

# R-003 & NASA Langley Research Center

- Flow solver: USM3D-ME 1.0.1 ( <https://software.nasa.gov/software/LAR-19841-1> )
- Spatial discretization: 2nd-order, cell-centered, finite-volume, mixed-element, unstructured-grid
- Time integration or iteration method: Steady state with Hierarchical Adaptive Nonlinear Iteration Method (HANIM)
- Name of committee grids (or “self-prepared”): 1.R.01, 1.R.05, 1.R.07, 2.R.01, 3.R.02
- Cases submitted: Case 1; Case 2 (2.1–2.4); Case 3 (3.2–3.4)
- Initialization method: Free stream conditions
- **Turbulence model:** SA-neg-QCR2000-R (for Case 1), SA-neg (for Cases 1–3)
- **Convergence/stopping criteria:** meanflow and turbulence-model residuals reach machine zero or F&M averages over last 2000 iterations remain within prescribed tolerance
- Relevant recent publications related to solver and/or high-lift applications:  
AIAA 2013-2541, AIAA-2015-1747, AIAA Journal 54(9) 2016, AIAA 2016-0858, AIAA 2016-0860, AIAA Journal 55(10) 2017, AIAA 2018-1102, AIAA 2019-2333, AIAA Journal 59(8) 2021, AIAA Journal 59(11) 2021, AIAA 2021-1552, AIAA 2021-0470 , AIAA JoA 59(3) 2022, AIAA 2023–1759, AIAA 2023–3252