

AIRCRAFT CABIN

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MANAGEMENT

Star of Africa

Ethiopian Airlines interiors

Bring it on

BYOD wifi IFE

SWISS CS100

Style and substance



How PCS is installed in a seat (photo: Lantal)

Pumped up for comfort

MOST AIRCRAFT SEATS RELY ON FOAM TO PROVIDE SUPPORT BUT ALTERNATIVE TECHNOLOGY CAN PROVIDE A MUCH MORE FLEXIBLE SOLUTION.
IAN HARBISON REPORTS

✧ **The Lantal Pneumatic Comfort System (PCS)** first entered service in 2005 but the market picked up in 2009 and it is now in service with 12 airlines. More importantly, says Thomas Steiner, Vice President at PCS, there has been a further upturn in the market recently, with the system not only being selected by first time customers but also becoming the subject of repeat orders from existing operators as new aircraft enter the fleet. The system is relatively complex and costly and so application has been limited to the front end of the aircraft (although the company is looking at ways of extending its applicability to premium economy and economy for longhaul flights through the development of a simpler, cheaper variant).

The repeat customers include SWISS, which selected the system for the Airbus A330 and A340 in 2009 and Boeing 777-300ER earlier this year; and Air Canada for 777s in 2013, 787s in 2014 and further 777s in 2015. The system is also fitted throughout first and business class on Etihad A380s and 787s, including The Residence on the A380. JetBlue has installed PCS on the Airbus A321s that it uses for US transcontinental services and it was part of a recent upgrade programme for SAS A330/340s. It will also enter service later this year on A350s of a European airline and in 2018 with a Middle Eastern operator. In total, more than 12,000 PCS-equipped seats are in current service.

He says this is because of a growing realisation that there are some drawbacks to the use of foam in aircraft seats. Over time, the material compresses and loses its rebound characteristics, becoming softer and thinner, sometimes allowing the underlying seat structure to be felt by the passenger. Foam can also absorb liquids and odours and has to be replaced after several years.

In contrast, PCS uses impermeable air-filled tubes with a pump that has automatic settings for volume and pressure that provide the correct level of firmness for different flight modes. For example, for taxi, takeoff and landing, it is important that the seat cushion is firmer, as well as having some lateral support. If the seat is in semi-recline or bed mode, then it is more important that the back rest is firm, as this gives more support to the passenger's torso.

The PCS pressure sensors can also detect passenger size and weight and adjust the levels accordingly. A further benefit is that a massage function can be incorporated, with the rhythmic inflation and deflation of the tubes working on the back or from the shoulders to the knees. In addition, the passenger also has the ability to modify the level of softness to suit their own personal requirements.

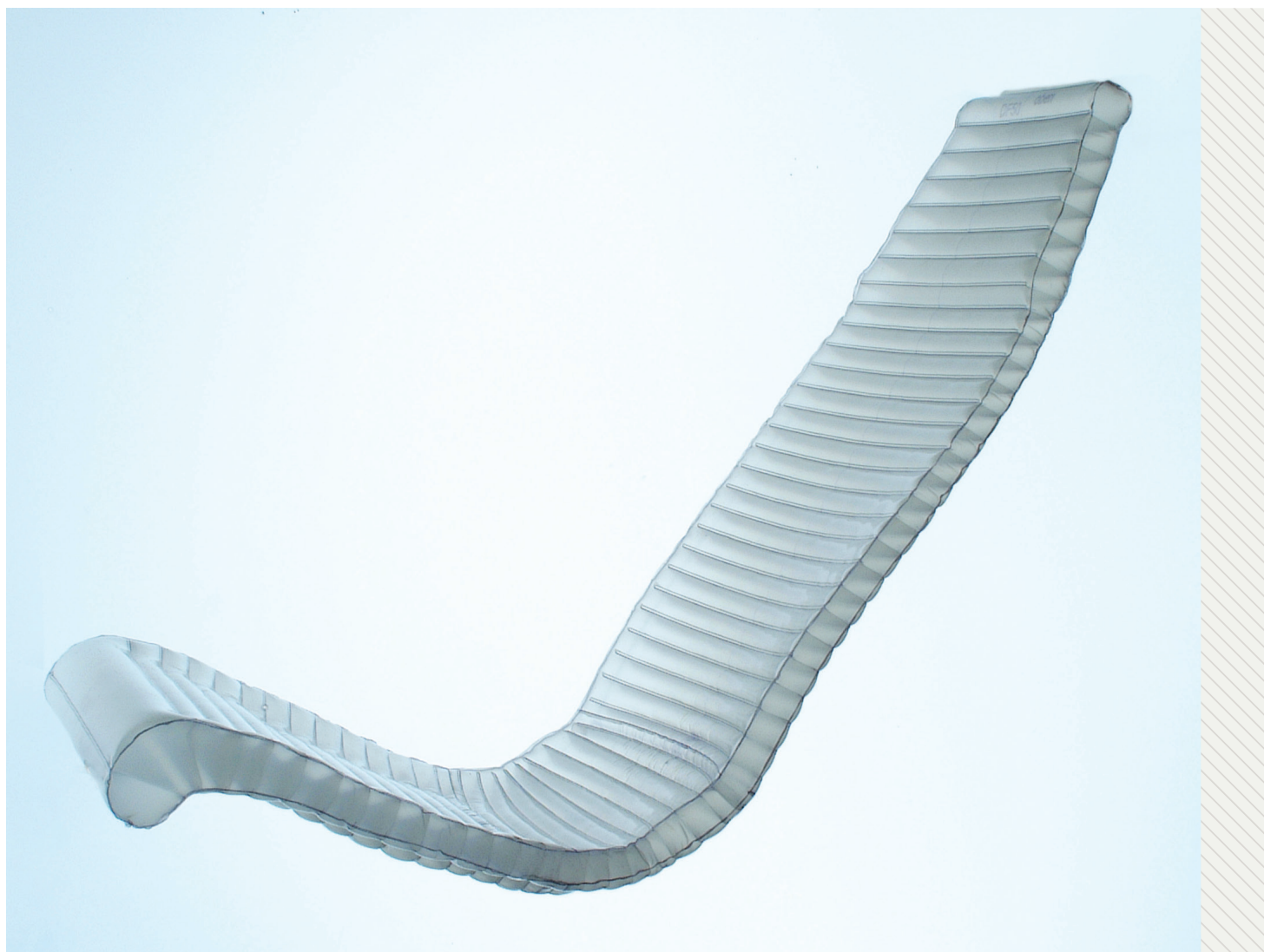


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From a practical point of view, there is a weight saving of 3 to 5kg for a first class seat and 1.5 to 3kg for a business class seat. Steiner says the system is maintenance free although, if a fault develops, it is flagged up automatically through the cabin management system.

The complexity of this system is driven by certification requirements. PCS has to interface with both the electronic control unit and the passenger control unit for the seat, which must be approved for every seat/aircraft combination. Fortunately, Lantal has developed close working relationships with B/E Aerospace, Stelia Aerospace, Thompson Aero Seating and Zodiac Aerospace. ↘

↓ A close-up view showing the air-filled tubes (photo: Lantal)



→ SAS fitted PCS to its Thomson Vantage XL seats during an Airbus A330/340 cabin upgrade programme last year (photo: SAS)



Steiner predicts that airlines will increase the amount of information held on each passenger as way of delivering a highly personalised service, probably through an app. When a customer boards the aircraft, information will be seamlessly transferred from their mobile device to the cabin management system. He sees one possibility being the storage of preferred seat position and softness data. Some airlines already have provision for seat position memory on a single flight and this would be a logical extension.

PCS is not just limited to the airline market. There are interesting applications in the aeromedical field. Cabin pressure can be modified on medevac flights to protect patients with severe head injuries and PCS could be used to adjust the pressure in areas of a seat or a stretcher to support patients with particular critical conditions. Discussions are now underway with a major operator of air ambulance aircraft.

Further in the future, and in cooperation with the textile side of the Lantal business, it may be possible to imbed sensors in the material that could measure passenger pulse and temperature. Combined with pressure sensor data from the PCS, indicating passenger movement, it might be possible to provide crew alerts for a potential medical emergency, such as a heart attack. ●

SHINING EXAMPLE

Sometimes, everyday technology is best demonstrated under extreme conditions. A good example with Lantal's Pneumatic Comfort System (PCS) is its use on Solar Impulse 2, the Swiss experimental aircraft with four electric motors powered by batteries charged during the day by photovoltaic arrays mounted on the wings and fuselage.

As the pilots, Bertrand Piccard and André Borschberg, were unable to move around in the cramped 3.8m³ cockpit, seat comfort was a critical factor in the success of the venture. Thomas Steiner says the project team first tried memory foam for the seat but long-endurance simulations showed that the pilots were experiencing pain from pressure points. Lantal, also Swiss-based, was approached and developed a unique one-off solution that proved its worth during the multi-stage round-the-world flight.

The pilot seat included an inflatable cushion to give back support to the pilot, both in an upright position and when reclined – the pilots could only take short 20-minute breaks every few hours. There was also a massage function, while features not normally found on the airline version included a built-in parachute and a toilet under the seat that used removable bags. Borschberg noted that, while the contact between the seat and the body was good, it did not make him sweat.

The need for such a system is demonstrated by the fact that when the aircraft finally landed in Abu Dhabi on 26 July, having left there in March 2015, it had covered 43,041km in a flight time of 558 hours and 6 minutes – just over 23 days. The longest sector was 8,924km from Nagoya in Japan to Hawaii, taking Piccard 117 hours 52 minutes – almost five days.



The two pilots celebrate after Bertrand Piccard (right) completed the final leg from Cairo to Abu Dhabi (photo: Solar Impulse)