Test Case 1: CRM-HLS (Simplified High-Lift Common Research Model)

This test case is designed to replicate some of the flow physics seen on the outboard wing of the full CRM-HL, but in a more simplistic manner. The geometry consists of a constant sectional profile cut from the full configuration just outboard of the end of the flaps. Geometry includes the main element, a slat, a semi-span flap, and several slat brackets designed to match the size and locations of the full model. These sectional profiles are extruded and swept to form a finite span simplified swept wing. Specifically, this model is designed to replicate the over-predicted separation typical of RANS solver behind the outboard slat brackets.

At the beginning of the workshop, this case only exists in computational form, meaning no experimental data is available for comparison. This case will predominantly be used 'blind', but compared across TFGs to inform predictive capabilities.

Geometry

Available on HLPW6 Website: https://aiaa-hlpw.org/HLPW6/cases

Geometry Reference Quantities

Mean Aerodynamic Chord (MAC)	30 inches
Reference semi-span	72 inches
Moment Reference Center (MRC)	x = 34.8082 inches, y = 0.0 inches, z = 0 inches
Semi-span model reference area (Sref)	2,160 in^2
Leading Edge Deflection (reference)	30°
Trailing Edge Deflection (reference)	37°

Case Parameters and Requirements

Mach Number	0.20
Chord Reynolds Number	3.55 x 10^6
Angles of Attack	10°, 15°, 20°, 25°, 30°, 35°
Reference Static Temperature	518.67 °R
Reference Static Pressure	14.696 psi
Important Details	• Geometry is provided in full-scale inches • When using a dimensional code, it is recommended to adjust viscosity to match requested Reynolds number, this should result in reference quantities of SSL air. • All simulations are run Free-Air with no tunnel or support systems included • Symmetry boundary condition is typically applied at y = 0.0 inches.

Optional: Geometric Variations

Several parametric variations of the geometry are feasible, and can be explored with TFG direction:

- Stowed Flap
- Alternative LE Bracket Width
- Alternative LE or TE Deflections