

COLLOQUIUM

Group: Engineering Fluid Dynamics

As part of his MSc thesis assignment

Tjarke van Jindelt

will give a presentation, entitled:

Numerical Investigation of Vortex Breakdown

Date: Thursday May 21, 2015

Time: 13:00

Room: Horst Building Room N109

Summary:

Results of recent CFD simulations of the flow over an Airbus type aircraft show breakdown of the vortex, generated by the strake on the engine nacelle, over its wing. This vortex breakdown might be a determining factor in predicting C_{Lmax} of the aircraft.

A brief description is given of the vortex breakdown phenomenon, explaining features of this flow, as well as theories and experiments devoted to its understanding. Subsequently results are discussed of a numerical investigation on vortex breakdown occurring in a tube, which serves as a test case for the type of vortex breakdown encountered over a wing.

The analysis includes the examination of the influence of the choice of the turbulence model, the influence of the computational grid as well as the role of unsteadiness of the flow. Furthermore, the consequences are addressed of changing the strength of the vortex.

The results of the present study show clear advantages for the RSMg turbulence model. Furthermore, it appears that employing structured grids to resolve the vortical structure of vortex breakdown has advantages over using unstructured grids. However, for more definite validation of the numerical findings results of further experiments are needed.

Assessment committee:

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Prof.dr.ir. H.W.M. Hoeijmakers (mentor)
Dr.ir. E.T.A. van der Weide (mentor)
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d.d. _____