DREAMLINER The - mostly chaotic - development of the 787
DIEHL / INTERVIEW “We want to outpace our competitors”
METALWORKING Slot milling delivers performance boost

Airbus A 400 M:

Suppliers under pressure

The military Airbus A400M will definitely go into production. Unfortunately, this is no reason for suppliers to heave a collective sigh of relief.
The magic of lighting above the clouds

The days when airline passengers simply wanted to get from A to B as quickly as possible are long gone. Today’s traveler wants to feel good, and for some airlines the means to achieve this goal have become unique selling points. And it all starts with the shade of white light emitted by the cabin illuminations. LEDs, fiber optics and new projectors are opening the way for innovative lighting effects, as well as offering an opportunity to reduce costs.

Since LEDs have become more powerful the trend is now away from fluorescent tubes,” confirms Sven Koppert, Business Development Manager at Goodrich. LEDs are light, long-lasting and require little power, all of which suits the airlines. But the tiny lamps have their problems: The color shade varies widely between individual LEDs and the human eye is very sensitive to such differences. In the early days the company therefore combined colored LEDs with white fluorescent tubes in order to create color effects. “The homogeneity of LEDs available today is better. But there is still the problem that color perception under the light emitted by a white LED differs from what we see in sunlight,” Koppert continues. To correct this error Goodrich offers lamps which combine white LEDs with red and blue ones. To make the white illumination inside the aircraft cabin as homogenous as possible, Goodrich prefers to sort the LEDs by color and brightness prior to installing them.

Thanks to their high performance and declining manufacturing costs, the price of LEDs is currently on a par with that of tubes. Except that LEDs last longer, consume less electricity for the same brightness, weigh less and can be dimmed. But LEDs can do more than just turn darkness into light. Light designers can use them to create scenarios that offer passengers that feel-good factor. Blue-white light simulates the morning, rousing passengers to cheerful wakefulness and making the cabin seem cleaner and fresher. A more yellowish light creates a pleasant atmosphere in which to dine. In contrast to tubes, LEDs are easy to control, and programmable lighting means that the crew are better able to switch from one effect to the next. Sven Koppert believes this will in the foreseeable future become a standard on-board feature.

“The 787 Dreamliner is illuminated entirely with LEDs,” reports Dr. Jan Günther, Key Account Manager Boeing at Diehl Aerospace. The tiny lamps allow the cabin to be illuminated in smaller segments than was possible with tubes. And the ease with which the LED combinations can be controlled in terms of overall color and brightness allows standard scenarios to be created. During boarding and deboarding, passengers see a ‘blue sky’ effect with side walls and bins illuminated in white which makes the cabin seem larger. The color hues during the flight depend on the given circumstances. Sunrise and sunset can both be simulated, while dark blue helps passengers to enjoy their rest.

Helping to combat the jet lag
The right lighting effect even helps to combat the jet lag that can occur when after a long-haul flight the lighting conditions and hour of the day at the point of destination are quite different from...
those back home. During the flight, mood lighting scenarios simulate the passing time of day, gently preparing passengers for the hour prevailing at their destination. Whether this really reduces jet lag is yet to be scientifically proven. Light and music can also be combined in an animation, for example to speed up boarding and deboarding.

The color variations between as-supplied white LEDs also cause problems for the light designers at Diehl Aerospace, and they too mix in other colors. “A variety of control circuits ensure that the colored LEDs always generate a homogenous lighting environment,” Jan Günther explains. In his imagination the controllability of the LEDs could be used to simulate more than just sunrises. They could for example display the French Tricolor to celebrate France’s independence day, not to mention creating moods in the cabin featuring the airlines’ image and branding, or even just turning the cabin ceiling into a starry night sky as happens on board the 777.

But LEDs are good for more than just mood lighting. Large numbers of tiny white LEDs can illuminate the entire cabin almost entirely without casting a shadow.

Jan Günther sees even more potential for lighting effects in the cabin: “Modern laser projectors can project sharp images even without lenses. So you could project a starlight effect onto the cabin ceiling that recreates the actual position of the stars at that moment above the plane itself.” Of course he is aware that the curved walls and cabin fixtures present some difficulties here, and it will be a while before such ideas come to fruition.

Another answer to the demand for elegant interior lighting solutions comes from Schott Aviation. The company offers a system that comprises laterally radiating optical fibers and an LED light source. “There are several ways to create the impression of space and distance inside the cabin. One of them is to use flexible contour lighting with fiber optics,” says Nina Berlin, Marketing and Product Manager at Schott Aviation Lighting. Her new product HelloLine, she tells us, has already been installed in Business Class by an Asian airline. The light is emitted evenly along the entire length of the optical fiber, and by integrating colored light from RBG LEDs a whole range of lighting effects can be created. The radiated light is also completely dazzle-free – and therefore very easy on the passengers’ eyes.

**Design is the key factor**

The new optical fibers are installed in the seats so as to emphasize their contours. This makes the aircraft cabin seem larger and provides better orientation when all else is dark.

“Airlines are looking for opportunities to stand out from the competition,” says Nina Berlin “and today, they are doing this increasingly through economic and ecological factors, but above all through design.” This consideration, coupled with the myriad ways in which tiny laser projectors can be combined with easily controllable LEDs, will definitely inspire designers working with light to create many more attractive solutions.

**German Summary**

Die Tage, wo der Passagier einer Fluglinie einfach nur möglichst schnell von A nach B wollte, sind schon lange vorbei. Der Reisende heute will sich auch wohl fühlen und spezielle Angebote der Airlines hier avancierten zu Alleinstellungsmerkmalen. Und das fängt schon beim Farbton weißen Lichts bei der Kabinenbeleuchtung an. LEDs, Glasfasern und neue Projektor-Einheiten öffnen neue Möglichkeiten für neue Lichtszenarien und bieten die Chancen der Kosteneinsparung. Der deutschsprachige Beitrag ist nachzulesen auf www.aerotec-online.com