



SEGULA
TECHNOLOGIES

Motorisation and electrification

Towards more efficient complete battery packs

Is Europe the future leader of the electric vehicle battery ecosystem?

Autonomous and connected mobility

On the road to fully autonomous vehicles

**The automotive revolution
is accelerating!**



Introduction

Dear readers,

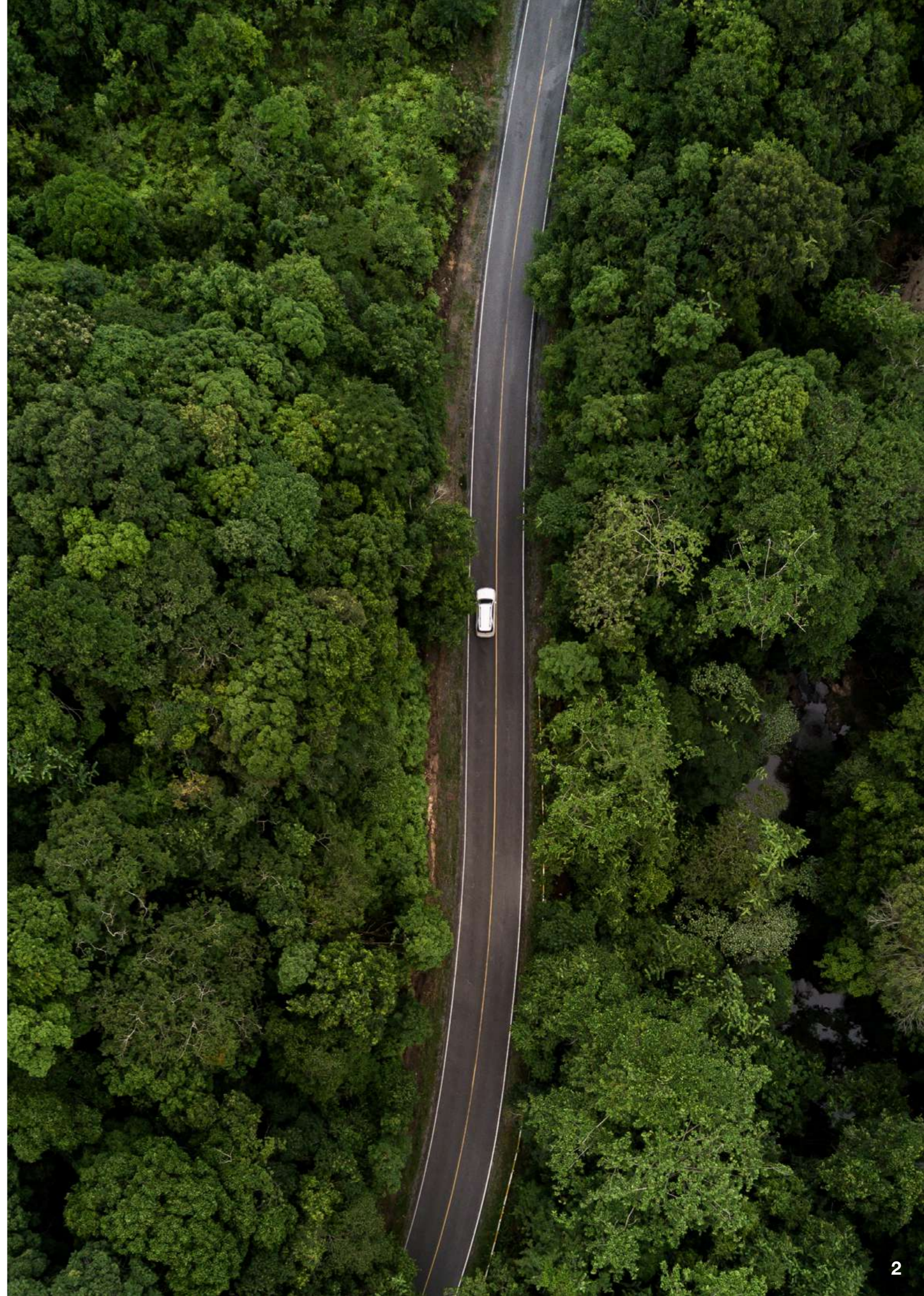
At a time when the automotive industry is reinventing itself at breakneck speed, this transition to electric mobility requires a unique combination of innovation, skills, and expertise.

From vehicle design to the industrialisation of production lines, SEGULA Technologies masters all the skills that are shaping this new era. Our expertise enables us to meet the technological, environmental and economic challenges facing the industry and to support our customers at every stage of their journey, providing them with tailor-made solutions.

Innovation is our driving force. We are committed to being at the forefront of developments in electric powertrains, autonomous driving systems and connected mobility solutions. Our teams work tirelessly to integrate the most advanced technologies and turn futuristic visions into tangible realities.

In this issue, we share our vision and skills with you, to help you make this exciting transition, where sustainability and efficiency go hand in hand with performance and aesthetics. Together, let's build the future of the automobile.

Franck Vigot, Président, SEGULA Automotive



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VEHICLE DESIGN AND INDUSTRIALISATION



Technicon Design, where innovation meets passion

Serving industry players for four decades, Technicon Design, the SEGULA Technologies subsidiary dedicated to industrial design, combines engineering excellence with the creativity of teams of passionate designers.

Find out in this article how this group subsidiary, based at the heart of the world's best automotive design clusters (Paris, Shanghai, Munich, and Los Angeles), always manages to stay one step ahead of developments in the automotive market.



Emotion, efficiency, innovation. More than 40 years after its establishment in the UK in 1978, Technicon Design has never deviated from this founding triptych. Integrated into the SEGULA Technologies Group in 2017, it is now a trusted partner - in America, Europe, Asia, and Africa - for major manufacturers and equipment suppliers in the transport, marine, aerospace, luxury and industrial design sectors.

Its promise? To bring its clients' ideas to life by offering them an innovative approach that anticipates market trends. 'The role of the designer is to push back boundaries to propose innovative solutions while placing the end user at the centre of the design process,' explains Pierre Authier, Design Director at Technicon Design. Developing innovative products therefore requires reconciling the emotional aspects with usability and technical feasibility.

Whether strengthening its customers' teams by bringing in in-house talent, or setting up a group of experts dedicated to a project, Technicon Design demonstrates every day its ability to offer tailor-made solutions to meet the specific needs of those it works with.

Perpetual adaptation

In a particularly competitive and constantly changing industrial world, Technicon Design stands out for its acute sense of adaptation. Our in-house designers are just as capable of understanding the needs of a start-up as those of a major, century-old international manufacturer.

They can design an entire vehicle or concentrate on creating a specific part. They excel at designing both mechanical components and digital applications. And they do all this while adapting to ever tighter schedules. 'Manufacturers now renew their ranges every four or six years. So we have to be able to deliver highly complex projects quickly. Above all, our creative process must perfectly anticipate technological advances and social changes so that the part or vehicle delivered meets consumer expectations when it is released.'

In other words: creativity is strongly encouraged throughout the design process so that we are always one step ahead of market developments.



Pierre Authier, Design Director, Technicon Design, SEGULA Technologies Group

Working closely with customers

In practice, the projects carried out by Technicon Design follow a fairly standard pattern, moving through different phases from initial design to production.

What really sets the company apart, however, is the collaborative and transparent approach it preaches to its customers. This is a key success factor, according to Pierre Authier. 'We systematically involve experts from our customers' various departments in the creative process. In addition to the technical and engineering teams, we also involve our customers' marketing and sales managers. This close collaboration between the teams must enable the designer's vision to be aligned with the company's objectives. The designer must remain receptive to suggestions while preserving their creative integrity'.

Depending on the assignment, budget and schedule constraints should, on the contrary, stimulate creativity and encourage innovation. In all cases, automotive projects require meticulous planning and efficient resource management.

AI, accelerating the creative process

Four decades after its creation, Technicon Design faces the future with serenity by committing to a process of continuous improvement of its design methods. Its vision for the future of automotive design emphasises innovation and sustainability.

From today, its teams are working to integrate environmental, social, and economic aspects into their projects. Among the major challenges of the moment, Technicon Design is currently integrating and developing the use of new tools integrating artificial intelligence. Innovative solutions that reinvent design methods without distorting them. *"It's not about replacing designers with AI-based tools. We are instead focusing our thinking on the use of artificial intelligence as an accelerator of our creative process,"* explains Pierre Authier. *"We want to preserve the human aspect of the work. That is to say this know-how, this passion and this pleasure of creating which animate our teams with each new mission."* Emotion, efficiency, innovation: no doubt, Technicon design knows the formula.



STYLE AND DESIGN

Technicon Design presents the new Trèves audio technology

Zoom in on the story of an innovative collaboration between Technicon Design and the Trèves group, with a video illustrating a unique audio experience in the car interior.

'At Trèves, when we talk about Technicon Design and SEGULA Technologies, we never talk about suppliers, we always talk about partners.' The interview with Mark Cooper, Vice President of Trèves, has barely begun, and we can already see the strength of the links between this specialist in car interior acoustics and the design branch of the engineering group. We had no idea that just a few moments later Mark Cooper would put his money where his mouth was, by introducing us to three of SEGULA Technologies' talents, who were meeting that very day in the room next door to work on a new joint project. *'If I had to list the reasons for working with Technicon Design, I would of course talk about their graphic expertise and speed of execution, but above all their real ability to understand and anticipate our needs.'*

Expert opinion. In its 200-year history, Trèves has lived through all the major technological breakthroughs in the automotive industry and carried out countless innovation projects for dozens of manufacturers and equipment suppliers around the world. Originally founded by a family specialising in the manufacture of fabrics, the group has now refocused on noise reduction and sound diffusion technologies for vehicles. An international success story, the group now has almost 29 sites across the globe, and is forecasting sales of 750 million euros in 2023.

Showcasing innovation

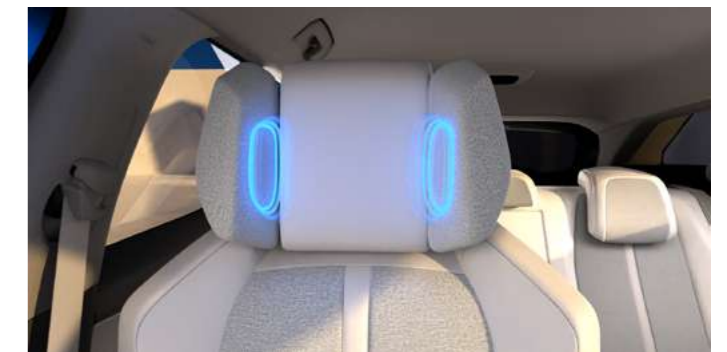
When it comes to choosing an emblematic project carried out with his partners at Technicon Design, Mark Cooper doesn't hesitate for long and is enthusiastic about one of the most recent. It was the design of a video broadcast last year to major players in the automotive sector to promote the new Sonified in-house concept. *'More than a technology, this system offers a completely new experience of audio immersion in a vehicle. Unlike traditional loudspeakers, the sound is diffused directly through elements of the passenger compartment such as headrests, seats or the floor. This improves vehicle comfort, soundproofing, and interior aesthetics.'* So much for the technology. There remains a crucial problem: how do you demonstrate the potential of such a novelty when its central element, sound, is by definition, impossible to represent on a model or sketch?

This is where Technicon Design's expertise comes into play. The designers from the SEGULA Technologies subsidiary came up with the idea of symbolising sound diffusion in a promotional video by means of graphic waves propagating through the passenger compartment. With vibrations emanating from the heads and seats, the two-minute video provides a visual demonstration of the system's effectiveness. It also shows its aesthetic benefits, with before-and-after sequences illustrating the elimination of traditional loudspeakers now found in the doors or dashboard.

'This highly visual and educational video has earned us some very good feedback from our first prospective customers. Thanks to it, they immediately understood the benefits of our innovation. It's very simple: we now use it in all our sales presentations.'

Two partners in unison

Sonified technology, which has already been adopted by several major carmakers, should find its way into the design of new production vehicles. It will provide a rhythm to the journeys of drivers and passengers in the first cars fitted with this technology. Although it is currently aimed more at the top-of-the-range segment, over the years Sonified should also be deployed in mass-produced cars. *'From the very first stages of this project, we were certain of the strength of our concept. Technicon design enabled us to convey this conviction to our contacts. This video project is a perfect illustration of our teams' ability to work intelligently together. True partners, no doubt about it.'*



Better aerodynamics through lighter vehicles

The current energy crisis is contributing to the electrification of mobility. But it's not the only one. It is also encouraging carmakers to make their vehicles lighter and more aerodynamic. SEGULA Technologies is working on this trend, as Bruno Derrien, Automotive Architecture Business Expert, reports.

The 2000s saw cars gain in weight, and volume. *'The popularity of SUVs is linked not only to aesthetic reasons but also to the feeling of safety provided by their elevated driving position,'* he notes. *'This has led to a trend towards cars that are overweight and larger: wider, taller and, above all, with bigger wheels. Wheels are among the heaviest parts of a car, and this leads to a vicious circle of over-dimensioning to preserve the interior volume of the passenger compartment and impact resistance, as they are incompressible.'* The increase in the overall performance of vehicles, in terms of acoustics, interior finishes, and equipment, also weighs heavily and must be offset by weight savings. In the ten years between 2012 and 2023, the average weight of cars has risen by more than 50 kg, or 4.3%. Finally, regulations, particularly on pollution control systems (addition of catalytic converters, particle filters, etc.), also play a role.

The hunt for weight

Today, at a time when fuel prices are soaring and we need to decarbonise our cars to limit global warming, carmakers are looking for every last kilo and optimising aerodynamics. The main aim is to reduce CO2 emissions and the unladen weight of vehicles. All the more so since, at the start of 2024, the government tightened up its weight-based penalty, a specific French feature, by lowering the threshold for applying the tax to cars exceeding 1.6 tonnes. For electric cars, the hunt for kilos is just as important, to increase their range.

'There are a number of possible solutions for reducing weight,' says Bruno Derrien. *'Manufacturers can use materials that are lighter than steel, such as aluminium.'* For a long time, aluminium was reserved for top-of-the-range vehicles because of its cost. But now, the balance of profitability in terms of the cost/mass gain ratio has shifted sharply in favour of lightweighting solutions using more expensive materials.



High-performance steels also enable sheet thicknesses to be maintained or even reduced. Composite polymers are also becoming increasingly competitive with metals, which are very energy-intensive to produce.

However, one of the key levers remains the optimisation of dimensioning and the use of materials, which are constantly being improved by the expertise and digital simulation used in the automotive sector. Reducing mass leads to a reduction in engine, brake, cooling, and structural sizing... It's a virtuous circle!



The challenge of aerodynamics

It's not enough to reduce weight. While mass means that extra power and energy are needed to cope with changes in speed, wind resistance becomes a major factor in fuel consumption above 50 kph. The emphasis is therefore on the aerodynamics of new cars. And that's precisely the job of an automotive architect like Bruno Derrien. *'This is all the more important in the case of electric vehicles, where a 14 cm-high battery is placed under the floor of the vehicle,'* he stresses. At the same time, the overall height of the car has to be contained, so that there isn't too much air resistance, and the roof has to be lowered, mainly at the rear, to reduce aerodynamic drag.

The result? The body needs to be enlarged and the interior ergonomics revised. To ensure that passengers did not lose out in terms of comfort, with a more limited amount of space, the seating positions were lowered and lengthened. *'It's all a question of comfort angles between the torso, legs, and feet,'* explains the automotive architect. *'At the same time, it prepares us for the future of autonomous vehicles, by providing us with a position in which we can relax during car journeys, as we will no longer be at the wheel. And in order to maintain easy access to the vehicle, this lowering of the bodywork is leading us to optimise the sections above the side doors by studying, for example, solutions for frameless doors around the windows, as is the case for coupés.'*

The silhouettes of vehicles, particularly SUVs, are therefore evolving towards this profile with a more plunging rear end, like the new Peugeot 4008 and 3008 or the future Renault Rafale'.



Our strengths: a materials R&I department

SEGULA Technologies has its own Research & Innovation (R&I) division, whose expertise is not confined to the automotive market. *'At SEGULA Technologies, we work for a number of industrial sectors - heavy goods vehicles, rail, aerospace, etc.,'* explains Bruno Derrien. *'So we can take advantage of technology transfers between sectors, to be innovative. In the preliminary design phase for a future commercial vehicle, for example, we took advantage of the R&I department's experience with buses to develop a super-light panel.'*

Another example: for the recyclability of mini-cars - made up of a tubular structure with glued plastic skins - the glue posed a problem during recycling. However, SEGULA Technologies' R&I department had already identified an innovative glue capable of dissolving at around 120°C. In this way, the tube and the skins can be easily separated and recycled independently.

'And our expertise doesn't stop there,' concludes Bruno Derrien. *'Automotive equipment manufacturers call on us to carry out architecture studies. Their aim is to complete their innovation projects with full integration in the vehicle, to assess its full potential and present it to their manufacturer customers. SEGULA Technologies is also working on the electric batteries of the future and how best to integrate them into vehicles. So there's no shortage of automotive projects, each more innovative than the last. The car of tomorrow has yet to be imagined. That's what we're doing!'*

Mini cars for maxi services

Design of complete vehicles: Some references

In Europe, 98% of car journeys are daily journeys of less than 80 km. In this context, a small electric car is perfectly suited to everyday needs.

Why microcars? Microcars offer significant advantages for urban, suburban and rural mobility. In areas where cars are the mainstay of daily life, microcars offer a low-cost solution with very low running costs. The market for microcars is growing rapidly and could reach 100 billion dollars a year by 2030 worldwide, with 30 to 40% of the volume in Europe (source: McKinsey).

- **Lower costs:** Less expensive to buy and maintain, they are ideal for restoring access to highly economical mobility in Europe's less densely populated areas.
- **Energy efficiency:** Their lower energy consumption is particularly beneficial, with a considerably reduced impact over the entire life cycle of the vehicle. This is thanks in particular to their weight of less than 450kg (not including the battery) and their formidable efficiency, which means they can be fitted with small batteries.
- **Short journeys:** They are perfect for short, frequent journeys typical of suburban, and rural areas.
- **Complementarity:** They can be used as a complement to traditional cars for journeys that don't require large vehicles.

SEGULA Technologies has therefore invested heavily in the development of mini-cars, focusing on the essentials. This segment is divided into two categories:

1. **Light quadricycles:** these can be driven from the age of 14 with an AM licence and have a maximum speed of 45 km/h. These vehicles, which are safer than scooters, are particularly popular with young urbanites.
2. **Heavy quadricycles:** Available from the age of 16 with a B1 licence, they can reach speeds of up to 90 km/h & 4 seats. With the increasing electrification of the car fleet, these vehicles represent a practical, and environmentally friendly alternative for short journeys of less than 200 km in both rural and urban areas.

For the past decade, SEGULA Technologies has been working in this field with the aim of:

- **Making quadricycles** lighter by adopting a frugal design.
- **Offering innovative and disruptive solutions** in terms of diversity of use.
- **Offering a range of turnkey developments** to manufacturers and numerous emerging start-ups.

Here are a few examples of outstanding projects:

- **Renault Twizy:** Launched in 2011, this car was one of the first urban ecomobility concepts. SEGULA Technologies was involved in the design of the tubular body frame, the thermoformed plastic outer body, and the side windows.
- **AMI by Stellantis:** Since its launch in 2020, this model has been a great success. SEGULA Technologies contributed to the development of the open-air version and to the design of the Topolino, the Fiat version of the Citroën AMI, launched in 2024.

What's next? Focus on the ULP (Ultra Light Platform) project

The ULP project, launched by SEGULA Technologies, represents a major opportunity in the development of micro-cars and enables the creation of a true industry. The objective is to offer our clients, as well as new players, a robust and shared technical platform that ensures a positive economic equation for embarking on the micro-car venture.

This ultra-light, modular, and adaptable platform aims to provide an innovative solution for L6e and L7e vehicles. With a variable wheelbase ranging from 2.50 to 3.70 metres and a width of 1.5 metres, ULP allows for the integration of various powertrain architectures and battery capacities.

The 48V electrical architecture and the unique electronic system shared among all partners ensure maximum efficiency. Safety is ensured with a minimum 3-star EuroNCAP rating, ABS, and airbags as standard.

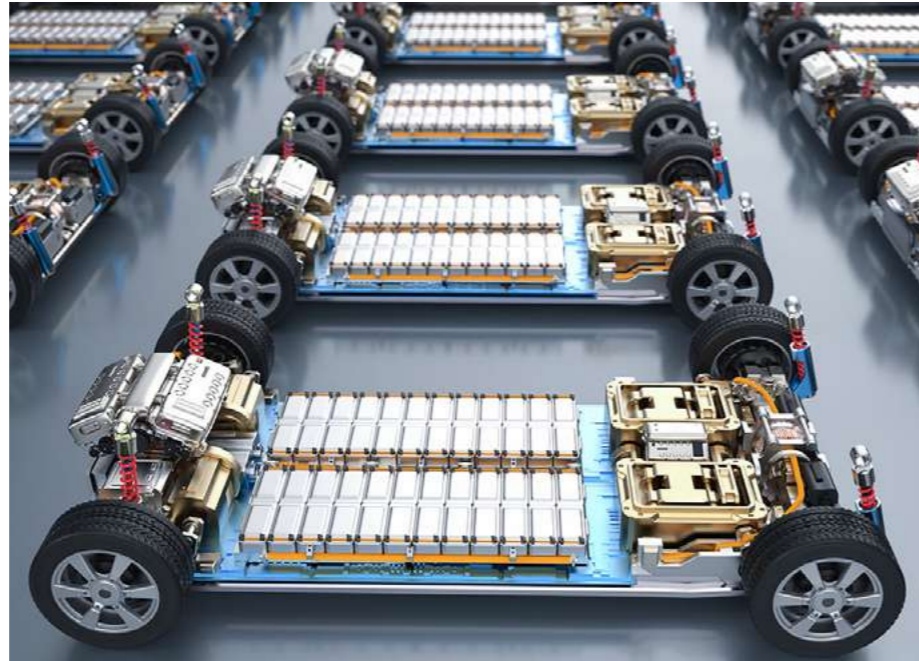
SEGULA Technologies forecasts an annual production volume of 7,500 vehicles, in collaboration with industrial partners identified as potential co-leaders of the project.



Towards more efficient complete battery packs

The future of electric mobility mainly revolves around the battery pack. The goal? To reduce costs, which make up the largest portion of the price of electric vehicles, increase range, and shorten charging times, which are the major barriers to clean mobility.

With the current state of knowledge, electric vehicles are set to adopt more economical solutions in the short term. They are expected to reach cost parity with combustion engine cars within three years. Furthermore, internal performance in terms of range and charging speed will improve in the medium term. SEGULA Technologies supports battery manufacturers and carmakers in this long-term transition, spanning the next 10 to 25 years. The Group is actively involved in the development of complete battery packs for all vehicle categories and manufacturers.



The activities carried out by SEGULA Technologies in relation to the development of the battery pack focus on several key areas:

Study of the Battery Management System (BMS), the integrated control unit within the battery pack, is essential for monitoring the battery's health, determining its state of charge, managing the charging process, and optimising battery usage to ensure longevity. The BMS retains data on the battery's behaviour to better manage its performance.

Mechanical simulations, such as crash tests and "thermal venting" analysis, are conducted to track the expulsion of hot gases in the event of a thermal runaway, aiming to prevent these incidents. Additionally, the heating and cooling systems are studied to manage fast charging and prevent cell ageing.

Competitive analysis of battery technologies is carried out to stay ahead in innovation.

Reflection and analysis of potential safety concerns related to the battery's functionality are considered throughout the product development process.

Supplier management for battery pack components and procurement, as well as maintaining technical relations with these suppliers, is a key focus.

Battery ageing analysis is conducted during normal usage, incorporating feedback and managing mechanical and electrical validation processes.

Compliance with various regulatory standards is critical. SEGULA Technologies performs testing on prototypes in collaboration with partner organisations to obtain approvals and assess how the batteries can be integrated into the vehicle.

Global battery simulations are carried out to ensure proper performance during a WLTP (Worldwide Harmonised Light Vehicles Test Procedure) cycle, which measures the range of electric vehicles.

Management of real crash tests and all potential incidents is also a crucial part of the process.

"For various car manufacturers, we are already working on improving the battery pack, for which we are able to internally deploy all the skills related to this activity. In this context, we have centres of expertise in several countries — France, Morocco, Tunisia, Romania, Spain — each with their own specialities, while simplifying communication through a single point of contact,"

Laurent Martin, Electric Mobility Expert at SEGULA Technologies.



Setting course for electric mobility

Converting the car fleet to electric mobility is a major challenge in the context of climate change. How will this electrification of mobility take place? Laurent Martin, an expert in electric mobility at SEGULA Technologies, describes the main issues involved in this transformation and explains how the company is helping manufacturers to make the leap.



Where do we stand today on the road to electrified mobility?

The Paris Agreement aimed to keep the global temperature increase well below 2°C above pre-industrial levels by 2100. To this end, the signatories agreed to cut global CO2 emissions by a factor of 20, and the European Union pledged to become carbon neutral by 2050. By that date, there should be no internal combustion vehicles using non-carbon-neutral fuels on the roads. This objective will be achieved through a number of milestones: 60% of light vehicles on sale will be electric by 2030; 100% by 2035, except for internal combustion vehicles using synthetic fuels, but only 50% of lorries will still be electric. This is the European roadmap. So the transition is going to happen very quickly, almost by forced march. Investment in electric mobility will be heavy, given that electric cars still represent only a small minority of the market. The sector has no choice. So we need to be able to support it in tackling this shift towards decarbonisation with equanimity.

What are the main challenges facing the electrification of mobility?

For many people, **the cost of electric vehicles** is the first obstacle to their deployment. But this is a misconception. An electric vehicle may be more expensive to buy today, but it is far more economical to run, and even particularly profitable for drivers who cover more than 15,000 km a year. For those who drive less, the government's subsidy helps to limit the extra cost of ownership. And it is estimated that the price of electric vehicles will be equivalent to that of combustion-powered cars within three years.

To achieve this, it will be necessary **to reduce the cost of batteries**, which can represent up to 40% of the price of vehicles, and increase their range. Technologies are constantly evolving. Huge investments are being made worldwide in the construction of gigafactories, which will manufacture the battery cells. The very long lifespan of batteries means that amortisation models can be envisaged over several lifetimes. The batteries could operate for 800,000 km. That's a lot longer than a car that's likely to give up the ghost after 250,000 km. An electric battery will therefore have a new life, for energy storage in buildings, for example, if it is to last 25 years or more. It can then be recycled up to 90%!

It will also be necessary to reduce the volume and mass of the electric motor, obtain more torque, optimise efficiency and limit thermal overheating.

Another challenge for the deployment of electric mobility is to optimise the efficiency of the various energy converters (DC/DC, AC/DC and inverter) on board vehicles and their power electronics, to avoid overheating. Finally, the issue of recharging systems for electric vehicles is obviously key. Today, there is one charging point for every eight electric cars, but one charging point in five is out of order. And the situation is getting worse. The aim is therefore to improve their reliability for intensive use.

How is SEGULA Technologies supporting the industry on the road to decarbonisation?

We have developed a great deal of research and innovation on all these issues. For example, **to reduce the cost of electric vehicles**, we are looking to reduce their mass, particularly that of the batteries, to improve the sizing of the motors. Did you know that a 50 kWh battery weighs around 350 kg? We also want to improve tooling and manufacturing processes, to save manufacturing time and therefore costs.

We support both gigafactories and carmakers in the development of **electric batteries**, validation, certification and crash-testing. We are a driving force behind proposals to improve the design and choice of chemical processes for these batteries in Europe. We support manufacturers in the design of their electric motors. For example, we carry out various simulations to optimise the thermal cooling of these motors: ventilation simulation, hydraulic cooling and electromagnetic simulation. **If the design is right**, the motor will be highly efficient and will heat up very little, while evacuating residual heat efficiently. This is essential for performance!

We also carry out a great deal of benchmarking and **analysis work on power electronics**, on behalf of our customers, to strengthen our expertise in the calibration of electric motors.

In 2024, we are developing a new business in charging systems for electric vehicles, based on our experience gained from numerous electric **charging sessions**. Our ambition is to support the deployment of the network of charging points over the next 15 or 20 years, and to help operators ensure the reliability of their systems. Finally, on a broader scale, we are contributing our expertise in all aspects of **digital technology** on board cars, connecting electric vehicles to the Cloud... Not forgetting the cybersecurity aspect, which is essential for the car of the future.

"SEGULA Technologies' added value comes from our broad range of skills. We have all the electric mobility skills in-house, or via our partners, and the desire to take on new challenges!"

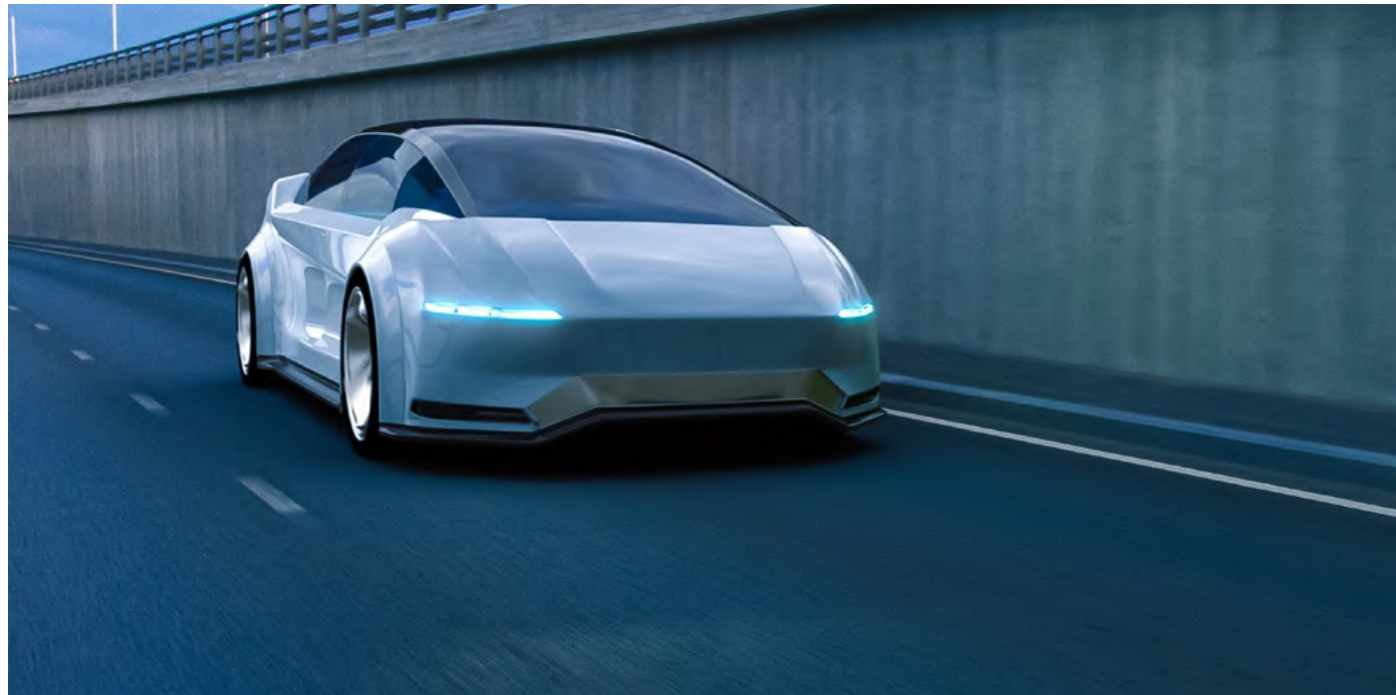


Laurent Martin, an electric mobility expert at SEGULA Technologies

An in-house autonomous vehicle at the service of innovation

SEGULA Technologies is a key player in the field of autonomous vehicles. The company not only has a dedicated team but also a platform equipped with a level 4 autonomous vehicle that it has fully implemented to carry out experiments for its clients.

At the origin of this platform, SEGULA Technologies wanted to test its ability to integrate a complete set of key technologies into an autonomous vehicle and aimed to enhance the skills of its employees on the subject. The company was also able to organise an ecosystem of startups, capable of developing or providing these technologies.



A platform to learn how to navigate autonomously

The platform was designed like a valet parking service, except that the valet is not a person but an application developed by SEGULA Technologies!

'The owner calls their vehicle parked in the car park using their smartphone, where they've installed the app, to request it to come and meet them,' explains Julien Fouth. *'The vehicle receives the call, "understands" it, and starts moving through the car park.'*

Manoeuvring in an enclosed space is not that simple, especially since there has been no prior mapping or GPS.

'Artificial intelligence gives the vehicle self-learning capabilities, using onboard sensors, among other things,' he continues, *'enabling the autonomous car to navigate in a crowded environment, reach the toll barrier, exit the parking lot, meet the user who called it, and take them to their destination, while assessing the traffic situation depending on the weather, road conditions, etc. These functions have been tested on SEGULA Technologies' closed circuit, with various routes and different vehicle call scenarios.'*

Modules operating through artificial intelligence

Since then, around thirty research and innovation projects have been carried out on the platform, focusing on issues such as location sensor processing, human-machine interface, and navigation. *'We have worked with a car manufacturer to validate each function of an electric vehicle controlled by artificial intelligence,'* says Julien Fouth. *'One of the experiments involves, for example, crossing a roundabout using AI modules.'*

For this project, the chosen technology is based on "explainable artificial intelligence" methods and "reinforcement learning." The reinforcement learning approach relies on deep neural networks.

'Without going into too much detail, it involves learning the decisions to be made from experiences,' he continues. *'Each time the autonomous vehicle makes a correct decision, the environment provides a reward. Each time it makes a wrong one, there's a penalty. This way, the vehicle optimises its decision-making behaviour.'* Around the roundabout, specific zones have been defined: observation zone, decision zone, danger zone...



A range of expertise

SEGULA Technologies mobilised, for this purpose, a range of expertise, including an AI designer who creates the model, defines the necessary dataset, and analyses the results; an integrator for electronic solutions on the autonomous vehicle; a data engineer to label the data (i.e., assign information to the data so that machine learning algorithms can better understand their meaning); a human-machine interface developer, in other words, dashboards that analyse information in real time...

"We have all these profiles at SEGULA Technologies, which allowed us to successfully carry out this project for our client," says Julien Fouth proudly. *"I had the opportunity to lead this project for two years, which enabled me to witness the exceptional power of artificial intelligence in decision-making by an autonomous vehicle. It remains a particularly innovative experiment to this day!"*

On the road to a fully autonomous vehicle

What distinguishes a connected car from an autonomous car? Where do we stand in terms of autonomy in the automotive sector? As an expert in connected and autonomous mobility, Julien Fouth, Technical Standard Manager at SEGULA Technologies, answers these questions.

“The autonomous vehicle is necessarily connected,” says Julien Fouth, *“simply to open the vehicle’s doors with a smartphone, for example, or to detect obstacles using so-called ‘proximity’ communication devices via standard protocols such as Bluetooth 5.1 or 5.2.”* It is also used for other purposes, including alerting emergency services in case of an accident using long-distance communication technologies like 4G or 5G networks.

“Even better: users will have the ability to add new features and services throughout the vehicle’s life, with regular updates to always benefit from the latest software versions thanks to Over-The-Air (OTA) technology. We are working on this to enhance the reliability and safety of these technologies.”

The source of data for connected vehicles

And connectivity doesn’t stop at the vehicle itself. To be aware of traffic conditions on their route, users can rely on information from other vehicles on the path. *“Take for example”,* suggests Julien Fouth, *“a navigation system capable of providing an alternative route when the originally planned route is congested. This is possible thanks to preceding vehicles that have detected the traffic jam and communicate in real-time to the cloud.”*

Connected vehicles are also able to exchange information with their environment, specifically with certain road infrastructures: a tunnel, an intersection, a traffic light, etc. *“All of this already exists,”* he clarifies, *“but not in real-time.”* There is still a lot of latency in the cloud. However, given how quickly computing power is evolving, we can remain optimistic about improving user safety with more immediate information.

Not all autonomous vehicles are truly autonomous

Often, driver assistance is confused with true autonomous driving, which does not yet exist. The SAE (Society of Automotive Engineers) distinguishes five levels of automotive autonomy.

“Level 1 involves simple driver assistance, such as the beep that sounds when approaching an obstacle,” explains Julien Fouth. *“Level 2 is considered semi-autonomous driving, where the vehicle can be controlled by features like adaptive cruise control. Level 3, known as conditional autonomous driving, allows a vehicle to park itself, with control over both longitudinal and lateral movement. Level 4 vehicles are autonomous in structured environments; these exist today. Level 5 vehicles handle everything completely autonomously but are still under development.”*

The essential features of the autonomous vehicle

To clarify, what is expected from an autonomous vehicle? It must be capable of perceiving its environment, meaning it should be able to see, hear, and know where it is located—just like a human driver.

To achieve this, the autonomous vehicle is equipped with a range of sensors, such as cameras, radars, or lidars, which must work together to understand all situations. These components need to be integrated into a single temporal and geometric framework to merge their data and improve performance. *“This step of environmental perception by the autonomous vehicle is crucial,”* says Julien Fouth. *“We differentiate between the vertical perception of objects, such as pedestrians, cyclists, and motorcyclists, and the horizontal perception of road signs, such as crosswalks and solid lines. Different sensors are used for each!”*

Once an object is perceived, it needs to be positioned on a map. Working with high-definition mapping is complex due to the vast amount of information. *“Moreover, the autonomous vehicle operates based on dynamic mapping,”* he emphasizes, *“to know what is happening in front and behind it. Additionally, the vehicle uses satellite data (GPS...). Our challenge is to correlate the information from the vehicle’s sensors with that from the satellites, with centimeter-level accuracy!”*



Make decisions and act

In addition to perceiving its environment, the autonomous vehicle must also be able to make decisions: stopping in front of an obstacle, manoeuvring around it, overtaking the car in front, or even turning around. The onboard technologies will also be able to take into account the driver’s preferred style of driving, whether it’s sporty or eco-friendly. This consideration translates into rules for longitudinal and lateral control, defining instructions for engine torque, braking, or steering angle control.

“When taking into account the driving behaviour of drivers, we enter into significant complexity,” observes Julien Fouth. *“The autonomous vehicle must operate alongside users with highly varied driving habits while also adhering to traffic laws. A human driver is aware of what might happen with other drivers. This is where artificial intelligence plays a role in assessing different situations. We are talking about situational intelligence.”*

To then take action, the autonomous vehicle must do so safely. *“In this context, it must adhere to progressive rules. Control instructions cannot be applied in an all-or-nothing manner; They must be gradual, for the comfort and safety of the vehicle’s occupants. This is the challenge of interactions between the chassis and the transmission system, to replace the driver’s hands and feet.”*



Modelling and Artificial Intelligence

To make these functions work together, the automotive industry uses both traditional computational tools, notably to model vehicle behaviour, and artificial intelligence in the quest for full autonomy. *“In this context, artificial intelligence needs to be able to explain its decisions and actions,”* insists Julien Fouth, *“which it currently cannot do. SEGULA Technologies is working precisely on this ‘explainable artificial intelligence’.”*

More broadly, the company has specialised in the entire range of connected and autonomous vehicle offerings, from design to industrialisation: developing ADAS (Advanced Driver Assistance Systems), algorithms to manage sensor data, both individual and combined, designing decision modules of varying complexity, and conducting virtual validation activities... Virtual validation is one of SEGULA Technologies’ strong areas of expertise. In the case of an autonomous vehicle, to test all its functions in every possible situation, it would need to drive millions and millions of kilometres over years. This is economically very costly, if not impossible for manufacturers. Therefore, validation through the generation of various driving scenarios is THE solution. A virtual solution mastered and implemented by SEGULA Technologies.

“Our services benefit from ongoing monitoring of the state-of-the-art in autonomous mobility,” concludes Julien Fouth. *“We work with a startup ecosystem to stay abreast of sector innovations. This way, we are better equipped to support our clients’ needs and to be ‘drivers’ of the vehicles of tomorrow.”*

VALIDATION AND CERTIFICATION TESTS

With the acquisition of significant parts of a development centre in Rüsselsheim and the operation of the Rodgau-Dudenhofen (Germany) and La Ferté Vidame (France) test centres, SEGULA Technologies has the engineering and testing expertise of an automotive manufacturer.

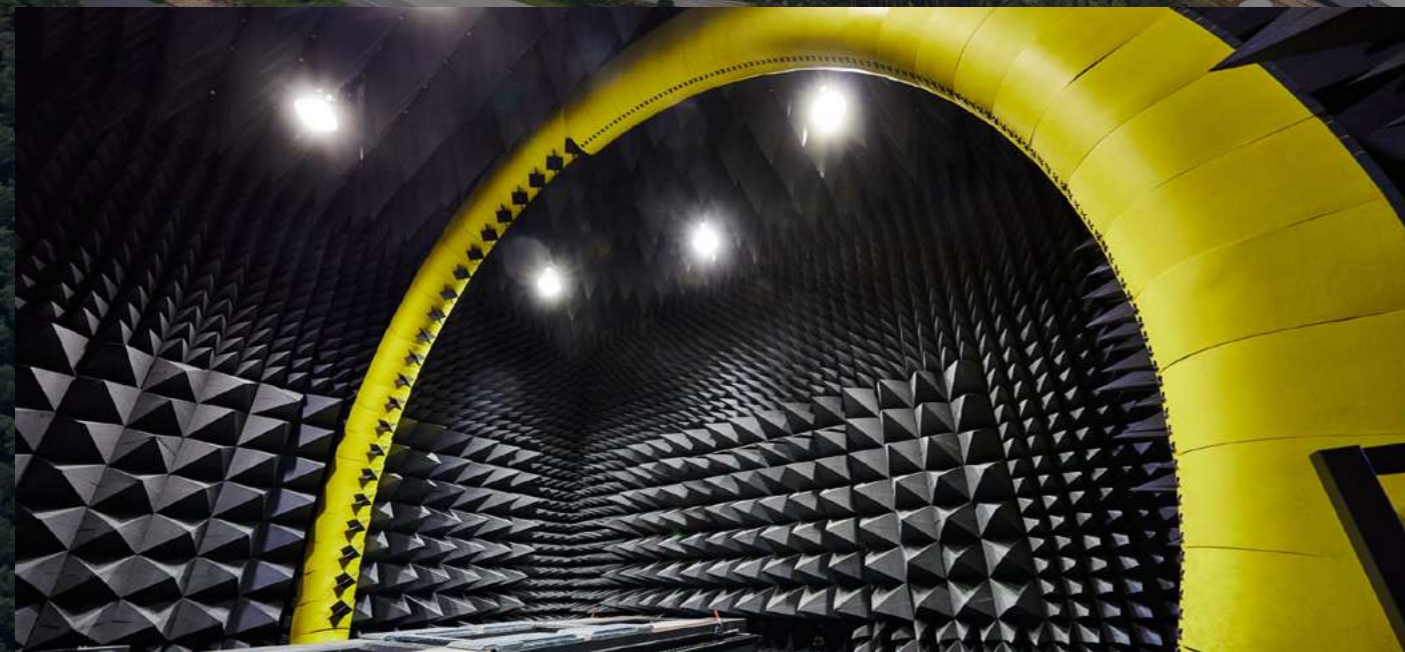
Within our own independent infrastructure, we test complete vehicles, systems, subsystems, and components for automotive manufacturers and suppliers.

Our automotive test centres in Germany

In Germany, SEGULA Technologies is the full-service provider for the automotive industry, offering comprehensive development and testing services for complete vehicles and all drive systems. The highly qualified and specialised teams have mostly gained extensive experience with globally recognised equipment suppliers. These team members joined SEGULA Technologies after the outsourcing of Opel's engineering activities in 2019. These roots highlight the company's approach, which integrates the mindset of equipment suppliers with the proactive initiatives of an engineering service provider.

The Rüsselsheim test centre, equipped with state-of-the-art testing infrastructure, and the multifunctional Rodgau-Dudenhofen test centre, which features over 20 different test tracks across 280 hectares, are significant assets of the Group. Located near Frankfurt Airport, in the heart of Europe, these facilities, along with eight other sites across the country, offer clients a comprehensive range of development, testing, validation, and certification capabilities.

SEGULA Technologies' service portfolio includes powertrain development, NVH (Noise, Vibration, and Harshness) testing, antenna and electromagnetic compatibility testing, connectivity testing, autonomous vehicle (ADAS) testing, fuel cell testing, as well as emissions and chassis-related topics, among others. Combined with the group's nearshore and offshore service centres, SEGULA Technologies covers virtually the entire V-model development cycle in automotive engineering.



VALIDATION AND CERTIFICATION TESTS

SEGULA Technologies, a major player in automotive test centres

In the automotive industry, ensuring the quality and safety of vehicles is a top priority. At the heart of this imperative are tests, an essential step to guarantee the performance, reliability, and compliance of automobiles. Within SEGULA Technologies, the testing centres play a crucial role in the development and validation of vehicles.

Driving Activity

Track or road testing evaluates various aspects, such as vehicle behaviour, wear over a specified endurance mileage, and the functional validation of systems and subsystems. These tests cover a broad range of parameters, including specific tests to assess towing and hauling capacities. SEGULA Technologies also conducts OBD (On-Board Diagnostic) tests on internal combustion, hybrid, and electric engines to check powertrains, as well as ADAS tests focused on advanced driver assistance systems to assess their effectiveness and reliability in real-world conditions.

With its expertise and centres, SEGULA Technologies offers clients tests on maximum acceleration capabilities, braking performance on obstacles, and resistance to external elements such as water, dust, and corrosion. The test centres also conduct urban condition tests, with frequent stops and low-speed travel (traffic lights, road signs), simulating daily driving conditions and detecting potential faults or blockages. Break-in phases over several thousand kilometres are carried out to identify any defects, such as loss of power or abnormal warning indicators.

The Group places particular emphasis on vehicle disassembly to inspect every weld point and ensure optimal structural integrity.

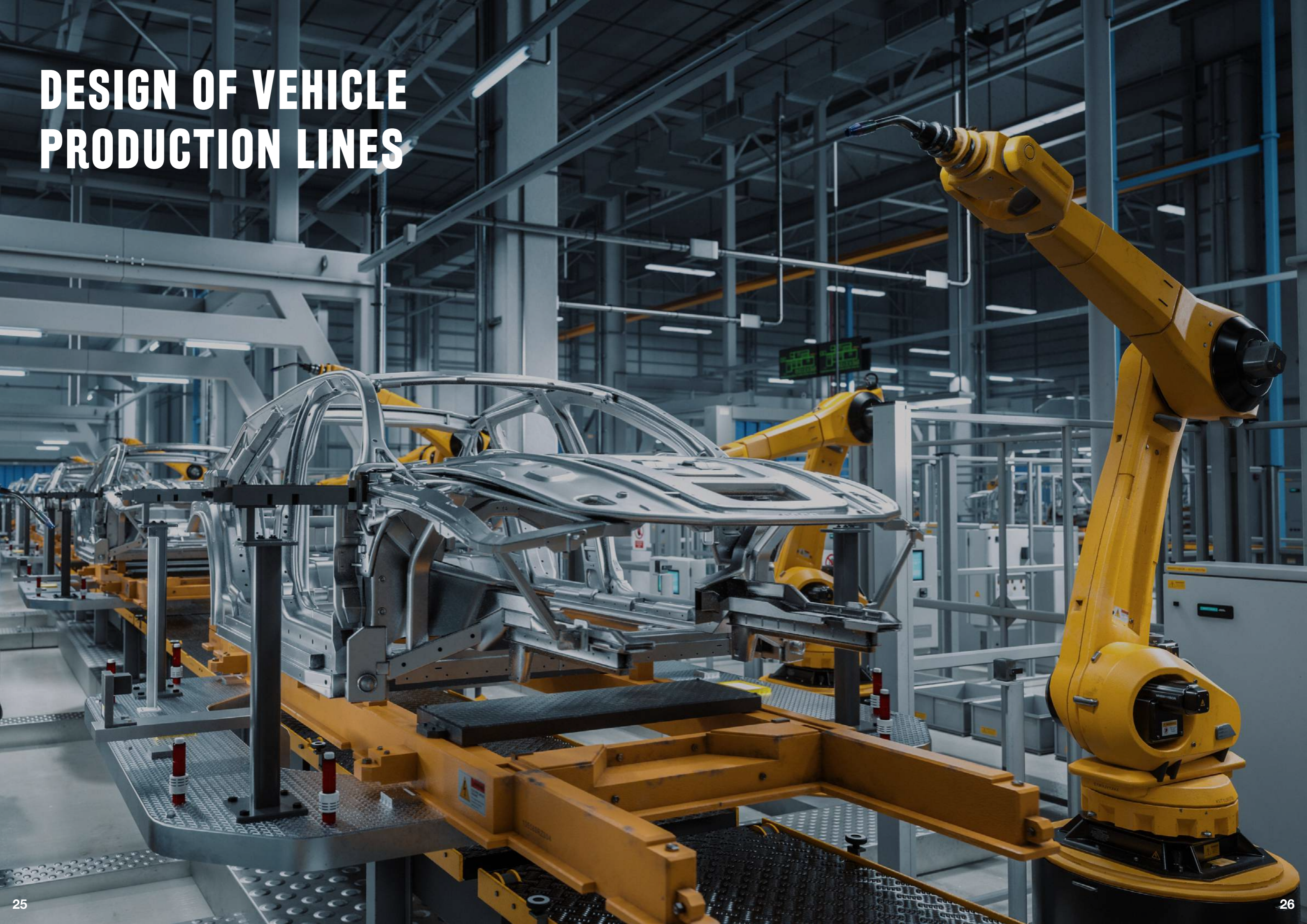
Variety of Circuits and Outdoor Testing: Simulation as Close to Reality as Possible

SEGULA has a diverse range of test circuits, allowing the simulation of a multitude of road conditions, from cobblestones and mountain tracks to unrestricted highways, as well as simulating various vehicle loads using mannequins or static weights.

Outdoor testing, with a mix of city, road, and motorway driving, provides a realistic perspective on vehicle performance in varied environments, including abroad for driver assistance system testing.



DESIGN OF VEHICLE PRODUCTION LINES



What is industrial performance?

Efficiency. Agility. Sustainability. For industrial companies in the automotive sector, success often starts with operational excellence within production units. This is a strategic challenge for which SEGULA Technologies offers tailored support with a proven methodology.

"Today, a high-performing factory is not just one that produces more. It is primarily a factory that is agile enough to respond to product diversity and production rhythm variability." In addition to proven expertise in industrial engineering, Serge Silvani, Director of the Manufacturing Engineering Division, also has an undeniable sense of formula... and timing! The observation summarised by the Industrial Strategy and Performance Manager at SEGULA Technologies is now shared by most automotive industry players. These companies must disrupt their habits in the era of Industry 4.0, Artificial Intelligence, and ecological transition. The challenge remains to turn this awareness into a real transformation strategy on the ground. What objectives should be set? Which actions should be prioritised? How should one adapt without impacting? Should everything be started from scratch or should the existing be improved? It is precisely to answer all these questions - and many more - that SEGULA Technologies now offers industrial players a tailored and proven solution in industrial strategy and performance. In other words: a customised and proven solution to help major automotive groups improve the performance - economic, technological, human, or energy - of their industrial systems in record time.

Perpetual adaptation

Based on a methodology inspired by lean management principles, SEGULA Technologies' strategic support aims to elevate production units to a high level of performance both today and in the future. *"In the automotive market, everything is always accelerating: technological advancements, product range renewals, and even consumer expectations. Manufacturers and suppliers must therefore be increasingly flexible and ready to adapt to the constant market changes. This is exemplified by the challenge posed by the rise of electric powertrains, which have become dominant in just a few years."*

In practice, these strategic choices for industrial performance can address various issues faced by the company: competitiveness, sustainability, human resources management, and cost reduction. They also come into play at different stages of an industrial project, whether it's creating a new production unit, improving the performance of an existing factory, or preparing for an expansion or relocation project.

From the existing factory to the excellent factory

In all cases, the implementation of an industrial performance strategy must aim for excellence to yield long-term benefits. *"The manufacturer must be able to measure the performance gap between the existing factory they have today and the excellent factory they will have tomorrow after their efforts. The goal is clearly to achieve a leap in performance. This is precisely the promise of our strategic support offer, which is based on SEGULA Technologies' experience, technical expertise, and global benchmarking capability,"* summarises Serge Silvani.

In three words? A winning strategy.



SEGULA Technologies' support offering in 3 questions

What is the proposed methodology?

We optimise the processes of our industrial clients based on lean management principles. The pre-project phase consists of two stages. First, the diagnostic phase, during which we analyse and understand the company's issues. This involves site visits, expert interviews, and on-site measurements. We then move on to the framing phase, which aims to define the scope and objectify the project. This includes drafting feasible scenarios, setting quantitative objectives, and proposing optimisation strategies. After these two pre-project stages, we move on to the implementation phase. Here, we develop the chosen scenario, monitor project progress, and work towards achieving the productivity goals while adhering to the planned schedule and budget.

How does this support process work?

Whether they are SMEs, mid-sized enterprises, startups, or large corporations, we consider our clients to be true partners. Throughout the support phase, we prioritise transparency and open communication to ensure mutual understanding and effective collaboration. Depending on the project's needs, we can deploy SEGULA Technologies experts directly to the client's sites and/or work remotely. With a presence in over 30 countries, we are able to advise industrial clients close to their locations. We can also leverage our network of global partners to offer additional solutions to our clients, for example, on emerging technologies or niche subjects.

Why trust SEGULA Technologies?

Thanks to our high-level skill set, we are able to assess an industrial system in record time across a range of areas including strategic vision, supply chain, quality control, IT, and automation. We have 1,800 technical experts in-house who specialise in industrialisation, as well as lean manufacturing, project management, and innovation specialists. On a group scale, we undertake over 150 R&D projects annually. In the automotive sector, we are already involved in gigafactories, Industry 4.0, and artificial intelligence for manufacturing. This innovative and pragmatic expertise benefits our clients through our strategic support missions.

Tooling Automation Systems

SEGULA continues to develop its “integrator” activity for the automotive sector by focusing on high-value-added projects on a global scale. In a context where manufacturers are looking to further robotise their plants, SEGULA Technologies leverages its expertise in robotics to meet their needs. This know-how enables the Group to design automated production lines with advanced positioning interfaces for vehicle assembly.

SEGULA offers its clients turnkey solutions. The Group supports them from the pre-project phase through to the implementation of a ready-to-use manufacturing process (pre-treatment engineering, process validation, manufacturing study documentation, product, and process optimisation).

Our expertise

Robotised production lines

Design: Advanced engineering enables the creation of robotised production lines tailored to each client’s specific needs, optimising the configuration to maximise efficiency and productivity.

Manufacturing: SEGULA oversees the production of components, ensuring high-quality standards through rigorous processes and the use of advanced technologies.

Commissioning: On-site integration and thorough testing ensure the commissioning process is secure, guaranteeing that each production line operates optimally from the start.



Automated production cells

Design: The design team works closely with clients to develop customised cells, incorporating the latest robotic and automated technologies.

Manufacturing: The production of automated cell components is carried out with precision, ensuring the quality and durability of the equipment.

Commissioning: On-site installation is accompanied by rigorous testing to ensure the proper functioning of the cells, minimising the risk of interruptions and optimising productivity.

Optimisation: Once in production, SEGULA Technologies provides continuous optimisation services, adjusting processes to improve performance and reduce costs.



Industrial transfer

Relocation of industrial lines: SEGULA ensures the relocation and reinstallation of industrial equipment with remarkable precision and efficiency.

Space optimisation: By reorganising the production space, SEGULA optimises the use of surfaces, contributing to improved ergonomics and increased productivity.

Timeline optimisation: Effective management of timelines helps to minimise production interruptions, ensuring a quick and efficient restart.

Securing the commissioning: By securing each stage of the commissioning process, SEGULA ensures a swift and seamless resumption of production without disruption.

Tooling manufacturing

Studies: In-depth technical studies enable the design of custom tools that meet the specific requirements of clients.

Machining: The use of state-of-the-art machines ensures extreme precision in tooling manufacturing.

Assembly: The assembly is carried out with great precision, ensuring the reliability and performance of the tools.

Geometry: Rigorous geometric checks are performed to ensure that each tool meets the defined tolerances and specifications.

Process optimisation

Optimisation of Systems and Work Environment

Maintenance of Lines and Cells to Extend the Efficiency and Longevity of Machines



New assembly lines for a major French manufacturer’s site

A French automotive manufacturer is modernising one of its sites to produce a new utility vehicle and increase its production capacity. The goal is to create a supplier ecosystem, including integrators capable of redefining and installing new production lines without interrupting the current production. The challenge? **To integrate new lines capable of producing up to 43 different versions of the vehicle in record time.** SEGULA’s TAS division was selected for this task due to its proven expertise in integration.

Our Missions:

Study: Development of 3D production processes based on client specifications, including the installation of robotic lines and programming of automation systems.

Manufacturing: Procurement and fabrication of necessary equipment, collaborating with partners in Turkey and India, followed by adjustment and delivery to the client’s site.

Commissioning: Installation and adjustment of lines during production stops, ensuring their reliability and ramp-up of production speed.

Project Management: Coordination of various tasks, adhering to schedules and the manufacturer’s quality standards.

The Project in Numbers



50
People involved

3
Years of continuous operation for the launch of 5 vehicles

45
A planned production of 45 vehicles per hour

‘Industry 4.0 pioneers today will have a real competitive advantage tomorrow’

What is Industry 4.0? What are the challenges and trends to follow in digital transformation? How does SEGULA Technologies establish itself in this field? Insights from Jean-Yves Beguin, Head of Manufacturing Engineering & Tooling North America.

Industry 4.0 is a hot topic today, but definitions often vary. What would be yours?

It's true that it sometimes seems like every expert has their own definition. At SEGULA Technologies, we consider that this concept describes the phenomenon of digital and technological transformation within a company. Thanks to connected devices, network data management, and artificial intelligence, our traditional industries—sometimes over a century old—now have new levers to improve their operational performance, industrial processes, and thus their profitability.

Industry 4.0 therefore represents a technological response to the major challenges facing the industry and the economy in general. The automotive sector is currently one of its main areas of application, as are major aerospace companies, which are becoming pioneers in this field.



So it's not just a passing trend?

I believe this criticism is no longer valid. Industry 4.0 is not just a trend, but a strategic transformation that has become indispensable in the industry. It is now a tangible reality. Certainly, relatively new processes emerging from artificial intelligence, industrial metaverses, or virtual twins still need to make their way into industries and prove their effectiveness. However, more mature solutions like connected devices and data tracking tools are now widely deployed in companies.

From a broader perspective, digital tools are increasingly of interest to members of our ecosystem. They have understood that by freeing up human time and eliminating the burdens of repetitive tasks, they can gain more time for creative or relational missions.

Moreover, in my view, the real debate is not about substituting humans with artificial intelligence, but about achieving a rapid return on investment, and thus profitability. Despite significant investments, digital transformation sometimes still struggles to demonstrate its impact on economic performance. For this to happen, it must become an essential component integrated into the strategy of industrial companies.

How does SEGULA Technologies position itself on this topic?

To successfully navigate the strategic shift to Industry 4.0, manufacturers need reliable partners who can understand their current challenges and, more importantly, their future ones. Industry 4.0 is not a one-size-fits-all solution; it must and should be customised for each company.

While Industry 4.0 technologies are available, fully exploiting them remains a challenge. This observation guides our support. Well-versed in technological and operational issues, our teams assist our clients in implementing solutions tailored to their current realities. This can involve a comprehensive approach over several months, with SEGULA Technologies resources integrated into their team, or more specific tasks addressing targeted needs.

For instance, I'm thinking about launching a predictive maintenance approach or designing a digital twin of an industrial site or production line (Building Information Modeling). In all cases, on the ground, Industry 4.0 should enable our clients to make anticipatory decisions, being better informed through data-driven insights. This is our commitment.

And what about tomorrow? Industry 4.0 is inevitably a discipline of endurance...

Indeed, digital transformation opens up new perspectives and opportunities for the industry, but it also requires long-term commitment and investments. Technological advances will continue to accelerate the pace of adoption of Industry 4.0 and transform industrial processes.

This phenomenon will concern more and more industrial sectors and more and more companies, including SMEs. Likewise, at SEGULA Technologies we foresee an intensification of partnerships between digital and industry players. A dialogue that will make it possible to more fully exploit Industry 4.0 technologies.

In other words: the benefits of digital transformation will materialise more as technologies evolve. And in particular artificial intelligence which will become increasingly important in industrial decision-making. These forecasts should encourage industrial leaders to get started without delay. Companies that invest in Industry 4.0 today will have a real competitive advantage tomorrow.

Is Europe the future leader in the battery ecosystem for electric vehicles?

With demand for electric vehicles expected to increase twelvefold between 2018 and 2030, the European automotive market is undergoing a significant electrification. The establishment of factories specialising in battery production is crucial for reducing dependence on imports, driving technological innovation, and revitalising our industrial regions. In response to these challenges, SEGULA Technologies offers its expertise to stakeholders looking to invest in this sector.

Roberto Vieira, General Director of automotive activities in France, has a clear ambition for European electric vehicle battery production: to develop a robust and competitive production capacity in Europe. Our goal is to: *build R&D centres for battery product definition, establish our own manufacturing units in Europe, scale up, and close the gap in this future-oriented field.* It is up to European manufacturers to quickly bring high-performance batteries to market in terms of range, availability, and power, to compete effectively. Let us remember that the government forecasts that two-thirds of new cars sold in 2030 will be electric, with this figure reaching 100% by 2035.

While the current share of electric light vehicles is about 2%, it must, according to the targets set by our policymakers, reach 42% in eleven years. Market prospects are enormous. In the current context of energy transition and technological revolution, the creation of battery manufacturing facilities on European soil represents a major opportunity for the continental automotive industry.

An environmental and economic challenge

On the ground, SEGULA Technologies positions itself as a strategic partner to advise major players in the sector on the execution of these ambitious projects. It supports, among others, the ACC consortium, which includes Stellantis and Mercedes, AESC France in Douai, whose batteries will equip the new Renault R5, and the partnership between Verkor and Renault in France for the future battery production plant in Dunkirk.

Behind this objective lies a dual challenge. Firstly, an environmental one, as locating production in Europe inherently reduces the carbon footprint of the final product. Additionally, it secures supply and reduces dependence on imports while eliminating the environmental cost of transportation. *"We must not forget that France has a significant advantage with its very low-emission energy, through its nuclear fleet and renewable energy sources,"* emphasises Roberto Vieira.

Secondly, a cost issue. *"The battery currently accounts for between 30% and 40% of the price of an electric vehicle."* Reducing the cost of battery production by relocating it will inevitably impact the final price for the consumer.

Furthermore, these factories are hubs of innovation where cutting-edge technologies are developed to improve battery efficiency, durability, and capacity. In other words, the construction and operation of battery factories are expected to generate numerous jobs and contribute to local and national economic growth.



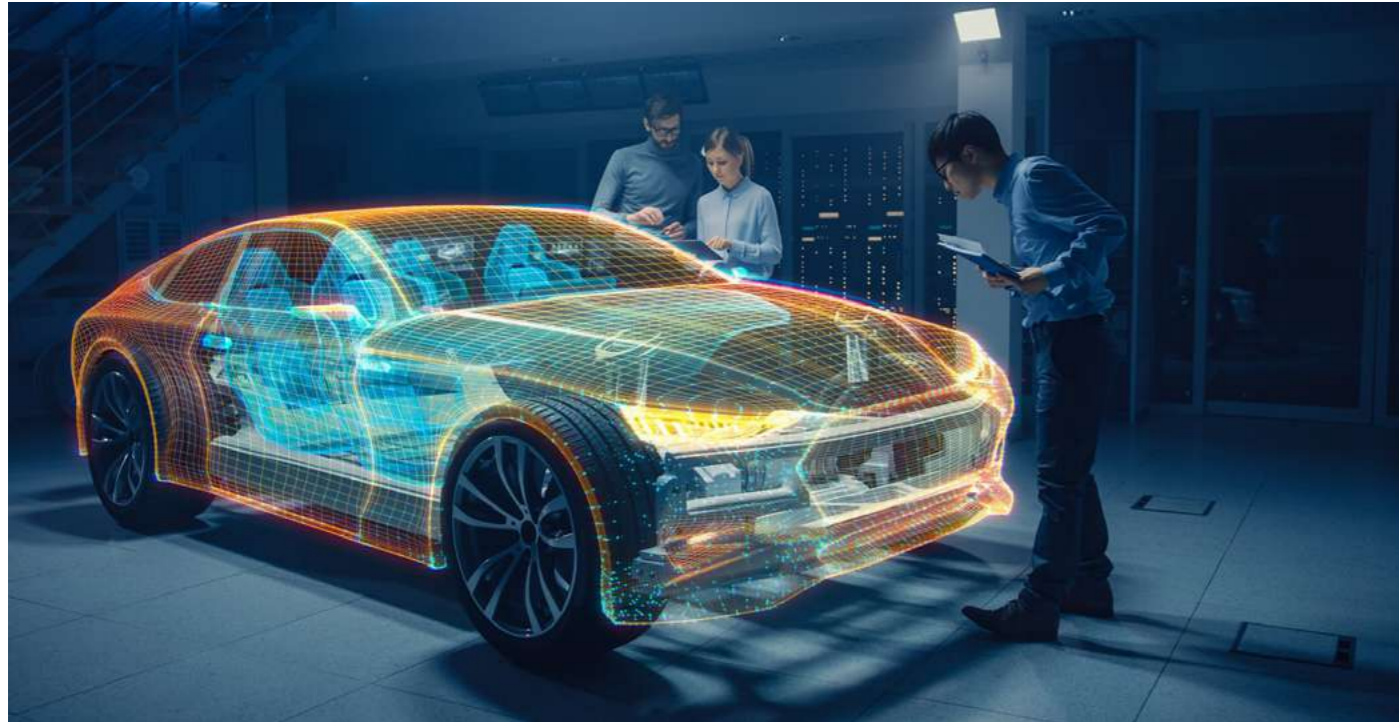
Technological challenges to overcome

That's the theory. Now, let's turn to practice. Europe's delay in this field is due to the fact that battery plants are complex facilities with significant technological challenges. *"Battery production is unique,"* warns Roberto Vieira. *"It involves a product with complex specifications, combining flexible components with more rigid ones."* Its manufacturing is divided into stages and requires expertise in electrochemistry, mechanics, and more. Training highly skilled teams to handle advanced materials is crucial. *"All of this requires technicians and engineers—each an expert in their field—and top management to coordinate all the sectors, to achieve a high-performance product,"* adds the expert, who notes that the gap with the Asian market will gradually close. *"Our first clients include R&D centers in the field of product development, pilot units resembling mini battery manufacturing entities to iterate, learn, and fine-tune these machines to reach optimal performance and safety levels. Once these processes are mastered, they will need to be scaled up with the help of gigafactories,"* emphasizes Roberto Vieira.

In the meantime, SEGULA Technologies' support for battery factory projects covers various areas: feasibility studies, strategic planning, construction supervision, coordination, commissioning, and innovation integration. This multidisciplinary expertise has built SEGULA's reputation for excellence in the automotive world and is now available for European battery ecosystem players to tackle their current and future challenges.



Analysis of automobile competition: SEGULA's benchmarking workshop



The automotive industry is in constant evolution, with manufacturers competing to offer the most advanced technologies, the most appealing designs, and the most innovative performance. In this context, SEGULA's benchmarking workshop plays a major role in evaluating the competition through meticulous and in-depth vehicle analysis.

The benchmarking workshop combines cutting-edge technological equipment with the extensive experience of the teams to provide clients with ultra-precise technical analyses of vehicles according to their needs: detailed analysis of the technologies used piece by piece, integration of battery packs, and other aspects such as power electronics and material types.

To achieve this, the workshop experts dissect each vehicle to analyse its functioning and distinctive characteristics. From powertrains to advanced embedded electronic systems, all components are examined using the latest technological innovations.

The deliverable, a detailed and precise analysis of the results, will enable clients to refine their product strategies and remain competitive.



From technical assistance to work packages, the need for results

For a long time, automotive manufacturers sought SEGULA Technologies exclusively for Technical Assistance (TA). With growing trust, the demand has now shifted to "work package" contracts. What is this? How does this organisation change the projects? What are the benefits for both parties?

Responses from Nicolas Dubois, Business Unit Manager, and David Le Buan, Prototype Project Manager.



Technical Assistance or Work Package: What are the differences?

When a client engages SEGULA Technologies for a project, they might request the provision of activities defined by the client. "This is what we call a 'Technical Assistance' contract," explains Nicolas Dubois.

Another option is the work package contract with SEGULA Technologies, under which the company must deliver specific outputs—also known as "units of work." "For example, in logistics procurement, these deliverables might include order placements, delivery tracking, system confirmations, etc.," he continues. "The work package requires both a commitment to resources and results. However, we are free to organise ourselves as we see fit to deliver these outputs effectively."



At least 15% savings

The main advantage of the work package organisation for the client is economic. *“The benefit amounts to a minimum of 15% compared to Technical Assistance,”* reveals David Le Buan. *“The advantage for us is the freedom to organise ourselves, with control over the project. We can manage the activity in our own way, which allows us to be more efficient, agile, and productive. We can consolidate certain tasks, which saves time and enhances performance. These benefits are also valuable for the end client!”*

In the context of the previously mentioned logistics procurement project, SEGULA Technologies transformed the client’s operations. With a large number of parts to procure (1,000 to 1,200 parts per vehicle, including wiring, wipers, seats, carpets, etc.), synchronising team operations ensures maximum efficiency.

“Thanks to these benefits and our good results, the client increasingly entrusts us with more activities,” notes David Le Buan. *“This is the principle of the work package organisation: the more missions we have, the more effective we can be because we can consolidate our tasks!”*

Highly satisfied clients

“We have been involved in this activity for nearly 20 years,” reports Nicolas Dubois. *“Our expertise is well known and recognised by the client. The shift to work packages has had a real positive impact, as clients increasingly entrust us with higher-stakes projects, such as new electric vehicles. This increased responsibility is also accompanied by improved client satisfaction scores.”* Clients appreciate not only SEGULA’s staff competencies but also our skills across a wide range of fields and our global presence.

“This diversity allows us to showcase our expertise to clients. It’s our strength! Regardless of the structure or activity, we can provide the necessary skills and implement effective work package organizations. We can even offer proposals to define clients’ needs when they require support.”

FROM TECHNICAL ASSISTANCE TO WORK PACKAGE

The stage after the work package: the turnkey project

With increasingly stringent pollution standards (Euro 7, LEV 7 in Brazil, Bharat 6 in India) and the push towards electrification, automotive manufacturers need to innovate more than ever in terms of vehicle powertrains. A major player in the sector, for example, has chosen to outsource the production of prototypes, which the group then tests to ensure that the engines meet the expected requirements.

In 2020, SEGULA Technologies was selected to assemble the prototypes for the manufacturer, thanks to its technical offering, budget proposal, and extensive experience with thermal vehicle engines: a turnkey project, completed from A to Z.

“With our client, we work daily towards a common goal. We are true partners. That’s one of the secrets to our success. We’ve built a relationship of trust, and this close collaboration has grown year after year. We are ready to extend this turnkey service to other clients across all geographical regions, guaranteeing cost efficiency, agility, quality, and productivity.”

Nicolas Dubois – Business Unit Manager for Prototype Engine Manufacturing for Stellantis at SEGULA Technologies.

Expectations

The automotive manufacturer is seeking a provider to support a continuous improvement mission for its engines.

The supplier needs to be able to manage projects as they progress through various phases of launch.

The client wants a partner capable of handling all aspects involved in the supply chain and engine manufacturing processes.

SEGULA Technologies’ Missions

- Purchasing management
- Methodology oversight
- Warehouse management (storage and reception)
- Forklift operator
- Order preparation
- Engine manufacturing

Benefits for the Client

- Economic advantage
- Increased productivity
- Optimal organization
- Ongoing skill development
- Real versatility of multi-skilled staff

Key Figures



1
country in front office

2
countries in back office

3,67 / 4
the rating, described as excellent for the quality of services in 2023

The expertise of the Slovakia, Serbia and Czech Republic region

SEGULA Technologies has automotive experts in over 30 countries. Focus on our expertise in Slovakia, Serbia, and the Czech Republic.

With its two branches in Serbia and the Czech Republic, SEGULA Slovakia offers a multitude of teams specialising in three key areas:

- Process Engineering
- Product/Process Compliance
- Logistics Engineering

With teams in Slovakia, Serbia and the Czech Republic, SEGULA Technologies is well positioned to support its customers' complex industrial projects, from the design phase through to implementation. Their wide-ranging expertise guarantees optimum management of every aspect of the project, ensuring that all the elements are perfectly aligned to achieve the defined objectives.

Focus on its activities

Process engineering

The Process Engineering department at SEGULA Slovakia stands out for its specialized expertise in final vehicle assembly lines and battery production lines. Co-design is central to their approach, ensuring perfect synergy between vehicle design and manufacturing processes. The creation of assembly ranges, developed with precision, provides detailed instructions for assembly, thereby ensuring efficient and high-quality production. Balancing workstations is also a priority, optimising workflow and minimising downtime on the production line.

Additionally, the team oversees the manufacturability and feasibility of parts, ensuring that each component meets production requirements. Their cross-functional activities include project management, quality control, and management, ensuring optimal coordination. Moreover, the department benefits from diverse expertise in stamping, welding, painting, automation, conveyors, and the implementation of Automated Guided Vehicles (AGVs), skills that enhance manufacturing efficiency and flexibility.



Product / process conformity

The Products/Processes Compliance department at SEGULA Slovakia offers comprehensive expertise in design, compliance, geometry, quality, and metrology. Its main commitment is to ensure the compliance of products and processes, making sure that every aspect of the vehicle meets the highest standards.

By focusing on quality and precision, the team ensures constant monitoring to guarantee that products and processes adhere to defined standards. Its methodical approach includes a thorough evaluation of every detail of the vehicle, from design to production, to ensure optimal quality at every stage of the process.

Additionally, the department stands out for its ability to effectively solve compliance issues, offering innovative solutions tailored to the specific needs of each project. With its sharp expertise and commitment to excellence, SEGULA Slovakia establishes itself as a trusted partner for ensuring the quality and compliance of products and processes in the automotive industry.

Logistics engineering

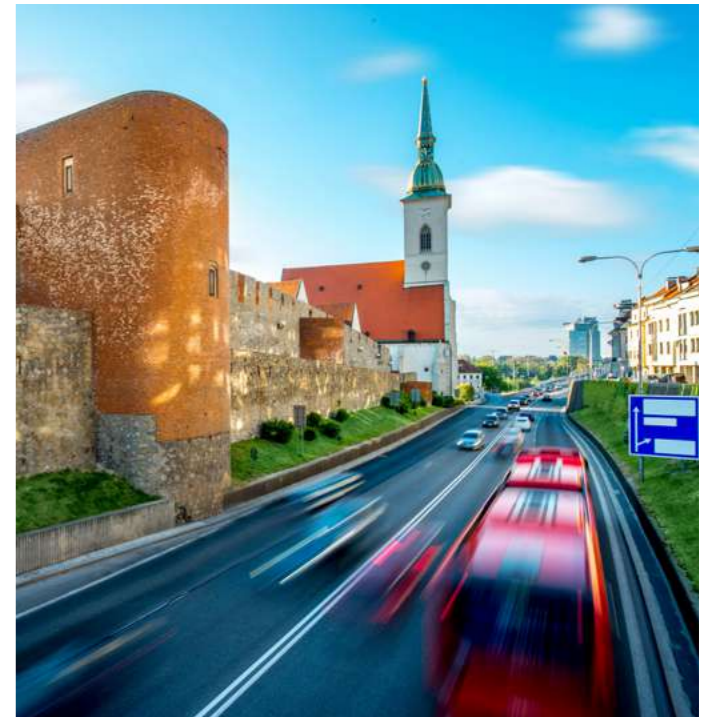
SEGULA Slovakia's Logistics Engineering department offers a comprehensive range of expertise in internal logistics, flow simulation, production site architecture, and parts storage logistics management. With an in-depth understanding of internal operations, our experts design efficient and optimised logistics systems that reduce waiting times and improve productivity.

Through advanced flow simulations, our team can anticipate needs and potential challenges, allowing for proactive adjustments to ensure smooth and seamless operations. Each production site's architecture is meticulously planned to maximise efficiency and minimise time and space wastage, ensuring optimal resource utilisation.

Regarding parts storage logistics management, SEGULA Slovakia is committed to precise inventory management, ensuring that necessary parts are available at the right time and place. Our rigorous approach guarantees optimal parts availability, contributing to smooth and efficient production flows.

Your ideal partner for your new projects

With its cutting-edge expertise and commitment to operational excellence, SEGULA Slovakia positions itself as an essential partner for industries looking to optimise their production processes and ensure product quality. If you want to leverage our proven expertise and tailored approach, do not hesitate to contact us today to explore how we can meet your specific needs and contribute to the success of your business.



From right-hand drive to left-hand drive: a turnkey project led by SEGULA Australia

SEGULA Australia, established in May 2020, quickly positioned itself as a key player in the automotive services sector. Offering a comprehensive range of design and validation services, the Australian entity has distinguished itself with its expertise in RHD (Right-Hand Drive) to LHD (Left-Hand Drive) conversions, in addition to its extensive skills in other areas of automotive engineering.

This expertise reflects the company's ability to tackle complex technical challenges and meet the specific needs of its clients.

Design architecture management: Design of innovative and functional vehicle architectures.

Programme management: Effective project management to meet deadlines and budgets.

Design Validation: Rigorous verification of compliance with standards and specifications.

2D and 3D CAD: Detailed two- and three-dimensional modelling to visualise and optimise designs.

Approval validation: Ensuring regulatory compliance and vehicle certification.

Production support: Technical assistance to ensure a smooth transition to series production.

Focus on our activities

Recently, SEGULA Technologies worked with RMA Automotive to adapt Ford's iconic F-150, the world's best-selling pickup, to right-hand drive. Ford Australia's objective was to bring the F-150 to the local market to compete with the Chevrolet Silverado and Dodge Ram.

In this re-engineering and remanufacturing project, SEGULA Technologies, drawing on its extensive industry experience, was able to supply a product designed and validated by the OEMs.

The vehicle will be offered in two trim levels, XLT and Lariat, and with a short or long wheelbase. Each vehicle is powered by a twin-turbocharged 3.5-litre V6 engine and has a towing capacity of 4.5 tonnes. Retail production began in 2023.

The project brought together more than 40 highly experienced automotive experts from Australia, France and India, and involved more than 60,000 hours of design and technical development.





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