Valeo BeamAtic®

But evolution did not stop there. Whilst high beams provide the most efficient lighting, the light must be switched to low beam, every time another vehicle approaches or is in front. In usually dense road traffic, this is the most frequent situation. A new camera driven control system - Valeo calls it BeamAtic® - provides an Adaptive Driving Beam maintaining maximum light, except in zones occupied by other vehicles. Visibility is equivalent to that obtained using high beams while protecting other drivers from glare. In the advanced version, Valeo BeamAtic® Premium, the automatic switching between high and low beams improves driving comfort and safety.

In high beam position, each headlamp generates a cone of light which illuminates the entire area. When another vehicle approaches or is approached, the system detects and locates it using a camera equipped with powerful image processing software. A mobile shield is then positioned to mask the part of the beam covering the zone occupied by the other vehicle, while tracking its trajectory. The other vehicle is therefore protected from the light and there is no dazzling of the driver. Thanks to the BeamAtic® function drivers in other vehicles see what appears to be low beam light, while the driver in the car fitted with BeamAtic® sees what appears to be normal high beam light, with the road fully illuminated.

The Valeo BeamAtic® system includes a video camera located at the top of the windshield, an ECU with a powerful data-processing software and a specific light module capable of smooth light beam adaptation for other vehicles.

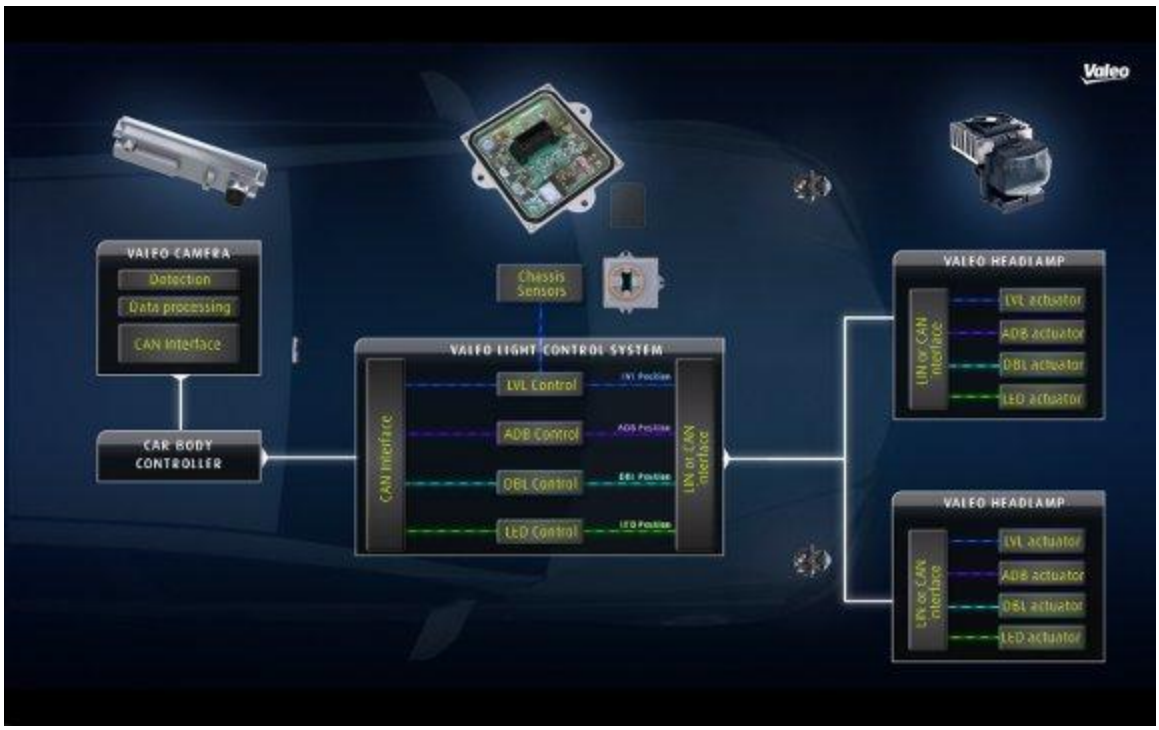

image 7 : Architecture of the Valeo BeamAtic® Premium system

image 8 : Valeo BeamAtic® Premium beam schematics with an oncoming car (top left), car approaching (top right), with a preceding vehicle (bottom left) and full beam (bottom right)

New Light Sources

Halogen lights are still widely used for automotive, but we are about to see the change towards new light sources that will increase both visibility and reliability of the headlights. The newcomers are Xenon lights and LED lights.

Xenon lights

Xenon lamps, more accurately Xenon arc lamps, produce light by a gas discharging process. Electric current passes through an ionised gas mixture (comprising xenon) at high pressure. This process produces bright white light, coming close to natural sunlight.

Xenon lamps have a higher luminous efficacy than halogen lights. Therefore, they provide twice as much light as halogen lights. Together with the fact that the light is white, it ensures much better visibility and comfort of the driver. With a longer and wider beam, obstacles are recognized earlier.
Other advantages are:

- lower power consumption : 35W vs 55W for a H1 halogen bulb;
- increased lifetime of the lamps, as there is no filament that may burn out.

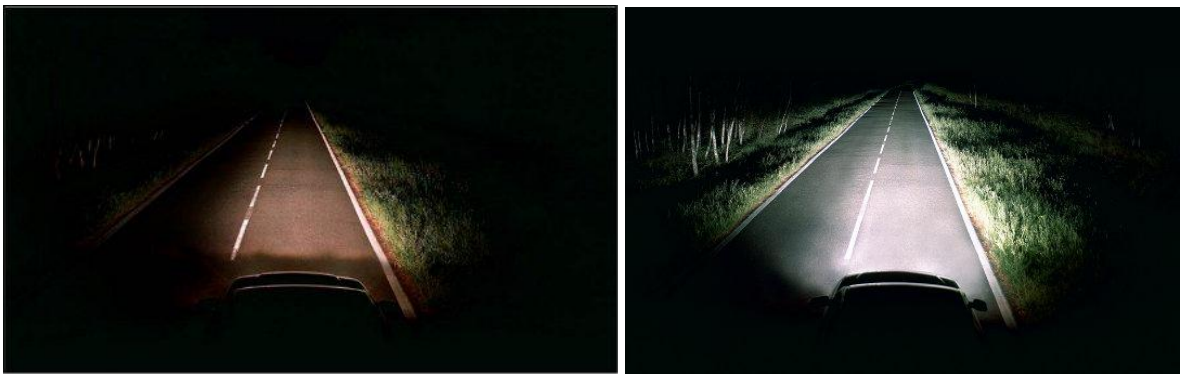

image 9 : Road visibility with Halogen (left) and Xenon (right) low beam

Please note that Xenon headlights must include an automatic levelling device and a cleaning system. Their role is to reduce dazzling as much as possible, even with the more powerful light flow:

- by compensating the vertical light beam orientation for variation of the vehicle inclination due to various loading,
- by reducing light diffusion at the outer headlamp glass due to dirt deposits.

Checking Xenon headlights includes also checking of the levelling device and the cleaning system.

A Xenon lamp includes a ballast. At light ignition, this device produces a high voltage impulse of roughly 20 000 V; afterwards the voltage is stabilized at about 85V (42V for newer lamps). That's the reason why the repairer must protect himself from high voltage discharges. Before replacing the Xenon lamp, disconnect the battery and wait until complete discharge of the

ballast.

LED lights

Today, LED lights are commonly used for **D**aytime **R**unning **L**ights (DRLs), which have become mandatory in Europe in 2011 (for all newly approved passenger cars and small delivery vans). They provide a bright light with low energy consumption in combination with many styling opportunities of the car.

image 10: Headlamp with LED DRL for Audi A5

A **L**ight-**E**mitting **D**iode is a semiconductor light source, based on the electroluminescence effect. In a thin layer of a silicon chip, called p-n junction, electric charge carriers (electrons and their counterparts, called holes) recombine and fall into a lower energy level. This energy is released in form of photons, or light.

LEDs for automotive front lighting produce bright white light with a very high luminous efficacy. Combined with high quality optics and electronic control, LED front lights are at the leading edge of performance. You will find them integrated in most recent vehicles.

Valeo supplies Full LED headlamps for the original equipment of new car models, for Ford Mondeo for example. Those headlamps include:

- a BiLED™ Module (BLM) : a dynamic beam light, including low beam and high beam;
- a complementary LED Module (CLM) : an additional static low beam light;
- a Daytime Running Light & Position Light (DRL/PL) module: obviously LED, but with a leading edge “flat guide” technology;
- a Turn Indicator (TI) module : also LED based with the “flat guide” technology.

image 11: Valeo Full LED headlamp for Ford Mondeo

Valeo’s PremiumLED technology is twice as efficient as Xenon and five times as efficient as halogen headlamps. LEDs have a lifespan significantly exceeding that of the Halogen bulb or even a Xenon discharge lamp.
In addition, the colour of the light - equivalent to daylight - provides greater visual comfort.