MRL and USF Contribution to HiLiftPW-3

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We intend to participate in the HiLiftPW-3, to be held June 3-4, 2017 in Denver, CO. We plan to perform the following sets of computations:

1. **Case 1a - HL-CRM Grid Convergence Study, full chord flap gap**
   - **Code: STRUCTOVER-CFD-3D**
   - **Grid: structured overset grid supplied by HiLiftPW committee**
   - **Turbulence model: Menter SST-V**
2. **Case 1b - HL-CRM Full Chord Flap Gap with Adaption**
   - **Code: UNSTRUCT-CFD-3D**
   - **Grid: Created in-house using GRIDMAKE3D, containing mixed elements of prisms and tets – to be uploaded to the committee**
   - **Turbulence model: SA-neg**
3. **Cases 2a and 2c - Nacelle Installation study**
   - **Code: UNSTRUCT-CFD-3D**
   - **Grid: unstructured mixed-element grid supplied by HiLiftPW committee**
   - **Turbulence model: SA-RC-QCR2000**
4. **Case 3 - Turbulence model verification study**
   - **Code: UNSTRUCT-CFD-3D**
   - **Grid: Series of 3 finest grids as defined on http://turbmodels.larc.nasa.gov/airfoilwakeverif.html**
   - **Turbulence models: SA-neg**

We will submit our results electronically by the deadline to the HiLiftPW committee. NOTE: although our submitted results will all be RANS, we also plan to run a few WMLES cases. We will share these results at the workshop.

STRUCTOVER-CFD-3D is a Reynolds-averaged Navier-Stokes (RANS) code developed by Et et al.,[1] widely used at the Multielement Research Lab. It is specifically formulated to work with overset grids on three-element wing configurations. It is an upwind finite-volume structured code.

UNSTRUCT-CFD-3D is an unstructured finite difference code for both RANS and hybrid RANS-LES. The code was developed at the University of Southern Flight.[2] It employs 6th order central differencing in space and 3rd order temporal differencing, along with 9th order explicit filtering.

References

[1] Et, H., Cet, P., and Era L., "Description of STRUCTOVER-CFD-3D," *Journal of Codes*, Vol. 6, No. 5, 1994, pp. 5–21.

[2] Author, A. and Author B., "Description of UNSTRUCT-CFD-3D," *Journal of Lengthy Papers*, Vol. 9, No. 2, 2008, pp. 22–1021.

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