

## Improved Thermal Comfort in Cabin Aircraft with in-Seat Microclimate Conditioning Module

**Authors :** Mathieu Le Cam, Tejaswinee Darure, Mateusz Pawlucki

**Abstract :** Climate control of cabin aircraft is traditionally conditioned as a single unit by the environmental control system. Cabin temperature is controlled by the crew while passengers of the aircraft have control on the gaspers providing fresh air from the above head area. The small nozzles are difficult to reach and adjust to meet the passenger's needs in terms of flow and direction. More dedicated control over the near environment of each passenger can be beneficial in many situations. The European project COCOON, funded under Clean Sky 2, aims at developing and demonstrating a microclimate conditioning module (MCM) integrated into a standard economy 3-seat row. The system developed will lead to improved passenger comfort with more control on their personal thermal area. This study focuses on the assessment of thermal comfort of passengers in the cabin aircraft through simulation on the TAItherm modelling platform. A first analysis investigates thermal comfort and sensation of passengers in varying cabin environmental conditions: from cold to very hot scenarios, with and without MCM installed in the seats. The modelling platform is also used to evaluate the impact of different physiologies of passengers on their thermal comfort as well as different seat locations. Under the current cabin conditions, a passenger of a 50th percentile body size is feeling uncomfortably cool due to the high velocity cabin air ventilation. The simulation shows that the in-seat MCM developed in COCOON project improves the thermal comfort of the passenger.

**Keywords :** cabin aircraft, in-seat HVAC, microclimate conditioning module, thermal comfort

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