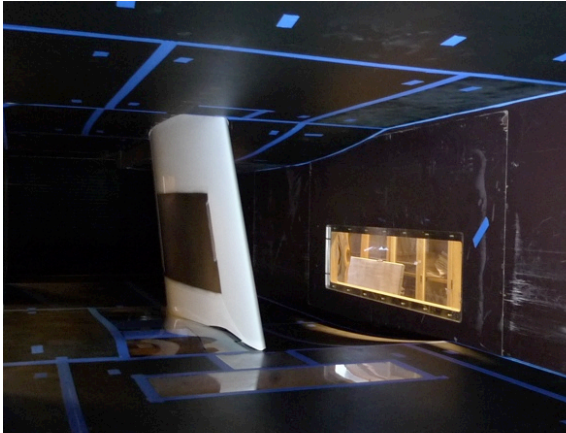


Experimental Investigations of Receptivity in Three-Dimensional Boundary Layers

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The major objective of the RECEPT project is the development of the capability to predict the in-flight performance of a future laminar flow aircraft through development of more accurate transition prediction tools.

The idea is to develop a transition prediction method which includes the effects of the initial disturbance amplitude.

The main issue for such method is the information about the entrainment process of ambient disturbances into the boundary layer, e.g. the receptivity process. Therefore, a substantial part of the project is dedicated to experimental and numerical work to identify and quantify the receptivity coefficients for swept wings.

A related important issue is the critical size of the roughness elements for direct triggering of transition. Any imperfection of the surface of a wing may generate perturbations inside the boundary layer on the wing. However, if the perturbation amplitude is not large it may first grow and then die without triggering transition. But if the size of the surface imperfection is above a certain value, disturbances trigger transition rapidly, and the flow downstream the roughness elements will be turbulent. The knowledge of the critical size of the roughness elements is of great importance for aircraft with laminar wings, since it defines the surface quality requirements for the wing manufacturing, and will be investigated here, too.

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