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
