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?
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.

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

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.

Sponsored by the AIAA APPLIED AERODYNAMICS TC in collaboration with the ROYAL AERONAUTICAL SOCIETY

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