



Aircraft-Pilot-Coupling: Biodynamic Feedthrough Induced Oscillations

Are you considering graduate studies ?

Modern civil and business jets are increasingly lightweight and flexible, which leads to the structural modes encroaching into the bandwidth of the pilot biodynamics and control. Passive coupling between the pilot and the aircraft occurs through the pilot seat and the inceptor when the low frequency structural vibration modes of the aircraft are excited causing inadvertent pilot input. This may cause an excitation of additional structural modes or interfere with the autopilot leading to oscillations that negatively impact the ride quality and in some extreme cases lead to, like in the case of Japan Airlines flight JAL706, fatalities.

The research project aims to develop: a discrete biomechanical model of the pilot using multibody dynamic techniques, a lumped mass model of the pilot seat and a model of the inceptor. The overall model will be integrated into an aircraft aeroservoelastic model and linearized around certain representative seated postures. Parametric studies representative of different pilots will be conducted to identify potential induced vibrations due to aircraft-pilot-coupling. The research work will be sponsored by Bombardier Aerospace and you will have the opportunity to work on-site in Montréal with engineers developing state-of-the-art tools.

The research project has the potential to extend beyond the present scope to span active-pilot modelling and the development of refined ride-quality-analysis.

The Industry-Grade Engineering Skills You Will Acquire:

- Multibody Dynamics Modelling.
- Human Pilot Modelling Techniques.
- Aircraft-Pilot-Coupling in Aeroservoelastic Models.
- Engineering Parametric Studies.
- Ride-Quality-Analysis.
- Vibration Analysis.
- Skills that are applicable to other modes of transportation such as automotive and rail.

For further details, please contact:

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