

Ice Accretion and Shape Modelling

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Keywords: *Water Catch Efficiency, Ice accretion, Physical modelling*

The process through which water changes its state from liquid to solid is mainly a thermodynamic problem; however, the study of ice formation on an aerofoil flying at a certain velocity includes aerodynamic effects that affect how the water droplets impinge on the surface. Variables such as the angle of impact, temperature or amount of droplets are calculated by means of the software IceANS (Ice Accretion Numerical Simulation), which can then be used for determining the shape of the new surface of the airfoil. In this work, the theoretical background used for the ice accretion simulation will be explained, considering aspects such as the meteorological conditions or the different types of ice found in real flights. It is expected that the results reached within these simulations allow to determine the influence of atmospheric conditions in the performance of the airfoil.

REFERENCES

- [1] G. Furtin, J.L. Laforte and A. Ilinca, Heat and mass transfer during ice accretion on aircraft wings with an improved roughness model. *Int. J. Therm. Sci.*, Vol. **45**, pp. 595–606, 2006.
- [2] Y. Cao, C. Ma, Q. Zhang and J. Sheridan, Numerical simulation of ice accretions on an aircraft wing. *Aerosp. Sci. Technol.*, Vol. **23**, pp. 296–304, 2012.