Version 2
August 20, 2024

Slides 7 and 8 updated for static temperature of 271 K (487.8 R)

DPW-8 & AePW-4

Buffet Working Group

June 25, 2024

aiaabuffet@gmail.com

Administrative Information

- **Meeting schedule modified**
  - Third Tuesday of every month (exception for this month)
  - 10:00 Eastern Time (will be adjusted for Daylight Saving Time)
  - Meeting cadence may have varying start time – feedback is welcomed
- **For questions about the working group, please email** aiaabuffet@gmail.com
- **Website updates**
  - Main workshop landing page
    https://aiaa-dpw.larc.nasa.gov
  - Buffet Working Group website
    https://aiaa-dpw.larc.nasa.gov/WorkingGroups/Group3/group3.html
  - Geometry website
    https://aiaa-dpw.larc.nasa.gov/geometry.html
  - Grid website (in work)
    https://aiaa-dpw.larc.nasa.gov/grids.html
  - Postprocessing website (in work)
    https://aiaa-dpw.larc.nasa.gov/postprocessing.html

Committee-Supplied Grids Status

- **The Organizing Committee will be providing standard grids**
  - DPW community has found this to be important
  - AePW community has had many user-generated grids
- **Participants are strongly encouraged, but not required to use these supplied grids**
- **It is desired for participants to supply grids for posting on the website**
- **Gridding guidelines have been posted to the grids website**
  https://aiaa-dpw.larc.nasa.gov/grids.html
- **Grid partner updates**
  - Helden Aerospace (HeldenMesh)
  - Cadence (Pointwise)
  - NASA Ames (overset)

Grids

- **Committee-supplied grids will be provided (stay tuned for an email)**
- **Geometry**
  - High-quality CAD for the ONERA OAT15A is on the website
  - https://aiaa-dpw.larc.nasa.gov/geometry.html
  - Various spans
- **Common grids are being generated**
  - Strongly encourage use of committee-supplied grids
  - Cadence/Pointwise, Helden Aerospace, and NASA Ames
  - 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 (a large-file upload link can be provided)
- **Coordinate system**
  - x: aligned with chord (nominally downstream)
  - y: spanwise (out the pilot's right ear)
  - z: up (completes the right-hand rule)

Schemes

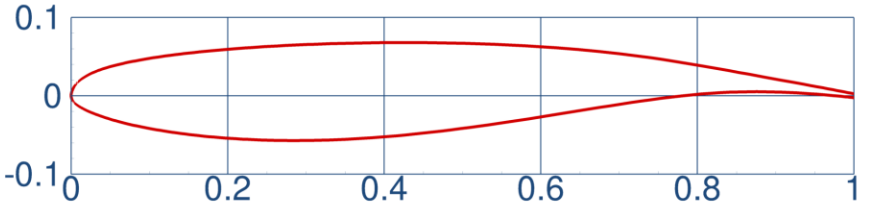
- **Wide range of potential solvers**
- **Many users may use more than one scheme**
  - 47 RANS
  - 45 URANS
  - 35 hybrid RANS/LES
  - 19 LES/WMLES
  - And more

Subgroup Interest

- **Many questions exist regarding best practices for unsteady schemes and grids**
- **Provided grids are using previously-established RANS best practices**
  - A need exists to develop/refine grid best practices
  - Detailed discussions within subgroups will be valuable
  - We will begin starting off-week groups by scheme (once per month)
- **Subgroup leaders**
  - URANS: TBD
  - Hybrid RANS/LES: Johan Jansson, KTH (jjan@kth.se)
  - WMLES: Jeff Housman, NASA Ames (jeffrey.a.housman@nasa.gov)
- **Email working If you are interested/planning to submit a data set**
  - This will help us with logistics and organization
  - A Participant ID will be assigned to you when this interest email is received (preferred) or upon submission of the data set (also ok to do)
- **Individuals are welcome to attend these meetings and not submit data!**

Test Case 1a: Workshop-Wide Validation

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

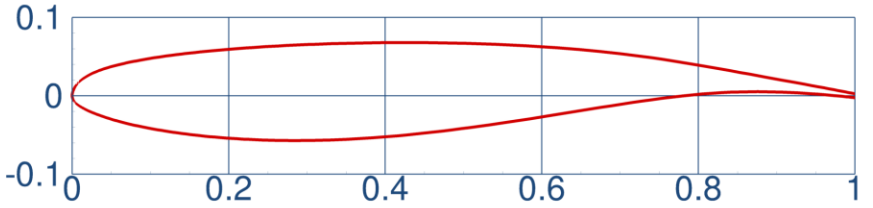


ONERA OAT15A Transonic Airfoil

- **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
  - Use periodic boundary conditions for sidewall boundary conditions
- **Grids**
  - Six-member grid family; four are required, six are desirable
  - Encourage use of committee-supplied grids; user-generated grids are acceptable
  - Three committee-supplied grid options: one cell wide, span=0.1 chord, and 230mm chord with 780mm span (users can contribute one or multiple geometries)
- **Conditions**
  - Mach 0.73, Re_c=3m (based on chord length), T_{static}= 271 K (487.8 R)
  - Alpha: 1.36, 1.50, 2.50, 3.00, 3.10, Buffet WG supplement: 3.25, 3.40, 3.50, 3.60, 3.90

Test Case 1b: Buffet Working Group Supplement

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



ONERA OAT15A Transonic Airfoil

- **Validation of unsteady CFD analysis, required**
- **Users are encouraged to employ best practices**
- **Settings**
  - Unsteady CFD (e.g., URANS, DES, LES, etc.)
  - Prefer some version of SA, multiple turbulence models can be submitted
  - Use periodic boundary conditions for sidewall boundary conditions
- **Grids**
  - Same geometry options as Test Case 1a
  - Specialized grids for unsteady schemes will likely be generated by participants
- **Conditions**
  - Mach 0.73, Re_c=3m (based on chord length), T_{static}= 271 K (487.8 R)
  - Alpha: 1.36, 1.50, 2.50, 3.00, 3.10, 3.25, 3.40, 3.50, 3.60, and 3.90

Data Submission for ONERA OAT15A (In Work)

- **Please follow instructions here:** https://aiaa-dpw.larc.nasa.gov/postprocessing.html
- **Case 1a**
  - Required data
    - F&M (`DPW8-AePW4_ForceMomentAveraged_v1.dat`)
    - C_P cut (`DPW8-AePW4_SectionalCutsAveraged_v1.dat`)
  - Optional data set supplement
    - Boundary layer profile data (`DPW8-AePW4_BoundaryLayerAveraged_v1.dat`)

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  - Optional data set supplement
    - Boundary layer profile data (`DPW8-AePW4_BoundaryLayerAveraged_v1.dat`)
- **Case 1b**
  - Required data
    - F&M data (both `DPW8-AePW4_ForceMomentAveraged_v1.dat` and `DPW8-AePW4_ForceMomentUnsteady_v1.dat`)
    - C_P cut data (both `AePW4_SectionalCutsAveraged_v1.dat` and `DPW8-AePW4_SectionalCutsUnsteady_v1.dat`)
  - Optional supplement
    - Boundary layer profile data (`DPW8-AePW4_BoundaryLayerAveraged_v1.dat` and/or `DPW8-AePW4_BoundaryLayerUnsteady_v1.dat`)

Nominal Schedule

- **May, 2024**
  - ONERA OAT15A geometry release ✔
- **June, 2024**
  - ONERA OAT15A grids released
- **August, 2024**
  - First look of Test Case 2/3 grids
  - AVIATION in-person meeting
- **October 31, 2024**
  - ONERA OAT15A data submission deadline (may be reconsidered)
- **Fall, 2022**
  - Mini Workshop 1, virtual
- **January, 2025**
  - SciTech in-person meeting
- **Fall, 2025**
  - Mini Workshop 2, virtual
- **March, 2026**
  - Delivery of final data set
- **June, 2026**
  - Workshop in San Diego, CA
- **Winter, 2026 (updated)**
  - NASA Ames 11-ft test
- **January, 2027**
  - SciTech Special Sessions in Orlando, FL

Upcoming Meetings

- **Next meeting is July 16**
  - Individuals or teams are welcome to present preliminary analysis
  - Please contact aiaabuffet@gmail.com if you are interested to present
- **An in-person, workshop-wide evening meeting will be held at AVIATION (date and time not yet assigned by AIAA)**
- **Upcoming JAXA buffet workshop**
  - Hybrid
  - Friday, August 30th, 12:30-18:00 JST
  - Contact Andrea Sansica for more information (sansica.andrea@jaxa.jp)
- **Note: Static Deformation Working Group has started**

Leadership Team

- **Working Group Leadership**
  - Hadar Ben-Gida, Technion Israel Institute of Technology IL
  - Brent Pomeroy, NASA Langley US
  - Daniella Raveh, Technion Israel Institute of Technology IL
  - Bret Stanford, NASA Langley US
  - Andrea Sansica, JAXA JP
- **Subgroups**
  - URANS: TBD
  - Hybrid RANS/LES: Johan Jansson, KTH SE
  - WMLES: Jeff Housman, NASA Ames US

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