

SPECIAL TECHNOLOGICAL SESSION (STS05)

TRANSITION LOCATION EFFECT ON SHOCK WAVE BOUNDARY LAYER INTERACTION

ORGANIZER: PIOTR DOERFFER

Title of the Presentation: Transition location effects on a supercritical airfoil

Authors: D. Sszubert*, F. Grossi*, Y. Hoarau†, M. Braza*

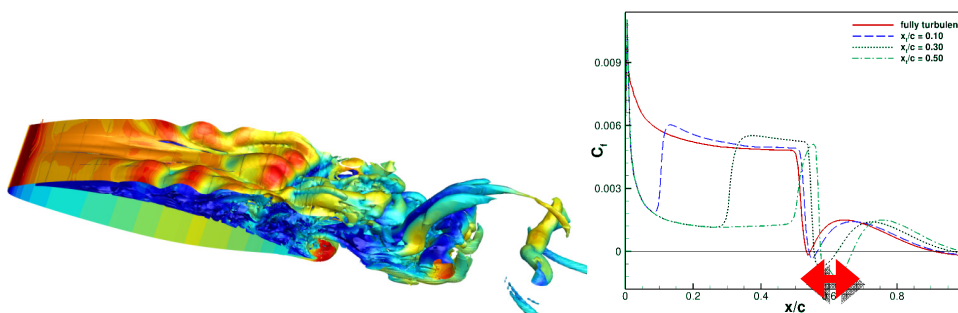
* IMFT, Institut de Mécanique des Fluides de Toulouse, UMR CNRS 5502, Allée du prof. Camille Soula, 41400 Toulouse, France marianna.braza@imft.fr, www.imft.fr

† ICUBE - équipe de Mécanique des Fluides de Strasbourg, hoarau@unistra.fr, Strasbourg, France

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ABSTRACT

The present study investigates the effects on the transition location on the upper surface of a supercritical airfoil (the V2C configuration studied by Dassault in order to provide a laminar boundary layer upstream of the separation), by means of CFD methods at Reynolds number of 3,245 Million, Mach number 0.70 and incidence in the interval between 3 and 7 degrees. The present test-case is part of the TFAST European programme. The transition study has been carried out by URANS approaches. Moreover, a special attention has been paid to the fully turbulent flow case by means of DDES (Delayed Detached Eddy Simulation) methods for the case of 7° that clearly develops transonic buffet instability. A comparison among URANS and DDES approaches used is carried out in respect of their predictive capabilities to capture the buffet and the trailing-edge instability modes. The transition location effects on the skin-friction and on the whole drag coefficient indicate a decrease of the skin-friction for an optimum transition position at $x/c=30\%$ of the chord.



REFERENCES

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