

SPEAKER SPOTLIGHT



Dipl.-Ing. Ivan Windemut, a scientist at the German Aerospace Center (DLR), will present a lighting concept developed for the Next Generation Train (NGT) project

What is the NGT project?

The NGT project involves using an interdisciplinary approach to tackle the key questions of how the high-speed and intercity trains of the future can be made fast, safe, energy-efficient, comfortable and environmentally friendly.

The main project aims are to increase the certified train speed to 400km/h; halve energy consumption; reduce noise; increase passenger comfort; improve driving safety; reduce wear and lifetime costs; introduce cost-efficiencies through modularisation and system integration; and increase the efficiency of development and permission processes.

As part of our work on optimising onboard systems in terms of energy efficiency and passenger comfort, we developed an innovative concept for lighting passenger areas in double-deck trains.

How did you develop the lighting concept?

We used well-established software – which is normally used to calculate levels of illumination in buildings – to develop a model of a double-deck train and calculate the illumination and energy demand of our lighting concept. Our full-size NGT mock-up was also adapted, by integrating organic LEDs (OLEDs), to verify the model and to investigate passenger acceptance of OLED light. We proved that it is possible to realise an EN 13272-conforming lighting system on a double-decker using OLEDs that are already available. Volunteers

deemed the OLED light more comfortable than LED light.

How is your concept different to other solutions?

Commonly, train lighting systems consist of fluorescent lamps combined with halogen spots as reading lamps. Our OLED system uses half the specific energy of common lighting solutions and gives nearly the same illumination. OLEDs can also be dimmed continuously between 0% and 100%, without steps, so we were able to integrate reading lamps and constant light functions (balanced with sunlight) in the general lighting system.

What other benefits are there to using OLEDs?

The project demonstrated that OLEDs are energy-efficient, compact and low maintenance. OLEDs are genuine area light sources, they produce high-quality diffuse light with no glare and excellent colour rendering. OLEDs provide the basis for extremely thin (2mm) and lightweight lighting solutions, which is especially important in double-deck trains. Today, OLEDs enable the creation of free-form lighting sources, and at some stage in the future, large-scale lighting solutions on flexible carrier materials. Currently, OLED panels are limited in size (145 x 145mm), therefore a combination of several OLED panels within a module system is necessary. OLEDs still have a high cost, because they are produced in small quantities, but that will certainly change in the future.

Dipl.-Ing. Ivan Windemut will make his presentation at 10:55hrs on Day 1 of the mainstream conference, Wednesday, 4 November