

Abstract Submitted  
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**Assessment of the DNS Data Accuracy Using RANS-DNS Simulations**<sup>1</sup> JUAN D. COLMENARES F., SVETLANA V. POROSEVA, University of New Mexico, SCOTT M. MURMAN, Nasa Ames — Direct numerical simulations (DNS) provide the most accurate computational description of a turbulent flow field and its statistical characteristics. Therefore, results of simulations with Reynolds-Averaged Navier-Stokes (RANS) turbulence models are often evaluated against DNS data. The goal of our study is to determine a limit of RANS model performance in relation to existing DNS data. Since no model can outperform DNS, this limit can be determined by solving RANS equations with all unknown terms being represented by their DNS data (RANS-DNS simulations). In the presentation, results of RANS-DNS simulations conducted using transport equations for velocity moments of second, third, and fourth orders in incompressible planar wall-bounded flows are discussed. The results were obtained with two solvers: OpenFOAM and in-house code for fully-developed flows at different Reynolds numbers using different DNS databases.

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