

AIAA 7th Drag Prediction Workshop, NASA Common Research Model Grids

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General grid information:

Grids are multi-block structured grids, consisting of an O-grid surrounding the geometry, H-blocks filling the near-field domain, and the whole surrounded by an O-grid extending to the farfield boundaries. The grids have been obtained by automatically splitting the blocks defined by the base topology in order to increase the number of blocks for better MPI-scaling. Connections between blocks can consist of compound faces.

For sharing purposes, all grids have been converted from their native format to cgns.

BC information is embedded in the grid file in the respective zone names, e.g. "Face 000001 BC 15:lMin-1lMax-1,JMin-1JMax-13,KMin-1KMax-9":

BC 0: mirror plane (y=0)
BC 15: solid wall (fuselage)
BC 16: solid wall (wing)
BC 20: farfield boundary

Grid naming convention:

Grid names follow the pattern XXX-YYYYY-ZZZ

XXX LoQ/HiQ, refers to low or high dynamic pressure conditions in the wind tunnel;
 This influences wing bending and thereby defines the geometry used to generate the grid
YYYYY refers to the angle of attack of the wind tunnel test which influences wing bending,
 and thereby defines the geometry used to create the grid. a2p75 indicates AoA=2.75 degrees
ZZZ grid size, see below for grid size information

Grid size information:

grid	#blocks	#cells	#points	
L1T	592	4,344,832	5,102,256	Level 1, Tiny
L2C	760	15,100,992	16,923,108	Level 2, Coarse
L3M	1,408	36,318,720	40,199,392	Level 3, Medium
L4F	2,445	71,552,320	78,780,353	Level 4, Fine

Use of grids in DPW7 studies:

<u>Grid-convergence</u>	<u>Angle of Attack sweep</u>	<u>Re-dependency</u>
LoQ-a3p00-L1T	LoQ-a2p50-L3M	LoQ-a2p50-L3M
LoQ-a3p00-L2C	LoQ-a2p75-L3M	HiQ-a2p50-L3M
LoQ-a3p00-L3M	LoQ-a3p00-L3M	
LoQ-a3p00-L4F	LoQ-a3p25-L3M	
	LoQ-a3p50-L3M	
	LoQ-a3p75-L3M	
	LoQ-a4p00-L3M	
	LoQ-a4p25-L3M	