

TRACK 1: STRUCTURES / AERODYNAMICS**“CHALLENGES IN DEVELOPING
A LIGHT WEIGHT PASSENGER SEAT”****BY****DR ZHENG GUOYING AND MR LIM GUO HUI
SINGAPORE TECHNOLOGIES AEROSPACE****ABSTRACT**

The aviation industry faces tough operating environment amidst increasing fuel cost and thin margins. Airlines are turning to interior markets to develop innovative products which help them minimise cabin interiors weight with better functionality.

In the passenger seats market, a fully functional featured economic class passenger seat weighing 15kg per passenger place was considered as an excellent solution a few years ago. This expectation has been raised by the recent introduction of light weight seats. One of the examples is Recaro CL3710 seat displayed in Hamburg Interior Show 2013, weighing 12kg per passenger.

The challenges associated with developing lightweight passenger seats are not only coming from airliners, but also coming from regulation requirements. With 16g dynamic qualification effect from October 27, 2009 on green aircraft, newly installed seats are most likely required to be 16g dynamically qualified, in addition to previous 9g static qualification, resulting in challenges to develop lightweight structures. With further enhancement to cabin safety, aviation authorities have raised flammability standards which impact seats design directly, resulting challenges in material selection to keep end product light.

Life cycle cost, both first investment and maintenance efforts, is sensitive to every air carrier. High reliability and low maintenance efforts of products must be addressed as early as at starting of development of a light weight seat, as well as throughout the entire processes.

These expectations are brought to mind in developing a lightweight passenger seat from scratch with promises of low costs, comfort and certifiable end product. To balance between advance material that offers light weight versus cost factors; comfortable and functionality versus weight and maintenance; structure integrity versus cost of manufacturing, the team adopts innovative approaches in the process of creating the product.

BIOGRAPHY OF SPEAKERS



Dr Zheng Guoying has been working with ST Aerospace since 1999. As appointed Deputy Chief Engineer she is heading Engineering for Passenger Seat Development. Besides, she is an Engineering Specialist in Structures and Interiors; Design Signatory of CAAS AW003; Compliance Verification Engineer of EASA DOA 21J292; appointed Chief of Office of Airworthiness of EASADOA 21J292 since 2007. She has been actively participating professional activities to promote engineering. She is a Fellow of IES, Member of CoFIES, Committee Member of Aero Chapter IES, Member of IStructE, Chartered Engineer and Member of WISE.

Her experiences include research in dynamic and composite structures; lecturing postgraduates and undergraduates; design of civil structures; engineering and certification in various aircraft structures and interiors. She has published 20 research papers.



Mr Lim Guo Hui is a key member in Passenger Seat Development team under EDC, ST Aerospace, in developing innovative designs. His responsibilities include modular design, structure optimization, configuration update and coordination, patent research and flammability compliance in studies of regulators' airworthiness requirements for seating systems/interior products and guiding modular designs towards these required standards. Mr Lim is a ST Aerospace scholar who graduated with First Class Honours in Aerospace Engineering with a Minor in Business from NTU in 2013 and had completed the Global Immersion Programme with Georgia Institute of Technology in 2010.

He performed structural analyses for UAV structures using both FEM and classic methods, and successfully integrated parametric optimization capabilities into in-house toolkits, during his attachment to EDC.

Concurrently Mr Lim also holds the appointment of a Platoon Commander as part of his National Service with exposure in armoured vehicles technologies. He was awarded both the Sword of Merit and Silver Bayonet in 2007 for his military performance.