AUTO

INTERNATIONAL JOURNAL OF THE FIA

P 44 / FINN FLIES SAFETY FLAG

05

'Motor sport makes you respect safety even more'

Two-time Formula 1 title winner Mika Häkkinen on why he is committing to advancing road safety

P 62 / OLYMPIAN EFFORTS

04

IOC President Thomas Bach on a new togetherness

The Olympic chief on the movement's new message and how working with the FIA is leading to change

P 50 / RALLY-RAID REINVENTED

04

The long-distance drive towards sustainability

How the FIA Rally-Raid World Championship is taking technology on a bold new journey

P 76 / DON OF THE RACE TRACK

06

The remakable tale of motor sport's flying headmaster

Away from racing Nino Vaccarella was a studious academic but his exploits on track made him a legend

issue #35

'THANK YOU, JEAN'

Jeddah, 5 December 2021: F1 drivers and Stefano Domenicali salute Jean Todt during his last Grand Prix attendance as FIA President

FORMULA 1®

24 HOURS OF LE MANS

SIR JACKIE STEWART

ROLEX 24
AT DAYTONA

TIME SUSPENDED

Can one really beat time at its own game? We have tried. Since the dawn of civilization, we have continually raced against the clock, creating ever-new ways to defy time. Machines of unrivalled power propel us faster than we've ever dreamt. To this day, we continue to perfect motor sport, pushing it to the brink. Because to this day, time has not been beaten. But we have found that whatever the speed, when one challenges the limits of the machine as well as their own, the clock can almost be stopped. And at that most elusive of moments, time nearly stands still. **Welcome to the moment.**

#Perpetual

OYSTER PERPETUAL COSMOGRAPH DAYTONA
IN 18 CT WHITE GOLD

ROLEX

MOTION FOR LIFE

MICHELIN

FORMULA E

MICHELIN

OFFICIAL FOUNDING PARTNER
AND TYRE SUPPLIER

AUTO INTERNATIONAL JOURNAL OF THE FIA

Editorial Board: Jean Todt, Gérard Saillant, Saul Billingsley, Olivier Fisch
Editor-In-Chief: Justin Hynes
Contributing Editor: Marc Cutler
Chief Sub-Editor: Gillian Rodgers
Art Director: Cara Mills
Contributors: Pino Allievi, Carole Capitaine, Piotr Magdziarz, Chris Medland, Anna Nordkvist, Gaia Pelliccioli, James Roberts, Luke Smith, Tony Thomas, Kate Turner
Repro Manager: Adam Carbajal
Printing: Golinelli Communications Lab
We would like to thank the following for their help with this issue of AUTO: Mark Adams, Mathieu Fonteneau, Hayley Gallagher, Alejandra Salmeron Garcia, Benjamin Menard, Caroline Morard, Sami Raisanen
Advertising: Stephane Fillastre
sfillastre@fia.com

Design Origination: seidldesign, Stuttgart
seidldesign

THE FIA

The Fédération Internationale de l'Automobile is the governing body of world motor sport and the federation of the world's leading motoring organisations. Founded in 1904, it brings together 236 national motoring and sporting organisations from more than 135 countries, representing millions of motorists worldwide. In motor sport, it administers the rules and regulations for all international four-wheel sport, including the FIA Formula One World Championship and FIA World Rally Championship.

THE FIA FOUNDATION

The FIA Foundation is an independent UK-registered charity that supports an international programme of activities promoting road safety, the environment and sustainable mobility. It was established in 2001 with a donation of $300 million from the FIA and is governed by a Board of Trustees. Among its activities, the Foundation participates in various UN road safety and environment-related partnerships and is a member of the UN Global Road Safety Collaboration.

Dear reader, dear friend,

Earlier this year the FIA, in association with global consultants EY Parthenon, published a major report on the economic impact of motor sport worldwide. With a total gross output of €159.2 billion and 1.5 million jobs globally, our sport makes an extraordinary contribution to economies all over the world.

To illustrate that positive effect, our cover story, the latest in our series on the missions of the FIA's #PurposeDriven movement, focuses on the motor sport stakeholders behind the goal of Community Development. From the teams at the forefront of innovation, to the Federation's member ASNs who organise competitions in every region, to the circuit builders growing engagement through infrastructure development, we reveal how our sport delivers technological advances, societal improvement, community engagement and prosperity.

To continue to provide that benefit, motor sport must reflect the concerns of society, and in this edition we provide three examples of how the FIA is ensuring it remains relevant with stories about the Federation's research into sustainable fuels, the FIA World Rally Championship's introduction of hybrid power in 2022, and the exciting ambitions of the newly-created FIA World Rally-Raid Championship.

The latter, the sixth senior FIA World Championship and promoted by A.S.O, represents an exciting development, as it not only includes the iconic Dakar Rally but provides great opportunity for manufacturers to explore technologies such as electric and hydrogen power, as well as new fuels. Extending the theme of sustainability, we profile automotive leader Jaguar-Land Rover CEO Thierry Bolloré, who has pledged to make Jaguar an all-electric brand by 2025.

Elsewhere, we speak to Formula 1 legend Mika Häkkinen about his commitment to road safety, and in separate articles AUTO explains how the FIA and FIA Foundation are boosting road safety among vulnerable populations through the FIA Safe and Affordable Helmets programme and the helmet coalition.

We also talk to Thomas Bach, President of the International Olympic committee, who tells us how the IOC and FIA are collaborating on road safety, diversity and youth engagement.

Our Rear View section reviews the remarkable racing career of nino vaccarella, who passed away recently, and details the development of the Ferrari 250 GTO, one of the marque's greatest cars. Finally, we examine the activities of the Touring Club Suisse (TCS), which this year celebrates its 125th anniversary.

As I embark on a new path, I would like to warmly thank my presidential team, the FIA Members Clubs and governing bodies, all the Sport and Mobility stakeholders and, of course, the whole FIA staff, for their hard work, passion and resilience.

JEAN TODT,
FIA President

contents

From the economies of global motor sport, to world rallying's hybrid move, to the new world Rally-Raid series, this is AUTO

40


85

20


36


58


26

76


44


50

01 UP FRONT

P10—13
Gallery
Retiring Nakajima leads Toyota's WEC celebrations; Project 356 World Rally Tour ready for Antarctica mission

P14—18
News
Alpine targets FIA WEC Hypercar campaign; FIA launches Safe & Affordable Helmets in Mexico; Tesla Model 3 tops car sales in Europe

02 DRIVING FORCES

P20—21
Théo Pourchaire
The FIA Formula 2 teenage sensation on winning at Monaco and delivering on his boyhood dreams

03 TECH REPORT

P22—23
AVL's virtual Le Mans win
How Le Mans rookie Ferdinand Habsburg used AVL RACING simulator technology to achieve LMP2 success at La Sarthe

04 COVER STORY

P26—27
Economics of competition
An FIA-backed global study has revealed motor sport's true value – AUTO discovers how the results could bring great benefits

P28—31
Performance advantages
How race track performance generates value for the global economy – and can benefit society as a whole

P32—35
Study to reap rewards
Motorsport Australia's CEO and Automobile Club d'Italia's President on how the EY study will benefit motor sport in their region

P36—37
On track to success
Why race tracks are a major driver of motor sport's economic impact, as explained by architects Hermann and Carsten Tilke

05 AUTO FOCUS

P40—42
New stage for sustainability
How the FIA WRC will enter a new age of sustainable competition in 2022 with plug-in hybrid rally cars

P44—48
F1 winner to safety champ
Mika Häkkinen is using his personal motor sport experience to help the FIA's push for greater road safety

P50—54
Rally-Raid's rebirth
Sustainability lies at the heart of the new-for-2022 FIA World Rally-Raid Championship – with promoter ASO already gaining manufacturer interest

P56—57
FIA helmet coalition
The Foundation's work as part of the FIA's Safe & Affordable Helmet Programme

P58—60
JLR classics reimagined
Jaguar Land Rover's Thierry Bolloré on taking the British marques into new territory

P62—64
FIA and IOC: in it together
IOC President Thomas Bach on working with the FIA and Olympic success at Tokyo

P66—68
The drive to a better future
How the FIA's various championships are rising to the challenge of achieving carbon-free mobility

P70—71
Fighting the fixers
A new FIA campaign aims to warn against the risks of competition manipulation

06 REAR VIEW

P73—75
Frank Williams
Paying tribute to the legendary nine-time Constructors' title-winning Formula 1 team owner, who passed away recently

P76—79
Legend: Nino Vaccarella
When he wasn't running his school in Sicily, the Italian was enjoying "adventure holidays" in racing and inspiring fans along the way

P80—83
Ferrari 250 GTO
With an incredible history and stunning looks, we recount how the 250 GTO or 'Il Monstro' became the world's most expensive car

07 INSIDE THE FIA FAMILY

P85—88
Club World
As it celebrates its 125th anniversary, the Touring Club Suisse is planning for the next century of mobility

08 FINAL LAP

P90
Final Lap
The new portable charging device that should help counter a lack of charging points for EV vehicles

FIA WORLD ENDURANCE CHAMPIONSHIP

TOYOTA'S VICTORY RUN

Kazuki Nakajima retired from the FIA World Endurance Championship in style after securing victory with Toyota team-mates Brendon Hartley and Sébastien Buemi at the season-closing Bahrain 8 Hours. The 2021 WEC title was won by their team-mates in the #7 GR010 Hybrid – Kamui Kobayashi, José María López and Mike Conway – after they finished second in the race having secured pole position during qualifying. Victory makes them the first-ever champions in the WEC's Hypercar era, having completed the Le Mans 24 Hours/WEC title double for the first time in their careers. Nakajima, who had taken the chequered flag in the #8 Toyota, retires with three overall Le Mans wins and the 2018/19 LMP1 title to his name.

NAKAJIMA BOWS OUT ON A HIGH
Former F1 driver Kazuki Nakajima leaves the FIA WEC having enjoyed nine seasons with the Toyota Gazoo Racing team. The Japanese said it had been an honour to compete for the team, adding: "I feel so lucky to have won races, championships and Le Mans alongside so many talented, passionate and dedicated colleagues."

PROJECT 356 WORLD RALLY TOUR

THE ULTIMATE ICE RACER

This is the re-engineered 1956 Porsche 356 that racer and philanthropist Renée Brinkerhoff is driving across Antarctica during December in a 356-mile trek to raise awareness of child trafficking. It's the final part of the American's Project 356 World Rally Tour, which has seen her cover seven continents competing under her Valkyrie Racing team banner on events such as La Carrera Panamericana, the Targa Tasmania, the Caminos Del Inca and the Peking to Paris Rally. After 18 months of work, UK senior chassis design engineer Kieron Bradley has adapted the Porsche to include a crevasse bar to stop it falling down large ice cracks, and skis and tracks to run on instead of wheels. The car will also be painted red to show up in the snow.

CAMPAIGN TO END CHILD TRAFFICKING
With famed polar explorer Jason de Carteret by her side, Renée Brinkerhoff is heading to Antarctica to raise funds for her Valkyrie Gives non-profit organisation, which supports child trafficking victims through education, rescue and restoration. "Our racing efforts have given us a voice on a global platform to put an end to child trafficking," she says.

01

NEWS

In this issue: Alpine unveils Hypercar plans for FIA WEC; Ogier clinches eighth WRC title; FIA launches Safe & Affordable helmet programme in Mexico; Prodrive to contest Dakar Rally using sustainable fuel; Tesla Model 3 becomes first all-electric best-selling car in Europe

From left: ACO President Pierre Fillon, Alpine CEO Laurent Rossi and Signatech Team Principal Philippe Sinault.

NEWS Alpine to build LMDh Hypercar to enter WEC from 2024

Alpine will develop an LMDh car for entry to the top-flight class in the FIA World Endurance Championship from 2024.

The entry will be in partnership with Signatech, with which they returned to sportscar racing in 2013, and includes plans for a four-year project with the car and running two cars in the first year.

Alpine will use a next-generation Oreca LMP2 chassis, a one-make hybrid system as per the rules for the category, and aerodynamics developed in collaboration with their Formula 1 team.

The news comes after Alpine took a podium in the Hypercar category at Le Mans this year, having entered the race in a grandfathered LMP1 chassis.

It joins Ferrari, which will be entering an LMH car in the WEC in 2023, as the only two F1 teams that will also compete at the top level of sportscar racing alongside other manufacturers including Porsche, Audi, Cadillac, Peugeot, Acura and the existing Glickenhaus and Toyota.

Laurent Rossi, Alpine CEO, said: "The Alpine Endurance programme underlines the brand's dedication and ambition in motor sport. By competing in both F1 and endurance, Alpine will be one of the rare brands to be present in the two key disciplines of motor sport."

Prior to entering the Hypercar category at the top level in WEC, Alpine achieved two LMP2 world titles (2016 and 2019) and three victories at the Le Mans 24 Hours in the hotly-contested LMP2 category (2016, 2018 and 2019).

NEWS Ogier claims eighth WRC title and hails 15-year journey with Ingrassia

Sébastien Ogier won his eighth FIA World Rally Championship crown in nine years in November, while his Toyota team clinched the manufacturers' title.

The 37-year-old Frenchman won the season-ending ACI Rally Monza in northern Italy ahead of Welsh team-mate Elfyn Evans, his only title rival, after they were separated by just half a second overnight.

Ogier is the second most successful driver in the sport's history after retired nine-times world champion and compatriot Sébastien Loeb.

Ogier, who will compete part-time with Toyota next season, lived dangerously when he clipped a concrete barrier at the Monza circuit on the final day but escaped serious damage and clinched his fifth win of the season and the 54th of his career.

He and Evans battled for the rally lead throughout the weekend before the Welshman spun in the penultimate stage with his team-mate then winning by 7.3 seconds. Spaniard Dani Sordo finished third for Hyundai.

The championship ended with Ogier on 230 points to Evans's 207 and 176 for Hyundai's Belgian driver Thierry Neuville.

Toyota, which won nine of the 12 rallies this season, took the manufacturers' crown with 522 points to Hyundai's 463.

"Definitely emotion came like a firework crossing the final line, I would say. I am super happy winning this title," said Ogier after taking his eighth crown. "But the biggest emotion today was the small one. I would like to know what [co-driver] Julien [Ingrassia] is thinking, but it was such a weird feeling knowing it is really the end now.

"We achieved much more than we were dreaming 15 years ago when we met. This scenario to end up this way is the best possible. One more unforgettable memory that I have with Julien. It is hard to describe all that we feel right now."

Sébastien Ogier and Julien Ingrassia clinched their eighth WRC title at Monza.

NEWS European Truck Racing Championship to reach net-zero emissions by 2038

The FIA European Truck Racing Championship plans to reach net-zero carbon emissions by 2038 following its switch this year to biofuels that fully originate from renewable sources.

ETRC was the first FIA-regulated championship to run Hydrotreated Vegetable Oil (HVO) biofuels in 2021, with the IVECO pace truck powered by bio-liquefied natural gas (bio-LNG). This marked the first step into a new era for the series and provided proof on track that it is possible to have lower greenhouse gas emissions with commercial vehicles on the road.

After the 2021 season finale at the Misano Circuit, the ADAC Mittelrhein together with the ETRA promoter hosted a Get-Together event which was joined by representatives from the FIA, event organisers, and partners Iveco, Ford and Goodyear to talk about the sustainability transition of the series and net-zero plans.

The FIA Truck Racing Commission is now investigating the feasibility of introducing new forms of energy to the championship with the objective of future regulations being open to different types of energy technologies, according to ETRA managing director Georg Fuchs.

"The event at Misano has been a great opportunity to talk about our sustainability plans and underline our commitment to reach net-zero by 2038 at the latest," said Fuchs. "The FIA ETRC is in a unique position to showcase existing technologies and prototypes, and drive the acceptance of more sustainable solutions among professional truck drivers forward, which will directly benefit the wider transportation industry.

"With the HVO biofuel in all race trucks introduced for the 2021 season and the IVECO pace truck powered by bio-LNG we already have two sustainable technologies, and we welcome any new advances in this field to the grid."

European truck racing has run on biofuels this year and aims to hit net-zero by 2038.

NEWS Three-star Williams commits to becoming climate positive by 2030

The Williams Racing Formula One team has unveiled a new 'green' sustainability strategy by committing to becoming a climate positive company by 2030.

The new sustainability strategy means that the company not only plans to achieve net-zero carbon emissions, but also create an extra environmental benefit by removing additional carbon dioxide from the atmosphere.

To achieve this, Williams has developed a series of technology and data-driven initiatives that will be taken in the short and medium term to accelerate the transition to a better planet and address some of the most important environmental challenges in F1 and global sport.

The analysis is based around five key pillars: Climate Action, Biodiversity Stewardship, Sustainable Innovation, Industry Access for All and Purpose Driven Leadership. This includes targets for how the team will reduce carbon emissions from travel and energy consumption at its headquarters in Oxfordshire, UK, reduce waste and water usage, and over time create its own energy.

There are also targets for how the team can protect and preserve the biodiversity on the 60 acres of its HQ campus, including the Letcombe Brook – one of only 240 chalk streams in the world – and improve the life cycle management of its race cars.

Williams CEO, Jost Capito, believes that by implementing the new sustainable strategy it will enable the team to showcase how the world can be more climate positive through F1's global sporting platform.

"As a huge global sporting platform, F1 has the power to inspire millions of people across the world, and as the pinnacle of so many advanced technologies it has the ability to create technical solutions to help tackle the challenges we face as a planet," said Capito. "As we progress towards our goal to be climate positive in the years ahead, my hope is that Williams Racing can inspire all those connected with our sport and beyond."

Williams Racing CEO Jost Capito is leading the team towards new climate positive goals.

NEWS FIA launches latest Safe & Affordable Helmet programme in Mexico

Ahead of November's FIA Formula 1 Mexican Grand Prix, the FIA Safe & Affordable Helmet Programme took another step forward with the distribution of UN-standard certified helmets in Mexico City, organised by the FIA and its Member Organisation ANA Automóvil Club A C with the support of the FIA Foundation and the Keep Fighting Foundation.

Motorcycle riders and passengers have long been vulnerable users of motorised transport. In the Americas, the increasing ownership of motorcycles has resulted in an increase in motorcyclist fatalities and injuries, with head injuries being a major concern. This trend has affected Mexico. In 2000, motorcyclists represented only six per cent of road fatalities, while in 2020 this figure reached 25 per cent.

The FIA Safe & Affordable Helmet Programme seeks to address this through the creation of the lowest priced helmets on the market, while also meeting the UN ECE 22.05 safety standards as certified by independent experts. Research shows that safe helmet wearing is one of the most effective road safety interventions, reducing the number of head injuries among moped riders and motorcyclists by around 44 per cent.

In order to raise awareness of the importance of wearing helmets and to encourage the local government to ensure that only high standard helmets are introduced in the market, a demonstration event was organised in Mexico City in the framework of the FIA Formula 1 Grand Prix. The Mexico launch follows similar initiatives in Kenya and Nepal.

The event gathered FIA President Jean Todt, FIA Vice-President for Sport and OMDAI, NACAM and FIA Americas President José Abed R, ANA Automóvil Club A C President Julián José Abed Jiménez, ANA Seguros General Director Raúl Barba, Mexico City Road Safety and Information Monitoring Director Valentina Delgado Sánchez, Formula 1 CEO Stefano Domenicali, Uber Eats Latin America General Director Eduardo Donnelly, FIA Foundation Programmes Manager Agnieszka Krasnolucka, FIA Secretary General for Automobile Mobility and Tourism ad interim Onika Miller, Red Bull Formula 1 driver Sergio Pérez, Chairman of the Board of Grupo Carso Carlos Slim Domit, Mexican Red Cross President Fernando Suinaga Cárdenas and FIA Deputy President for Automobile Mobility and Tourism Thierry Willemarck, among others.

Top: FIA President Jean Todt led a host of delegates at the helmet programme launch in Mexico, which included Mexican F1 driver Sergio Pérez (above).

The Keep Fighting Foundation, created by Michael Schumacher's family to promote the spirit of perseverance that characterises the seven-time FIA Formula 1 World Champion, donated 2,600 helmets to Mexico. FIA Member Club ANA announced a distribution plan in five Mexican regions particularly in need.

COALITION EFFORT

FIA President Jean Todt, who also serves as the United Nations Secretary-General's Special Envoy for Road Safety, said: "Wearing a helmet is key to protecting the lives of two-wheeled riders. The FIA Safe & Affordable Helmet Programme is part of the consolidated action of our Federation to make a profound impact on the global road safety challenge. I salute the authorities of Mexico for their participation and I would like to sincerely thank our Member Club ANA for organising this event, as well as the FIA Foundation and the Keep Fighting Foundation for their active support. I urge other governments and the private sector to join those who have already committed to this promising initiative."

'This programme is part of the FIA's action to make a profound impact on the global road safety challenge'

To promote long-lasting change in helmet wearing attitudes among motorcyclists and to influence policy makers to set up comprehensive helmet safety policies, the FIA and FIA Foundation created a Helmet Coalition in Mexico, bringing together stakeholders from the government, civil society and the private sector.

The coalition, led by the ITDP (Instituto de Políticas para el Transporte y el Desarrollo), will elaborate an 18-month action plan to improve helmet safety in Mexico, in line with one of the recommendations included in the Global Plan of the Decade of Action for Road Safety, published by WHO on 28 October, 2021.

FIA Foundation Executive Director Saul Billingsley said: "The motorcycle is an increasingly popular mode of low-cost transport in Latin America, but without access to helmets which are safe as well as affordable, lives are unnecessarily at risk, particularly from head injuries. Establishing a Mexican national helmet wearing coalition, with the collaborative support of long-term partners ITDP Mexico and ANA, will help to address the need for greater awareness of motorcycle safety, and lay the groundwork for a cross-sectoral cooperation to ensure safe journeys for all."

The launch of the programme in Mexico was also supported by Formula 1 drivers, who asked their team designer to customise Safe & Affordable helmets.

F1 drivers supporting the helmet scheme included Mick Schumacher and Kimi Räikkonen (top left).

NEWS Iron Dames test FIA F3 car at Magny-Cours

Two young aspiring female drivers from the Iron Dames racing project have been given the opportunity to test a FIA Formula 3 car at Magny-Cours, France.

The 17-year-olds were Maya Weug, who became the first female driver to join the prestigious Ferrari Driver Academy, and Doriane Pin, a finalist in the FIA Girls on Track – Rising Stars programme.

Weug and Pin were given their first taste of an FIA F3 car, which races on the support ladder for Formula 1, to support the progression of their racing careers as part of the Iron Dames racing project.

Iron Dames, created by Deborah Mayer, aims to support women in motor sport whether they are drivers, mechanics, engineers or working in management. Earlier this year its members competed alongside the Iron Lynx cars in the Le Mans 24 Hours and FIA World Endurance Championship.

"This experience was important in demonstrating to Maya and Doriane what is involved in the next level of racing, and I'd like to thank FIA F3 for offering this amazing opportunity to both drivers," said Mayer.

"These will be the fastest cars they have ever driven up to now, and it will help prepare them for climbing to the next stages of their careers."

Weug finishes her debut season as part of the Iron Dames project having raced across both Italian Formula 4 and ADAC F4 this year, while Pin, who also had her first season with the Iron Dames, finished a strong third in the Drivers' championship of the Michelin Le Mans Cup series.

Iron Dames Doriane Pin and Maya Weug have tested in F3.

NEWS Prodrive to run Dakar 2022 using sustainable fuel

Prodrive will contest the 2022 edition of the Dakar Rally in January using sustainable fuel having successfully first run it while competing in this year's FIA World Cup for Cross-Country Rallies.

The Bahrain Raid Xtreme (BRX) team will use sustainable fuel developed at Prodrive's powertrain facility and headquarters in Banbury in conjunction with UK-based company Coryton Advanced Fuels.

Known as 'Prodrive ECOpower', the fuel can be used as a substitute for unleaded petrol in the same, unmodified engines and has been specifically developed to demonstrate the environmental benefits of the latest sustainable fuel technology.

The main components are generation 2 biofuel, manufactured from agricultural waste, and efuels created by capturing carbon from the atmosphere. As a result, the fuel reduces greenhouse gas emissions by 80 per cent compared to unleaded fuel.

Prodrive Chairman David Richards believes that using sustainable fuel technology in both Dakar and the FIA World Cup for Cross-Country Rallies, where cars cover thousands of miles across tough terrain, is the perfect way to showcase the technology.

"I am a great advocate of motor sport taking the lead in developing, proving and promoting new technologies that can help address climate change," said Richards. "The Dakar and World Cup are the perfect environment to showcase the benefits of the next generation of sustainable fuels, and demonstrate that they can be used in road vehicles to reduce the use of fossil fuels, while offering the same performance and range."

While Prodrive ECOpower has been developed for motor sport use, the fuel can be used as a direct replacement for unleaded petrol in almost any vehicle, and the company is planning to run a near-identical fuel in a number of its road vehicles to further prove the technology.

The Bahrain Raid Xtreme team will use Prodrive ECOpower sustainable fuel at Dakar in 2022.

NEWS FIA and United Nations to digitalise Carnet de Passages en Douane

The FIA and United Nations Economic Commission for Europe (UNECE) have signed an agreement to formalise their co-operation on the digitalisation of the Carnet de Passages en Douane (CPD) Distribution System.

The CPD facilitates the temporary importation of private and commercial vehicles, and the e-Distribution System is expected to speed up the border crossing for millions of motorists around the globe.

It will replace the current CPD and will significantly reduce the administration process to ensure the exchange of customs information is done in a secure environment.

This will prevent false submission of customs declarations and further benefits such as the systematic availability of advanced information, which would enable stakeholders to conduct risk assessments prior to the arrival of vehicles.

FIA President Jean Todt said: "The strengthened partnership between the FIA and UNECE marks our joint commitment to promote safe and sustainable mobility for all road users worldwide. The digitalisation of the CPD will provide a solution that is needed by customs administrations to help manage risks and reduce border waiting times."

The CPD is based on two international conventions: 'The Customs Convention on the Temporary Importation of Private Road Vehicles' (signed in New York on June 4, 1954) and 'The Customs Convention on the Temporary Importation of Commercial Road Vehicles' (signed in Geneva on May 18, 1956).

Hosted by UNECE, the Conventions have 96 Contracting Parties, where the system is implemented and managed by the FIA on behalf of the Alliance Interntionale de Tourisme/FIA CPD network and their affiliated members.

Olga Algayerova, UNECE Executive Secretary, said: "The 59 UN legal instruments on inland transport administered by UNECE provide a common framework for the development of efficient, safe and sustainable transport and mobility. Accelerating the digitalisation of procedures under these tools is helping more and more countries to reap their benefits."

UNECE Executive Secretary Olga Algayerova and FIA President Jean Todt sign the CPD agreement.

NEWS Tesla Model 3 becomes first all-electric best-selling car in Europe

The Tesla Model 3 has become the first all-electric car to be the best-selling in Europe, having topped sales in September.

It is the first time an electric car has outsold rival models with petrol engines and registered more new cars than established brands such as Fiat, Nissan or Seat, according to a report from JATO Dynamics.

Tesla leads the EV market with a share of 24 per cent, ahead of the Volkswagen Group with 22 per cent, Stellantis with 13 per cent, and Hyundai-Kia with almost 11 per cent.

This is a significant milestone for EVs and another sign that the motor industry is pivoting away from the combustion engine, with fully electric and plug-in hybrid vehicles accounting for 23 per cent of Europe's car market in the same period – nearly double that from 2020.

In August, EVs outsold diesel vehicles in Europe for the first time ever, taking 21 per cent of the market share with 1501,737 vehicles sold in total. By contrast, diesels had a 20 per cent share with just 141,635 units sold.

Global Analyst at JATO Dynamics, Felipe Munoz, believes that while EVs are gaining in popularity during the pandemic there are still other issues, including the global semi-conductor shortage, which have affected production of new cars.

"This year, the industry has responded well to the pandemic, but it is now facing new supply chain challenges due to the chip shortage," said Munoz. "The growing popularity of EVs is encouraging, but sales are not yet strong enough to offset the big declines seen across other segments."

Tesla leads the EV market in Europe, with its Model 3 outselling petrol engine rivals for the first time.

NEWS High Level Panel discuss impact of motor insurance on road safety

The FIA High Level Panel for Road Safety (HLP) has hosted an online workshop aimed at facilitating discussions on the link between motor insurance and road safety, and the impact they have on each other.

Chaired by FIA President Jean Todt, the online workshop entitled 'Motor Insurance and Road Safety' had 70 participants and built on the outcomes of this year's 'Strategic Discussion on Automotive Insurance and Road Safety: Aligning the Stars to Pave the Way to Safer Mobility'.

FIA Deputy President for Automobile Mobility and Tourism Thierry Willemarck opened the session by highlighting areas in which the insurance sector and motor insurance can contribute to improving road safety, with input from Global Federation of Insurance Associations President Don Forgeron and Asociación de Superintendentes de Seguros de Latinoamerica President Tomás Soley.

The session focused on obstacles hindering the development of motor insurance in low- and middle-income countries. Elements identified included: poor observance of compulsory measures (usually linked to inadequate enforcement), a dichotomy comprising poor financial viability for insurance firms and high prices for drivers, and a lack of adequate technical expertise from public authorities.

FIA Policy Commission Chairman Ferry Smith spoke about how innovation and data would drive future mobility, highlighting the likely positive effects on reducing the cost of mobility and improving road safety.

Smith hosted the closing session alongside Secretary for the FIA HLP, Miquel Nadal, with talks on the need to increase coordination between stakeholders and develop a comprehensive approach to the insurance business.

The FIA HLP discussed the lack of motor insurance in low- and middle-income countries.

THÉO POURCHAIRE:

Making the dream real 02

From watching the Monaco Grand Prix as a three-year-old to winning in the principality 15 years later, French FIA Formula 2 star *Théo Pourchaire* continues to deliver on the boyhood dreams he had when he slept in his go-kart at the side of his local track

TEXT
/
CHRIS MEDLAND

Théo Pourchaire became an F2 winner this year at Monaco – a track close to his home and his heart.

Hailing from Grasse, Théo Pourchaire grew up in an area that has produced multiple Formula 1 drivers, with Charles Leclerc and the late Jules Bianchi the most recent to make it from the Cote d'Azur region to the top of the motor sport ladder. But Pourchaire wasn't aware of that heritage when he was first introduced to a go-kart in the same year that he first saw F1 in Monaco.

"Basically my father is a big fan of motor sport," Pourchaire says. "He's more into rallying, but he put me in a go-kart at three years old and my first memory is not of me driving but of going to Monaco to support Michael Schumacher. Starting at three years old it's difficult to be fast! I was actually too tired to do an entire day of driving, so in the middle of the race track I would stop the kart next to the track and fall asleep inside it!

"At the beginning I wasn't a good driver, I was just learning as everyone does I think. It was a lot of work that started at three years old, and up to today I worked a lot to be where I am."

Pourchaire is now 18, but that means he already has a decade and a half of driving experience under his belt. Unsurprisingly, success came quickly once he started competing in the French karting scene, even if he rues his first race at national level.

"My first year of a category that is called '*Minime*' in France, I was eight years old, so I was the youngest. I was really stressed because there were some big names in France. I was in the South of France, which is a small league compared to Paris which had lots of drivers, and I was a bit scared to race against them.

"In the first race I took pole position, but I made a mistake in the wet. It was raining in the final and I crashed on the first lap. I was angry with myself because it was my first race, I was really young but I was fast already. At the second round on a different track I won that race with a 10-second advantage over P2."

Pourchaire's precocious talent was soon spotted and French ASN, the Fédération Francaise du Sport Automobile (FFSA), weighed in with support. Pourchaire moved to the academy at Le Mans to complete his studies alongside his racing – "maybe I can work in the future if I'm not a professional racing driver" – as he stepped up to Formula 4.

Third in the overall standings and winner of the FFSA Academy junior championship was a strong start, though Pourchaire didn't secure a pole position during the campaign. That changed the following year in ADAC F4. There he emerged as champion with six poles and a definite sense that he was improving on his raw speed.

"It was really important. Qualifying is not an easy thing to do, it's really difficult and with the stress of the first year in single-seaters I had to prove everything and deliver good results because it's really expensive. My family was trying to help me as much as possible but I also had the federation, I had some sponsors, so I needed good results.

"Qualifying is really difficult, you have to be mentally prepared for that and be really calm to do the perfect lap. When I was young it was not an easy thing to do, and even today I am still struggling a bit in qualifying. I try to prove myself day after day."

FIGHT TO THE TOP

That last point is a pertinent one, because Pourchaire didn't have a pole at all during his debut year in Formula 3 with ART. But starting as a 16-year-old, it was a sensational campaign in testing conditions amid the COVID-19 pandemic.

'There is only one dream I live for. I think I was born to be Formula 1 World Champion'

THÉO POURCHAIRE:

The Frenchman has tested in F1 courtesy of his partnership with the Sauber Academy.

"It was a difficult year because we had pre-season testing in Bahrain and I was struggling quite a lot to be honest," he recalls. "I was in the top 15 or top 10, but not fighting at the front with the top guys. Then we had the start of the pandemic and we had nothing to do.

"In the beginning of July we were in Spielberg [in Austria], so having had no driving as a rookie was really difficult for me. The first race weekend was tough, I was P20 in qualifying and one second off my team-mate who was on pole, so mentally it was not easy. I knew I was young, everyone told me, 'Théo, you are young, you have time to learn', but I wanted to win.

"The following weekend was the Styrian Grand Prix and I got P5 in qualifying and my first win, so that was quite a huge improvement. I was really proud of that and mentally the weekend was a big boost for me."

The turnaround was attributed to managing stress better, and Pourchaire certainly did that as he finished the year in excellent form, missing out on the title by just three points to Oscar Piastri.

"To be honest, on the in-lap I was crying in my helmet a little bit. I have to admit that because it was not easy. It was nine races in 11 weeks so that was really hard mentally and physically. When I crossed the line my engineer told me, 'Okay Théo, you are vice-champion of Formula 3' and I was a bit disappointed because it was my fifth podium in six races, so the end of the season was amazing but it was not enough to win the title.

"But then when I came back to the pits I saw all the team and my family, and they told me, 'Théo, it's amazing, you are vice-champion and you have to be proud of that'."

Staying with ART to step up to Formula 2, that pole drought was ended in Monaco of all places, where Pourchaire won the feature race despite not yet being old enough to drive a road car.

"It was really special because before the start of the season I was looking at the calendar and I was only looking at Monaco," he says. "I was saying to myself, 'Théo, you're going to race at Monaco, it's going to be super hard'. I didn't know what the result was going to be but I took pole, I won the feature race, it was an amazing weekend and I just wasn't expecting that at all!

"I almost did the perfect job and I was really proud. Winning in Monaco is like winning my home race, I live just 45 minutes away and it was a dream. I came to see the grand prix maybe 10 times with my father and now I'm an F2 winner there."

Pourchaire has been touted for a future Formula 1 drive courtesy of his partnership with the Sauber Academy – he tested a 2019-spec Alfa Romeo C38 F1 car at the Hungaroring in August – and while at the time of writing he is still targeting the F2 championship this year he is likely to remain in the series in 2022, with Alfa Romeo boss Frédéric Vasseur saying he is also likely to get FP1 outings in Formula 1.

"If we see the performances I would say [I'm destined for Formula 1] because I'm almost always at the front, but F1 is not always about performances, there are other issues. We talked with Sauber, we had a good discussion with them and I think they have a great plan for me. We will see, but I'm still focused on trying to win the championship this year, to finish well at least, and then we'll see what happens in the future. Sauber are supporting me a lot so I'm thankful to them.

"There is only one dream that I live for and I want to achieve that," says Pourchaire. "My dream is to be a Formula 1 World Champion, for sure. I think I was born to be an F1 World Champion. It's my ultimate dream, my ultimate goal, and I will do everything to achieve it and have no regrets."

While there's a long road ahead before the Frenchman grabs what he believes to be his birthright, there's every chance that the dreams nurtured by a child asleep in a go-kart in the infield of his local circuit could yet come true. ◂

03

Virtually assured of victory

Le Mans rookie *Ferdinand Habsburg* had never driven the iconic Le Sarthe circuit before his debut this year. But thanks to intensive preparation on the simulators at AVL RACING, the Austrian was able to power his way to the top of the LMP2 podium at the prestigious 24 Hours event. Here's how he did it...

"Le Mans winner... it is a dream to be able to say that, and I cannot thank everyone involved enough," smiles Ferdinand Habsburg. "The many laps in the simulator and working with the AVL race engineers in Graz were excellent preparation for this challenge." On August 22 this year, the 24-year-old AVL RACING brand ambassador, who lined up alongside Dutchman Robin Frijns and French driver Charles Milesi as part of the Belgian WRT team, became a Le Mans winner in the LMP2 category on his first appearance at the legendary Circuit de la Sarthe.

The Le Mans 24 Hours circuit was completely new for Habsburg. In preparation for the French endurance classic, he had spent the previous week working hard in the AVL Driving Simulator in Graz, Austria.

Going to Le Mans as a rookie is no easy task. The track is long, with a full lap covering 13.62 kilometres. The drivers have to get used to changing light conditions, driving in the night, and managing traffic which is particularly difficult considering the big speed differences between the cars. On top of that, the available practice time needs to be shared between the three drivers in each car, meaning they don't get too many laps under their belt before the flag drops on Saturday afternoon.

Therefore preparation is key to success – even more so at the first attempt. Habsburg used the full-motion driving simulator at AVL RACING to prepare for the event in the best possible way. AVL RACING has been supporting Habsburg since his days in the junior categories, with sessions on the driving simulator and corresponding race engineering services.

Ferdinand Habsburg used cutting-edge AVL RACING simulation technology to achieve LMP2 success on his Le Mans debut.

MODEL BEHAVIOUR

The AVL Driving Simulator is equipped with a full-motion hexapod system that allows it to execute motions of the frame and cockpit in which the driver is seated. It is important that the magnitude and timing of the motion is spot-on to create a proper immersion for the driver, allowing them to better judge the handling of the car.

During the set-up and development of the driving simulator, great emphasis was put on minimising any delay that might distract the driver. This of course applies likewise to the projection system. In the case of AVL RACING, a 180° screen with 5m diameter is illuminated with three true 120 Hz projectors. The avoidance of any delay between the motion of the cockpit and the projection of the image onto the screen is critical to prevent motion sickness and giving the driver wrong cues.

As a first step in preparation, the car model of Habsburg's LMP2 for Le Mans was created in AVL VSM™ RACE. AVL's fully dynamic, in-house developed vehicle dynamics software has been used in motor sport for more than 20 years. AVL VSM™ RACE is used either in-house by AVL for various motor sport engineering projects, such as the determination of the Balance of Performance (BoP) for DTM, or it is utilised by customers, such as the FIA, which uses the software to investigate future regulations for various race categories.

The vehicle dynamics software features a parametric model that is split into components, such as an aero model, a suspension model, or an engine model. Typically, AVL VSM™ RACE is used on a laptop or in the cloud to create the correlation between real-car data and simulation outputs, utilising AVL's sophisticated driver model. When going to the driving simulator, the virtual driver model is simply replaced by the human driver, while the rest of the model remains untouched.

ENGINEERING THE RACE

The first task for Habsburg was learning the circuit. Although he knew the layout from sim racing, driving it with a sophisticated high-definition track model that accurately features curbs and road irregularities on a full-motion simulator with big screen, made for a steep learning curve. The data acquisition system on the driving simulator allows it to record several hundred channels every lap, for instance vehicle speed, steer angle and brake pressure. But the real value of the data acquisition lies in metrics that cannot be measured on a real race car, such as the tyre saturation. This is a metric to quantify how much of the available tyre force potential the driver is actually using. It helps the driver to understand where he can push more, and where he is already close to the limit.

A race engineer pulls up the data on a screen to allow Habsburg to see the differences in his driving between different laps, pointing out the good things and where improvements are needed. The focus is on driving technique, and for the driver to try what works and what doesn't work. The advantage of the AVL Driving Simulator is that it is a fully controlled environment, so the car behaves the same every lap and only the driver makes a difference.

Set-up changes are done in a matter of seconds. A few mouse clicks and the balance of the car model changes immediately. Typical changes include altering the level of downforce, the aero balance, or the grip level of the track. The focus is for the driver to recognise the handling difference and to adjust his driving style accordingly. The target is to give the driver a toolbox of experiences of what to do when, for example, the handling changes in a specific way. This is important because, due to the duration of the race, track conditions and temperatures vary considerably affecting the handling of the car, so the driver must be able to cope with it in the best possible way.

Apart from trying to achieve the ultimate lap time, another focus is on being easy on the car while still finding good pace. In a 24-hour race, the strain on the car is enormous, so drivers must make sure they do not overstress the car by, for example, constantly running over particularly punishing curbs. Together with the race engineer, the areas where the driver needs to be careful are identified, while always considering how to minimise the lap time loss.

> **'The laps in the simulator and working with the AVL RACING engineers were excellent preparation'**
>
> FERDINAND HABSBURG

AVL's Driving Simulator features a five-metre diameter, 180° screen and a full-motion hexapod system.

The energy input into the tyres is also a key factor which is considered. Depending on the driving style, this can be considerably different, even if the lap time is similar. So driving style has a big effect on tyre degradation, and a close look at the data allows all involved to identify the most critical parts of the track in terms of tyre energy. Consequently, different driving styles and lines are tried to identify the best way to conserve tyres without losing too much time.

The detailed preparation on the AVL Driving Simulator with its race engineers helped Habsburg to tackle the Le Mans race weekend in a much better prepared way. That, together with the outstanding performance of all three drivers and the team, contributed to finally having a Le Mans winner in the AVL RACING Ambassador line-up.

By the time Habsburg raced the Team WRT Oreca he had plenty of virtual Le Sarthe experience.

Purpose»Driven
COMMUNITY DEVELOPMENT

COVER STORY
/
Motor sport's global value

P28—29
Report rewards
A study by EY Parthenon has revealed motor sport's economic worth

P30—33
Gains in performance
How the quest for track performance helps aid the world's economy

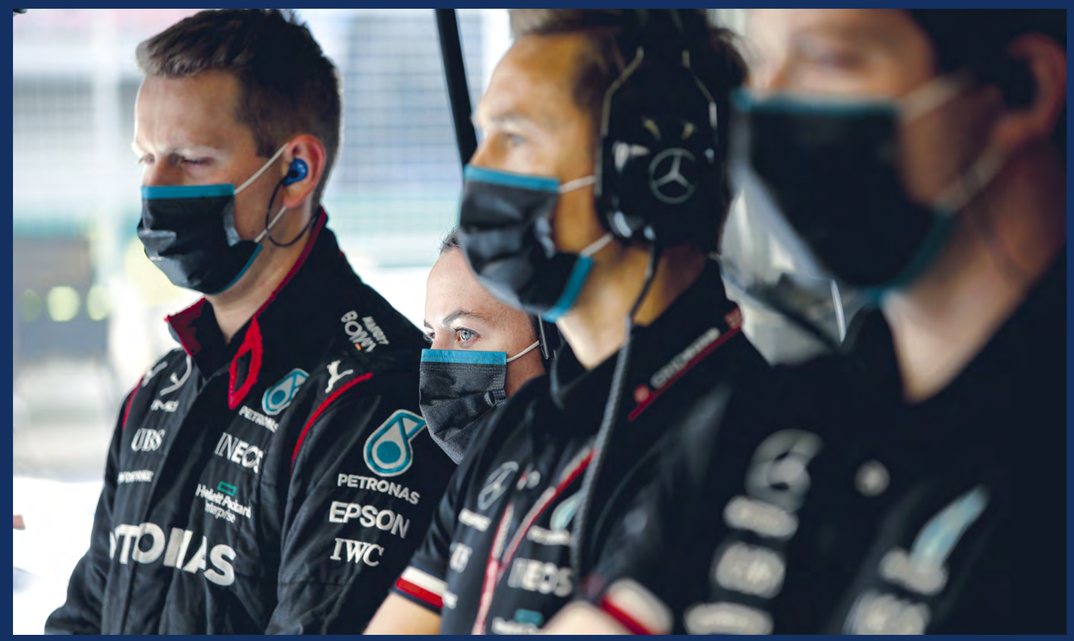
P34—37
Knowledge is power
Armed with the FIA's report, ASNs can add to motor sport's prosperity

P38—39
On track to success
Why race tracks are big driver of motor sport's economic impact

04

WORTHY PURSUIT

Now that an FIA-backed study has revealed motor sport's true global economic value, more work can be done to ensure it continues to be a driver of employment and ground-breaking technology, while also providing answers to some of the big problems facing today's society



A recent study found motor sport had a global annual revenue of €159.2 billion, employing 1.5 million people and covering 60,700 events worldwide.

Purpose»Driven
COMMUNITY DEVELOPMENT

The economics of competition 04

Motor sport has always been recognised as a driver of economic improvement but until recently the scale of that impact has remained nebulous. Now, thanks to a global FIA study conducted with management consultants EY Parthenon, the true value of racing has been established – and the results could bring great benefits

TEXT / LUKE SMITH

Motor sport has an enormous number of positive qualities. As well as providing competition and sporting spectacle, it helps to bring communities and people together through a united love for racing. But the economic benefit of global motor sport is also vast, helping to stimulate growth in countries by staging events, and creating jobs through a burgeoning industry that has a far reach.

The true economic value of motor sport was revealed when the findings of the FIA-commissioned report conducted by EY Parthenon were published earlier this year.

Analysing the motor sport industry in 2019, the study found a total gross output of €159.2 billion, acting as a notable figure that proved the scale and the continued growth of motor sport around the world.

The undertaking of the study was about more than grabbing headlines with large numbers, though. The FIA commissioned the report in order to demonstrate the value of motor sport to economies, and, in doing so, aid in stakeholder negotiations with government and sponsors.

Matt Colston heads up Ernst & Young's sports, events and venues practice in the Asia-Pacific region, and helped oversee the undertaking of the 2019 report. He had previously worked on a national study with the ASN for Australia, Motorsport Australia, and on similar projects for other sports.

"They're a tool that sports can use for governments to demonstrate the value of their sector or their sport," says Colston. "They help with getting investment into infrastructure, programmes and the like. They've been quite successful through the experience we have."

It was for this reason the FIA wanted to undertake the study, as well as building on a previous report completed in 2007 to help gauge the growth of motor sport as an industry. But with 145 member countries, it was no easy task to gather all of the data required to form the report.

The starting point for Colston and his team was to work with a definition of 'motor sport' as an industry. The FIA defines motor sport as "any competition or related sport activity restricted to vehicles that have at least four non-aligned wheels and are constantly and entirely controlled by a driver on board the vehicle". The industry as a whole would cover participants including competitors, officials and club members, governing bodies, facilities, tracks, teams, event promoters and auto-related industries.

The EY Parthenon report covered every aspect of motor sport, from F1 (above) down.

"We spent time scoping out exactly how we were going to do it, what we were going to measure, and the methodology we were going to go down," says Colston. "There was a lot of time up front making sure everybody on the working group with the FIA were comfortable with that process and how we defined the industry, which is vital."

GROWTH SPURT

With the definitions set, the data collection process could begin. The methodology comprised a combination of both primary and secondary research. The primary research was conducted through 20,000 surveys sent to a number of different groups, including all licensed participants at each of the ASNs, local and national event promoters, tracks and clubs to give a "huge spread of the industry sector".

"To back that up, we also did a lot of secondary data collection," Colston adds. "That was based on information which was already out there, based on some of the data the FIA had collected. The data collection process itself took about a year. It was quite extensive."

The survey questions helped build up a picture using a mix of qualitative and quantitative data.

"It was all data around how often do you participate in the sport, what do you spend when you participate, do you travel, how long do you stay away when you're racing?" Colston explains. "There was also some qualitative data around age, gender, what the barriers are to participating more and what things could make you engage more in the sport? So we got a lot of that data as well which was very useful."

There was close collaboration with each of the ASNs over the findings. "We spent a lot of time consulting with them to sense check the data to make sure we interpreted it properly," Colston says. "And that once we'd crunched our numbers the output actually made sense to them."

The final results showed a total gross output for motor sport in 2019 of €159.2 billion, with a direct output of €59.8bn – economic activity directly generated by the industry – as well as a significant 'flow on' effect to other industries, such as money spent in the service industries by event attendees, allowing the money to circulate through broader sections of the economy.

It marked a growth from the 2007 report, which returned a direct industry output of €31bn, albeit to different methodology. But the EY Parthenon team worked to make it as comparable as possible, ensuring that the growth figures were reliable.

"We tried to cut it to make it as comparable as possible which obviously demonstrated there was significant growth in the sector over that time frame, which is a great thing," says Colston. "Again, it is one of those things that is useful to demonstrate to government decision-makers around investment into a sport."

As well as the raw economic impact, governments and stakeholders could also see the job generation thanks to motor sport. The 2019 report detailed 1.5 million total paid jobs, as well as more than 300,000 unpaid jobs, such as marshals and volunteers.

"It's quite a high volunteer base in the sport, which is very positive," says Colston. "That's something which in itself adds value above and beyond the economic side, particularly around social inclusion. Those other indirect values are huge. It's not just the pure dollar values of the economy, it's the other benefits around sport participation and volunteering."

One of the stand-out qualitative findings from the report was the average length that participants are staying within the motor sport industry, which Colston said was around 18 years. "Other sports would kill for that, to have someone engaged in a sport for that period of time," he says. "It was those sorts of interesting things that we gathered through the process as well."

But the report also highlighted room for growth. It found that motor sport remained a male-dominant industry, with the level of female participation being "generally on the lower scale" compared to other sports, according to Colston. It is an area that the FIA is already pursuing through schemes focused on women such as Girls On Track, and shows the importance of such projects to ASNs when they look to secure funding. Another observation was the high level spent per participant in motor sport, due to the amount of equipment involved such as cars to race and required safety equipment.

'Other sports would kill for that, to have someone engaged in it for such a long time'

Motor sport's volunteer base was highlighted in the report for having positive social effects.

It is hoped the report will help with attracting government investment in new facilities.

As well as the global picture, each ASN that provided enough data was given a snapshot of their own economic impact, making it valuable on a national level when negotiating with their own governments and stakeholders about funding or legislation. "It was great that a lot of those ASNs saw the value in getting a snapshot of their own country," says Colston. "It helps them to deal with governments and demonstrate the value of their sport."

The report findings helped paint a comprehensive economic picture of motor sport with a depth and detail that had not previously been reached, showing the standing of the industry and its overall impact.

"It's the size of the industry that surprised me," says Colston. "It has huge value. From that growth from 2007, it's a really significant industry."

Motor sport's global economic importance was laid bare in the EY report findings.

MOTOR SPORT AT A GLANCE

€159.2B TOTAL GROSS OUTPUT	**1.5M** TOTAL PAID JOBS	**2.7M** MOTOR SPORT PARTICIPANTS*
€66.8B TOTAL VALUE ADD	**302,000** FORMAL (UNPAID) OFFICIALS, MARSHALS AND VOLUNTEERS	**60,700** EVENTS
21,600 LOCAL MOTOR SPORT CLUBS	**146** NATIONAL MOTOR SPORT FEDERATIONS**	**7,200** FACILITIES, TRACKS AND VENUES

* Participants include (i) 'competitors', (ii) 'officials, marshals and volunteers', and (iii) 'non-competing club members'
**National Sporting Authority/ies, members of the FIA (known by the French acronym ASN/ACN)

Purpose»Driven
COMMUNITY DEVELOPMENT

04

PERFORMANCE GAINS

The FIA's recent worldwide study on the economic and social impact of motor sport demonstrated just how much the quest for performance on track generates value for the global economy – and helps solve some of the big problems facing society

TEXT
/
MARC CUTLER

When the FIA commissioned a first-of-its kind study with EY Parthenon into the financial and economic impact that motor sport has worldwide, it revealed how important the industry can be to local economies.

Companies involved in motor sport generate employment and subsequently economic value, whilst also being a testing-bed for positive change in society.

That is particularly the case in the UK, home to 'Motor Sport Valley' in Northampton and Milton Keynes, where 80 per cent of the teams on the Formula 1 grid are based. One of those is the eight-time constructors' champion Mercedes F1 Team, which employs nearly 2,000 people across both its factory and engine bases in Northampton.

"Here in Brackley we employ 1,000 people and then a similar number again at our Brixworth engine base, Mercedes-AMG High Performance Powertrains (HPP)," says Chief Operations Officer, Rob Thomas. "However, that's the tip of the iceberg – when you consider the supply base that supports both organisations, you quickly run into many, many tens of thousands of people who are directly employed in motor sport, which of course benefits the UK economy."

Much of the technology developed at HPP will directly benefit Mercedes-Benz's car arm as it works to develop the Vision EQXX, an electric car that aims to combat the often talked about issue of range in EVs. They are aiming to have a real-world range of more than 1,000 kilometres by targeting a single-digit figure for Kwh per 100 kilometres (over six miles per Kwh) at normal highway driving speeds.

"Some very important work is underway at Mercedes-AMG HPP to support Mercedes-Benz in developing the Vision EQXX," explains Thomas. "The technological advances we make in F1 and projects like the Vision EQXX will be adapted and applied for potential use in new electric architectures. F1 and our relentless pursuit for efficiency and quicker lap times will continue to play a very important role in our journey towards sustainable mobility for years to come."

This innovation extends further north to Cumbria where 2017 World Rally Championship constructors' champion, the M-Sport World Rally Team, bases its operations. The company is about to open its new state-of-the-art Evaluation Centre, which includes a 1.55-mile test track and 10,732m² R&D facility that was made possible due to investment from the British Government's Regional Growth Fund and Cumbria Local Enterprise Partnership.

Matthew Wilson, Director at M-Sport, says that while there were setbacks due to the COVID-19 pandemic, it should benefit the local economy in Cumbria as it looks to recruit people to work at the facility.

"We finished the track and the building just as the pandemic started, so it was a tough time in that sense just with the unknown," says Wilson. "But I think we're through the other side of it and we're pushing to get as many people here as we can and get it utilised, which is going to be a really useful tool.

"It's something unique and what we're hoping to do is open it up to Original Equipment Manufacturers (OEM) and things like that. Its fully behind closed doors and you've also got all of these facilities on site for the test track, so we're really hoping that will give us some value either just as a normal circuit or as a proving ground."

M-Sport has been a key driver in recruitment across both its motor sport and commercial road arm, MS-RT. The opening of a new £4 million facility in Dagenham alongside car maker Ford has the potential to create more than 120 jobs when the factory is fully operational in 2022 and will be an opportunity for the company to showcase its motor sport technology on the road.

"I think with the new facility for MS-RT we have a real connection to passing that motor sport knowledge down to the road car. More manufacturers are using motor sport to showcase their technical ability," notes Wilson. "Our MS-RT side is something that has grown quite a lot in the last year. The link to the motor sport side is huge and that's what gives it its real kudos and credibility."

But its not just the UK that feels the benefit of the motor sport industry on society.

Genoa-based Racing Force Group is a newly-formed joint venture between motor sport safety equipment makers Bell Helmets and OMP, and one of the key figures for them is how there are 60,000 motor sport events worldwide with 2.7 million participants. ▸

Mercedes employs 2,000 people in the UK at its engine and factory bases – with many more involved in its supply base.

Purpose Driven
COMMUNITY DEVELOPMENT

‘We are a truly international group; I will say that we have a leading role in motor sport’

PAOLO DELPRATO, RACING FORCE GROUP

Paolo Delprato, Group President and Chief Executive Officer for Racing Force, believes these figures show that motor sport is very important worldwide, not just for the business generated but for all the social aspects involved.

“Our products are designed for competitions, but as often happens the know-how generated by these studies can be transferred to other areas,” says Delprato. “This is the case for Driver’s Eye, which was recently used in Formula E and is now in the testing phase in Formula 1.”

Driver’s eye was developed originally by start-up company ‘Zeronoise’, which was later acquired along with Bell Helmets by Racing Force. The technology offers TV viewers a unique perspective and a real-life glimpse into what goes on in the cockpit of a race car.

“It enables you to broadcast live images of what the driver actually sees through a very small micro camera installed inside the helmet and approved by the FIA,” says Delprato. “Thanks to the research done, this technology can be transferred to other sectors and applications outside motor sport.”

FOSTERING GLOBAL AND LOCAL TALENT

In 2019 the motor sport industry generated 1.5 million paid jobs, according to the FIA report conducted with EY Parthenon. More than 900,000 of these are indirect jobs that came from the ‘flow on’ effects to other industries including supplier demand for intermediate goods and services, and additional consumption by people employed in the industry.

On an international scale Racing Force has more than 400 employees located in three different continents and 30 different nationalities. While much of the development for its safety products is done in-house, it still works with more than 600 suppliers for its catalogue of over 2,000 products.

According to Delprato, while it is important for Racing Force to maintain in-house production for its safety innovations, the work it does with local suppliers at its factories in Italy or Bahrain enables them to develop their products using expertise garnered from Racing Force.

“The main products are produced internally, while others – always maintaining the know-how within our group – are made in collaboration with suppliers, with some of whom we have a more than 10-year relationship and who have exploited the experience with Racing Force to develop other products in new areas.

“We are a truly international group. We sell in 80 countries through our dealer network, and we have relationships with all major motor sport players; teams, drivers, car makers, promoters, suppliers. We have more than 3,400 customers and over 600 suppliers. If we count all the people who periodically talk and have relationship to Racing Force, I will say that we have a leading role in motor sport.”

This ability to work in-house but also outsource work to local suppliers is one of the main strengths of the motor sport industry. While many racing teams have the technical ability to put together cars in-house and develop their performance, because of the volume of cars that need to be produced a lot of the machining and fabrication work gets outsourced locally.

M-Sport links up with local companies in Cumbria to help this supply and demand process, even helping develop talent through local universities and eventually giving them job opportunities when they qualify.

“We try and do as much in-house as we can, but there are certain things that we can’t do just because of the sheer volume,” says Wilson. “When we are trying to produce a Rally2 car as often as we can, you can imagine the numbers are quite high.

“A lot of the machining and some of the fabrication work gets put out to local companies, and we have deals with local colleges to try and take some of their skilled guys when they qualify. We’ve got the nuclear side here as well with Sellafield, so there is a lot of skill with that type of work in this area.”

Sellafield is one of the biggest nuclear sites in the UK located just 25 minutes away from M-Sport’s headquarters in Dovenby Hall. The site not only uses the same local companies for machining work, but has also been a stepping-stone for employees of M-Sport who are looking for a lifestyle change but to remain working in the same area.

“One of the things they have to do is work with local companies, so we’re able to use those companies as well because there is a lot of skill there. We can utilise the skill that is already in this area,” explains Wilson. “It works in both ways – we’ve had people who have trained up and maybe they are slightly older and wanted a different lifestyle, and they’ve not had to leave the area, they have gone on to work in the nuclear industry.”

Likewise, Mercedes F1 also invests a lot into apprentices, graduates and interns, and takes that outreach further to schools and universities. In 2020 the team launched ‘Accelerate 25’, part of its vision to increase diversity and become a more inclusive outfit.

“Diversity and equality of opportunity is very important to us. In 2020, we launched Accelerate 25, a five-year programme to mark the formalisation of our vision to become a more diverse and inclusive team,” says Thomas. “We are continuously raising our standards of entry and, until 2025, we aim for at least 25 per cent of all new starters at our team to come from under-represented groups. We’re on course to exceed that target.”

RACING FOR A PURPOSE

Much of M-Sport’s MS-RT business is currently in the styling package for road-going counterparts and carry-over parts such as the suspension units, the likes of which enable rally cars to take huge jumps in Finland and land with the driver still in control. But there is scope for that to grow with the introduction of the new WRC Rally1 hybrid rules.

The crossover between road cars and racing cars in this area will be one of the main outputs of development for both M-Sport and Ford, as the cars will be able to run in full electric mode when they go through city centres to reach the next rally stage or in service parks. According to Wilson, M-Sport has utilised its partnership with Ford to fine-tune the performance of the electric element based on the data it has got from its road cars.

“There is a lot to think about for the engineers and obviously the guys at Ford have been involved, that’s something they were able to help us with and the deployment side of things; how to get the most out of the system. So that’s where we have had a really good relationship with Ford on that.”

While the electric element is initially going to be a controlled system for all the manufacturers in WRC, the initial developments made by Ford based on its road cars can be built on using the data gathered by the team once they run the system on a rally stage and understand how to extract more performance from it.

Wilson believes this is where motor sport has changed significantly in recent years, as more championships embrace hybrid and electric technology. It’s no longer just about being able to showcase a product for the road, it’s how can motor sport better develop its products for a more sustainable future.

“Back in the old days a lot of it was about manufacturers being able to showcase their product – the old saying ‘Win on Sunday and sell on Monday’ – but I think some of that has really changed,” says Wilson. “Now for manufacturers, whether that’s Formula E, WRC, F1 or Formula E, its more to showcase their technical ability.

“We’re in changing times for motor sport with all the new powertrains that are coming, whether that’s hybrid or electric. That’s probably another reason why motor sport is really important for manufacturers because those technologies are changing all the time and motor sport is a good way of showcasing them.”

Italian-based Racing Force Group (top) encompasses OMP and Bell Helmets, as worn by WRC star Thierry Neuville (above).

M-Sport's work covers rallying and road car production, with bases in Cumbria (below) and a new £4m plant in Dagenham.

‘A lot of our machining and fabrication work is put out to local companies’

MATTHEW WILSON, DIRECTOR, M-SPORT

Purpose»Driven
COMMUNITY DEVELOPMENT

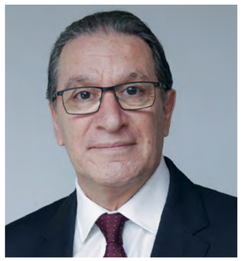
KNOWLEDGE IS POWER

04 At every level, motor sport events organised by FIA Member ASNs have the ability to generate employment and create prosperity. And now, armed with the findings of the EY-Parthenon study, the CEO of Motorsport Australia and the President of the Automobile Club d'Italia believe they have the data to back up calls for government support of motor sport projects

TEXT / LUKE SMITH

F1's return to Imola in 2020 had an induced economic impact of almost €4m on the Emilia-Romagna region – even without spectators.

TCR racing at Eastern Creek – but areas beyond the country's main cities are also keen to stage events.



Motorsport Australia CEO Eugene Arocca says the EY report is "manna from heaven" for ASNs.

The report will also aid potential investment, says ACI President Angelo Sticchi Damiani

The FIA EY Parthenon report outlined the enormous economic impact that motor sport has on a global scale, as well as reflecting the growth of the industry. But for each of the National Sporting Authorities (ASN) that oversee motor sport domestically across the FIA's 145 member countries, the report also helps outline the impact of their work at home, adding to their national economies.

"For our ASN, this data is of fundamental importance," explains Angelo Sticchi Damiani, FIA Vice-President and President of the Automobile Club of Italy (ACI). "The FIA report made with EY Parthenon effectively tells the value of motor sport in Italy, which goes far beyond Formula 1, and provides a measurable numerical content that indisputably highlights the extremely positive impact of sports racing."

Eugene Arocca, the CEO of Motorsport Australia, says he was "surprised" by the lack of appreciation his government had for the impact of motor sport when he started in the role. One of his earliest moves was to commission a national report by EY, which was built upon in the recent global study.

"It has really opened the eyes of the government, tourism bodies, venue operators, stakeholders generally and sponsors to the sheer economic power of motor sport," he says.

With every event that an ASN helps to organise, there is a clear economic stimulation through the creation of jobs, both directly and indirectly. At a very base level, there is job creation at the ASN itself, but this then extends to a wider level of direct employment at every track, facility, team and organisation involved in racing events. For example, Motorsport Australia employs around 50 people internally, but helps stimulate a national motor sport industry employing 18,000 people.

The indirect job creation is also hugely important, though. With every event that takes place, hotels and restaurants are filled up by spectators, competitors and participants, leading to a huge impact on the service industry. This 'flow on' effect is responsible for more than 900,000 indirect paid jobs worldwide.

"It is clear that the impact of a motor sport event on direct and indirect employment is extremely significant," says Sticchi Damiani. "Being able to show them a precise number relating to the direct and indirect employment from our events allows us to make visible and measurable the economic and social impact of the event on the territory."

The use of concrete economic data is vital for ASNs when it comes to liaising with both government officials and sponsors, proving the positive impact that motor sport can have. A number of motor sport events and major projects depend on government funding or approval, while sponsors are crucial in the support of ASNs, becoming critical partners.

"Being able to highlight economic and social data is central in a discussion with potential partners interested in entering the world of motor sport ," says Sticchi Damiani. "Knowing the economic impact can confirm ideas or dissolve the doubts or reservations of a potential partner – private or institutional – on whether or not to enter into a discussion with ACI or, more generally, with the motor sport sector."

Arocca says the data in the report is "manna from heaven" for ASNs such as Motorsport Australia when it comes to aiding talks with governments. "There is no doubt that it is a door opener for organisations, or members of parliament, or regional councils that are just probably in the dark about it," he says. "It's a door-kicking opener for those partners which have always had but need vindication for the investment that they are making." It has also helped its discussions with sponsors. Arocca says that when Motorsport Australia first did a report in 2014, it had one major sponsor. In 2021, it has 10.

POSITIVE INFLUENCE

Beyond the direct impact of the industry, reports such as the FIA EY Parthenon study also reflect how ASNs benefit wider communities through both social improvement and economic development.

"The data shows in fact how many people are involved in the area, with a direct impact of employment linked to motoring events, in addition to the economic growth they generate," says Sticchi Damiani. "This shows how the impact of motor sport goes far beyond that of a simple motor race, and represents fundamental information for our sporting world."

Events staged by Motorsport Australia can be particularly influential for areas outside the major cities, serving as "the most significant economic input for that town that it gets in any given year," according to Arocca.

"I've seen towns that have got a population of 400 in central Victoria explode to 2,000 people over a period of one week – that's five times their population," he says. "They just pray for these events. Seven or eight years ago, we used to often struggle to get support for these events. Now we've got regional areas lining up to put their hands up to get a national or a state round of a motor sport or off-road or a rally event. It just brings a country town to absolute life. I think no other sport does that on a regular basis around our country."

There are very clear examples for Motorsport Australia and the ACI in how economic reports have helped secure funding for major motor sport projects.

'I've seen towns with a population of 400 explode to 2,000 people in a week. They just pray for these events'

EUGENE AROCCA, CEO MOTORSPORT AUSTRALIA

Australia went almost 20 years without having a new track built, but in 2018 The Bend Motorsport Park in South Australia was opened. "There is no doubt that to get investment money and support from government, this national report in 2014 was used," says Arocca, "and the track was ultimately opened up in 2018. So that's a clear, specific example of a company investing in motor sport on the back of this report."

In Italy, the return of Imola to the Formula 1 calendar in 2020 as a late replacement for events cancelled due to the COVID-19 pandemic helped shine a light on the positive impact the race could have on the Emilia-Romagna region. It paved the way for a contract for the grand prix to be secured until 2025, which Sticchi Damiani called "a success for the whole of Emilia-Romagna".

"The grand prix at Imola without fans (due to COVID-19) has guaranteed an induced economic impact of almost €4 million," he adds. "So it is easy to foresee an even greater return thanks to the public in the stands."

Particularly as economies look to rebound following the COVID-19 pandemic and help increase tourism, motor sport events look set to play a crucial part. In Italy, Rally Italia Sardegna has also had a hugely positive effect on the promotion of the island. "It is clear that all motor sport events, albeit with different quantitative levels, have an important added value," Sticchi Damiani says.

Arocca believes that motor sport will be "in the sweet spot" to secure funding from governments that are "prepared to spend a lot of money on regional tourism" as they rebound from the pandemic, leaning on the proof of motor sport's positive impact outlined in the FIA's report.

"Any ASN that doesn't take the global report and use it to get to the front of a queue is just missing an opportunity," says Arocca.

"That is where we're going to be placing ourselves in the next two months. We're going to be giving this report to every government, every opposition, every regional tourism body, every venue and selling the story. We'll fill the town for five days. We'll fill the restaurants, we'll go to the hotels, and we'll really bring an area to life."

'It is clear that the impact of a motor sport event on direct and indirect employment is extremely significant'

ANGELO STICCHI DAMIANI, ACI PRESIDENT

The economic benefits of motor sport helped secure funding for The Bend circuit in Southern Australia, says Arocca.

DEVELOPING PROSPERITY

TEXT / JUSTIN HYNES

04 Motor sport's capacity to improve communities extends beyond the activities of the companies directly involved in competition and a major driver of economic impact are the tracks at which teams race, as the world's foremost circuit architects *Hermann* and *Carsten Tilke* explain

Track architects Hermann and Carsten Tilke see their circuits as beneficial to local and national economies.

The Tilkes believe visitors to the Jeddah Cornice Circuit will see Saudi Arabia in a new light.

When you take on a project, how much involvement is there with local authorities or the companies building circuits in terms of mapping the economic impact the facility might have?

Carsten Tilke: There are many different kinds of projects. A Formula 1 project has a major economic impact where usually the government is also involved because it's not just making money with the track, it's economically marketing the country. A good example is Baku [in Azerbaijan], which ahead of the race I don't think many people were aware of as a potential destination. People were wary of travelling to Baku but it defied expectations. You can really use this as a marketing platform and also to create a kind of landmark for the city and for the country itself, and I think this is a positive one.

On the other hand, we have smaller circuits which many private investors are doing. More and more of these are coming on stream. These are private motoring clubs, like golf clubs where people go to drive their cars. There are now a lot of these in the US, but we're doing clubs in Japan, Canada, China, Russia, all over the world. It's because people cannot drive performance cars on the streets anymore, so they create clubs and circuits to be with like-minded car enthusiasts. Additionally, car manufacturers are building more and more experience centres, where they invite customers to showcase their model line-up.

Hermann Tilke: For example, we've done a lot for Porsche with their experience centres. We're building two at the moment. With people increasingly unable to use their cars as they are intended, and with cars featuring more and more assisted systems, they can't feel their cars on the streets so now they do it on tracks. This boosts these smaller tracks' business and as a consequence the wider economy.

So there are levels of impact. The bigger one, of course, has touristic value but there are many smaller ones that have an economic impact, just creating business around them.

One of the clubs you're talking about is Vancouver Island circuit in British Columbia, Canada. When you are doing a development such as that how difficult is it to convince local authorities and regional governments to build something they may see as negative due to space, noise or environmental concerns?

CT: It really depends on the country. Every country has different rules. Some are very strict and the permissions can take time. It can be a big hurdle, but if you do it in the right way and you have the right proposal, the right information, and make the right investigations beforehand then it certainly helps. This where we help and guide our clients because there are a lot of elements that can stop a development.

HT: It's important to say as well that maybe 20 years ago it was considered a bad thing to build a race track. Today, it is much more acceptable, from an environmental standpoint and from an investment outlook.

CT: There is absolutely a positive economic impact. Facilities such as Vancouver Island create jobs, they encourage visitors, indirect benefits are there. We try to make them as sustainable as possible. There are many measures at the moment to bring infrastructure that you can access with your electric car, you can also have solar panels for efficient energy use and so on. You can make tracks much more sustainable now and this is the goal.

In terms of the larger projects, this year Formula 1 is visiting Saudi Arabia for the first time and you designed the Jeddah Cornice Circuit. What is the forecast for that circuit?

CT: Saudi Arabia was closed to tourism for so many years and only began granting tourist visas in 2019, so the projections are still unclear, but for sure it will show the world a different Saudi Arabia than they might expect. They can use the race to build a new feeling about Saudi Arabia, a more open feeling. We have our people there now. Fifteen people have been working there for a year to supervise everything. It's a great example of how you can use a circuit to gain a big advantage at the end. It's hard to forecast it, but I think it will be a big impact.

> 'People can't drive performance cars on the streets anymore, so they create clubs and circuits'
>
> CARSTEN TILKE

Globally, is interest in constructing motor sport circuits increasing? Where are the biggest areas of growth right now?

CT: At the moment, yes. More and more projects are coming online. For investors, or state, or regional authorities there are not so many events you can invest in with similar returns. Just take major events – there's the Olympic Games, the Football World Cup or the European Championships, but to have this is much more difficult and you have to build, let's say, different kinds of stadiums which are much more expensive, a lot more expensive than building a race circuit. And the events come and then they're gone.

F1 has the opportunity every year to show people you're among the best. Every year people see the development the country has made during the past year and so on. It's a constant platform. Compared to some others, it's actually also a cheaper one. For me, it makes sense for a lot of countries to do it and to invest in it to show the world.

Q: In the creation of a plan for investors or developers seeking to build a new facility, how valuable is the type of economic impact information compiled by the FIA and EY Parthenon?

CT: It is of great value. Every country is unique and in every place there will be some adjustment, but for sure it gives an indication of what the positive effects can be. It could be a very good tool for future tracks, to indicate the impact. More and more, behind a lot of projects, careful business plans are being constructed.

We do a lot of business planning for our clients now because we have a lot of information from all over.

HT: We have also created a community of all the club tracks, through which all our tracks speak to each other and exchange information because ultimately they're not competitors. They're in the same situation and the same business, and they experience what is good and bad and they can just learn from each other.

CT: We do an event each year, inviting all our customers so they can speak to each other, connect, and work together because there is a lot of common experience. It's a club of clubs. They can, for example, develop a joint membership programme, whereby if you're a member of one club you can also use the facilities of others. It's a big community and we tell our clients that they don't just have access to our experience, they can use the experience of the whole network.

The facilities at Vancouver Island have been developed with sustainability in mind.

brembo 60 1961 2021

ALWAYS IMPROVING

After so many years, we keep winning
in the most difficult races in the world,
guaranteeing the best braking performance
thanks to increasingly innovative solutions.

brembo.com

05

Sustainability showcased on the biggest stages

TEXT / MARC CUTLER

In 2022 the FIA World Rally Championship will embrace a new age of sustainable competition, with plug-in hybrid cars tackling the world's toughest stages for the first time in the championship's 50 history

The FIA World Rally Championship will never be quite the same again. Significant and wide-sweeping changes are on the horizon for 2022 that will see rally's premier class commit to a more sustainable future and an ambitious 2030 net-zero target.

With other top-flight FIA championships such as F1 and Formula E adopting more sustainable practices and increasing their use of greener technology, the time has come for rallying to join them in leading the way. The new regulations will see plug-in hybrid vehicles compete in the WRC for the first time in the championship's 50-year history, with the introduction of fossil-free fuel, sustainable energy supplies, and a new safety-enhancing chassis also on track for a 2022 debut.

FIA Rally Director Yves Matton believes that the new rules will make the championship more attractive to new manufacturers than ever before, and enable it to become a testing ground for the latest sustainable technologies.

"The Rally1 hybrid project is a major landmark in the development of rallying and underlines the FIA's commitment to sustainability and technology laboratory," says Matton. "Next year's Rally1 cars with hybrid plus sustainable fuel will make the FIA World Rally Championship more relevant and more attractive to car makers than ever before."

The headline change likely to have the most significant environmental impact will be the use of hybrid power – mandatory for all competitors from next season. All top-tier manufacturers have agreed to use a common unit consisting of a 3.9kWh battery coupled to the MGU that will deliver 100kW (134hp) of power and 180Nm of torque.

This new system will recuperate energy during braking and coasting, and can also gain up to 80 per cent of charging power in around 20 minutes from an external supply during service breaks. This is in addition to the standard 1.6-litre turbocharged petrol engine that currently delivers up to 380hp of power.

AIMING FOR NET-ZERO EMISSIONS BY 2030

The new hybrid-power rules are a significant change for the WRC and are backed up by a commitment to reduce CO^2 emissions. This includes a target to reach net-zero in just eight years' time, following the roadmap outlined by the FIA's PurposeDriven strategy which states that all motor sport events must reach net-zero emissions by 2030.

The move has been backed by leading manufacturers Toyota, Hyundai and M-Sport who have already begun testing their new 2022-spec Rally1 machinery. The new rules will be given a competitive debut at the season-opening Rallye Monte-Carlo in January. ‣

The WRC provides a perfect proving ground for new technologies given the rough terrain it covers.

All three WRC manufacturers – M-Sport (Ford), Hyundai and Toyota – have embraced the Rally1 regulations.

FIA Rally Director Yves Matton believes WRC will become a testbed for new green technology.

Road users will benefit from WRC's sustainability work, says WRC Promoter CEO Jona Siebel.

With plug-in hybrids being a first for WRC, the introduction of 100 per cent sustainable fuels next season will also be a world-first for an FIA world championship event. A hydrocarbon-based fossil-free fuel created by P1 Racing Fuels blends synthetic and bio-degradable elements, which will be developed further with the help of global energy and chemical experts Aramco.

The new fuel will comply with quality standards for motor racing fuels as well as industry requirements for road car fuel and will be mandatory for all top-tier competitors at WRC events.

Many of the changes being made will enable manufacturers to test these new technologies in some of the harshest environments in the world, including the notorious Acropolis Rally in Greece, which is known for being extremely tough on cars due to the rocky and rough stages.

This is why WRC Promoter Chief Executive Officer, Jona Siebel, believes it is a perfect opportunity to validate hybrid technology in these environments, proving that it is safe and reliable for mass-produced vehicles intended for consumers.

"Rallying is one of the harshest environments a production-based car can experience. The WRC is a tremendous platform to develop and validate hybrid technology and renewable fuel for mass-produced vehicles, on real roads and under all circumstances. We are raising the bar to play our part in developing sustainable mobility. Road car users all over the world will ultimately benefit from what we learn by using both on rally stages."

In addition to hybrid power and sustainable fuel, the WRC will introduce several other notable changes next season. To support the championship's drive to reach net-zero emissions by 2030, the FIA has confirmed that energy supplied in service parks will, where possible, be sustainable from 2022 onwards.

The short-term target is to provide all European service parks with renewable energy at first, with a wider rollout to include infrastructure-developed locations later on.

Where local grid capacity is insufficient, WRC generators will be used and run on fossil-free bio-diesel with surplus power returned to the local grid. In future seasons, the target is for these fuel cell generators to be hydrogen powered.

CUTTING-EDGE NEW CHASSIS

With the introduction of high-voltage technology the FIA has made even further safety breakthroughs when it comes to protecting drivers, with new WRC chassis regulations being brought in to provide better protection during high-load impacts.

The 2022 rules will see a new design philosophy introduced by the FIA with an innovative new spaceframe structure mandated for all vehicles. Under Rally1 regulations, the pressed steel bodyshell is replaced by a specially designed FIA-homologated structure that will see the new WRC cars essentially become purpose-built prototypes.

FIA homologation crash tests have so far highlighted the significant safety improvements made compared to current WRC cars. Notably, a 51 per cent reduction in passenger-side intrusion, while the roof can now absorb up to 115 per cent more energy during a barrel roll compared to current-spec machinery.

Measures have also been taken to improve safety at the front of the car, particularly the driver's feet and legs, with intrusion into the bulkhead area reduced by up to 70 per cent.

All of these changes set for next year not only enhance the World Rally Championship's green credentials, but provide further evidence of the FIA's ongoing commitment to reducing emissions throughout top-level motor sport. ◂

'The WRC is a tremendous platform to develop hybrid technology and renewable fuel'

JONA SIEBEL

Rallying à la mode

Under Rally1 regulations, the driver will be able to use the extra hybrid power in three distinct modes:

FULL ELECTRIC MODE
Up to 20km of full-electric range will be made available on all road sections in between rally stages, but restricted to 50 per cent to extend battery life. The service park and other built-up areas will also be designated for full-electric use.

STAGE START MODE
The full 1000 kilojoules of energy will be made available to support the petrol engine for approximately 10 seconds at the beginning of each stage, or until the driver overrides this by applying the throttle or brake.

STAGE MODE
Teams can select up to three personalised hybrid power 'maps' to determine how theirs is to be used during a special stage, and this can be tailored to the driver's preference as well as to suit the current road conditions.

Additional maps may also be created for regen as determined by the teams. Recuperation by braking will be limited to 30kW, however, hybrid units can be pre-programmed to ensure that sufficient power is accessible throughout the stage.

WRC drivers will be able to tailor the new hybrid engines to suit their preferences while on stage.

MIKA HÄKKINEN:

05

'Motor sport makes you respect safety even more'

Mika Häkkinen recovered from serious injuries sustained on track to take two Formula 1 World Championship titles, and two decades on from his greatest success he's using his experience to advocate for safety on the world's roads

TEXT / TONY THOMAS

With his kid-sized right racing boot pressed hard down on the throttle bar of his cadet kart, six-year-old Mika Pauli Häkkinen hurtled towards the first race track corner he had ever approached.

The commitment and bravery that came to define a single-seater career, which peaked with back-to-back Formula 1 titles in 1998 and '99, were immediately evident... So, too, was his lack of experience.

Young Mika took too tight a line on entry, whacked a kerb and flipped his kart, which then landed on top of him – happily without hurting its chastened pilot.

In that instant he learned a lesson that would remain with him throughout his decades in competition: "I recognised that this is dangerous. And that I have to be careful. And that motor racing was not a kindergarten, that I have to respect it and pay attention." ▸

Double F1 champion Mika Häkkinen has turned road safety ambassador, working with the FIA and President Jean Todt.

Nyck de Vries wins the first official world championship Formula E race and the first run at night – the 2021 season opener at Diriyah.

Häkkinen was a fan of Todt's abilities as Ferrari team principal – this was Schumacher's title win at Suzuka 2000.

...The Finn stayed with McLaren for 1999 and more championship glory followed.

The first of back-to-back F1 Drivers' World Championships came in 1998...

He never forgot the panic-stricken faces of his mother and father as they ran towards him, thinking their darling boy had been hurt. He never forgot the shock and fear of an accident. He was learning fast about the dark foil that accompanied motor racing glory.

"I remember how excited I felt," says Häkkinen, "as a young boy, sitting in a go-kart for the first time, hearing and feeling the engine start... then starting to drive... Then I turn in a little bit too early and suddenly I'm lying under the kart and I can see my parents running towards me and then when I crawled out from under the kart, how worried they were."

ADVOCATE FOR SAFETY

Forty-seven years on, now comfortably retired from racing and with five children of his own, Häkkinen reflects on how that chastening first fall has driven him to become increasingly involved with FIA-led global road safety programmes.

Chief among these is the FIA's Action for Road Safety campaign, which was launched in 2011 in support of the United Nations Decade of Action for Road Safety. One of the FIA's priorities with its campaign was to mobilise the motor sport community to help improve global road safety standards.

The irony of using go-faster throttle-jockeys as advocates for safer driving is not lost on Häkkinen, though he is quick to explain how it is perfectly rational: "It's quite funny when we are talking about racing drivers, because our intention is always to go flat out, you know – as fast as possible, so it makes people think: 'What do these guys know about it? They just want to go fast.'

"But that experience is what comes through to daily life and motor sport makes you respect your safety and your health even more."

And in Häkkinen's view, speaking as one who learned from a young age how rules could be applied to driving, education about road safety can't start early enough. "It's really crucial," he says, "and let me put it this way: when you start getting your driving licence at 17 or 18, while this is not too late, I'm certain that if you learn the basics at a younger age, you carry this for the rest of your life. The older you get, the more challenging it is to adapt and understand this advice. So you really need to put this in your memory bank as early as you can."

The high global profile enjoyed by Formula 1 champions guarantees an audience for any activity with which they are associated, but merely securing 'eyeballs' is too crude a measure of Häkkinen's new engagement.

"This is not the key point," he says. "The key point is to pass on the education that we have learned from our career of racing, and going through these dangers and seeing the development of safety and protection for our lives. And that is important, because we can be active in these areas with our fans and also with businesses. And by using the right people, the FIA can encourage others to join them and help with safety on the roads."

> **'I'm certain that if you learn the road safety basics at a young age, you carry this for the rest of your life'**
>
> MIKA HÄKKINEN

The death and injury statistics associated with road crashes reveal the urgency of active engagement in road safety campaigns. FIA figures show that 1.3 million people are killed in road crashes every year – the equivalent of one person every 30 seconds, or 10 Boeing 777 passenger jets crashing every day. Five hundred of those killed daily are children. Road injury statistics are no less stark: 50 million people are seriously injured on the roads worldwide every year and one in two of those suffering from spinal cord injuries was hurt in a car accident.

And as Häkkinen relates, conversations with FIA President Jean Todt about the gravity of the situation, and how motor sport could be helpful both as a laboratory and as a platform for raising awareness, have prompted him to become increasingly vocal with regard to road safety. At a meeting earlier this year in Geneva, Todt and Häkkinen discussed the FIA's Action for Road Safety programme and Häkkinen was shown a low-cost helmet, designed and built under the FIA's Safe & Affordable Helmet Programme. This initiative was launched with the aim of designing and manufacturing a cheap-but-safe motorcycle helmet, costing around $20, for distribution in countries with high numbers of injuries and deaths from motorcycle accidents.

Häkkinen believes road safety education should start at a young age.

The need is particularly acute in some Asian countries with populations largely dependent on two-wheeled transport, where hot climates and the high cost of existing helmets conspire to prevent many from wearing this vital piece of safety equipment. One UN study found that 3.4 million deaths in Asia, Africa and Latin America between 2008 and 2019 might have come from motorcycle crashes. And that as many as 1.4 million of those fatalities could have been avoided with the proper use of safe helmets.

The FIA's own safety department, usually dedicated to high-level safety research with a motor sport focus, channelled its expertise into the programme, which aligns with UN safety standards and which recently received a donation of five thousand helmets from the Keep Fighting Foundation founded by Michael Schumacher's family.

Häkkinen admits he felt compelled to help support programmes such as these by adding his own energy and charisma to the work that is already under way.

"Jean is an amazing character," says Häkkinen, "and he really puts the full commitment of his life into fantastic projects. When I see what he has been doing and how he is activating outside of motor racing, to try to improve road safety, it is incredible."

PERSONAL EXPERIENCE

Any motor sport fan with knowledge of Häkkinen's career will realise immediately that his motivation for becoming involved in road safety projects, particularly those designed to prevent head injuries, is intensely personal.

In 1995, at the season-closing Australian Grand Prix, held that year on the Adelaide street track, the Finn suffered an accident that almost killed him.

Driving for McLaren, and rated as one of the most talented 'coming men' in the sport, Häkkinen lost control of his car at 130mph after the failure of the left-rear tyre approaching the fast right-hand Brewery Bend. Little speed was scrubbed before a horrifyingly sudden sideways impact with the barriers. Mika's head was buffeted violently from side to side in the split second post-crash and it was only thanks to brilliantly administered medical intervention that he didn't die in the following minutes.

Häkkinen's skull had been fractured and he required an emergency tracheotomy to ensure he could keep breathing. He spent the next eight weeks in hospital, recuperating and learning how to restore his balance after disruption to bones in his inner ear. And while his eventual recovery was complete – witness that title double, won against Schumacher and Ferrari – the crash had a profound effect on his approach to racing. ▸

Häkkinen's 1995 season with McLaren almost ended fatally in a qualifying crash in Adelaide...

McLaren showed its support for Mika after his accident, which altered the Finn's approach to the sport.

'The real world is a lot of cars and people, not a simple race track with a fixed number of cars'

MIKA HÄKKINEN

"There had been a lot of good support from McLaren, from the management and from the family," he says, "and after the accident my attitude to people changed quite a lot. I started looking them in the eye and listening to what they were saying. Before that I was just, 'Okay, I will keep my foot down on the throttle, I'm the best, I'm going to win every race'. But the accident helped me realise, 'Oh shit, I have a team around me' and that with the team, we will win."

That team ethic is very much at the forefront of Häkkinen's mind now, as he begins the process of becoming a highly visible road safety advocate. He and Todt have been speaking "for quite a long time" about how to work together and it was Todt's ability to lead teams in pursuit of a goal – proven most emphatically during his tenure as Ferrari's F1 team principal – that convinced Häkkinen something similar could be achieved in the road safety realm.

"What Jean learned in Formula 1," he says, "and what I also saw from a different perspective is that anything is possible with the right team, and that applies to safety as much as it does to performance. But the difference is that on normal public roads it gets very, very complicated – really, really complicated. The real world is a lot of cars and people, not a simple race track with a fixed number of cars going round and where you can make changes to a particular corner to maybe make it safer. It becomes a very big, complicated subject and Jean has taken huge responsibility to improve that area, using all of his experience. And I think this is absolutely incredible."

Häkkinen says he feels "very much at the start of the journey" in terms of his new commitment, but equally that he senses its urgency, even from the civilised security of his Monaco home. "It's a very busy place indeed, you know, and when I look around, while I'm walking or driving, I can see that there are a huge number of things that can be done. But I know that Jean and the FIA have great experience, and I am very happy to be part of the team."

THE ULTIMATE LONG-DISTANCE RELATIONSHIP

TEXT / JAMES ROBERTS

In 2022, cross-country competition will enter a new era as the FIA and promoter partner A.S.O. launch the World Rally-Raid Championship, with the iconic Dakar Rally as its flagship event. AUTO looks at how the series has come about and why sustainability lies at the heart of its events

05

When the drivers crest the sand dunes of the beautiful Ha'il desert next January, it will mark the beginning of a new era. Following in the footsteps of the ancient Bedouin tribes who navigated the Arabian peninsula, the competitors beginning the two-week, 9,000km Dakar Rally will be embarking on their own historic journey.

For the first time, the 12-stage trek of the famous cross-country event will count towards a world title as it forms the opening round of the brand new FIA World Rally-Raid Championship.

On the route from Riyadh, through the mysteriously-named Empty Quarter, towards the finish on Jeddah's majestic Red Sea shoreline, a new class of vehicle will tackle the 44th edition of this historic discipline. Known as T1 Ultimate, this pioneering category will provide a pivotal opportunity for manufacturers to engineer alternative and experimental technologies for a road-relevant future.

The T1.U is the first step in a sustainable drive to support climate action by ensuring all the categories in the Dakar Rally and FIA World Rally-Raid Championship will be powered by low-emission energies by 2030. Next January represents the start of an enormously exciting and ambitious future.

Back in June, the announcement of the seventh world championship under FIA governance was made, following an agreement that A.S.O. (Amaury Sport Organisation) will become the exclusive promoter for the series over the next five years. ▸

Audi was the first manufacturer to sign up for the new series with its hybrid electric RS Q e-Tron.

Bahrain Raid Xtreme has redesigned its Prodrive Hunter to meet the new T1+ class regulations for the 2022 Dakar.

'The Dakar has always been a technological laboratory for cross-country and the manufacturers who compete'

YANN LE MOËNNER, A,S,O, CEO

There are plans to expand the series into the Americas, says A.S.O. CEO Yann Le Moënner.

The joint regulatory framework between the two entities was supported by Jean Todt, FIA President, who said at the declaration of the new championship: "I am delighted with the outcome of long and fruitful discussions with A.S.O., which becomes the promoter of the FIA World Rally-Raid Championship, with a calendar that includes the famous Dakar."

Yann Le Moënner, CEO of A.S.O., is also pleased that an agreement to stage a World Championship has been reached. "Under the impetus of the FIA, cross-country now joins the disciplines recognised worldwide by the FIA such as Formula 1, the WRC or the WEC. Evolving as a world championship will help promote cross-country, not only to manufacturers and to motor sport stakeholders in general, but also to the media.

"To be part of the world championship it was necessary to harmonise the regulations of the Dakar with those of the other events. The Dakar team therefore got together with the FIA to establish common regulations that will now be applicable to the entire discipline, supported by the FIA which will be responsible for enforcing it among the participants."

Beginning in the Kingdom of Saudi Arabia with the flagship Dakar, the new championship will join together, in a single calendar, a collection of the most important cross-country rallies in the world.

"The fact Dakar will join the championship is a major step," says FIA Rally Director Yves Matton. "Dakar has been a leading event in cross-country for a while, but its fixture in the championship is a really positive development. To achieve this we have reached agreement in the sporting and technical regulations between A.S.O. and the FIA. We now have rules that are 100% the same, which is important for the interests of the championship, but also of value to the entrants who know they can compete in all the Rally-Raid events without changing anything to their cars."

Yann Le Moënner adds: "The Dakar is the event that gave birth to cross-country and which boosts the audience of the discipline among fans and the general public. A world championship could not be envisaged without its flagship event. In addition, the Dakar has always been a technological laboratory for both cross-country and the manufacturers who take part in it.

"At a time when the world is experiencing a transition towards new forms of energy, and greater attention is also being paid to on-board safety in the transport sector, the Dakar could not help but support this change through its role as the pioneer that it has always been. Being part of the world championship will therefore make it possible to benefit all the other events of the championship and thus strengthen and develop the entire discipline."

World Championship honours will go to Manufacturers, Drivers and Co-Drivers, while titles will also be awarded to the smaller lightweight prototype T3 and modified production Side-by-Side (SSV) vehicles in T4. New regulations for prototype trucks (T5) will also come into force for 2022. Scoring will be weighted so longer marathon events, like Dakar, will yield 50 points for the winner, reducing to 30 points for a rally winner – with points awarded down to 15th place.

GLOBAL REACH

In addition to the elevated status of the cross-country discipline, the year-round visibility of the championship will increase in coming years as organisers seek to expand both its global footprint and number of rounds.

"The idea for the new series is to have a mix of long rallies, like Dakar, and shorter events, similar in duration to those in the World Rally Championship," adds Matton. "We will never be able to have as many rounds as WRC or F1 but we plan to expand across the world in different regions to ensure we have a championship that offers excellent value for our stakeholders."

Le Moënner expands on the potential shape of the calendar: "It will comprise four or five dates depending on whether it will include one or two 'marathon' events such as the Dakar (event of 10 stages or more, including a marathon stage over two days). It will take place on a minimum of three continents.

"In its first year the championship will focus on five events in Europe, Africa and Asia. In the medium term, once the world championship has been launched we will consider also expanding onto the American continent and returning to South America, where the Dakar was run successfully for more than 10 years. The United States is also a good destination for cross-country. Off-roading holds an important place there, and more and more Americans come to race in our events and even win them, such as Ricky Brabec in motorcycle racing and Casey Currie in SSV, both of whom won the Dakar in their respective categories in 2020."

Greater visibility, parity in sporting and technical regulations and a goal for a sustainable future has increased the attractiveness of the championship to both OEMs and independent car makers. And the popularity of Sport Utility Vehicles (SUVs) continues to grow in nearly every market in the world. In January this year almost half (44%) of all new passenger car registrations in Europe were SUVs and in both the Americas and Asia there is a growing trend for high performance off-road vehicles.

The other appeal for automotive firms is the extreme conditions that cross-country desert rallies offer. There are significant variances in day/night temperatures, steep changes in altitude, tricky terrains – such as sand and stone – and a premium is placed on reliability, with distances of up to 800km every day.

"While it is a competition, it is very important for us that motor sport is also a laboratory," says FIA Technical Director Xavier Mestelan Pinon. "Dakar is the flagship for the new FIA World Rally-Raid Championship and it will be a showcase for the automotive world. Teams and Manufacturers are coming to the Dakar to test and improve their technologies and I am certain we will see more and more manufacturers as well as pioneering new technology companies and sector disruptors joining in the future. The T1.U regulation offers great freedom to innovative engineers and designers in a really challenging ▸

Toyota is also eyeing T1+ success at next year's Dakar with a new version of its Hilux.

competitive environment. It represents a challenge I don't think they could find in any other motor sport series."

Le Moënner agrees, suggesting that the new Championship has three areas of appeal for manufacturers.

"Cross-country is a sport based on three pillars that naturally interest manufacturers. These are the man/driver, the vehicle (reliability and safety), and nature, with which they must compromise. For manufacturers, this calls for three objectives: driver safety through on-board systems, sustainable technologies that can be used in mobility, and respect for the environment. Cross-country is the ideal sport to allow manufacturers to develop their systems and technologies and make them more reliable, which will be of benefit to commercially sold road vehicles in the future."

The T1+ class features enhancements to the existing T1 specification, with improvements in suspension and wheel sizes. But of greater significance is the creation of T1 Ultimate which supports the FIA's long-term environmental strategy with significant freedom for motorisation and energy storage.

"The objective is that all vehicles entered in cross-country will integrate a low-emission technology of some kind – alternative energies such as biofuels, hydrogen, hybrid, and why not one day full EV – by 2030," says Mestelan Pinon. "A first step will be taken with vehicles of elite Manufacturers and Teams that will have to integrate this technology from 2026. This movement has already begun with the arrival of Audi, which for its first participation in the Dakar 2022 will be powered by a hybrid electric technology. Other manufacturers have already shown an interest in joining the discipline in this 100% sustainable dynamic. Working together with the FIA on this change will among other things make it possible to establish new technical regulations for this category of vehicle, regulations which manufacturers need to have so as to be able to plan their investments and their research and development schedule."

As part of Audi's first electric-powered entry, former event winners Carlos Sainz and Stéphane Peterhansel will pilot the new RS Q e-Tron in Audi's joint programme with Sven Quandt's Q Motorsport. Audi have taken the electric motors (MGUs) from their Formula E car to power each axle.

A third MGU serves as an energy converter between the battery and a two-litre petrol engine. The engine itself is not connected to the wheels but acts as a generator for the battery, which is also charged through regenerative braking.

FIA Rally Director Yves Matton says Rally-Raid will have a mix of short and long 'marathon' events.

'It's hard to say what the best future technology is, but by using Rally-Raid for testing, we will find a solution'

XAVIER MESTELAN PINON, FIA TECHNICAL DIRECTOR

HYDROGEN SOLUTION

With a desire for low-emission energies for a sustainable future, the freedom in the regulations extends to incorporate hydrogen, either as a fuel cell or directly as fuel for an internal combustion engine (ICE). And a hydrogen solution is exactly what the independent French firm Pipo Moteurs are developing for the 2023 Dakar.

"It isn't just manufacturers we are getting requests from each week," says Matton. "There are also companies which are involved in new technologies that want to use cross-country as a platform to promote their innovations."

FIA Technical Director Xavier Mestelan Pinon says it's difficult to predict which technology will provide the best sustainable direction for the future, but the new championship will give manufacturers an ideal proving ground.

"For me, hybrid power has been well developed, but ultimately it's not relevant for the long term," says Mestelan Pinon. "I'm a fan of fully electric power. The MGU and inverter work well because the weight is low, they are efficient and reliable. However the main problem is how you store the energy. We know we need to improve the technology, as the current batteries are too big.

"We can use hydrogen to produce electricity with a fuel cell, but also as a fuel for an ICE, but it needs to be safe and easy to produce – perhaps by harnessing the sun's energy? Today it's impossible to say what the best technology is for the future, but by using rally-raid for testing, with its impact of endurance and extreme conditions, it will be the best laboratory for discovering the solution."

One example of where the e-motor has a direct benefit over a conventional combustion engine is head-to-head on a stage at high altitude. With a 3% power loss for every 300 metres in height for the ICE, the MGU would have exactly the same power as at sea level. Such details will form discussions in future regulations where there would be a need for a balance of performance, but today the brief to manufacturers - who are forming a queue to get involved - is deliberately open to help drive the change for a carbon-free future.

"I'm excited about the opportunities for this new championship, as part of the DNA of the FIA is to bring in new technology and test it in challenging conditions," says Matton. "We have opened the door to attract newcomers. The first is Audi next year, but from the interest shown from the other manufacturers, I believe there is a really great future for this new championship."

Head first towards safer riding

TEXT / KATE TURNER

05 With more than a quarter of global road traffic deaths involving motorised two- or three-wheelers, ensuring that riders are equipped to mitigate risk is key. The FIA Foundation is helping through the development of national motorcycle helmet coalitions to increase safety for riders and passengers

What does the future of urban mobility look like? For more than half the global population already living in cities, the answer might be 'congestion'.

Two-thirds of the global population will be living in cities by 2050, according to UN Habitat, including megacities, which are typified by unplanned expansion, often with insufficient or non-existent transport options.

The growing popularity of motorcycles, then, is not hard to understand as they are low cost, accessible and able to navigate around congested spaces. And with the rise of gig-economy services like ride-hailing apps and doorstep delivery services, motorcycles are becoming ever more prevalent in cities worldwide.

Currently there are around 270 million motorcycles on the road, but by 2050 the global fleet of motorcycles is projected to account for more than 400 million vehicles representing a 50 per cent increase compared to today, according to UNEP.

The impacts of traffic are significant. In Lagos, Nigeria, for example, the average worker spends 30 hours every single week stuck in traffic, with many leaving before dawn and returning after dark to reach employment. A recent study suggested just a 10 per cent modal shift from single-occupancy cars to motorcycles could reduce time lost in traffic by two-fifths.

Rising motorcycle use poses a wide range of challenges including road safety, with a significant increase in motorcyclist fatalities and injuries in many countries. For example, in Mexico, motorcyclists represented just six per cent of road fatalities in 2000 but today make up a quarter of all road deaths. In particular, helmet use is a major factor in crash fatality rates. Research shows that a motorcycle helmet can reduce the risk of death by 42 per cent and risk of head injury by 69 per cent in a crash. "Use and access to affordable yet quality helmets in low- and middle-income countries such as Kenya has been historically been low, making riders vulnerable to serious injury, in particular head injuries," warns Saul Billingsley, Executive Director for the FIA Foundation. "More than a quarter of global road traffic deaths involve motorised two- or three-wheelers and the rate of fatalities is rising rapidly."

The FIA Foundation is supporting the development of national motorcycle helmet coalitions to increase motorcycle and motorised three-wheeler safety for riders and their passengers, and to support public awareness of and government engagement with the issue.

The first coalition was launched in Kenya, which currently has among the highest road traffic death rates in Africa, with 12,463 road traffic-related deaths reported in 2018, mainly attributed to head injuries. The number of motorcycles has rapidly increased from 738,000 motorcycles and three-wheelers registered in 2013 to almost double that by 2018. Motorcycle taxis are popular in both urban and rural areas. The government also recognises them as an important form of employment but has challenges in terms of regulation. The majority of the country's motorcycles are used as motorcycle taxis, known locally as 'boda boda', and have been part of the country's fleet since the 1990s. "Our industry is an essential and growing element of Kenya's transport system," explains Kevin Mubadi, President of the Boda Boda Safety Association, "but the challenge to access safe, affordable and appropriate helmets means that the number of riders suffering from serious head injuries is on the rise."

While compulsory motorcycle helmet use laws exist, enforcement is currently inconsistent and helmet use is low, with just a quarter of all rural riders reporting that they always use helmets. Boda bodas pose some particular injury risks, with 71 per cent of riders saying that passengers never ask for a helmet, and just 10 per cent of passengers reporting always using helmets.

PROTECTING LIVES

Established by NGO Transaid with support from the FIA Foundation, the helmet coalition project was announced as part of the FIA Safe & Affordable Helmet Programme. The FIA programme has seen the creation of an innovative new high-quality motorcycle helmet which meets UN safety standard 22.05, is comfortable in hot and humid climates, and available at a target selling price of around 20 USD, supported by an initial €1.3 million budget from the Foundation.

"Wearing a helmet is key to protect the lives of two-wheeled riders," says Jean Todt, FIA President and United Nations Secretary-General's Special Envoy for Road Safety. "The FIA Safe & Affordable Helmet Programme is part of the consolidated action of our Federation to make a profound impact on the global road safety challenge.

'A national helmet-wearing coalition has the potential to deliver transformational change'

Promoting helmet use in Kenya (l-r): Kevin Mubadi, AU Commissioner for Infrastructure Dr Amani Abou-Zeid, Jean Todt and NTSA Director General George Njao.

The FIA has partnered with the Michael Schumacher Keep Fighting Foundation to distribute helmets.

In Kenya, Transaid is leading an initial 18-month project to build a network of stakeholders to improve safety and reduce injury nationally. A multi-sectoral approach which seeks to advocate for greater use of helmets will bring together multiple key stakeholders from government, civil society and the private sector, linking the groups that represent the varied and growing economies which use two- and three-wheelers to contribute to developing long-term solutions to improving access to safe, high-quality yet affordable helmets and increasing the rates of helmet wearing across the country.

Sam Clark, Head of Programmes at Transaid, says: "A national helmet-wearing coalition has the potential to deliver transformational change. We are going to be engaging with government, police, hospitals, private sector, transport associations and communities to develop the solutions which make Kenyan journeys safer."

The coalition is expected to take a broad approach to boda boda safety with a view to examining current legislation, ways to improve enforcement, and pilot initiatives that will improve access to good-quality rider training. "We are committed to taking a leading role in the national helmet coalition implementation," says Mubadi. "We welcome the FIA Foundation's funding for the multi-sectoral approach, which will seek to advocate for greater use of helmets to deliver safer Kenyan roads."

For Kenya, as with many fast-developing and urbanising countries, motorcycle use is only going to continue to increase in the years ahead. A vital mode of transport will become ever more important – but so will the mission to ensure that the millions who use motorcycles are protected and lives are saved.

THIERRY BOLLORÉ

Reimagining the classics

TEXT / JUSTIN HYNES

05 *Thierry Bolloré* took the reins at Jaguar Land Rover just over a year ago and his plans to reinvent the brand is taking the classic British marques into uncharted territory. But according to the former Renault CEO the plan will see JLR define the future of modern luxury

In September 2020, when Thierry Bolloré took the helm at Jaguar Land Rover, the legendary British brands were feeling the full effects of the pandemic. By year end, global retail sales were down 13.6 per cent on the previous year. Sales in North America, a key market for both brands, were down 14.3 per cent and in the UK, Europe and overseas, sales were down more than 20 per cent.

If not a full blown crisis – these effects, after all, were being felt across the industry – it was a signal that Jaguar Land Rover, with global sales of just 439,588 vehicles, is a brand that lacks the deep resilience required to face such downturns. And while COVID-19 is an extreme example of system shock, the post-pandemic automotive world is rushing headlong into a paradigm shift accelerated by changed demand patterns and climate change-inspired legislative moves away from JLR's core portfolio of luxury executive sedans, powerful GT cars and diesel-hungry SUVs. Something had to change.

Bolloré has been radical in his approach to that shift in vision. In February, just five months after taking over the role of JLR CEO from Ralf Speth, the Frenchman – who arrived after a turbulent year as Renault CEO following Carlos Ghosn's exit, and on the back of spells at the French company as COO and Chief Competitive Officer and a successful career at Chinese parts manufacturer Faurecia – unveiled a new direction for the historic marques entitle 'Reimagine'.

Billed as a vision of "the future of modern luxury by design" the plan includes JLR becoming a net-zero carbon business by 2039. And to do that it will move to being an all-electric luxury brand from 2025 to 'realise its unique potential'.

"Jaguar Land Rover is unique in the global automotive industry," says Bolloré. "A designer of peerless models, [it has] an unrivalled understanding of the future luxury needs of its customers, emotionally rich brand equity, a spirit of Britishness and unrivalled access to leading global players in technology and sustainability within the wider Tata Group.

"We are harnessing those ingredients to reimagine the business, the two brands and the customer experience of tomorrow. The Reimagine strategy allows us to enhance and celebrate that uniqueness like never before. Together, we can design an even more sustainable and positive impact on the world around us."

Land Rover has fared better than its sister brand recently thanks to strong sales of models such as the Range Rover.

GOING ELECTRIC

At the heart of his Reimagine plan is the electrification of both the Land Rover and Jaguar brands on separate architectures. Over the next five years, six pure electric Land Rover variants will be introduced through its three families of Range Rover, Discovery and Defender with the first all-electric variant arriving in 2024.

At Jaguar, by 2025 the brand will lose all of its petrol, diesel and recently-introduced hybrid models to become a pure electric luxury brand with an entirely new portfolio. Bolloré axed the long-planned XJ replacement and has indicated that rather than occupy a similar market segment to SUVs from rivals Audi, Mercedes and BMW, it will vault into the super-premium EV category, with an entry point not far from €115,000 – well over double the price of the current base model F-Pace, the brand's largest SUV. ‣

JLR CEO Thierry Bolloré has ambitious plans for the two brands, including making Jaguar all-electric.

'When the E-Type got onto the market it was a copy of nothing. That is what we are preparing now'

By 2030, 100 per cent of Jaguar sales and around 60 per cent of Land Rovers sold will be equipped with zero tailpipe powertrains.

Hydrogen power will also be investigated as part of the plan to achieve net-zero carbon emissions across its supply chain, products and operations by 2039, and according to Bolloré development is already underway with prototypes arriving on roads in the UK within the next 12 months as part of the long-term investment programme.

Annual commitments of circa £2.5 billion will include investments in electrification technologies and the development of connected services to enhance the journey and experiences of customers, alongside data-centric technologies that will further improve their ownership ecosystem.

In order to realise its vision the struggling manufacturer will work more closely with parent company Tata Group and its other subsidiaries to "enhance sustainability and reduce emissions as well as sharing best practice in next-generation technology, data and software development leadership".

"We have so many ingredients from within. It is a unique opportunity," says Bolloré. "Others have to rely solely on external partnerships and compromise, but we have frictionless access that will allow us to lean forward with confidence and at speed."

"As a human-centred company, we can and will move much faster, and with a clear purpose of not just reimagining modern luxury, but defining it for two distinct brands. Brands that present emotionally unique designs, pieces of art if you like, but all with connected technologies and responsible materials that collectively set new standards in ownership. We are reimagining a new modern luxury by design."

RISK AND REWARD

The plan is revolutionary. Jaguar's heritage has been built on offering performance and luxury at almost accessible price points. When the E-Type was launched in 1961 the list price of £2097 for the Roadster and £2196 for the Coupe was less than half the price of cars from its rivals, with Ferrari's 250 GT coming in at £6,500 and the Aston Martin DB4 at £4,000. Keen pricing and extravagant performance soon had racing drivers and celebrities flocking to buy an E-Type. Taking the marque out of the spaced marked aspirational and into rarefied realms occupied by the likes of Bentley, Aston Martin and Lamborghini appears risky and some industry watchers have predicted it could be the death knell for the historic marque. Bolloré disagrees.

"It was clear that Land Rover was a fantastic success but still had a lot of potential," he told *Autocar* in July. "Jaguar? It was damaged. The cars were great. They'd never been so good. But their positioning was not appropriate."

Bolloré later told *Auto Express* that while the current line-up of Jaguars are "beautiful cars" they have a problem. "You are wondering why we don't sell more? They go for Audi or they go for BMW. So it's a real issue in the positioning of the brand.

"When Jaguar was incredibly successful, at the time when the E-Type got onto the market, it was a copy of nothing. That is what we are preparing now."

But it seems that one element of Jaguar heritage may not appear in the new range – an E-Type-style GT, with Bolloré indicating that the subject of sports cars was "a big discussion point within the company".

Jaguar's first SUV, the F-Pace, has faced stiff competition from rivals Audi, Mercedes and BMW.

Land Rover's iconic Defender sold in the thousands even as the pandemic took hold.

The plan for Jaguar is enticing, however. It's current SUV model range sits roughly in the same space as Land Rover, though at a lower price point, effectively cannibalising the group's sales. With Land Rover outstripping Jaguar in terms of growth it is a situation the company needed to address.

In 2020, Land Rover introduced the latest iteration of its iconic Defender model and even in the year of the worst effects of the global pandemic sold 29,000 vehicles. With a price range of approximately €60,000-€125,000, the figures head into the tens of billions. Add in a model portfolio that includes the Discovery and at Range Rover the Vogue, Velar, Sport and Evoque, and the success of JLR's other brand is clear.

"Let's look at Range Rover," Bolloré told *Autocar*. "The pricing is very satisfactory and we have impressive volumes. Our positioning for this model is unique. So the thinking with Jaguar is that in future we do the same thing with a range of distinctive, highly desirable electric cars built on a principle of modern luxury – looking forward, not back."

It's a hugely ambitious plan, but one that if successful could see Land Rover continue its impressive growth as a manufacturer of luxury SUVs, while Jaguar transcends its existence completely, entering a new era of ultra-premium electric-powered desirability. It's a risky proposition, but ultimately it's what reimagination entails – sloughing off the old to emerge as something radically different and beautiful. ◂

THOMAS BACH:

Solidarity for the benefit of society

TEXT / JUSTIN HYNES

Since gaining recognition by the International Olympic Committee in 2013 the FIA has worked closely with the Olympic movement on projects that highlight both sporting achievement and community development. And according to IOC President *Thomas Bach*, the work is an example of the new Olympic pillar introduced at the recent Tokyo Olympics – Togetherness

05

Staging the Tokyo Olympics during the pandemic and in the midst of the city's fourth state of emergency was one of the biggest challenges the Olympic movement has faced. How proud are you of the outcome?

The Olympic Games Tokyo 2020 were the Olympic Games of hope, peace and solidarity. These were historic Olympic Games and it took an unprecedented effort from all of us in the Olympic community to make them happen in a safe way.

It was a difficult journey in unprecedented times. Like everyone during this pandemic, we were facing great uncertainty. We had to adapt our strategy and actions day by day in order to make these Olympic Games a reality. We had our doubts and sleepless nights. But we could not share these doubts because with all the uncertainty, they would have become a self-fulfilling prophecy. This may have led to the collapse of the Olympic Games. This weighed on all of us in the Olympic Movement, and it weighed on me personally. In the end, we were rewarded for all our collective efforts in overcoming this uncertainty with the overwhelming success of these Olympic Games.

We could only make the first-ever postponed Olympic Games a success because of the great solidarity of our Olympic community. This was the resounding message that the athletes from 205 National Olympic Committees and the IOC Refugee Olympic Team sent from the Olympic Games Tokyo 2020 to the world: whether in sport, or in the many challenges in life, we are always stronger together.

Because the Olympic Games Tokyo 2020 happened in a safe way, we have shown that even during this pandemic, we can come together and overcome separation. In this way, these Olympic Games gave us the most precious of gifts in these uncertain times: hope.

Can you elaborate on the application of the Olympics' new fourth goal of togetherness? Its application during this time is obvious, but how will it be promoted in the future and what is the Olympics movement's role in fostering community?

This past July, the IOC Session in Tokyo approved a change in the Olympic motto that recognises the unifying power of sport and the importance of solidarity. It has become increasingly obvious that we can only live up to our original Olympic motto of 'Faster, Higher, Stronger' by working together in solidarity. This is why our motto now adds the word 'Together': 'Faster, Higher, Stronger – Together'.

During the global coronavirus pandemic we have learned just how important solidarity is for all humankind in overcoming this and the many other challenges facing the world. The lesson is: we need more solidarity. More solidarity within societies and more solidarity among societies.

Based on this understanding, we have established Olympic Agenda 2020+5, which translates our learnings into action for the Olympic Movement. Sport has great social significance as the glue that bonds communities together. Guided by Olympic Agenda 2020+5, we will create and strengthen partnerships that will allow us to translate our motto into meaningful actions to bring about positive change in peoples' lives through sport.

This power of sport has been recognised when it was highlighted as an important enabler to achieve the United Nations Sustainable Development Goals. We know that we can only make the world a better place through sport together with others. This is why we are partnering with the UN, especially in areas such as peace, health, education, gender equality, climate change and many more. As a global community, we can only make progress on these and other challenges of our times by working together. This is also the vision of Jean Todt, who as the United Nations Special Envoy for Road Safety, is mobilising a wide range of stakeholders to make roads safe for everyone. Solidarity fuels our mission to make the world a better place through sport. ▸

IOC President Thomas Bach wants to work with the FIA and UN to improve global road safety.

This is what the amended motto reflects and this will be implemented through Olympic Agenda 2020+5.

The FIA collaborated with the IOC on the Olympic Virtual Series earlier this year. How does the IOC view the future of digital sport as part of the wider games movement and are motor sport Esports an ideal fit for this future?

This first edition of the Olympic Virtual Series was an innovative way to further reinforce the position of the Olympic Movement in the growing virtual sports and video-gaming space. Increasingly, fans want to take part in the telling of the story of sports. Connected events, like the Olympic Virtual Series, have the opportunity to strengthen our relationship with people and younger generations by making them actors of an Olympic experience, wherever they are in the world.

Digital Motor Sports were indeed part of the programme thanks to a very exciting partnership with the FIA. In particular, the engagement of President Jean Todt was key to have the FIA play an essential role in this inaugural Olympic Virtual Series. Competitors could take part in virtual time-trials that would ultimately lead the best players to face each other in a Grand Finale. We saw a great response from the Digital Motor Sports community who appeared to appreciate taking part in an Olympic event: something the IOC is very keen to reiterate in the future.

Electric karting demonstrations have been held at two editions of the Youth Olympic Games. Could you foresee a time when this sort of competition might feature in the Games?

Rather than being a medal event, the E-karting campaign held at two Youth Olympic Games were aimed at promoting simple and universal tips to make roads safer for all through the FIA's Golden Rules for Road Safety. This was another great initiative of Jean Todt, who clearly saw the opportunity to partner with the YOG in this respect.

With road accidents being the number one cause of death for young people between the ages of 15 and 29 worldwide, these rules and campaigns are especially relevant to the Youth Olympic Games. The E-karting campaign was a great success and very well received by the youngsters participating in the YOG.

Full inclusion in the programme of the YOG is, however, a challenge, since we have to respect limits with regard to the number of participants and to the costs for the host.

The IOC President was proud of how the Olympic community came together to stage Tokyo 2020.

'With its global appeal, the world of sport can make a difference in raising awareness about road safety'

THOMAS BACH

In 2019 the FIA and IOC began a collaboration on the dissemination of road safety information via the Olympic Channel. How important is the IOC's work on road safety with the FIA in the greater picture of the movement's work to benefit communities?

Every day, the health and lives of thousands of children are put at risk through traffic accidents worldwide. This human tragedy comes at a huge cost to society. As an organisation dedicated to making the world a better place through sport, the IOC wants to play our part in making roads safe for children. Making the world healthier and safer for all is a team effort. With its global appeal, the world of sport can make a difference in raising awareness about the importance of road safety. This is why we are joining hands with the FIA to use the power of sport in educating the public about road safety.

In this respect, I would like to salute FIA President Jean Todt, who has made promoting road safety a central pillar of his presidency. His tireless advocacy for a road safety revolution demonstrates that his vision on this topic really transcends motor sport. His leadership on road safety is another illustration of the important role of sport in society. Whether it is promoting safer mobility, championing women in motor sport or working towards achieving healthier lives for everyone, under Jean Todt's great leadership the FIA has shown that it has understood how to make sport a force for good in society.

You are also a member of the FIA's High Level Panel for Road Safety. How valuable is it to have a coalition of leaders from the global business community, international institutions and NGOs in developing solutions to major societal issues?

With the FIA High Level Panel for Road Safety, Jean Todt has assembled an impressive list of leaders from all walks of life, who are advancing this important issue with their passion, engagement and leadership – qualities that indeed Jean has demonstrated throughout his term as FIA President. This is why I am proud to be able to call him a real friend, even beyond sports.

We can only make the world a better place through sport by working together. What is true for road safety also holds true for many other challenges that the world is facing. To address these complex and interconnected challenges, you need to bring together all the actors that have a stake in the issue at hand. Only such a multi-stakeholder approach leverages the expertise and authority of each partner that is needed to find solutions. With its global appeal, sport is ideally placed to build bridges and promote areas of cooperation. If sport can play a role in international relations today, it is precisely in supporting and strengthening such multi-stakeholder cooperation to find solutions to the many challenges the international community is facing. ◂

05

COMPETITION DRIVING THE ENERGY TRANSITION

The FIA has been involved in the global challenge of attaining carbon-free mobility for a number of years, thanks to the contributions of its various championships. AUTO looks at the efforts being made across motor sport to achieve sustainability

TEXT / CAROLE CAPITAINE

To seek, reflect, understand, act and especially anticipate in order to suggest – to propose so as not to suffer. Not to suffer the pollution caused by transport, not to suffer the multiple consequences of climate change, and not to suffer unsuitable regulations for transport. For more than 10 years this has been the credo of Jean Todt, President of the FIA: "Motor sport is a laboratory for the mobility of the future, particularly in terms of the environment." For the Frenchman, motor sport and competition can and must contribute to the mobility of the future. It is in their DNA, even more so today, in the period of doubt and turbulence that the automobile is going through, while the planet suffers as its natural – and especially energy – resources are dwindling. Racing drivers and engineers will help to seek solutions.

"Addressing the environmental challenges facing our planet is a priority for all of us. By reducing our impact on the environment through sustainable innovations, we will improve the transition to a sustainable future," says Felipe Calderón, President of the FIA Environment and Sustainability Commission since 2017, who, after taking office, predicted: "The reality is that there will be a change in regulations; moreover, that process is already underway. The way for us to deal with this is to promote to our clubs and members a better understanding of what is happening, and give them the strategies to better understand the changes to come. It is important that FIA members acquire expertise so as to be able to manage changes in regulation and engage in a constructive dialogue with the authorities. This will help avoid common mistakes regarding over-regulation."

Gilles Simon associates this momentum with the creation of Formula E in 2011 and with Formula 1 regulations that saw the introduction of turbocharged 1.6-litre hybrid power units in 2014.

"Thanks to our commissions, various working groups, our natural curiosity and personal commitment, and our international contacts, we offer certain solutions to manufacturers and promoters, even if it is hard to know what will happen in 2030," admits Simon, former FIA Technical Director during those two key stages, and now a consultant for the federal authority.

Xavier Mestelan-Pinon, who recently succeeded Simon, describes the rich roadmap followed by the FIA and all those involved in this ecologically responsible quest: "In WEC, the hybridisation of the LMP1 category allowed fuel consumption to be significantly reduced [from 2010 to the arrival of the most mature LMP1 hybrids in 2019, fuel consumption was halved]; hydrogen, in the future, is a proposed path [for a zero-emission competition with the MissionH24 programme of the ACO and GreenGT]. In the WRC, hybridisation will be introduced in 2022. In World RX, electrification has been introduced as in Pure ETCR.

"We recently presented e-GT, which appeals to multiple manufacturers, testifying to the alignment between our suggestions and the needs of manufacturers. The Dakar and the new FIA World Rally-Raid Championship are opening up to many responsible technological opportunities. The new generation of Formula E testifies to the progress made over the last seven years thanks to the competition over charging, range, power.... In F1, the new power unit regulations [for 2025 and beyond] look promising. This phase of research, development and gestation is particularly stimulating.

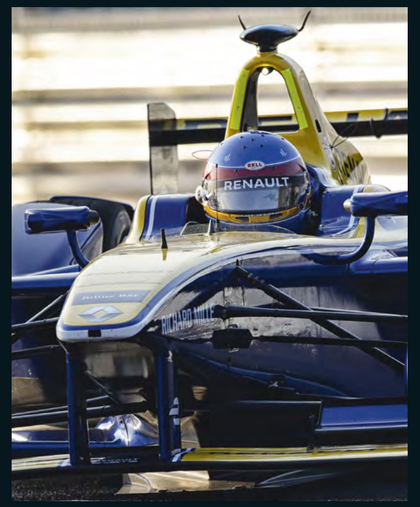
"Sport is a great driver of mobility. There is not one solution but several. All-electric, hybrid, hydrogen with fuel cell or with combustion engine... Each of our championships is a great technological laboratory for stakeholders in the automotive world. We explore all fields of possibilities, with our long-time partners but also with new skills that some of these new and future technologies require. For example, we are in contact with Ariane Espace, energy companies, as well as legislators and institutions."

Formula 1's switch to hybrid power units in 2014 was a key stage for the FIA in its sustainability drive.

RENEWABLE SOURCES

Before demonstrating the results of its research on race circuits as well as more institutional paths, the FIA follows various lines of work, whatever the championship or racing machine. "The powertrain, aerodynamics, weight, brakes, tyres, fuel, and the nature of the materials used are all parameters on which we intervene to reduce energy consumption as well as emissions," explains Bruno Famin, Director of Operations in the Sport Division.

A renewable fuel label (from second-generation or synthetic biomass) has been introduced by the FIA with the aim of adopting these fuels in all championships (except 100 per cent electric). Thus, the European Truck Racing Championship has innovated this year by using a fuel produced from renewable sources, with the latest generation of fuel from hydrogenated vegetable oil produced synthetically for racing machines. ‣



Above: Formula E has made progress in electrification sinceits launch, while F1 has promising new power unit regulations in development.

Right: The new FIA World Rally-Raid Championship will promote technical innovation.

The new eGT series is attracting strong interest from manufacturers.

Hybridisation of the LMP1 category has helped drive down fuel consumption in WEC.

'Each of our championships is a great technological laboratory for the automotive world'

For a lower impact on CO_2 emissions, the pace truck that will lead the field at events is an Iveco S-Way NP running on bioLNG (bio liquefied natural gas). In the WEC – and in particular at the 2022 Le Mans 24 Hours – TotalEnergies will offer a 100 per cent renewable competition fuel, Excellium Racing 100, produced on the basis of bioethanol, sourced from wine residues from French agriculture, and ETBE (ethyl tertiary butyl ether) produced using raw materials also from the circular economy. This fuel should allow an immediate reduction in CO_2 emissions of at least 65 per cent from the cars on track.

"For F2 and F3, we are looking at the use of renewable fuel by 2023, and then it will be F1, which requires some additional adaptations," says Nikolas Tombazis, head of F1 and single-seater technical regulations at the FIA. "F1, for the 70 years that the world championship has existed, has contributed to many advances both in terms of safety and performance. Today, with the cars still as competitive as ever, our objectives are to limit budgets and use technologies that contribute to the defence of the environment. The next Model of Power Unit F1 will illustrate this commitment. Aerodynamics will also consume less. We need to be leaders on all this research."

GLOBAL REACH

In 2020, the ABB FIA Formula E Championship became the first international sport to achieve carbon neutrality certification since its inception, thanks to investments in certified climate conservation projects in all racing countries to offset the emissions produced in the first six seasons of racing. The race format also allows reduced consumption, as does the composition of the annual calendars worldwide. As this quest for sustainable mobility is global, the FIA is of course also developing, for example, a framework for the deployment of these new energies. It thus draws up sporting regulations that are necessary for the competition, just like the safety rules.

"The work is extensive," enthuses Mestelan-Pinon. "It is a question of ensuring safety, not only of the cars but also in the pits, for storage as well as refuelling, and that of the drivers, marshals and spectators. And lastly, we also need to define the technical specifications of these structures, which most of the time are as yet non-existent on the circuits or in the service parks for rallies and Cross-Country."

Recently, Toyota fielded a hydrogen-powered car, a Corolla H2, at the Fuji 24 Hours. Its entry was made possible thanks to the safety process put in place by the FIA, which is also dedicating time to the MissionH24 programme of the ACO and GreenGT for the introduction of a category dedicated to hydrogen-electric prototypes at the 2025 Le Mans 24 Hours. Everything is to be built by and thanks to motor sport. A challenge that can serve as a trigger for all the billion-euro hydrogen plans recently announced by many European, American or Asian states. Sport, a driver of progress, does not mark time! ◂

The progress on track /

Formula E has been a fruitful laboratory for the development of car battery technology.

FIA Formula E World Championship
After Gen 1, which appeared in 2014 when this first all-electric, single-type formula was created, Gen 3 will be introduced in competition for the 2022/2023 season, the ninth edition of the electric championship. While two cars (and two 28kWh batteries), with a pit-stop to change machines, were needed initially in order to cover the race distance (45 minutes), the range of one single-seater's battery is now sufficient, in parallel with a v ery significant increase in performance. The progress made through competition is concrete: it concerns range, charging, weight and regeneration. Power will be increased to 350kW (475hp) as opposed to 250 at present, with a fast charge possibility at 600kW for 30 seconds.

FIA Formula 1 World Championship
As the flagship discipline of the motor racing world, F1 testifies to the progress made by motor sport in terms of energy consumption. Fuel consumption, in kilos per race, has decreased sharply over the past 30 years, for equally efficient machines (1000 horsepower today). In the 1990s, an F1 car consumed an average of 174kg of fuel per race. In 2005, this consumption fell to 150kg, then 130 in 2008 to reach 114kg today (V6 turbo 1.6-litre hybrid engine). The future target, with the next regulations, is 70-80kg, representing a decrease of more than half. Hybridisation (limited to 120kW), tyres and aerodynamics have allowed this virtuous evolution. The next generation of F1 will also use 100 per cent renewable fuel. Currently, PU efficiency is between 45 and 47 per cent depending on the competitor.

FIA World Rally Championship
In 2022, the WRC will run a common hybridisation system, which can be used on road sections (in ZEV mode) and on special stages. The power provided by the electric motor will be 100kW, and the 3.9kWh lithium ion battery will be recharged by regeneration and plug-in at the service park. The combustion engine will use a 100 per cent renewable fuel.

FIA World Endurance Championship
After hybridisation appeared in 2012, endurance racing has been able to record significant reductions in fuel consumption – by almost half. In 2022, a 100 per cent renewable fuel will be used. The hypercar continues this work of 'democratising' the hybrid system. In 2025, a category dedicated to hydrogen will be introduced, with a common chassis for manufacturers, with the research effort for the latter being focused on the fuel cell.

FIA World Rallycross, Electric GT, Pure ETCR
Full electric power is either arriving in or being specified for these disciplines. Whereas next year, for its spectacular starts, the World RX will use the 'all' electric power (500kW) suitable for this type of performance, and Pure ETCR will have an FIA eTouring World Cup in 2022, eGT is intended for supercar manufacturers, with machines with a maximum power of 430kW powered by batteries with a capacity of 73kWh and accepting a fast charge at 700kW.

FIA World Rally-Raid Championship
Besides safety constraints, new technologies are being studied and welcomed. Hydrogen, full electric or hybrid projects are in preparation. The objective: range and refuelling on special stages and at the bivouac. Promoter ASO has said that by 2030 all cars entered will be powered by low-emission energies.

05

HEEDING FAIR WARNINGS

TEXT / JUSTIN HYNES

While research shows that motor sport remains largely unaffected, the FIA is taking steps to protect its competitions

At its most essential sport is about fair competition between rivals adhering to a carefully considered set of rules that provide for dispute and ensure a level playing field.

According to the legal definition established at the Council of Europe Convention on the Manipulation of Sports Competitions in 2014, competition manipulation or match-fixing is "an intentional arrangement, act or omission aimed at an improper alteration of the result or the course of a sports competition in order to remove all or part of the unpredictable nature of the sports competition with a view to obtaining an undue benefit for oneself or for others."

Match fixing is when the result of a tournament or competition is partially or completely decided in advance and the match is played to ensure a pre-determined outcome. This is against the rules of the game and often the law. The most common reason for match-fixing is to obtain a pay-off from gamblers, but teams may also intentionally perform poorly to gain a future advantage, such as a better draft pick or, on paper, a less eminent opponent in a play-off.

Competition manipulation occurs when a participant in a sports competition, for example an athlete, a coach, a referee, knowingly underperforms or deliberately makes decisions that affect the result or course of a competition, in order to obtain an undue benefit, usually a sporting or financial benefit. At its extreme the threat of manipulation involves predetermining the outcome of an event, but manipulative behaviour extends right down to the use or dissemination of 'insider' information to profit from gambling either personally or by proxy.

Between the start of the pandemic in April 2020 and October of this year, Sportradar Integrity Services, a global supplier of sport integrity solutions and partner to over 100 sports federations and leagues, including the FIA, detected more than 1,100 suspicious sports competition, with 655 of those detected in the first nine months of 2021.

During that time Sportradar utilised its bet monitoring system, the Universal Fraud Detection System (UFDS), to detect suspicious activity in 12 different sports across more than 70 countries worldwide.

Andreas Krannich, Managing Director, Integrity Services at Sportradar said: "Match-fixing is evolving, and those behind it are diversifying their approach, both in the sports and competitions they target, and the way they make approaches to athletes, such as the rise in digital approaches."

REGULATION AND EDUCATION

Motor sport has largely been free of manipulation, however the FIA is vigilant in its efforts to prevent possible transgressions, through regulation and education. Appendix M of the FIA International Sporting Code sets out a regulatory structure that includes competition monitoring, restrictions on betting by competition stakeholders, prohibition of financial inducements aimed at the manipulation of outcomes, prevention of conflicts of interest, reporting obligations and sanctions.

The regulations also provide for awareness-raising and training programmes for Competition Stakeholders, especially for young licence-holders, on the risks of the Manipulation of Competitions and disseminate all relevant information.

In order to fulfil this part of the regulations, the FIA recently launched a dedicated e-learning platform, #RaceAgainstManipulation, to raise awareness of the risks of competition-fixing.

The latest development of a long-running partnership with Sportradar Integrity Services that includes monitoring of events with its Fraud Detection System (FDS), the ramtutorial.fia.com platform consists of a 30-minute tutorial during which participants learn what constitutes competition manipulation, how to identify the behaviour of competition fixers, become informed of their obligations and duty to report, and learn about the serious consequences arising from breaches of regulations. After completing the tutorial, participants will receive an FIA certificate.

"Safeguarding the integrity of motor sport worldwide is of paramount importance," said FIA President Jean Todt. "No reports of betting manipulation in motor sport have been received to date but we must be vigilant. And the best way to achieve this is through education. #RaceAgainstManipulation will help stakeholders to recognise potential threats, assist them in the reporting of misconduct. It is an essential tool in the fight to maintain sporting integrity and I advise everyone involved in our sport to use it."

Experts have found that competition-fixing is happening more through digital approaches.

FIA championship competitors have have been briefed about its new match-fixing campaign.

Online tutorials for those involved in motor sport aim to educate them about the risks of competition-fixing.

'No reports of betting manipulation in motor sport have been received but we must be vigilant'

FIA PRESIDENT JEAN TODT

FIA President Jean Todt is determined to safeguard motor sport's integrity against match-fixing.

FIA Secretary General for Sport, Peter Bayer added: "This user-friendly platform is a milestone for the FIA and the motor sports world as it will help raise awareness of the specific contents of the International Sporting Code on this topic and in particular what competition manipulation means in an informative and entertaining approach."

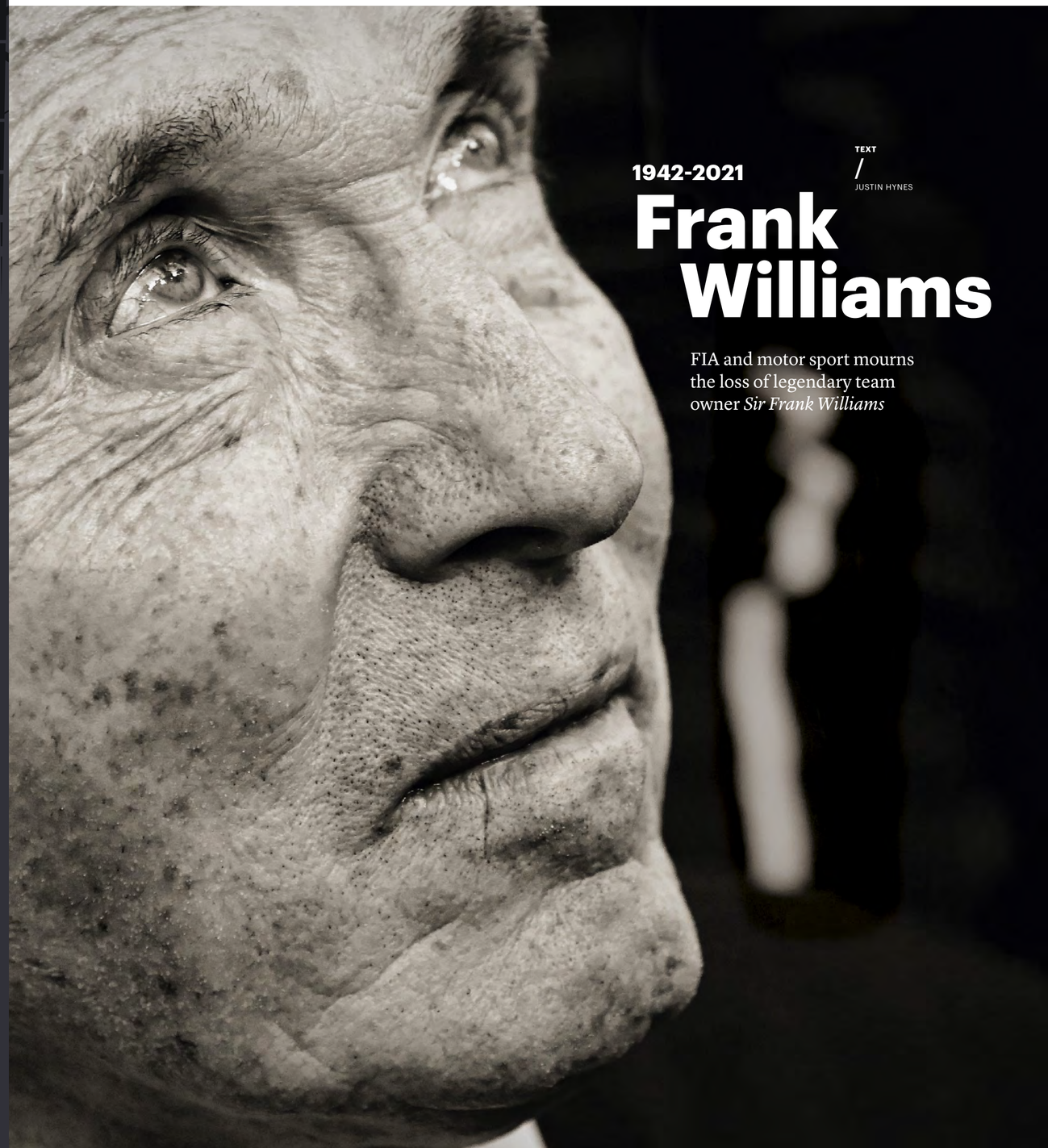
RAISING AWARENESS

#RaceAgainstManipulation is targeted at drivers competing in national and international competitions, team personnel, officials, volunteers, event organisers and FIA staff and consultants, as well as the wider motor sport community including national sporting organisation (ASN) staff and consultants, media and fans around the world. Through this initiative, the purpose of the FIA is to have the largest possible reach.

Awareness-raising around the issue of sports manipulation and the e-learning platform is now being extended to presentations to competitors in FIA championships. In August of this year, drivers taking part in the FIA Formula 1 Belgian Grand Prix were given a briefing on the contents and use of the #RaceAgainstManipulation platform.

Pierre Ketterer, head of the Governance, Integrity & Regulatory Department of the FIA, the department responsible for Appendix M of the ISC and the development of the e-learning platform is confident that the combination of regulation and education will help maintain the integrity of motor sport

"Motor sport has a tremendous history of great sportsmanship and thankfully does not have an issue with manipulation, but given the growing threat seen worldwide we have to be vigilant," he concludes. "The FIA is committed to providing participants with a level playing field and giving fans a competitive spectacle, they can trust. #RaceAgainstManipulation will help us ensure that is the case."



1942-2021

Frank Williams

FIA and motor sport mourns the loss of legendary team owner *Sir Frank Williams*

TEXT / JUSTIN HYNES

06

The FIA has paid tribute to Formula 1 legend Sir Frank Williams who passed away recently at the age of 79. Across a six-decade career in motor sport, the founder of the Williams F1 team won nine FIA Formula One World Championship Constructors' titles and seven Drivers' titles, scoring 114 grand prix victories.

The news of his death was announced in a statement issued by the Williams team. "It is with great sadness that on behalf of the Williams family, the team can confirm the death of Sir Frank Williams CBE. Sir Frank, passed away peacefully surrounded by his family. We pay tribute to our much loved and inspirational figurehead. Frank will be sorely missed."

Honouring Sir Frank, FIA President Jean Todt said: "Sir Frank Williams leaves a lasting impression on the history of F1. He was a pioneer, an exceptional personality and an exemplary man. On behalf of the entire FIA Community, our thoughts are with his family, friends and with Williams Racing. Rest in peace, my friend."

Formula 1 CEO Stefano Domenicali said: "He was a true giant of our sport who overcame the most difficult of challenges in life and battled every day to win, on and off the track. His incredible achievements and personality will be with etched on our sport forever. My thoughts are with all the Williams family and their friends at this sad time."

A salesman by day, Williams fulfilled his racing ambitions at the weekend and, aged just 24, he launched his own team, Frank Williams Racing Cars. Four years later, they were competing in Formula 2 and Formula 3. In 1969 he purchased a Brabham BT26A chassis, with which flatmate, friend and driver Piers Courage finished second in Monaco and at the US Grand Prix.

But tragedy struck at the 1970 Dutch Grand Prix when Courage ran off the track, one of his front wheels hit his helmet, and his car burst into flames. Williams continued to race in Formula 1 with intermittent success in the following years but eventually he was forced to sell 60 per cent of his team to Canadian businessman Walter Wolf in 1975. The relationship soured and Williams left the team.

In early 1977 Williams set up shop at an old carpet warehouse in Didcot, Oxfordshire and signed a promising young engineer by the name of Patrick Head. Together they would go on to make grand prix history as Williams Grand Prix Engineering.

The new team made its F1 debut at the 1977 Spanish Grand Prix and two years later scored its first win at the 1979 British Grand Prix. Alan Jones brought the team its first Drivers' title in 1980 while the team to its first Constructors' Crown in the same year and Keke Rosberg won the 1982 World Championship.

In 1983, the team began a new relationship with Honda which would lead to Constructors' World Championship success in 1986 and 1987, with Nelson Piquet taking the 1987 Drivers' title.

Tragedy struck in 1986, however, and Williams' life would change forever. Following a test at the Paul Ricard circuit in March, Williams set off on the almost 150-kilometre drive to Nice Airport. Travelling along the twisting roads at speed, Williams lost control and the car ended up on its roof following a 2.5-metre drop into a field.

Williams' passenger, the team's marketing manager Peter Windsor, escaped with minor injuries. But Williams suffered a spinal fracture which would leave him in the wheelchair for the rest of his life.

"I was late for a plane, which I didn't need to be late for because I got the French time mixed up with the English time," explained Williams several years later. "The roads were bumpy, the hire car was not the world's best, and suddenly I was off the road upside down and with a broken neck.

"It was very unfair on my family, particularly my wife, because of how my circumstances changed. In hindsight, it was a careless and a selfish thing to have done."

Despite his life-changing injuries and Williams was back at the helm of his team within nine months and set about masterminding his team's most successful era.

The Williams-Honda team was dominant in 1986 and 1987 with Nelson Piquet and Nigel Mansell and after Honda departed for McLaren,

A new partnership with Renault was even more successful, with the team winning World Championships in the early 1990s with Nigel Mansell and Alain Prost.

There was further tragedy in 1994 when Ayrton Senna was killed at Imola but the Williams team recovered and continued its winning streak with Damon Hill and Jacques Villeneuve, who became World Champions in 1996 and 1997 respectively. While the 1997 title remains Williams' most recent, it continued to win grands prix throughout the first decade of this century and scored its most recent win at the 2012 Spanish Grand Prix.

'Sir Frank Williams leaves a lasting impression on the history of Formula 1'

FIA PRESIDENT JEAN TODT

Below: Piers Courage driving for Frank Williams Racing Cars at the 1969 Monaco Grand Prix .

Left: Alan Jones on his way to the 1980 title.

Left: Nigel Mansell with Frank Williams during the dominant 1992 season.

Above: FIA President Jean Todt paid tribute to the team owner.

Left: Patrick Neve gave Williams Engineering its debut at the 1977 Spanish Grand Prix.

Right: Damon Hill won the 1996 Championship for Williams.

Tragedy struck the Williams team when Ayrton Senna was killed at Imola in 1994.

Nino Vaccarella's racing talent caught the attention of Enzo Ferrari, who failed to lure him away from his beloved Sicily.

NINO VACCARELLA:

The flying headmaster

06

For school teacher *Nino Vaccarella,* motor sport was an "adventure holiday" best enjoyed on the roads of Sicily or La Sarthe. But the Italian, who recently passed away, was a truly gifted driver whose pursuit of racing purity made him a legend to millions

TEXT
/
PINO ALLIEVI

Something non-Italians might not realise is that, for many years, the most popular driver in the Italian racing world was Nino Vaccarella. In fact, he was idolised in the south of the country, especially in Sicily, while merely respected and admired everywhere else.

To understand why, you have to know a bit about a strange social phenomenon, with its roots in an ancient culture. Essentially, while the south of the country was poor and technologically bereft, its inhabitants often embraced racing with a passion. Vincenzo Florio created the Targa in 1906 when Sicily was predominantly an agricultural area which was looking to create its own identity after being ruled by Greeks, Romans, the Byzantines, Arabs, Normans, Spanish and Hapsburgs.

At the same time anything with futuristic connotations was eagerly embraced. Florio was an industrialist and shipping magnate, charismatic and elegant. He liked to dress in white suits, finished off with a Panama hat on his head and a big cigar clenched between his teeth. He organised the Coppa Florio in Brescia, which was the forerunner to the Italian Grand Prix. Then came the Targa Florio, an event which would be impossible to stage today with its 72 kilometre route that ran through cities, ancient towns, up mountains, through villages and fields, and endlessly beautiful backdrops. The crowd? Between half a million and 700,000 people would turn out to watch.

Antonino Vaccarella was the standard bearer for this, the oldest race of all. He was born in 1933 and died at the ripe old age of 88, first taking part in the race in the early '60s. He won it three times and regretted that he could have won a further three but for some bad luck.

Vaccarella was not a crowd-pleaser. He was not a fashion icon like Hamilton or an ascetic like Senna, neither did he dominate totally like Schumacher, nor was he a charmer like Piquet. Instead he was a refined gentleman at the wheel, very cultured, with a law degree, and came from a respected middle class family. His father was a man of letters who established the first private school in Sicily. After his parents died, Nino became the headmaster and would attend to these duties in between racing.

ORDINARY AND EXTRAORDINARY

Only someone as well organised and calm as Vaccarella could have balanced two such unlikely roles. He was phlegmatic and could be subtly ironic. He gave out the impression of never having been stressed, even during the most frenetic moments. He possessed an aura of calm in a sport where panic and haste would often catch people out.

"I loved both activities," he said. "At school, I mainly looked after the administration and going racing felt like an adventure holiday. I raced everywhere, on almost all the continents, ▸

Victory at Le Mans in 1964 was shared with Jean Guichet in a Ferrari 275P.

The last of three Targa Florio wins came in 1975 in an Alfa Romeo 33 with Arturo Merzario.

but afterwards it was nice to come back home because it meant I could immerse myself in the everyday problems of ordinary people."

So normal in fact that his phone number was always in the Palermo phone book, so that anyone could ring him, although no one ever did, not quite believing it could be the racing hero. But behind this ordinary exterior he was sharp as a tack, able to size people up with just one glance, assessing their strengths, weaknesses, character and habits. So it was a pleasant task, over the years, to get him to recall the people who had most impressed him – for example, Enzo Ferrari.

"I first went into his office in mid-1962 and I was struck by how dark it was and by his stentorian handshake, the way that, behind those dark glasses, he was scrutinising me, as if to see inside me." Or Huschke von Hanstein, Porsche's racing director among many other roles. "He was a great expert on racing and that was all he talked about to ensure he wasn't asked about Germany during the war." Then there were his thoughts on Volpi di Misurata, who signed him to Scuderia Serenissima: "He was obsessed with racing, there was no handbrake."

When Vaccarella decided to take up racing, he started with his father's Fiat 1100. It was 1957 and, in Sicily, hillclimbs and circuit racing were flourishing. But it soon became apparent that he needed something more to fight with the best. He therefore acquired a Lancia Aurelia GT, and with it he took his first win in the Bellacampo-Passo di Rigano and also got himself noticed in the Messina 10 Hours. Vaccarella tackled and retired from his first Targa Florio. It hurt, because this was the race that got him into racing. The garage next to his home was where the great drivers would meet prior to the event: Fangio, Castellotti, Musso, Ascari, De Portago... they all contributed to Nino's dream and that was the start of it.

In 1959, Vaccarella joined Mimmo Dei's Scuderia Centro-Sud and drove a Cooper-Maserati F1 car to win the Catania hillclimb on Mount Etna. Then, at the wheel of a Maserati 2000, he won most of the races, including the Sassi-Superga hillclimb, having towed his race car the 1000 kilometres from Palermo to Piedmont. He was accompanied by his friend Raimondo Mirabella, a professor of art history, who took on the role of 'mechanic'. Having won, the headmaster and the professor visited an exhibition of paintings in Turin.

The year 1960 was when he became more or less a professional driver, signing a contract with Maserati, extending his agreement with Scuderia Serenissima, as well as tackling a Formula 1 Grand Prix at Monza in 1961. On that day, marred by the Von Trips tragedy, Vaccarella was at the wheel of an uncompetitive De Tomaso-Alfa Romeo. His bravura at the wheel was evident and his skill on show every time he raced.

A HERO'S WELCOME

He had got himself noticed and for the 1962 Targa Florio he was entrusted with a works Porsche, which he shared with Jo Bonnier. His pace in the 718 TS61 was out of this world: two to four minutes faster per lap than his Swedish team-mate and big names such as Graham Hill and Dan Gurney. But the Porsche was no match for the two far more powerful Ferraris and he finished third.

The Old Man noticed, however, and handed Vaccarella a 'part-time' contract. It would be a rewarding relationship with wins in prestigious races such as the Nürburgring 1000Kms, the Sebring 12 Hours with Luigi Scarfiotti, the Le Mans 24 Hours with Jean Guichet and the Monza 1000Kms with Lorenzo Bandini. There were many other wins, including of course the unforgettable 1965 Targa Florio.

A few days after this triumph, Vaccarella and a friend were driving through Collesano, which had been a crucial point in the race. The road was blocked by a procession celebrating the Feast of the Virgin Mary. When the people realised that, stuck in the traffic, was the past Sunday's hero and race winner, they rushed towards him and carried him aloft to the church in the main square, while the 'Madonna' was left forgotten in a corner.

Monza 1961: Vaccarella's De Tomaso-Alfa Romeo was uncompetitive, but his skill shone through.

Vaccarella went on to win many more races, including the Targa in 1971 and '75, the last time when he was 42 years old in an Alfa Romeo 33. Strangely, however, the Targa was not Nino's favourite event.

"By a long way, I preferred racing at Le Mans, because I loved fast tracks where your foot is always pushed hard on the throttle," he recalled. "The Targa was all about daring and balance. It was very physical and sometimes, unexpectedly, you could come across a flock of sheep or cows standing in the road. In the race, in the villages, you could find someone crossing the road when you were doing 200mph. It was risk all the time. But tackling the high-speed corners at Le Mans was just a pure pleasure. And winning in 1964 with Jean Guichet, who always had beautiful women in tow, was one of the most satisfying wins."

Enzo Ferrari entered Vaccarella in just one F1 Grand Prix, at Monza in 1965, which ended in retirement, preferring to keep him occupied with endurance races. But he did want Vaccarella to drive for him on a full-time basis. "He put a proposal to me at Maranello one foggy day in winter when I had travelled from sunny Sicily. Ferrari wanted me to live in the Emilia region. I told him I could only dedicate myself 50 per cent to racing as I didn't want to leave Sicily, nor my school, and the discussion ended there and then."

Vaccarella spent a lot of his time over the years with his son Giovanni, who had gone down a different motor sport route, competing in rallies. Unfortunately, a terrible accident while testing left him unable to move his legs. Nino was always with him and they would watch every Grand Prix on television together.

"We never missed one," he said a few months back. "I have to say I find the modern car technology fascinating. There's one driver I like a lot, Lewis Hamilton. He seems above the norm because, although it's true the Mercedes is usually very competitive, he can also win when his car is not the best. That's how you recognise a real champion."

Right up until the end, Vaccarella would drive friends and VIPs around the Madonie course, of which he knew every inch, including where the road surface changes were. "I think I must have driven the Targa course at least 500 times, totalling around 36,000 kilometres, and yet I never tire of it."

Out on these drives, he would always be recognised, treated like a cross between a rock star and a deity. He would smile benevolently at this show of affection and commented: "I took part in over 120 races and I was always happy. But eventually I began to feel the loss of friends like Bonnier, Bandini, Scarfiotti, Giunti and Parkes. We were rivals on track, but off it relations were friendly and we spent many enjoyable hours together. Yes, we really had fun, but maybe the world was different then."

True, and the real difference was that there were people like Nino Vaccarella. ◂

'I was struck by the way that, behind those dark glasses, Ferrari was scrutinising me, as if to see inside me'

NINO VACCARELLA

Vaccarella was adored by his Italian fans, particularly in the south of the country. Above: The teacher-racer was calmness personified.

06

Priceless prancing horse

TEXT / JUSTIN HYNES

Born in troubled times for Ferrari, the 250 GTO went on to dominate sports car racing in the early 1960s. A decade later, obsolete and undesirable, it was changing hands for less than $10,000. But with incredible history and stunning looks, the car originally called '*Il Monstro*' has gone on to become the world's most expensive car

In 2018 automotive history was made when David MacNeil concluded the private purchase of what is believed to be the world's most expensive car. The founder and CEO of IMSA sport car series sponsor WeatherTech paid a staggering $70 million to join one of the world's most exclusive clubs, as an owner of one of just 39 Ferrari 250 GTOs to be built and remain extant.

That aficionados of classic racing machinery merely offered a sage nod at the stratospheric price tag tells you all you need to know about the GTO, a car routinely described as Ferrari's greatest creation, a machine of such stylistic and mechanical purity that just shy of 60 years after its creation it has transcended the relative mundanity of function to take on an elevated existence as both icon and artwork.

Development of the Ferrari 250 GTO began as early as 1960, with sports car design chief Giotto Bizzarrini tasked with using the existing 250 GT as the basis for a new machine that would meet the Group 3 challenge expected from other new cars being developed by Jaguar (E-Type) and Aston Martin (DP214). ▸

Considered by many to be the world's most beautiful car, the Ferrari 250 GTO was also a GT title winner.

The powerplant used was Giacchino Colombo's venerable but tried and trusted Tipo 168 Comp/62 60º V12, a twin overhead camshaft, 2,953cc unit that was now putting out 300bhp.

Bizzarrini, working at the racing department known as *Controlli, Collaudie e Sperimentazione* (Controls, Tests and Experiments), created a rough prototype called Papera from his own 250 GT Boano chassis, building a car that was as low to the ground and as aerodynamically efficient as possible. The engine was moved lower and further back providing scope for a sleek, new fastback body. Aerodynamic experiments focused on reducing lift at the front and improving downforce at the rear.

The new car was tested for the first time at Monza in 1961 with Stirling Moss and Willy Mairesse at the wheel. The tests revealed that the new design was a significant step forward in every area over the existing 250 GT SWB Berlinetta and the Sperimentale, which raced at Le Mans in 1961 and is often cited as an early testbed of the GTO. Moss was impressed enough to order a GTO in light green for the following year and it was only his terrible accident at Goodwood in Easter 1962 that prevented him from racing chassis number 2643 anywhere other than a three-hour race at Daytona early in '62.

A RARE BEAUTY

However, while progress was encouraging, the development of the new 250 was not without difficulty, most notably when Bizzarrini exited Ferrari in the infamous 'palace revolution' that almost brought the company to its knees.

With Enzo Ferrari taking a withdrawn role in the wake of his son Dino's death, the Commendatore's wife Laura became an ever more prominent, influential and some say tyrannical presence in Maranello, often to the frustration of senior personnel.

One of the most discontented was sales manager Girolamo Gardini and in 1961 he presented Enzo Ferrari with an ultimatum that either Laura retreat or he would leave. There would only be one winner.

Gardini left the company but in the wake of his departure senior personnel including technical director Carlo Chiti, team manager Rovolo Tavoni and Bizzarrini penned a letter to Ferrari opposing Gardini's dismissal. The result was a mass exodus with eight of the team's influential engineers leaving the company. Some predicted the end of the Scuderia.

Ferrari was made of stern stuff, however, and rather than capitulate to the demands of his employees he set about rebuilding. He brought in 26-year-old Mauro Forghieri as technical director and together with designer Sergio Scaglietti the pair were tasked with finishing work on the 250 GTO. "We got rid of the generals," he told his new recruits . "Now you corporals must take charge."

Forghieri and Scaglietti set about refining the design of a car initially dubbed '*Il Monstro*' and over time the latter shaped it into a thing of rare beauty. More testing was undertaken with Moss's work being added to by Giancarlo Baghetti, Lorenzo Bandini and Mairesse. The price tag for the production car was €16,000 (around €135,000 today) and only buyers personally approved by Enzo would be allowed to pay for one. Just 39 examples would be built.

The first 250 GTO was shown to the media during Ferrari's annual press day on 24th February, 1962. Known internally as Comp.62, it was English journalists who first referred to the car as the GTO, and though it was unofficial the name stuck, with GT standing for *gran turismo* and O for *omologato*.

The GTO was finally ready for the track. It made its racing debut at the 1962 12 Hours of Sebring driven by Phil Hill, who at the time was the reigning Formula 1 World Champion, and Olivier Gendebien. Up against a fleet of Corvettes, a Jaguar E-Type, various Porsches, MGs, Maseratis and a dozen Ferraris, the GTO won its class and placed second overall behind a Ferrari Testa Rossa driven by Jo Bonnier and Ludovico Scarfiotti – and a new era was born.

The GTO was equally successful in the 1962 FIA International Championship for GT Manufacturers cars. With the Lightweight E-Type and DP214 not yet ready, the new Ferrari utterly dominated, scoring maximum points in the over two-litres class.

During the fifth round, at the Le Mans 24 Hours, GTOs placed second and third overall behind the winning Ferrari 330 TRI/LM, with Pierre Noblet and Jean Guichet in the lead GTO ahead of Leon Dernier and Jean Blaton. Guichet, in his twilight years, told *Road and Track* magazine: "The GTO is one of the most beautiful racing cars ever made. Fast and one of the only multi-purpose racing cars. The GTO was perfect whatever the conditions and the type of race."

Mike Parkes at the wheel of a Maranello Concessionaires GTO during the 1963 Tourist Trophy at Goodwood.

'The GTO is beautiful and was perfect, whatever the conditions and the type of race'

Ferrari new boys Mauro Forghieri and Sergio Scaglietti refined the GTO's design.

COLLECTORS' FAVOURITE

The GTO went on to win the GT World Championship in 1963 and '64. During its time various chassis were raced by some of the sport's greatest drivers. Moss, Mairesse, Bandini, Innes Ireland, Masten Gregory, Nino Vaccarella, Chris Amon, Mike Parkes and Richie Ginther all took their turn at the wheel of Bizzarrini and Scaglietti's stunning design. But by the end of 1965, when it was bested by Carroll Shelby's Cobras, it's time as a racing machine was done.

The GTO story might have ended there. By the early 1970s US raced cars were being advertised for sale for less than $10,000 as demand for an obsolete competition waned.

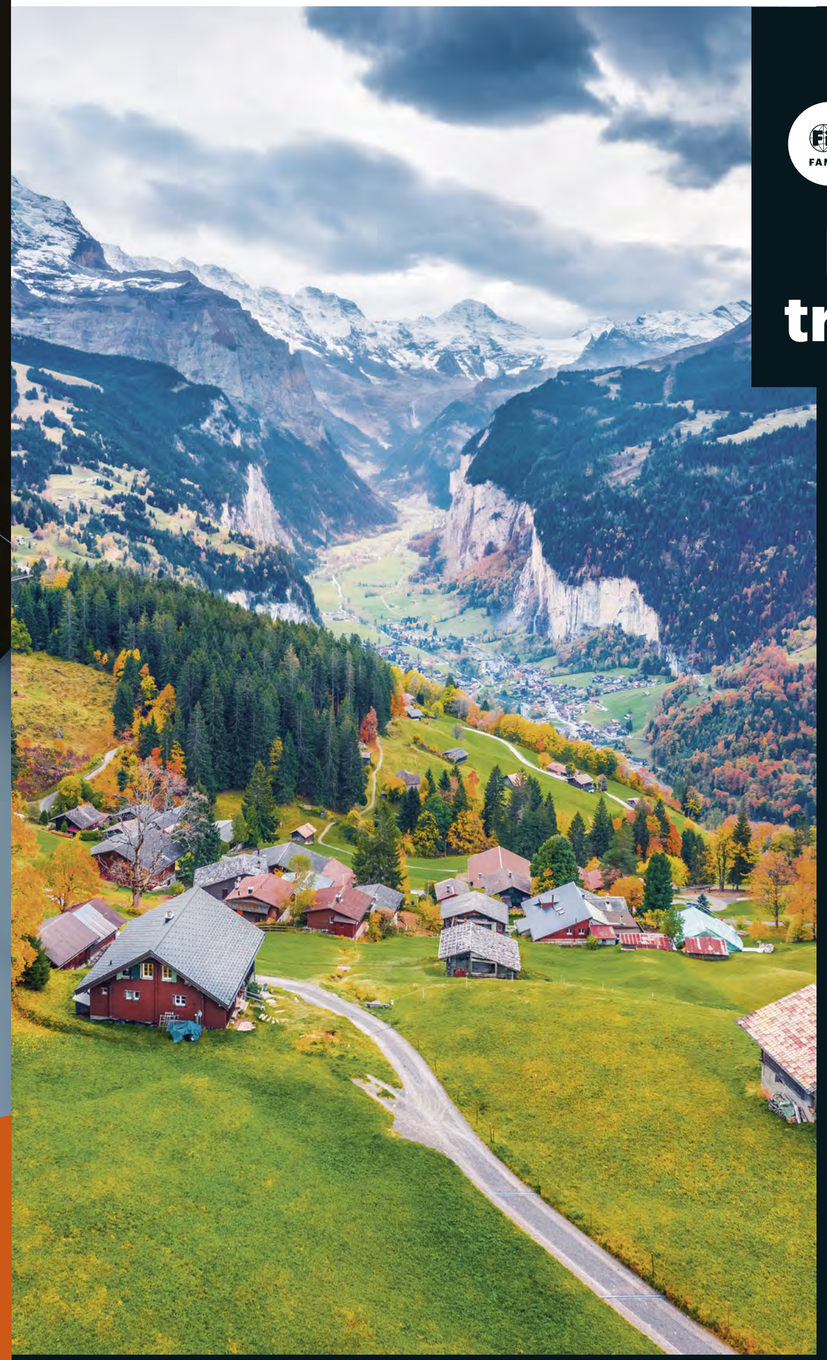
But as a nascent classic car scene began to expand so too did the GTO's value. Pink Floyd drummer and Ferrari aficionado Nick Mason bought chassis number 2757 – the car raced to third place at Le Mans in 1962 – for £35,000. In the economically flush 1980s fashion designer Ralph Lauren bought chassis #3987 – a car that had been raced by Pedro Rodríguez and Roger Penske – for $650,000. A year later, a US collector named Frank Gallogly bought a GTO for a million.

Prices of classics such as the GTO plummeted in the '90s but since then values have soared. Buoyed by its standing as the car in which Ferrari distilled all of its 1950s into a class-leading machine that firmly established the marque as the 'ultimate' racing team, and by the matchless history that can be attached to each and every chassis, the GTO has become the classic asset by which all others are judged.

In February 2012, the apple green GTO built for Moss was reportedly sold for $32 million. And since then prices have only increased. In 2014 a 1962 GTO Berlinetta went under the hammer at $38m and just months before the 2018 sale of chassis number 4153 to MacNeil, chassis number 3413 sold for $48.4m. The near $22m premium paid by MacNeil for a GTO that had not been crashed and which remains in pristine, original condition may have been stratospheric, but with no sign of the Ferrari 250 GTO losing its magnetic grasp on the emotions of classic car enthusiasts worldwide, it may yet come to be seen as a bargain. ◂

With the original Bizzarrini design refined by Scaglietti, the 250 GTO was presented to the media in 1962.

Stirling Moss ordered a GTO in light green, only for his Goodwood crash to curtail his race exploits.



FIA FAMILY

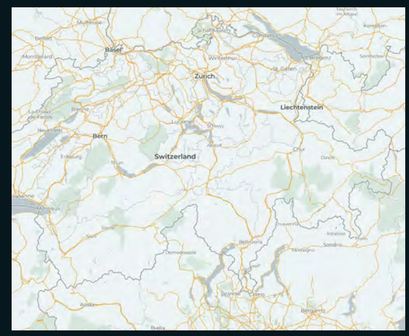
Pathways to transformation

07

As it celebrates its 125th anniversary Switzerland's Touring Club Suisse (TCS) is planning for the next century of mobility, through electrification, digitalisation and automation

TEXT
/
GAIA PELLICCIOLI

Switzerland might be a small country but it is aiming big when it comes to sustainability.



Although a small country, Switzerland is recognised as a global leader in sustainability, while at the same time having a high CO2 footprint per capita, a sizeable amout of which is caused by transportation.

Mitigating the effects of climate change remains the top priority and in 2019 the Swiss government signed up to net-zero emissions by 2050.

Fully committed with an ecological and sustainable mobility concept is the Touring Club Suisse (TCS). The club, which this year celebrates its 125th anniversary, is today the largest mobility club in Switzerland with 1.5 million members and 1,700 staff.

"The focus in the medium term is on the ecological transition and especially – at least for the time being – on electro-mobility", says Peter Goetschi, Member of the World Council for Automobile Mobility and Tourism, and President of the TCS.

For the club, however, electric mobility still suffers from unfounded prejudices, and a transparent and factual information campaign is needed if this kind of mobility is to be promoted in Switzerland.

"Electric technology is available and reliable, and it must now be made easily accessible to all," says Goetschi. "Private and public companies should be encouraged to provide their employees with charging stations and fleets of environmentally-friendly vehicles. This can be done, for example, through tax incentives. Finally, it is also a matter of ensuring a sufficient supply of renewable energies and an efficient distribution network to meet the anticipated increase in domestic electricity demand. The TCS will support these efforts."

Parallel to electro-mobility, the great digital transformation of society has triggered further changes in the transport sector, such as the implementation of multimodal transport solutions and shared mobility services.

With the increased interlinking of different modes of transport into integrated mobility services, TCS has successfully been able to adapt to its members' new needs and expectations, diversifying its business portfolio and changing focus from the car to people's mobility habits.

Touring Club Suisse President Peter Goetschi plans to support members as their mobility needs change.

'Electric technology is available and reliable, and it must now be made easily accessible to all'

"Five years ago, we redesigned our membership model that used to be based on the vehicle and turned it into a membership model based on the person," explains Goetschi.

"[We did this] precisely in order to do justice to the changed mobility habits of our members: they are now increasingly travelling by various means of transportation and want to be accompanied by the TCS however they travel – by car, public transport, bicycle or, most recently, perhaps even with an e-scooter, and in the future maybe by drone."

In a bid to expand its services beyond roadside assistance the club explored new businesses (i.e. travel, insurance, etc.) and recently launched projects in the areas of home and health.

"As members expanded their radius of action and began to drive abroad more frequently, the TCS began to accompany its members abroad as well thanks to its TCS ETI travel insurance in conjunction with FIA clubs around the world.

"With its own legal protection insurance, driver training courses and a large number of campsites throughout Switzerland, TCS has developed further services over the years all in line with our message, 'TCS – always at my side'.

"[In the field of medical assistance], the club already successfully operates an assistance medical service with six TCS doctors carrying out around 5,000 medical [remote] examinations for ETI Travel Booklet holders every year.

"TCS also promotes research and supports the first professorship in Switzerland for emergency telemedicine at the University of Bern in cooperation with the Inselspital Hospital.

PANDEMIC SUPPORT

This commitment is intended, among other things, to support and increase the role TCS plays in the health sector.

Over recent months, medical matters have been in focus for TCS due to the COVID-19 pandemic.

"The outbreak of the pandemic led to record numbers of requests for assistance at the TCS. In the early days, around 20,000 calls reached our ETI Call Centre," says Goetschi. "Compared to the same period the year before, this was an increase of over 350 per cent. The TCS has only been able to absorb this historic rush by substantially increasing the personnel resources at the ETI headquarters.

"Thanks to the 'Travel Safety' module integrated into the TCS app, the ETI head office was able to coordinate repatriations to Switzerland more quickly and efficiently. The app allows the geographical location of members to be recorded and to assist them with advice in the event of dangerous incidents.

"In addition, the TCS supported the launch of COROSOL – the Coronavirus Solidarity Fund. COROSOL is a non-commercial platform for personnel exchange. It facilitated the transfer of resources in Switzerland, especially in the transport/logistics sector, but also in the health sector. In addition it helped people and sectors who were temporarily unable to work to do so."

In other areas of health and society, road safety remains a fundamental part of the club's programme. "One of our focuses is to make future road users aware of the dangers of traffic. Even the youngest children should learn the correct behaviour from an early age," says Goetschi.

"Based on a good cooperation with the police in road safety education as well as our driver training courses, we have been able to develop unique awareness programmes for lifelong road safety, especially for the benefit of vulnerable users.

"As early as 1908, the TCS called on the Swiss government to introduce compulsory traffic instruction in schools. Today, the TCS produces and distributes 80,000 reflective waistcoats per year to first and second grade primary school pupils. In addition, the TCS supports the police in carrying out road safety education measures and gives children a variety of tips on the correct behaviour in road traffic on its website and via social media."

In 2020, the TCS launched an innovative campaign together with the Geneva cartoonist ZEP and his character Titeuf to get children fit – and safe – for their journey to school.

Since 1968 the club has tested more than 1,500 children's car seats to provide parents with important information for the purchase and correct handling of the seats, as well as establishing high standards for manufacturers and legislators.

'One of our focuses is to make future road users aware of the dangers of traffic'

The tests take into account various traffic situations, comfort, user-friendliness and the pollutant content of items, allowing the TCS to play a key role in consumer protection.

In addition to a variety of road safety campaigns, since 1952 the TCS has been committed to t he comprehensive education of drivers.

"In 2000, the TCS set up its first driving centre in Thun. Since then, 9,000 courses have been held annually in the now 15 driving centres across the country, for example courses on driving with trailers, motorbike courses and winter driving courses.

Around 125,000 participants have been learning about correct driving ▸

TCS's membership model is now based on people's needs rather than the car, with many using multimodal systems like Zürich's trams.

behaviour every year, including young drivers, police officers, firefighters and senior citizens."

As mobility evolves, the club's formule for success is holding onto traditional services while developing them further and offering members something new.

In this context, the TCS's Mobility Academy, founded in 2008 as a think tank, deals with the mobility of the future and explores out-of-the-box ideas. In recent years, it has started following the development of drones.

The club not only offers drone courses, it also aims to understand the role of drones in the mobility of tomorrow, and how clubs can position themselves to benefit from this new paradigm.

"TCS was one of the first organisations in Switzerland to offer professional drone courses," says Goetschi. "Today, we are the largest provider of such courses in the country.

"We are grateful and happy that the FIA Innovation Fund supports this endeavour – for us, but also for all other FIA clubs – because drones will eventually play a role in our mobility that should not be underestimated."

ADAPTING TO CHANGE

At a time when notions of what the automobile may become over the next few decades are still pulling into focus, Goetschi is firm in his belief that members' needs will always come first.

"We want to continue to be at our members' side for the next 125 years," says the President of the TCS, which celebrates its 125th anniversary this year.

"To do this, we need to further develop and adapt our services and products to the changing mobility needs of our members.

"Safe, sustainable and affordable mobility remains the common thread for us.

"While digitalisation, electrification and automation will transform our lives and the very concept of mobility, they will also be an opportunity for the TCS to support members in the most modern and efficient way.

"Electrification, for example, has already led to a real revival of cycling – thanks to the development and spread of e-bikes – which has prompted the TCS to extend its breakdown service to e-bikes as well," says Goetschi.

"Mobility today is evolving in exponential, incredibly fast and ever-shorter cycles due to digitalisation, automation and electrification.

"Cities want to offer more space to pedestrians and bicycle traffic, and enable the use of so-called 'vehicle-like devices', sometimes also called PMD (Personal mobility device), such as e-scooters.

"As a result, there is less and less space and traffic capacity left for individual [car] transport. This development must be closely monitored and partly put into perspective in the interest of our members."

In conclusion, Goetschi adds: "We will have to continue to move along these three transformation paths –decarbonisation, digitalisation and automation of urban transport – in the transport sector in the coming years and try to use the strengths, weaknesses, opportunities and risks that arise with them in such a way that, in the end, an ecologically, economically and socially sustainable mobility concept can arise."

More than 1,500 children's car seats have been tested by the TCS since 1968.

'Drones will eventually play a role in our mobility that should not be underestimated'

TCS was one of the first organisations in Switzerland to offer drone courses.

POWER TO GO 08

A major barrier to EV uptake is the availability of charging points. A new development launched at COP26 aims to solve the problem

FINAL LAP *the last word*

According to Bloomberg's New Energy Finance division, by 2040 upwards of 66 per cent of new passenger vehicle sales will be Electric Vehicles. However, while the trend promises extensive progress towards net-zero carbon emission goals, the problem of how to effectively charge those vehicle remains.

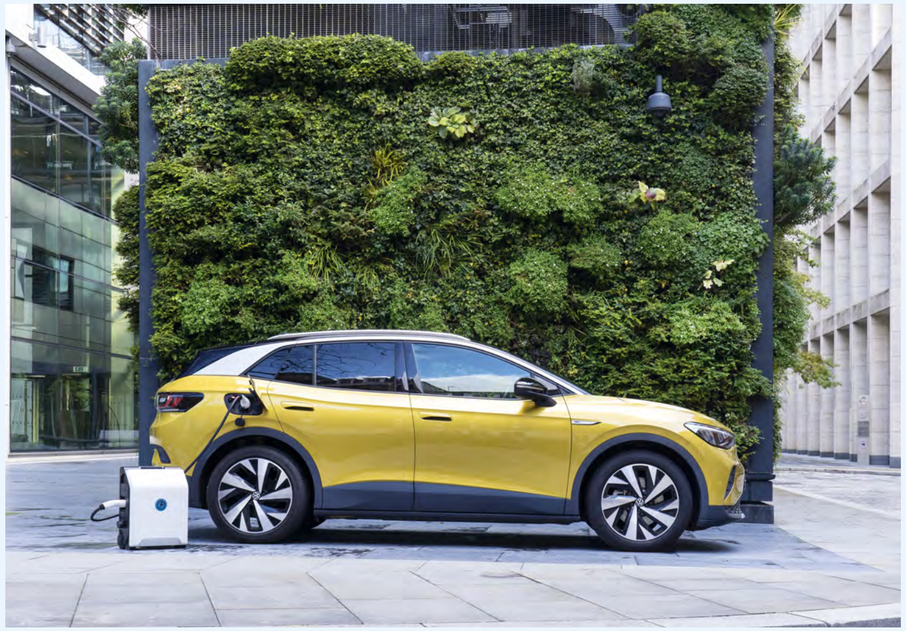
In the UK alone, some 8.5 million people have access to designated parking (on- or off-street), making on-street charging impossible for more than 40 per cent of car owners. Inability to charge near or at home is the main reason to reject EVs. According to research, 38 per cent of participants said they were not likely to buy an EV in the next five years, with 59 per cent worried about being unable to charge at home.

A new development by technology firm ZipCharge, the Go, launched at the recent COP26 climate summit aims to address the issue.

The Go is a power bank the size of a compact wheeled suitcase, which can be charged at home or elsewhere using a standard domestic plug at a lower cost per kWh of electricity when compared to public charging. Using the retractable handle, users then wheel it to wherever they've parked their EV and plug it into the charging port. The port locks the charging cable in, securing the charger with the vehicle. The unit provides up to 32km of range – sufficient for what EU research states is the average daily commute – in around 30 mins.

Integrated 2G/4G connectivity enables users to manage the charger via a mobile app. Inbuilt Artificial Intelligence (AI) will learn users' charging patterns to make schedule recommendations to optimise charging at off-peak times, saving money and reducing the load on the grid. A bi-directional AC-DC inverter enables two-way charging from the grid to the unit, and from the unit to the grid, so the power bank can be used to store cheap off-peak energy and feed it back into the grid at peak times. Additionally, a communications module supports smart charging, updates and diagnostics. Geo-fencing and tracking technology provide security.

"Never before has the automotive industry had cause to innovate so rapidly to help us reach a low-carbon future," says ZipCharge Co-founder Jonathan Carrier. "One of the key barriers to wider uptake of EVs is charging anxiety; the inability to charge near or at home. The Go removes that hurdle and in doing so it will democratise EV ownership."



The ZipCharge Go is a suitcase-sized portable charging unit designed to combat the lack of EV charging points.

RICHARD MILLE

A RACING MACHINE ON THE WRIST

TOURBILLON RM 58-01
WORLD TIMER - JEAN TODT

www.richardmille.com