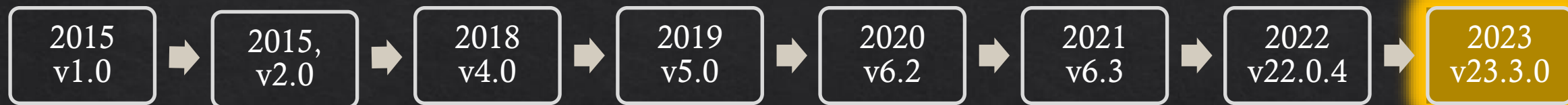


BARAM,CFD for Everyone

Unleash the Power of your Cluster

The Journey so far



- Setup
 - General
 - Materials
 - Models
 - Cell Zone Conditions
 - Boundary Conditions
 - Reference Values
- Solution
 - Numerical Conditions
 - Monitors
 - Initialization
 - Calculate Conditions
 - Run Calculation

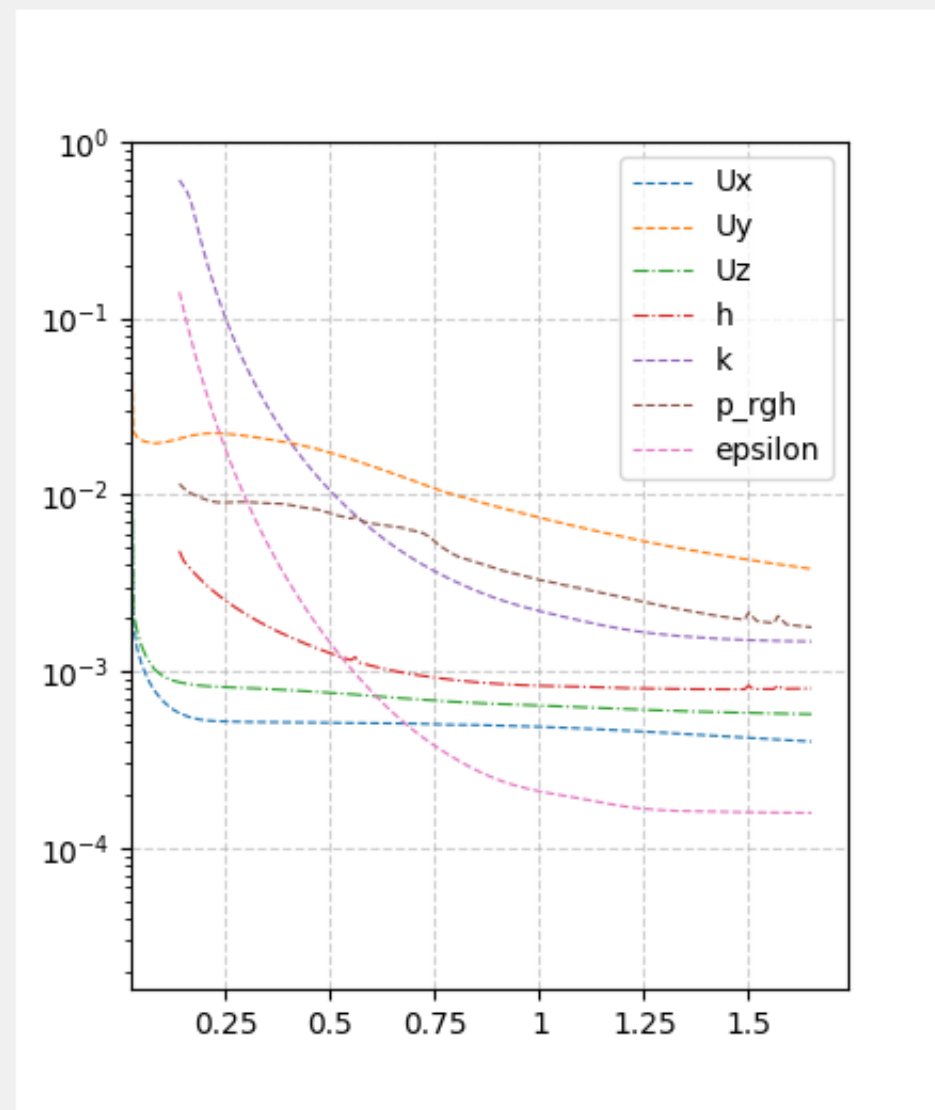
Boundary Conditions

filter string is here

region0

<ul style="list-style-type: none"> ● in-1 Velocity Inlet ● in-2 Velocity Inlet ● out Pressure Outlet ● wall Wall 	<p>Inlet</p> <ul style="list-style-type: none"> Velocity Inlet Flow Rate Inlet Pressure Inlet ABL Inlet Open Channel Inlet Free Stream Far-field Riemann Subsonic Inflow Supersonic Inflow <p>Outlet</p> <ul style="list-style-type: none"> Pressure Outlet OpenChannel Outlet Outflow Subsonic Outflow Supersonic Outflow 	<p>Wall</p> <ul style="list-style-type: none"> Wall Thermo-Coupled Wall <p>Misc.</p> <ul style="list-style-type: none"> Symmetry Interface Empty Cyclic Wedge Porous Jump FAN
--	--	--

Residuals



baram Public

Edit Pins Unwatch 1 Fork 9 Starred 39

main 4 branches 11 tags

Go to file Add file Code

About

	jiban Default value changed to one half of the value of FeatureAngle.	4a6e873 7 hours ago	🕒 1,125 commits
📁	.github/ISSUE_TEMPLATE	Update issue templates	last year
📁	PyFoam	Issue #248, inline "table" like following can be mishandled.	2 months ago
📁	baramFlow	Merge branch 'pbmean'	7 hours ago
📁	baramMesh	Default value changed to one half of the value of FeatureAngle.	7 hours ago
📁	gradle/wrapper	"gradle" will compile UI file.	last year
📁	libbaram	Issue #349 baramMesh export 프로젝트 여부 확인을 위해 baram.foam...	yesterday
📁	resources	Issue #341, Unused widget removed and icon changed	last week
📁	widgets	커밋 누락 파일 (parallel environment 설정 및 병렬 실행 기능 상위 라이...	3 weeks ago
📄	.gitignore	Issue #304 baramSnappy has been merged	last month
📄	INSTALL.md	vtk 9.1.0 is not available for Python 3.10	last year
📄	LICENSE	Initial commit	last year
📄	README.md	Typo	10 months ago

CFD for Everyone

baramcfd.org/ python open-source cfd openfoam

- 📖 Readme
- 📄 GPL-3.0 license
- 👤 Activity
- ★ 39 stars
- 👁 1 watching
- 🍴 9 forks

Report repository

Releases

11 tags Create a new release

baramcfd.org

[BARAM on GitHub](#)[Screenshots](#)[Features](#)[Installation](#)[Internationalization](#)[Release Notes](#)[Guides](#)[BARAM on GitHub](#)

BARAM is a Free Open Source Computational Fluid Dynamics (CFD) software package. *BARAM* is developed to mitigate the steep learning curve of Text-based Solvers. *BARAM* helps you focus on a problem itself with intuitive graphical user interface. For now, *OpenFOAM*® solvers modified by *NEXTFOAM* are integrated into *BARAM*. *NEXTFOAM* develops and releases it under GNU Public License (GPL).

“*BARAM*” (pronounced like ‘baa-laam’) is a Korean word that means “wind”.

BARAM package has two applications, *BaramFlow* and *BaramMesh*. *BaramMesh* generates mesh for calculation, and *BaramFlow* calculates fluid dynamics with that mesh.

Source code of *BARAM* is published on [GitHub](#), and *BARAM* supports following platforms.

- * Ubuntu 20.04 or later
- * CentOS 8.2 or alternatives (Rocky Linux, AlmaLinux, ...)
- * OpenSUSE Leap 15.4
- * Linux Mint 21 "Vanessa"
- * Windows 10 or later
- * macOS 10.14 or later

For installation from the source code, please refer to [Installation](#) page.

Binary installation package for 64-bit windows is here for convenience.

[Download BARAM v23.3.0 Installer for 64-bit Windows >](#)

- ◆ Incompressible Flow
- ◆ Buoyant Flow
- ◆ Multi-Phase (VOF)
- ◆ Conjugate Heat Transfer (CHT)
Multi-Region

- ◇ Steady/Transient Case
- ◇ Cell Zones
 - ◇ Porous Zone
 - ◇ Sliding Mesh
 - ◇ Actuator Disk
 - ◇ Multiple Reference Frame (MRF)
- ◇ Turbulence models
 - ◇ K-Epsilon
 - ◇ K-Omega
 - ◇ Spalart-Allmaras

One Step Forward

blockMesh

snappyHexMesh

surfacePatch

reconstructPar

topoSet

splitMeshRegions

decomposePar

blockMesh

snappyHexMesh

surfacePatch

reconstructPar

topoSet

decomposePar

splitMeshRegions

BaramMesh

1. Geometry

2. Region

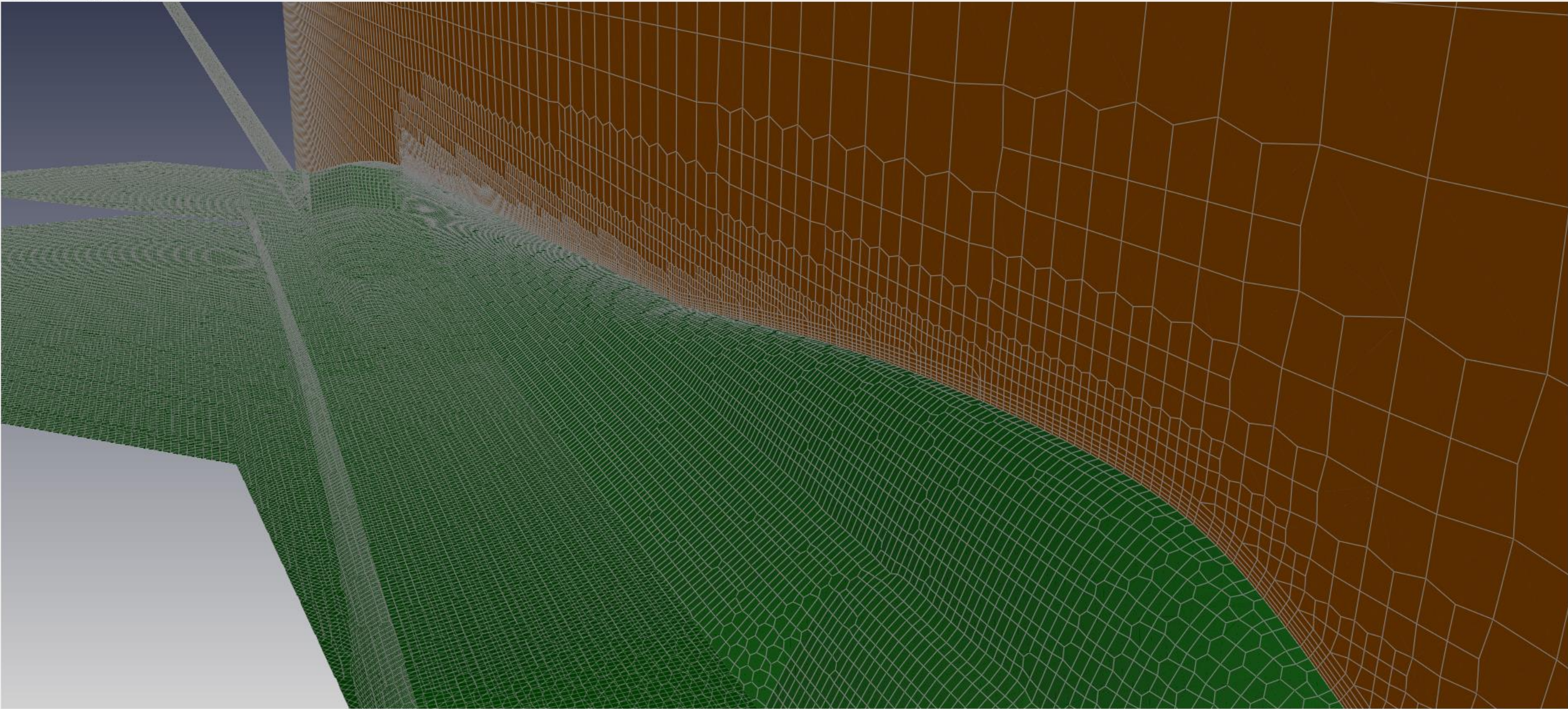
3. Base Grid

4. Castellation

5. Snap

6. Boundary Layer

7. Export



Seven Steps

1. Geometry
2. Region
3. Base Grid
4. Castellation
5. Snap
6. Boundary Layer
7. Export

1. Geometry



2. Region



3. Base Grid



4. Castellation



5. Snap



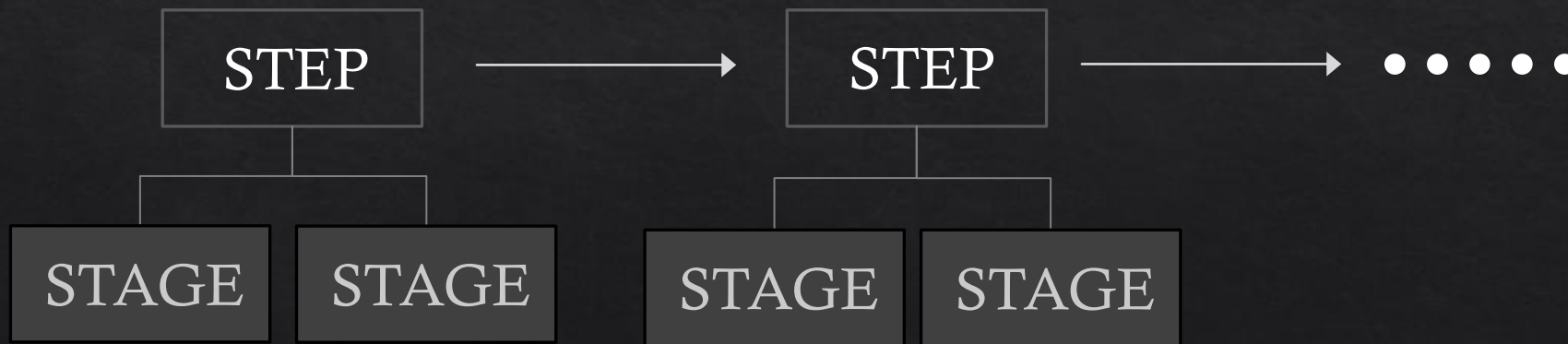
6. Boundary Layer



7. Export

Organization

- ◆ Several *Steps* to generate Final mesh
- ◆ Two *Stages*(pre, post) in each Step



The screenshot shows the 'Castellation' software interface. It features a 'Configuration' section with the following settings:

- Number of Cells between Levels: 3
- Feature Angle Threshold: 30
- Keep Non-Manifold Edges
- Keep Open Edges

Below the configuration is an 'Advanced' section and a 'Surface/Feature Refinement' section. The 'Surface/Feature Refinement' section contains a table with the following data:

Group	Level		
aaa	3		

At the bottom of the interface, there are buttons for 'Refine', 'Reset', 'Next', and 'Unlock'. The 'Refine' and 'Reset' buttons are highlighted with a hand-drawn border.

1. Geometry

2. Region

3. Base Grid

4. Castellation

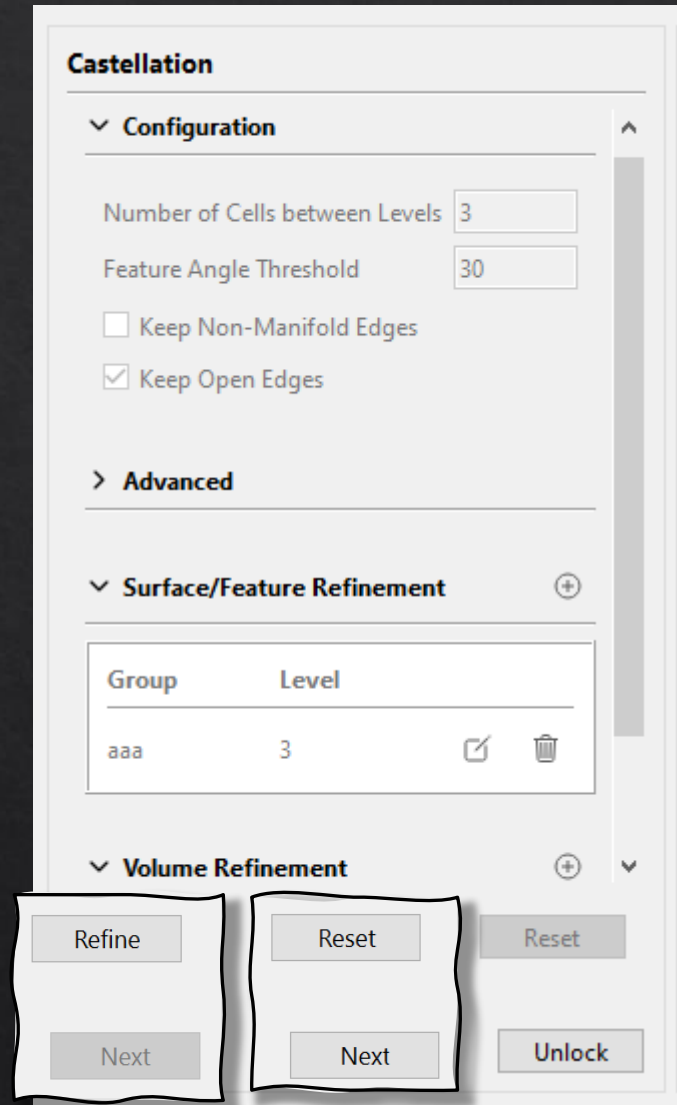
5. Snap

6. Boundary Layer

7. Export

Locking

- ◆ Each Step is **locked** on proceeding to the next step
- ◆ A step needs to be **unlocked** to change configuration in the step
- ◆ **Reset** removes the mesh generated in a step (i.e. move to former stage in the step)



1. Geometry



2. Region



3. Base Grid



4. Castellation



5. Snap



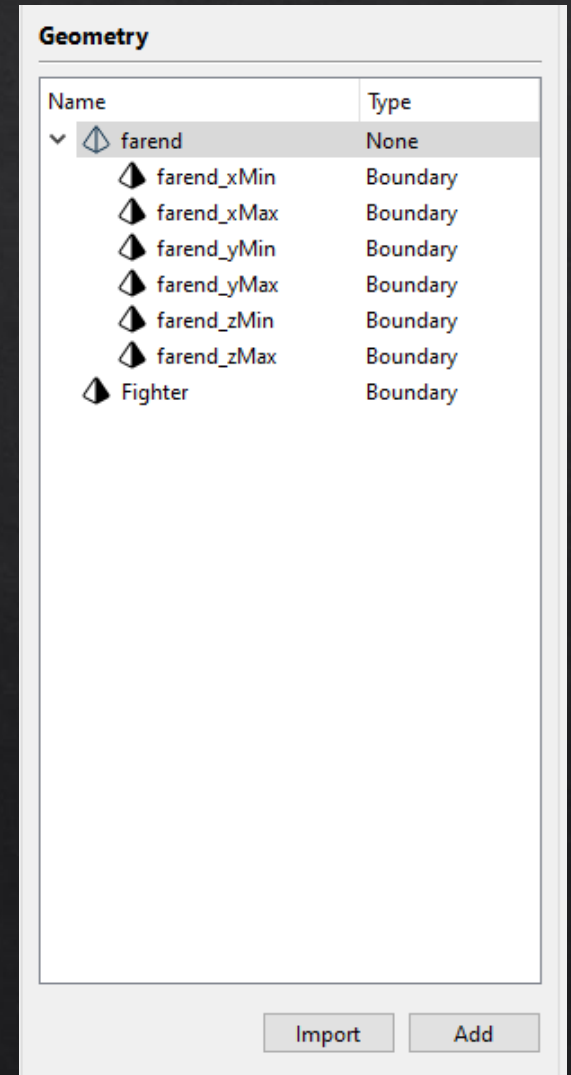
6. Boundary Layer



7. Export

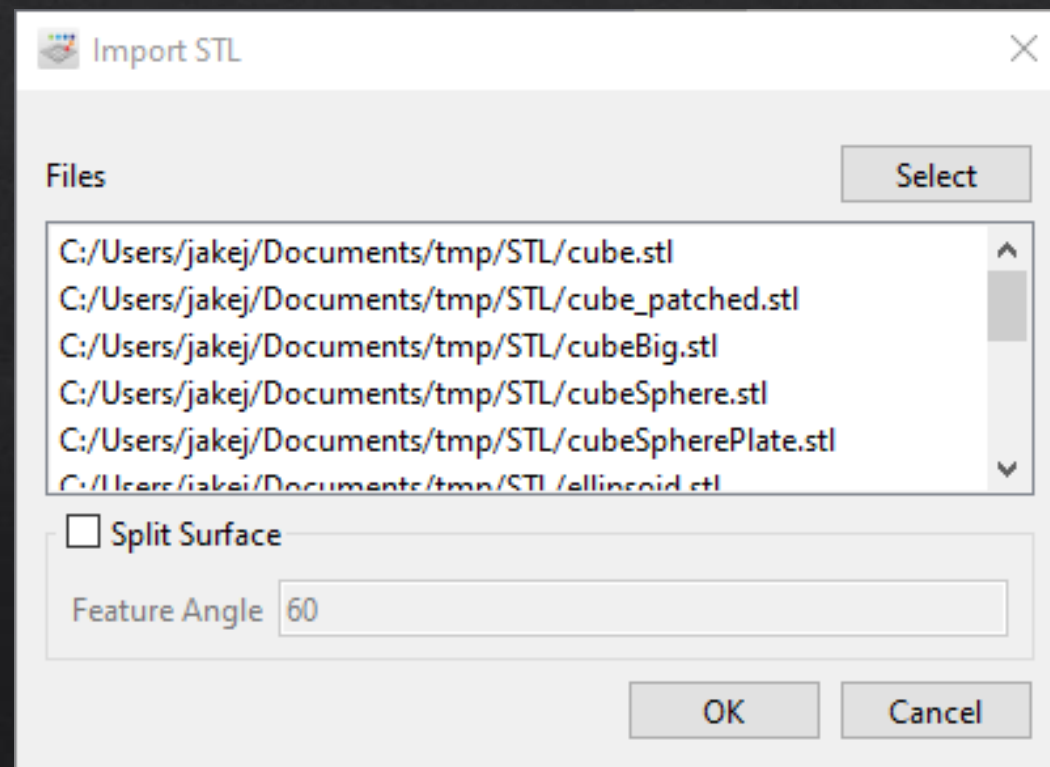
Geometry

- ◆ Import **STL** surface files
- ◆ Add Simple Geometries (Hex, Cylinder, Sphere)



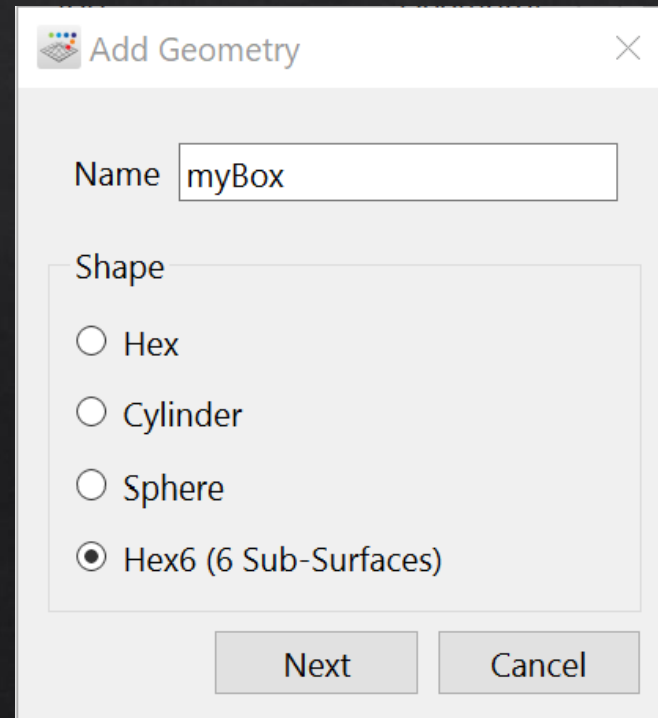
Geometry

- ◆ Import **STL** surface files
- ◆ Add Simple Geometries (Hex, Cylinder, Sphere)



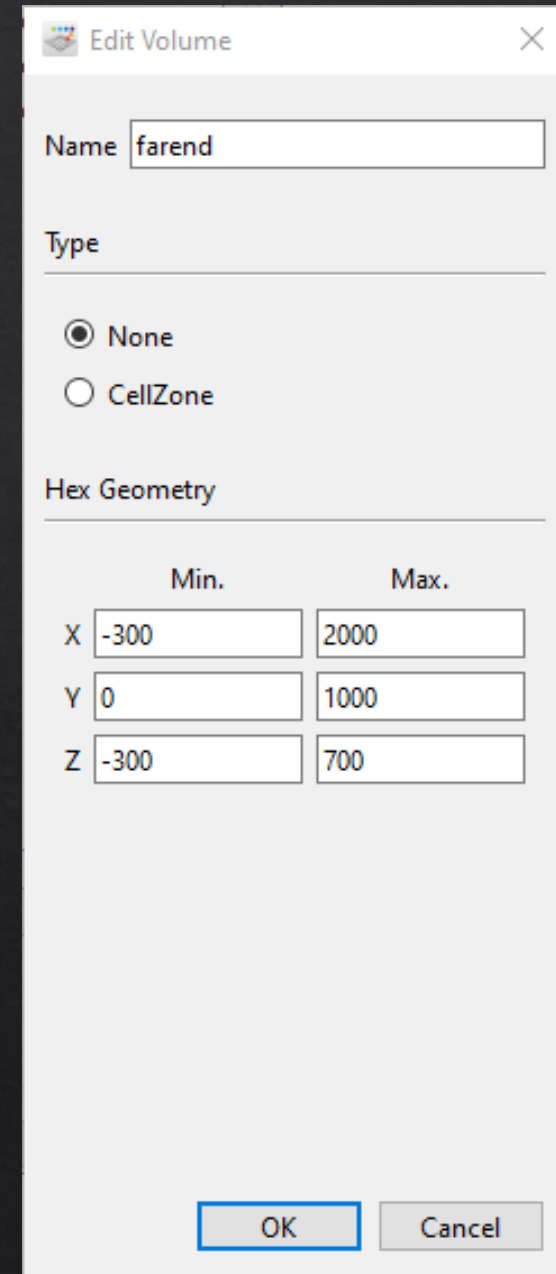
Geometry

- ◆ Import **STL** surface files
- ◆ Add Simple Geometries (Hex, Cylinder, Sphere, Hex6)



The 'Add Geometry' dialog box is shown with the following details:

- Name:** myBox
- Shape:** Hex6 (6 Sub-Surfaces) is selected with a radio button.
- Buttons:** 'Next' and 'Cancel' are located at the bottom right.



The 'Edit Volume' dialog box is shown with the following details:

- Name:** farend
- Type:** 'None' is selected with a radio button.
- Hex Geometry:** A table of coordinate ranges is provided.
- Buttons:** 'OK' and 'Cancel' are located at the bottom right.

	Min.	Max.
X	-300	2000
Y	0	1000
Z	-300	700

Surface Types

- ◆ Each Surface can be assigned to a Boundary, an Interface or None.
- ◆ **Inter-region Interface** needs to be designated by user

Edit Surface

Name

Type

Boundary

None

Interface

Non-Conformal

Inter-Region

OK Cancel

Region Points

◆ Case should have one *Region* at least

The screenshot shows a 'Region' management window with a list of three regions and an 'Edit Region' dialog box. The regions are:

- R3 (Fluid)**: Point (4, 1, 1)
- R2 (Fluid)**: Point (1, 1, 0.5)
- R1 (Fluid)**: Point (1, 1.5, 3.5)

The 'Edit Region' dialog box is open for R1 and contains the following fields:

- Name: R1
- Type: Fluid Solid
- Point (Specify a point in ther region):
 - X: 1
 - Y: 1.5
 - Z: 3.5
- Buttons: Update, Cancel

1. Geometry

2. Region

3. Base Grid



4. Castellation

5. Snap

6. Boundary Layer

7. Export

Region

air (Fluid)  

Point (61.8844, 540.701, 123.92)

Edit Region

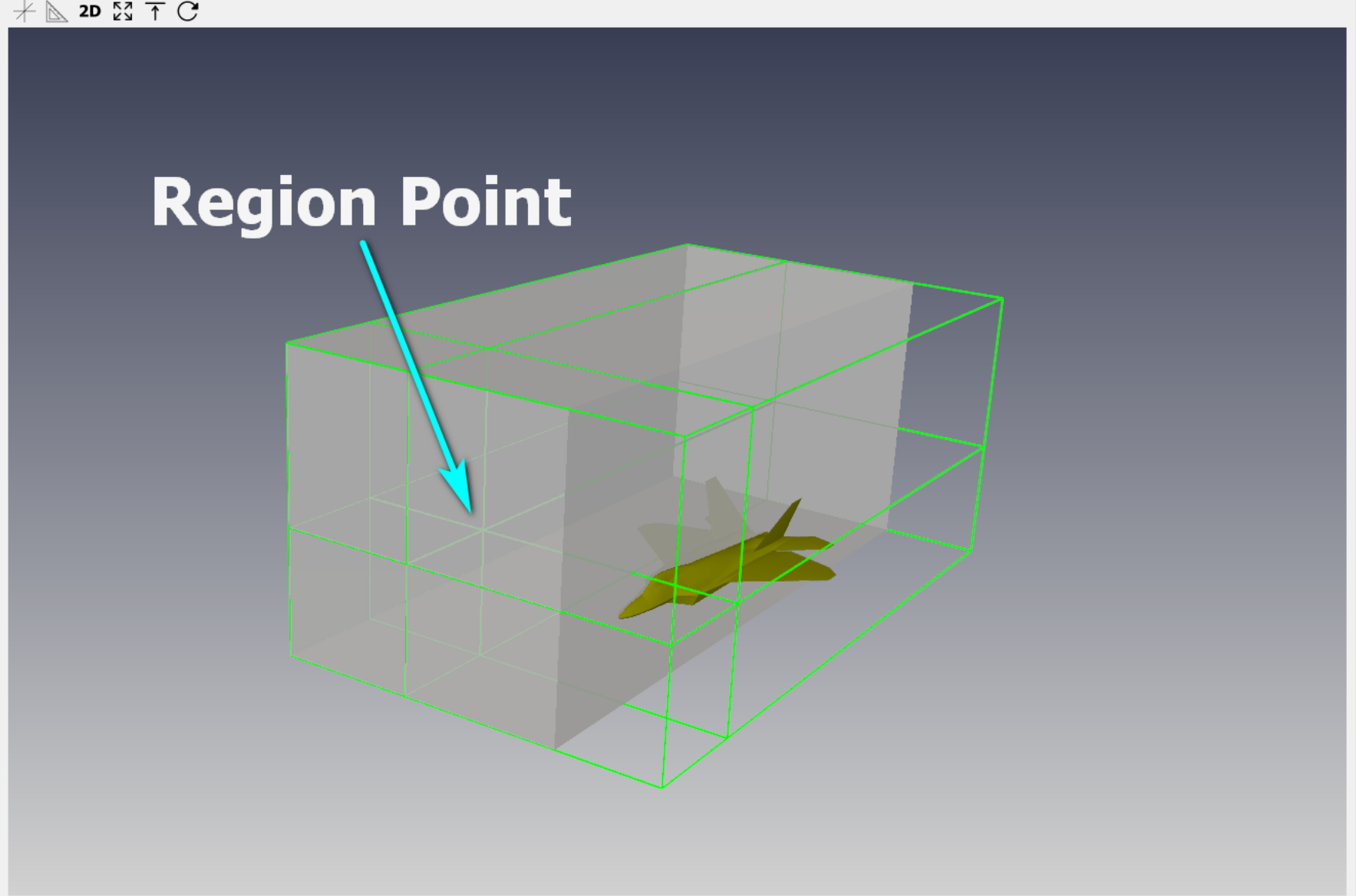
Name

Type Fluid Solid

Point (Specify a point in ther region)

Display Control

Name	Type
Fighter	Geometry <input checked="" type="checkbox"/>
farend_zMin	Geometry <input type="checkbox"/>
farend_zMax	Geometry <input type="checkbox"/>
farend_yMin	Geometry <input type="checkbox"/>
farend_yMax	Geometry <input type="checkbox"/>
farend_xMin	Geometry <input type="checkbox"/>
farend_xMax	Geometry <input type="checkbox"/>



Next

Base Grid

- ◆ Automatic bounding box Calculation
- ◆ Hex6 designated as bounding box

Base Grid

Grid Span

	Min.	MaX.	Len.	Cell
X	-300	2000	2300	15.3333
Y	0	1000	1000	16.6667
Z	-300	700	1000	16.6667

Use Hex6

farend

Number of Cells per Direction

X 150

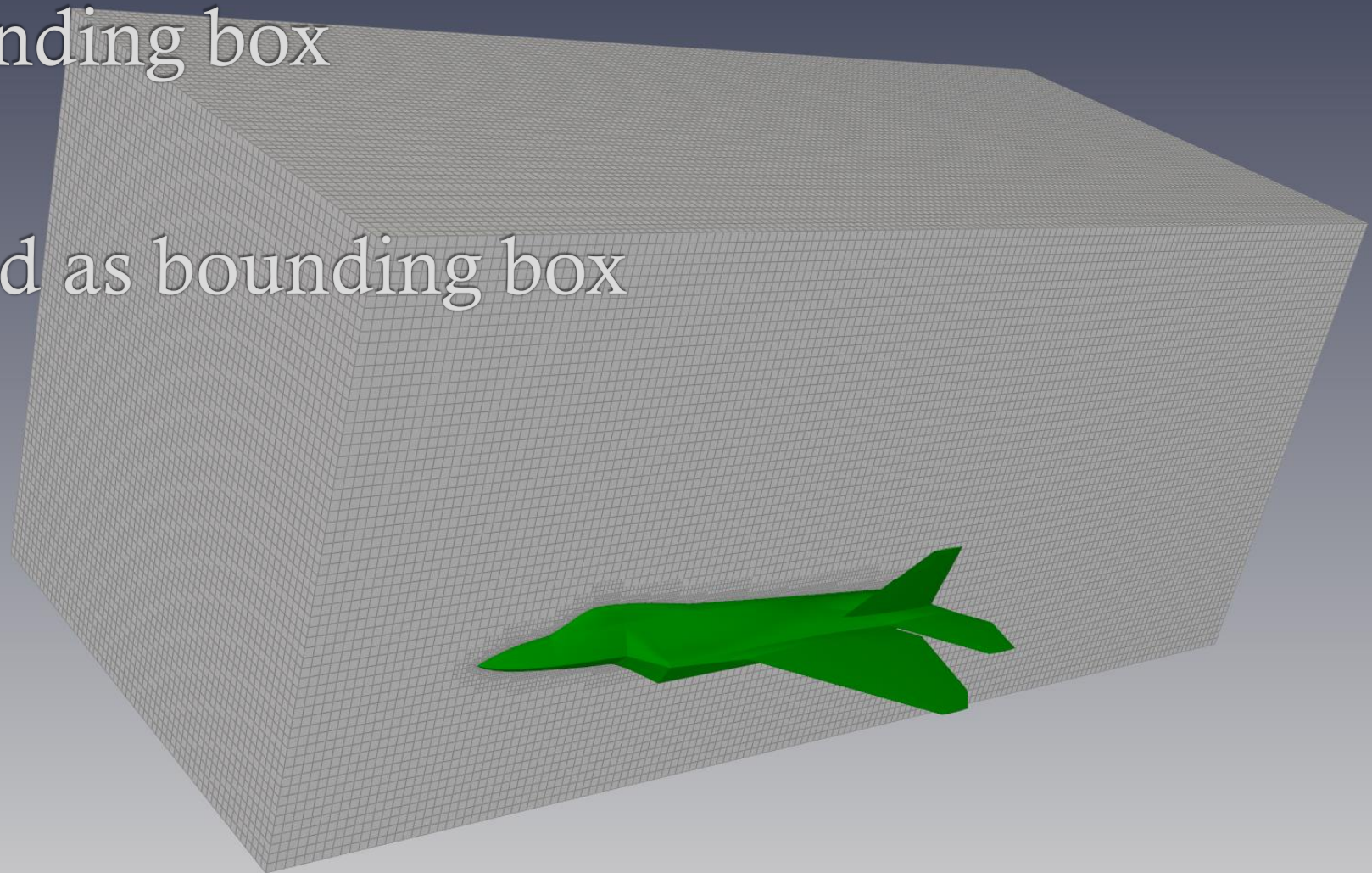
Y 60

Z 60

Reset

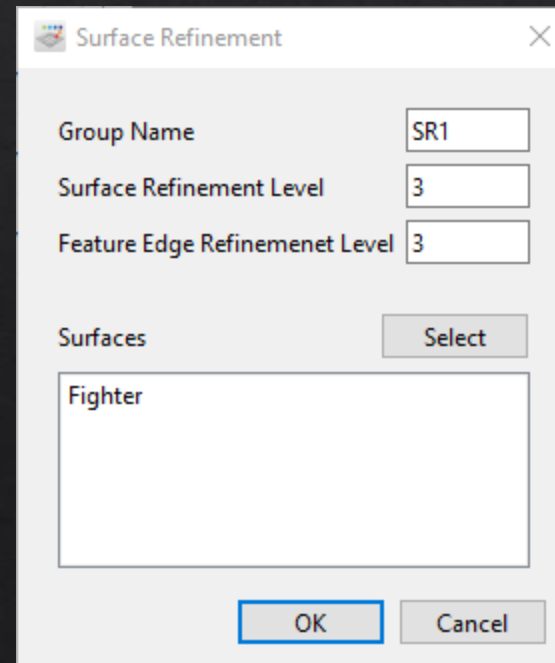
Base Grid

- ◆ Automatic bounding box Calculation
- ◆ Hex6 designated as bounding box



Castellation

- ◆ Surface, Feature Edge based refinement
- ◆ Volume based refinement



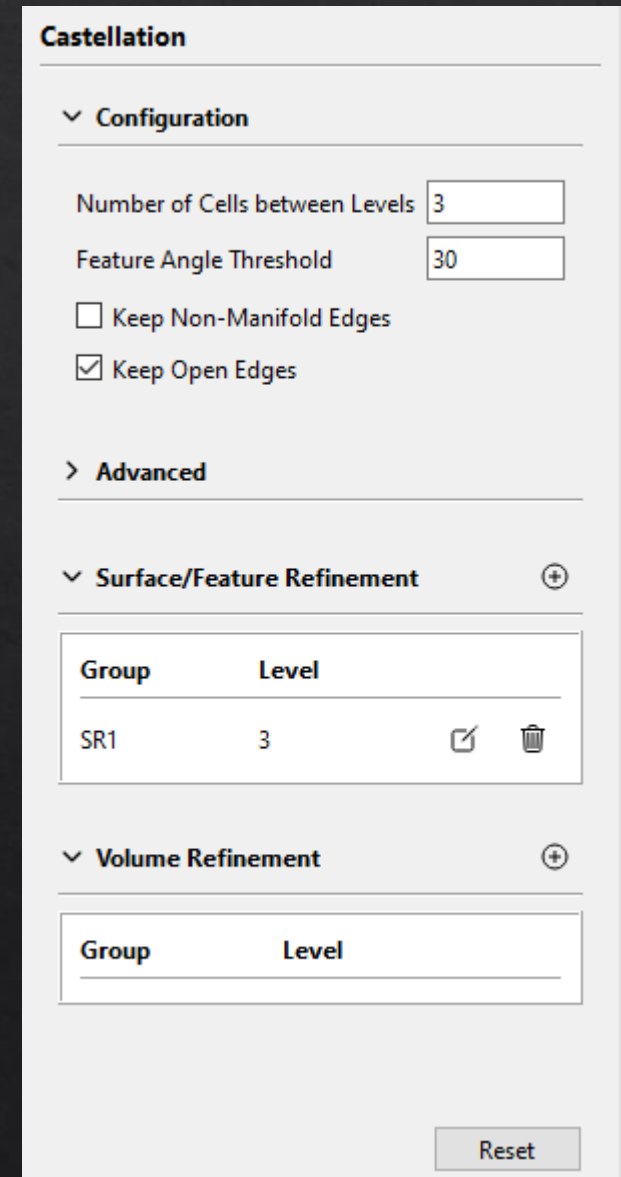
Surface Refinement dialog box showing configuration for a group named SR1. The Surface Refinement Level and Feature Edge Refinement Level are both set to 3. The Surfaces list contains 'Fighter'. The dialog includes OK and Cancel buttons.

Group Name	SR1
Surface Refinement Level	3
Feature Edge Refinement Level	3

Surfaces: Select

Fighter

OK Cancel



Castellation settings panel with sections for Configuration, Advanced, Surface/Feature Refinement, and Volume Refinement. The Surface/Feature Refinement section shows a table with one entry: SR1 at level 3. The Volume Refinement section is currently empty. A Reset button is located at the bottom right.

Configuration

Number of Cells between Levels: 3

Feature Angle Threshold: 30

Keep Non-Manifold Edges

Keep Open Edges

Advanced

Surface/Feature Refinement

Group	Level		
SR1	3	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Volume Refinement

Group	Level
-------	-------

Reset

Snap

Snap

Global Configuration

Iteration Count

Smoothing for Surface	<input type="text" value="3"/>
Smoothing for Internal	<input type="text" value="3"/>
Mesh Displacement Relaxation	<input type="text" value="30"/>
Snapping Relaxation	<input type="text" value="5"/>

Feature Snapping

Snapping Relaxation	<input type="text" value="15"/>
<input type="checkbox"/> Multi-Surface Feature Snap	

Tolerance	<input type="text" value="3"/>
Concave Angle (degree)	<input type="text" value="45"/>
Min. Area Ratio	<input type="text" value="0.3"/>

Boundary Layer Addition

- ◆ Global Configuration
- ◆ Configuration per Boundary Group

Boundary Layer

Configurations

Group	Layers
surfaces	5

Advanced Configuration

Number of Grow:

Starting Analysis

Feature Angle Threshold:

Max. Thickness Ratio:

Patch Displacement Smoothing

Number of Iterations:

Smooth Layer Thickness:

Medial Axis

Min. Axis Angle:

max Thickness Ratio:

Number of Smoothing Iter.:

Slip Feature Angle:

Max. Snapping Relaxation Iter.:

Mesh Shrinking

Num. of Buffer Cells:

Max. Layer Addition Iter.:

Max. Iter. Before Relax:

Reset

Next

Display Control

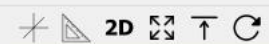
Cut

X Plane: Invert

Y Plane: Invert

Z Plane: Invert

Name	Type	Color
internalMesh	Mesh	■
Fighter	Geometry	■
Fighter	Boundary	
farend_zMin	Boundary	
farend_zMin	Boundary	
farend_zMax	Geometry	
farend_zMax	Boundary	
farend_yMin	Geometry	
farend_yMin	Boundary	
farend_yMax	Geometry	
farend_yMax	Boundary	
farend_xMin	Geometry	
farend_xMin	Boundary	
farend_xMax	Geometry	
farend_xMax	Boundary	



Boundary Setting

Group Name:

Number of Layers:

Thickness Model Specification

Final and Expansion

Final and Total

First and Expansion

First and Total

Total and Expansion

First and Relative Final

Size Specification: Relative

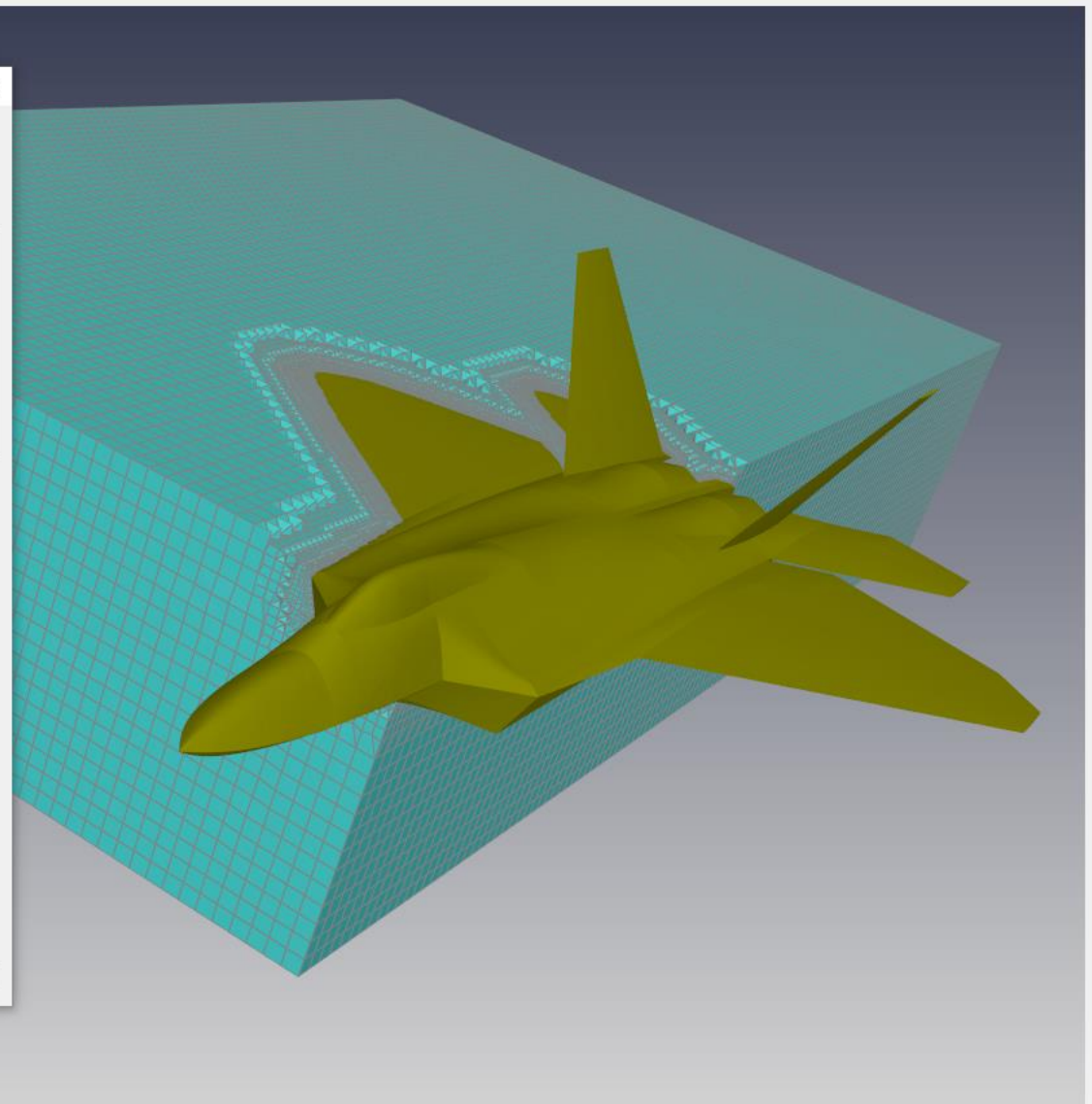
Final Layer Thickness:

Expansion Ratio:

Min. Total Thickness:

Boundary:

Fighter



Q & A