



Ansys Fluent Simulation Report

Analyst	lorenzo.campoli
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System Information

Application	Fluent
Settings	3d, double precision, density-based implicit, Spalart-Allmaras
Version	23.2.0-10213
Source Revision	aafc525902
Build Time	Aug 18 2023 08:23:03 EDT
CPU	Intel(R) Xeon(R) Gold 6242R
OS	Windows

Geometry and Mesh

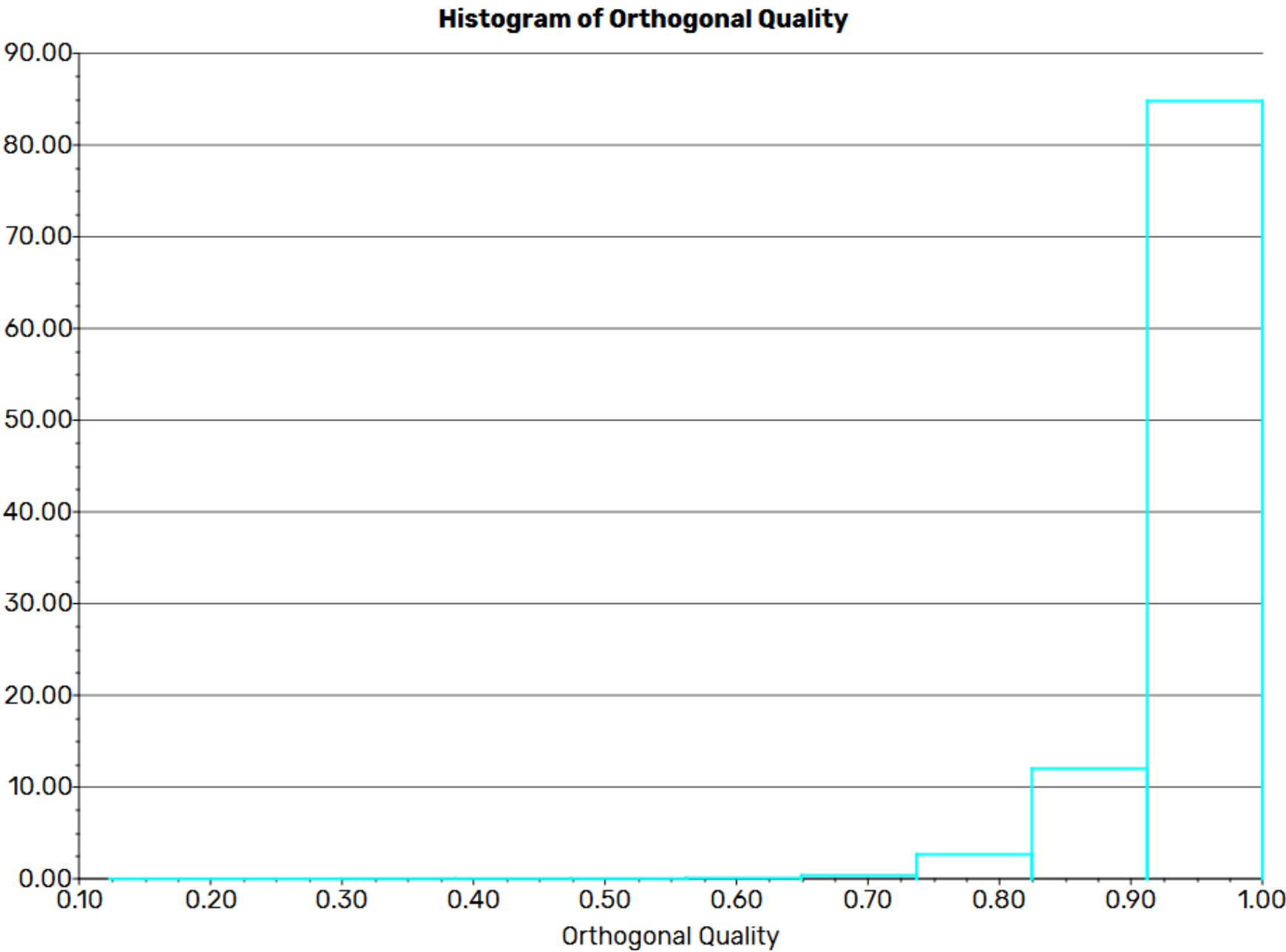
Mesh Size

Cells	Faces	Nodes
5540296	20851453	10106834

Mesh Quality

Name	Type	Min Orthogonal Quality	Max Aspect Ratio
enclosure-enclosure1	Mixed Cell	0.123239	503658.25

Orthogonal Quality



Simulation Setup

Physics

Models

Model	Settings
Space	3D

Model	Settings
Time	Steady
Viscous	Spalart-Allmaras turbulence model
Production Option	Vorticity
Heat Transfer	Enabled

Material Properties

— Fluid	
— air	
Density	ideal gas
Cp (Specific Heat)	nasa 9 piecewise polynomial
Thermal Conductivity	piecewise linear
Viscosity	sutherland
Molecular Weight	28.966 kg/kmol
— Solid	
— aluminum	
Density	2719 kg/m^3
Cp (Specific Heat)	871 J/(kg K)
Thermal Conductivity	202.4 W/(m K)

Cell Zone Conditions

— Fluid	
— enclosure-enclosure1	
Material Name	air
Specify source terms?	no
Specify fixed values?	no
Frame Motion?	no
Laminar zone?	no
Porous zone?	no
3D Fan Zone?	no

Boundary Conditions

— Inlet	
— nozzle_exit	
Velocity Specification Method	Magnitude, Normal to Boundary
Reference Frame	Absolute
Velocity Magnitude [m/s]	2677.533
Supersonic/Initial Gauge Pressure [Pa]	-33317.15
Temperature [K]	1785.159
Turbulent Specification Method	Intensity and Length Scale
Turbulent Intensity [%]	10
Turbulent Length Scale [m]	0.3
Outflow Gauge Pressure [Pa]	0
Note: Reinject particles do not change their injection association	no

— far	
Gauge Pressure [Pa]	0
Mach Number	0.65
Temperature [K]	266.5813
Coordinate System	Cartesian (X, Y, Z)
Component of Flow Direction (x,y,z)	(-1, 0, 0)
Turbulent Specification Method	Turbulent Viscosity Ratio
Turbulent Viscosity Ratio	1
Note: Reinject particles do not change their injection association	no
— inlet	
Gauge Pressure [Pa]	0
Mach Number	0.65
Temperature [K]	266.5813
Coordinate System	Cartesian (X, Y, Z)
Component of Flow Direction (x,y,z)	(-1, 0, 0)
Turbulent Specification Method	Turbulent Viscosity Ratio
Turbulent Viscosity Ratio	1
Note: Reinject particles do not change their injection association	no
— Outlet	
— outlet	
Backflow Reference Frame	Absolute
Gauge Pressure [Pa]	0
Pressure Profile Multiplier	1
Backflow Total Temperature [K]	266.5813
Backflow Direction Specification Method	Normal to Boundary
Turbulent Specification Method	Turbulent Viscosity Ratio
Backflow Turbulent Viscosity Ratio	1
Note: Reinject particles do not change their injection association	no
Acoustic Wave Model	Off
Backflow Pressure Specification	Total Pressure
Build artificial walls to prevent reverse flow?	no
Radial Equilibrium Pressure Distribution	no
Average Pressure Specification?	no
Specify targeted mass flow rate	no
— Symmetry	
symmetry	symmetry
— Wall	
— s01s02s03	
Wall Thickness [m]	0
Heat Generation Rate [W/m^3]	0
Material Name	aluminum
Thermal BC Type	Temperature
Temperature [K]	323
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip

Wall Surface Roughness	rough bc standard
Wall Roughness Height [m]	0.0001
Wall Roughness Constant	0.5
Convective Augmentation Factor	1
— raceway2	
Wall Thickness [m]	0
Heat Generation Rate [W/m^3]	0
Material Name	aluminum
Thermal BC Type	Temperature
Temperature [K]	323
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	rough bc standard
Wall Roughness Height [m]	0.0001
Wall Roughness Constant	0.5
Convective Augmentation Factor	1
— s04s05	
Wall Thickness [m]	0
Heat Generation Rate [W/m^3]	0
Material Name	aluminum
Thermal BC Type	Temperature
Temperature [K]	323
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	rough bc standard
Wall Roughness Height [m]	0.0001
Wall Roughness Constant	0.5
Convective Augmentation Factor	1
— fin1	
Wall Thickness [m]	0
Heat Generation Rate [W/m^3]	0
Material Name	aluminum
Thermal BC Type	Temperature
Temperature [K]	323
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	rough bc standard
Wall Roughness Height [m]	0.0001
Wall Roughness Constant	0.5
Convective Augmentation Factor	1
— base	
Wall Thickness [m]	0
Heat Generation Rate [W/m^3]	0
Material Name	aluminum
Thermal BC Type	Temperature

Temperature [K]	323
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	rough bc standard
Wall Roughness Height [m]	0.0001
Wall Roughness Constant	0.5
Convective Augmentation Factor	1
— pl_body	
Wall Thickness [m]	0
Heat Generation Rate [W/m^3]	0
Material Name	aluminum
Thermal BC Type	Temperature
Temperature [K]	323
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	rough bc standard
Wall Roughness Height [m]	0.0001
Wall Roughness Constant	0.5
Convective Augmentation Factor	1
— pl_nose	
Wall Thickness [m]	0
Heat Generation Rate [W/m^3]	0
Material Name	aluminum
Thermal BC Type	Temperature
Temperature [K]	323
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	rough bc standard
Wall Roughness Height [m]	0.0001
Wall Roughness Constant	0.5
Convective Augmentation Factor	1
— vernier_exit1	
Wall Thickness [m]	0
Heat Generation Rate [W/m^3]	0
Material Name	aluminum
Thermal BC Type	Temperature
Temperature [K]	323
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	rough bc standard
Wall Roughness Height [m]	0.0001
Wall Roughness Constant	0.5
Convective Augmentation Factor	1
— vernier_exit8	
Wall Thickness [m]	0

Heat Generation Rate [W/m^3]	0
Material Name	aluminum
Thermal BC Type	Temperature
Temperature [K]	323
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	rough bc standard
Wall Roughness Height [m]	0.0001
Wall Roughness Constant	0.5
Convective Augmentation Factor	1
— pl_fin1	
Wall Thickness [m]	0
Heat Generation Rate [W/m^3]	0
Material Name	aluminum
Thermal BC Type	Temperature
Temperature [K]	323
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	rough bc standard
Wall Roughness Height [m]	0.0001
Wall Roughness Constant	0.5
Convective Augmentation Factor	1
— nozzle_wall	
Wall Thickness [m]	0
Heat Generation Rate [W/m^3]	0
Material Name	aluminum
Thermal BC Type	Temperature
Temperature [K]	323
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	rough bc standard
Wall Roughness Height [m]	0.0001
Wall Roughness Constant	0.5
Convective Augmentation Factor	1

Reference Values

Area	0.44175 m^2
Density	0.879731 kg/m^3
Enthalpy	289872.7 J/kg
Length	1.5 m
Pressure	0 Pa
Temperature	266.5813 K
Velocity	212.7987 m/s
Viscosity	1.683485e-05 kg/(m s)

Ratio of Specific Heats	1.4
Yplus for Heat Tran. Coef.	300
Reference Zone	enclosure-enclosure1

Solver Settings

— Equations	
Flow	True
Modified Turbulent Viscosity	True
— Numerics	
Absolute Velocity Formulation	True
— Under-Relaxation Factors	
Modified Turbulent Viscosity	0.8
Turbulent Viscosity	1
Solid	1
— Discretization Scheme	
Flow	Second Order Upwind
Modified Turbulent Viscosity	Second Order Upwind
— Time Marching	
Solver	Implicit
Courant Number	0.1
— Solution Limits	
Minimum Absolute Pressure [Pa]	6.731715
Maximum Absolute Pressure [Pa]	2167274
Minimum Static Temperature [K]	10
Maximum Static Temperature [K]	4686.7
Maximum Turb. Viscosity Ratio	1e+07

Run Information

Number of Machines	1
Number of Cores	36
Case Read	22.552 seconds
Data Read	11.828 seconds
Virtual Current Memory	50.399 GB
Virtual Peak Memory	56.3687 GB
Memory Per M Cell	9.0288

Solution Status

Iterations: 750

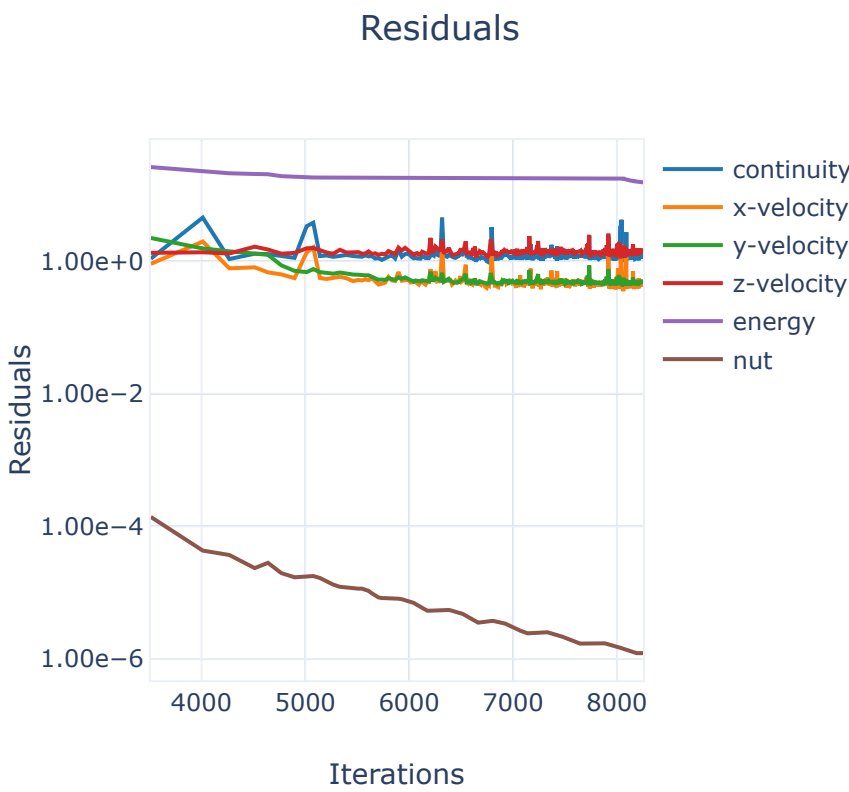
	Value	Absolute Criteria	Convergence Status
continuity	1.236044	0.001	Not Converged
x-velocity	0.5233758	0.0001	Not Converged
y-velocity	0.5086394	0.0001	Not Converged
z-velocity	1.505001	0.0001	Not Converged
energy	15.45832	0.0001	Not Converged
nut	1.226408e-06	0.0001	Converged

Report Definitions

q_average	160063.5	W/m^2
cn_moment	-0.04694617	
cm	1.193187	
cy	-0.0136347	
cn	0.9018507	
ca	0.5736227	
cfl-number	0.1	

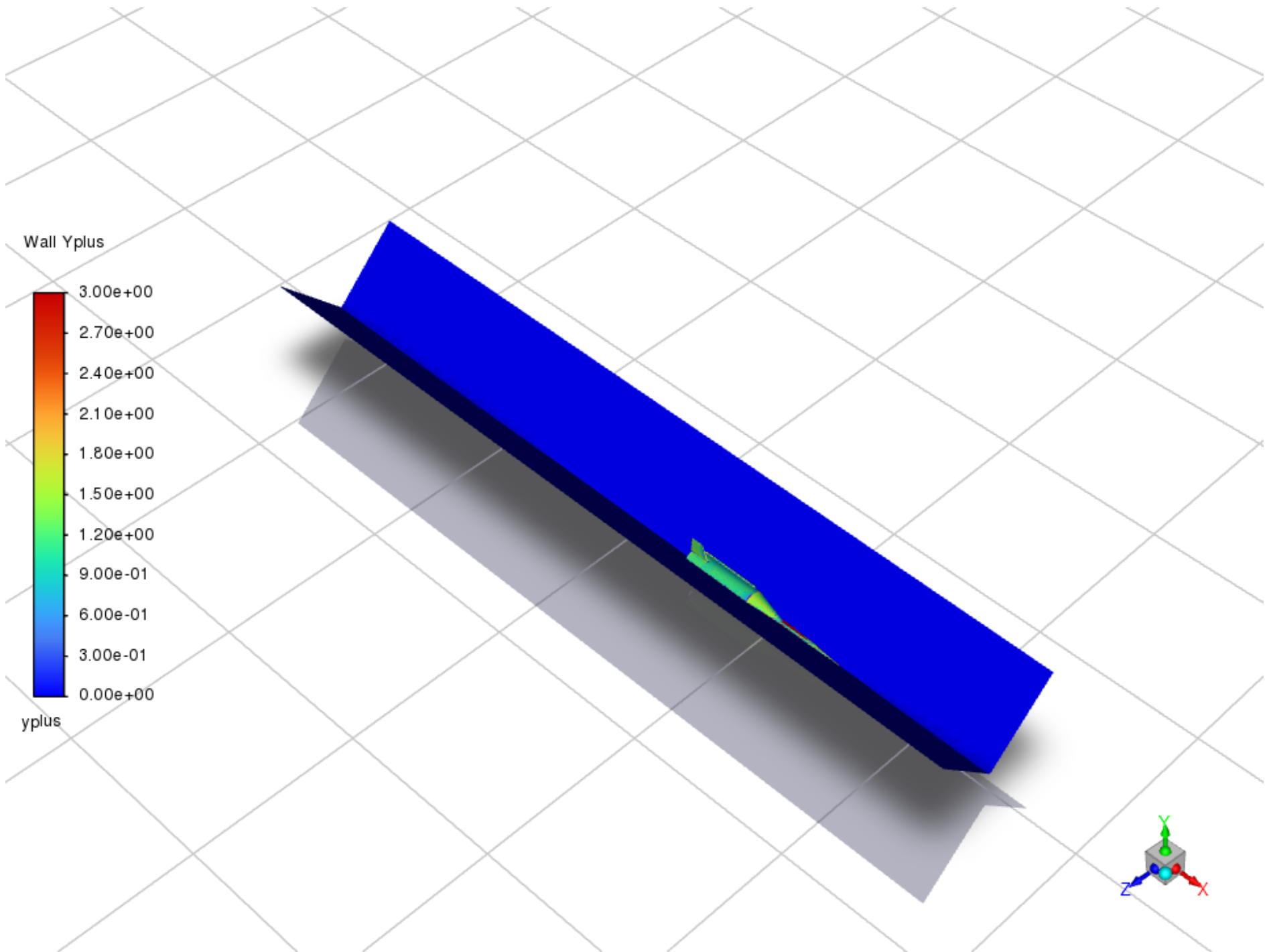
Plots

Residuals

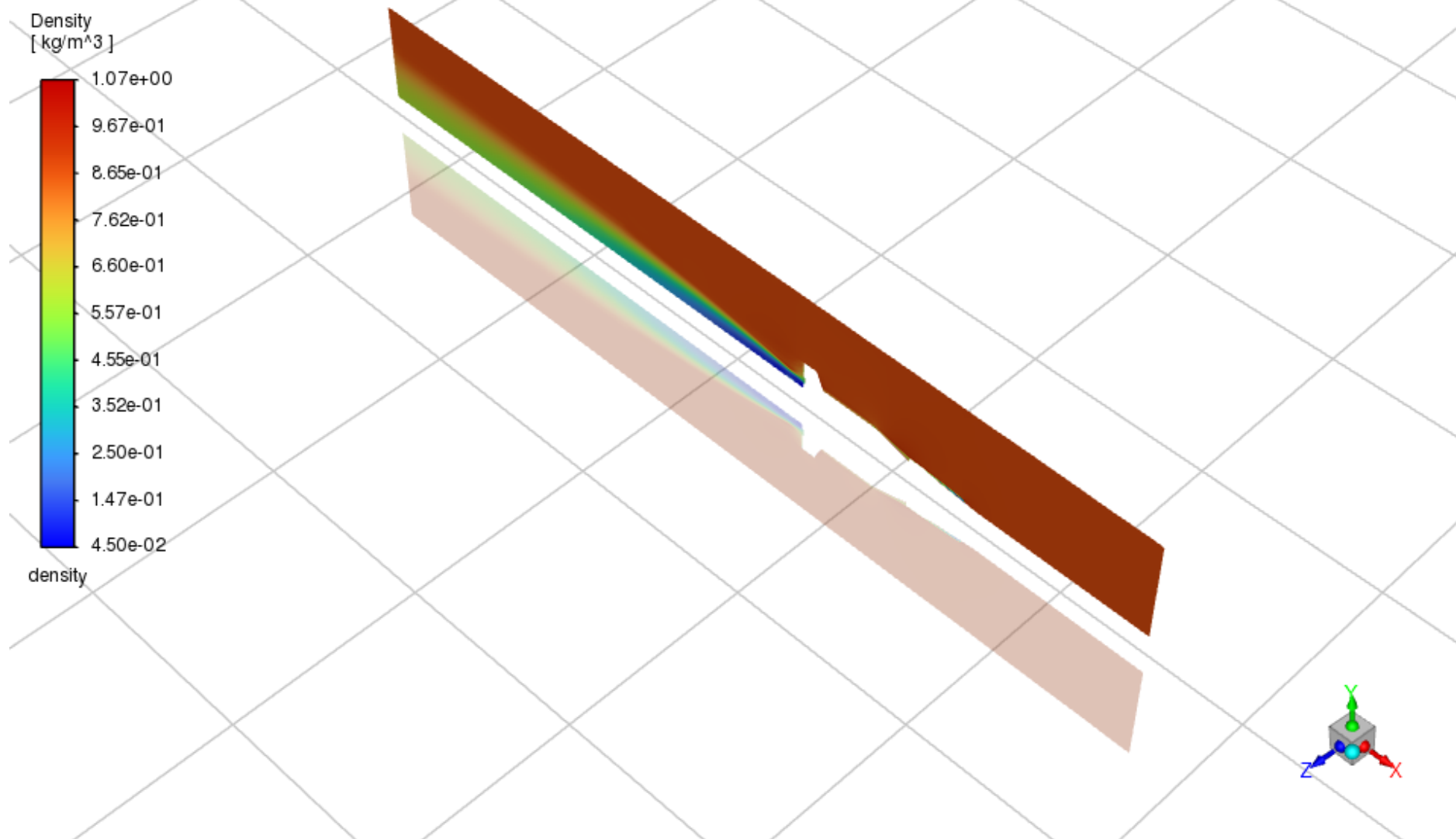


Contours

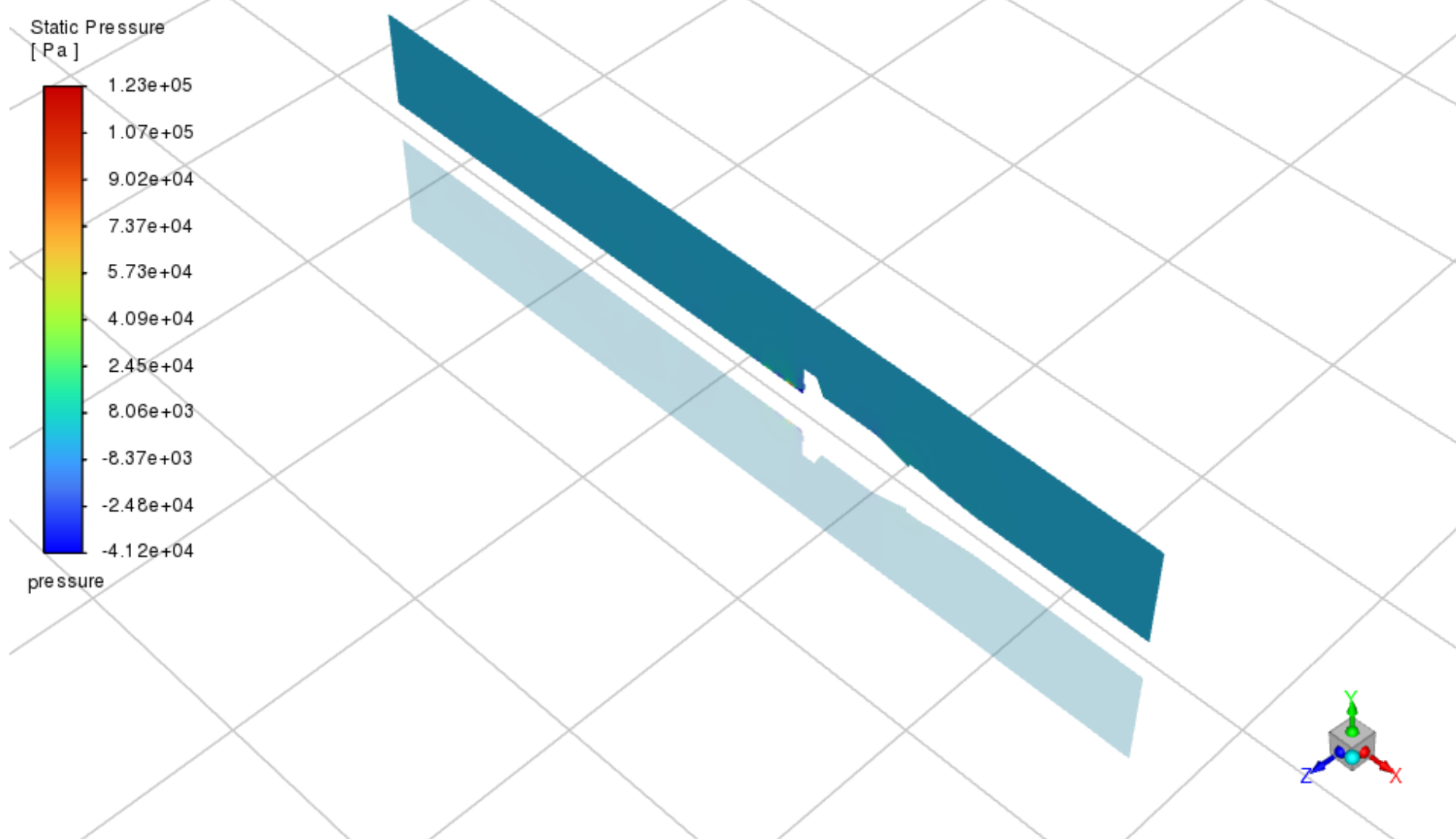
yplus



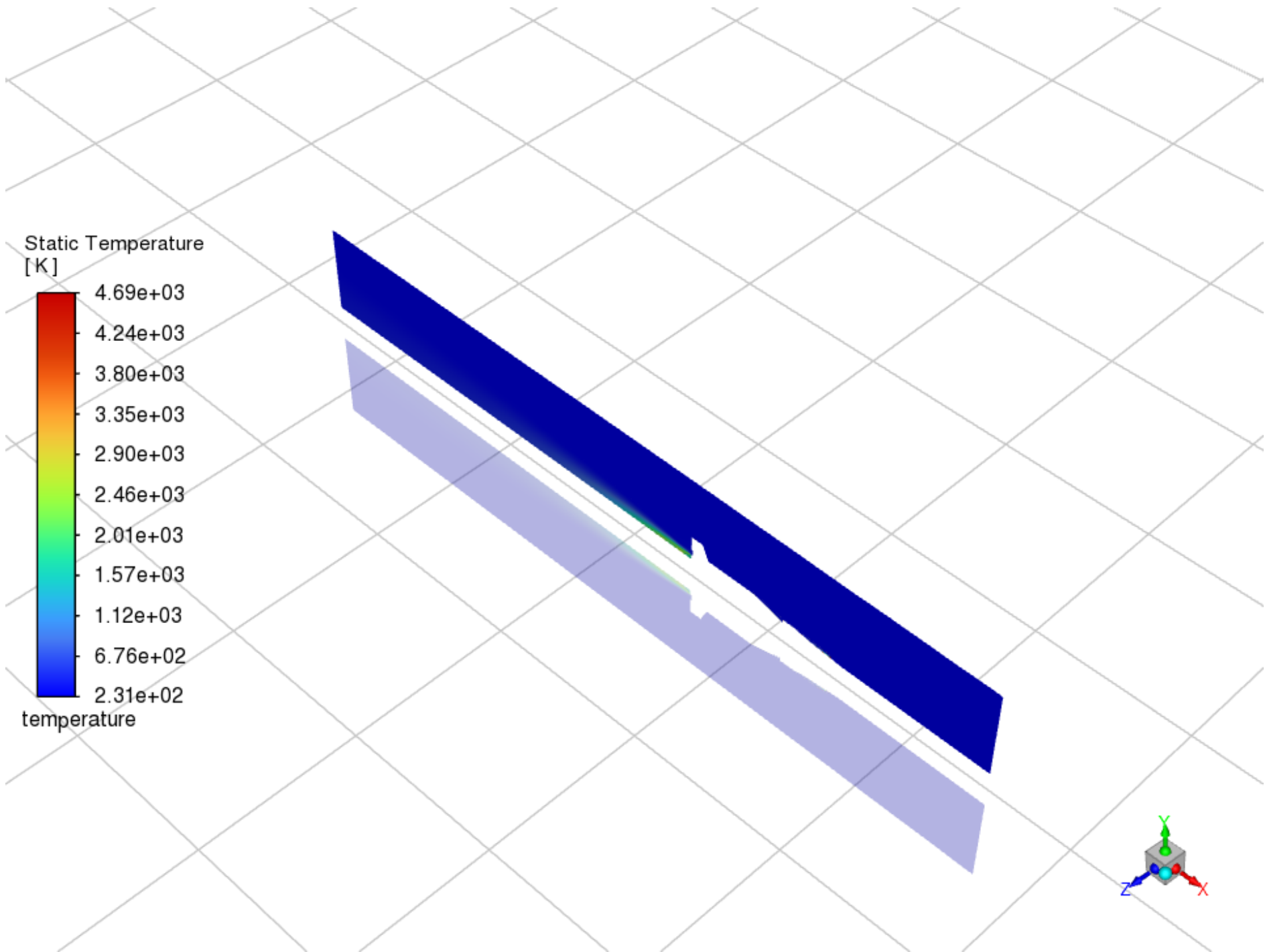
density



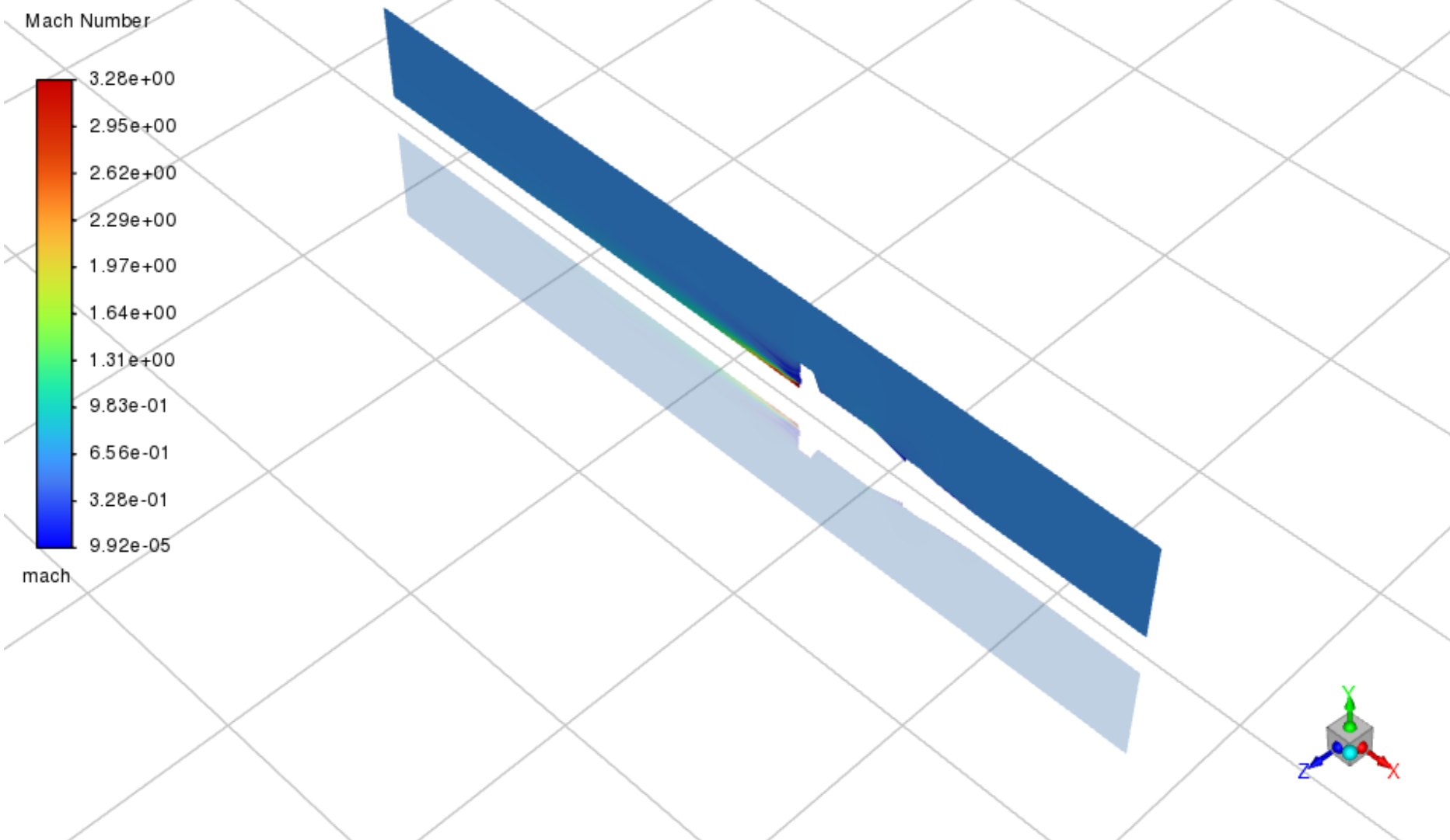
pressure



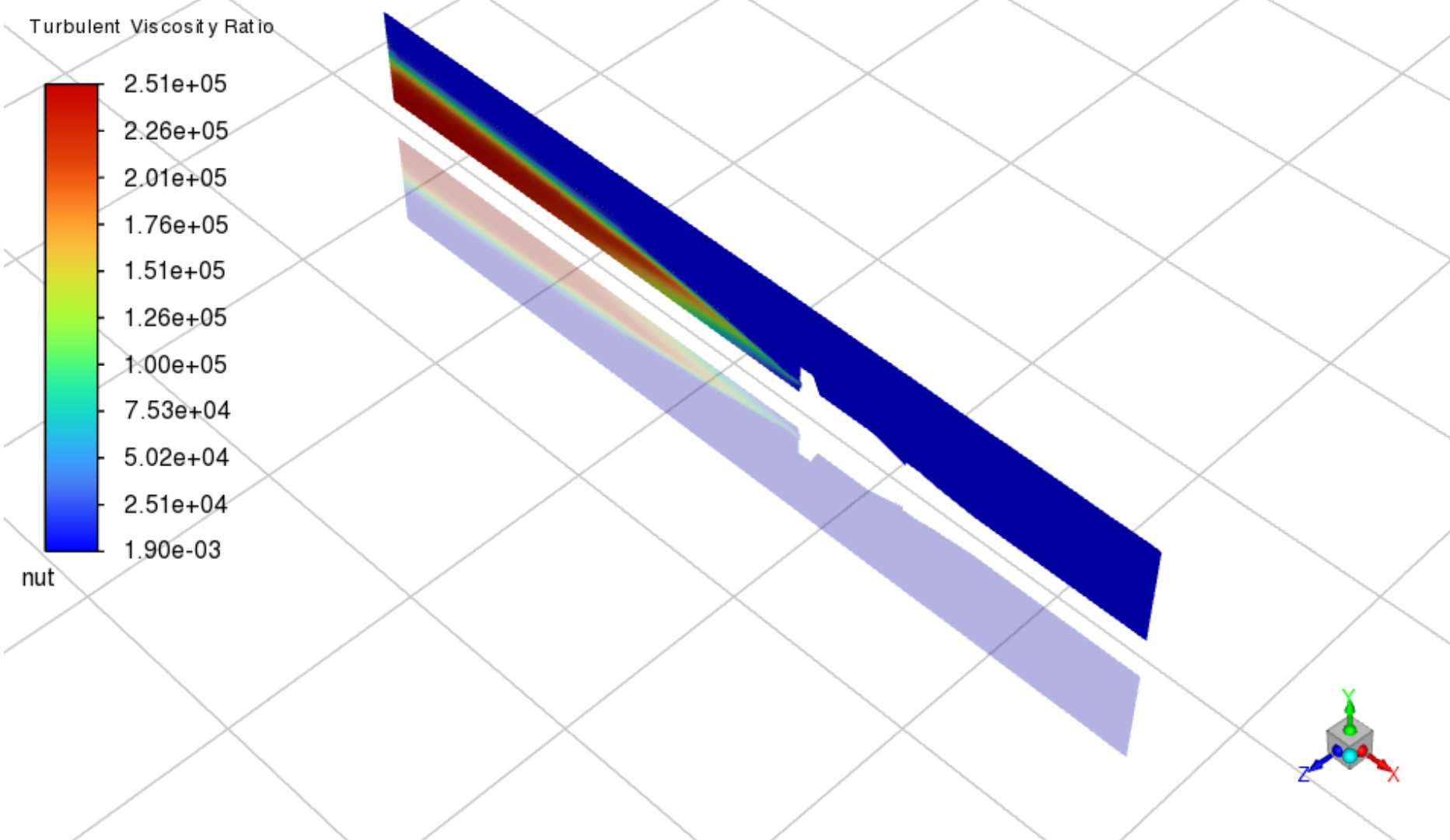
temperature



mach



nut



Vectors

velocity

