specialist Diehl Aerospace and German light manufacturer Osram have joined forces to determine how aircraft lighting, in terms of colours and brightness, can be used to enhance passenger well-being using new, chronobiologically adapted light.

In a six-day trial using a Diehl model-aircraft cabin in Nuremberg, the partners demonstrated that chronobiologically adapted lighting based on light-emitting diodes (LED), particularly on long-haul, overnight flights, can result in a medically measurable improvement in sleep, as well as enhancing well-being and resulting in greater alertness on arriving at the destination.

Light is the primary stimulus for regulating the human body clock and can influence how a passenger rests.

Some 32 participants each experienced three realistic long-haul, overnight flights in the simulator. The partners found that activating LED-based lighting systems improve rest and comfort for passengers. During the tests, the lighting was adapted to the respective phases and times of the journey using LEDs and intelligent lighting management systems. The colour spectra were selected in accordance with the time of day to support the circadian rhythm (a person’s daily cycle of activity).

During the tests, the participants were assessed in terms of brightness, sleep quality, stress, well-being and alertness using questionnaires, electrocardiogram measurements for heart rate, saliva samples to measure melatonin and stress-hormone levels, and movement sensors.

The research found that warm, white light at the beginning of an overnight flight contributes to relaxation, promoting melatonin production and a slower heart rate, resulting in better sleep.

Meanwhile, cold, white light, with a high blue content, on the morning after a restless sleep can help passengers be more alert on reaching their destination by suppressing the excretion of sleep hormone melatonin. – Emma Kelly.