C_D_Suzanne

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INPUT DATA

- Problem Description: To simulate the drag around an object.

- Dimensions:

    - X: 0.328 mm; Y: 1.6mm; Z: 1.9mm;

    - Projected frontal area: ??????

- Boundary Conditions:

    - Inlet: 5 m/s; 10 m/s & 15 m/s

- Target Reynolds Number:
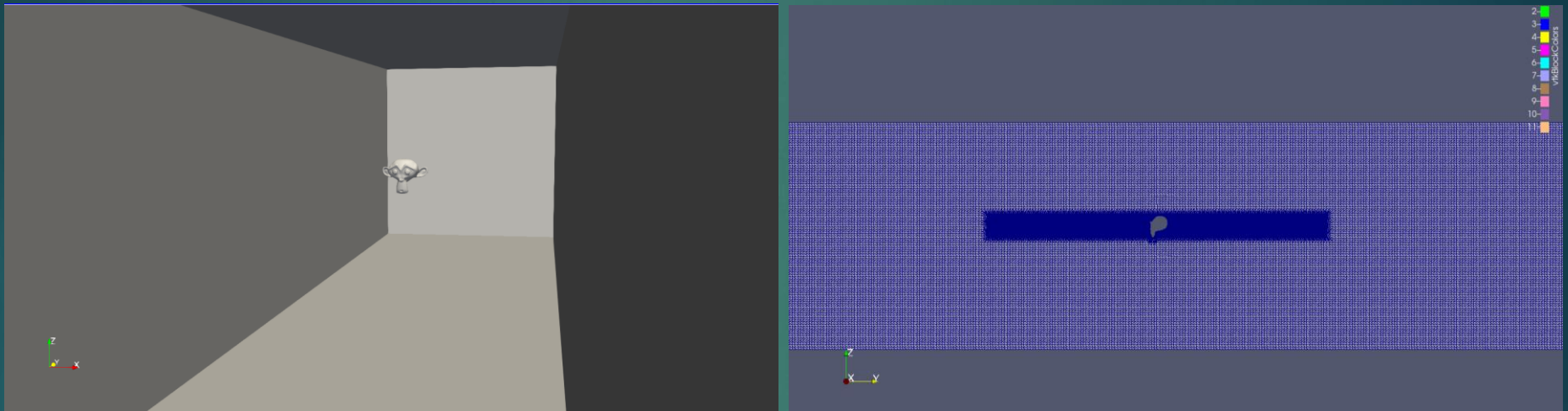
Inlet Velocity	Reynolds Number
5 m/s	653
10 m/s	1,310
15 m/s	1,960
20 m/s	2,610

Computational Domain

Grid Specifications:

Cuboid in shape with the obstacle embedded within the domain.

20mm x 20mm x 50mm (flow-wise direction)

Computational Domain Information

- Boundary Conditions:
  - 6 Patches: lowerWall, upperWall, inlet, outlet, front & back- all set as slip boundary conditions.
  - Obstacle set as *wall*
- Initial Conditions:
  - Density-Normalized Pressure set at 0 (gage). *zeroGradient* on inlet and on the obstacle. *Slip* boundary condition on walls.
  - Velocity set to uniform value throughout with *noslip* boundary condition on the obstacle.
- Numerical Schemes
  - Grad Schemes: Gauss linear default.
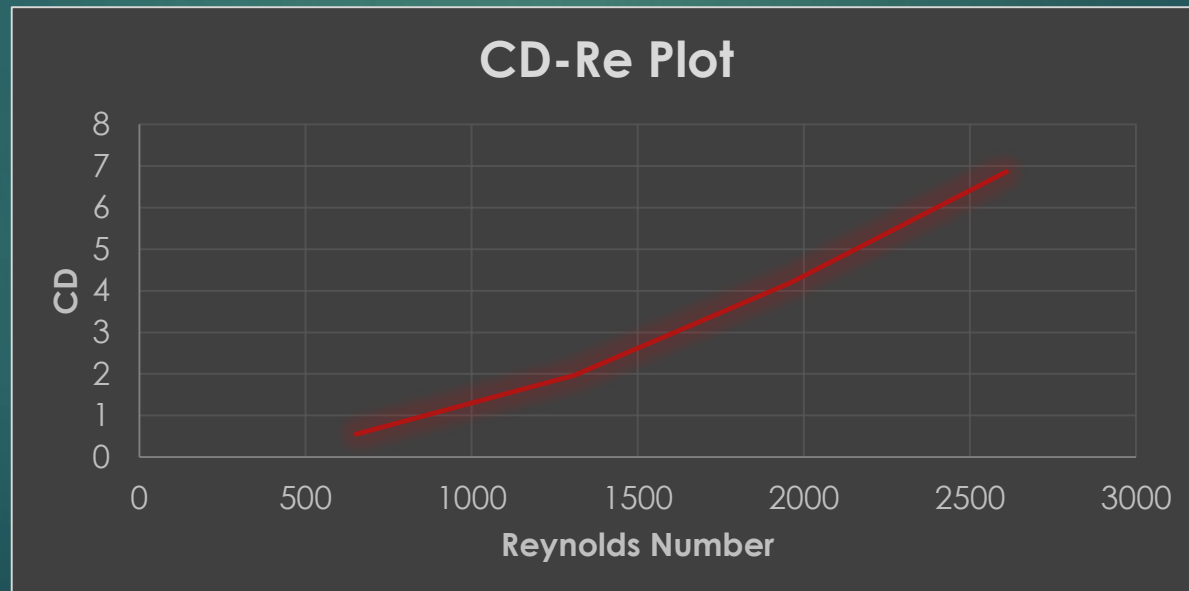 - Divergence Schemes: phi,U : Gauss limitedLinear 1

RESULTS

Density-Normalized Pressure Distribution

Velocity Streamlines
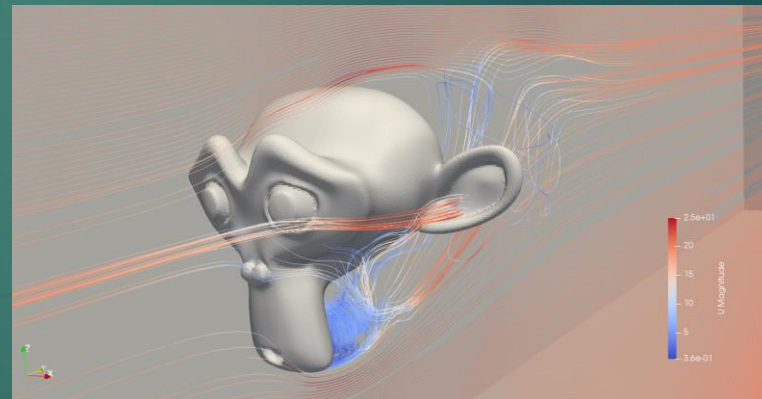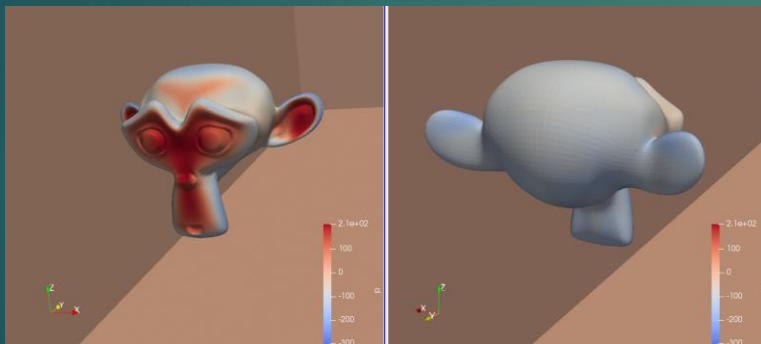
RESULTS

Inlet Velocity	C_D	Pressure Residuals	U Residuals	C_D Residuals
5 m/s	0.550	0.0011	5 E-05	E-03
10 m/s	1.972	0.0024	1.25 E-05	E-03
15 m/s	4.198	0.0040	2.01 E-05	E-03
20 m/s	6.868	0.0058	3.38 E-05	E-02

CD-Re Plot

RESULT REPORTING

- Compromises: Mesh investigation was not comprehensive. The solution may not be grid independent.

- Increase in drag was not as expected for the bluff body.

  - The lifting force generated may be contributing to the drag forces.

- Further investigation ought to be performed on the development of the boundary layer to study the thickness of the boundary layer.