

# truecolours

The latest LED lighting systems bring vitality to the colours and designs of aircraft interiors, as well as other elements such as inflight catering

- 01. A single-bar HelioJetTCS, which can produce many colours including red...
- 02. Purple...
- 03. And green



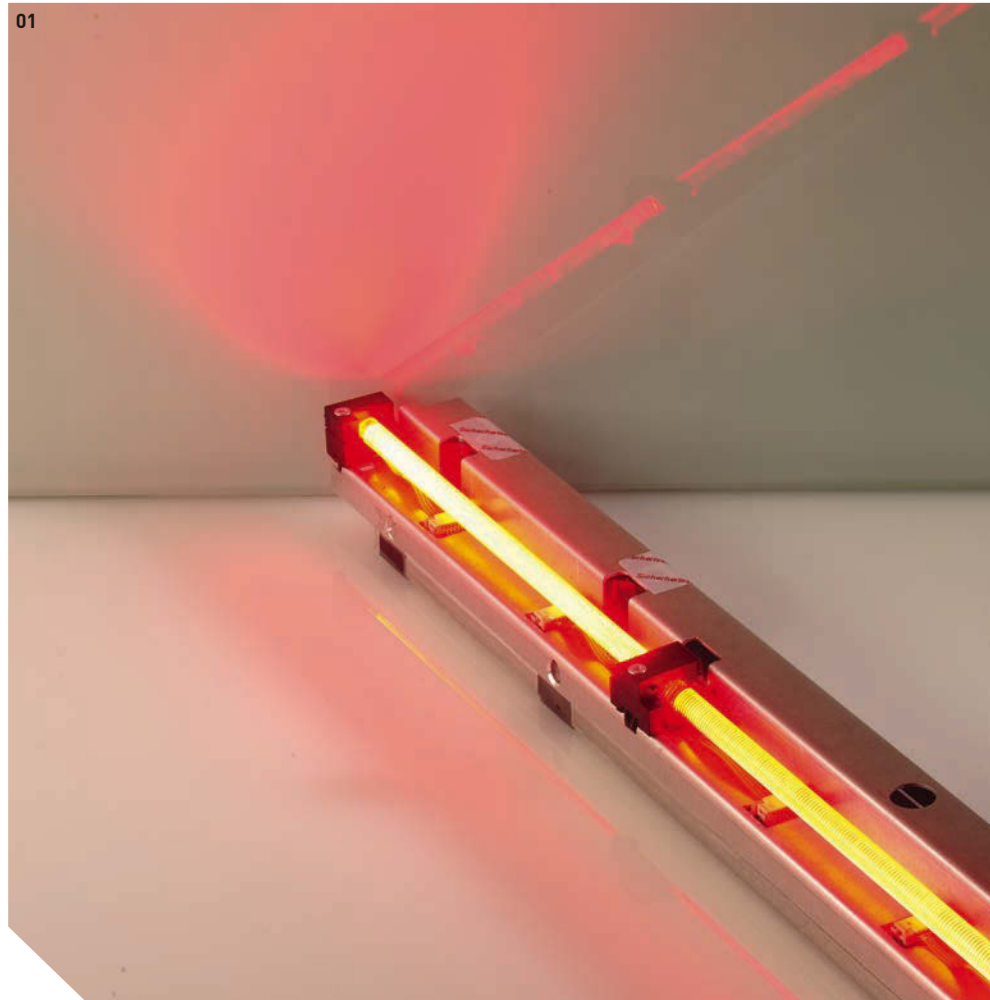
Replacing fluorescent tubes with LED lighting seems to be a widespread development in modern cabin lighting. However, there are challenges when aiming for a state-of-the-art LED system. Using HelioJet technology, Schott and Lufthansa Technik have found a way to create a brighter future in aircraft interiors.

Lighting has become an essential factor in cabin interior designs. Not only does the quality of light decisively influence passenger comfort, it also enables airlines to enhance their onboard brand recognition. A recent study on behalf of Schott Aviation reveals that 89% of the representatives surveyed, who came from airlines, completion centres, lighting manufacturers and design offices, stated that lighting is “really important” or “important” for cabin design.

Since lighting has only recently begun to play a major role in retrofit and linefit projects, the importance of light is likely to increase. The cabin lighting market has been estimated at approximately US\$1 billion and is growing. As the study for Schott Aviation reveals, LED technology is expected to remain the industry standard for aircraft lighting for at least the next five to 10 years. Compared with the old technology of fluorescent tubes, including ballast units, LEDs are widely recognised for their high mean time between failures and flexible use.

“About four years ago, when we started to develop a unique LED cabin interior lighting system with our partner Lufthansa Technik, we addressed three general dimensions: design, performance and efficiency,” says Dr Armin Plichta, director at Schott Aviation. “Looking back, consistent performance over time is the biggest challenge.”

The intensity and colour temperature of LEDs changes with use. Some change faster than others and there is no predictable pattern. This



phenomenon is inherent to LED technology and cannot be avoided.

“Every LED cabin system has to be evaluated by how and to what extent it manages the problem of ageing LEDs,” explains Plichta.

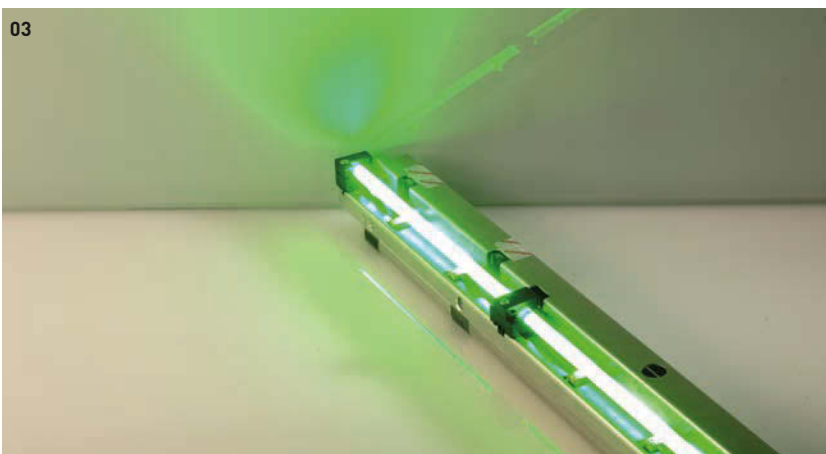
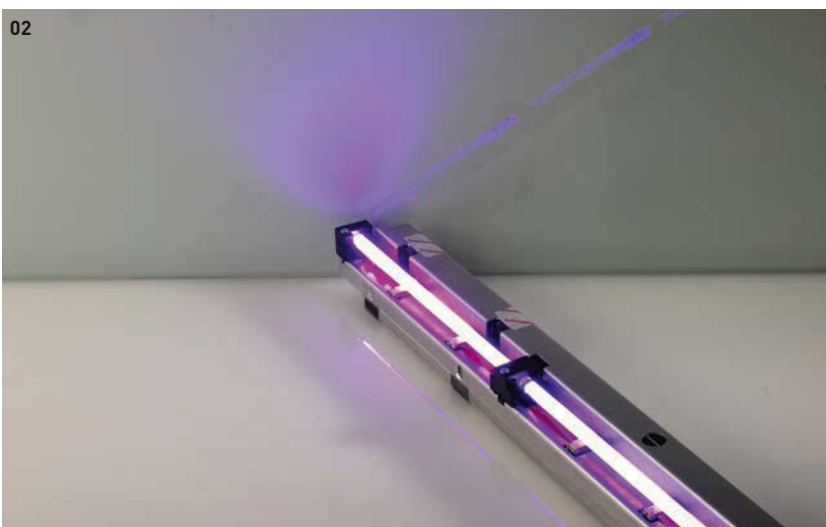
Shifts in light intensity and changes in colour temperature create obvious undesirable effects. ‘Light dots’ are a well-known defect when using LED light strips. When single LEDs lose their intensity, homogeneous light distribution is no longer possible. This distortion becomes even more dramatic with RGB LEDs for coloured light.

“We know from airlines that shifts in intensity and colour have become

the crucial point when considering LED lighting. Maybe the ageing phenomenon was somewhat underestimated in this context,” underlines Andrew Muirhead, director of the innovation business unit at Lufthansa Technik.

The study revealed that several airlines would like to invest in LED cabin lighting, but still think that there is no suitable LED system currently available for aviation.

HelioJet technology overcomes the phenomenon of ageing LEDs. Rather than placing numerous LEDs in a line, it works with only two LEDs per lighting element, which feed light from



the two ends into an optical light converter. Based on fibre-optic principles, the converter mixes the light and distributes it evenly over the entire distance of the light element. This enables HelioJet to provide unmatched homogeneous light – not only when new LEDs are installed, but continuously over time. The light mix in the converter overcomes the problem of ageing LEDs by reducing it to an indiscernible effect.

“If you have 10 LEDs that are not managed in a row on a strip, every shift in intensity and colour becomes obvious,” says Muirhead. “That is not the case with HelioJet technology.”

HelioJet also enables controlled light output by accurately adjusting the light and aperture angle. The light is no longer emitted in every direction, providing new possibilities for precise light design solutions.

#### BRIGHTNESS ABOVE THE CLOUDS

Since the European aviation authority EASA issued a supplemental type certificate (STC) for the Airbus A320 family, HelioJet technology has been lighting the cabin in an Airbus A319.

“People tell us after seeing the modified A319 that HelioJet adds a new dimension to interior lighting quality,” reveals Plichta. And indeed,

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COMPARED WITH FLUORESCENT TUBES, HELIOJET THROWS A DIFFERENT LIGHT INTO THE CABIN ”

compared with the fluorescent tubes that have previously lit the interiors of the A319, HelioJet throws a different light into the cabin.

04. A schematic of the HelioJet technology in white

“Now green salad looks green because it, and all materials including the lenses in front of the lights, no longer age and turn yellow,” explains Plichta. So it is no real surprise that all interview partners from airlines who participated in the Schott Aviation study claimed that cabin lighting is “really important” with respect to passenger comfort. The group of designers who were asked the same question answered similarly.

However, HelioJet not only makes passengers and designers happy, but also addresses business administration and reduces required maintenance.





LIGHTING WILL INCREASINGLY BECOME AN ESSENTIAL TOOL TO CONTRIBUTE TO BRAND RECOGNITION



HelioJet requires only about one-fifth as many light diodes as other LED strip solutions.

“From a business perspective that implies greater reliability, which is expressed as a higher mean time between failures. Additionally, one can exchange all LEDs and even repair the HelioJet on the spot with the possibility of reusing existing components when the aircraft is on the ground. That saves time and waste,” Muirhead explains.

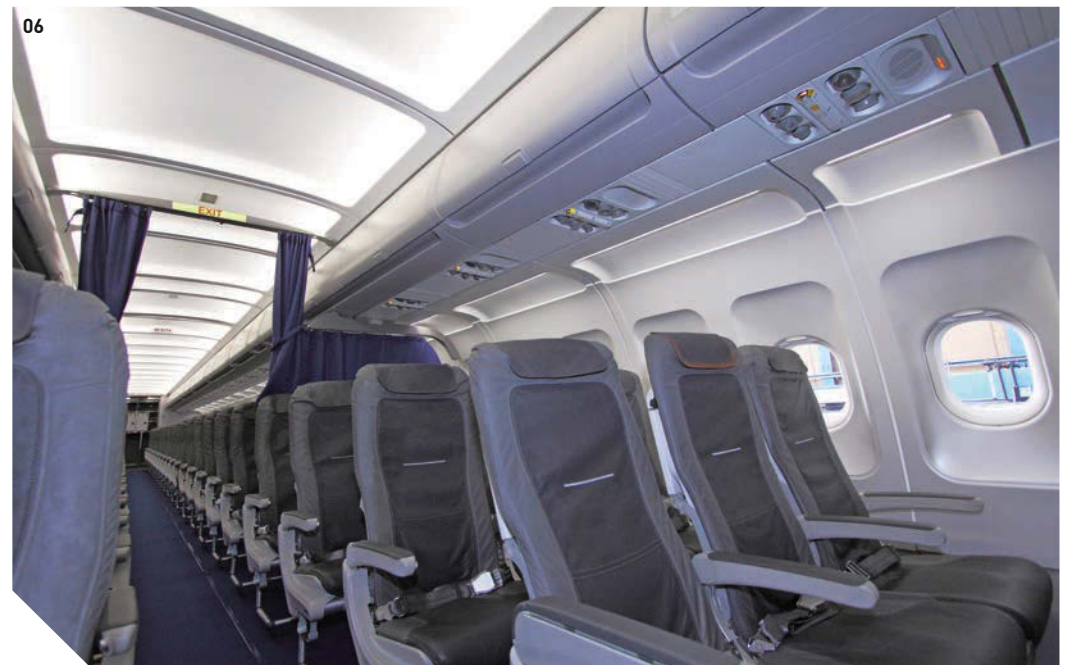
**COLOURS TO COME** HelioJet was presented to the public for the first time at the Aircraft Interiors Expo in Hamburg in 2011. With the introduction of this technology for white cabin light, the question of using it for coloured light arose. The answer is HelioJetTCS – the red, green, blue, white (RGB-W) version with True Colour Stabilisation (TCS).

“With HelioJetTCS, we made a huge move forward. It is the HelioJet for advanced use,” Plichta says. HelioJetTCS gives 16 million colour shades – offering almost unlimited possibilities for mood lighting and corporate colour themes. Light is a very effective way to influence passenger perception and mood.

“Lighting will increasingly become an essential tool – not only to create an appealing atmosphere, but also to contribute to brand recognition. The first impression that passengers receive when they enter an aircraft is a huge opportunity for the airline to build its brand,” states Plichta.

Some airlines, such as Virgin Atlantic, already employ coloured light to deliver a distinctive boarding experience.

HelioJetTCS also works with an optical light converter. At each end,



four LEDs feed in light, which is mixed in the optical light converter. Since colour LEDs are much more heterogeneous than different shades of white, HelioJetTCS also includes sensor-based controller technology, which ensures that every LED installed in the system is perfectly in tune with the specified setup and accurately produces the desired colour temperature.

The controlling system does more than manage the LEDs in one HelioJetTCS unit; it also controls all HelioJetTCS in the cabin. In this case, the light is subjected to online control to make sure it retains the desired set point values. Any colour play can be controlled using the ‘nice HD’ cabin

- 05. A schematic of HelioJetTCS
- 06. An Airbus A319 cabin with HelioJetTCS lighting
- 07. An Airbus A319 cabin with fluorescent lighting



management system from Lufthansa Technik, for example.

“We really offer an all-in-one-solution, for which there is nothing comparable in the market. The optical light converter and the sensor technology of HelioJetTCS are unique,” concludes Muirhead. ☒

Contact: [aviation.info@schott.com](mailto:aviation.info@schott.com)  
 Web: [www.heliojet.aero](http://www.heliojet.aero)



## HelioJet cabin lighting at work! Now with STC approval for the A320 family

There is no second chance to make a good first impression. This also holds true when passengers board an airplane. With HelioJet, the innovative cabin lighting system from Lufthansa Technik and SCHOTT, passengers are impressed from the very first moment. HelioJet technology redefines LED lighting. Two LEDs feed light from both ends into an optical light converter, which mixes the light according to fiber optic principles. The output is unmatched homogeneous light; no visible color shifts over time and no "dead spots." HelioJet is easy to install, and maintenance costs are low. HelioJet is already flying and has EASA STC approval for the Airbus A320 family.

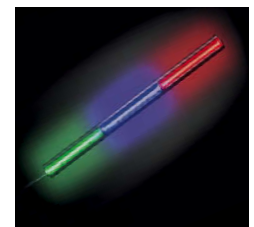
Let HelioJet also work for you! | [www.heliojet.aero](http://www.heliojet.aero)



Same aircraft interior before HelioJet has been installed



HelioJet technology with EASA STC for even light distribution



HelioJet<sup>TCS</sup> with True Color Stabilization. Coming soon!



**Lufthansa Technik**

More mobility for the world

**SCHOTT**  
glass made of ideas