



**H2**  
PROJECT

# MISSION

NEW PROTOTYPE. ZERO-EMISSION. PURE PERFORMANCE



11.10.23



RICHARD MILLE



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# MISSIONH24, THE STORY SO FAR

Ever since the Automobile Club de l'Ouest, the founder and organiser of the 24 Hours of Le Mans, was established in 1906, it has been a fervent advocate of mobility for all. Safety, performance, comfort and energy efficiency are all crucial topics to which the ACO and its legendary race have made important contributions, accelerating specific research.

With energy transition now a fundamental issue, the ACO has been striving for several years to reduce the race's carbon footprint and find new energy solutions. MissionH24 – a joint venture with GreenGT (H24Project today) to roll out the use of hydrogen in racing – was officially presented in 2018.

The objective is clear: to create a hydrogen class at the 24 Hours of Le Mans and in the FIA World Endurance Championship. Partners joining the programme include TotalEnergies, Symbio, Michelin, OPmobility, Dietsmann and Richard Mille.



# MISSIONH24, EPISODE 3

First, LMPH2G. Then, H24. Today, the MissionH24 racing team presents a new electric-hydrogen prototype with very different aims. The third phase of the mission has begun.

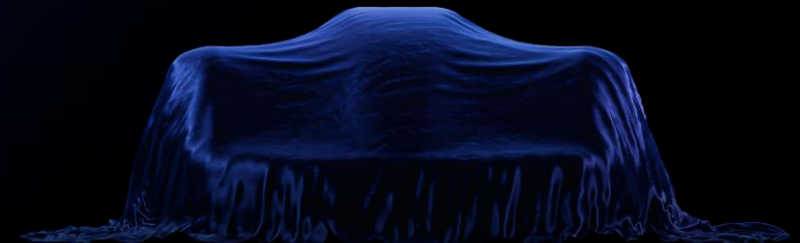
The essential stages of research, development, verification and burn-in testing of the new power unit (hydrogen cell system, tanks, electric motors, battery, etc.) on laboratory cars are now complete. The focus has switched to performance with a racing car ready to rival the other forms of energy on the track!



L M P H 2 G



H 2 4



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# BACK TO MISSIONH24 MILESTONES

Before 2018, hydrogen had never been introduced at this level of Endurance racing. MissionH24 faced a blank page.

## 2018

At the Spa round of the ELMS, four-time 24 Hours of Le Mans winner Yannick Dalmas completed a lap of the famous undulating circuit in the LMPH2G. The car also refuelled with hydrogen, in public. MissionH24 was up and running.

## 2019

TotalEnergies created the world's first H2 mobile filling station, designed to travel from circuit to circuit with the team.

## 2020

Demonstration lap at the 24 Hours of Le Mans.

## 2021

With the LMPH2G, then the H24, the team designed and tested the assembly of a new power unit running with a hydrogen cell system.

## 2022

Four finishes in four Michelin Le Mans Cup races for the H24, competing in the Innovative Car class. A sporting and technological achievement!





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2023

A third car is to be built. Ambitions have evolved. The focus has switched to performance with a racing car ready to rival the other forms of energy on the track.





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## A ZERO-EMISSION RACING CAR

The essential functions have already been tried and tested in the LMPH2G and H24. This new electric-hydrogen prototype harnesses the results of the latest R&D conducted by our technical partners. Hydrogen cell, electric motor, hydrogen tanks, battery, tyres, aerodynamics, chassis - all designed for optimum zero-emission performance. A pioneering industrial challenge!



RICHARD MILLE



## HYDROGEN CELL SYSTEM

The new MissionH24 prototype is equipped with a Symbio hydrogen cell system using next-gen multi-stack technology. The fuel cell is made up of plates and membranes in which an electrochemical reaction takes place producing electricity, heat and water. Max. net power output = 300 kW. By way of comparison, we estimate that the power density will be 50% greater than the system used on the H24.

This latest generation offers high efficiency which has a significant impact on the volume and weight of the storage system (onboard H2 tank). Integration into the car is optimized with the symbio teams. Clear progress has been made on weight and distribution to meet the demands of a racing car. The hydrogen cell system powers zero-emission mobility... zero-emission racing.



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## HYDROGEN TANKS 1/2

Weight and safety are essential criteria for the performance of tanks storing gaseous hydrogen under high pressure.

Plastic Omnium, a partner of the ACO for the supply of tanks for hydrogen competition cars, has developed storage systems and contributed to their development and installation in the vehicle.

There are 2 of them, they store 7.8 kg (3.9 x2) of hydrogen at 700 bars for a total weight of around 100kg. They have been developed following the most advanced rules of the art with optimization of composite materials in order to lighten them and improve the weight ratio of H<sub>2</sub> to total weight of the tank, without compromising on performance and safety. The target autonomy during racing is 25 to 30 min.



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## HYDROGEN TANKS 2/2

These tanks are certified according to the international standard ECE R134 which guarantees compliance with the most stringent specifications on the safety regulations for the storage of gaseous hydrogen. They are installed in the vehicle following safety regulations developed by the FIA.

The car will be able to refuel using the infrastructure planned for the future H2 class at the 24 Hours of Le Mans.

TotalEnergies is working hand-in-hand with the ACO on designing this infrastructure.



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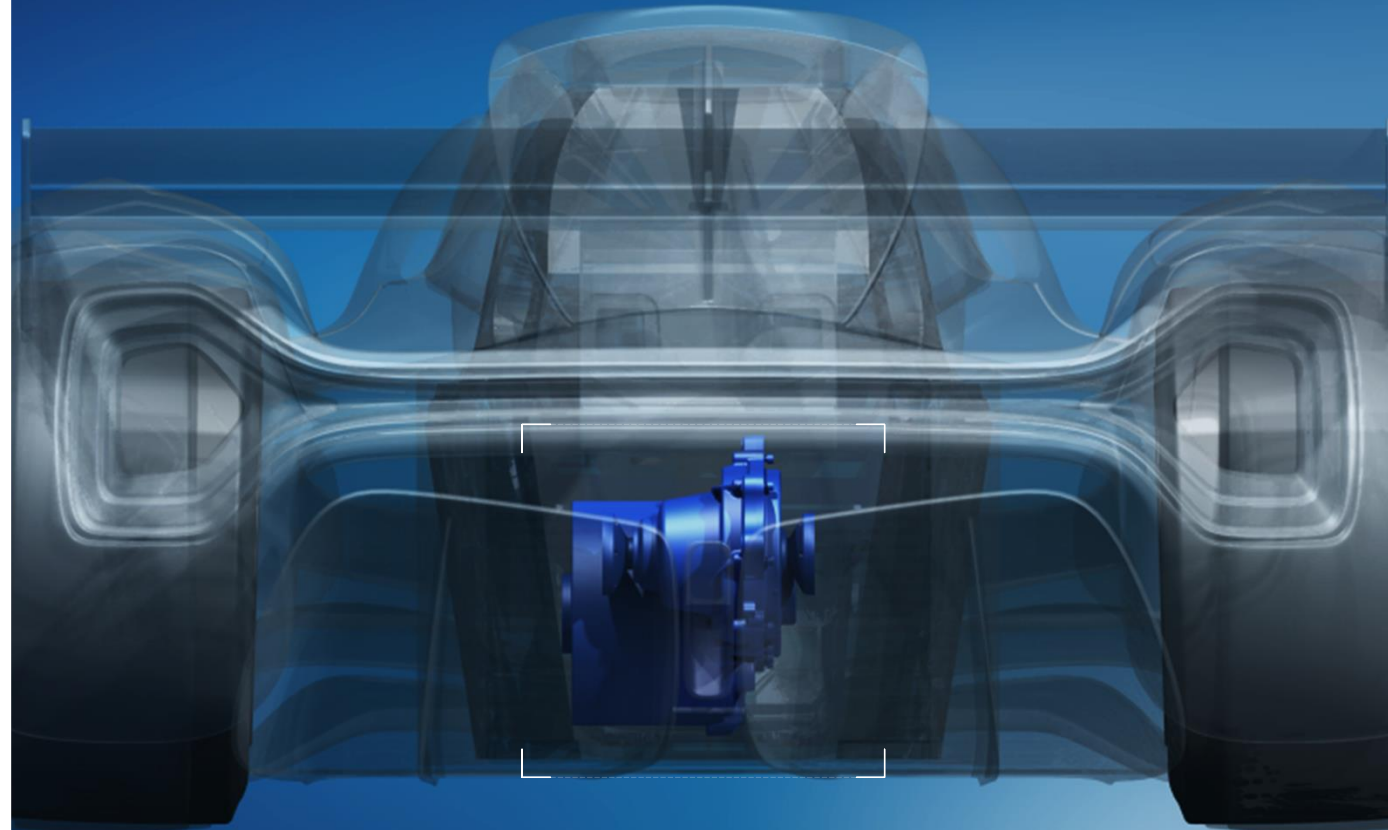
## MOTOR AND DRIVETRAIN

A single high-performance electric motor drives the rear wheels compared with two motors at present on the H24.

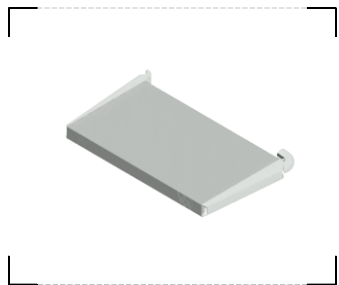
- Power density > 20 kW/kg.  
N.B. This is greater than a F1 MGU-K (approx. 16 kW/kg)
- Target max. weight: 30 kg (vs. 48 kg for the H24)
- Max. power 650 kW (872 hp)
- Compact high-efficiency gearbox and LSD for easier integration
- A single gear ratio thanks to the large operating range of the electric motor



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## CHASSIS

ADESS chassis with an LMP-type structure. Optimised cooling system. Inside the cockpit, the narrower structure means that the driver is seated more centrally to:

- Reduce weight
- Leave space on the sides for aerodynamic and cooling purposes
- Integrate the power unit components more effectively

Target max. weight: 1300 kg vs. 1450 kg for the H24. The possibility of using variable aerodynamics may be considered.



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## LITHIUM BATTERY

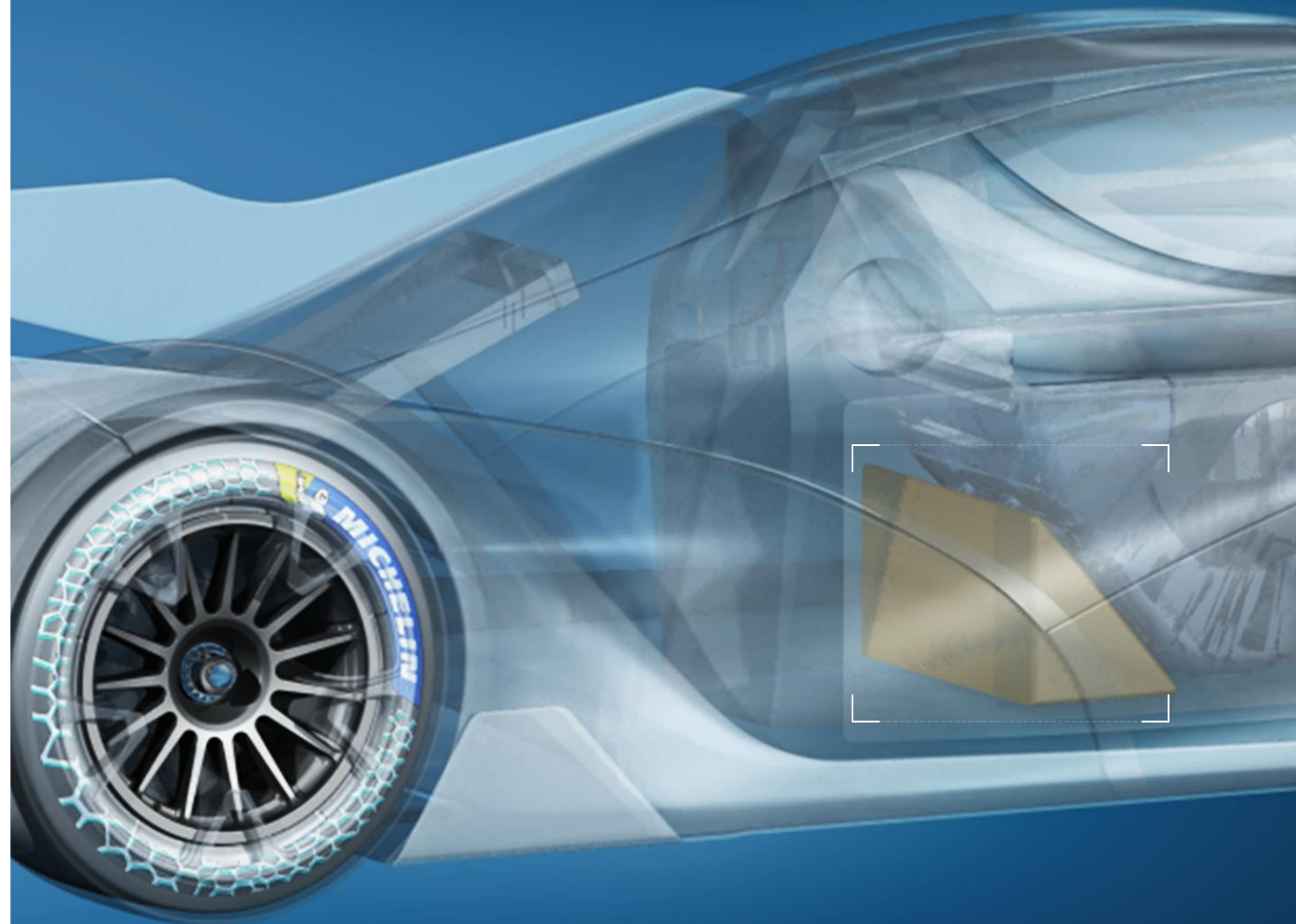
A high-performance lithium battery to:

- Provide the dynamic power required by the system
- Recover most of the available braking energy
- Max. power: 400 kW

Target max. weight: 80 kg vs. 92 kg currently in the H24  
Integration and casing adapted to the architecture.



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## TYRES

For Michelin, the Competition is an essential activity for accelerating the development of new, ever more sustainable solutions.

The Group aims to use 100% biosourced or recycled materials by 2050 and is committed to introducing on average 40% biosourced or recycled materials in 2030 in its tires. H24 initiated this commitment over the last three years.

This new vehicle will shape the future Hydrogen category which will soon race at the 24 Hours of Le Mans, while increasing the level of performance. The constraints on the tire will be specific, greater and therefore require preparation.



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## KEY MILESTONES

MARCH 2024

GENERAL DESIGN FINALISED

JUNE 2024

MOCK-UP

FROM  
OCTOBER 2024

POWER UNIT ASSEMBLY  
BENCH-TESTING

FROM  
JANUARY 2025

CAR ASSEMBLY  
FIRST CIRCUIT TESTS







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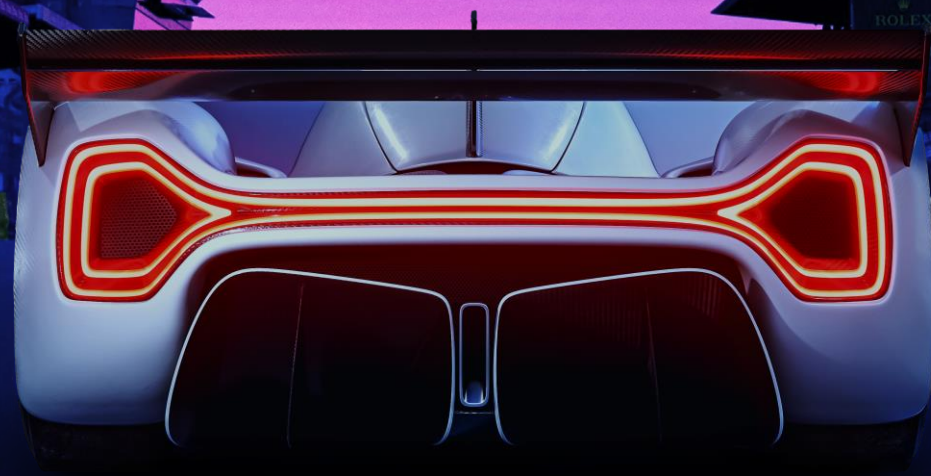
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KEY FIGURES

1300 KG

320 KPH

0% OF CO<sub>2</sub>



THE GOAL :  
AMONG THE TOP  
GT3 ENTRIES



## ZERO-EMISSION RACING

A new car calls for a new name. To encourage engagement in a programme dedicated to tomorrow's general mobility needs and demonstrate our common values, MissionH24 is inviting everyone to help choose a name for this totally new racing car. Share your ideas on our Instagram, Facebook and X accounts over the next month. The chosen name will be revealed on social media on 13 November.







# COMMENTS AND REACTIONS <sup>1/2</sup>

“After introducing hydrogen to the racetrack, MissionH24 is now entering a new phase: bringing hydrogen to competitive racing! This new prototype clearly intends to rival the other forms of energy in the field. Hydrogen technology is safe, reliable and can perform. The ambition is now to provide the first zero-emission winner of the 24 Hours of Le Mans.”

## PIERRE FILLON

PRESIDENT ACO,  
CO-PRESIDENT MISSIONH24

“MissionH24 begins a new chapter today: the design, building and development of a brand-new electric-hydrogen prototype in association with our technical partners TotalEnergies, Michelin, Symbio and Plastic Omnium. This is the next exciting step in our move towards zero-carbon motorsport.”

## JEAN-MICHEL BOURESCHE

PRESIDENT H24PROJECT,  
CO-PRESIDENT MISSIONH24

“Thanks to MissionH24, hydrogen technology has stood out in the competition world. Now the time has come to prove that this technology can offer an alternative to fossil fuels with the same efficiency and zero CO2 emission. This new car will be for those involved the real symbol of the future of motorsport in line with the energy transition.”

## BASSEL ASLAN

TECHNICAL DIRECTOR





# COMMENTS AND REACTIONS 2/2

“I’m delighted to reach a new milestone in the development of this hydrogen prototype. I joined the project five years ago and the technology has progressed. Each stage is a new leap forward. This new prototype will, I am sure, be another big step. I can’t wait to drive it.”

**NORMAN NATO**

DRIVER

“I’ve been fortunate to play a part in MissionH24’s continual progress since I joined in early 2021. As a driver, it’s a great opportunity to develop electric-hydrogen technology in racing and assist this transition towards more sustainable forms of energy. This new prototype is evidence that hydrogen is indeed one of tomorrow’s mobility solutions.”

**STÉPHANE RICHELMI**

DRIVER

“MissionH24 and the introduction of hydrogen in competition is a new revolution for motorsport and automobiles. The objectives are crucial: the decarbonization of competition and mobility.”

**BERNARD NICLOT**

INNOVATION MANAGER



# PARTNER COMMITMENTS

“For Michelin, racing plays an essential role in accelerating the development of new, more sustainable solutions. The group aims to use only renewable, recycled or biosourced materials by 2050 and is committed to introducing an average of 40% of such materials into its tyres by 2030. The H24 has got this commitment off the ground over the last three years. This new prototype will shape the future Hydrogen class that will soon compete in the 24 Hours of Le Mans, while increasing performance levels. There will be greater, more specific constraints on the tyre. We therefore need to be prepared.”



“We are proud to have been the fuel cell partner for the MissionH24 adventure from the outset. This new prototype demonstrates once again how motor racing is a wonderful laboratory, enabling real-life testing under extreme conditions and driving the performance levels of our technology even further. We have set ourselves the challenge of a 300-kW net power output for this car which equates to what we develop for our heavy mobility customers. The multi-stack system will meet the compactness requirements and the weight, efficiency and heat dissipation demands of competition. Zero-emission hydrogen-powered mobility is a reality. Symbio is ready to accelerate its deployment, both on the racetrack and on the road.”



“As a leading company in the energy industry, Dietsmann has consistently demonstrated pioneering spirit in maintenance, actively embracing and promoting new technologies for better and greener performance. Dietsmann is honored to join forces with H24Project and MissionH24 in a unique opportunity to advance mobility solutions in the fascinating realm of motor racing. This collaboration brings together our commitment to support innovative automotive technologies with our unwavering determination in harnessing hydrogen as a clean and significant source of sustainable energy. Together with H24Project and MissionH24, we eagerly anticipate furthering our commitment to innovation and sustainability, promoting the importance of clean energy.”

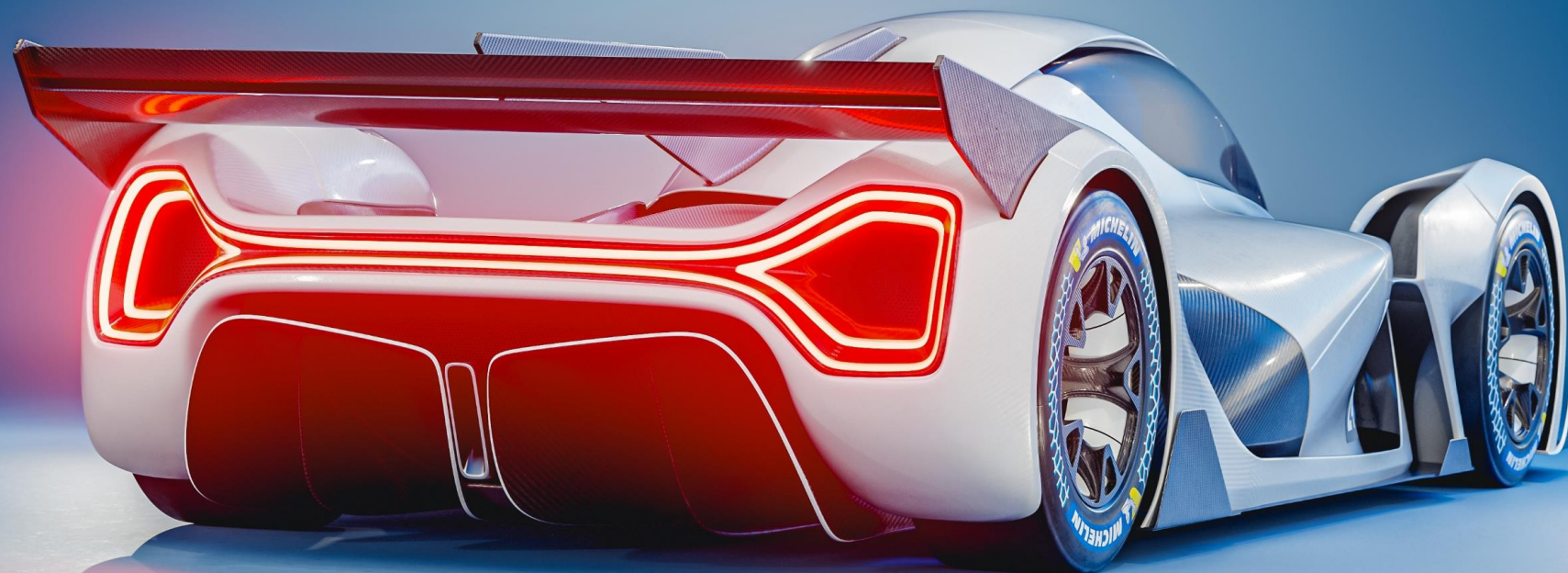




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CAROLE CAPITAINE ACO



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