

What do an astrophotographer and an automotive engineer have in common?

- **We brought together an astrophotographer and a SEAT photometry expert under one of the darkest skies in Europe, at the Dark Sky Alqueva observatory in Portugal**
- **The engineers spent more than 800 hours in the dark to test the light systems on the new Leon**
- **Both specialties use a similar wraparound light to illuminate without distracting from the main focus, the road and the stars**

Martorell, 28/01/2021. Every sunset on the shores of Lake Alqueva in Portugal is the prelude to a spectacle like few others in Europe. This is the moment when astrophotographer Miguel Claro goes to the observatory to prepare telescopes and cameras to capture the vast blanket of stars at nightfall. 1,100 kilometres away, in Martorell, Carlos Elvira, Head of Lighting Development at SEAT, and his team also work in the utmost darkness to test the lighting systems of each vehicle. The two specialties, astronomy and photometry (light intensity analysis) applied to motoring, have more in common than you might imagine.

In search of the best light. The headlights on a car are a fundamental element for comfort and safety. **“All our work is focused on achieving lighting that perfectly adapts to the different conditions you’d expect to find on the road”** explains Carlos. That’s why it’s essential to carefully calculate the range and width of the beams, as well as the contrast and brightness of the lights they design. Furthermore, Miguel Claro has to precisely calibrate the telescopes and cameras to capture the full intensity of constellations such as Orion, as well as the Pleiades, Vega and Sirius nebulae, his favourite.

A suitable environment. Whether looking for the best performance from the most advanced lighting or photographing the stars, Carlos and Miguel must work with light in pitch darkness. **“Darkness is the background for my work, as it reveals the beauty of the universe”** says Miguel. **“For me it’s a necessity”** agrees Carlos. The two experts spend a lot of time surrounded by darkness; Miguel out on the balcony overlooking outer space at the Alqueva Dark Sky reserve, where **“the sky is totally clear at least 260 nights a year”** and Carlos and his team, who spent **“around 800 hours to test and validate them”**, he said.

The light that matters. For both professionals it’s essential to work without any type of light pollution. **“The dark sky of this area enables you to see the stars as far as humanly possible with the naked eye; all you have to do is look up and you’ll see more than 4,000”** he said. Carlos and his team drive up to 30,000 km in dark and extreme locations like this in the four corners of the world to test the headlights of a single model. **“Warm tests are used to check the operation of the electronics and cold tests to check the distribution of light on the road and the accumulations of ice”** he adds.

Two light observatories. Carlos is surprised when he enters Dark Sky Alqueva. **“It’s like entering our own optical tunnel”** he exclaims. He is referring to the 40 metres of asphalt in the SEAT Technical Centre where night driving conditions are recreated with precision and where they also observe pinpoints of light, although in his case they’re the 340 LEDs that make up the headlights and rear lights of the new Leon.

The star of photometry. As well as offering greater light output and durability and lower consumption, LEDs give SEAT’s lighting designers greater possibilities for where, when and how to direct light. **“The key points for us are to ensure an efficient definition of the control electronics, an optical concept that enables maximum performance and a balance**

between technique and design for an attractive, safe result” says Carlos. This is how they achieved, for example, the 1740 lumens of low beam on the Leon with a range of 70 metres in its Full LED version.

Similar wraparound lighting. Carlos also looks at the fine red line around the Alqueva observatory. The astrophotographer uses it to illuminate the space without distorting his vision and photographs. **“It’s exactly the same as the arc of interior light that we designed for the new Leon”** says the expert in photometry. An arc designed with exactly the same goal in mind: to illuminate without dazzling or distracting the driver from their main focus; in this case, the road. **“It was a great technical challenge, but we achieved the maximum functional result”** he explains. This strip of LEDs is also coupled with the vehicle’s safe exit assistant, which warns passengers if a vehicle is approaching when a door is opened.

SEAT is the only company that designs, develops, manufactures and markets cars in Spain. A member of the Volkswagen Group, the multinational has its headquarters in Martorell (Barcelona), sells vehicles under the SEAT and CUPRA brands, while SEAT MÓ covers urban mobility products and solutions. SEAT exports more than 80% of its vehicles, and is present in 75 countries.

SEAT employs over 15,000 professionals and has three production centres – Barcelona, El Prat de Llobregat and Martorell, where it manufactures the SEAT Ibiza, the SEAT Arona, the CUPRA Formentor and the Leon family. Additionally, the company produces the Ateca in the Czech Republic, the SEAT Tarraco in Germany, the SEAT Alhambra in Portugal and the Mii electric, SEAT’s first 100% electric car, in Slovakia. These plants are joined by SEAT:CODE, the software development centre located in Barcelona.

SEAT will invest 5 billion euros through to 2025 in R&D projects for vehicle development, specifically to electrify the range, and in equipment and facilities. The company aims to make Martorell a zero-carbon footprint plant by 2050.

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