Dear Readers,

The automotive seating sector is a hotbed of innovation, with seemingly unlimited ways to improve and develop. The main driving factor as always is the desire to reduce weight, but unlike certain other areas of manufacturing where weight reduction is the only driving force, in seating there are many other factors to consider. These of course, include aesthetics, comfort, space-saving and functionality, but with new technologies coming to the fore, other considerations such as heat control, driver monitoring systems and self-healing/stain resistant fabrics are also very much on the agenda.

There has never been a more exciting time in the history of seating, with so many challenges leading to a rapid development of new ideas and innovations; and at the International Motor Show (IAA) 2015 in Frankfurt this year, some of the leading automotive seating suppliers showcased their latest technologies.

The IAA in Frankfurt is typically a great platform for the big players to introduce new systems and technologies, and this year’s show was no different. Johnson Controls, Recaro and Faurecia all displayed innovative new ideas and seating systems at Frankfurt to show off their latest developments, while there is a growing trend in research circles towards smart textiles and fabrics which can improve safety and comfort.

Johnson Controls SD15

Johnson Controls took the opportunity at Frankfurt to showcase their 2015 Seating Demonstrator ‘SD15’, which it says is based on extensive research exploring what consumers expect as car seating from 2020 and beyond.

According to the information released by the company, the SD15 demonstrator features a simulated vehicle environment with a focus on first and second row seating while addressing the three megatrends from a seating perspective: autonomous driving, lightweight, and increasing customer demands towards individualization and style for future urban mobility.

A variety of new innovations have been integrated into the new seating configuration, which contribute to light-weighting, ‘intuitive motion’ and space-saving. Key features include: A slim, optimized design; a fibre reinforced composite back frame; cushion and curved tracks; long tracks for cargo versatility and a conversational option; cost efficient and lightweight plastic cushion pan for A-surface; rear-seat flexibility; storage and superior comfort;
seamless tie-downs; ink-jet printed covers; alternative trim attachments; and a slim tilting headrest.

The SD15's front row features a power driver seat mounted to a curved track, removing the need for separate and complex mechanisms found in conventional seating arrangements. The seat also has a control console mounted directly to the structure which moves with the occupant, rather than being fixed between the seats.

The demonstrator also showcased Johnson Controls latest generation of headrests, an ultra-slim design that can be combined with a tilting mechanism; ideal where space is at a premium. The passenger seat and rear seats are mounted on the company's Gemini long track system to increase flexibility and space. The passenger seat can slide forward to stow against the instrument panel, or backwards to create maximum curbside storage.
The second row uses the Gemini long tracks to smoothly transition from a four-seater to a five-seater. The structure expands when moved forward to create a centre seating position, and contracts when moved backwards to fit between the wheel wells and produce greater leg-room for occupants.

In terms of aesthetics, both the front and rear seats demonstrate Johnson Controls new ink-jet printing fabric technology, which allows for a variety of patterns and colours enabling automakers to distinguish/individualize their brand.

The launch of the SD15 comes against the backdrop of the news that Johnson Controls is set to spin off its automotive seating and interiors units, which will operate as an independent, publicly-traded company. This will enable the company to concentrate on its higher-margin operations such as the development of automotive batteries, while allowing a reduction in the amount of capital the company diverts into the seating sector. The new company will focus its attention to the Chinese market, where it already has a 43% market share of the seating sector. By 2017, Johnson Controls says it expects to have 72 factories in China producing seating and interior trim.

**RECARO Jubilee**

RECARO (a subsidiary of Johnson Controls) celebrated a 50-year jubilee this year, and did so by exhibiting several milestone products from its history at the IAA, along with a new, production-ready seat: the RECARO Sports Seat Platform (RSSP).

The RSSP combines lightweight design and modularity with numerous possibilities for customization. The platform is aimed at OEM’s who wish ‘to highlight distinctiveness with an attractive, lightweight car seat for their sporty and super sporty models, as well as electric vehicles’.

The main innovation with the platform is to separate the load-bearing structure from the design shell within the backrest. This, they say, allows OEM’s to configure the seat according to their own design specifications, while also benefitting from the advantages of shared parts. The new technologies and design also contribute to reduced weight and increased safety. The load-bearing backrest structure mainly consists of carbon fibre materials, while the seating shell is constructed using high-strength steel and Organosheets.
In comparison with conventionally constructed backrest structures, the RECARO backrest is 60mm thinner and an impressive 40% lighter. Despite these savings, the sports seat platform fulfils the highest standards for frontal and rear-impact crashes.

**Faurecia Active Wellness**

Faurecia were also present at the IAA with a number of innovative new seating solutions, and the company is responsible for the seating in the new Audi A4, the Alfa Romeo Giulia, and the Renault Talisman. In addition, earlier this year, Faurecia was selected by Volkswagen as one of 44 suppliers who will collaborate with the group on a common strategic level under the banner of the FAST (Future Automotive Supply Tracks) initiative.

For the Renault Talisman, Faurecia developed an innovative light sculpted panel using Cover Carving Technology (CCT) for the front seat backs, which allows a full 3cm of extra leg-room for rear passengers. These sculpted panels take the form of a semi-rigid, resistant, flexible and lightweight shell. This, says Faurecia, gives automakers additional design freedom, frees up space, and weighs 1kg less per row than conventional plastic seat back shells. Another key advantage is that the new design uses 80% less tooling costs when compared with a traditional plastic back panel.
Another innovation, which Faurecia refers to as a major advancement in automotive seating, is the Active Wellness Concept (pictured above), which was first introduced and the Shanghai Motor Show in 2015.

The Active Wellness seat employs a variety of unique sensors to detect the heart rate and breathing rhythm of the driver and/or occupants, as well as other data based on the latest medical research. The seat will then provide a specific massage pattern along with airflow through the seat’s ventilation system, to re-energize a tired occupant or de-stress an individual, thus making the journey a much more healthy and enjoyable experience.

The concept is expected to debut in premium vehicles first, with production possibly set to begin as early as 2018.

**Smart Textiles and Future Seating**

Driver wellbeing is an area where we can expect to see further innovation in the coming years, and Faurecia are not the only company working on this kind of technology. According to the eSafety Forum, driver fatigue accounts for 8.3% of all vehicle crashes, and up to 35% of serious accidents in the EU each year. To put that into context, fatigue could account for up to 7,000 fatalities attributed to fatigue-related collisions, and a social cost of approximately 10-14 billion Euros per year.

The EU-funded Harken project has seen the development of a prototype seat and seatbelt with smart textiles that use built-in sensors to detect driver heart rate and breathing patterns. The project partners collaborated to develop smart fibres with electrical properties which could be incorporated into the seating fabric and at various points on the seatbelt to accurately monitor the driver’s condition.

The project focussed on the monitoring aspect of a system, and since its conclusion in 2014 several of the project partners have continued to develop and improve the technology with the aim of commercialization. The intention is that automakers can combine the technology with warning and alarm systems to alert the driver of his or her drowsiness.

Another interesting piece of research being undertaken by the Hohenstein Institute in Germany, is investigating the potential for heat transfer in seating systems as a form of energy saving.
One of the stumbling blocks for the uptake of electric vehicles has always been driving range (or the lack of), and researchers are working towards intelligent energy management as a means of improving that range. Systems such as heating and air conditioning drain a large amount of energy from electric vehicle batteries, and the research here is looking at intelligent thermal management in seating as a way of conserving energy.

The project is looking at the effect that the human body and the heat it emits have on a number of different functional textiles. Researchers are considering different seating covers and fabrics in various different usage scenarios, with the one constant that the ‘feel-good’ temperature of the textile surfaces should be 23°C. The aim, of course, is to produce seating textiles and fabrics which can successfully transfer heat to reduce the amount of heating/cooling required and therefore reduce energy use.

**Summary**

Innovation in the seating sector continues at pace, but the news that Johnson Controls is set to split off the seating and trim section of its business should serve as a warning of the high capital investment costs that this sector demands.

Seating has a number of criteria to fulfil, in that it is required to be ever lighter, to create more space and functionality, to reduce manufacturing costs, and to provide the aesthetics and customization that customers demand. While there is always space for new innovation, these factors will decide which technologies come to the fore in future years.

**Author: Colin Pawsey**
Dear Seating Expert,

The 11th International Conference on Innovative Seating 2016 will bring you next generation innovative seating solutions to enhance quality of seating systems and comfort levels.

For more information and the schedule of events, please download the agenda, email at eq@ipc.de or call +49 (0) 30 20 913 – 274.

**Early confirmed Speakers include:**

- **Ralf Küumper**, Vice President, LEAR
- **Markus Kussmaul**, Vice President, RECARO Germany
- **Udo Schultheis**, Director Human Factors and Ergonomics, Zodiac Seats, USA
- **Dr. Andreas Braun**, Head of Multimedia Appliances, Fraunhofer Institute
- **Prof. Dr. Peter Vink**, Faculty of Industrial Design Engineering, TU Delft

We look forward to meeting you in February 2016!