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**Amandine Cocq**, Optic Marketing Manager at Gaggione:

"In the transport sector, lighting is far more than a matter of visibility, it is a critical component of safety, performance and user experience. Yet one essential element is often underestimated: optics. Without carefully engineered optical systems, even the most powerful light sources can fail to deliver the required illumination quality. In the transport sector, optical performance must be evaluated beyond lumen output, with key parameters including luminous intensity distribution, beam angle, peak intensity, uniformity, cut-off control, glare limitation, colour stability and optical efficiency.

From railway platforms and airport runways to aviation obstruction lights, vehicle interiors, driver cabins, signaling systems, tunnel lighting, marine navigation aids and emergency lighting, each application imposes specific constraints. These

include strict regulatory requirements, harsh environmental conditions, long operating lifetimes, and the need for precise light distribution.

Material selection is equally critical, as optical components may be exposed to vibration, temperature variations, UV radiation, humidity, dust, cleaning agents, long operating hours, and fire-safety requirements such as EN 45545-2 for railway applications. By optimising the interaction between the LED package, primary optic, secondary optic and mechanical integration from the earliest design phase, it becomes possible to support regulatory compliance while ensuring stable photometric performance, reduced stray light, lower thermal stress and long-term operational reliability.

Optics play a decisive role in shaping light to meet these demands, ensuring visibility where it is needed,

minimising light pollution, and enhancing visual comfort for both operators and passengers.

Gaggione brings recognised expertise to this challenge, supporting transport industry stakeholders with both standard optical solutions and fully customised developments.

This dual approach allows us to address a broad spectrum of projects, from straightforward implementations to highly constrained environments.

In critical transport infrastructures, lighting cannot be left to approximation. By integrating advanced optical design from the outset, stakeholders can significantly improve performance while reducing operational costs and environmental impact." 🌟

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*Images courtesy of Gaggione.*