CFD-based Analysis of Wind Tunnel Installation Effects

H. Maseland
National Aerospace Laboratory NLR
Anthony Fokkerweg 2, 1059CM Amsterdam, The Netherlands

F. Moens
ONERA - Office National d'Etudes et de Recherches Aérospatiales
8 Rue des Vertugadins, 92190 Meudon , France

Abstract

In the project DESIREH a high-lift system was designed for a laminar wing and was verified by a wind tunnel test campaign in the European Transonic Windtunnel facility ETW. In order to fairly assess the design special effort has been taken to evaluate side effects of the wind tunnel setup.
In general due to the size of the model interference effects from wind tunnel walls are present. The contribution will show efforts undertaken to simulate the model inside the test section by CFD methods and will compare the findings to the measured data. Additionally, in a pressurized wind tunnel environment the deformation of the model gets significant. CFD-CSM coupled simulations have been performed to assess the difference of the flow present in the experiment to the ideally shaped wing. A comparison is made to wing deformation measurments obtained during the wind tunnel test by stereo pattern tracking.