

Summary of CRM-HL meshes for HLPW-4

As of 02/19/2022

For simplicity, each set of meshes is numbered (1, 2, 3,... for the committee-provided meshes and 101, 102, 103,... for the other meshes). Each set typically comprises either a family or a logical grouping. Within a given set, additional numbers may be used to identify logical mesh subsets (e.g., 1.1, 1.2, 1.3). Grid level is most commonly indicated by letters (e.g., AAAA, AAA, AA, A, B, C, D, E, ...) from smallest to largest, going by the official HLPW-4 Mesh Generation Guidelines. Other notation may be used to indicate the flap setting (if no other notation is used, then the configuration is the “default nominal configuration” with flap setting 40/37). Most of the provided grids are “free air” (half-model with symmetry plane in free air). In-tunnel grids are indicated with “T” designation.

IMPORTANT: Please double-check the BCs in any grid that you download. We have noticed small mistakes/typos occasionally (for example, a prescribed x-symmetry plane when it should be y-symmetry).

Committee Meshes

1 (40/37 nominal config) – Unstructured from Pointwise

1.1 – Tet

- 1.1.A – 71M cells, 12M nodes
- 1.1.B – 188M cells, 32M nodes
- 1.1.C – 544M cells, 91M nodes
- 1.1.D – 1.2B cells, 203M nodes

1.2 – Prism-Tet dominant

- 1.2.A – 29M cells, 12M nodes
- 1.2.B – 75M cells, 32M nodes
- 1.2.C – 213M cells, 91M nodes
- 1.2.D – 468M cells, 203M nodes

1.3 – Hex-Tet dominant

- 1.3.A – 22M cells, 12M nodes
- 1.3.B – 53M cells, 32M nodes
- 1.3.C – 142M cells, 92M nodes
- 1.3.D – 301M cells, 203M nodes

2 (40/37 nominal config) – Unstructured from Pointwise; same as 1 except smoothed in a postprocessing step

2.1 – Tet

- 2.1.A – 71M cells, 12M nodes
- 2.1.B – 188M cells, 32M nodes
- 2.1.C – 544M cells, 91M nodes
- 2.1.D – 1.2B cells, 203M nodes

2.2 – Prism-Tet dominant

- 2.2.A – 29M cells, 12M nodes
- 2.2.B – 75M cells, 32M nodes
- 2.2.C – 213M cells, 91M nodes
- 2.2.D – 468M cells, 203M nodes

- 2.3 – Hex-Tet dominant
 - 2.3.A – 22M cells, 12M nodes
 - 2.3.B – 53M cells, 32M nodes
 - 2.3.C – 142M cells, 92M nodes
 - 2.3.D – 301M cells, 203M nodes
- 2 (37/34 config) – Unstructured from Pointwise; smoothed in a postprocessing step
 - 2.1_37/34 – Tet
 - 2.1_37/34.D – 1.2B cells, 200M nodes
 - 2.2_37/34 – Prism-Tet dominant
 - 2.2_37/34.D – 463M cells, 200M nodes
 - 2.3_37/34 – Hex-Tet dominant
 - 2.3_37/34.D – 298M cells, 201M nodes
- 2 (43/40 config) – Unstructured from Pointwise; smoothed in a postprocessing step
 - 2.1_43/40 – Tet
 - 2.1_43/40.D – 1.2B cells, 200M nodes
 - 2.2_43/40 – Prism-Tet dominant
 - 2.2_43/40.D – 463M cells, 200M nodes
 - 2.3_43/40 – Hex-Tet dominant
 - 2.3_43/40.D – 297M cells, 200M nodes
- 3 (40/37 nominal config) – Structured Overset from NASA Ames
 - 3.A – 20M solution nodes (35M total nodes)
 - 3.B – 65M solution nodes (113M total nodes)
 - 3.C – 232M solution nodes (388M total nodes)
 - 3.D – 550M solution nodes (953M total nodes)
- 3 (37/34 config) – Structured Overset from NASA Ames
 - 3_37/34.A – 20M solution nodes (35M total nodes)
 - 3_37/34.B – 65M solution nodes (113M total nodes)
 - 3_37/34.C – 232M solution nodes (388M total nodes)
 - 3_37/34.D – 550M solution nodes (953M total nodes)
- 3 (43/40 config) – Structured Overset from NASA Ames
 - 3_43/40.A – 20M solution nodes (35M total nodes)
 - 3_43/40.B – 65M solution nodes (113M total nodes)
 - 3_43/40.C – 232M solution nodes (388M total nodes)
 - 3_43/40.D – 550M solution nodes (953M total nodes)
- 4 (40/37 nominal config) – Structured Overset from NASA Ames; same as 3 except smaller min y+ approx. 1 on A
 - 4.A – 20M solution nodes (35M total nodes)
- 5 (40/37 nominal config) – Unstructured from Pointwise; “v3b” variant
(similar to 2, with fixes made in slat-bracket tight pocket regions and flap track fairings regions)
 - 5.3 – Hex-Tet dominant
 - 5.3.A – 22M cells, 12M nodes
 - 5.3.B – 53M cells, 32M nodes
 - 5.3.C – 143M cells, 92M nodes
 - 5.3.D – 310M cells, 209M nodes

Other Meshes

- 101 (40/37 nominal config) – Unstructured from BETA-CAE, min y^+ approx. 1, wake refinement for lower alpha
101.C – 217M cells, ≈ 172 M nodes
- 101 (37/34 config) – Unstructured from BETA-CAE, min y^+ approx. 1, wake refinement for lower alpha
101_37/34.C – 220M cells, ≈ 172 M nodes
- 101 (43/40 config) – Unstructured from BETA-CAE, min y^+ approx. 1, wake refinement for lower alpha
101_43/40.C – 218M cells, ≈ 172 M nodes
- 102 (40/37 nominal config) – Unstructured from BETA-CAE, min y^+ approx. 100, wake refinement for lower alpha
102.C – 103M cells, ≈ 68 M nodes
- 102 (37/34 nominal config) – Unstructured from BETA-CAE, min y^+ approx. 100, wake refinement for lower alpha
102_37/34.C – 103M cells, ≈ 68 M nodes
- 102 (43/40 nominal config) – Unstructured from BETA-CAE, min y^+ approx. 100, wake refinement for lower alpha
102_43/40.C – 102M cells, ≈ 68 M nodes
- 103 (40/37 nominal config) – Unstructured from BETA-CAE, min y^+ approx. 1, wake refinement for high AoA also
103.A – 91M cells, 68M nodes
103.B – 173M cells, 138M nodes
103.C – 276M cells, 218M nodes
103.D – 389M cells, 323M nodes
103.E – 723M cells, 629M nodes
- 104 (40/37 nominal config) – Unstructured from BETA-CAE, min y^+ approx. 100, wake refinement for high AoA also
104.A – 43M cells, 30M nodes
104.B – 103M cells, 81M nodes
104.C – 153M cells, 110M nodes
104.D – 238M cells, 191M nodes
- 105T (40/37 nominal config in wind tunnel) – Unstructured from BETA-CAE, min y^+ approx. 1
105T_alpha.A – 100M cells, 74M nodes
105T_alpha.B – 156M cells, 121M nodes
105T_alpha.C – 278M cells, 226M nodes
- 106T (40/37 nominal config in wind tunnel) – Unstructured from BETA-CAE, min y^+ approx. 100
106T_alpha.C – 168M cells, 125M nodes
- 107 (40/37 nominal config) – Modification of 103; unstructured from BETA-CAE, min y^+ approx. 1
(also referred to as “C+”; 107.C has increased refinement in some areas compared to 103.C)
107.C – 311M cells, 262M nodes
- ~~130 (40/37 nominal config) – Unstr from Pointwise (for High Order TFG), various y^+~~
~~130.AAAA – various tiny sizes, includes both linear and high order meshes~~
~~130.AAA – various small sizes, includes both linear and high order meshes~~
(removed by request from grid creator and High Order TFG)
- 131 (40/37 nominal config) – Unstr from Pointwise (for High Order TFG), various y^+ , not following official guidelines

- 131.Coarse – *various sizes*, includes both linear and high order meshes
- 131.Medium – *various sizes*, includes both linear and high order meshes
- 131.Fine – *various sizes*, includes both linear and high order meshes
- 131.ExtraFine – *various sizes*, includes both linear and high order meshes

- 140 (40/37 nominal config) – Unstructured from KHI
 - 140.C – 366M cells, 368M nodes

- 150 (40/37 nominal config) – Unstr from BSC (for High Order TFG), various y^+ , not following official guidelines
 - CRM-HL_40-37_Nominal_BSC_AllTet_Medium_Q2 – *various sizes*, Q2
 - CRM-HL_40-37_Nominal_BSC_AllTet_Medium_Q3 – *various sizes*, Q3

- 160 (40/37 nominal config) – P2 unstr from Inria (for High Order TFG), various y^+ , not following official guidelines
 - 160_y+100_TetP2.meshb.gz – $y^+=100$
 - 160_y+200_TetP2.meshb.gz – $y^+=200$
 - 160_y+800_TetP2.meshb.gz – $y^+=800$

- 170 (40/37 nominal config) – Structured Overset from CFS Engineering
 - 170.A – 81,398,960 cells
 - 170.B – 297,318,224 cells
 - 170.C – 1,068,628,480 cells

- 170 (37/34 config) – Structured Overset from CFS Engineering
 - 170_37/34.A – 81,398,960 cells
 - 170_37/34.B – 297,318,224 cells

- 170 (43/40 config) – Structured Overset from CFS Engineering
 - 170_43/40.A – 81,398,960 cells
 - 170_43/40.B – 297,318,224 cells

- 180 (40/37 nominal config) – Unstructured from NASA, min y^+ approx. 100, intended for WMLES
 - 180.D – 418 million nodes

- 181 (40/37 nominal config) – Unstructured from NASA, min y^+ approx. 100, intended for WMLES
 - 181.C – 156 million nodes

- 190 (40/37 nominal config) – Polyhedral from Siemens
 - 190.A – 111 million cells, 359 million nodes
 - 190.B – 351 million cells, 1086 million nodes

- 200 (40/37 nominal config) – Unstructured from Boeing, intended for WMLES
 - 200.C – 296 million cells

- 210 (40/37 nominal config) – Structured overset from NASA, intended for hybrid RANS/LES
 - 210.C – 576 million solution nodes

- 220 (40/37 nominal config) – Structured overset from NASA, intended for WMLES
 - 220.B – 620 million solution nodes

- 230 (40/37 nominal config) – Polyhedral from Hexagon/Cradle
 - 230.A – 12 million cells, 44 million nodes
 - 230.B – 27 million cells, 87 million nodes
 - 230.C – 62 million cells, 187 million nodes

230.D – 143 million cells, 448 million nodes

240 (40/37 nominal config) – Unstructured from JAXA

240.C – 209 million cells, 86 million nodes

250 (40/37 nominal config) – Unstructured from BSC, intended for WMLES

250.A – 43 million cells, 10 million nodes

250.C – 274 million cells, 58 million nodes