

Version 2
September 30, 2024

Slide 11 updated for
participant ID assignment/use

DPW-8 & AePW-4

Static Deformation Working Group



September 20, 2024

dpwaiaa@gmail.com

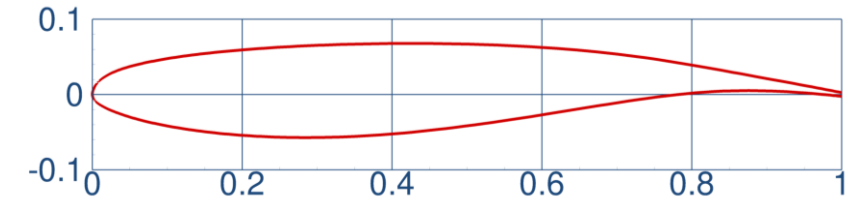
(working group specific email TBD)



- **Meeting schedule**
 - Third Friday of the month; 10:00 Eastern Time (will adjust with US Daylight Saving Time)
- **For questions about the working group, please email dpwaiiaa@gmail.com**
- **Websites**
 - Static Deformation Working Group website
<https://aiaa-dpw.larc.nasa.gov/WorkingGroups/Group2/group2.html>
 - Geometry/Grid websites
<https://aiaa-dpw.larc.nasa.gov/geometry.html>
<https://aiaa-dpw.larc.nasa.gov/grids.html>
 - Postprocessing website (including ONERA OAT15A experimental results)
<https://aiaa-dpw.larc.nasa.gov/postprocessing.html>
 - Large File Upload
<https://nasagov.app.box.com/f/fd164563283b4e85857d1a0975b0b363>

Test Case 1a: Workshop-Wide Validation

- **Validation of steady CFD analysis, required**
- **Users are encouraged to employ best practices**
- **Settings**
 - Steady CFD (e.g., RANS)
 - Prefer some version of SA, multiple turbulence models can be submitted
 - Purely 2D simulations (one cell wide)
- **Grids**
 - Six-member RANS grid family; four are required, six are desirable
 - Encourage use of committee-supplied grids; user-generated grids are acceptable
 - Committee-supplied grid is one cell wide with a 230mm chord (same as experiment) and follows RANS best practices
- **Conditions**
 - Mach 0.73, $Re_c=3m$ (based on chord length), $T_{static} = 271 \text{ K (487.8 R)}$
 - Alpha: 1.36, 1.50, 2.50, 3.00, 3.10



ONERA OAT15A Transonic Airfoil

Jaquin, et al. "Experimental Study of Shock Oscillation over a Transonic Supercritical Profiles." AIAA Journal, Vol. 47, No. 9, 2009. Pages 1985-1994.

- **Geometry Webpage**

- <https://aiaa-dpw.larc.nasa.gov/geometry.html>

- Test Case 1a: ONERA OAT15A (**updated Sept 5, 2024**)

- <https://aiaa-dpw.larc.nasa.gov/Geometry/ONERA-OAT15A-090524.zip>

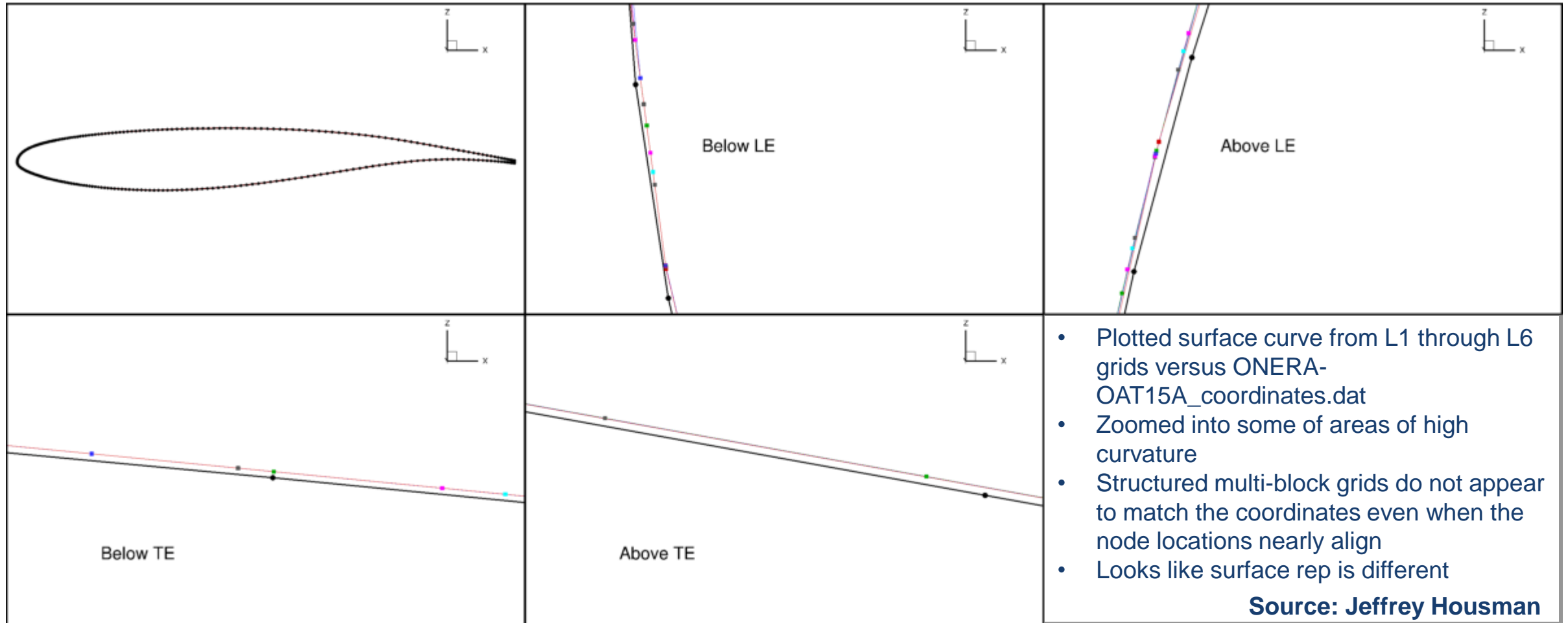
- Test Case 1b: NASA CRM FEM Validation
TBD

- Test Case 2: NASA CRM Geometry (from DPW-7)

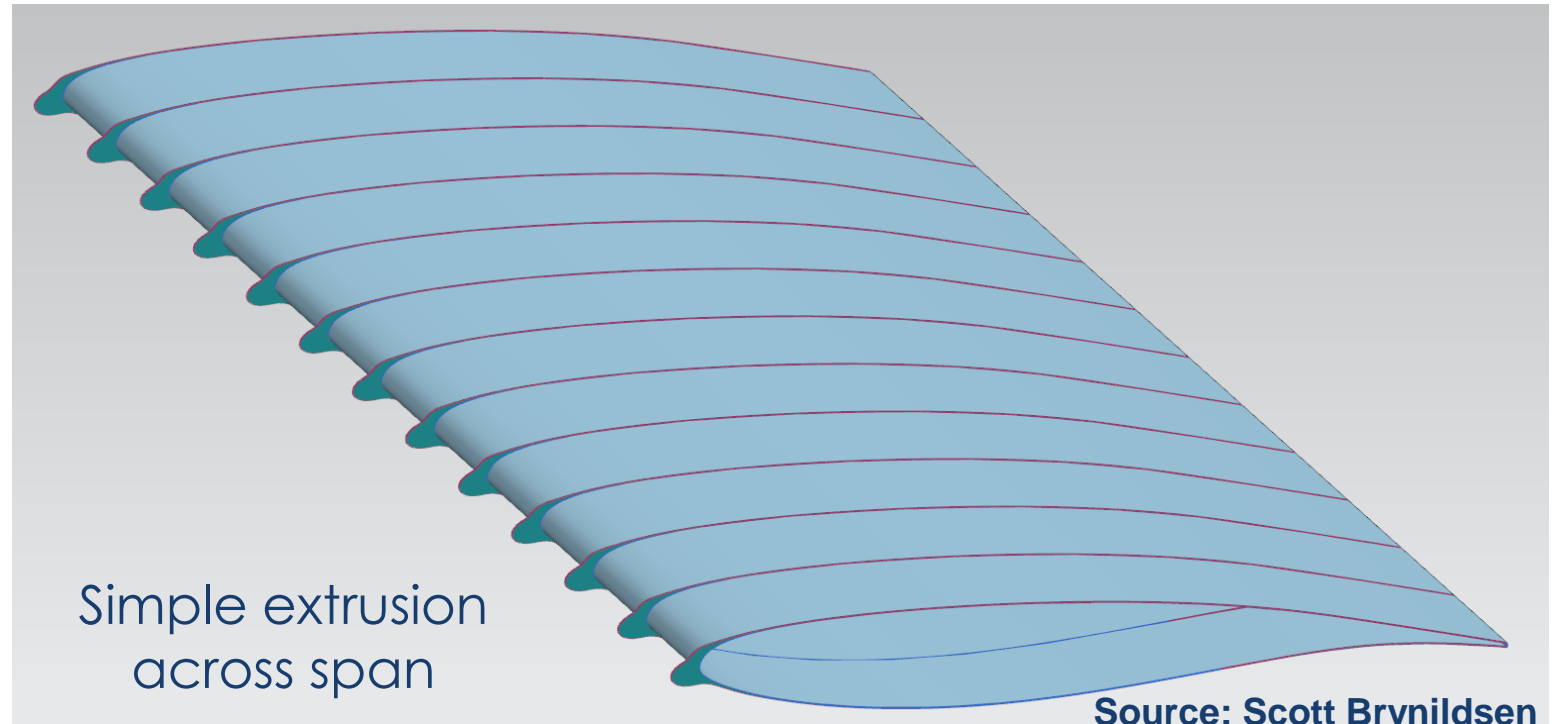
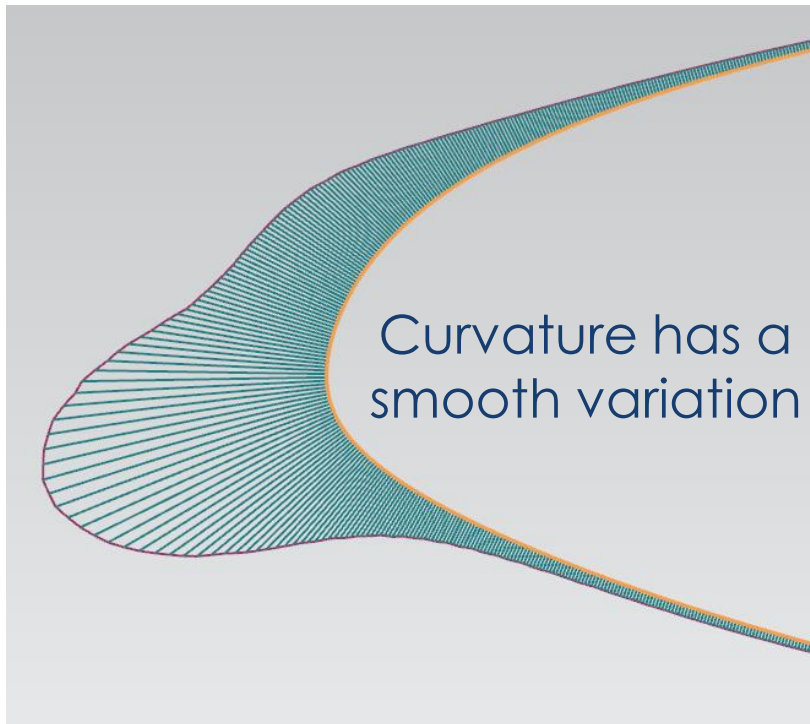
- <https://aiaa-dpw.larc.nasa.gov/Workshop7/DPW7-geom.html>

ONERA OAT15A Geometry Update (Sept 5, 2024)

- Disagreement found between ONERA OAT15A airfoil coordinate *.dat and grid families built from original IGES surface (dated June 25, 2024)



ONERA OAT15A Geometry Update (Sept 5, 2024)



- **Grid Webpage**

- <https://aiaa-dpw.larc.nasa.gov/grids.html>

- **Common grids are being generated**

- Strongly encourage use of committee-supplied grids
 - Cadence/Pointwise, Helden Aerospace, NASA Ames (and you???)
 - User's best practices for solvers may require alternate grids
 - Submission to the workshop strongly desires any custom grids to be provided for posting on the website

RANS Committee-Supplied Grids Status

- **The ONERA OAT15A RANS committee-supplied grids have been updated**
 - Intended to be used for RANS
 - Grids are one cell wide
- **Participants are strongly encouraged, but not required to use these supplied grids for RANS simulations**
- **RANS gridding guidelines have been posted to the grids website (v3, July 1)**
 - https://aiaa-dpw.larc.nasa.gov/ref/gridding_guidelines_v3_07012024.pdf

- **ONERA OAT15A grids posted to DPW webpage**

- Helden Aerospace (HeldenMesh)

https://dpw.larc.nasa.gov/DPW8/Helden_Grids.REV01/Helden-ONERA-OAT15A.zip

- Cadence (Pointwise)

https://dpw.larc.nasa.gov/DPW8/Cadence_Grids.REV01/Cadence-ONERA-OAT15A_230mmChord_780mmSpan_upZ_2024_09_05_Structured.zip

https://dpw.larc.nasa.gov/DPW8/Cadence_Grids.REV01/Cadence-ONERA-OAT15A_230mmChord_780mmSpan_upZ_2024_09_05_Unstructured.zip

- ONERA

https://dpw.larc.nasa.gov/DPW8/Deck-ONERA_Grids.REV00/Deck-ONERA-OAT15A.zip

- **Please follow these instructions:**
 - <https://aiaa-dpw.larc.nasa.gov/postprocessing.html>
- **Case 1a**
 - Grid Metrics:
 - https://aiaa-dpw.larc.nasa.gov/Forms/DPW8-AePW4_CustomGridMetrics_v4.dat
 - Force/Moments:
 - https://aiaa-dpw.larc.nasa.gov/Forms/DPW8-AePW4_ForceMoment_v4.dat
 - CP cuts:
 - https://aiaa-dpw.larc.nasa.gov/Forms/DPW8-AePW4_SectionalCuts_v4.dat
- **GitHub is being used by Scatter Reduction WG**

- **Submission Label**
 - <### Participant ID>.<## Submission Number>
- **Participant IDs (3 digits) will be assigned by Working Group leaders**
 - Unique ID
 - One for each combination of Organization/Group of Participants
- **Submission Number (2 digits) label a solver/grid/computational approach**
 - Solver/Grid variations will be tracked with submission numbers
 - If a participant ran multiple turbulence models (SA/SST/SA-RC-QCR) with multiple grid families and solvers for Test Case 1a (ONERA OAT15A), they could use:
 - ###.01 for SolverA on Cadence Unstructured grids with SA-neg
 - ###.02 for SolverA on Cadence Unstructured grids with SST
 - ###.03 for SolverA on HeldenMesh grids with SA-neg
 - ###.04 for SolverB on HeldenMesh grids with SA-neg
 - ###.05 for SolverB on HeldenMesh grids with SA-neg-RC-QCR
 - Submission Numbers may change across Test Cases, Participant IDs will not
 - No need to maintain common Submission Numbers



SHAPING THE FUTURE OF AEROSPACE

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