

4th AIAA CFD Drag Prediction Workshop

Opening Remarks

John Vassberg

27th Applied Aerodynamic Conference
San Antonio, TX
20-21 June, 2009

4th AIAA CFD Drag Prediction Workshop

Organizing Committee

Tom Zickuhr, David Levy

Cessna Aircraft

Rich Wahls, Joe Morrison

NASA

Dimitri Mavriplis

U. of Wyoming

Mitsuhiro Murayama

JAXA

*Olaf Brodersen,
Bernhard Eisfeld*

DLR

*John Vassberg,
Ed Tinoco, Mori Mani*

The Boeing Company

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DPW-IV Objectives

- Provide Impartial Forum To Evaluate RANS Solvers
- Identify Areas Needing Research & Development
- Conduct Blind Test of State-of-the-Art CFD Methods
 - Follow-Up Wind-Tunnel Tests After Workshop
- Document Results
 - Available on DPW-IV Website After Workshop
 - AIAA Papers for Chicago Summer 2010
- International Representation:
 - Industry, Academia, Gov't Labs & Commercial Vendors

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Participation Demographics

- Total Participants: 19
- Total Solution Sets: 29
- USA: 37% , Europe: 37% , Asia/Russia: 26%
- Industry: 26% , Gov't: 32% , Univ: 11% , Vendors: 32%
- Structured: 47% , Unstructured: 53%
- Returning From DPW-III: 47% , New To DPW-IV: 53%

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Case 1a: Grid Convergence Study

Single Point Grid Sensitivity Study on Four Grids

- CRM Wing-Body-Horizontal Configuration
- Mach = 0.85 , $C_L = 0.5 (\pm 0.001)$, Re = 5 million
- Tail Incidence: $iH = 0^\circ$
- Coarse, Medium, Fine Meshes Required
- Extra-Fine Mesh Is Optional

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Case 1b: Downwash Study

Four Drag Polars on Medium Grid

- CRM Wing-Body \pm Horizontal
- Mach = 0.85 , Re = 5 million
- Alpha = 0.0° , 1.0° , 1.5° , 2.0° , 2.5° , 3.0° , 4.0°
- Tail Incidences: -2° , 0° , 2° & No Tail
- Derive A Trimmed Drag Polar
- Derive Delta Drag Polar:
 - Tail Off vs. Trimmed

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Case 2: Mach-Sweep Study (optional)

Three Drag-Rise Curves on Medium Grid

- CRM Wing-Body-Horizontal ($iH = 0^\circ$)
- $C_L = 0.40, 0.45, 0.50$ (± 0.001)
- Mach = 0.70, 0.75, 0.80, 0.83, 0.85, 0.86, 0.87
- Re = 5 million

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Case 3: Reynolds Number Study (optional)

Single Point Solution on Medium Grid

- CRM Wing-Body-Horizontal ($iH = 0^\circ$)
- $Re = 20$ million
- Mach = 0.85
- $C_L = 0.50$ (± 0.001)

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Agenda

Saturday, 20 June, 2009 (8:30-5:30)

- Overviews: Geometry, Grid, Test Plans
- Participant Presentations (Sessions 2-6)

Sunday, 21 June, 2009 (9:00-4:00)

- Participant Presentations (Sessions 7-8)
- Invited Presentations
- Summary of CFD Results
- Open Discussion & Next Steps

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Agenda

Wednesday, 24 June, 2009 (2:00-5:00)

- DPW Follow-On Studies
- 103-APA-22
- Room Travis D
- Session Chairs: Ralf Rudnik & Mori Mani
- Presentations:
 - 5 Publications
 - 1 Summary DPW-IV (Oral)
 - Panel Discussion: Joe Morrison (Host)