The **future** of comfort and safety in the aviation industry starts with innovative technologies from SCHOTT **today**

As a reliable partner to the aviation industry, SCHOTT is well known for innovative solutions, product flexibility, industry expertise and years of experience. With our groundbreaking technologies for interior lighting, reading lights, sensor technology, data communication, electronic packaging and optical coating, your safety and comfort is in good hands.

To find out more about our advanced innovations,
please visit **www.schott.com/aviation**

Special glasses for decorative applications

Hermetic packaging for reliable protection of sensitive aircraft electronics and sensors

Fiber optic systems for datacom and sensor technology

Coated instrument glasses and filters for cockpit applications

LED and fiber optic solutions for interior lighting and seat illumination

SCHOTT
glass made of ideas

Photo | Foto : SCHOTT/T. Nowak

Subtle Flight Attendant
Dezente Flugbegleiter

The demand for more comfortable interior designs is growing all over the world, especially inside long distance airplanes. A fictitious flight illustrates the developments that passengers can soon look forward to – thanks to components from SCHOTT.

Der Bedarf an komfortableren Innenausstattungen insbesondere für Langstreckenflugzeuge nimmt weltweit zu. Eine fiktive Flugreise zeigt, welche Entwicklungen – dank Komponenten von SCHOTT – schon bald auf die Passagiere warten.

FRANK LITTEK

It is the middle of the night and Robert H. finds a starry sky sparkling above him. Of course, it isn't for real. After all, Robert H. is sitting, or to be more precise, lying in the Business Class of a commercial aircraft on its way from Frankfurt to Singapore. The airplane is flying over the Indian Ocean at an altitude of 39,000 feet and is scheduled to land only two hours from now. Although it is still the middle of the night, a friendly flight attendant brings him a cup of coffee. Robert H. had asked her to wake him up. He adjusts his seat into an upright position and thanks her. "The captain would be pleased to have you and Mr. Olthoff stop by the flight deck to say hello. Anytime during the next hour would be fine," she says. "I would love to," he answers.

Peter Olthoff is responsible for the airline's fleet and, therefore, one of the main decision-makers when it comes to buying and designing new aircraft. Robert H. works for the aviation division of the SCHOTT Group and has known him for years. Now, he is sitting inside an airplane whose interior, to a large extent, they both designed. On his way to the flight deck, Robert H. allows this to sink in one more time. Next, he decides

Es ist mitten in der Nacht. Über Robert H. funkelt ein Sternenhimmel. Natürlich ist er nicht echt, denn Robert H. sitzt, besser gesagt, er liegt in der Business-Klasse eines Verkehrsflugzeuges, das sich auf dem Weg von Frankfurt nach Singapur befindet. Gerade überquert das Flugzeug den Indischen Ozean in einer Höhe von 39.000 Fuß. Noch zwei Stunden bis zur Landung. Obwohl es mitten in der Nacht ist, stellt die freundliche Flugbegleiterin ihm eine Tasse Kaffee hin. Robert H. hatte sie gebeten, ihn zu wecken. Er fährt den Sitz in eine aufrechte Stellung und bedankt sich. „Der Flugkapitän würde sich freuen, Sie und Herrn Olthoff im Cockpit begrüßen zu dürfen. Die nächste Stunde wäre dafür gut geeignet." „Gerne!"

Peter Olthoff ist der Flottenchef der Airline und damit ein wesentlicher Entscheider, wenn es um Kauf und Ausstattung neuer Flugzeuge geht. Robert H. arbeitet für das Luftfahrtgeschäft des SCHOTT Konzerns und kennt ihn seit vielen Jahren. Jetzt sitzt er in einem Flugzeug, dessen Interieur sie beide zu großen Teilen gemeinsam entwickelt haben. Auf dem Weg ins Cockpit wird Robert H. es noch einmal auf sich wirken lassen. Doch zuvor interessiert ihn das Wetter.

Er schaltet den Bildschirm vor sich an. Die Datenübermittlung für das komplette Infotainmentsystem an Bord erfolgt über Glasfasern, nicht mehr über Kupferkabel wie früher. Eine extrem leistungsfähige und ebenfalls sichere Lösung. In Glasfasern gibt

Futuristic design of an aircraft interior with lighting and other product solutions from SCHOTT. Today, SCHOTT already flies along in a significant number of airplanes and has strengthened its commitment to the aviation market by creating the so-called "Aviation Plattform" inside which all of the company's activities are bundled.

Futuristisches Design einer Flugzeug-Inneneinrichtung mit Beleuchtungs- und Produktlösungen von SCHOTT. Schon heute fliegt SCHOTT in vielen Flugzeugen mit und hat sein Engagement mit einer sogenannten „Aviation Plattform", die alle Aktivitäten innerhalb des Unternehmens bündelt, im Luftfahrtmarkt verstärkt.

to turn on the monitor in front of him to learn more about the local weather. The data transmission for the entire infotainment system on board takes place using glass fibers and not copper wiring, as in the past. A rather effective and reliable solution, by the way; after all, glass fibers never experience short-circuits, therefore, there is no risk of fire. This was often a problem. The weather report is looking good: calm, 29 degrees Celsius outside and only 60 percent humidity – basically "dry", at least by Singapore's standards.

Robert H. turns off the screen, stands up and follows the extremely thin, yet clearly visible stripes, which mark the way to the emergency exits. These are part of the intelligent new emergency system. Unlike the solutions used in the past, these are not fluorescent foils, but rather stripes illuminated by LEDs that make it possible to control the evacuation of the plane and avoid blocked doors. Otherwise, the cabin lighting is pleasantly dimmed, just as it should be at night. Only the seats and windows are marked by fine light-bands. Some passengers are busy reading. Their reading lights can be easily adjusted to make sure they don't disturb their sleeping neighbors.

es keine Kurzschlüsse und damit kein Brandrisiko. Früher häufig ein Problem. Der aktuelle Wetterbericht verheißt Gutes: windstill, 29 Grad Außentemperatur und nur 60 Prozent Luftfeuchtigkeit – für Singapur geradezu „trocken".

Robert H. schaltet den Bildschirm wieder aus, steht auf und folgt den Streifen des neuen intelligenten Notfallsystems, die ganz fein und trotzdem gut sichtbar, den Weg durch die Kabine zu den Notausgängen markieren. Anders als in der Vergangenheit handelt es sich dabei nicht um Fluoreszenzfolien, sondern um von LEDs beleuchtete Streifen, über die sich die Evakuierung der Maschine gezielt, zum Beispiel an blockierten Türen vorbei, steuern lässt. Ansonsten ist die Kabine angenehm abgedunkelt – so wie es in der Nacht sein sollte. Nur Sitze und Fenster sind durch feine Lichtbänder markiert. Und einige Passagiere lesen. Die Reading Lights lassen sich dabei so flexibel einstellen, dass sie keinen Nachbarn beim Schlafen stören.

Komfort auf höchstem Niveau

Über eine Treppe erreicht Robert H. das Hauptdeck, wo er sich in der Economy-Klasse wieder nach vorn orientiert. Da befindet sich die Shopping-Mall, ein kleiner Teil des Flugzeuges, aber eines der „liebsten Kinder" des Marketing-Chefs der Airline. Zugegeben keine schlechte Idee. Angeboten werden zollfreie Waren. Einige Nacht- >


Photo | Foto : SCHOTT/Reich

In addition to new, design-oriented lighting, such as reading lights and LightPoints™, glass-to-metal connections (below) and optical filter glasses (lower right) improve safety. Data transmission via glass fibers or fiber optics is yet another field for the near future, in advanced infotainment systems, for example.

Neben neuen designorientierten Beleuchtungslösungen wie Reading Lights und LightPoints™ sorgen Glas-Metall-Verbindungen (unten) oder optische Filtergläser (rechts unten) für ein Plus an Sicherheit. Ein weiteres Zukunftsfeld ist die Datenübertragung mit Glasfasern bzw. Faseroptik, z. B. für immer komplexere Infotainment-Systeme.

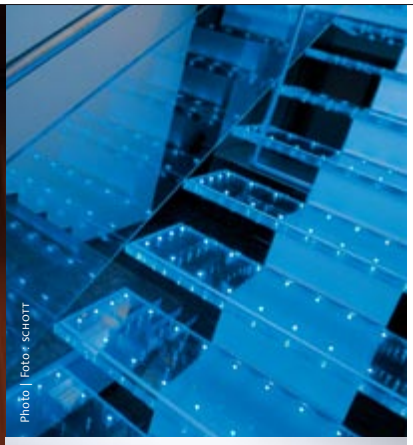
Photo | Foto: SCHOTT

Photo | Foto : SCHOTT/H. Fischer


Photo | Foto : SCHOTT/R. Maier

Photo | Foto : SCHOTT/H. Fischer


Photo | Foto : SCHOTT/A. Stephan

Comfort at the highest level

Robert H. takes the steps to get to the main deck and finds himself facing the economy class. The shopping mall is located here. While it might only be a small section of the aircraft, it is one of the airline's marketing manager's "favorites". Not a bad idea, one must admit, as duty free products are sold here. Robert observes that there are a few night owls taking advantage of the early hour to walk around. Almost immediately, a display cabinet filled with watches catches his attention. Thanks to anti-reflective glass Amiran®, no more annoying reflections get in the way of viewing. A film can be seen on top of the nearly invisible glass surface. At the touch of a finger, Robert H. is able to view the manufacturer's full line of watches interactively on a display screen. The zone just ahead of him somehow leaves a pleasantly warm, even feminine, feeling. Just perfect for the perfumes that can be tried here. This environment is created with customized fiber optic and LED lighting

schwärmer nutzen die frühe Stunde schon zu einem Bummel.

Sein Blick streift eine Vitrine, in der Uhren ausgestellt sind. Dank des entspiegelten Glases Amiran® stört keine Reflexion den Durchblick. Auf einer fast unsichtbaren Glasfläche läuft ein Film. Per Fingerdruck kann Robert H. auf dem Display interaktiv das Uhrenprogramm des Herstellers betrachten. Der Bereich etwas weiter vor ihm hat eine angenehm warme Atmosphäre. Irgendwie feminin. Durchaus passend zu den Parfums, die es dort zu probieren gibt. Die Atmosphäre entsteht durch die Beleuchtung per Faseroptik und LED. Er geht weiter, passiert einen größeren Waschraumbereich und erreicht die erste Klasse. Er möchte auf keinen Fall jemanden stören. Jeder Fluggast hat hier einen individuell gestaltbaren Privatbereich für sich. Ein wesentlicher Baustein: Smart Glass, Flächen, die bei eingeschaltetem Strom durchsichtig sind, ausgeschaltet aber einen hervorragenden Sichtschutz bieten. Robert H. folgt der Treppe nach oben. Kaum angekommen, steht er auch schon vor Peter Olthoff. „Was für ein Zufall." Er schüttelt ihm die Hand, ist gerade auf dem Rückweg von einem der Waschräume ins Cockpit. Robert H. kann ihn gleich begleiten. Ganz begeistert erzählt er, dass er die aktuellen Nachrichten über einen Bildschirm ver-

solutions. He keeps moving, passes by a large washroom area and enters First Class. By no means is anyone disturbed, because each passenger has their own personal area with customized Smart Glass surfaces that become transparent when the power is turned on, yet can be easily switched off for more privacy. As Robert H. arrives at the steps to the next level, he is surprised to see Peter Olthoff standing right in front of him. "What a coincidence," he notes and shakes Peter's hand. As the two make their way up to the flight deck, Peter enthusiastically explains how he was able to follow the news on a monitor that was integrated into a mirror in the washroom.

The flight deck is surprisingly tight. Large displays are glowing in front of where the captain sits. All of the displays are pin sharp, without any reflections. A unique coating is what makes this possible. Used together with a fog-resistant coating and a filter, the contrasts are enhanced thereby providing a much better view of the instruments, even when the sun is shining brightly. A quiet gong sounds and an error message immediately appears in orange on one of the displays. Is it anything serious? Robert H. is afraid to ask. The captain turns around and casually says, "Just a problem with the cooling in one of the freight compartments." Things like this happen. "Most of the problems we experience are mechanical in nature, not electronic. Despite the fact that airplanes experience a great deal of condensation," he adds. Here, thanks to the reliable protection that hermetic glass-to-metal packaging from SCHOTT Electronic Packaging provides for electronic components, moisture is unable to interfere with relays and other sensitive electronic components.

They continue their conversation. Then, the autopilot leaves the cruising altitude, preparation for landing begins and it's time for the guests to leave the flight deck. Robert H. immediately notices that the lighting inside the cabin has changed and how! A reddish shade is in the air, although it is really hardly noticeable – much like a perfect dawn in the early morning. This pleasant lighting that closely resembles daylight is made possible by the combination of RGB lighting and the white flashed opal glass Opalika®, known for its exceptional light dispersion.

Peter has now returned to his seat and Robert H. says goodbye. They'll both be meeting again soon to discuss new ideas from SCHOTT for the airline. A few of the passengers can be seen stretching along the aisle. Although it is still dark, it is gradually getting brighter. Robert H. decides to return to his seat. Suddenly, he notices that the cabin has gained depth and gotten higher. Has it increased in size? Now, he should know better. The clever output of light is what makes this possible.

The plane shakes just a little, as it prepares for descent. As the final minutes of the trip begin, the fasten-your-seatbelt signs light up just above him. For the first time, during this very long evening, Robert H. is looking forward to spending the next few days in Singapore. <|

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folgen konnte, der in den Spiegel integriert ist. Gemeinsam begeben sie sich in Richtung Cockpit. Das Flugdeck präsentiert sich überraschend eng. Vor dem Platz, den der Kapitän einnimmt, leuchten große Displays. Alle Anzeigen sind gestochen scharf, ohne Reflexionen. Eine spezielle Entspiegelung macht es möglich. Dazu kommen eine Anti-Beschlagschicht und Kontrastverstärkungsfilter, die vor allem bei starker Sonneneinstrahlung für einen klaren Blick auf die Instrumente sorgen. Ein leiser Gong ertönt. Gleichzeitig wird in oranger Schrift eine Fehlermeldung auf einem der Displays angezeigt. Etwas Ernstes? Robert H. wagt nicht zu fragen. Der Kapitän dreht sich um. „Ein Problem mit der Kühlung in einem der Frachträume", erklärt er lapidar. So etwas kommt vor. „Probleme macht meist die Mechanik, weniger die Elektronik", erklärt er weiter, „obwohl es in Flugzeugen sehr viel Kondenswasser gibt." Aber dank des Schutzes von elektronischen Komponenten durch hermetische Glas-Metall-Verpackungen von SCHOTT Electronic Packaging hat Feuchtigkeit bei Relais und anderer sensibler Elektronik keine Chance.

Sie plaudern. Dann verlässt der Autopilot die Reiseflughöhe. Die Vorbereitung auf den Anflug beginnt, die Gäste müssen das Cockpit verlassen. In der Kabine fällt Robert H. sofort das Licht auf. Es hat sich verändert. Und wie. Ein rötlicher Farbton liegt in der Luft, kaum wahrnehmbar, wie bei der Dämmerung am frühen Morgen in der Natur. Diese angenehme tageslichtähnliche Beleuchtung ist möglich durch die Kombination von RGB-Beleuchtung und dem Milchüberfangglas Opalika® mit seiner hervorragenden Lichtstreuung.

Peter Olthoff hat seinen Sitzplatz erreicht. Robert H. verabschiedet sich. Schon bald will man sich treffen, um über neue Ideen von SCHOTT für die Airline zu diskutieren.

Neben dem Gang räkeln sich die ersten Passagiere. Noch ist es dunkel. Doch es wird langsam heller. Robert H. lässt sich in seinen Sitz fallen. Gleichzeitig bemerkt er jetzt die räumliche Tiefe und Höhe der Kabine. Ist diese größer geworden? Er sollte es besser wissen. Die geschickte Beleuchtung macht dies möglich.

Photo | Foto : Getty Images

Ensuring access to precise information inside the cockpit is absolutely vital. Filter glasses and coated glass components offer a better view of the instruments and indicator lights.

Im Cockpit sind präzise Informationen überlebenswichtig. Eine besserer Sicht auf Instrumente und Kontrolleuchten ermöglichen Filtergläser oder beschichtete Glaskomponenten.

Die Maschine ruckelt leicht, der Sinkflug hat begonnen. Das Anschnallzeichen über ihm leuchtet auf. Die letzten Minuten der Reise haben begonnen. Robert H. freut sich auf die Tage in Singapur. Zum ersten Mal in dieser langen Nacht. <|

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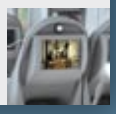
SCHOTT & AVIATION

TRANSISTOR OUTLINES (TO) FOR TRANSCEIVERS

Transceivers are signal transmitting and data receiving units that are a vital part of any data communication network. TO Packages house optical signal transmitting/receiving electronic units that need to be protected from humidity and other negative influences.

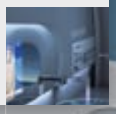


NIGHT SKY SIMULATION

Highly flexible fiber optic bundles driven by LED light sources enable each design of starry skies in the cabin and offer an additional atmospheric design element.

MIRONA™

In front of a light background, Mirona™ appears as a transparent pane of glass. In front of a dark surface, it acts as a mirror, providing a silvery, esthetic brilliance. As a result, Mirona™ opens up unlimited fantastic design options.

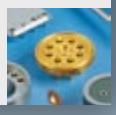


V.I.P. READING LIGHTS

To support the individual comfort for passengers in the upper classes on board, we provide a wide range of highly sophisticated design-orientated LED Reading Lights.

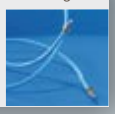
FEEDTHROUGHS FOR PROXIMITY SENSORS

Proximity sensors help to increase the safety of an aircraft e.g. by controlling whether any outside door is closed properly. Since proximity sensors are often placed in difficult environments, their performance must be ensured by protecting them adequately.



DATACOM

For weight reduction and increasing security reasons, multicore optical data cables have already been developed for on-board databus solutions.



FEEDTHROUGHS FOR FUEL TANK SENSORS

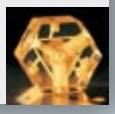
Fuel tank sensors measure the fuel levels directly within the tank. Sensor systems within fuel tanks are exposed to kerosene as well, as temperature fluctuations, and thus need to be protected hermetically.

FEEDTHROUGHS FOR RELAYS

A relay is an electrical switch that opens and closes under the control of another electrical circuit. In harsh environments, it is absolutely vital that relays are hermetically sealed.

INERTIAL REFERENCES

Gyroscope position measurement: Gyroscopes made of Zerodur®, the zero expansion glass ceramic from SCHOTT, are the elements of the inertial reference for precise position measurement in any aircraft.



HERMETIC FEEDTHROUGHS FOR PROXIMITY SENSORS

Proximity sensors help to increase the safety of an aircraft by controlling whether the landing gear is retracted completely. Since proximity sensors are often placed in difficult environments, their performance must be ensured by protecting them adequately.

TODAY'S APPLICATION

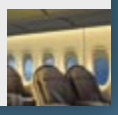
FUTURE APPLICATION

IN-SEAT READING LIGHTS

The combination of LED and side emitting fibers enable cabin designers to use the floor path marking system as an additional design object, rather than a purely functional emergency system.

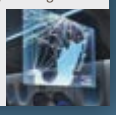
UPWASHLIGHTS

Moodlighting will be created through the latest generation of LED technology with the capability of endless length and highest homogeneity and intensity.



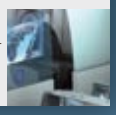
HOLOPRO™

The patented HoloPro™ technology makes it possible to project images or movies onto anti-reflective glass during both daylight or night-time, otherwise the material is transparent.



LC SMARTGLASS™

Simply turning on the power switch changes the LC Smartglass™ from translucent white into a visually transparent display and offers creative design options, as well as private spheres on demand.

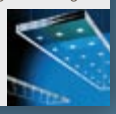


CONTOUR LIGHTS

Side emitting fiber optics are used to create a unique, linear, homogeneous illumination with flammability proven material. RGB LED light sources enable the application to create light scenarios within the cabin.

LIGHTPOINTS™

LightPoints™ offer the unique ability to allow LEDs to float and glow inside glass and the power supply elements are invisible. By triggering the single LEDs, an informative aspect can be added to the application.

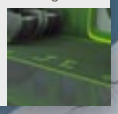


DAYLIGHT SIMULATION

Ultra-flat panels driven by LEDs or backlighted opaque surfaces in the ceiling simulate daylight atmosphere in the cabin. Ultra-flat panels and Opalika® surfaces provide diffuse lighting and simulate daylight atmosphere in the cabin.

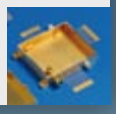
EMERGENCY LIGHTS

The combination of LED and side emitting fibers enable cabin designers to use the floor path marking system as an additional design object, rather than a purely functional emergency system.



RADAR PACKAGES

Electronic radar devices are part of the radar units of anti-collision systems which help to increase over-all safety mechanisms for aircrafts. Vacuum-tight packages protect the radar devices from humidity and other disrupting conditions.



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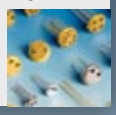
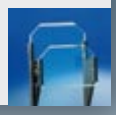


SPECIAL HEAD UP DISPLAYS

Semi-reflecting instrument glass produced and assembled by SCHOTT enables the projection of the instrument data onto the cockpit window. Supporting the look of surroundings and all flight data at the same time, SHUD is a key element to touch down under difficult weather conditions.



GLASS BASINS

Glass wash basins for elegant sanitary facilities. Different shapes and colors are possible according to customer specifications. For safety reasons, all basins are, of course, thermally tempered.

GALLEY APPLICATIONS

Glass ceramic cooktop and fiber optic lighting components that fulfill special thermal requirements allow for various applications from cooling to cooking in challenging environments.

HERMETIC CONNECTORS FOR HYDRAULIC PUMPS

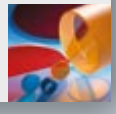
Hydraulic pumps are needed to operate an aircraft's landing gear. Hermetic connectors can be used to feed through electricity into the hydraulic pumps system.

DC/DC CONVERTER PACKAGES

DC/DC converters convert aircraft voltage that is generated in the engines to any required voltages of the final electronic devices, e.g. cockpit instruments. Hermetic packages for DC/DC converters protect the electronic device from harsh environments.

TECHNICAL GLASS, FILTERS AND COMPONENTS

Coated technical glass and filters from SCHOTT used as contrast enhancement filters, night vision filters, anti demist-covers guarantee a perfect view and protection of instruments, enabling precise vision under challenging circumstances. With tactile screens made of SCHOTT technical glass, functionality and design are being combined in the cockpit using a specific glass substrate with a conductive ITO coating.



Source | Quelle : SCHOTT

COMPONENTS FOR COMFORT AND SAFETY

Every passenger flying inside an Airbus or Boeing comes into contact with products from SCHOTT, either directly or indirectly: innovative lighting solutions offer attractive design and pleasant light conditions, optoelectronic components and glass-to-metal connections higher safety. <|

KOMPONENTEN FÜR KOMFORT UND SICHERHEIT

Jeder Fluggast eines Airbus oder einer Boeing kommt direkt oder indirekt mit SCHOTT Produkten in Kontakt: Innovative Lichtlösungen sorgen für attraktives Design und angenehme Lichtverhältnisse, optoelektronische Komponenten und Glas-Metall-Verbindungen für ein Plus an Sicherheit. <|