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**Computing transitional flows using wall-modeled large eddy simulation** JULIEN BODART, JOHAN LARSSON, Center for Turbulence Research, Stanford University — To be applicable to complex aerodynamic flows at realistic Reynolds numbers, large eddy simulation (LES) must be combined with a model for the inner part of the boundary layer. Aerodynamic flows are, in general, sensitive to the location of boundary layer transition. While traditional LES can predict the transition location and process accurately, existing wall-modeled LES approaches can not. In the present work, the behavior of the wall-model is locally adapted using a sensor in the LES-resolved part of boundary layer. This sensor estimates whether the boundary layer is turbulent or not, in a way that does not rely on any homogeneous direction. The proposed method is validated on controlled transition scenarios on a flat plat boundary layer, and finally applied to the flow around a multi-element airfoil at realistic Reynolds number.

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