講演番号	019

文献番号	20225019

ShyTech Displays

-High quality user experience content when and where needed-

Andreas Brueninghaus [1)] **Juergen Baethis** [1)] **Kai Hohmann** [1)] **Jochen Moeller** [1)]

1) Continental Automotive GmbH, Babenhausen, Germany

KEY WORDS: ShyTech; automotive; user experience; UX; driver distraction; display; instrumentation; infotainment; image quality; local dimming; postcard effect

Although current and future cockpits are digital, immersive and provide an increasingly exciting user experience, they can benefit from being ‘shy’ at certain times: Hiding control surfaces made of buttons, lights and switches behind device fronts is an ongoing trend in many areas and has already been applied to some extend in the automotive industry. Continental’s ShyTech technol¬ogy contributes to design, functionality and safety.

ShyTech displays from Continental provide a new solution to reconcile changing ergonomic needs and the look-and-feel issue of standard displays in the off-state. The new technology makes it possible to access information and control functions on demand by activating hidden displays in simple ways. **Fig. 1** provides an example of a ShyTech display fully activated. **Fig. 2** shows the same cockpit fully deactivated.

Fig.1 ShyTech dashboard with all functional areas active (right)

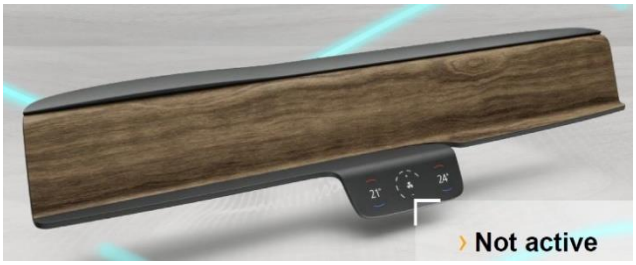

Fig.2 ShyTech dashboard completely deactivated (left)

ShyTech fully integrates, for instance, three displays in a pillar-to-pillar cockpit panel. The individual display areas as visible in Fig. 1 are covered by a foil with optimal light transmittance properties. The foil surface has a graphic and tactile layer with a fine 3D structure reproducing the look and feel of a natural material.

The ShyTech cover foil can be used to create a purist dash-board design with a classy look and feel when the displays are deactivated. Thus, the changing need for information and control in the vehicle cockpit can be reconciled against the bland look of standard displays showing no contents. ShyTech enables a holistic, positive UX with a classy design, which reduces potential sources of distraction in the vehicle.

The exemplary foil texture design is based on Continental specification and print data. The decisive factor was to achieve a meaningful balance between the surface’s color saturation for a natural incident light appearance, the highest possible transmittance, but also the best possible shielding against visibility of the underlaying mechanical structure. A high transmittance of about 30%, a low reflectance of less than 10% with realistic matt appearance of natural textures and a minimized color shift to cover the full color spectrum provided by the display was achieved.

Main relevant participators who drive the high quality impression of a ShyTech display application are the brightness of the display content visible on the final decorative surface, the fact that there should be no visible postcard effect, a minimized colorshift affected by the transmissive ShyTech surface and a high image quality which is specified by the MTF value.

ShyTech technology also offers potential benefits to limiting the power consumption of large displays. With the growing display sizes in the vehicle cockpit, display power consumption is gaining importance. This is a bonus point of the on-demand principle. A comparison between a state-of-the-art series-production LTPS LCD with edge backlight and the ShyTech demonstrator with matrix local dimming backlight solution is shown.

The total power consumption of the demonstrator depends on the contents depicted on the ShyTech display when activated. This is reflected in the power consumption ranging between 8 and 12 W. It should be noted that the ShyTech demonstrator uses not finally optimized materials. Further development in combination with an intelligent human machine interface design will result in a reasonable power consumption and thermal load.