

DPW-7

Expanding the Envelope

2-Day Workshop
AIAA AVIATION 2022

Chicago, IL USA

June 25-26, 2022



Visit the DPW website at:

<http://aiaa-dpw.larc.nasa.gov>



or send inquiries to:

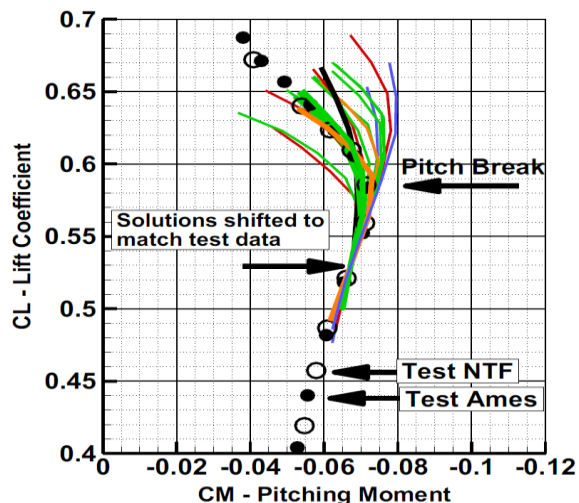
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CFD Drag Prediction Workshop VII (DPW-7)

THE CHALLENGE

Predict the effect of shock-induced separation on the variation of lift and pitching moment with increasing angle-of-attack at transonic conditions.

Flow conditions dominated by shock-induced separation represent a significant portion of the flight regime critical to aircraft safety and government certification regulations. All too often, anomalies in this flight regime are not discovered until flight test, resulting in expensive and time-consuming campaigns to “fix” associated issues. CFD can be far more efficient than wind tunnels in simulating the forces and moments of an elastic airplane at flight Reynolds number, but to be of practical use, CFD must be shown to adequately model the development and progression of shock-induced separation with increasing angle-of-attack in this portion of the flight envelope.



Results from DPW-6. Only five solutions match test data beyond Pitch Break. CAN YOU?

CFD Drag Prediction Workshop VII (DPW-7)

Organizing Committee

John Vassberg, Ben Rider
The Boeing Company

Olaf Brodersen, Stefan Keye
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Mitsuhiro Murayama
JAXA

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Textron Aviation

Raj Nangia
On behalf of the Royal Aeronautical Society

Chris Toomer
University of the West of England, Bristol

Dimitri Mavriplis
University of Wyoming

Dates

Geometry	April 13, 2021
Release Standard Grids	Sep 1, 2021
Notice of Intent to Participate	Feb 18, 2022
Abstract Deadline	Apr 1, 2022
Data Submittal Deadline	May 1, 2022

Check the DPW website for additional information and updates.

Workshop registration will be handled through normal AIAA procedures.

Workshop presentations will not be official AIAA papers; however, several participants will be invited to support a special session on shock-induced separation prediction to be held during the AIAA SciTech Meeting, January 2023.

Objectives

- To build on the 20+ years of success of the AIAA Drag Prediction Workshop series.
- To assess the state-of-the-art computational methods as practical aerodynamic tools for aircraft force and moment prediction of industry relevant geometries.
- To provide an impartial forum for evaluating the effectiveness of existing computer codes and modeling techniques using Navier-Stokes solvers.
- To identify areas needing additional research and development.



NASA Common Research Model (CRM)

NOTE: DPW-7 test cases DO NOT include the horizontal tail.

General Information

- This workshop is open to participants worldwide. Efforts will be made to ensure representation from all areas of industry, academia and government laboratories.
- Participation in the CFD studies is not required to attend the workshop. Everyone is welcome!
- Open forums will be included in the workshop to discuss the solutions and modeling techniques.
- Results will be made available after the workshop in a report and on the DPW website.
- A nominal registration fee will be required for attendance.
- AIAA membership is not required

Sponsored by the

AIAA APPLIED AERODYNAMICS TC

in collaboration with the

ROYAL AERONAUTICAL SOCIETY



Test Cases

DPW-7 will focus on the NASA CRM **Wing-Body** configuration (**no tail**) with prescribed static aeroelastic wing twist. Results will be compared to high-quality wind-tunnel data from multiple facilities.

Required

Case 1: Grid Convergence Study

Case 2: Alpha Sweeps at Constant Re

Case 3: Re Sweep at Constant CL

Optional

Case 4: Solution-Adapted Grid

Case 5: Beyond RANS:

**URANS, DDES, WMLES,
Lattice-Boltzmann, etc.**

**Case 6: Coupled Aero-Structural
Simulation**

**Check the DPW website
for Test Case details.**



All participants are encouraged to build their own grids using 'best practice' techniques. IGES and STP models are available for grid construction. Grid size requirements can be found on the DPW website. All grids used **for results presented at the workshop must** be submitted to the DPW Organizing Committee to be made available to all interested parties. *Note: All results and grids will be published electronically on the DPW website:*

<http://aiaa-dpw.larc.nasa.gov>