutes per vehicle.

There are still a large number of cars in the no-go zones and the work will continue this summer. There is much to be done but JAF is already looking ahead to help the region revive its tourist industry, which has been badly damaged by the earthquake.

# charging forward

Earlier this year the EU tasked the FIA with building a racing series for electric vehicles. But just how close are we to a credible championship and what barriers must be overcome before we can truly plug and play? InMotion asks the men bidding to make EV racing a reality sooner rather than later...



# There is a cohesive argument that suggests the racetrack may ultimately be the last bastion of the internal combustion engine.

The outside world will move on: fossil fuels will become scarce; hybrids will rise and fall; electric vehicles will become ubiquitous. On the racetrack, however, time will stand still: performance will outweigh cost, and so the energy density of crude oil distillates will demand that they remain the fuel of choice for motorsports.

There are, of course, counter arguments, many of which feature an ethical component, albeit ethics tinged with hard-nosed practicality. The modern interpretation of motorsport demands that technology developed for racing also delivers real world benefits to the automotive industry, society at large, or both. That's difficult to deliver under favourable circumstances but to do so with a powertrain rooted in the 20th Century will be impossible. And leaving altruism aside, from a commercial point of view that's also a powertrain destined to become less appealing to sponsors with green agendas of their own.

Thus, arguments both empirical and principled are driving forward the idea of electric racing. But while the call for an electric series has grown more clamorous, the actuality of such a racing programme has issues of its own.

The Zytec Group has considerable prowess as a designer and manufacturer of both electric and hybrid powertrains. It developed the hybrid Panoz Q9 (aka Sparky) LMP1 car, which first competed in 1998, and a decade later supplied the KERS which propelled McLaren to the status of first F1 team to win a grand prix using a hybrid powertrain. It has developed various EVs for the road, most notably the Smart ED (formerly the Smart fortwo EV).

In Zytec's considered opinion, building a pure electric racing car capable of replicating the performance of an IC-driven single-seater is currently at the very edge of the technology envelope, though not unfeasible.

"I think it's possible," says Pete May, Senior Engineer, Motorsport Applications. "You could produce a very nice, very lightweight, very high power-to-weight ratio drivetrain featuring electric

motor and controller technology to rival IC engines. Given the developments that we've seen with KERS, the actual powertrain is feasible and capable of delivering the same power as a petrol engine with probably less than two-thirds of the weight - but that really isn't the issue. The problem is carrying the energy to do it."

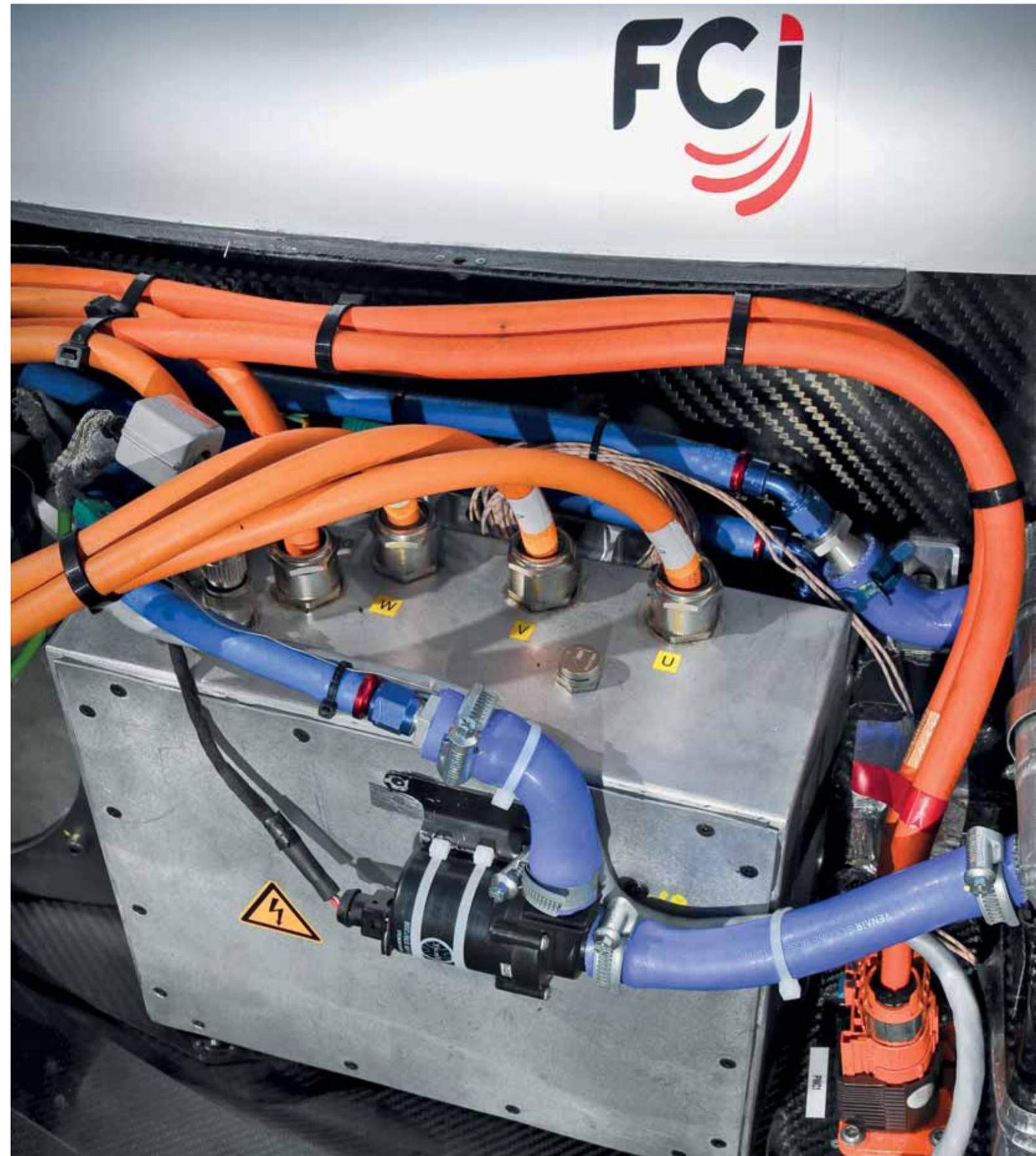
As is the case on the road, energy storage technology is the limiting factor in the design of an electric racer. The ability to make an electric racing car has long existed - Zytec themselves built an electric F3000 demonstrator at the end of the 1980s - but while electric motors and power electronics have made giant strides forward since then, the development of battery technology tends to proceed at a more stately pace.

May suggests the problem of electric racing is properly explained by looking at the numbers. "Petrol provides something like 13kWh/kg (kilowatt hours per kilogram) and the best batteries considered safe and rated for racing provide something like 0.25kWh/kg.

"It's a little more favourable than it sounds, as the efficiency of a petrol engine is around 25 per cent, so the usable figure is something like 3.5kWh/kg whereas battery-to-ground efficiency of an electrical system might be over 90 per cent," he continues. "Add in the capacity to regenerate electrical energy when decelerating, and the real energy-per-kilogram performance of a battery is probably one-sixth of what you are likely to get from petrol."

"It means you could quite easily match the performance of something like a GP3 car or a Formula BMW, albeit with a short race distance of maybe 10-15 minutes, and with a car that is a lot more expensive than the IC equivalent.

"Batteries are developing all the time, so races have the potential to get longer," May adds. "In theory, a series could start now with a fully designed car, and simply increase the duration of races as the development of batteries allowed. The questions remaining are: is there sufficient interest





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in 15-minute races? And, are teams prepared to invest more money to get out the same performance?"

Perhaps an answer can be gleaned from the take-up of electric racing away from single-seater formulae.

During the winter of 2009-2010 an electric car category was added to France's famous Trophee Andros ice-racing series. Nicolas Prost took the title (and successfully defended it this year) driving an Exegon Engineering Evo2 electric buggy, powered by a pair of 45kW Siemens motors and SAFT lithium-ion batteries, producing 24kWh and weighing 277kg (one-third of the total vehicle weight).

Manufacturer's specs suggest the battery pack was capable of supplying energy for a constant 150km/h over 35minutes, though ice races tend to be on the order of 15 minutes to preserve the quality of the ice. It ensured the category did not look out of place and thus was very popular.

Batteries prefer the cold. When BMW's Racing Mini E set the fastest electric lap of the Nordschleife, it did so after being chilled to -5°C in a refrigerated truck.

Ice-racing obviously is a more natural fit, so perhaps more significant is the fact the ice-racers have since been modified for road racing. They

competed this year at Pau, in an eight-lap event billed as the first 'Grand Prix Electronique,' running alongside the F3 International Trophy race. The significance of the event was denoted by the presence in the field of Monaco Grand Prix winner and former Toyota and BAR F1 driver Olivier Panis.

Coming much nearer to the idea of a single-seater electric formula is the

(continued page 26)

**"You could easily match a GP3 car."**  
**Pete May,**  
**Zytek Group**



## Leading The Charge

*FIA Alternative Energies Commission member Lord Paul Drayson believes that an electric championship is inevitable and he wants to plug in at the front of the grid.*

Drayson Racing has the avowed intention "to be the world's leading green technology racing team". It is also the first outfit to sign up for the SportsEV Cup. Racing polymath and eponymous founder Lord Paul Drayson is a member of the FIA's Alternative Energies Commission and a massive enthusiast for green racing. The former UK Minister for Science and Technology has an engineering background with a PhD in robotics. He competed in British GTs using a bio-ethanol powered Aston Martin in 2006 before more recently entering a bio-ethanol LMP1 Lola-Judd in ALMS and ILMC. His win at Elkhart Lake was a first for an E85-fuelled car. Kicking on from that success, Drayson now stands in the vanguard of the electric racing movement.

"Last year, when looking at the evolution of technologies in both the automotive world and in motorsport, it was clear we were fast approaching the point where electric drivetrains, either as hybrids or as pure EVs, were becoming technically viable," he says.

"I believe there is a real opportunity for motorsport in this arena: I think it's very important that motorsport shows it is part of the solution to the energy efficiency challenge and the challenges of climate change; that the tremendous track record motorsport has of driving innovation is applied to improvement of efficiency and reduction of emissions.

"There's an opportunity here: motorsport, by getting involved in electric vehicles, can showcase the real potential of this technology and the excitement of it. I think it's the right thing to do, because we have a pretty significant problem we need to overcome in terms of energy dependency. We have less than 40 years of oil left and we have a significant challenge around climate change. And although motorsport makes a tiny contribution to global greenhouse gasses, it makes a big difference in terms of technology development and public perception. And that's why I think it is absolutely vital for motorsport to be at the forefront of this, and I'm delighted the FIA is taking a lead. I think Jean Todt is doing a great job in this, and I'm really excited about it."

Wearing the hats of team owner, racing driver and professional engineer,



Drayson looks at EV racing from several different points of view. "At all levels it makes a huge amount of sense to me. As an owner, I think this is a very attractive commercial opportunity. We're going to see dramatic growth of electric vehicles over the next ten years and therefore I think there is a commercial opportunity for race teams and for motorsport technology development organisations to develop products, systems and cars for that market.

"Secondly, as a driver, I'm very excited about the possibility of such a car. When you think about what an electric drivetrain offers in terms of performance, I think, as a driving experience, it's going to be tremendous - but it is going to be different because obviously an electric motor provides 100 per cent of the torque immediately; you



don't see the classic torque curve that you get with an IC engine.

"As an engineer it's fascinating. The regenerative braking as soon as you lift off the throttle is going to change chassis design, and the removal of the IC engine is going to offer all sorts of new options for aerodynamics. It's going to require a new type of engineer: someone with electrons flowing through their veins rather than petrol."

While the higher echelons of motorsport are focused on hybrids, the potential for full EV is, says Drayson, futuristic but also elegantly simple.

"From the engineering standpoint, EV has the advantage of being focused. A hybrid needs to integrate an electrical system with an IC system and then carry around the weight of both. An EV racer has its own challenges but they are mostly based around range, which itself is determined by drag, the weight and performance of the batteries and the efficiency of the vehicle. While technically demanding this allows us to focus on the areas of development that are most valuable for moving forward the performance of the overall vehicle.

"Of course it's possible to overcome the limitations of battery capacity by going hybrid, but that doesn't really force you to address the key limitations that exist at the moment."

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embryonic EV Cup, which, after a false start this summer, is due to commence at Laguna Seca on November 26th.

The EV Cup will feature three categories. The PrototypeEV class is a free formula, where experimental vehicles can time trial with no restrictions placed on weight or power. CityEV and SportsEV, however, are single make championships. The latter is devoted to city-focused production vehicles and will feature the compact THiNK City electric car. The SportsEV category, meanwhile, will race with the Westfield iRacer.

Westfield's owners, the Potenza Group, have a parallel programme to develop a fleet of road-going electric Westfields alongside the iRacer, though Dr Paul Faithfull, managing director of Potenza Technology acknowledges developing the cars for racing is a more straightforward activity.

"The challenges are different, but the thing that makes racing simpler is the fact that it exists in a controlled environment: you know how far the vehicle needs to go, so the issue of 'range anxiety' doesn't exist to the same extent," he says. "Then there is the simplicity of a racing car which doesn't

have the extra systems required by a road car."

The 770kg car features approximately 320kg of lithium-phosphate batteries grouped into eight battery packs. These store approximately 23kWh, which feeds two 80kW Oxford YASA motors driving the rear wheels.

The iRacer's designers suggest that at racing pace that should be sufficient for a 13-lap race of the 2.6km Silverstone National Circuit.

While nominally a two-seater in the traditional Westfield style, the company is currently developing an optional 'buddy pack' of extra batteries to fill the passenger compartment and significantly increase the range of the racing car.

The extra storage will address the power-hungry nature of EV racing and the fact that the relationship between speed and endurance is more extreme in an EV than it is in a vehicle with a conventional IC engine.

"Ultimately, the harder you push, the shorter the distance you can travel," insists Faithfull. "The irony of the car is that it's quicker than we can allow it to be. The motors provide 160kW, but if we give the drivers the full amount of power

**"You know how far the vehicle needs to go, so the issue of 'range anxiety' doesn't exist."**  
**Dr Paul Faithfull,**  
**Potenza Technology**

**THINKING BIG**

Think has been building electric vehicles for 18 years and their THiNK City is the first vehicle of its type to be granted pan-European regulatory safety approval and CE certification. The road-going version offers sodium or lithium batteries, has a range of 160km and can reach speeds of 110km/h. The racing version will feature a Li-ion battery pack, tuned software with increased output and a 100kg weight saving. It's top speed should be around 138km/h.

all of the time, they will use it - because they're racers - and they will not get very far. So we're developing software to control the power envelope, maybe providing a button for an overtaking burst," he adds.

"We've found with both the racing car and the seven road cars we have on trial, that knocking even 5mph off the top speed means you go an awful lot further."

Like many of those involved in electric racing, Westfield are seeking ways to add an aural element to their racing cars.

In engineering terms this may seem ridiculous: noise is wasted energy and therefore the last thing any EV needs - but there exists the perception that 'proper' motor racing is loud and as a customer-focused business it would be negligent to ignore what, ultimately, the market expects.

Perhaps the point at which EV racing can be judged to be successful won't come when a particular range or weight target is met; maybe it will be when people begin to accept that racing can be quiet. When that happens the last bastion of the IC engine will soon begin to crumble.





“The key is to build an event around the main race and to create the right kind of atmosphere.”



### Sprinting to Prominence?

Former French GP organiser Eric Barbaroux is convinced his Formulec championship can become the “Olympic 100m” of racing

Following the success of the electric Andros racer, plans are afoot in France for a single-seater EV series, to be run by Formulec, headed by Eric Barbaroux, former CEO of the French Grand Prix.

“It struck me that, although chemically there was a lot more energy

in one litre of petrol than in one litre of electrolyte, there are huge areas of electrical energy that have not been researched. At the same time, the petrol engine is still not very efficient, despite 100 years of constant development. As an engineer I believe that the electric motor has just as much or even more potential.”

The engineering consultancy Segula Technologies was retained to develop the powertrain for the EF01, which featured a prototype chassis based on a modified hillclimb car, chosen for dimensions which aid the dissipation

of heat from batteries. (It’s a common problem within the genre at 145kph, the original prototype iRacer was drawing 70kW, of which 10kW was waste heat).

Even so, in 2009 the Formulec organisation commissioned Brawn GP to help with aerodynamic development, specifically the internal airflows around the battery packs. “The battery manufacturers did not have the experience to cover this,” says Barbaroux. “Using an Formula One team with its superior aerodynamic, simulation and CFD capability was an important step.”

The EF01 began testing in September 2010, with Jules Bianchi and Alexandre Prémat driving. It then embarked a year of development, aimed at defining the specification for a production version of the car, while also taking part in demonstration runs to increase awareness. If all goes to plan there will be a 10-race series beginning late in 2012. The manufacturers claim a sub-3s 0-100kph time and a top speed of 250kph. It will be capable of racing for around 20 minutes.

Race time, says Barbaroux, should not be an issue. “The 100metres in the

Olympics takes just 10seconds but it is the biggest media event in all sport, so the key is to build an event around the main race and to create the right kind of atmosphere. We do not see this being a three or four-day event; we will do it all in one day. In terms of TV coverage a main event of 30 minutes’ live racing, packaged with 20 minutes of highlights and interviews creates a parcel of around 50 minutes, which is what the broadcasters are looking for.”

Barbaroux came to the conclusion that while there was potential for a global electric racing series it needed

to avoid comparisons with any form of conventional racing.

“Every sport has its own way of doing things. “The best way to illustrate what I am saying is to compare skiing and snowboarding. Downhill racing is spectacular and magnificent but competition snowboarding is a completely different culture, with the music and the carnival atmosphere. I think we should keep that in mind rather than trying to compete with conventional racing cars. The two are not comparable, and thus we need to adopt a different strategy.”

# True lessons in anti-doping

Having signed up to the code of the globe's major sports anti-doping body WADA, the FIA is launching a new online course aimed at educating drivers about banned substances, as SANDRA SILVEIRA CAMARGO, Head of Medical Affairs, explains...

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**F**rom the scandal of the BALCO lab's systemic doping of superstar baseball players and track and field athletes through the supply of its drug cocktail 'The Clear', to the recent unproven allegations levelled at Tour de France legend Lance Armstrong by former team-mate Tyler Hamilton, substance abuse in sport is never far from the back pages of the world's newspapers.

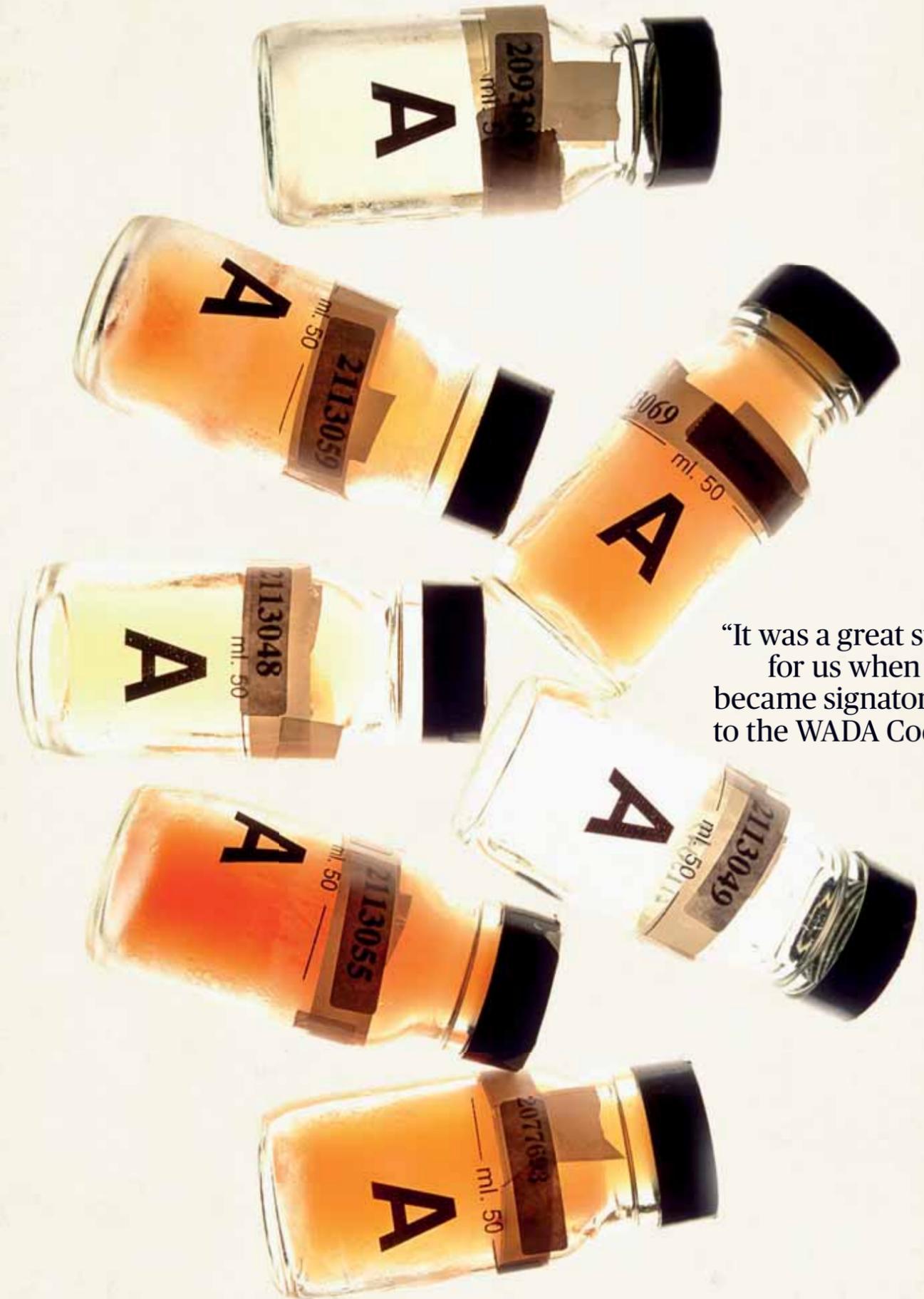
But while cycling, swimming, football and track and field sports have long battled against the effects of doping, motorsport has been largely free of performance-enhancing substances. Indeed, the prevailing opinion within the sport appears to be that when in control of a machine travelling at great speed, any substance beyond the natural will only serve to impair skill rather than enhance it.

Nevertheless, the notion that concentration can be improved and that rapid recovery from tiredness can be chemically accelerated is ever present, and so the FIA has in recent years pursued a rigorous approach to policing the issue of drugs in motorsport.

However, despite a proactive attitude, it was not until late last year that the Federation took its biggest step towards a globally accepted position on anti-doping, when it became a signatory to the World Anti-Doping Code of the globe's pre-eminent anti-doping body, the World Anti-Doping Agency (WADA).<sup>10</sup>

Joining the WADA 'family' was a significant step in the FIA's ongoing Race True campaign to educate motorsport competitors about anti-doping issues.

"It was a great step for us, last December, when we became signatories to the Code," explains the FIA's Head of Medical Affairs, Sandra Silveira Camargo. "But in fact we had been following their rules quite



"It was a great step for us when we became signatories to the WADA Code"



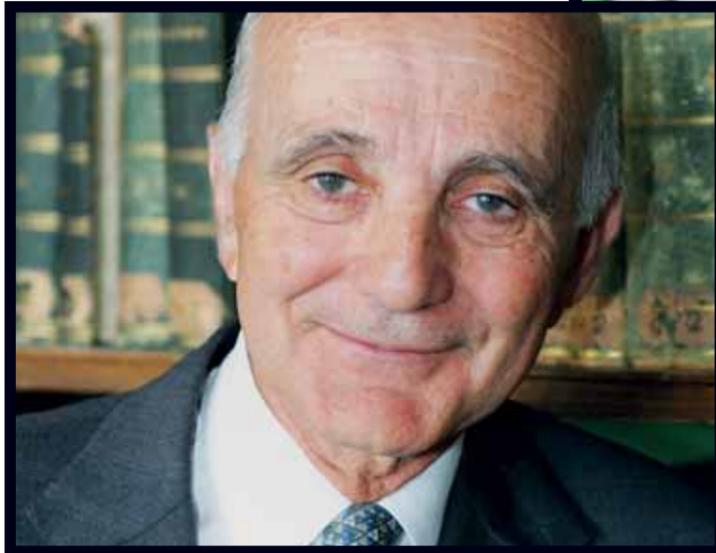
### TESTING TIMES

Positive results for EPO are shown (left) in the striped patterns on a computer at the National Laboratory for Drug Testing in Chatenay Malabry, France, while (right) samples are tested at the Franklin-Wilkins Building, King's College, London. (Below) Prof. Gérard Saillant, President of the FIA Medical Commission.



## "In terms of doping, motorsport is no different to other sports"

Prof. Gérard Saillant,  
FIA Medical Commission



strictly for several years already. However, it was simply a legal issue that prevented us from becoming a signatory to the Code.

"In order to be a signatory, you have to recognise the jurisdiction of the Court of Arbitration for Sport (CAS) in Lausanne and we couldn't do this as the FIA has its own International Court of Appeal. But since 2009 there has been an exception that makes CAS the appeal body for doping disciplinary cases for the FIA. This enables us to be part of the global anti-doping programme.

"We wanted to be fully in line with WADA because it is the organisation that makes the rules, not only for the international sports federations but also for a lot of governments, through the UNESCO convention<sup>(2)</sup>. Also, many of our ASNs follow the Code at the national level, so one of our main motivations was to have no gap between national rules and our international rules. Some ASNs had issues with their governments, who could not understand why the FIA was not part of the system. Now there is no doubt."

Signing up to the Code has been the catalyst for the FIA to step up its anti-doping efforts.

The FIA Medical Commission agrees that motorsport is just like any other sport. "You need to improve concentration, your reactions, you want to recover quickly after an accident or after an exhausting race. You want to have control of yourself, to keep yourself calm. You need good upper body strength, so in terms of doping it is potentially no different to other sports," says Prof. Gérard Saillant, President of the FIA Medical Commission.

"In fact," Camargo adds, "in motorsport, more than other sports, anti-doping is very important just

from a safety point of view because in motorsport you put the lives of others in danger. It's not just your own health you are risking but other people's as well - the marshals, the public, other drivers. It can have very serious consequences. So, from the safety point of view, it's essential that we do our best for doping prevention and doping tests, so that there is no doping in our sport."

But while motorsport is potentially as open to performance-enhancing substance abuse as any other sport, Camargo admits that such breaches are uncommon in motorsport and that the FIA's role is targeted more towards prevention of rule infringements rather than prosecution.

"The FIA really believes that prevention is much more critical than sanctioning people," she says. "Priority must be given to education and prevention rather than to repression, which does not necessarily achieve the objectives of a federation whose primary aim is to reduce as far as possible the risks inherent

in practising a high-risk sport. The rules have to be the same for everybody and we have to show that using, attempting to use or even possession of these substances does carry sanctions. Our objective is to avoid, as much as possible, people contravening the rules without even knowing it.

"This is what we want to make clear. People very often take the attitude of 'I have no interest in doping, so I don't have to care about it'. But you do, you must care, because, as the FIA Therapeutic Use Exemption Committee has pointed out, there are many substances in everyday products that can contravene the rules, even in pastilles you take for a cold and many other sources. It's really important to follow the rules and not ingest anything when you don't know the ingredients."

The key to preventing such unintentional lapses is, she says, education, and the FIA has instituted within its Race True campaign two programmes designed to educate drivers about the regulations on anti-doping. The first programme, involving the distribution of a leaflet containing the lists of banned substances, has been in progress since May 2011.<sup>(3)</sup>

"It is a small booklet, which you can carry in your wallet," says Camargo. "As I said, we feel that there is not a culture of doping in motorsport, but some people reach a high level of motorsport having no idea what is contained on that list. So we distribute this list to all drivers and co-drivers at international events. Hopefully, we can get everyone not only to keep the list with them, but also to show it to their pharmacist, doctor or physio and make them aware of the prohibited substances, so that nothing that breaks the rules is prescribed for the driver.

### THE ART OF EDUCATION

The FIA's new online anti-doping e-learning project features a new cartoon character designed to make taking part in the project easier. "It is designed to be user-friendly," says Sandra Silveira Camargo. "Sometimes with anti-doping messages people get a bit scared and this is not what we want. We simply want people to be informed."



"We are also distributing together with this list of banned substances a letter reminding the drivers of essential points that they must keep in mind, such as the fact that anything, from nutritional supplements to nose or eye drops, can contain substances on the prohibited list, and that the content of a specific drug can vary from one country to another," she adds. "So you need to be vigilant and know what you are putting in your body. I am taking the opportunity of this article to mention that the WADA Prohibited List is now also available on the iPhone app store, free of charge."<sup>(4)</sup>

The second and latest programme is a new E-Learning tool, which, Camargo says, the FIA will try to encourage drivers to access annually.

"The E-Learning project is a 30-minute course available in five languages - and more in future - accessed via the internet. At the end of it you have a small quiz and if your answers are correct there is a certificate confirming that you have passed the quiz. This is the main thing we are launching now and it is our long-term project. Since many people around the world now have access to the internet, we felt this was the best way of getting the message across in a high-quality, effective manner.

"We would really like the ASNs to be involved, because, after all, they are the ones who issue competition licences and we would like them to convince the drivers to access the course. In fact, while the course will be available on the FIA's website,<sup>(5)</sup> we are hoping that most drivers will access it via the website of their ASNs, who are all welcome to sign up to the project.

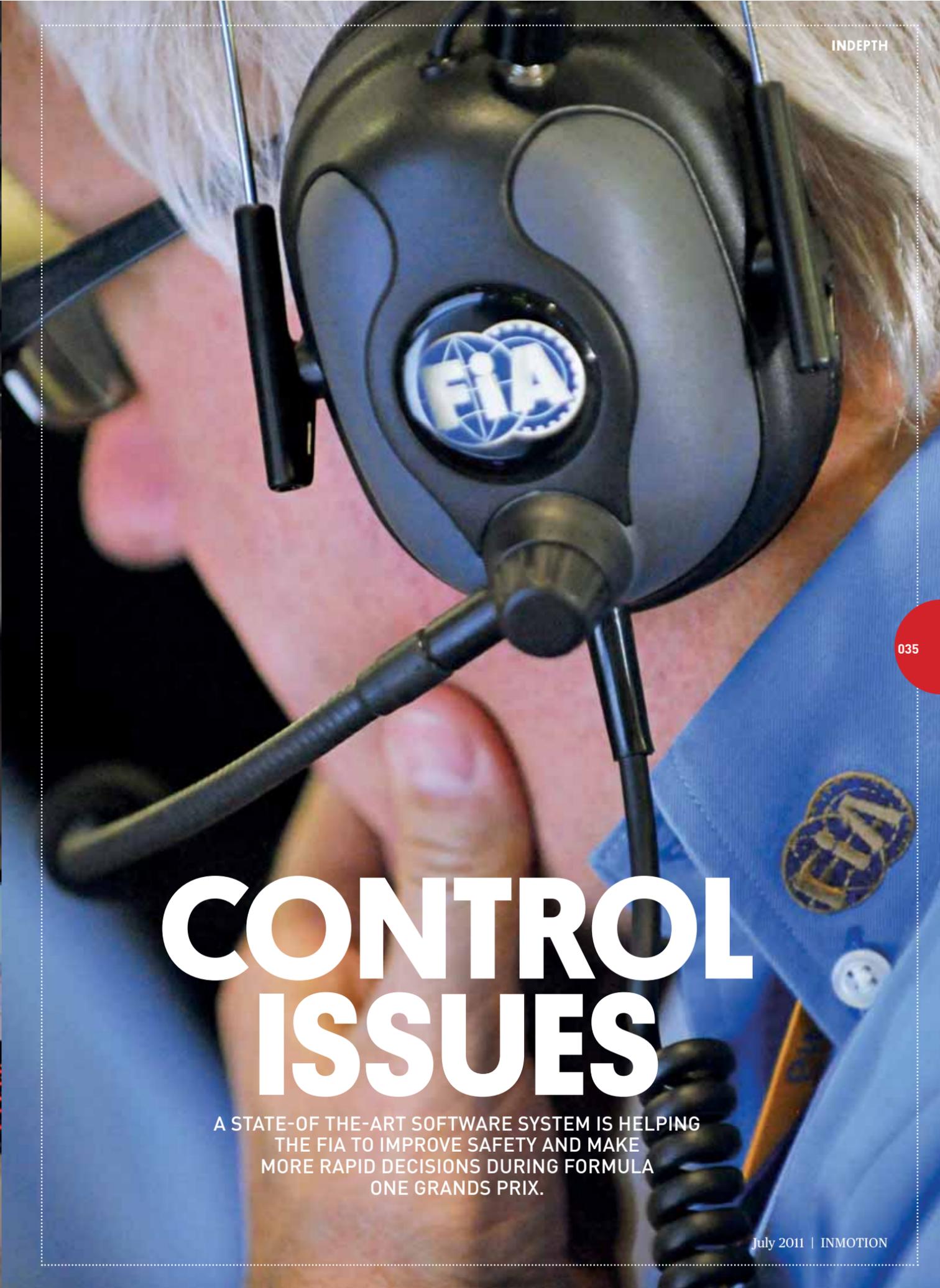
"We will update the course each year and our goal will be to get drivers to take this course annually. We believe that 30 minutes a year is not too much, and it will keep people updated on anti-doping."

Knowledge of the rules will, she concludes, prevent any transgression out of ignorance, though testing and policing will continue at all levels.

"Besides out-of-competition testing, our goal is to reach all disciplines in all international championships, cups, trophies and series, to show that we are there, that it is random and that it is present," she says. "It will sometimes be twice in a season just to ensure that people are not complacent and think that if we test once we will not do so again during a season. We also plan to build a close relationship with the national anti-doping organisations and convince them to increase their doping tests in motorsport.

"As mentioned earlier, we are more concerned with prevention than sanctions, but as the international body for motorsport we must make the drivers understand that whatever event they are taking part in, they are liable for testing."

1. [www.wada-ama.org](http://www.wada-ama.org)
2. [www.unesco.org/new/en/social-and-human-sciences/themes/sport/anti-doping/international-convention-against-doping-in-sport/](http://www.unesco.org/new/en/social-and-human-sciences/themes/sport/anti-doping/international-convention-against-doping-in-sport/)
3. [www.fia.com/en-GB/mediacentre/pressreleases/fiasport/2011/Pages/race-true-list.aspx](http://www.fia.com/en-GB/mediacentre/pressreleases/fiasport/2011/Pages/race-true-list.aspx)
4. [www.itunes.apple.com/us/app/wada-prohibited-list-2011/id408057950?mt=8](http://www.itunes.apple.com/us/app/wada-prohibited-list-2011/id408057950?mt=8)
5. [www.fia.com/en-GB/sport/anti-doping/Pages/index.aspx](http://www.fia.com/en-GB/sport/anti-doping/Pages/index.aspx)



# CONTROL ISSUES

A STATE-OF-THE-ART SOFTWARE SYSTEM IS HELPING THE FIA TO IMPROVE SAFETY AND MAKE MORE RAPID DECISIONS DURING FORMULA ONE GRANDS PRIX.



Race Director Charlie Whiting and his deputy Herbie Blash (top left) take an overview of the action in Barcelona, while a team of FIA experts and local circuit officials examine specific areas of the event.

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**D**own in the media centre of Barcelona's Circuit de Catalunya the message flashing up on the information screen is simple, a one-line message stating that once the chequered flag drops on the 2011 Spanish Grand Prix a quartet of drivers will be investigated for apparently not slowing down when yellow flags were waved for a late-race accident involving Team Lotus' Heikki Kovalainen. To most at the circuit, from marshals to media, racing drivers to team personnel on the pitwall, the possible transgression will have largely gone unnoticed.

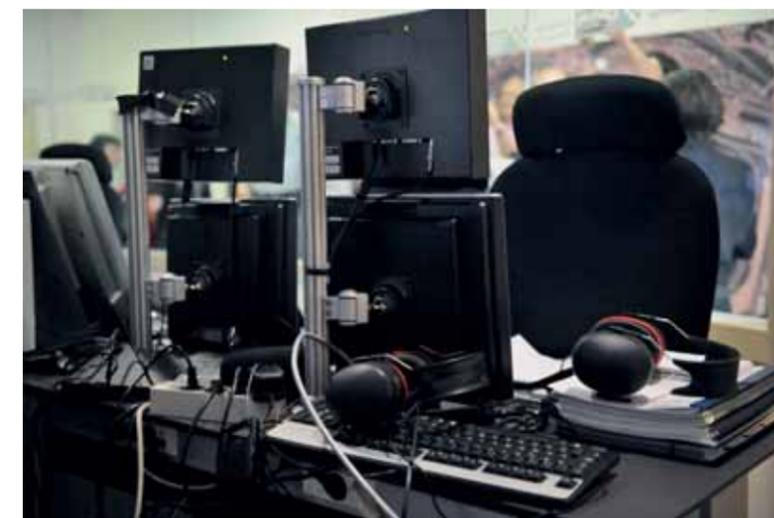
But up in a small room in the circuit's control tower nothing of this sort goes unnoticed. Lit by the glow of 24 television screens and by a battery of computer monitors that spit out lap information and display the position of every car on track, this is Race Control, where FIA personnel and a crew of local circuit officials run the rule over Formula One. Here, everything is monitored and F1's Big Brother casts an ever watchful and increasingly sophisticated electronic eye over every turn of a wheel.

If there is an incident of any kind, Race Control decides what should be done about it. It reports anything untoward to the FIA Stewards, so that they can decide if disciplinary action is necessary. It tells the teams what they can and cannot do.

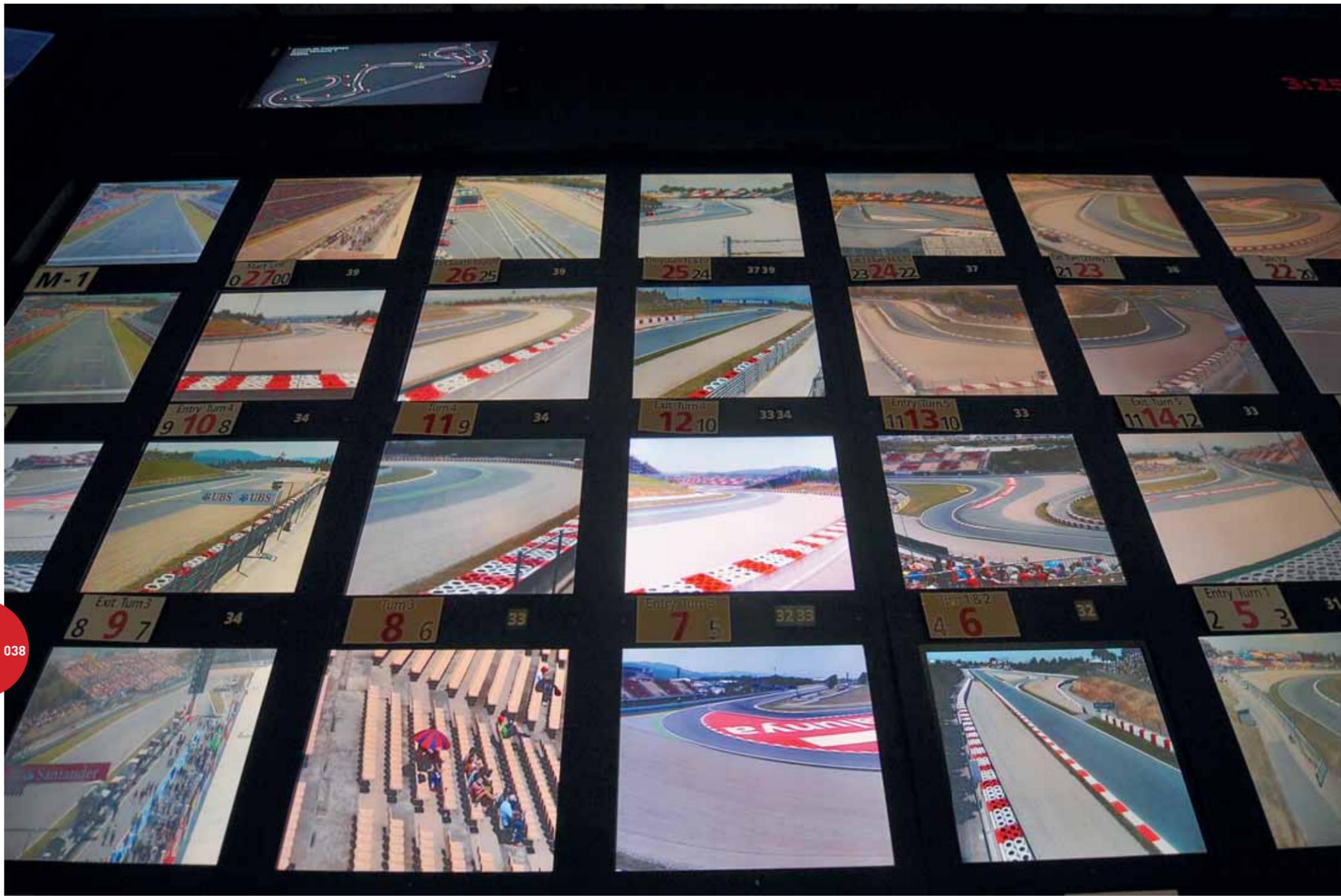
The men in the hot seats are Race Director Charlie Whiting and his deputy Herbie Blash. They have been doing the job for almost 15 years, but both have been in Formula One for much longer.



"F1'S BIG BROTHER CASTS AN EVER WATCHFUL AND INCREASINGLY SOPHISTICATED ELECTRONIC EYE OVER EVERY TURN OF A WHEEL."



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There are up to 45 television screens in Race Control, each displaying a different angle of the on-track action. Each is carefully monitored by the staff at each circuit. All communication is done via headsets and the room has a definite feel of 'Mission Control'. Flashpoints on the track are examined in Race Control which then sends reports of any incidents that need to be evaluated to the stewards in a nearby room.

Blash (62) has been in Grand Prix racing since he was a teenager, when he got his first job as a mechanic with Rob Walker's celebrated F1 team. At 20 he moved to Team Lotus, where he worked as a mechanic for Graham Hill and then Jochen Rindt. After Rindt's death in 1970 Herbie was briefly employed by Frank Williams and then joined Brabham, where he quickly became team manager for the new team owner Bernie Ecclestone. Ultimately, Blash would become Sporting Director of Brabham and when it closed down in 1988 he moved on to work for engine supplier Yamaha, overseeing the company's engine deals with Jordan and later Tyrrell.

During this time he also ran Yamaha subsidiary Activa, which does research and development and fabrication work for the motor sport industry. At 58, Whiting is almost a new boy alongside Blash. He started working on his brother's racing machinery when he was only 15 and in his early 20s worked as a mechanic on Formula 5000 cars. He joined the Hesketh F1 team in 1977 and then moved to Brabham, where he would remain for 10 years, working closely with Blash and enjoying the success of double World Champion Nelson Piquet in 1981 and 1983.

Formula One was a very different world then and skullduggery was the norm, but as the sport became more professional it needed more organisation and in 1988 Whiting became the policeman of F1, assuming the role of FIA F1 Technical Delegate. The poacher had turned gamekeeper. In 1997 he was promoted to the role of Race Director and Safety Delegate. Between them, the two men have attended more than 1000 grands prix.

They are not alone up here though. Race Control has a battery of television screens, with up to 45 of them, including the TV feeds that go out to the world, but also additional closed-circuit cameras. There are timing monitors and a bewildering display of buttons. The major players communicate via headsets. There is no shouting. In fact, even as qualifying heats up and potential flashpoints erupt as cars hit traffic and complain of being baulked by slower rivals, of having their 'flying lap' disrupted, in Race Control all is calm, with radio communication restricted to quiet consultation and analysis of incidents conducted with an apparently casual facility. It is, though, a focused ease, a comfort brought about by expert familiarity.

Although the facilities vary from one circuit to another, there are several key elements that remain unchanged. The FIA team brings their own specially-designed desk, so that they know exactly where all the buttons they need are located. The Race Control team members sit in the same places.

"These things are essential to allow us to make the right decisions to keep things safe, legal and on schedule," explains Whiting.

Making sure that the event runs on time is taken for granted by most in the F1 circus, but it is of key importance because of the need for television satellite links, which beam TV signals around the world.

"THESE THINGS ARE ESSENTIAL TO ALLOW US TO MAKE THE RIGHT DECISIONS TO KEEP THINGS SAFE, LEGAL AND ON SCHEDULE."





Race Control is a remarkably calm environment during a race. At the back of the room the specially-constructed FIA desk is manned by Whiting and his cohorts. In front sit a battery of officials from medical staff to technical and communications specialists. The control room is also in contact with the teams and drivers at all times and monitors radio traffic between the pitwall and the cars throughout each session. All the data is recorded for future reference should the need arise during a post-event investigation. Local staff also play a key part in proceedings, as Whiting says: "There are a dozen local officials who sit on a desk behind us in case they are needed."

## "WITHIN SECONDS YOU CAN BE LOOKING AT THE INCIDENT: FOR SAFETY OR TO REFER IT TO THE STEWARDS."

At the start of the race, Race Control is again remarkably calm. Whiting is out on the starting gantry, so for the first couple of laps, the job is done by Blash, who sits on Whiting's right. When Charlie returns, Herbie then concentrates on Safety Cars. To his right is Colin Haywood, the race secretary, who monitors the electronic marshalling system, sets yellow zones, posts messages on the timing screens, and assists with all the other tasks. He started out as the Chief Timekeeper in F1 in 1994. After a year in the World Rally Championship in 2002 he joined the FIA team in 2004.

Charlie, Herbie and Colin can all talk directly to the teams, to the safety and medical cars, to the stewards and even to the TV producers. They can also listen in to radio conversations between teams and drivers. Everything is recorded.

During the races there is constant activity to deal with, incidents and accidents and respond to, team enquiries and complaints. Regulation violations are referred to the FIA Stewards, who sit in a separate room nearby.

Race Control sends report of incidents that need to be evaluated to the stewards and then leaves it up to them to decide if there is a problem and what penalty should be applied.

When everything runs smoothly the system is invisible. It is only when there are complicated questions to be examined that the spotlight shines on those involved. With more complicated matters, investigations take place after the race, to allow the teams and drivers to have their say.

Race Control deals not only with the teams and the stewards but is prepared for all eventualities. On Whiting's left sits the Clerk of the Course - a local expert who communicates with his back-up teams in the local language.

"His job is to coordinate all the local staff," explains Whiting. "He communicates with the marshals and other services that might be needed. There are a dozen local officials who sit on a desk behind us in case they are needed. This includes the police, the fire services and other public officials."

Close to Whiting, ready to give advice when needed, is the FIA Medical Delegate Professor Jean-Charles Piette, a specialist of internal medicine at the celebrated Hôpital Pitié Salpêtrière in Paris. Piette coordinates the medical teams and advises Charlie and Herbie on medical matters.

This tried and tested team is aided by German communications technology provider Riedel Communications, which has two technicians at every race, one in Race Control, the other with the FIA Stewards.

Riedel has designed, manufactured and created the real-time networks for video, audio and communications for Formula One, using pioneering digital audio matrix systems.

The company has been involved in Formula One since 1993. In addition to the complex radio and intercom systems, the technicians use their technology to enable rapid decision-making.

Race Control is increasingly moving towards instant decisions and in order to achieve ever better performance the FIA's technical partner Riedel has begun working with software to integrate the video feeds with global satellite positioning systems, which automatically flags potential incidents. Race officials simply select a possible problem from a list that appears on their monitors and the system will take them directly to the correct segment of footage.

Racewatch has been developed by computer graphics software developer Gareth Griffith, who first made his name in the film industry in the 1980s, before selling that business and developing a new company creating interactive mapping software for television news, government and defence agencies.

That concern was sold in 2008 and since then he has been quietly developing Formula One race analysis and strategy software systems, initially with Honda Racing F1 and then later with Brawn GP, now Mercedes GP.

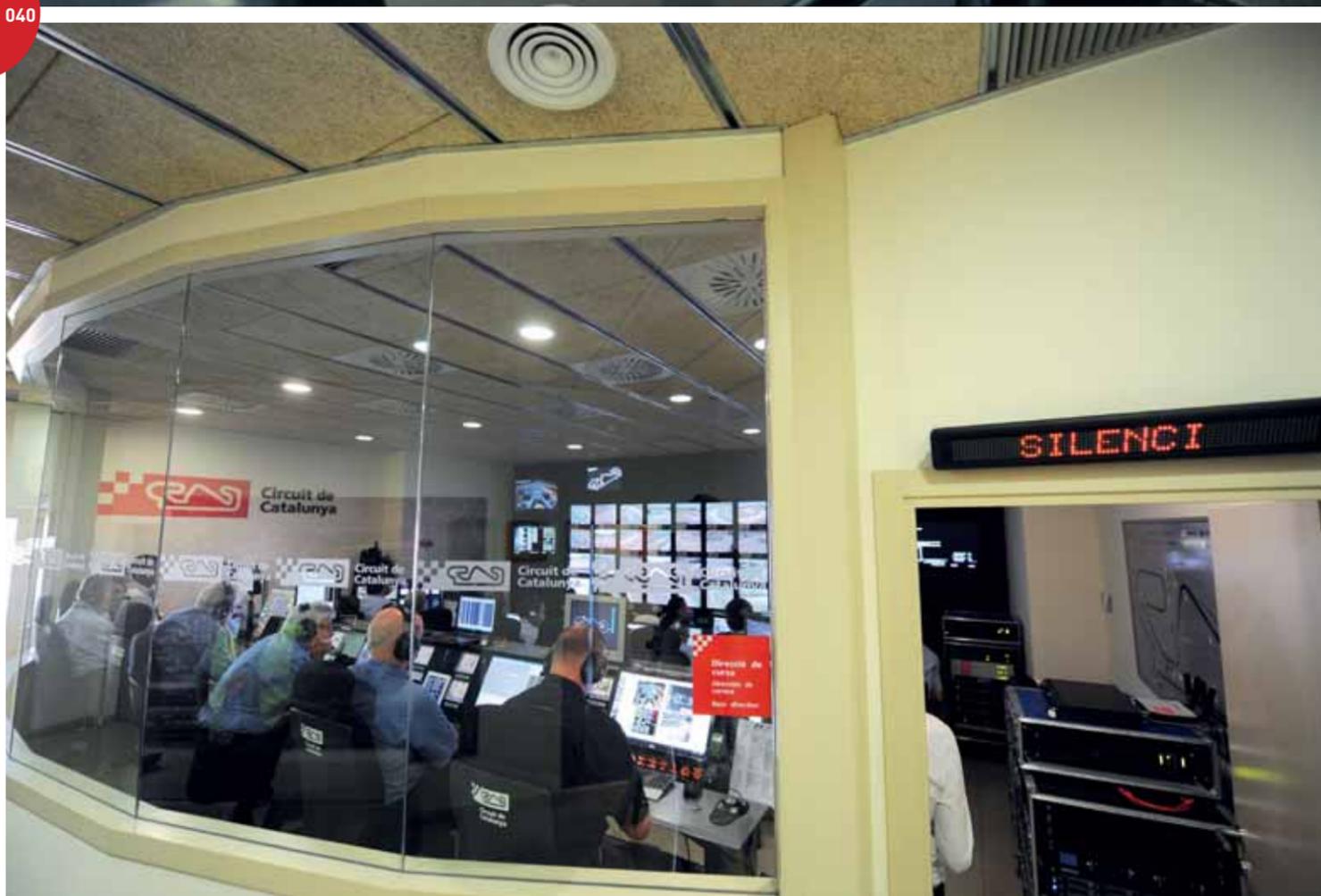
"The system gathers together the timing data, the GPS data and the tyre data," Griffith explains. "The idea of using it for Race Control started a couple of years ago. We tied in the cameras with the timing and the GPS, so we knew exactly where a car was on the track."

"Then we started to analyse the data to pick out incidents," he adds. "The software creates alerts and that automatically takes the Riedel technicians to the right cameras, instead of them having to find them, as used to happen. Within a few seconds Charlie can be looking at the incident: either for safety purposes or to refer it to the stewards. It is automated, using the data available and algorithms based on the interactions in that data."

"In the case of baulking, for example, the algorithms can analyse the proximity of two GPS signals to see how long it takes the car behind to close from five to two seconds behind the car in front. We can then measure how long the second car stays behind the first and if there is no time lost then there was no incident."

The Racewatch system can even be extended to helping apportion blame in the event of an on-track collision.

"The data can show us when a car is not behaving as it should be behaving and so we can ascertain at what moment that changed and if there was another car in close proximity at that moment," Griffith says. "There are already automatic alerts for speeding under yellow flags, which is hard to spot by eye, and they now come up automatically using the data, but with all of this it is still Charlie's decision whether to refer incidents to the Stewards and their decision as to whether the driver is penalised or not."





# THE URBAN SPACE MAN

According to the UN, more than half the world's population lives in cities and the trend is set to continue. It is, says automotive designer GORDON MURRAY, the number one mobility problem we now face. But he has a solution...

Gordon Murray is an extraordinary man. He could have retired years ago with the money he made in motor racing, but the money was not important. He was always looking for a challenge.

"When I was in my 20s getting a job at Brabham, I wanted to become the technical director," he says. "Then, when I was technical director, I wanted my first F1 victory. And then you want to win the world championship. After I had done that a few times, my next challenge was to build the McLaren F1, which we wanted to be the best engineered sports car ever made. Grudgingly - and I mean grudgingly - I took it racing and we won the Le Mans 24 Hours first time out, but the thought of yet another high-powered sports car did not really turn me on. I really needed a new challenge."

Murray had what he calls his "light-bulb moment" in 1993, when he was stuck in a traffic jam trying to get to work in Woking in the UK. "It just did not make sense. I felt that we desperately needed to do something."

He began analysing why automobile manufacturers shied away from making small cars and why, when they did build them, people would not buy them.

"Thus far the only country in the world that has done anything is Japan, where they introduced the Kei cars in 1949," he says. "This was a special

## “Things must change. We have a major mobility problem all over the world”

category of small vehicles and the idea at the time was to help people who could not afford a full-sized car, but had enough money to buy a motorcycle. They were originally limited to engines of just 150cc, but were gradually increased over the next few years to 360cc, at which point they began to sell.

“It is just crazy,” adds Murray. “The inertia in the car world with manufacturers is completely ridiculous. The manufacturers and marketing people are telling us what we should drive and our greediness means that we want bigger and faster cars. It is taking a long time for it to sink in that things must change.

“We have a major mobility problem all over the world, particularly when you look at the predictions of the number of people who will be living in city centres in the future. It is pretty horrific and we are already heading that way.”

Murray’s investigations revealed that the problem was that the investment

needed to produce any car with a steel body is huge.

“It does not make a difference which class of car you are talking about, the cost is enormous,” he says. “So the first problem to address was how to reduce that investment.”

The result is a new manufacturing process that Murray calls iStream, a system he believes is “essential in promoting wider mobility”.

iStream is centred around the idea of a monocoque chassis to which all the major components are fitted. The body panels are then added at the last minute to reduce complexity and assembly time - and to keep down the cost of accident repairs, while also reducing damage to paintwork that is normally associated with assembly line work.

The process means that an iStream factory can be a fifth of the size of a conventional plant, a figure that reduces the capital investment needed by more than 80 per cent, yet it is

sufficiently flexible to allow different models to be built concurrently. It provides manufacturers with the ability to manufacture a quality car with very low capital investment. It also reduces lead times to help car companies keep up with trends. Components, too, are minimised in order to support low cost manufacturing.

The process also allows the chassis to be scaled in size without the need for expensive retooling and software changes. It also means that a chassis can be used as a platform for different vehicle types and model variants.

In the future there is potential to re-body old chassis with more fashionable bodywork when design trends change, while re-use of the chassis and running gear significantly increases the possibilities for recycling and thus the sustainability of the industry. There is also potential for low-investment assembly plants to be located nearer to points of sale, which would create locally-sourced components, thus reducing transportation costs and the on-the-road price.

The evolution of the iStream process includes the mantra “think light”, while at the same time it promotes the use of materials selected to have the lowest possible life cycle impact. In this way energy usage and wastage are reduced and the process provides a significant marketing opportunity from an environmental perspective.

It is, Murray believes, a complete re-think of manufacturing materials and processes, aimed at making a significant reduction in CO2 emissions over the life cycle of the vehicles produced.

Once the process had been framed, the next step was to design a small car that people would buy.

“It is obvious why we need small cars,” Murray says. “The basic size of cars is a massive issue with urban mobility. Obviously you do not need to be Einstein to realise that if every car is five metres long only a certain number of cars will be able to go through a traffic light-controlled intersection in a certain period of time.

“With small cars traffic flows better,” he adds. “The narrower a car is, the easier it is for it to go around an obstacle. Small cars are important in terms of emissions and fuel consumption. These are directly proportional to the weight of the vehicle. It is pretty much a straight line down to the level of around 600 kg and it then flattens off a bit. Most of the studies that we are doing are for cars of 750kg or less.

“What puts people off is safety. People believe that if you have a small

### GORDON MURRAY

Born in Durban, South Africa, in 1946, Murray is best known as a Formula One designer. After his engineering studies he joined the Brabham F1 team where he stayed for 17 years, becoming technical director and winning two World Championships, in 1981 and 1983. He then moved to McLaren as technical director in 1988 and won three titles between 1988 and 1990. He left racing to build the McLaren F1 Road Car, a racing version of which won the 1995 Le Mans 24-Hours. He stayed with McLaren Cars until after the Mercedes-Benz SLR programme was completed and then founded Gordon Murray Design Ltd to design and develop road-going vehicles.

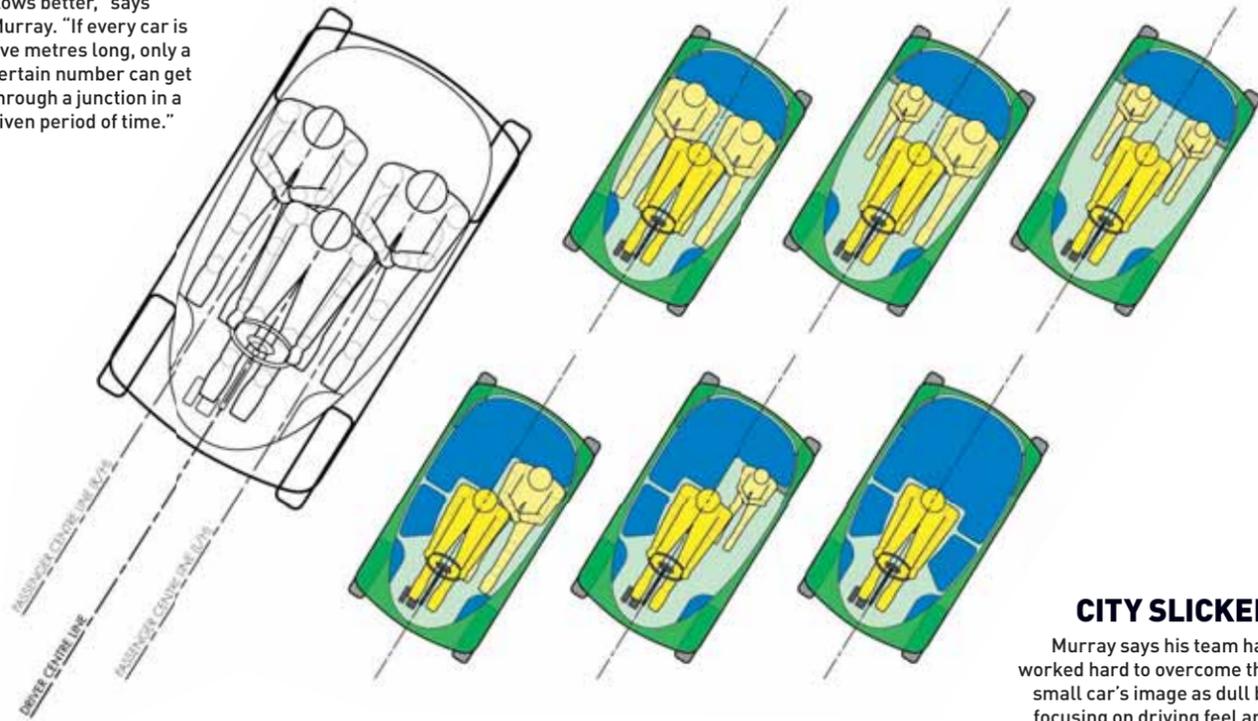


# 22

different countries have expressed interest in manufacturing Murray's iStream vehicles

**LITTLE BEAUTY**

"With small cars, traffic flows better," says Murray. "If every car is five metres long, only a certain number can get through a junction in a given period of time."



**CITY SLICKER**

Murray says his team has worked hard to overcome the small car's image as dull by focusing on driving feel and interior space. "It should be fun to drive," he says.



car you have a safety issue. What we are selling with iStream is a process that allows one to make lightweight cars with extreme levels of safety. We have done that by really bringing in F1 technology and reducing the cost to pennies for the everyday motorist."

The first car Murray and his team designed was called the T.25, a three-seater with a rear-mounted three-cylinder petrol engine. He subsequently teamed up with Zytec Automotive, a UK-based company with extensive experience in electric and hybrid powertrains, to create an electric version of the car, called the T.27.

"With iStream we are bringing composite technology to protect the passengers in crashes," he explains. "We have now got to the point where we have a low-cost monocoque for which each panel can be manufactured in 100 seconds, with affordable costs and which also solves the problem of attaching point loads."

"We have done two high-speed crash tests with the T.27 with immense safety," he adds. "You do not want any intrusion into the safety cell and you want crushable structures around that. It is the same idea as in F1. We are getting 100 per cent more specific energy absorption than steel - which is a huge increase. So the car is safe if you crash it on its own and a lot safer if you are hit by a bigger car. However, as more and more cities have to adopt the Japanese principle of having smaller cars for urban use, the question of high-speed crashes really goes out the window."

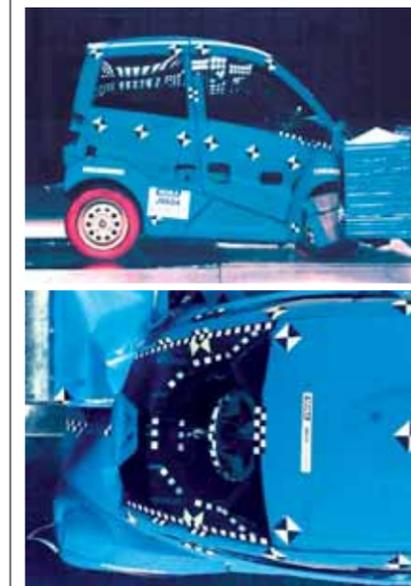
"The EuroNCAP rating scheme is a fantastic tool for saving lives in high-speed crashes but it means that lots of cars now have very stiff front ends to absorb energy in a 65kph accident. But those are not characteristics that you want with low-speed urban accidents with pedestrians and cyclists. We need to look long and hard at the mobility issues arising from car design for cities."

"We went through a 24-month period of life-cycle analysis aiming to look at the problem holistically and not just at one specific area. iStream generally delivers a 60 per cent reduction in manufacturing energy and a 40 per cent reduction in the life cycle CO2 footprint."

"The one thing that I am keen to do is change the image of the small car," he insists. "They have a reputation for being tinny, but why should they not be funky and fun to drive? With the T.25 and the T.27 we worked a lot on vehicle dynamics and the space inside the car and the driving feel. I guess that comes from racing as well. OK, we don't use carbon fibre and we don't have KERS

**96mpg** returned by the T.25 at the RAC's Future Car Challenge last November

**80%** reduction in initial capital investment via the iStream manufacturing process



**CRUNCH TIME**

Murray's T.27 underwent crash testing in January 2011. Put through the EU's mandatory 40 per cent offset deformable barrier front high-speed impact, the T.27 recorded no cabin intrusions. In a later, second test, the 50kph Mobile Deformable Barrier Protocol, it again achieved first class results.

and yet all the philosophy behind the concepts come from racing."

Murray believes that electric cars are a huge challenge because of the cost of the lithium-ion batteries. He believes that the T.27 will retail at half the average cost of other EVs thanks to smaller batteries and the savings from the iStream process. The weight-saving means that the T.27 is much more efficient than rival electric cars while the T.25 competed on the RAC Future Car Challenge in November, but managed to return 96 miles per gallon!

"The T.25 was not meant to go into production," he says. "It was really designed to be a demonstrator, so that people could drive an iStream car and feel the handling and see it all in action. It was designed as the best city car for Europe, the UK and perhaps Japan. There are some clever things on it."

"The T.27, though, was definitely built with production in mind. It was funded by the UK's Technology Strategy Board and we are talking to people right now who are interested in building the car. We have three people interested in building both, which would be nice."

Although the price of the cars would be too high for the developing markets in Asia, Murray says that the iStream process can be tailored for all markets.

"We are working on several other iStream vehicles," he says. "We have had interest from 22 different countries."

The team is based in Shalford, near Guildford in Surrey, in offices next door to the old Ferrari Guildford Technical Office (GTO) F1 design centre, where Gordon worked when it was taken over by McLaren to build McLaren F1 road car body kit. In recent months Gordon Murray Design has taken over this building as well as his projects expand.

"We have 33 staff at the moment," he says. "Two-thirds of them are engineers and technicians and the rest are management, marketing, graphics, styling and so on. I am really enjoying it. Most of the people who were with me at McLaren are here, so it's the old school with a different name on the door. They are a really talented bunch of people."

"I thought F1 was difficult until I tried to win Le Mans," he concludes. "That is a lot harder than people think. It is like 18 Formula One grands prix but in addition you have to deal with day and night, all kinds of weather, slower cars and driver fatigue. Doing this, though, I am starting to think it makes winning Le Mans look easy..."

"To design a car with increased safety, reduced weight, costs and CO2 emissions is the biggest challenge... by a long, long way."

# FORMULA FOR CHANGE

THE FIA'S NEW ENGINE REGULATIONS WILL MAKE FORMULA ONE A LEANER, GREENER, MORE ROAD-RELEVANT SERIES. BUT THE TRANSITION BRINGS WITH IT A FASCINATING SET OF ENGINEERING PROBLEMS TO BE SOLVED...



**We are fully supporting the FIA. In terms of strategy, it perfectly fits with the market.**

Jean-Francois Caubet, Renault Sport

Formula One, that most rarefied of motoring endeavours, a sport in which the watchwords 'conspicuous consumption' have held sway for three decades, is changing. While in times past it could use the throaty roar of high-powered, fuel hungry powerplants to shout down any argument that the sport should chime with prevailing environmental mores beyond the paddock walls, now Formula One must move with the times. As the new industry imperative becomes making motoring leaner and greener, so it must step into line.

Thus in response to a brave new world of high efficiency, low-emissions power, the FIA will soon impose a new engine formula on the sport. Originally it had intended to press ahead with the new formula in 2013, but delays in agreeing the eventual architecture led to the introduction of the new engines being put back a year to 2014. However, with consensus now achieved between the FIA and F1's engine manufacturers the switch will take place, from the 2.4 litre V8 engines currently in use to a downsized 1.6 litre, turbo-charged, V6 unit limited to 15,000rpm.

If that seems like a less than seismic shift - turbos of old could be notoriously thirsty - then the rider is that the new power units will incorporate a series

of electric power supply solutions. For most manufacturers involved in the sport, though, it is a paradigm shift that fits snugly with their wider businesses, with Formula One once again embracing technologies that can be transferred to road cars.

"We are fully supporting the FIA," said Jean-Francois Caubet, managing director of Renault Sport F1, the arm of Renault responsible for the supply of F1 engines, when asked about the original architecture proposed by the FIA. "It makes a lot of sense for a carmaker like Renault to be road-relevant. I think it is a key point for the future of Formula One.

"In terms of strategy, it perfectly fits with the market. We conducted a long study on what would be the future market for road cars and we think that in five to six years, probably 60 or 70 per cent of the total car market will be hybrid or electric, so to have a relevant engine is a strategic problem."

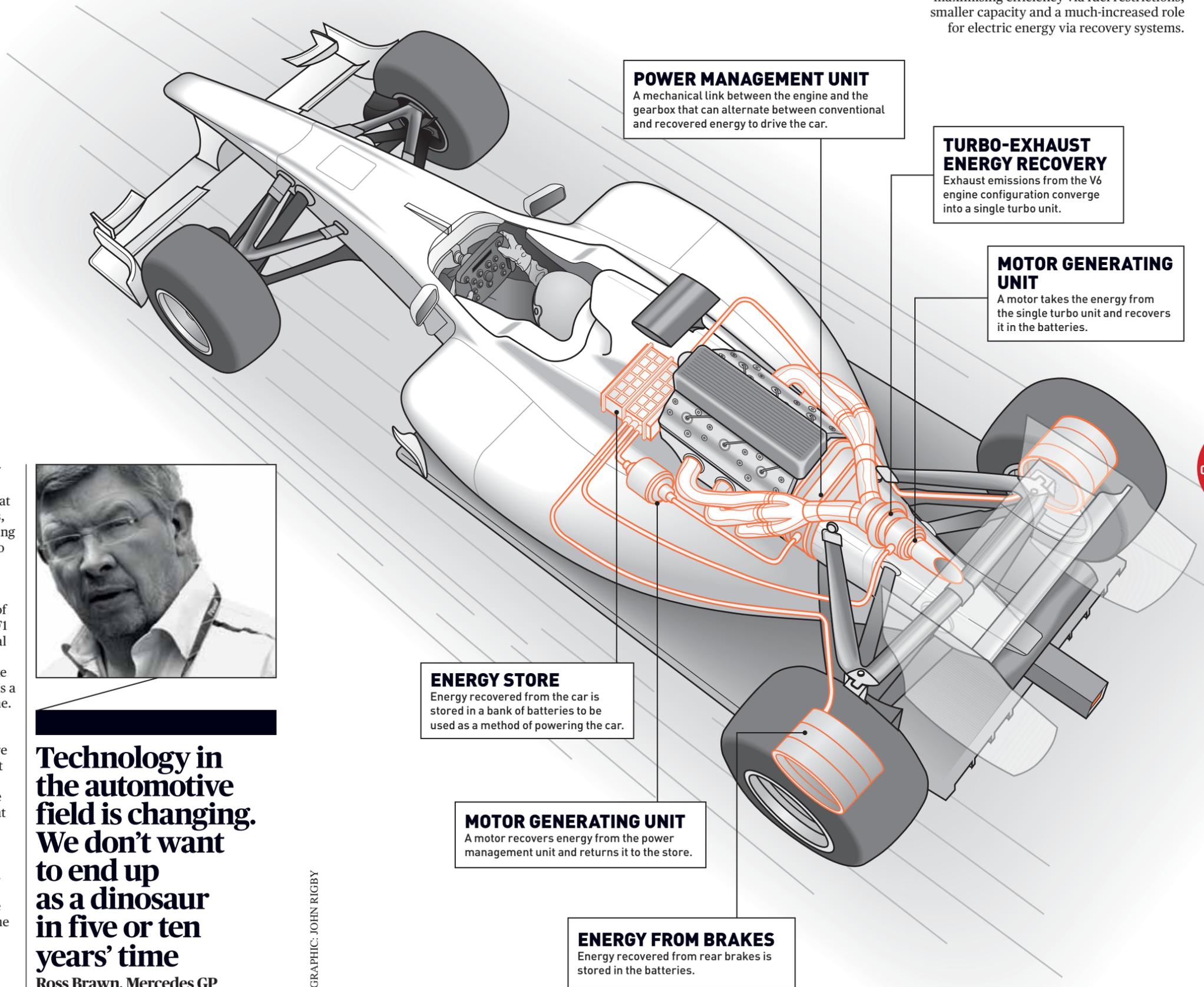
Mercedes' Ross Brawn, too, is convinced of the importance of road relevant technologies in Formula One.

"There are many considerations we have to include when changing the powerplant in F1," he said following the decision to adopt a V6 configuration for the new powerplants. "Obviously technology in the automotive field is changing and the big questions are



**Technology in the automotive field is changing. We don't want to end up as a dinosaur in five or ten years' time**

Ross Brawn, Mercedes GP



GRAPHIC: JOHN RIGBY



## We think the new engine formula is fundamental to the sport's future

Adam Parr, Williams F1

how relevant do we need to be and how relevant do we want to be?

"I think there is a justification for relevance in the type of engines we have in the future," he added. "We don't want to end up as a dinosaur in five or ten years and the technology we're working on with these new engines is the technology that is going to become commonplace in road car engines in the future: small-capacity, turbocharged engine; direct injection; KERS. When we do this, we can generate a lot more interest with a manufacturer, and we want to try to get some more manufacturers back in F1. We won't get that if we continue with a V8 normally-aspirated engine."

The adoption of a V6 configuration was welcomed by Ferrari president Luca di Montezemolo, ending the firm's reticence about the new formula.

"I will do Formula One as long as Formula One represents, for us, the most important research centre," di Montezemolo told by Reuters. "The decision of V6 is important because turbo-six is good for the future, not only for Ferrari but also for others."

Even teams that do not produce their own powerplants are keen to see the new technology introduced, as Adam Parr, Chairman of Williams, confirmed. "For several years we have said Formula One needs to move to more sustainable technology. We were supporters of KERS and we think the new engine formula is fundamental to the future of the sport."

The change in engine regulation has also attracted interest beyond the traditional suppliers. Craig Pollock, former boss of Formula One team British American Racing, is intent on returning to the sport, but this time as an engine supplier via a new venture P.U.R.E (Propulsion Universelle et Recuperation d'Energie).

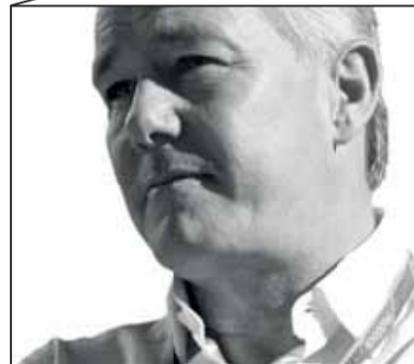
Initially, Pollock had vigorously pursued the FIA's original four-cylinder proposal citing the change as presenting "an ideal opportunity for P.U.R.E. to capitalise on Formula 1's status as a proving ground for new technology and demonstrate its expertise in high performance eco-friendly powertrains." The switch to a V6 configuration caught the former BAR boss out and while he admitted to being "disappointed" by the switch insisted that P.U.R.E. will maintain its interest in supplying engines in 2014 saying that the company can transfer some technology across to a V6 programme.

"We are already well on the road towards that," Pollock he said. "Basically you have got a phase one situation where you have to really analyse everything you are going to need. Luckily we can probably take quite a lot out of our four-cylinder engine now and apply it into the V6 engine."

Once the major players sit down to map the road ahead, however, the question is where will a small-capacity, turbocharged, hybrid powerplant take them in terms of engineering?

## We can take quite a lot out of our four-cylinder and apply it to the V6

Craig Pollock, P.U.R.E.



Essentially, the new regulations present Formula One's engineers with one simple problem - how to increase engine efficiency in light of three limitations being placed on the powertrain. First up is the FIA's plan, as part of the new formula, to curb fuel loads during the race and restrict the fuel flow to the combustion engine.

Currently a Formula One car uses in the region of 160kg of fuel over the standard 200-mile race distance. The intention is to reduce this amount by approximately 30-35 per cent with the introduction of a maximum fuel volume. Additionally, there will be an instant fuel flow limit introduced, equivalent to 100kg per hour. This will drive the engineers towards greater efficiency, as Rob White, deputy MD of Renault Sport F1 explains.

"There is a kind of double limitation that is going to drive us towards improved fuel consumption. It does not alter the fact that the first car past the post is the winner, but you have to achieve that with a given amount of fuel. In order to get more performance the only way to do that with a fixed amount of fuel is to increase the efficiency."

Gilles Simon, the FIA's Head of Powertrain and Electronics confirms that the regulations have been designed to push the sport down an increasingly restrictive route on the use of traditional fuel sources.

"If you want to have more horsepower, you simply need to have more efficiency. Instead of the current race situation where there might be some periods in which you have to compromise between fuel efficiency and power, in this regulation there will be no compromise - you have to work on efficiency. You will have this amount of fuel and you will need to extract the maximum horsepower from that and you do that by efficiency."

"With a fuel limit, you will push the engineers to work hard on lean mixtures, on very efficient combustion, because they want to have more horsepower for that amount of fuel," he adds. "Maybe they will work on ignition, or spray-guided combustion, the work of the turbocharger."

"For the teams, the huge reward will be when you have 1 per cent more efficiency than someone else, and the immediate translation will be that you have more horsepower," he added. "This will be the game, which is very different to today where you may have more horsepower, but with higher fuel consumption."

Beyond the traditional internal combustion engine, the new rules also

call for a much heavier use of electrical power from batteries than the current Kinetic Energy Recovery System (KERS) allows. With an increase in available power from 60kW and an energy limit of 400kJ per lap to 120kW and 4MJ, the electrical energy on tap will be ten times greater than the current system, making up much of the shortfall caused by the downsizing of the engine.

And it's in the perfection of the energy recovery and delivery that gains will be made, insists Simon.

"According to the efficiency of your electric motor you will have a different amount of power to your rivals and this will push development towards efficiency of the electrical system," he says. "If your efficiency is at 90 per cent, you will have traction power of 108kW. If your efficiency is 80 per cent you will have less power. The point is that the faster car will be the more efficient car. If you are more efficient in using the energy of the battery, you will have more power than your rivals. This is the prize."

Delivery of that electric power will be via the system currently in use, whereby energy is recovered from the braking process and stored in a (most likely chemical) battery, but also under the new regulations a second electric motor will be able to power the turbocharger.

"What is this motor for? Energy recovery from the exhaust, because

## The point is that the faster car will be the more efficient car

Giles Simon, FIA



## There is a double limitation that is going to drive us towards efficiency

Rob White, Renault Sport

this is an easy and simple way to get back energy," says Simon. "Normally, with a turbocharger when you reach a certain level of pressure back into the engine you open a waste gate. What we propose is that instead of opening the waste gate as usual you will 'brake' the turbine, so you will be able to control the speed of the turbocharger. Doing so when you have an excess of exhaust energy will recover energy that can be fed to the battery. To give an order of magnitude, this will be a 50kW motor, so it's huge. This is quite a novel way of recovering energy."

Simon also says that Formula One will also institute an 'electric drive only' rule when cars are in the pitlane. "This means the electric motor must be able to drive the car alone - so you will have a kind of 'pre-gearbox' able to split the torque from the electric motor and the torque from the combustion engine."

"When you hit the button for the pitlane limiter it will cut to the electric motor," he says. "We believe this is important because this is road relevant and this will define an architecture that is road relevant because you need to have this split possibility on any hybrid."

White, though, believes that these systems are only part of the story, with the design of the combustion engine itself being crucial to maximising the potential of the new rules.

"The performance is going to come from the thermal efficiency of the engine, relative to the chemical energy

that goes in," he argues. "The first target will be to maximise the piston energy and minimise the energy in the exhaust. Once we have finished that we will then maximise what we can get out of what is left. And then, once we have done those two things, we are going to look at it and say: 'Did we do the right things in minimising the energy in the exhaust or should we have allowed a little more?'"

Ultimately, according to Simon, the key is to give Formula One's teams engineering challenges that will drive road-relevant technology.

"All the engineers around the table with us are completely happy with what they have to do - it makes sense from a technological point of view," he said. "The technologies required are maybe not that easy but this is where the industry is going. For example, the combustion engine used will be GDI, which is nowadays not unusual on gasoline engines. However, we specify up to 500bar fuel pressure, which is very high with respect to current standards. Most of the cars with GDI have 100bar, some are coming on the market with 200bar and some work is being done to reach 300bar but what we propose is another step."

The freedom to push the envelope will extend to other areas as well. "Take the turbocharger," says Simon. "Maybe you would like to build an integrated turbo and electric motor. It may be that this will be the best way - but this does not yet exist elsewhere."

The worry is, however, that handing Formula One engineers a new set of problems, however beneficial, will increase spending in a sport where spiralling costs have long been a problem. Simon admits it is a delicate balancing act for the FIA.

"We have two contradicting objectives - one is to have costs under control but on the other side if what you use is only technology from the shelf, what's the sense for Formula One?" he asks. "If we want the sport to drive new technology and demonstrate how new technologies can be used on road cars we need to be logical and leave some space for engineering. We will leave freedom on these because this is where you can find efficiency and innovation."

"However, while we have not gone into a lot of detail in the regulations there are a lot of limits on materials and design that will keep the costs down."

For the engineers in F1, the new rules offer exciting opportunities and, after years of frozen engines, they are keen to play with new ideas, in the knowledge that their work will benefit not only the racing world but also the car industry.

# INPERSON

> Charged with reinvigorating the World Rally Championship and, as President of the Women in Motorsport Commission, tasked with getting more girls into motorsport, **MICHÈLE MOUTON** is a busy woman. The rally legend isn't complaining, though, saying it's "nice to give something back"...

054 Michèle Mouton is a busy woman. As the first President of the FIA's Women and Motor Sport Commission she's been tasked with increasing female involvement in motorsport. In a field that has for more than a century been seen as a bastion of chauvinism that mission would, for a regular person, be a full-time job. But not for Mouton. Formerly a world class rally driver, she has a furiously energetic mind and when not promoting the careers of women racers she's working as Manager of the FIA's World Rally Championship, spending her days co-ordinating all aspects of the series, including safety, regulations and the future calendar.

She represents the FIA at WRC events, working closely with manufacturers, promoters and event organisers, while also being a member of the working group responsible for the future development of the series.

"That is almost a fulltime job," she smiles. "There is not much time to do anything else. I am going to every event for nearly a week and then back to have meetings. I go to my house in the south of France and often to the FIA offices in Geneva. But I am very happy doing this. I'm not complaining at all.

"I like to do things properly and I'm enjoying this, because I'm working with FIA people who have the same views



about the future as I do, especially Jean Todt. It is nice to give a little bit back to the sport and I hope that we have the right vision for the sport in the future."

Mouton is involved in a number of different commissions in addition to her work with the stakeholders in the WRC.

"I prepare a lot of reports, develop the calendar in association with the

promoters and work with potential new manufacturers."

The big news in the WRC in recent months has been the announcement that the Monte Carlo Rally will return to the series in 2012.

"The most important thing was that the Automobile Club de Monaco wanted more flexibility. It is an event with its own characteristics and they felt that the FIA was not giving them the possibility to do that, so they did their own thing. Now we have the same vision and the two presidents - Jean Todt and Michel Boeri - have been working hard together to realise that the WRC needed the Monte Carlo Rally, and the rally needed the world championship."

There are hopes that other classic events will also return, notably the Safari Rally in Kenya.

"Everyone is talking about that," she admits. "Our view for the future is that we want big events, that are an adventure and a test of endurance. We do not want rallies doing a few laps around special stages in city centres. We want to be in cities but we want the events to be more open to the public. The Safari is a great, great event but is it still possible? If it is possible for sure we will try. We want a world championship and Africa should be part of that."

"The main thrust of development at the moment is in the BRIC countries: Brazil, Russia, India and China. This is the future and where we are working hard. There is a question also about the United States, which we have been discussing with the manufacturers, but not all of them are keen to go to the US. It is under discussion, but I do not think that will happen in the near future."

Getting new manufacturers involved is also important and with Citroën and Ford being joined by Mini and soon by Volkswagen, the future is looking brighter in that respect.

"There is no need for any limit," Mouton says. "For sure we can think about two or three more. I have not thought about limiting the numbers. We are happy that we have more coming. The WRC is improving a lot and there is more interest in the championship, which will help to create more big names and make more of an impact."

Mouton admits that while the domination of the sport by Sébastien Loeb is no fault of the prodigiously talented Frenchman, his stranglehold on the title has been problematic.

"It is true, but he has been alone at his own level," she says. "Perhaps if he had had more competitors maybe then he would not have won seven titles, but that is not a criticism. It is fantastic what



I'm working with FIA people who have the same views about the future as I do, especially Jean Todt



> Olympic skier, NASA advisor and now World Rally star, **ALBERT LLOVERA** has never let anything get in the way of his spirit of adventure – not even the spinal injury that, aged just 17, left him confined to a wheelchair...

Born in 1967 in Andorra, at the age of 17 Llovera was chosen to represent his country in downhill skiing at the 1984 Winter Olympics, making him the youngest competitor at the games. However, Llovera's world was turned upside down a year later when he damaged his spinal cord in a skiing accident in the European Cup and was left paralysed from the waist down.

For many, such an accident would have ended all thought of a sporting career. For Llovera, though, it was the start of a whole new story. Determined not to be held back, he trained hard to stay fit and then flew to the USA to work with NASA, aiding the organisation in its development of technology to aid astronauts who have suffered spinal injuries, a role Llovera self-deprecatingly described as like being a 'crash dummy'.

He learned to play tennis and then to ride bikes with his daughter in a specially adapted wheelchair. He also learned to drive, a move that sparked a new passion - motorsport.

In 1987, he won the Championship of Andorra for quad bikes, before then becoming the first paraplegic driver to be awarded an international competition licence for rallying in 1988. A year later he was champion of the 1989 Peugeot Rally Cup in Andorra. It was the start of a slow but steady climb through the ranks but Llovera eventually arrived in the WRC, first in the Junior World Rally Championship (JWRC) in 2001 and 2002 and, after finishing the 2009 Spanish Gravel Championship as runner-up, he last year joined the SWRC in a carefully homologated Fiat Abarth Grande Punto.

Circles on his steering wheel work as the accelerator and brakes, while the clutch is electronic and the gearbox works as on a motorbike. Having worked with Abarth for nine years now, he feels complete loyalty to the manufacturer.

It isn't always easy competing in a

hand-controlled car though. On gravel stages, as the engine speed drops into slow corners, he has reduced traction coming out of the bends, limiting torque and rpm, while on asphalt, slippery surfaces can challenge his control.

Recognising this, his first season in a S2000 on a global stage wasn't about winning. It was about learning the sport, the roads and his new car. "For me, it is a gift to have the opportunity to compete in rallies and especially in World Rally," he says. "I have a great time on event, but I also take the driving very seriously. When we are not on the stages we are all friends, but when we are driving, we all want to go as fast as possible and we are in competition."

A glance at Llovera's service area on event reveals a driver keeping morale high, as if he has the easiest job in the world. And Llovera believes he has. "Imagine being in my position and still getting to do everything I do! I'm the luckiest man in the world," he smiles.

In October 2010, though, Llovera was unable to enter the final round of last the SWRC after an infection led to restricted circulation in his legs. He was incredulous when doctors wouldn't let him discharge himself from hospital to fly to Britain to at least watch the rally.

But while a discharge on sporting grounds wasn't possible, a humanitarian cause would free him. Llovera was selected to be the first Andorran UNICEF Ambassador and, true to form, managed to escape the hospital to be sworn in.

Now in his second season of the SWRC, he is also the face of a UNICEF campaign to fundraise for schools in Mauritania and will travel there in November to supervise a programme to help women start their own businesses.

It's impossible to tell what the next chapter of Llovera's life will bring. Former FIA Production Car World Rally Champion and this year's Dakar Rally victor Nasser Al-Attiyah is a fellow SWRC driver and Olympian and perhaps best encapsulated Llovera's spirit by saying: "Sometimes something is taken away from a person that everyone else has, but that person is given back something that no one else has."

**ALBERT LLOVERA**

Andorran Albert Llovera's WRC career began in earnest in 2001, when he was aided by FIAT in entering the Junior World Rally Championship. He has most recently raced in the Super 2000 World Championship, driving an Abarth Punto. In 2010 he took part in six rounds of the SWRC, scoring a best finish of fifth in Mexico. This season he has so far competed in three of the eight rounds, with his best result being fourth in Jordan.

Part of the charm of the FIA World Rally Championship (WRC) derives from the diversity, dedication and passion of the people involved in it. One man who arguably defines these three qualities is FIA Super 2000 World Rally Championship (SWRC) driver Albert Llovera Massana. A former Winter Olympian, employee of the North American Space Agency (NASA), first ever Andorran UNICEF Ambassador, and father of 14-year old Cristina, Llovera is also unique in that he is the only WRC driver to have competed in an entirely hand-controlled rally car.



056 he has achieved and he is still the best driver in the series."

And what of the Women and Motor Sport Commission? It is a relatively new organisation but has already achieved a great deal during its relatively short existence with a number of programmes now up and running in support of young female racers.

"Currently we are supporting three youngsters in rallying, racing and karting," she says. "There is Molly Taylor, a young Australian who is competing in the WRC Academy series; in racing we selected Maiken Rasmussen, from Denmark and with the help of Volkswagen Motorsport she is doing a full season in the Scirocco R-Cup. And we have just had a selection from nine girls for a funded drive in the CIK-FIA Academy Trophy, which was won by a 15-year-old French girl, Lucile Cypriano.

"So we have one candidate in each discipline and we would like to have some more in the future. We have had fantastic support from all of the manufacturers for this programme and next year we will have two seats in the VW Scirocco R-Cup, so it is up to us to find the girls! In order to do so we have now approximately 20 national coordinators all over the world."

Mouton was recently at the Indianapolis 500 to discuss working

with Danica Patrick and Simona de Silvestro.

"They are the big names at the moment," says Mouton. "I proposed that Danica become an ambassador for us, but this year that is not going to be possible as she has no time available. However, Simona has agreed to be involved but we have to agree on how that will work. We also have Rahel Frey, who is in DTM with Audi."

The Commission is also working closely with former IndyCar racer Lyn Saint James, who raced in five Indianapolis 500s in the 1990s and was named Rookie of the Year in 1992. She has been promoting the idea of women in motorsport since 1994 when she established the Women in the Winner's Circle Foundation, an organisation that aims to encourage women to become racing drivers.

Saint James has since created her own exhibition, 'Women in the Winner's Circle', which traces the history of women racers over the past 110 years.

"What Lyn is doing is fantastic," says Mouton. "We are working closely with her and we hope to have her bring her exhibition to a conference in London next year which we will be holding together with the MSA."

The commission is also in contact with Vicki O'Connor, a longtime

motorsports executive, who learned the business working with Carl Haas and then ran the Atlantic Championship from 1985 until 2009.

"We have short, medium and long-term goals," Mouton concludes. "In the short-term we believe that the best policy is to promote and support ambassadors: so that we have strong names to help inspire new generations.

"The long-term goal is to get more women into motorsport at all levels, not only as competitors, but also as officials, team managers, engineers. We simply want to see more women involved."

**MICHÈLE MOUTON**

Originally from Grasse, in the south of France, Michèle Mouton arrived in motorsport almost by accident when a friend asked her to co-drive a rally in 1972. It led to a distinguished driving career in which she became the first, and so far only, woman to win a WRC round, at the 1981 San Remo rally. The following year she added wins in Portugal, Greece and Brazil to finish second in the championship. She has also competed in the 24 Heures du Mans and won the Pikes Peak Hillclimb in 1985. Mouton ended her driving career in 1986 to have a family and then began organising the Race of Champions in 1988, which she still does. She became the first President of FIA's Women and Motor Sport Commission last year and was named Manager of the World Rally Championship earlier this year.

> With the FIA's offices spread across three jurisdictions, the management of personnel has long been a challenge.

**JULIE LEGENDRE**, the Federation's new Head of Human Resources, aims to change that, and it means a lot more than just adhering to legislation...

The FIA is a complicated organisation. It is headquartered in Paris, its spiritual home, where the organisation of international motorsport has been carried out since rules were first codified by the Automobile Club de France (ACF). In 1904 it joined a number of other clubs to establish the first international body dedicated to the automobile world, the Association Internationale des Automobile Clubs Reconnus (AIACR), the forerunner of the FIA.

Today, however, 60 per cent of the 115 FIA permanent staff are based in Geneva, where the main administrative departments are located. There are still 27 staff in Paris, while a further 16 are based at the FIA Technical Centre in Chessington, Surrey, in the UK.

Administering this multinational organisation to ensure the federation achieves the maximum possible is no simple task, particularly as, prior to the arrival of Jean Todt as FIA President, each unit effectively ran itself. Todt concluded that there was a strong case for integrating all three operations and with this in mind hired Julie Legendre as its first Head of Human Resources.

Human Resources is a much misunderstood part of any large

organisation, its role being above all else to create a happy and productive workforce and reduce friction. This ranges from obvious issues such as pay and working conditions to more complex topics such as understanding the role employees play, so that their competence is understood by management and their abilities can be used to the maximum. This helps staff to become more engaged and committed and they are invested in the business they then add value and efficiency to an organisation. In all it helps foster a far healthier working environment, reduces staff turnover and leaves employees feeling that they are making progress.

Legendre joined the FIA from a retail and catering services business at Cointrin Airport in Geneva, just around the corner from the federation's offices.

A graduate of the Université Paris 2 Panthéon Assas, France's top law school, where she studied social law, Legendre began her professional career working with the Société Générale bank in Paris.

She later moved to Fédération Française du Bâtiment, the French national association for those involved in the construction industry but returned to Société Générale, this time heading the social relations department of its Franfinance subsidiary.

In 2009, though, she moved to Geneva to head the HR department at Canonica Management, a private sector company running shops and catering in Cointrin, in addition to having in-flight catering businesses based in Geneva, Paris and Nice. This experience enabled her to gain vital expertise in Swiss employment law and experience dealing with an organisation with offices in different countries.

Her first job when she arrived at the FIA was to define exactly what kind of Human Resources structure is required by the Federation.

"There was no Human Resources structure, so the position I am now in did not exist," she says. "My first mission, therefore, was to develop a suitable structure that would be able to deal with the needs of the FIA staff, in all of its locations, and to define such things as recruitment policy and all the usual things related to Human Resources, such as career development, training, compensation, benefits, labour relations. So I have been looking



at what was needed in all these areas.

"My second mission was to ensure that the FIA complies with all the necessary employment legislation in the different countries and to examine the relationships between the personnel and the management to see whether everything is working well and where there might be some improvement.

"The third job was to improve internal communication within the federation," she adds. "The goal there is to create better cohesion and thus improving the efficiency of the organisation to help it achieve its aims, both in sport and in the automotive world. We have started that process already with meetings of an information committee and I am now sending regular notes around the Federation to create more internal dialogue, so that everyone feels that their voices are being heard and that personal conflicts are being resolved and thus the organisation is working as well as it possibly can.

"There is a very good working climate within the FIA, but there are always things that can be improved and I have been discussing this a lot," she says. "So I suppose that so far you could say that I have been building that, while at the same time being a little bit of a negotiator and a diplomat."

Having three different FIA locations, in addition to the activities of FIA teams on the road at events, means that Julie has to spend some of her time travelling between the offices.

"For the moment I am spending most of my time in Geneva," she says. "I go to Paris for two days a month, although I think I will probably spend a little more time there in the future as there seem to be plenty of things to do when I am visiting. I have been to England once so far, to meet the people concerned there and to see the operations that are run from there."

Ultimately, the decision to create a Human Resources department at the FIA is very much in keeping with Jean Todt's belief that the administration of the federation needs to run more like a small corporation than a club.

### JULIE LEGENDRE

A social law graduate of the Université Paris 2 Panthéon Assas, Julie Legendre comes to the FIA from the commercial and banking sectors, having worked for Société Générale and also at the Fédération Française du Bâtiment, the French national association for the construction industry. Most recently, though, she worked in the HR department at Canonica Management, a private sector company running shops and catering service at Geneva's Cointrin airport.

# FIA CALENDAR

## → AUGUST

- 22 Historic Rallies Sub Commission
- 26 Women & Sport Commission
- 30 CIK Commission
  - GT Commission
  - TC Commission
- 31 Truck Racing Promotion Working Group
  - Truck Racing Commission
  - Circuits Commission

## → SEPTEMBER

- 01 Women & Motorsport Commission
  - Off-Road Commission
- 02 Safety Commission
- 06 Single Seater Commission
- 07 Founding Members Club
  - Audit Committee
- 11 Cross Country Rally Commission
- 12 Rally Commission
  - WRC Commission
  - Historic Technical Working Group
- 13 Legal & Consumer Affairs WG,
  - FIA Bruxelles, Brussels
- 14 Electric & New Energy
  - Championships Commission
  - Transport & Mobility WG,
    - FIA Bruxelles, Brussels
  - EuroTest, FIA Bruxelles, Brussels

## → OCTOBER

- 06 Founding Members Committee
  - Audit Committee
  - Senate
- 07 International Historical Commission
- 20 Coordination Group

## INMOTION

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EDITOR-IN-CHIEF: Norman Howell  
 EDITORIAL CONSULTANCY: Engine Room Media  
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 inmotion@fia.com  
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FEDERATION INTERNATIONALE DE L' AUTOMOBILE

8 Place de la Concorde | 75008 | Paris . France

(t) +33 (0)1 43 12 58 15 (f) +33 (0)1 43 12 58 19

[inmotion@fiacommunications.com](mailto:inmotion@fiacommunications.com)

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