A Tutorial for **Gota4Airfoil 2025**

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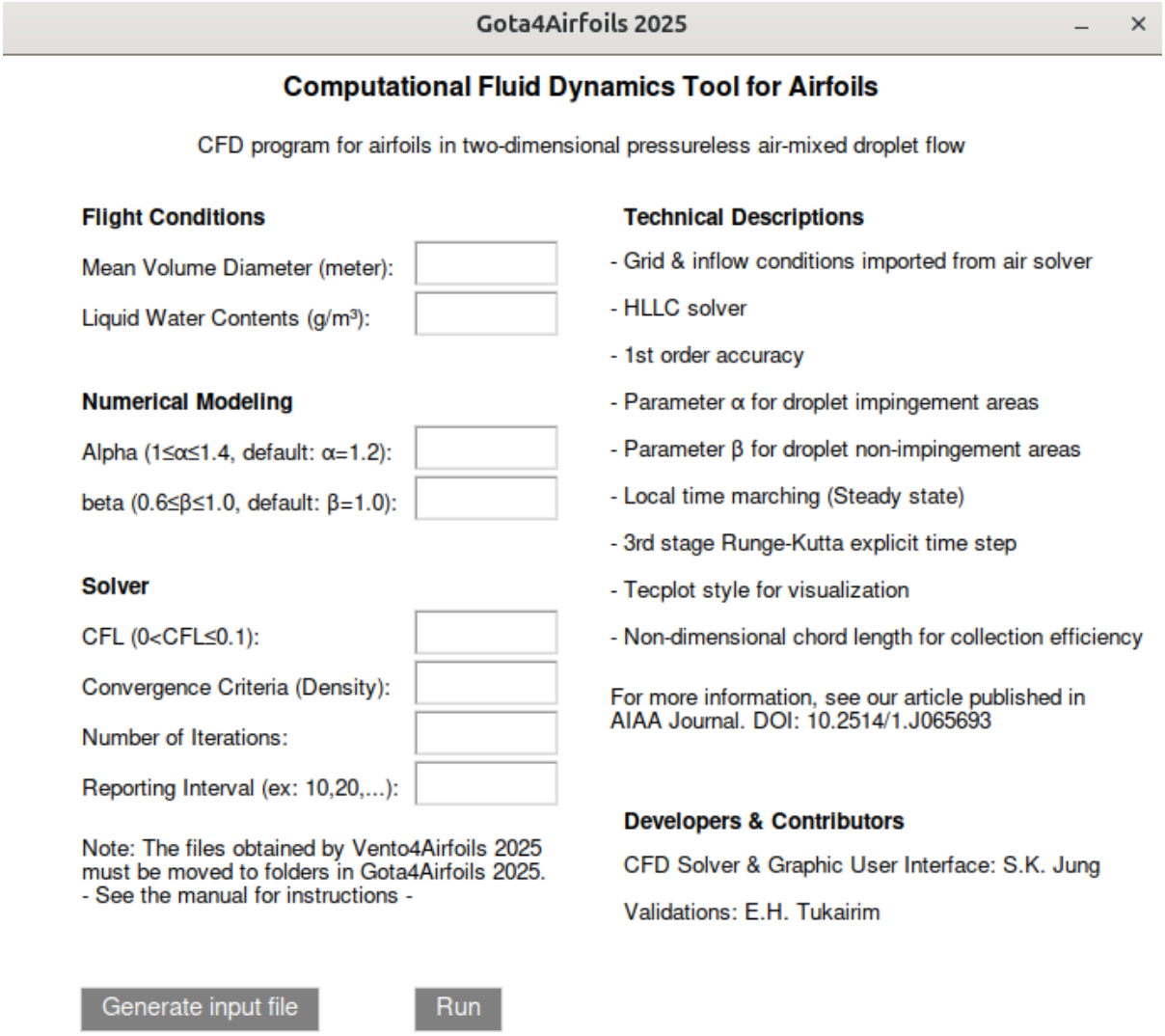

1 Introduction

This program is fully tested on Ubuntu 24.04.2. The technical descriptions for this program are briefly shown in the Graphic User Interface windows. To download this program, access url: `https://github.com/sungki-jung/CFD4Airfoils`, then download the following folders andnd files"

- folders: bin, _internal, outputs
- files: GUI

2 Preparations

Once you downloaded the folders and files, put the files and folders into any place in your computer. Then, find out **GUI_Drop_2025** as shown in fig. 2.

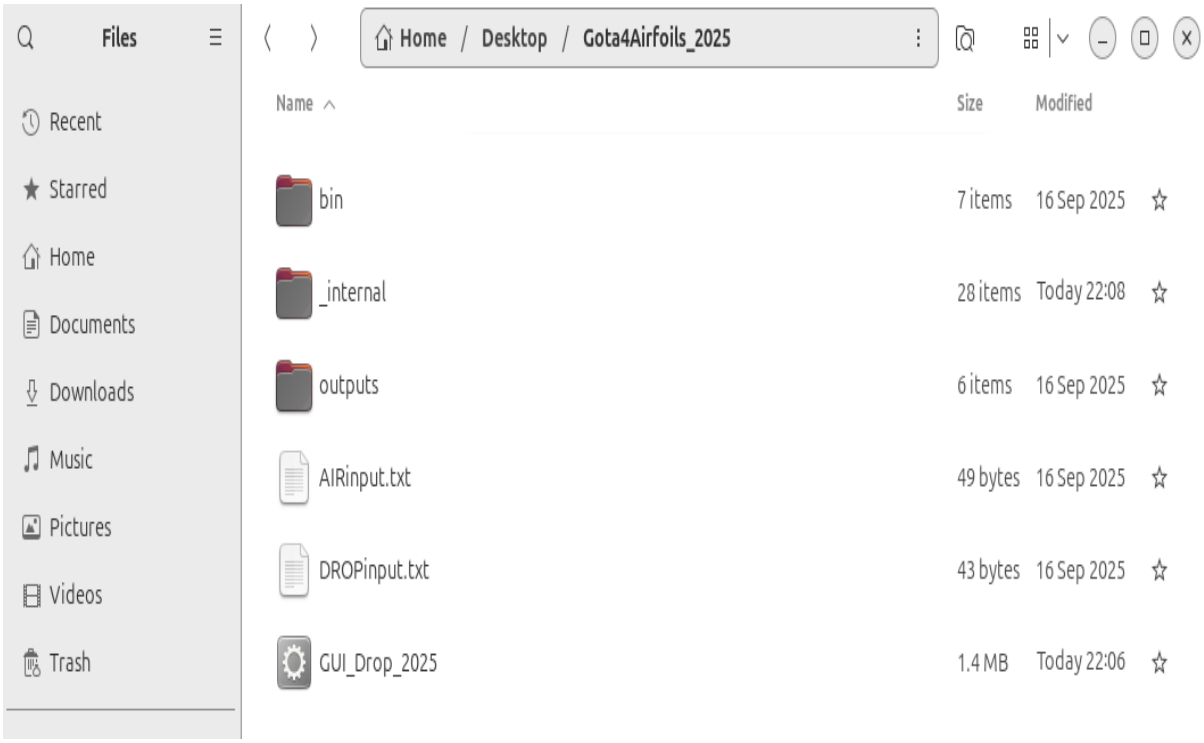

Figure 1: Program files and folders.

Firstly, the airflow solutions and grid files must be moved for droplet simulations. Thus, follow the instructions below,

- Move two files ('MESH_INDEX.txt' and 'NSSOLVER.TXT') in **bin** folder of **Vento4Airfoils 2025** to **bin** folder of **Gota4Airfoils 2025**.
- As a same manner, move two files ('NACA4412.AIRSOL' and 'NACA4412.GRID') in **outputs** folder of **Vento4Airfoils 2025** to **outputs** folder of **Gota4Airfoils 2025**.
- Lastly, move one file ('AIRinput.txt') in **Vento4Airfoils 2025** folder to **Gota4Airfoils 2025** folder.

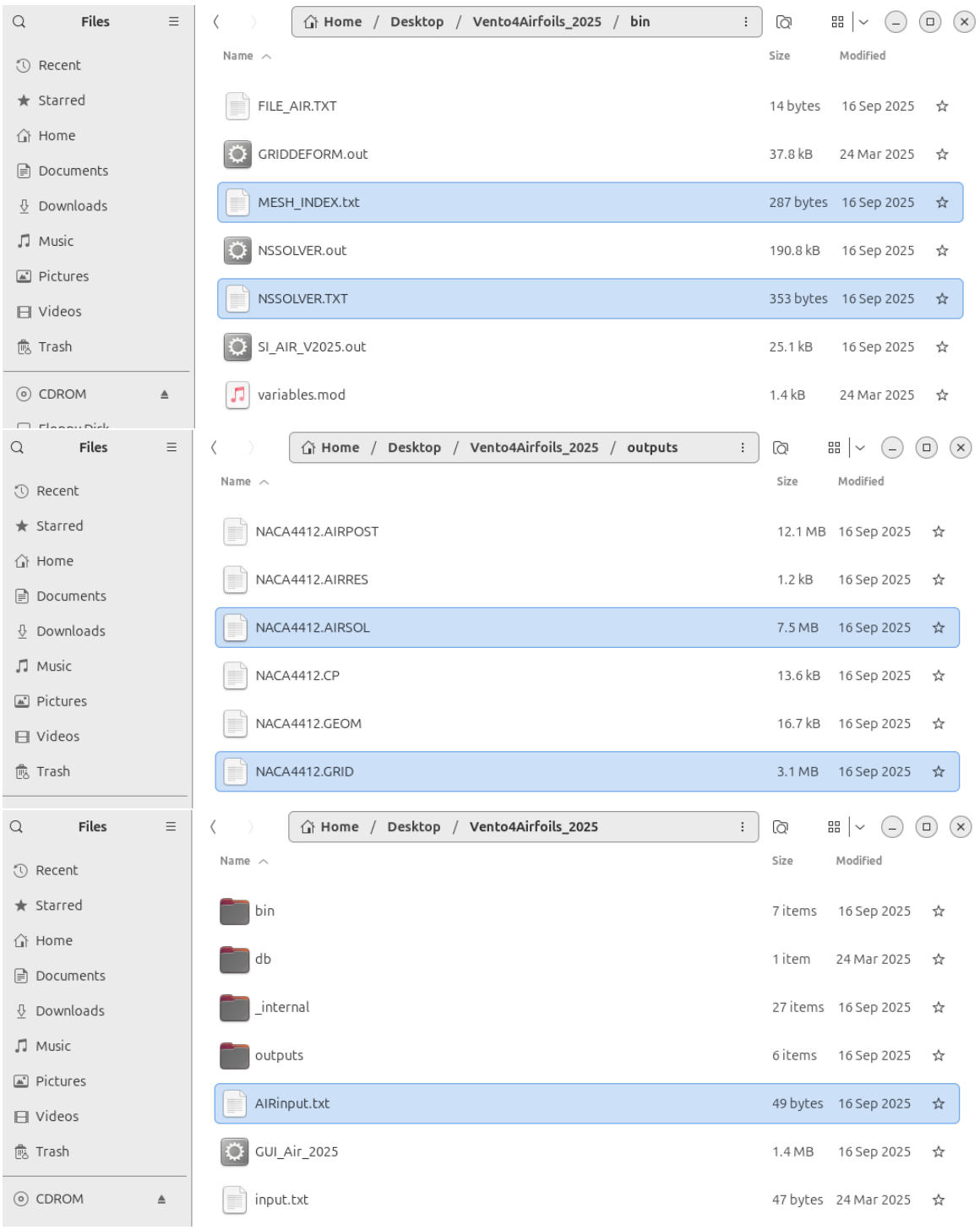

Figure 2: File movements.

3 GUI for Gota4Airfoil 2025

Open the terminal in **Gota4Airfoil2025** folder as shown in fig. 3. The terminal windows are shown in fig. 4. Execute the **GUI** file (type ./GUI_Drop_2025 on the terminal as shown in fig. 4 then hit "enter" on your keyboard).

Insert all parameters as shown in fig. 5. Click an icon, **Generate input file**, then, click an icon, **Run**. Residuals are shown in the terminal windows (fig. 5).

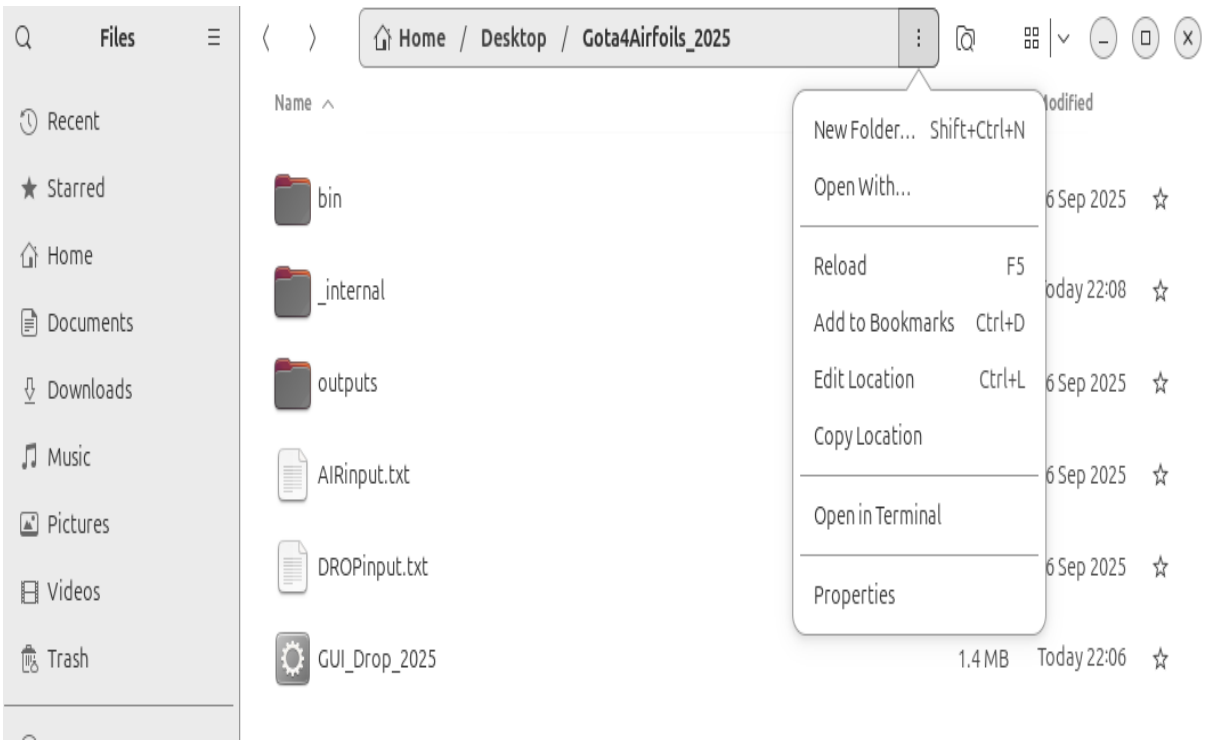

Figure 3: Terminal in **Gota4Airfoil2025** folder.

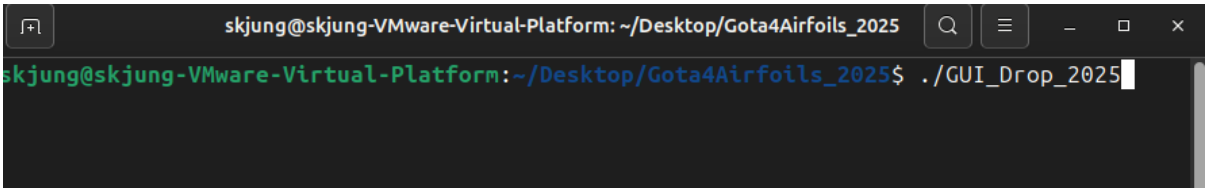

Figure 4: Terminal window.

4 Post-processing for Gota4Airfoil 2025

Once all calculations are completed, open **output** folder in **Vento4Airfoil2021** folder as shown in fig. 6. Extensions for each file in **output** folder denote the characteristics of outputs.

.CE: Collection Efficiency

.DROPRES: Residuals during CFD calculations

.DROPPOST: Post-processing

.DROPSOL: Primitive variables of droplet flow

4.1 Preparation for Visualization

For visualization of CFD simulations, install a visualization tool, **Paraview** that is a free open-source program, on your computer. To install **Paraview**, see url: `https://jungs-odds-and-ends.blogspot.com/2021/05/paraview-for-windows.html` or you can just type "sudo apt install paraview" on the terminal of Ubuntu to install the Paraview program.

4.2 Visualization Using Paraview

Once **Paraview** is installed, open **Paraview** program (type paraview on the terminal). Then follow figs. 7 to 9. Note that .DROPPOST file includes all information for CFD visualization. .DROPPOST

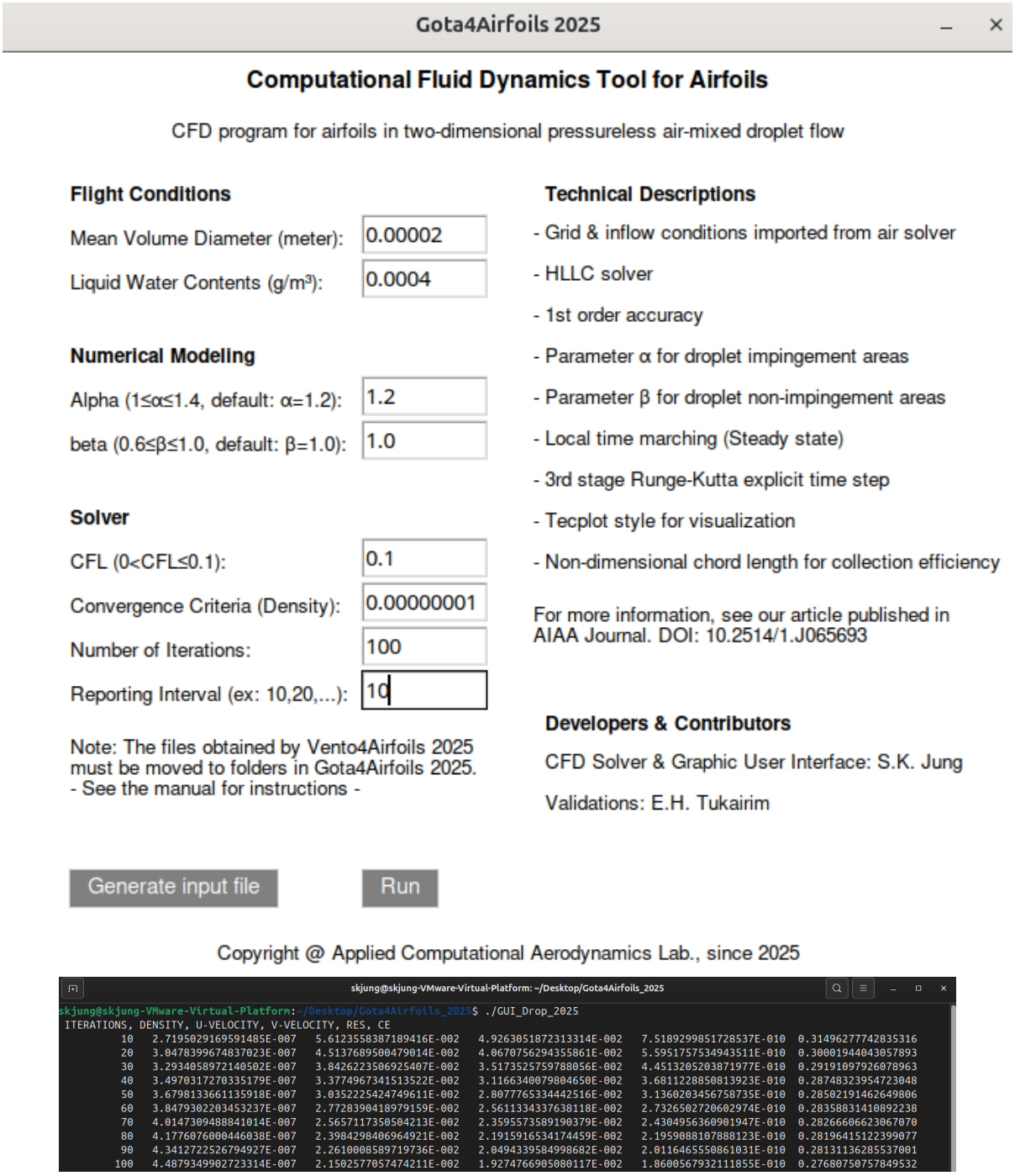

Figure 5: Example for all parameters and Run.

file was written in Tecplot format.

Figure 6: Outputs.

After you check the Tecplot format as shown in fig. 7, click **Apply** shown in fig. 8.

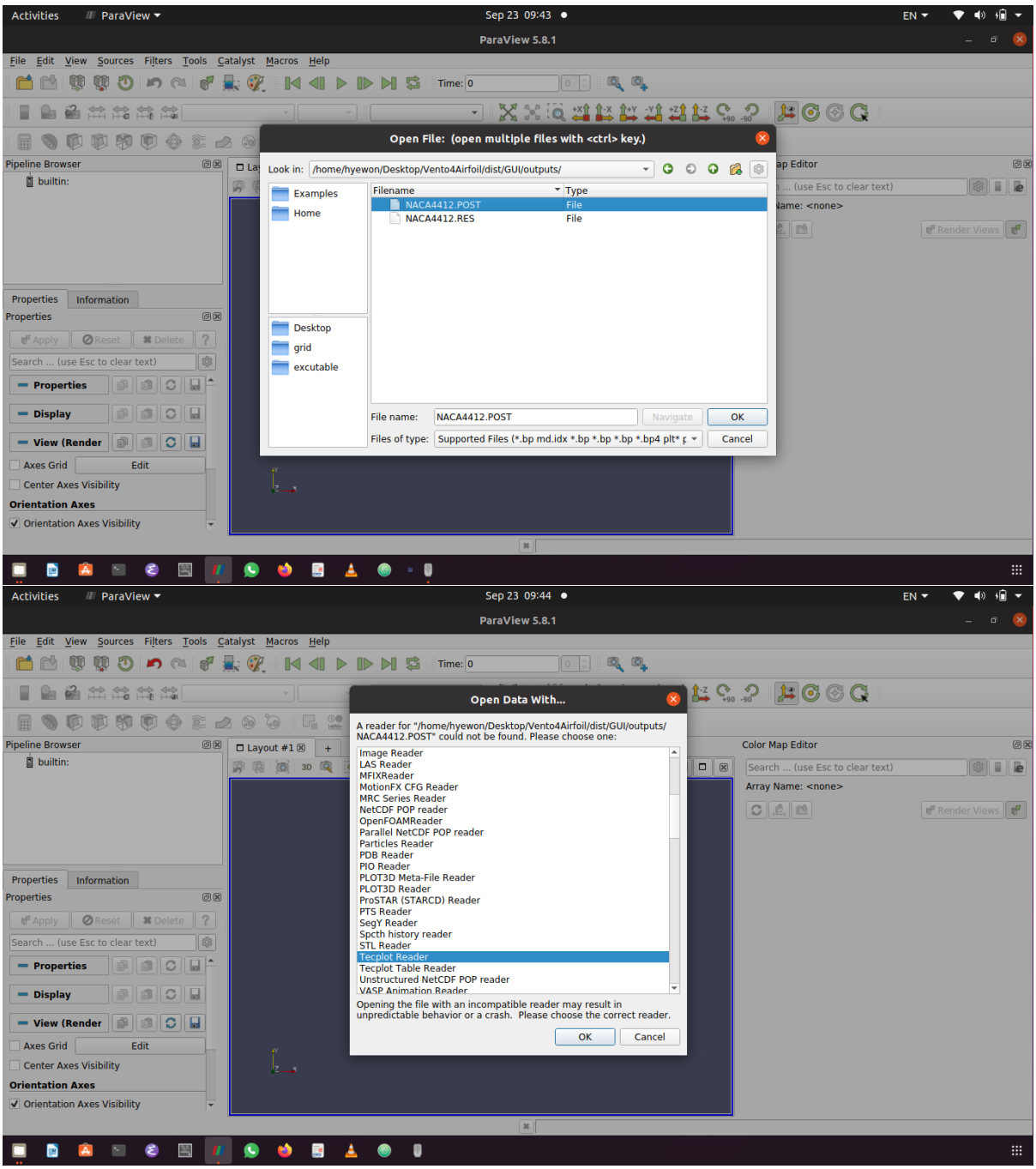

Figure 7: Select .POST file and choose Tecplot Reader in Paraview.

Lastly, change some options to visualize the simulation results.

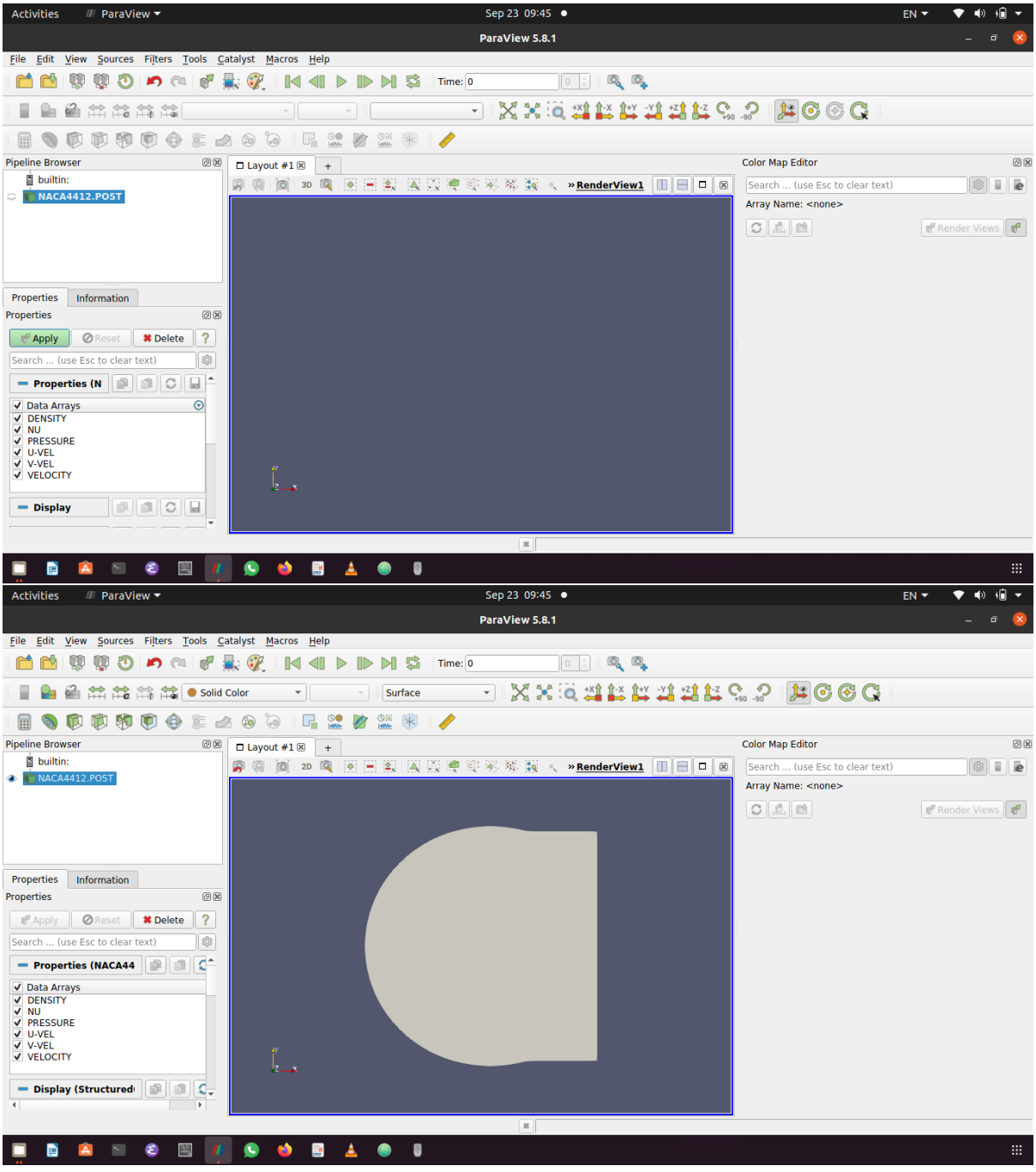

Figure 8: Apply and visualizations.

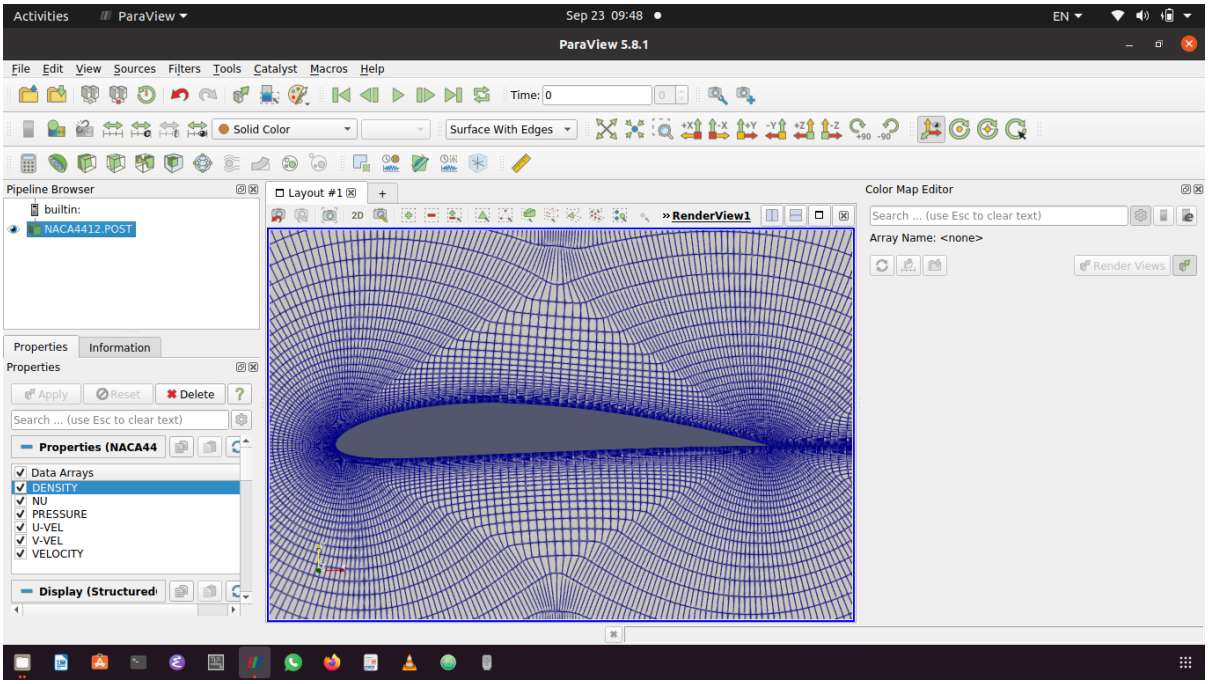

Figure 9: Options for visualizations.