Mechanical Engineering Seminar Series

- o **Date: Wednesday, October 26th, 2022**
- o **Time: 6:00 PM KST** <u>Online</u>
- o **Zoom Meeting ID: 951 4959 4171 / PW: 100269**

The Icing Engineering Process

: atmospheric conditions, aircraft performance, ice protection systems, and thermal simulation

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Dr. Lima da Silva got a degree of M.Sc. and Ph.D. in the University of Sao Paulo on ice protection simulation. He was a visiting scholar under Prof.Tuncer Cebeci at California State University Long Beach. He validated 2D Icing code against NASA and LEWICE results. He was also involved in Embraer 170/190 Smart Probes Innovative Icing Certification and Simulation (EASA CRI before AS 5562 – Goodrich), and the TAT, Pitot, and Static Port for Embraer 145 Ice Protection Systems (Goodrich) Embraer 190 Icing and Flight Test Campaign.

Abstract

This lecture shows the icing engineering process with atmospheric conditions, aircraft performance, ice protection systems, and thermal simulation. It offers the integration between aircraft performance simulation and icing simulation studies. The increased drag and decreased lift caused by ice affect the aircraft's performance. On the other hand, icing engineering needs the angle of attack versus calibrated airspeed curve to calculate the impingement and its limits. In addition, the icing needs the Altitude versus Calibrated Airspeed curve to find the most critical glaze icing condition. Regular icing courses rarely show this connection between flight mechanics and icing engineering. However, this interaction between different disciplines significantly affects the design and simulation of ice protection systems. Also, this course presents a brief introduction to icing atmospheric concepts and the icing simulation parameters. In the end, the lecture presents a thermal simulation implemented by the author and its main characteristics. The lecture does not focus on the current or future simulation tools but shows the icing engineering as a whole subject integrated into the airframe.

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