

PRESS KIT

VALEO AT CES 2017 IN LAS VEGAS

Contents

| | |
|--|-----------|
| Valeo at CES 2017 in Las Vegas | 3 |
| More automated, more electric: close up on three Valeo innovations..... | 4 |
| Valeo eCruise4U..... | 4 |
| Valeo XtraVue..... | 5 |
| Valeo 360AEB Nearshield..... | 6 |
| Valeo's intelligent approach to driving: two innovations and one strategic investment | 7 |
| Valeo C-Stream | 7 |
| Valeo Cockpit: the Experience of Traveling..... | 7 |
| Artificial intelligence, enabling the car to learn from the driver | 9 |
| The shared vehicle: a new form of mobility | 10 |
| Navya. | 10 |
| Mov'InBlue™: a smart key that's opening up new possibilities for users | 11 |
| Valeo's innovation strategy..... | 12 |
| CO ₂ emissions reduction & intuitive driving | 12 |
| Start-up spirit | 12 |
| Open innovation & incubators | 13 |

The automotive industry is currently facing a **three-part revolution**. First, the **engine rulebook is being rewritten** in line with the ramp-up of electric motors and alternative technologies such as hybrid powertrains. Second, the **automated car is enjoying accelerated development**. And third, **digital mobility is rising to prominence** in tandem with car-sharing. These disruptions are taking place on an unprecedented scale.

In these exciting times, with the car now representing the new frontier of the Internet of Things, Valeo has positioned itself at the cutting edge of change, and is proud to announce the world reveal of five major innovations at CES 2017 in Las Vegas:

- Valeo eCruise4U
- Valeo XtraVue
- Valeo 360AEB Nearshield
- Valeo C-Stream
- Valeo Cockpit

These technologies combine to form a new, more electric and therefore more environmentally friendly type of mobility, offering greater vehicle autonomy, improved comfort thanks to enhanced intelligence and better shareability thanks to extended connectivity.

Given that the total number of vehicles worldwide is expected grow, Valeo is committed to making the car safer, more energy efficient and more automated while also equipping it with cognitive abilities. In short, vehicle usage and the driving experience are about to be totally reinvented.



Valeo's innovations are marketed at competitive prices so as to be widely accessible throughout the world.

More automated, more electric: close up on three Valeo innovations

DID YOU KNOW?

A pioneer in vehicle electrification, Valeo is now the world No. 1 in the field.

One in every three vehicles worldwide is equipped with a Valeo electric system, which reduces energy consumption and CO₂ emissions.

Valeo's electrification systems are suitable for all vehicles, even ones without an electric powertrain.

Leveraging its central position in the automotive industry's three-part revolution, Valeo has come up with fresh solutions to the challenges of electrification and automation. In a world first at CES 2017 in Las Vegas, the Group is proudly presenting three innovations: **Valeo eCruise4U**, **Valeo XtraVue** and **Valeo 360AEB Nearshield**.

1) Valeo eCruise4U

Valeo eCruise4U is the first automated car that can drive in electric mode at low speeds.

Valeo eCruise4U blends automated driving technology with a 48-volt hybrid system to reduce fuel consumption and CO₂ emissions while enhancing driving comfort.

The Valeo eCruise4U innovation offers an automated hybrid driving experience based on five technological components, all developed by Valeo and assembled in a production vehicle currently available on the market:

- **Valeo sensors** provide the vehicle with a full view of its surrounding environment. The combination of camera, radar and LiDAR (Light Detection And Ranging) sensing technologies delivers the system robustness needed for high automation in all conditions. Valeo's LiDAR Cocoon is made up of six SCALA laser scanners installed around the car.

- The **Valeo Perception solution** defines the environment around the vehicle and provides the data needed for vehicle control.

- **Valeo's lateral and longitudinal control technology** for vehicles takes account of the hybrid powertrain, which utilizes both electric power and the internal combustion engine, to ensure smoother braking and acceleration.

- The **new advanced driver assistance system (ADAS) electronic control unit (ECU)** from Valeo is based on merge algorithms, which enable it to analyze all inputs from the sensors, anticipate events and control the vehicle.

- **Valeo's 48-volt e4AWD (All Wheel Drive) system**

Valeo's 48-volt system delivers benefits in terms of both vehicle usage and cost. The solution consists in adding the integrated Belt Starter Generator (iBSG 48V) to the engine of the vehicle and the electric Rear Axle Drive (eRAD 48V) to the rear axle. These two electric devices increase vehicle performance by around 30 horsepower, or 22 kilowatts, while at the same time reducing fuel consumption by 17%¹. The eRAD 48V module also enables motorists to benefit from the superior safety and comfort of an all-wheel drive, without the high price tag.

¹ Fuel consumption estimates are provided by Valeo for reference only. Actual results may differ depending on a variety of factors, including driving style and vehicle usage.

DID YOU KNOW?

Human error is the main cause of road accidents. The combination of Valeo's sensors and a powerful analysis tool protects road users from this type of risk. According to the US government's National Highway Traffic Safety Administration, 94% of the road accidents in the United States in 2015 were caused by human error.

The Valeo-developed solution also recovers braking energy, which is stored in a 48-volt battery for a variety of later uses, such as:

- Increasing engine torque for enhanced driving comfort and reduced fuel consumption.
- Driving on low-grip surfaces and in all-electric mode, which emits no CO₂.

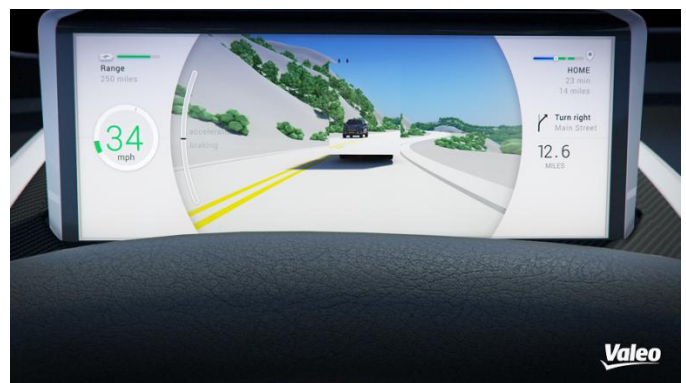
Valeo's 48-volt solutions can be applied across all vehicle types, to both gasoline and diesel engine models.

To round out this offering and grant users greater vehicle autonomy and electrification without compromising on safety, Valeo develops systems that act as the eyes and ears of the car, taking in what goes on around them and forming an invisible cocoon that guarantees all-around user protection. The combination of three different types of sensors provides a comprehensive picture of the road and its surroundings, day or night, rain, fog or shine. Camera, radar and LiDAR technologies come together to detect what the human eye cannot always see, at distances of between 10 centimeters and more than 200 meters. The three sets of sensors transmit information to Valeo's software program, which processes that data to make the right decisions.

2) Valeo XtraVue

A system based on a set of connected cameras that eliminates visual obstacles.

Valeo XtraVue uses a smart antenna installed on the car², combined with a laser scanner and Valeo's computer-vision camera system to show drivers what is happening on the road even outside their line of sight, streaming video from other connected vehicles and roadside infrastructure cameras onto the car's display. Leveraging existing public 4G and vehicle-to-vehicle (V2V) networks, the technology merges these data and creates a simple, enhanced view of the road. For drivers, it is like being able to see right through the obstacles in front of them, enabling them to make safer, better informed decisions, especially when overtaking.



With this innovation, Steven Spielberg would never have been able to shoot his first full-length film Duel...

² Developed by the unit formed following Valeo's acquisition of Germany-based peiker in 2016.

3) Valeo 360AEB Nearshield (Autonomous Emergency Braking)

Innovative technology to protect nearby pedestrians when vehicles perform low-speed maneuvers.

Valeo 360AEB Nearshield delivers a 360-degree view around the vehicle thanks to a system of four miniature cameras and ultrasonic sensors fitted to the front and rear bumpers. Not only do the detectors alert the driver to any potential obstacles, they also, most importantly, bring the vehicle to an automatic halt to prevent impact. By "eliminating" blind spots, this technology is especially useful for large vehicles such as SUVs and pick-up trucks, particularly for reversing.

Valeo 360AEB Nearshield leverages standard onboard features, such as warning tones and backup cameras. Should the driver fail to respond to such warnings, the solution intervenes by applying the brakes. Special algorithms enable the system to detect both stationary and moving objects. In this way, Valeo's innovation protects pedestrians, the vehicle and its occupants.

2018

The year in which backup cameras will become compulsory in all new vehicles in the United States.



Valeo's intelligent approach to driving: two innovations and one strategic investment

Making their world debut at this year's CES in Las Vegas are several Valeo innovations designed to make the car cabin safer, more comfortable, easier to use and more attuned to the potential needs of drivers and passengers. Redefining standards of comfort and safety, these solutions open the door to new traveling experiences.

Innovation No. 1

Valeo C-Stream

The new Valeo C-Stream dome module has two main characteristics:

1. Using interior cameras that observe the driver and passengers, the system maps out the vehicle's cabin, gathering information that can prompt the vehicle to take measures to increase safety and comfort, where necessary. Valeo C-Stream can, for example, determine the number of people traveling in the car, ensure the driver is suitably alert, and detect who is in the front passenger seat so it can adjust the airbag system accordingly. For autonomous vehicles equipped with Valeo C-Stream technology, the dome can also instantly calculate the best time for the driver to take back control following a period of automated driving.
2. The central rearview mirror has been replaced with a camera situated at the rear of the vehicle, thanks to which the system can project an image on the opposite side of the dome in the driver's line of sight. With Valeo C-Stream, drivers enjoy enhanced comfort and safety as well as reduced eye strain. Their vision no longer needs time to alternate between short and long distances. The reimagined rearview module also paves the way for new cabin designs – the rear window could be made smaller, for example – and provides a better view from the back seat.



Valeo has created a veritable cocoon inside the vehicle.



Innovation No. 2

Valeo Cockpit

At this year's CES, Valeo is unveiling the **Experience of Traveling** cockpit, which boasts features that correspond to three distinct phases of the driving experience: "task of driving" when the driver is in full control, "experience of traveling" when the semi-automated vehicle is driving itself, and "back to drive" when the driver takes back control of the vehicle.

During the "task of driving" phase, the cabin environment supports driving-assistance features to enhance safety.

- Lights projected against the windshield can, for example, draw the driver's attention to a hazard on the road in a simple manner. Should the system detect driver fatigue, it releases an energizing fragrance to encourage concentration.
- The interior lighting can help overcome blind spots, with a moving light inside the cabin signaling the presence of a vehicle outside of the driver's line of sight and indicating that it is not safe to change lanes.
- The interior lighting can also significantly enhance driving pleasure, with scrolling lights amplifying the sensation of acceleration and deceleration.

During the "experience of traveling" phase, the driver delegates the task of driving to the vehicle and sits back and enjoys the ride as a passenger. The ambient lighting then adapts to the environment by changing to softer colors while a relaxing fragrance fills the cabin, transforming the journey into a genuine sensory experience. In this phase, the emphasis is on passenger well-being.

Valeo has also imagined a system for illuminating its ionizer, which purifies and freshens the air in the cabin. Air with a high concentration of negative ions helps vehicle occupants relax, as if they had taken a walk in the woods or by the sea. Smooth, round and translucent, the ionizer pulsates light in a way that simulates breathing to inform the passengers that it is purifying the air in the cabin. Both visually and physically, the ionizer produces an instantly soothing effect.

- For passenger comfort, the cabin features smart reading lamps controlled by gesture recognition technology, which allows users to adjust the size of the beam with their hand movements.
- The cockpit also boasts the unique and innovative **AquAIRius®** cooling mist dispenser, developed by Valeo. In addition, the **AquAIRius®** system maintains an ideal level of humidity within the cabin to ensure optimal comfort.



During the "back to drive" phase, lights flashing through the cabin guide the driver's eyes toward the steering column while focusing his or her attention on the road, ensuring the vehicle can hand back control in total safety. At the same time, an energizing fragrance helps the driver regain concentration.

With this cockpit, Valeo is showcasing a unique and innovative range of products designed to shape the sensory experience associated with new ways of using cars.

In June 2016, Valeo announced that it had reached two important milestones in the worldwide development of its interior lighting systems:

1. Production start-up of interior lighting systems for 160,000 SUVs from a premium European automaker.
2. Development of interior lighting systems for 27 vehicle models on three continents, representing some two million vehicles equipped with Valeo's lighting technologies each year by 2021.

Strategic investment

Artificial intelligence, enabling the car to learn from the driver

Once an activity reserved for people, learning how to be a better driver is now a possibility for cars too. They can improve their knowledge with every journey thanks to a full spectrum of sensors and data-processing software. In line with this trend, Valeo acquired a 50% stake in CloudMade in November 2016. The skills of this artificial intelligence (AI) specialist will enable the Group to invent new ways of using the car.

With Zero-Click navigation, the car can now understand drivers' habits, anticipate their needs and even propose a selection of personalized itineraries. This system also predicts hazardous events that may occur in acceleration lanes and at junctions. Thanks to Valeo and CloudMade, car usage has been completely reimagined to offer greater assistance, more features, enhanced safety and reduced stress.

Attendees of CES 2017 in Las Vegas will be able to witness this innovation first-hand during a demonstration in real traffic conditions.

Valeo's expertise in the technologies required to develop driving assistance applications (sensors, cameras, laser scanners, etc.) as well as connectivity, human-machine interface and thermal climate control solutions, combined with CloudMade's command of big data processing, artificial intelligence and predictive engines, will allow CloudMade to provide its carmaker customers with solutions to continuously adapt driving assistance functions to the profile of each individual driver. This radically innovative product offering will enhance the user experience in terms of both intuitive driving and in-vehicle well-being.

CloudMade is a pioneering start-up in machine learning and artificial intelligence, with a focus on designing applications for the car industry. Valeo's investment in the company will provide it with the financial and technological resources it needs to fully achieve its development.

"Race against the machine": At CES 2017 in Las Vegas, Valeo is presenting a virtual rally racing game that lets attendees experience machine learning and artificial intelligence first-hand as they square off against an AI system developed by Valeo engineers. Valeo's AI can drive a car in difficult conditions and is already opening up new possibilities for the automated car of the future.

The shared vehicle: a new form of mobility

Valeo is proud to be hosting its research partner, Navya, on the demonstration circuit at CES 2017 in Las Vegas.



Automated driving and electric powertrains are two key focuses of Valeo's innovation strategy, which is why the Group acquired a stake in Navya in October 2016. Working at the crossroads of vehicle autonomy and electrification, Navya has developed the Navya Arma, a 100% automated, driverless, electric shuttle that can transport up to 15 people.

Already operating on a variety of private sites and public roads, the vehicle is equipped with numerous sensors and an onboard computing system that enables it to interact with its surroundings in total safety. It is a logical extension of Valeo's technologies and expertise, particularly with regard to data sensor processing, and showcases how they can be applied in a real-world setting.

Navya Arma offers a new form of urban and peri-urban mobility, which attendees at CES 2017 in Las Vegas will be able to experience for themselves on the Valeo circuit.

Navya is a technology company specializing in developing innovative, smart and sustainable mobility solutions.

October 2016 saw Navya's shareholders unanimously approve a capital increase of €30 million. French groups Valeo and Keolis and the Qatari Group8 acquired a stake in the company alongside Gavitation and CapDecisif Management, which joined in 2015, and Robolution Capital, the original investor.

www.navya.tech

Mov'InBlue™: a smart key that's opening up new possibilities for users

Mov'InBlue™ is a secure vehicle reservation and fleet management solution developed in partnership with Capgemini, a leader in consulting, technology and outsourcing services. Based on Valeo's InBlue® smart key technology, it allows users to lock and unlock their vehicle and start the engine all from their smartphone.

With Mov'InBlue™, car rental companies can offer their clients an end-to-end digital experience from vehicle pick-up to drop-off, eliminating the constraints of face-to-face service such as reception, opening hours, long lines and hard-to-find vehicles. At the same time, Mov'InBlue™ reduces the amount of time vehicles are off the road for inspections, cleaning, refueling and other maintenance operations, and enables leasers to develop new business models, such as car rentals by the hour.

This solution will enable corporate fleet managers to promote efficient car-sharing by optimizing reservation scheduling or key management, for example. Real-time data collection on maintenance, usage rates and more will also allow them to manage both the size and availability of their fleet.

A stand-out Mov'InBlue™ feature is that it allows users to lock and unlock their vehicle without having to access a GSM network. Compatible with more than 95% of vehicles on the road, the technology is already being upgraded to cater to automakers' future original equipment solutions.



Valeo's growth strategy is based on two key focuses: innovation and expansion in Asia and other emerging markets.

€1.3

billion

in R&D spending

Innovation at Valeo is mainly directed toward CO₂ emissions reduction and intuitive driving.

Two areas of innovation

1,406

patents

CO₂ emissions reduction

Valeo's research and development (R&D) strategy aims to assist the transition to "low-carbon" mobility, pursuing the Group objective of reducing fuel consumption and CO₂ and pollutant emissions without compromising on driving performance or pleasure. Valeo rises to this challenge by developing innovative technologies that are designed to increase the efficiency of internal combustion engines, electrify powertrains and optimize vehicles' overall weight and thermal management systems.

12,000

engineers

At the same time, Valeo studies worldwide social trends on an ongoing basis, from urban mobility to regulatory change, to stay in tune with consumer expectations and anticipate shifts in compliance requirements. This approach determines Valeo's priorities in terms of technological innovation, which range from reducing CO₂ and pollutant emissions to conserving raw materials.

19

research
centers

Intuitive driving

As market surveys show, drivers would like to mitigate the less pleasant aspects of driving, like traffic jams, long journeys and parking, and use this time for entertainment, rest or other activities, such as work or phone calls. To meet to this demand, Valeo develops technologies that make cars more intuitive, safer, and easier to drive based on the user experience.

Valeo is already the world leader in driving assistance, boasting technologies that enable cars to park themselves or drive autonomously on highways. For this reason, the Group can cater to customer needs, and now offers a wide range of technologies – from the Valeo Cruise4U vehicle to connected services such as Valeo InBlue[®] and Remote Clean4U[®] – that will enable it to take advantage of all the opportunities in this growth market.

Start-up spirit

The connected, automated and clean car of tomorrow will have little in common with that of previous generations. To design and produce this vehicle, today's automotive industry needs to integrate an increasingly wide variety of skill sets. For this reason, Valeo works with players of varying size and vocation, ranging from start-ups and universities to major groups.

Open innovation

Valeo pursues an adaptable innovation strategy based on agility and flexibility to keep abreast of social megatrends and continue tailoring products to its customers' needs. With this in mind, the Group has diversified its sources of inspiration and its partnerships, with initiatives such as the Valeo Innovation Challenge for students, now in its third consecutive year; the acquisition of a stake in Cathay Capital, a cross-border investment vehicle dedicated to venture capital financing for innovative start-ups; collaborations with Safran and Mobileye; the acquisition of an equity interest in Aledia; and the signature of a cooperation agreement with Ibeo.



The Valeo Innovation Challenge

In a bid to create more opportunities to reach students directly, Valeo started a new breed of contest in 2013 called the Valeo Innovation Challenge. The contest asks students to come up with a new product or system, or a new way of using cars, that will make vehicles smarter and more intuitive by 2030. With this contest, Valeo aims to build on its open innovation strategy by strengthening ties across the academic world.

Start-up incubator

Valeo continuously nurtures its start-up spirit. Refusing to centralize innovation, the Group instead harnesses 19 research centers and 35 development centers around the world, staffed with autonomous teams capable of quickly rolling out useful mobility solutions for end customers worldwide.

For this reason, Valeo has always believed in collaborative innovation and regular, personalized interactions with start-ups. Some encounters culminate in an acquisition, as was the case in 2007 with Connaught Electronics (now the Group's world excellence center for cameras). Others result in the purchase of equity interests, as with LED technology start-up Aledia.

Valeo also strengthened its open innovation ecosystem in 2016 by acquiring interests in several venture capital funds, thereby ensuring worldwide access to thriving local start-up networks in the San Francisco Bay Area, Shanghai and France. This initiative is boosting the Group's visibility and attractiveness among up-and-coming entrepreneurs, and is already generating a deal flow of some 100 opportunities a month.

DID YOU KNOW?

Valeo was ranked among the 100 most innovative companies in the world in the Thomson Reuters 2015 Top 100 Global Innovators.

APPENDIX

Follow our latest news on social media

Twitter: https://twitter.com/Valeo_Group

Facebook: <https://www.facebook.com/Valeo.Group/timeline>

LinkedIn: <https://www.linkedin.com/company/valeo/>

YouTube: <https://www.youtube.com/user/ValeoGroup>