Workflow of a CFD simulation
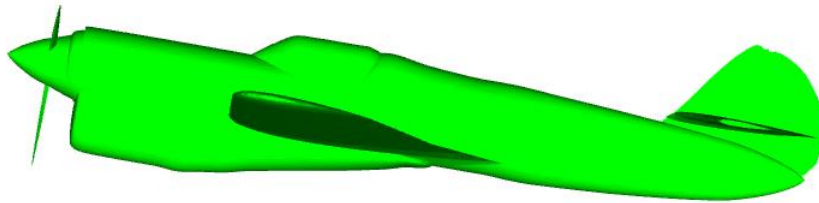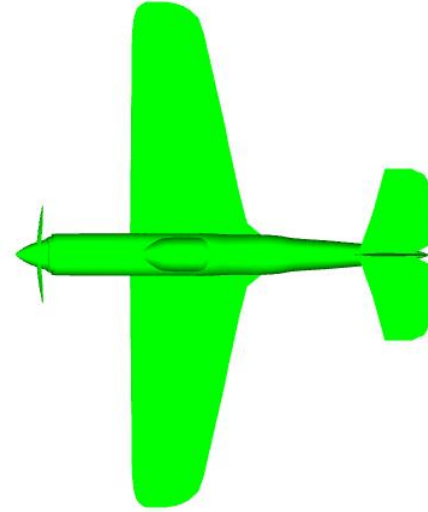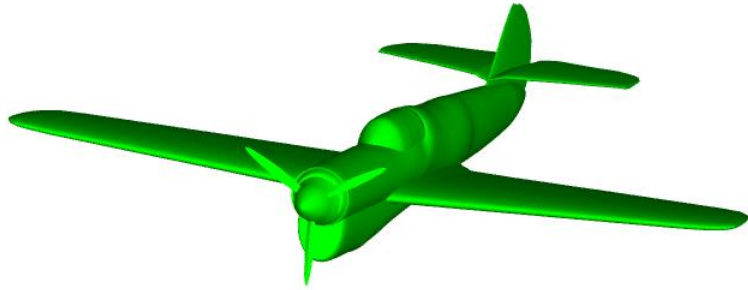
- Workflow of a CFD simulation:

    - Problem definition.

    - Geometry generation.

    - Mesh generation and mesh quality assessment.

    - Case setup:

        - Boundary conditions and initial conditions.

        - Physical models (many models but turbulence is the most important).

        - Selection of numerical schemes and stabilization options (many options available).

        - Run time parameters (timestep, iterations, saving frequency, final time, monitors).

        - Case parametrization if running and optimization case or space exploration.

        - And so on.

    - Launch the simulation using the available resources (parallel computing, GPUs, cloud computing, storage).

    - Monitor the solution (residuals and integral quantities) and co-processing.

    - Postprocessing – Qualitative and quantitative assessment of the results.
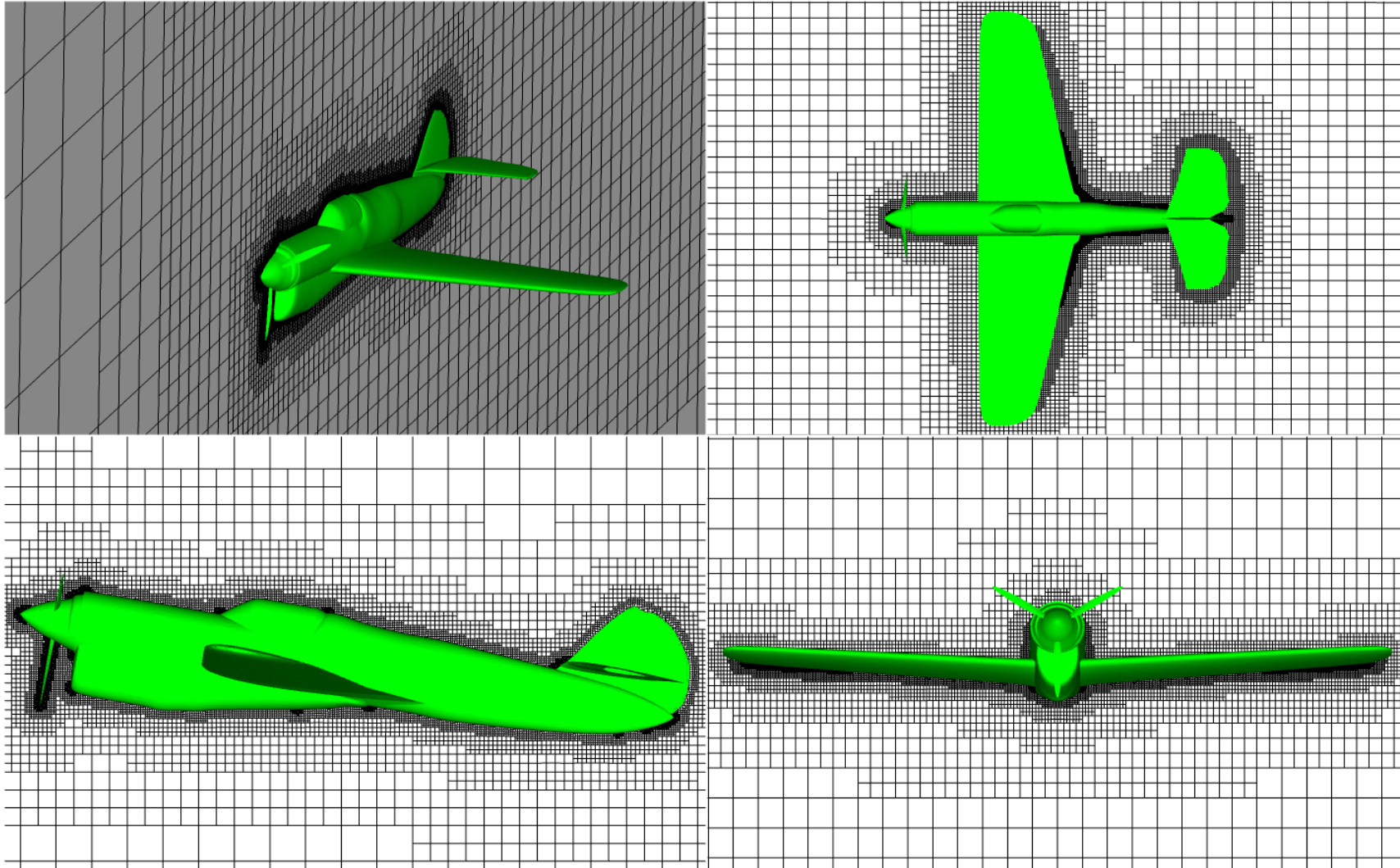
    - Report – Conclusions – Comparison with experimental results – Critical assessment of the results.
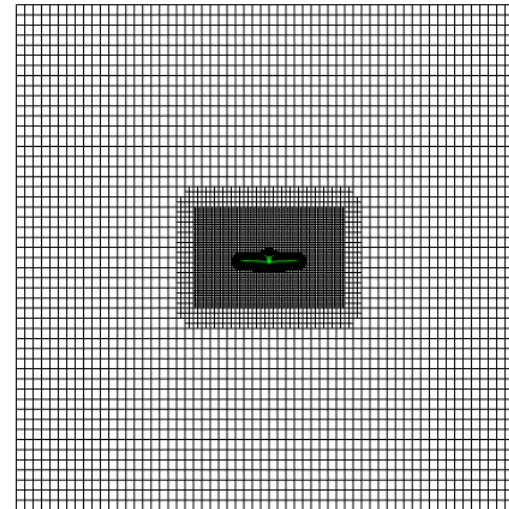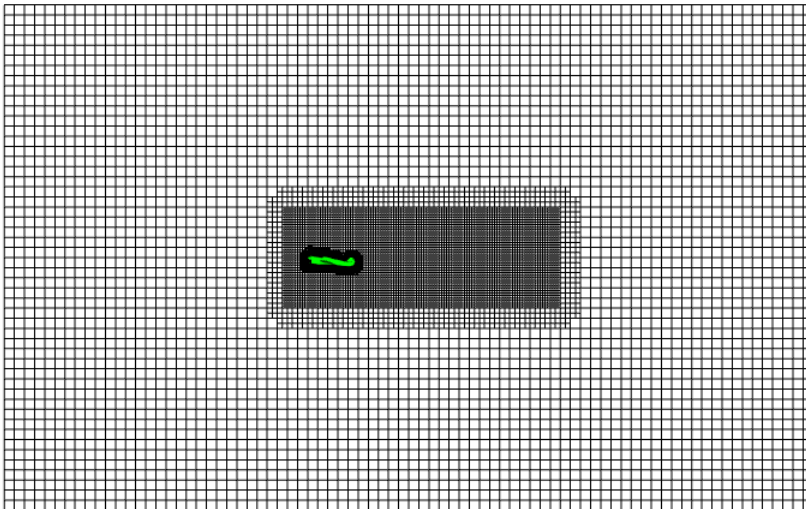
- Geometry generation.

- Mesh generation.

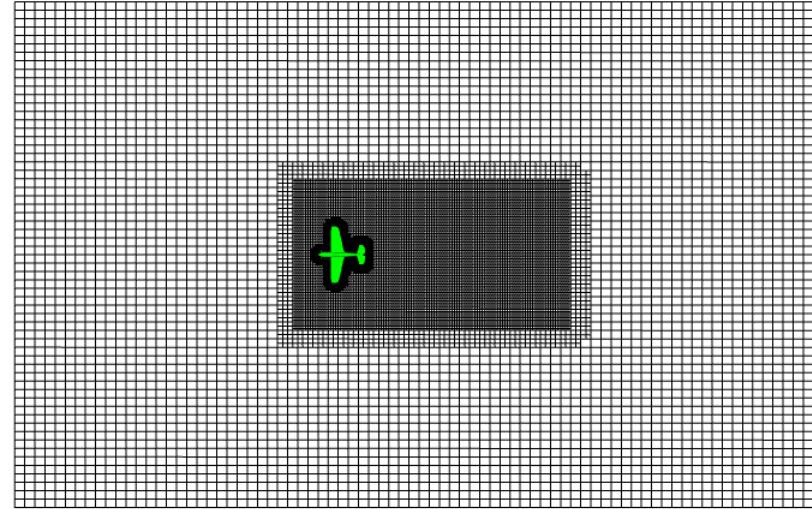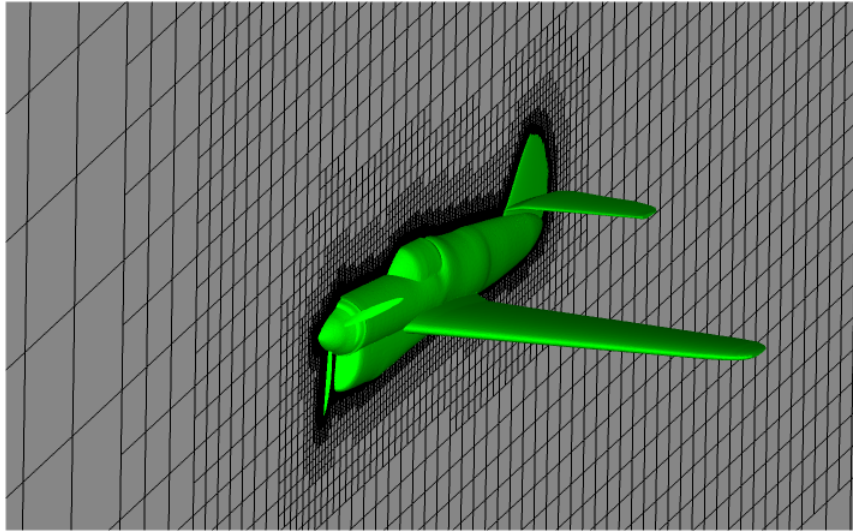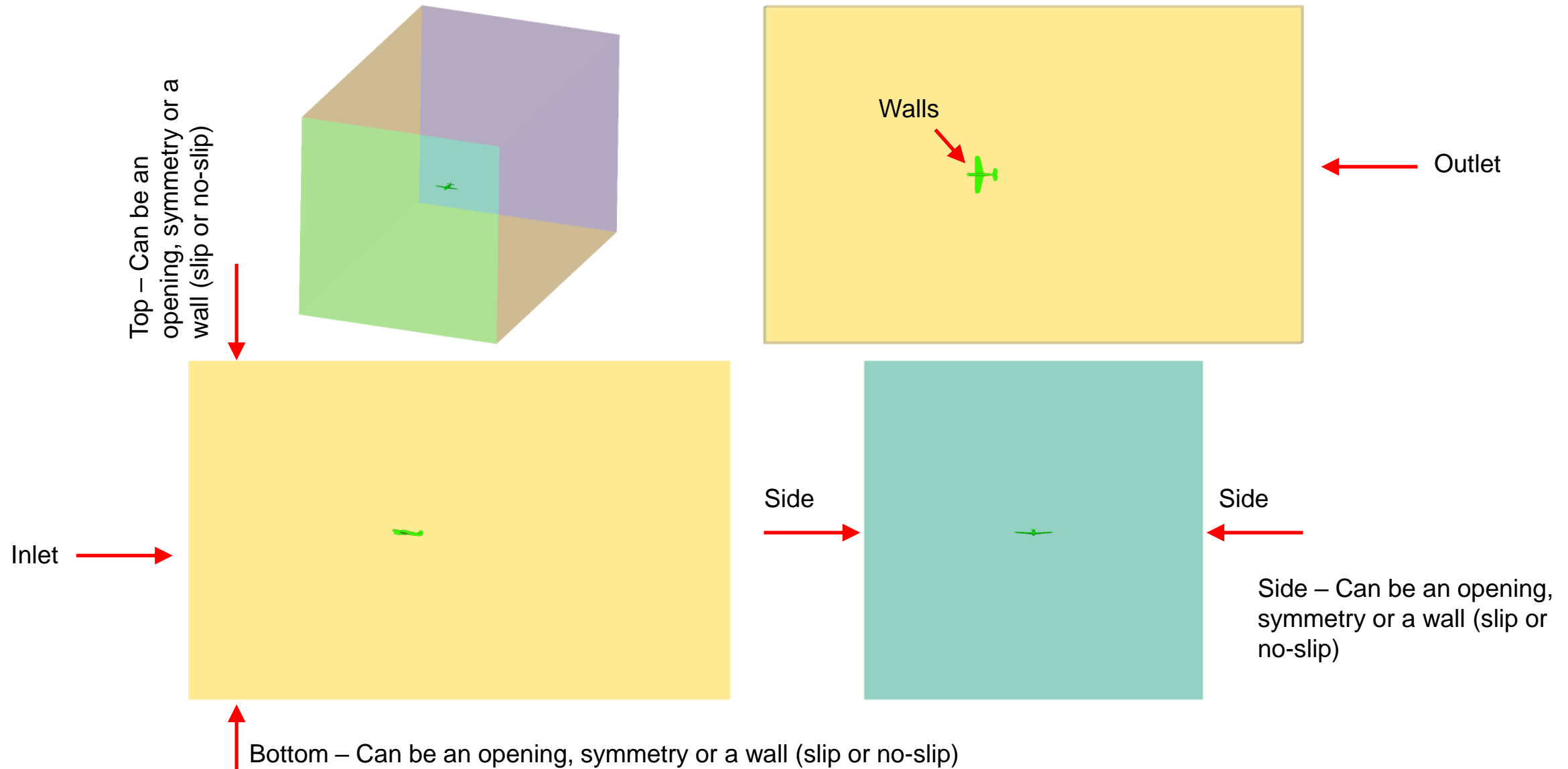# Workflow of a CFD simulation

- Mesh generation.

Workflow of a CFD simulation

- Definition of boundary surface patches – Boundary condition surfaces.

Top – Can be an opening, symmetry or a wall (slip or no-slip)

Walls

Outlet

Inlet

Side

Side

Side – Can be an opening, symmetry or a wall (slip or no-slip)

Bottom – Can be an opening, symmetry or a wall (slip or no-slip)

Workflow of a CFD simulation

- Setting up the case . Which involves definition of the boundary conditions (numerical values), initial conditions, physical models, monitors, saving frequency, numerics, and so on.

- Launch and monitor the solution.
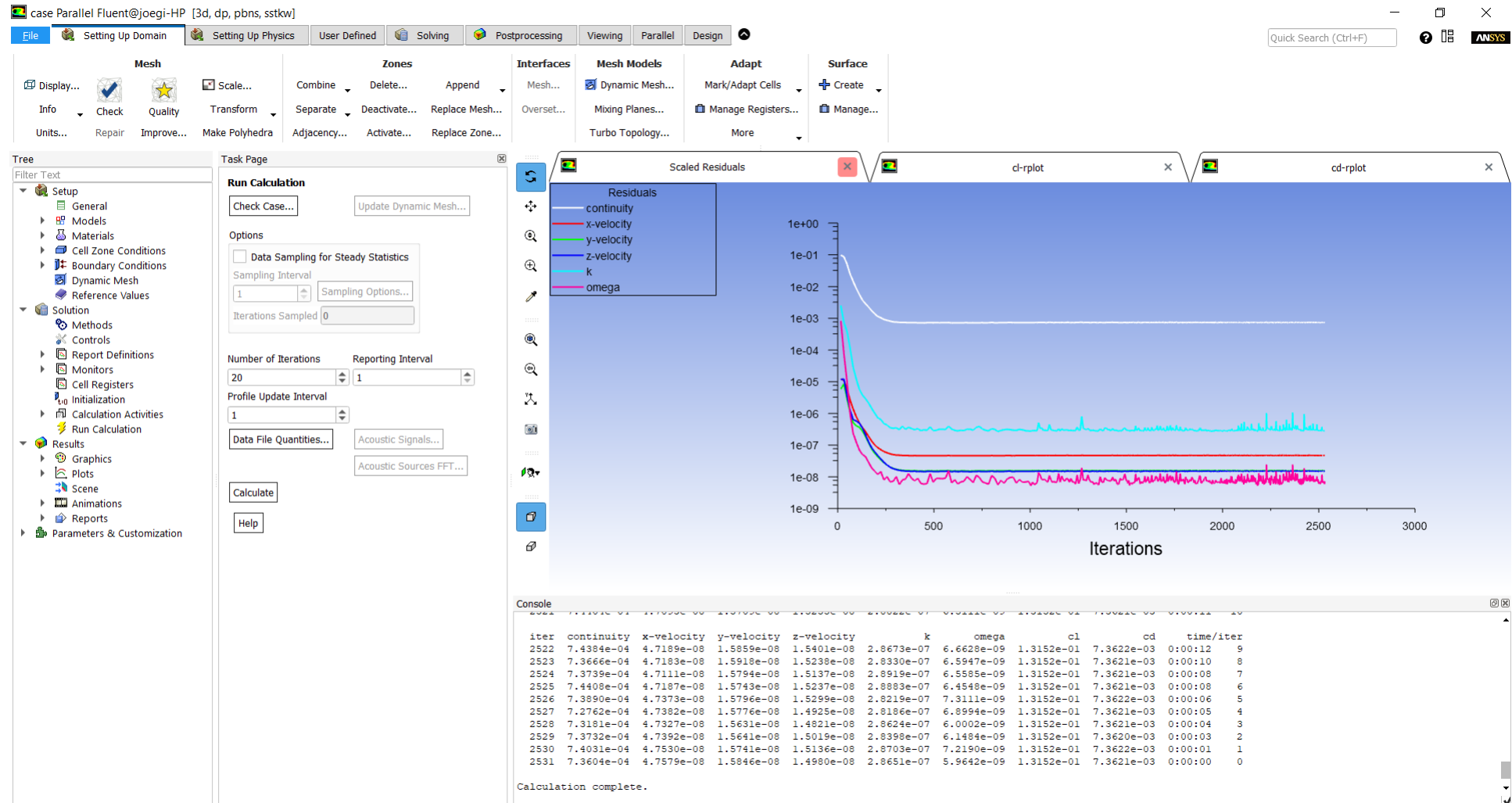
Workflow of a CFD simulation

- Post-processing – Visualization and quantification of the results.

Relative presure (Pa)

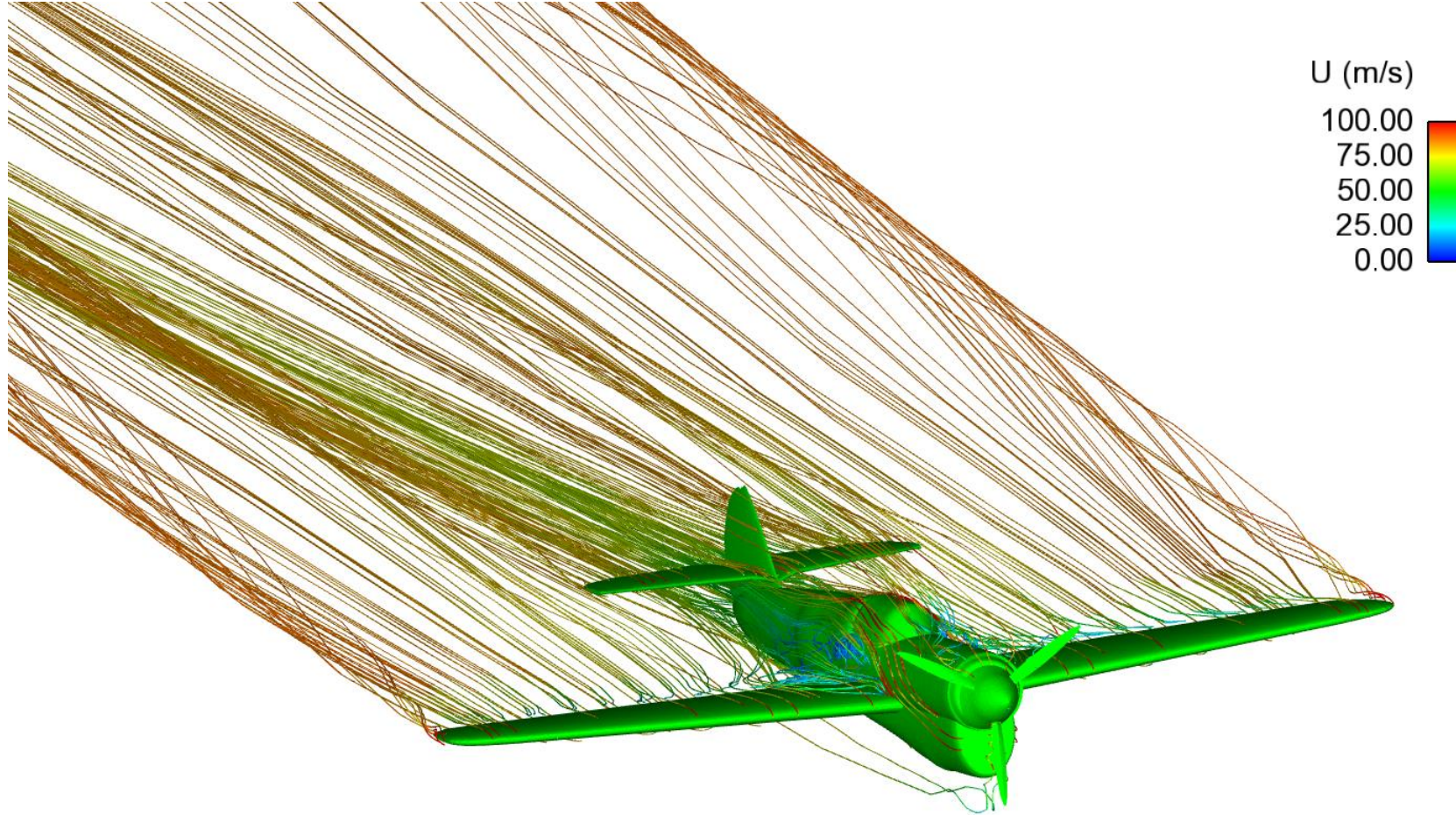-22000.00   -14000.00   -7000.00   350.00   7500.00
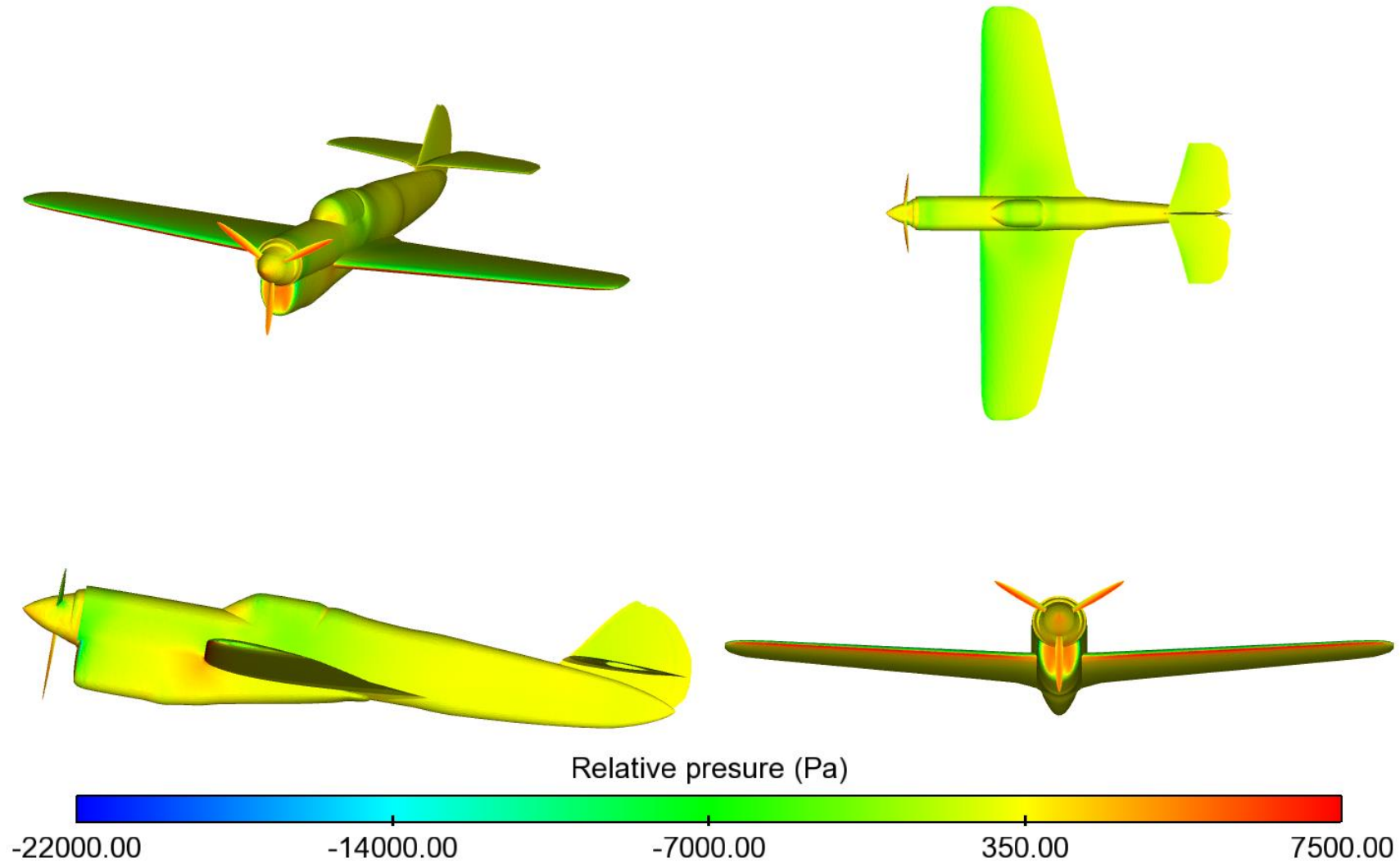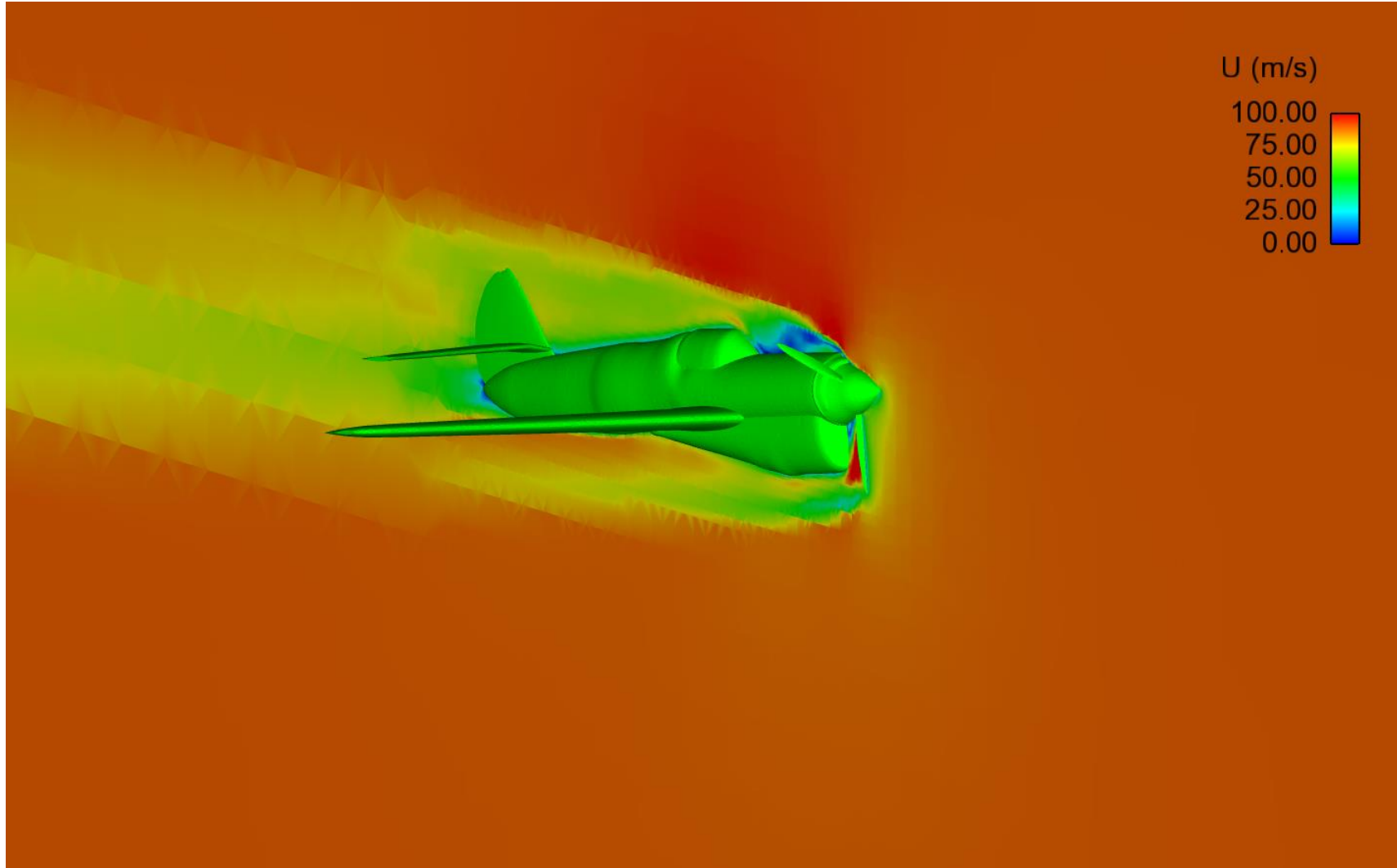
Workflow of a CFD simulation

- Post-processing – Visualization and quantification of the results.

Workflow of a CFD simulation

- Post-processing – Visualization and quantification of the results.
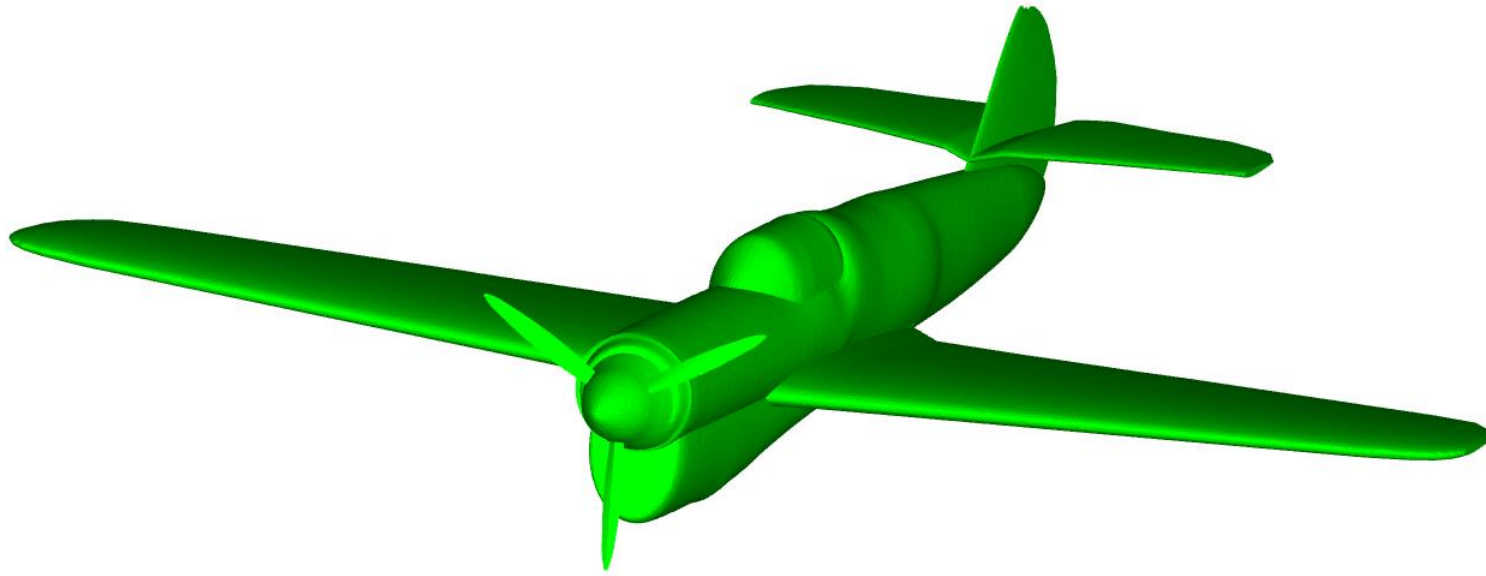
Workflow of a CFD simulation

- Post-processing – Visualization and quantification of the results.

Drag = 5741.52 N
Lift = 28903.8 N