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The study by visualisation of vortex structures developed on the upper surface of double-delta wings

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A large number of studies of flow visualisations, developed on the upper surface of delta and of gothic wings, and of cones, have been carried out in the wind tunnel of the Valenciennes University's Aerodynamics and Hydrodynamics Laboratory. These studies have provided a better understanding of the development and of the positioning of vortex structures and have enabled, in particular, the preferential nature of inter vortex angles, thereby defined, to be determined. This study of the ertical structures developed on the upper surface of a double-delta wing has revealed that these vortex flows are quite complex and that vortex structures interact with one another. Indeed, it would seem that vortex behaviour has something of a universal nature. An angular conformity between primary and secondary vortex torques and the leading edges of the wing can be expressed by the law of filiation. Inter vortex angles evolve with increasing incidence while fragmentation is a function of the apex angle. It would be interesting to recall that this particular spatial organisation of vortex structures, citing the concept of preferential angles, also appears in standard theories on aerodynamics as, for example, in those governing aerodynamic drag. Nevertheless, the link between interior and exterior vortex structures remains to be investigated further. Such studies might even prove the existence of a supplementary torque. In addition, the least resistance of secondary vortices in relation to their fragmentation inevitably calls for experiments to be undertaken with other possible combinations of slender bodies although these areas of research are beyond the scope of this article.

Biography

Abene Abderrahmane is Researcher at University of Valenciennes area energitic aerodynamic research. His research is in renewable energies (solar air air indicators variables for drying applications baffles. He hold the patent for solar bag and solar air baffles variables.

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