PRESS KIT

ON SHOW AT IAA 2019 –
THE VALEO INNOVATIONS AT THE EPICENTER
OF THE REVOLUTIONS SHAPING MOBILITY

FRANKFURT – SEPTEMBER 2019
Press kit
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The 68th Frankfurt Motor Show (IAA 2019) will be open to the public from September 12 to 22. The event is no longer being promoted as the annual forum for the global automotive industry, but as the leading platform for unveiling the very latest developments in mobility. The shift in semantics and scope is a reflection of the trends currently disrupting both the industry and society as a whole. Powertrain electrification, autonomous vehicles and digital mobility are transforming the automotive industry today more than ever before. And Valeo innovations are at the epicenter of all three revolutions.

The biggest French patent filer with the European Patent Office (EPO), Valeo holds the number one or number two position worldwide in each of its businesses. Valeo is the world number one in powertrain system electrification, which is helping to reduce CO\textsubscript{2} emissions. Valeo is also the leader in lighting and wiper systems, as well as in driving assistance systems, which comprise all the sensors that act as the car’s eyes and ears. As for thermal systems for engines, battery cooling and passenger comfort, Valeo ranks number two worldwide.

The revolutions shaping mobility are already a tangible reality for Valeo. For example, a LiDAR (Light Detection and Ranging) – a type of laser scanner known in the automotive industry as the sensor of the future – has been marketed by Valeo since 2017. In fact, it’s the only LiDAR sensor in the world that meets automotive industry standards, is series-produced and is already installed in cars that are now on the road. IAA 2019 in Frankfurt provides the perfect opportunity to showcase the Valeo innovations gradually coming to market. All of these innovations help to bring vehicles in line with new uses, by making them safer, more efficient, better for the environment and people’s health, and more closely adapted to each user’s needs.

Electrical systems play an increasingly important role in the automotive industry. Valeo is working, for example, on innovative 48V systems that help reduce energy consumption. With their affordable costs, these solutions make hybrid and electric vehicles more widely accessible. In Frankfurt, Valeo is presenting a plug-in, family hybrid vehicle prototype equipped with a complete Valeo electrical system, including electric motor, onboard charger and DC/DC converter. The vehicle provides the best of both worlds, it can drive 40 km in all-electric mode at speeds of up to 70 km/h in urban environments and switch to the internal combustion engine for longer distances. At IAA 2019, Valeo is once again demonstrating how electric vehicles can be integrated in city power grids.

The Frankfurt Motor Show is also an opportunity for Valeo to unveil its latest advances in battery thermal management systems, a key challenge for the electric vehicle segment. Vehicle batteries must be kept at the right temperature when charging, in order to safeguard their lifespan and maintain the vehicle’s value.

Valeo’s goal of making its cutting-edge technologies more widely accessible also applies to the autonomous driving segment. Valeo offers the automotive industry’s largest range of sensors, comprising ultrasonic sensors, cameras, radars and LiDAR (Light Detection and Ranging) systems, and the onboard artificial intelligence system which interprets the data collected to enable the vehicle to operate in its environment. It also develops extremely advanced cleaning systems to ensure that these sensors work reliably in all weather conditions and are never soiled. Valeo also draws on its unique expertise in vehicle visibility, acquired through its extensive experience in lighting and wiper systems.

With behaviors evolving and digital tools granting access to new ways of getting around, Valeo is developing technologies that promote the rise of intelligent mobility. One example is Valeo VoyageXR, an innovation presented in Frankfurt that reflects the growing trend of experience-sharing. With this new Valeo innovation, someone outside the vehicle can become a virtual passenger, turning an isolated, individualistic journey into a shared, immersive experience.

With over 2 billion euros or close to 13% of original equipment sales invested in Research and Development in 2018, innovation is at the heart of Valeo’s strategy. Valeo’s innovative technologies offer clear insights into what mobility will look like in the future. And given that some of the products and functions developed by Valeo are already being fitted in vehicles coming off the assembly line today, that future is very near.

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**Did you know?**

**Revolutions synonymous with growth and value for Valeo**

By developing innovative technologies that are critical to the three revolutions shaping mobility, Valeo is significantly increasing the value it contributes to vehicles.

**Electrification**

\[ x2 \text{ à } x9 \]

depending on the technology (low- or high-voltage systems, plug-in hybrids, etc)

**Autonomous vehicles**

\[ x10 \]

The more autonomous driving technology available in the vehicle, the greater the value contributed by Valeo.

**+85%**

the average increase in Valeo’s share of the value in new automaker platforms launched in 2019.
In its annual bulletin published at the end of 2018, the World Meteorological Organization (WMO) warned that concentrations of heat-trapping carbon dioxide (CO₂) had reached another record high.

The specialized UN agency also warned against a “dangerous rise in temperatures”. “The last time the Earth experienced a comparable concentration of CO₂ was 3-5 million years ago, when the temperature was 2-3°C warmer and the sea level was 10-20 meters higher than now,” the WMO said.

**CO₂-reducing technology accounts for more than 50% of Valeo’s sales**

Valeo has long specialized in designing systems that help to reduce emissions of CO₂ and other pollutants such as NOx and particulate matter.

In 2018, products that directly or indirectly contribute to reducing CO₂ emissions accounted for more than 50% of total original equipment sales (products sold directly to automakers for new vehicles).

Valeo invented the Stop-Start system that now equips millions of vehicles across the world. And it leads the field in vehicle electrification, with a large range of low- to high-voltage systems.

In addition to the electric motor itself, Valeo develops the related power electronics: inverters, which act as the brain of the electric vehicle, onboard chargers, and DC/DC converters, which convert a source of direct current from one voltage level to another.
Valeo, a key driver of cleaner mobility

Coming soon

Vehicle electrification, a fast-growing market

Less diesel and less CO₂ equals more electrification
The math is simple. To achieve the CO₂ reduction targets set by regulators and given the decline in diesel, automakers will inevitably have to electrify their entire vehicle offering, whether though partial or all-electric solutions.

Valeo develops electrification technologies spanning all vehicle segments and all uses, from small urban cars to premium sedans and SUVs. Its advanced systems range from low-voltage solutions to high-power motors.

+65%
Since 2015, annual growth in the electric vehicle market has averaged 65%. While only 2 million units were sold in 2018, the market is expanding sharply every year and shows no signs of slowing down. All the consumer studies conducted for Valeo show that electric vehicle buyers have no intention of going back – their next vehicle will be electric too.

Strict regulations introduced by states and cities, the new demanding regulators

1g of CO₂ is twice as expensive as 1g of gold
From 2021, the average emissions of all new cars sold by each automaker in Europe must not exceed 95g CO₂/km. For each gram over the limit, automakers will be fined 95€. The price of a gram of CO₂ in Europe will therefore be more than double the price of a gram of gold (around 40€ today).

Cities, the new mobility regulators
Auckland, Barcelona, Cape Town, Copenhagen, London, Los Angeles, Mexico, Milan, Paris, Quito, Seattle and Vancouver have all promised to ban internal combustion vehicles by 2030.
Valeo, a key driver of cleaner mobility

Coming soon 🗓

Valeo, world number one in electrification

10.5 billion €
At the end of 2018, the cumulative order intake of Valeo Siemens eAutomotive – the joint venture dedicated to high-voltage electrical systems – represented 10.5 billion euros. Created at the end of 2016, Valeo Siemens eAutomotive is probably the fastest-growing business in the history of the automotive industry.

48V all-electric urban car prototype
Valeo has leveraged its pioneering expertise in 48V systems to develop an all-electric urban prototype that operates at 48V. With a top speed of 100 km/h and a range of 150 km, the solution is ideally suited to city driving. It is also more economical, making all-electric vehicles more affordable for all.

Battery- or hydrogen-powered electric vehicle? Either/or!
While the future of vehicles is definitely electric, it is still unclear whether batteries (of any kind) or fuel cells will be used to power electric motors. At Valeo, it makes no difference because our technologies work just as well with both energy sources.

Valeo, the electric mobility champions
In addition to cars, Valeo uses its 48V systems to electrify other types of vehicles:
- autonomous shuttle buses;
- robotaxis;
- two- and three-wheel vehicles;
- delivery droids.

Powering homes and cities
In partnership with China-based X-Charge, Valeo has developed a system that recovers electrical energy from vehicles and sends power to the electricity grid or to homes, for use during peak demand.
Valeo, a key driver of cleaner mobility

Already here ✔

Valeo is the world number one in 48V systems for electric and hybrid vehicles, accounting for 40% of global order intake. The value of Valeo content per vehicle has doubled.

Through Valeo Siemens eAutomotive, Valeo is the world number one in high-voltage (> 60V) systems for electric vehicles. The value of Valeo content per vehicle has increased from sevenfold (full electric) to ninefold (plug-in hybrid).

48V = 95% of the benefits for 60% of the cost
Valeo’s 48V low-voltage hybrid system offers 95% of the benefits of a conventional high-voltage hybrid system for 60% of the cost.

A world leader in battery cooling systems
Beyond powertrain systems, Valeo plays a key role in the development of the electric vehicle through its expertise in battery thermal management, an area in which it is a world leader. Valeo offers a full range of battery cooling solutions, including direct, refrigerant-cooled technology and indirect, water-cooled systems. In 2020, Valeo’s battery cooling systems will notably be integrated into the major electric vehicle platform of a leading German automaker.

Going a step further, Valeo will soon offer thermal modules as aftermarket components. This means that systems already on the market will be able to benefit from the latest cooling technologies adapted to the charging speed selected for the vehicle. Smart control of all thermal systems ensures optimum battery performance, during both charging and driving, while also preserving the battery’s lifespan.

30%
Valeo’s heat pump systems can extend an electric vehicle’s range by 30% in winter, while still keeping drivers and passengers warm. Users no longer have to choose between heat or range – they can enjoy both.

For even greater efficiency, Valeo’s engineers have developed Valeo Flexheater. This radiant heating system comprises a series of heating panels that are integrated into the car’s interior components, such as the dashboard, door panels, seat backs and armrests. The system creates a uniform temperature that delivers immediate comfort to each vehicle occupant, in absolute silence. Better still, it can reduce energy use by up to 30%.

The economic and environmental benefits of lightweight materials
Valeo has developed a composite material that reduces the weight of a vehicle’s structural parts by 30% compared with steel equivalents, at a comparable price. The ultimate result is a reduction in fuel consumption and CO₂ emissions and an increase in range for electric vehicles.

Valeo’s lightweight composite material is made of glass fibers impregnated with resin. An initial application has been found for the material in a component on the front end of the vehicle, which is subject to the highest rigidity and resistance requirements. The material also provides the same shock-absorption capacity, guaranteeing a level of safety equivalent to steel parts.
Valeo, a key driver of cleaner mobility

At the 2018 Paris Motor Show, Valeo unveiled the most comprehensive air quality map ever made in Paris. Thanks to sensors installed on a fleet of vehicles, Valeo collected real-time information on the concentration levels of six particles: fine particles (PM 10 and PM 2.5), carbon monoxide, nitrogen dioxide, sulfur dioxide and ozone. The collected data will facilitate the invention of new, cleaner mobility solutions.

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Valeo has developed Oxy’Zen, an in-cabin air purification system that eliminates 98% of ultrafine particles. The system is activated automatically depending on the level of outdoor pollution.

Clean Road
Valeo has developed Clean Road, an application that calculates the best route in terms of air quality. It takes into account the distance, speed and air quality along the way.
The autonomous vehicle revolution

Valeo is the world’s leading manufacturer of driving assistance sensors.

It offers the automotive industry’s widest range of sensors, comprising ultrasonic sensors, cameras, radars and 3D LiDAR systems. Valeo entered the market in 1991, with the first ultrasonic parking sensors. Since then, its innovations have helped improve driver safety, driving assistance and vehicle automation. Valeo’s sensors act as the eyes and ears of a vehicle while software gives it a 360° view of its surroundings. This technology places Valeo at the epicenter of the revolution in autonomous and connected vehicles, which is currently transforming the mobility market in general and the automotive industry in particular.

Did you know?

**1/5th of the global market**

That’s Valeo’s share of the driving assistance segment. Valeo alone holds 20% of the global. It continues to pursue its goal of making these advanced technologies more widely accessible.

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**Thousands of hours unnecessarily wasted in traffic jams**

By easing traffic flows, allowing car-sharing and increasing safety, autonomous driving helps reduce the unnecessary cost of congestion, in terms of both time and money. The economic impact of urban and suburban congestion is colossal.

It represents tens of thousands of hours wasted and billions of dollars in losses for local authorities around the world*. And that’s without taking into account the environmental impact. In more specific terms:

- Drivers in the United States lost an average of 97 hours due to congestion in 2018, costing the world’s leading economy 87 billion dollars or an average of 1,348 dollars per driver.
- Boston has the world’s highest cost of congestion per driver. At 2,291 dollars, it represents almost half of the city’s average monthly salary (estimated at 4,038 dollars**).
- London drivers recorded 227 hours wasted due to congestion in 2018, Paris 237 hours, up 7% from the previous year, and Frankfurt 107 hours, down 8%.
- Bogotá holds the world record for time wasted in traffic jams (272 hours per year).
- Dublin has the slowest city-center speeds, averaging 9.5 km (or 5.9 miles) per hour, versus a pedestrian walking speed of 5 km (or 3.1 miles) per hour.


** Source: Numbeo, one of the world’s largest databases made up of data contributed by citizens living in the cities analyzed.

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The autonomous vehicle revolution

That’s the number of ultrasonic sensors, cameras, radars and 3D LiDAR systems Valeo will produce over the next five years. It’s also the number that Valeo produced between 1991 and 2017, illustrating the speed at which this market segment is accelerating. The product volumes to come out of Valeo’s facilities between now and 2024 will be equivalent to the volumes produced over a full quarter of a century.

In 2018, Valeo recorded 1 billion euros in order intake for products designed for robotaxis. Deliveries of these series-produced products will begin in 2021. It also recorded 1 billion euros in order intake for systems featuring artificial intelligence (AI), such as ultrasonic sensors and cameras.

These figures reflect the existence of two booming markets. The first is the market for driverless shuttles, operated by fleet managers as a method of collective transportation. These vehicles are at an autonomy level of 5, the highest possible. At this level, the aim is to achieve full automation, on all types of journeys and in all weather conditions.

The second market is automated or intuitive driving for private vehicles. The aim here is to drive further progress in autonomy and safety. It is worth noting that the United States’ National Highway Traffic Safety Administration has found that 94% of road accidents are caused by human error. In these private vehicles, drivers can delegate the tasks associated with driving in certain situations, such as in traffic jams on the highway. This market has reached an autonomy level of 3, which means that the driver must be ready to take back control as soon as the vehicle indicates it can no longer handle the driving autonomously.
The autonomous vehicle revolution

Coming soon 📅

Beyond words and gestures

Autonomous vehicles require a new form of communication. The world leader in automotive lighting systems, Valeo is contributing its expertise in this area to help autonomous vehicles move safely and seamlessly through their surroundings. Important and useful information could be shared, in the future, via the use of new lighting systems. In addition to generating high-definition glare-free beams, Valeo’s high-definition LED solutions can also project light signals or pictograms onto the road. A car could therefore use its headlamps, for example, to create the image of a crosswalk, clearly indicating to pedestrians that it is safe to cross.

Anticipating the arrival of autonomous vehicles on the road, Valeo has already presented its Valeo PictureBeam Monolithic to automakers. Its aim is to offer a solution that improves road safety as well as offering new features for customization and comfort. With this innovation, the pixels of the light beams are formed directly at source on the chip. The module is therefore smaller and weighs less than other HD lighting systems on the market, making it easier to integrate into cars. This new type of LED chip enables a definition of several thousand pixels. Each pixel can be lit, switched off or adjusted at will, and is entirely controlled by an electronic system designed by Valeo.

Scaled-up cleaning systems

Increasingly autonomous vehicles are equipped with a multitude of sensors that enable them to analyze their surroundings. These sensors need to remain clean at all times. By 2024, one in four autonomous vehicles will be equipped with a Valeo cleaning system, developed thanks to Valeo’s experience in automotive wipers.

Valeo already offers automakers three fully automated cleaning systems for all types of cameras and LiDARs:

- its cleaning systems for cameras include several types of nozzles, usually with a small retractable arm, that spray just the right amount of cleaning fluid onto the external lens. These can be combined with drying systems, and Valeo also offers a de-icing feature to ensure maximum performance in winter;
- the Valeo everView Centricam keeps cameras’ field of view constantly clear, with rain, mud, dust and other particles removed by centrifugation;
- the Valeo LiDAR everView is a cleaning technology for LiDAR sensors that uses just 25 ml of cleaning fluid, versus 100 ml for competing non-automatic systems.

1 in 3

In 2021, one in three robotaxis will be equipped with a roof-mounted Valeo module comprising an onboard electronic control unit that controls several systems simultaneously, together with various types of sensors, including cameras and LiDAR scanners, and various cleaning and cooling systems. Only a system-oriented manufacturer like Valeo has the capacity to combine innovative technologies in such distinct areas to create an all-round solution for autonomous vehicles. This innovation is the result of synergies generated between Valeo’s different Business Groups.
The autonomous vehicle revolution

Already here ☑

Unique expertise

The only LiDAR system in the world that meets automotive industry standards, is series-produced and is already installed in cars is a Valeo product. There are currently no other products that meet these three criteria. The Valeo system was first marketed in 2017. Four of the world’s leading automakers put their trust in Valeo and signed commercial agreements for the particularly affordable Valeo SCALA® LiDAR. This is what makes Valeo truly unique; the Group launches series production of its cutting-edge technologies as soon as it has confirmed compatibility with the automotive industry’s high standards. As a result, Valeo products are accessible to all, while others remain firmly out of reach. Valeo is now finalizing the development of a second generation of its 3D LiDAR system and is already actively preparing a third. LiDAR is a key component in autonomous driving (level 3 and above). Of all the sensors needed to increase vehicle autonomy, LiDAR scanners play the most crucial role.

Producing automotive LiDAR systems requires first-rate production capabilities, combining the highest standards of expertise in microelectronics, optics and photonics. It also requires an extremely broad and elaborate validation process, covering both virtual and real conditions of use and supported by highly complex tooled assembly lines – a key asset in this field and one that Valeo possesses.

Exceptional vision for autonomous vehicles

Valeo’s LiDAR, the Valeo SCALA®, is a sensor that works like a radar but uses light beams. It has a wide field of view (145°), much broader than other sensors, and can “see” more than 150 meters into the distance, with excellent accuracy and in all weather conditions. It can detect both stationary and moving objects and uses all the information it collects to create a 3D representation of its surroundings. This makes highly automated driving safer than ever. Without it, autonomous vehicles cannot and will not exist.
Unprecedented success stories
Valeo has already achieved six world firsts in autonomous driving – the journey around France in 2015, the roadtrips around Europe and the United States in 2016, the 24-hour Paris beltway run in 2017, the Valeo Cruise4U® tour of Japan in 2018 and, most recently, Valeo Drive4U®’s trial run on the streets of Paris in fall 2018.

Their uniqueness lies in the fact that they are always carried out on open roads, using vehicles fitted exclusively with series-produced Valeo sensors that are already being sold to automakers. Positioned all around the car, Valeo’s ultrasonic sensors, cameras, radars and 3D LiDAR systems offer a 360° view of the vehicle’s surroundings. This is supplemented by calculation algorithms, AI and deep learning technologies also developed by Valeo.

A world-first every two years
Since 2004, not two years have gone by without Valeo launching yet another world first in driving assistance systems. The pattern began with the first lane departure warning system in 2004 and has continued through to 2019, with the Valeo XtraVue Trailer®, the first image-processing system that enables drivers to “see through” their trailer or caravan for maximum visibility.
The digital mobility revolution

Did you know?

Fewer driving licenses = more innovation

According to a survey conducted by AlixPartners in 2018, one in ten Americans aged between 18 and 34 say that car-sharing services have allowed them to postpone or avoid getting a driver’s license. The consulting firm also estimates that the global ride-hailing market could be worth 285 billion dollars in the next 20 years. In a country that grew up with the automobile, these trends are particularly significant. The need for mobility is still there, but the solutions are evolving.

The value chain historically established in the automotive industry is also evolving. The business model used to be linear, with automotive suppliers providing equipment to automakers, which primarily produced individual mobility solutions. Today, the ecosystem is more fragmented. In this new, non-linear structure, Valeo is strategically positioned in the right segments and the right portion of the value chain. This is evidenced by the growth achieved over the past ten years, with sales rising from 7.5 billion euros in 2009 to nearly 20 billion euros today.
The digital mobility revolution

Coming soon

Valeo Voyage\textsuperscript{XR}, from road network to social network

Equipped with numerous sensors, cars can become a communication tool just like a smartphone. Valeo Voyage\textsuperscript{XR} creates a close connection between the driver and someone outside the vehicle. Equipped with a virtual reality headset and hand controllers, the remote passenger is teletransported into the back seat of the vehicle, appearing in the driver’s rear-view mirror in the form of an avatar. The virtual passenger has a 360° view and can see and talk to the driver. He or she can also see and hear everything the driver sees and hears, in real time.

By combining Valeo technologies with virtual reality systems that are already available to consumers, Valeo teams have developed the world’s first immersive communication system for vehicles, creating a unique cross-reality (XR) experience. The Valeo Voyage\textsuperscript{XR} solution combines various innovative technologies, including sensors for environment perception, connectivity for experience-sharing and virtual reality for an immersive journey:

- Body tracking technology uses cameras inside the vehicle to detect the position of the driver and any onboard passengers. It then estimates their height and weight in order to activate certain comfort and safety features. Valeo Voyage\textsuperscript{XR} uses this technology to sense movements made by the vehicle’s occupants so that these can be copied by their avatars.
- Valeo’s directional sound system enhances the impression that the virtual passenger is physically present. Having a sound system aligned with the physical space minimizes the psychoacoustic effects and facilitates communication within the vehicle and between the vehicle and its virtual passenger.
- The four series-produced, panoramic cameras adapt to traffic conditions in real time to create a 360° view of the vehicle’s surroundings – a visibility function usually used to provide assistance during parking.
- The digital rear-view mirror provides a window into the virtual world, displaying the animated avatars of remote passengers as if they were seated in the back of the vehicle.
- Connected screens make it possible to share a variety of digital content, such as photos, videos, music or updated information about the vehicle’s destination.

Innovative automotive services inspired by teletransportation

By making the other side of the world accessible to all, the immersive experience provided by Valeo Voyage\textsuperscript{XR} comes very close to teletransportation. And this is just the beginning. Thanks to shorter waiting times, faster speeds and a better connection to the cloud, the arrival of 5G will open up a host of new opportunities in mobility.

Valeo has identified numerous uses for the XR platform and is already working with several of its customers to test certain applications. These include:

- Valeo Assist\textsuperscript{XR} to remotely integrate service apps into vehicle systems;
- Valeo Coach\textsuperscript{XR} to provide assistance with truck driving;
- Valeo TeleOp\textsuperscript{XR} for remote operations on autonomous vehicles and driverless shuttles;
- Valeo Mediator\textsuperscript{XR} to help manage conflicts relating to shared vehicles and fleets.

With Valeo’s help, motor vehicles have now become an integral part of the digital revolution.
Heading toward empathic vehicles with Valeo Smart Cocoon

The idea of a vehicle that can sense its passengers’ emotions is now a reality, thanks to Valeo Smart Cocoon. With this innovative technology, Valeo can create a customized comfort bubble to suit each vehicle occupant, based on characteristics such as body type, heart rate and clothing. Adjusting the environment to suit each person’s needs also improves energy efficiency, with savings of up to 30%.

The system leverages artificial intelligence and the information captured by various sensors to deliver personalized comfort through a combination of temperature, lighting, sound effects and fragrance. The interior lighting, for example, adjusts automatically to reflect the temperature and reinforce the feeling of comfort, with warm shades for heat and pale shades for cool. The vehicle also becomes empathic in the sense that it can take into account the state of its driver and passengers, by detecting signs of fatigue, distraction, emotion and stress.
The digital mobility revolution

Already here ✔

Self-parking cars, from fiction to reality

Cyber Valet Services is a unique solution that enables vehicles equipped with Valeo Park4U® technology to park autonomously (i.e., without a driver on board) in connected parking lots. Both the parking and pick-up sequences are activated via smartphone.

The vehicle drives itself inside the parking lot by combining the power of automated parking technologies (Valeo Park4U®) with Valeo onboard telematics and secure key systems (Valeo InBlue®).

The vehicle sensors, together with the information provided by the equipment installed in the parking lot, allow the vehicle to move autonomously through the parking lot, including several stories underground.

In addition to the space freed up by optimized parking, equipped parking lots will be able to provide customers with convenient new services such as automatic car washing, maintenance and automated electric vehicle charging. For vehicle fleet managers, this service will optimize fleet use by reducing the time it takes to drop off and pick up vehicles.

Valeo XtraVue Trailer, towing an invisible load

The first of its kind on the market, Valeo XtraVue Trailer is an innovation that enables drivers to see what is happening on the road behind their trailer or caravan, an invaluable driving assistance system that makes vehicles easy to maneuver and safer to drive.

The system uses video cameras fitted at the rear of a vehicle and the rear of a trailer or caravan. Feeding into a single, homogeneous image, it allows drivers to see what is going on behind their vehicle on a small display located in front of them, as if their trailer or caravan had disappeared, making maneuvers easier than ever, whatever the size of the trailer or caravan being towed. Drivers can change lanes, reverse and park, all with full control over their environment.
The digital mobility revolution

Already here ✔️

Parking made easier over the years thanks to Valeo
2006 : first reversing camera system with superimposed distance indicator (Valeo ParkVue®)
2007 : first ultrasonic semiautomatic parking assistance system (Valeo Park4U®)
2010 : launch of Valeo Park4U® 2.0 with perpendicular parking and automatic braking
2011 : first 360° parking assistance system (with vehicle lateral protection)
2013 : first smart rear camera with integrated object detection
2013 : fully automatic parking with Valeo AutoPark4U®
2015 : launch of Valeo Park4U 3.0 with forward parking
2015 : first ultrasonic sensor to operate underneath aluminum (for aluminum vehicle bodies)
2016 : first fully automated remote parking assistance system with Valeo Park4U® Remote
An impressive pace of five Valeo innovations per day

**13%**
of Valeo’s original equipment sales were invested in Research and Development in 2018, a ratio comparable to that of the world’s tech giants (source: survey published by U.S. magazine “Strategy+Business”).

**53%**
of 2018 order intake was for innovative products released in the last three years.

**More than 2 billion €**
were invested in R&D in 2018.

**2145 patents** were filed worldwide in 2018, representing more than five inventions developed and patented each day.

Valeo diversifies its sources of inspiration by forging partnerships with universities, laboratories, industry leaders and start-ups.

The number of people working in R&D at Valeo has risen from 6,000 in 2009 to 20,000 today.

Valeo is the leading patent filer in France and among the top 20 filers in Europe.

Cutting-edge processes: Valeo’s robot density is three times higher than the average for the automotive industry.
Valeo, the technology leader at the epicenter of the revolutions shaping

A leader in AI for automotive applications

1 milliard €
In 2018, Valeo recorded 1 billion euros in order intake for AI-enabled products.

Created in 2017, Valeo.ai is the first global fundamental research center dedicated to AI for automotive applications.

Its teams already include 200 experts in AI, machine learning and deep learning.

A continuous succession of world firsts

- 2018: demonstration of an autonomous vehicle, on the streets of Paris, fitted exclusively with series-produced sensors
- 2017: production launch for the world’s first series-produced LiDAR (Light Detection and Ranging) system that meets automotive industry standards
- 2016: roadtrips around Europe and the United States and the 24-hour Paris beltway run, all in an autonomous vehicle
- 2014: first secure, smartphone-based virtual key system
- 2010: first system to offer a 360° bird’s-eye view of the vehicle’s surroundings
- 2007: first blind-spot detection system
- 2003: invention of the Stop-Start system
- 1991: production of the first ultrasonic sensors for parking assistance applications