

F14, Mach 1.2 Flow Passes Wings-Body Combinations

- Mesh generations
- Solver
 - Initial conditions
- Post-Processing



Mesh Generation



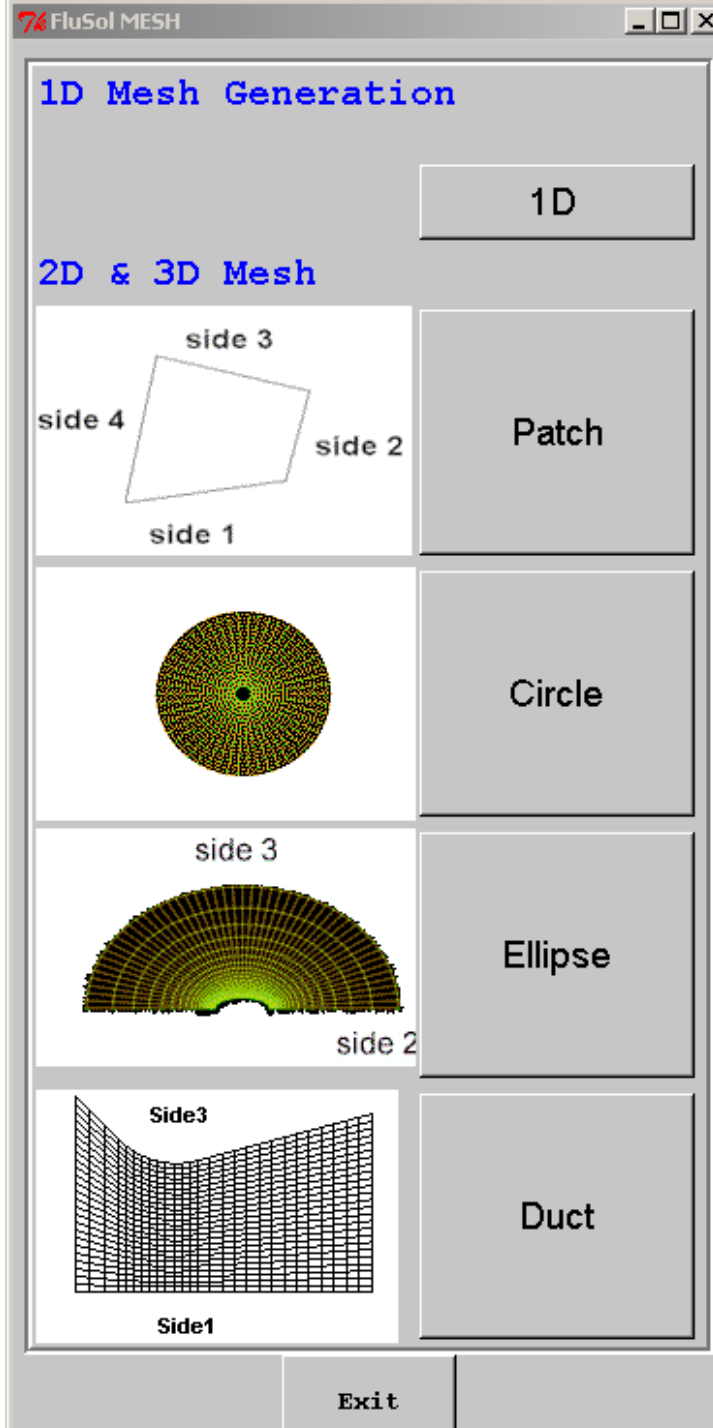
fluSol

Solver



Post-Processing

Exit



File

Patch Initial & Boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number:

1

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu 1 Circular arc ▼ ityb 3 Elliptic arc ▼

slopu (line) 0.5 slopb (line) 0.0

radius (slopu) 0.5 radius (slopb) 0.0

Parabolic power (slopu): 0.5 Parabolic power (slopb): 0.0

X-Axis length (axu): 0.5 X-Axis length (axb): 0.3

Y-Axis length (ayu): 0.1 Y-Axis length (ayb): 0.1

strux 0 strlx 0

dxumin 0.1 dxlmin 0.1

residue 0.0001 stretch 0

factor 0.0 dymin: 0.0

☒ Create wings number of wings: 4

Cross section: 1 circular arc, ▼ thick 0.05

wing location: 0 Total sweeping elements 60

NACA XXXX None

☐ Upper wing profile

☐ lower wing profile

Node coordinates

node: quad 4 ▼

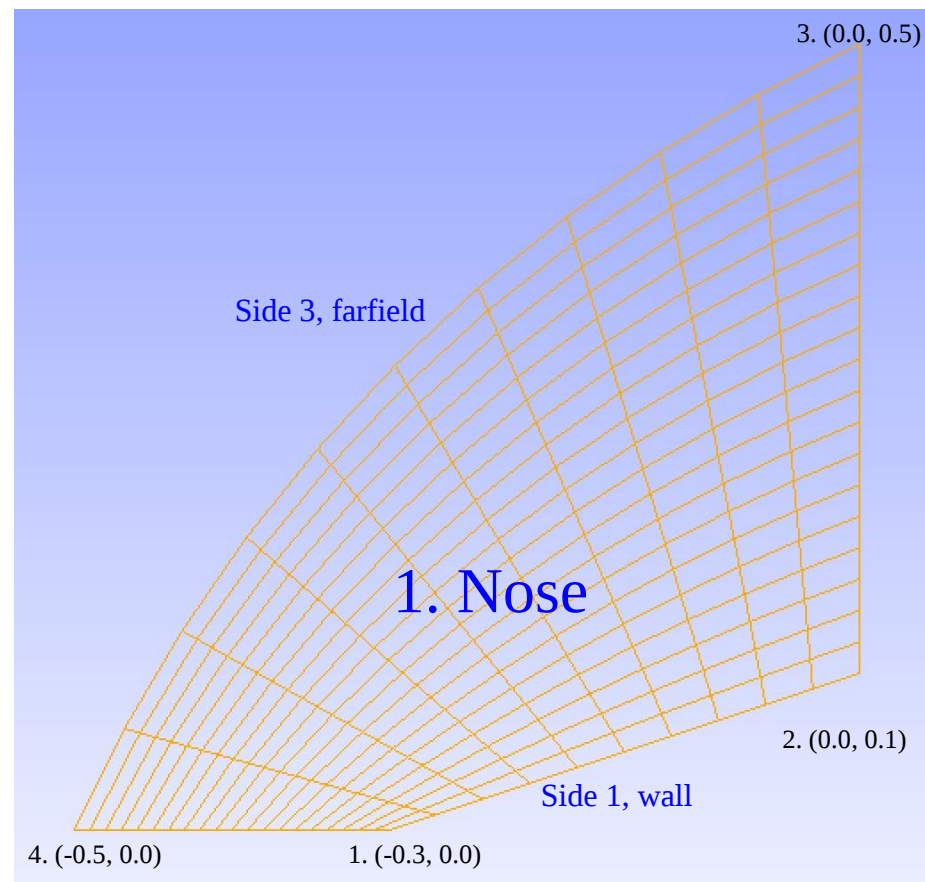
elx 10 eley 20

Node 1 X1: -0.3 Y1: 0.0

Node 2 X2: 0.0 Y2: 0.1

Node 3 X3: 0.0 Y3: 0.5

Node 4 X4: -0.5 Y4: 0.0



File

Patch Initial & Boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number:

1

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu 1 Circular arc ▼ ityb 3 Elliptic arc ▼

slopu (line) 0.5 slopb (line) 0.0

radius (slopu) 0.5 radius (slopb) 0.0

Parabolic power (slopu): 0.5 Parabolic power (slopb): 0.0

X-Axis length (axu): 0.5 X-Axis length (axb): 0.3

Y-Axis length (ayu): 0.1 Y-Axis length (ayb): 0.1

strux 0 strlx 0

dxumin 0.1 dxlmin 0.1

residue 0.0001 stretch 0

factor 0.0 dymin: 0.0

☒ Create wings number of wings: 4

Cross section: 1 circular arc, ▼ thick 0.05

wing location: 0 Total sweeping elements 60

NACA XXXX None

☐ Upper wing profile

☐ lower wing profile

Node coordinates

node: quad 4 ▼

elx 10 eley 20

Node 1 X1: -0.3 Y1: 0.0

Node 2 X2: 0.0 Y2: 0.1

Node 3 X3: 0.0 Y3: 0.5

Node 4 X4: -0.5 Y4: 0.0

File

Patch Initial & Boundary conditions

Initial & Boundary Conditions

Wall face numbers (ex. 2,4):

1

Farfield face numbers (1,3):

3

Axis-symmetry line face numbers:

Set boundary condition on face numbers

Set variable output on face:

File

Patch

Initial & Boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number:

2

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu

0 Straight line

ityb

0 Straight line

slopu (line)

1.0

slopb (line)

0.0

radius (slopu)

1.0

radius (slopb)

0.0

Parabolic power (slopu):

1.0

Parabolic power (slopb):

0.0

X-Axis length (axu):

0.0

X-Axis length (axb):

0.3

Y-Axis length (ayu):

0.0

Y-Axis length (ayb):

0.1

strux

0

strlx

0

dxumin

0.1

dxlmin

0.1

residue

0.0001

stretch

0

factor

0.0

dymin:

0.0

☒ Create wings

number of wings:

4

Cross section:

1 circular arc,

thick

0.05

wing location:

0

Total sweeping elements

60

NACA XXXX

None

☐ Upper wing profile

☐ lower wing profile

Node coordinates

node:

quad 4

elex

10

eley

20

Node 1

X1:

0.0

Y1:

0.1

Node 2

X2:

0.2

Y2:

0.1

Node 3

X3:

0.2

Y3:

0.5

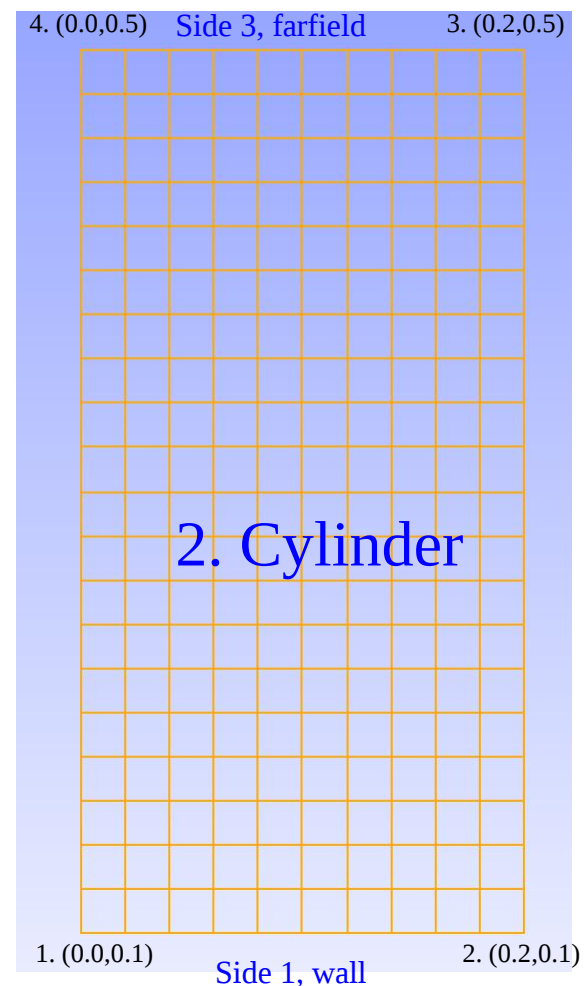
Node 4

X4:

0.0

Y4:

0.5



File

Patch **Initial & Boundary conditions**

Patch Mesh Generation

View mesh

Assembly blocks

Region Number:

2

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu 0 Straight line ▼ ityb 0 Straight line ▼

slopu (line) 1.0 slopb (line) 0.0

radius (slopu) 1.0 radius (slopb) 0.0

Parabolic power (slopu): 1.0 Parabolic power (slopb): 0.0

X-Axis length (axu): 0.0 X-Axis length (axb): 0.3

Y-Axis length (ayu): 0.0 Y-Axis length (ayb): 0.1

strux 0 strlx 0

dxumin 0.1 dxlmin 0.1

residue 0.0001 stretch 0

factor 0.0 dymin: 0.0

☒ Create wings number of wings: 4

Cross section: 1 circular arc, ▼ thick 0.05

wing location: 0 Total sweeping elements 60

NACA XXXX None

☐ Upper wing profile

☐ lower wing profile

Node coordinates

node: quad 4 ▼

elex 10 eley 20

Node 1 X1: 0.0 Y1: 0.1

Node 2 X2: 0.2 Y2: 0.1

Node 3 X3: 0.2 Y3: 0.5

Node 4 X4: 0.0 Y4: 0.5

File

Patch **Initial & Boundary conditions**

Initial & Boundary Conditions

Wall face numbers (ex. 2,4):

1

Farfield face numbers (1,3):

3

Axis-symmetry line face numbers:

Set boundary condition on face numbers

Set variable output on face:

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File Editor

Patch Initial & Boundary conditions

Patch Mesh Generation View mesh Assembly blocks

Region Number: 2 Write Mesh Preview Mesh Close

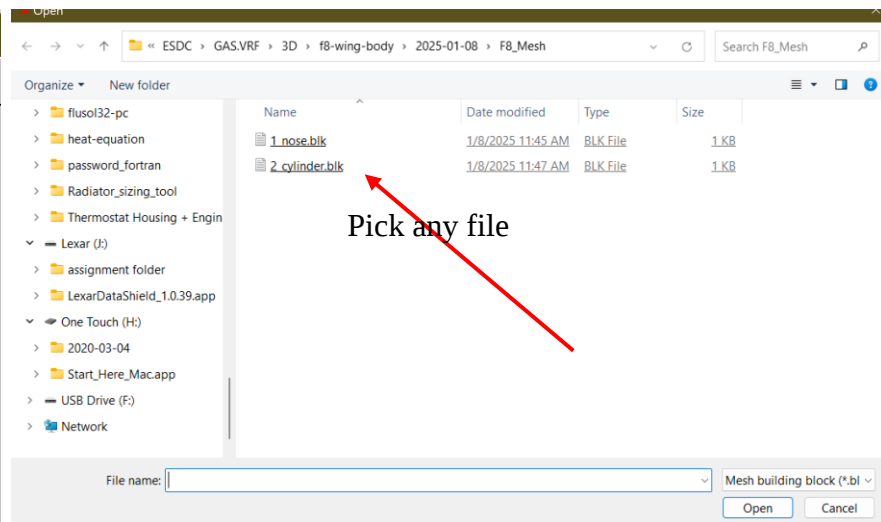
Upper Curve (Side 3) Lower Curve (Side 1)

ityu 1 Circular arc ityb 0 Straight line

slopu (line)	1.00000	slopb (line)	0.00000
radius (slopu)	1.00000	radius (slopb)	0.00000
Parabolic power (slopu):	1.00000	Parabolic power (slopb):	0.00000
X-Axis length (axu):	0.0	X-Axis length (axb):	0.0
Y-Axis length (ayu):	0.0	Y-Axis length (ayb):	0.0
strux	0	strlx	0
dxumin	0.1	dxlmin	0.1
residue	1.00000e-004	stretch	0
factor	0.0	dymin:	0.0
☐ Create wings		wing:	4
thick	0.05	nwing:	2

Node coordinates node: quad 4

elex	10	eley	20	
Node 1	X1:	0.00000	Y1:	0.10000
Node 2	X2:	0.20000	Y2:	0.10000
Node 3	X3:	0.20000	Y3:	0.50000
Node 4	X4:	0.00000	Y4:	0.50000



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File Name

☐ 1_nose.blk

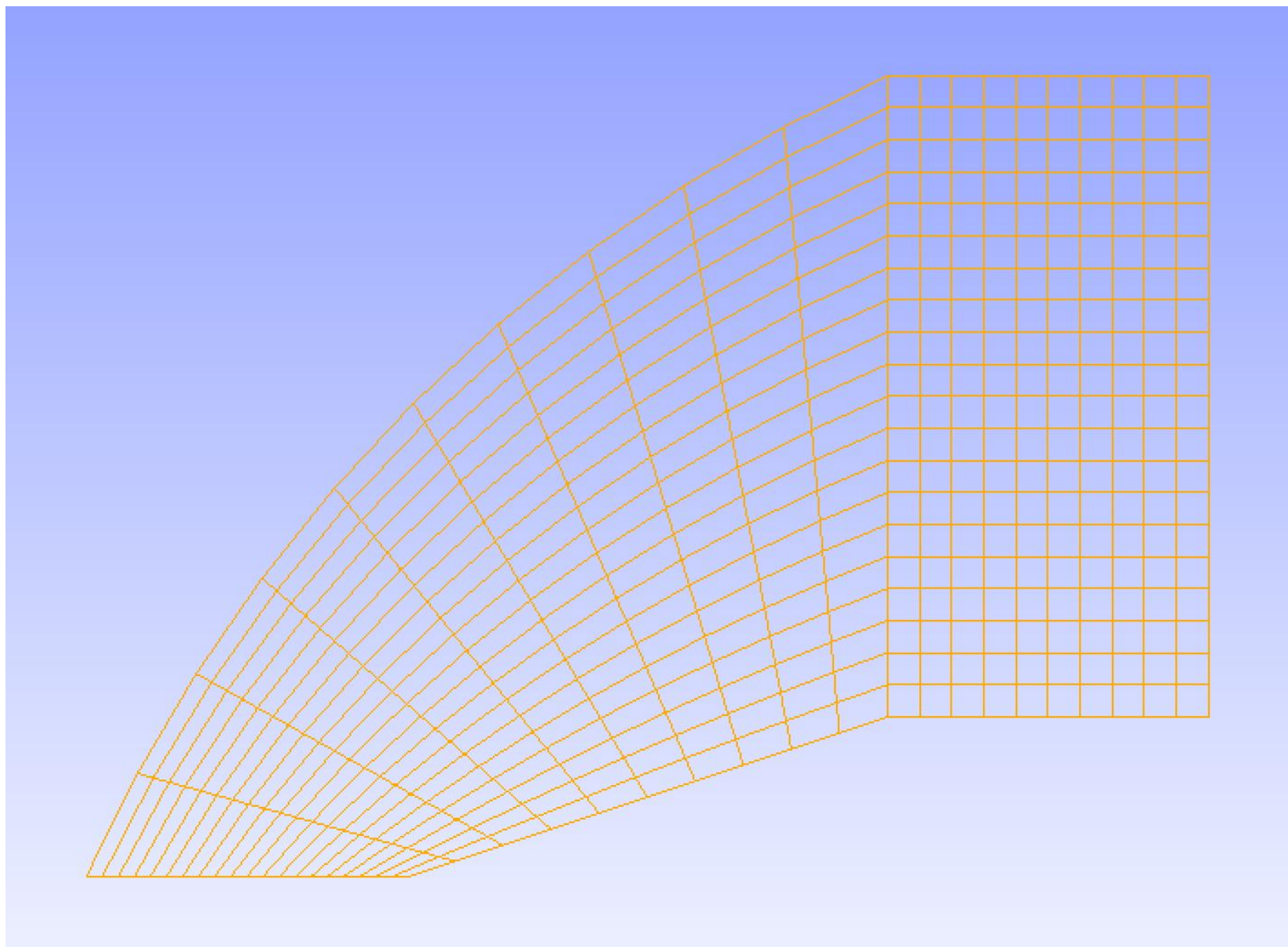
☐ 2_cylinder.blk

☐ View selected building blocks mesh

☒ View all blocks mesh

☐ Save combined building blocks *.cbk

Close



File

Patch Initial & Boundary conditions

Patch Mesh Generation View mesh Assembly blocks

Region Number: 3 Write Mesh Preview file Close

Part name: Reset Variables:

Upper Curve (Side 3) Lower Curve (Side 1)

ityu 0 Straight line ▼

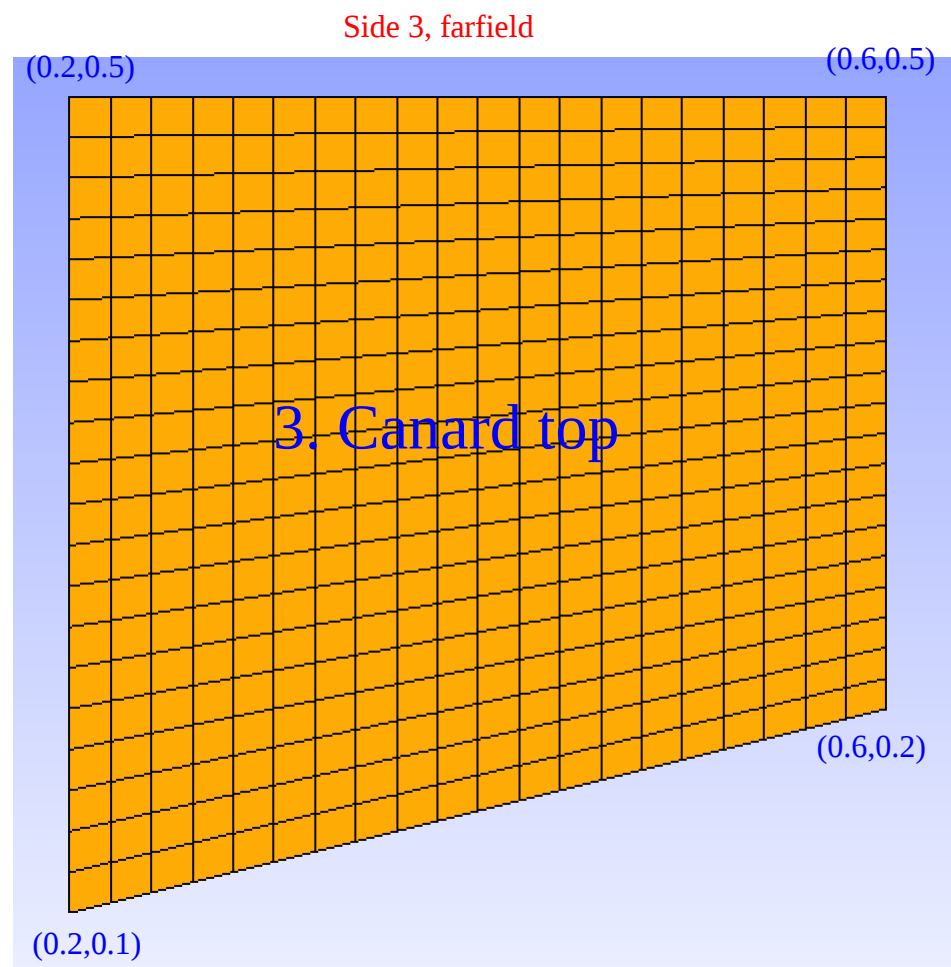
slopu (line) 1.0
 radius (slopu) 1.0
 Parabolic power (slopu): 1.0
 X-Axis length (axu): 0.0
 Y-Axis length (ayu): 0.0
 strux 0
 dxumin 0.1
 residue 0.0001
 factor 0.0
☒ Create wings
 Cross section: 1 circular arc, ▼
 wing location: 0
 NACA XXXX None
☐ Upper wing profile
☐ lower wing profile

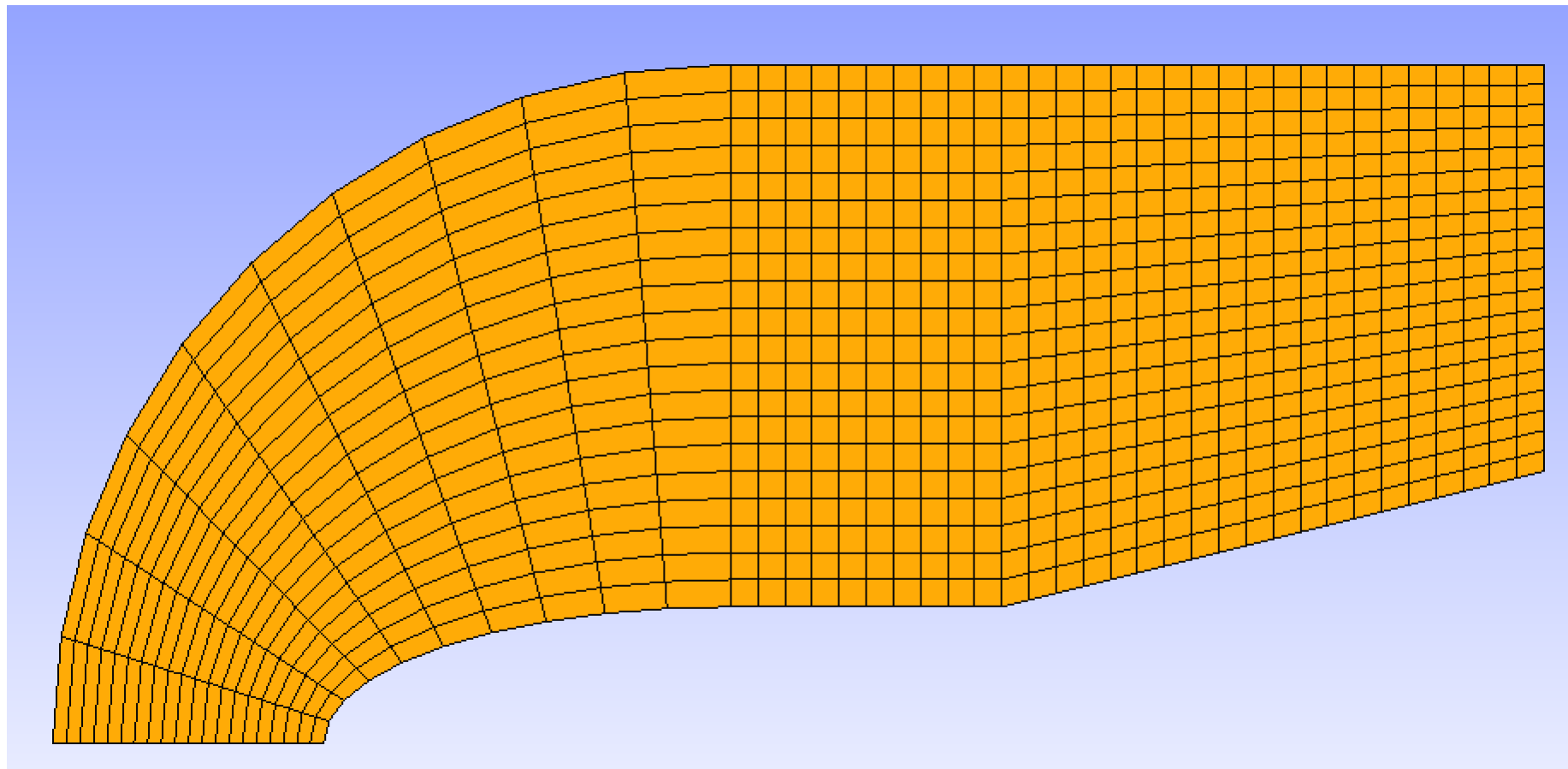
ityb 0 Straight line ▼

slopb (line) 0.0
 radius (slopb) 0.0
 Parabolic power (slopb): 0.0
 X-Axis length (axb): 0.3
 Y-Axis length (ayb): 0.1
 strlx 0
 dxlmin 0.1
 stretch 0
 dymin: 0.0
 number of wings: 4
 thick 0.05
 Total sweeping elements 60

Node coordinates node: quad 4 ▼

elex	20	eley	20
Node 1	X1: 0.2	Y1: 0.1	
Node 2	X2: 0.6	Y2: 0.4	
Node 3	X3: 0.6	Y3: 0.5	
Node 4	X4: 0.2	Y4: 0.5	





File

Patch Initial & Boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number:

4

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu

0 Straight line

ityb

0 Straight line

slopu (line)

1.0

slopb (line)

0.0

radius (slopu)

1.0

radius (slopb)

0.0

Parabolic power (slopu):

1.0

Parabolic power (slopb):

0.0

X-Axis length (axu):

0.0

X-Axis length (axb):

0.3

Y-Axis length (ayu):

0.0

Y-Axis length (ayb):

0.1

strux

0

strlx

0

dxumin

0.1

dxlmin

0.1

residue

0.0001

stretch

0

factor

0.0

dynmin:

0.0

☒ Create wings

number of wings:

2

Cross section:

1 circular arc.

thick

0.05

wing location:

12

Total sweeping elements

60

NACA XXXX

None

☐ Upper wing profile

☐ lower wing profile

Node coordinates

node: quad 4

elx

20

eley

20

Node 1

X1:

0.2

Y1:

0.1

Node 2

X2:

0.6

Y2:

0.1

Node 3

X3:

0.6

Y3:

0.2

Node 4

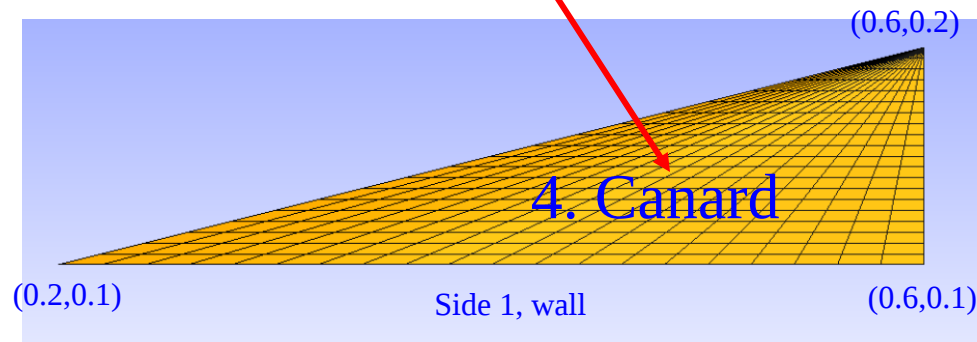
X4:

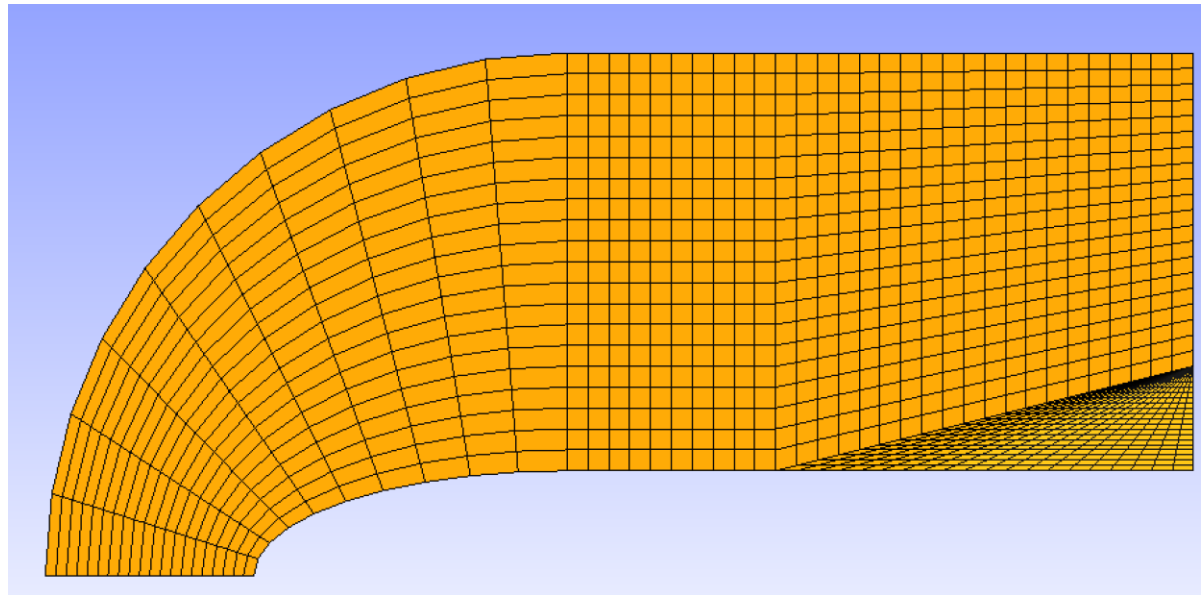
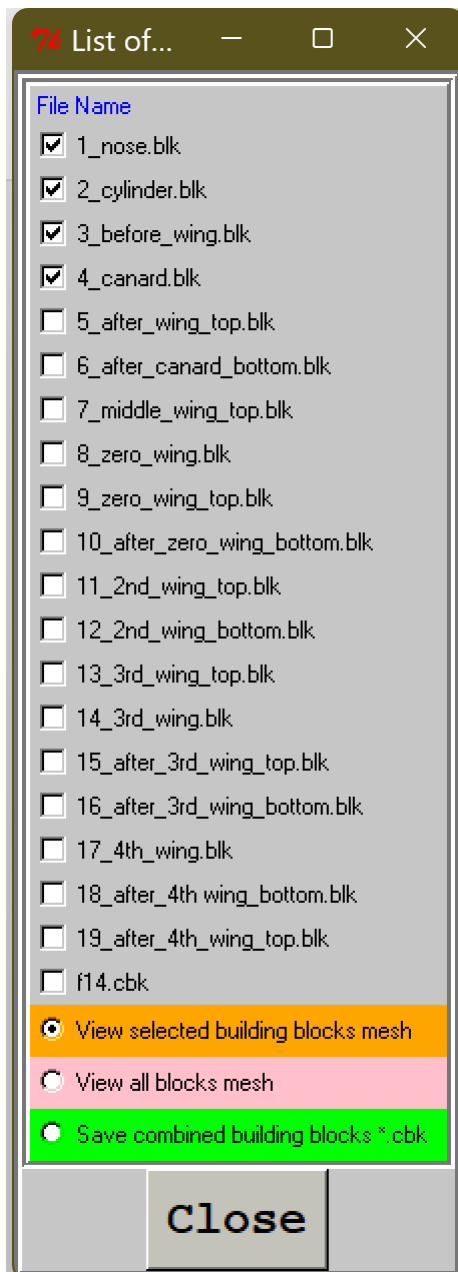
0.6

Y4:

0.2

2 Wings,
wing cross-section shape = circular arc
Wing location = 12
Thickness = $0.05 \times \text{chord}$





File

Patch Initial & Boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number:

5

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu 0 Straight line ▼ ityb 0 Straight line ▼

slopu (line)

1.0

slopb (line)

0.0

radius (slopu)

1.0

radius (slopb)

0.0

Parabolic power (slopu):

1.0

Parabolic power (slopb):

0.0

X-Axis length (axu):

0.0

X-Axis length (axb):

0.3

Y-Axis length (ayu):

0.0

Y-Axis length (ayb):

0.1

strux

0

strlx

0

dxumin

0.1

dxlmin

0.1

residue

0.0001

stretch

0

factor

0.0

dymin:

0.0

☒ Create wings

number of wings:

4

Cross section:

1 circular arc, ▼

thick

0.05

wing location:

0

Total sweeping elements

60

NACA XXXX

None

☐ Upper wing profile☐ lower wing profile

Node coordinates

node: quad 4 ▼

elx

10

eley

20

Node 1

X1:

0.6

Y1:

0.2

Node 2

X2:

0.9

Y2:

0.3

Node 3

X3:

0.9

Y3:

0.5

Node 4

X4:

0.6

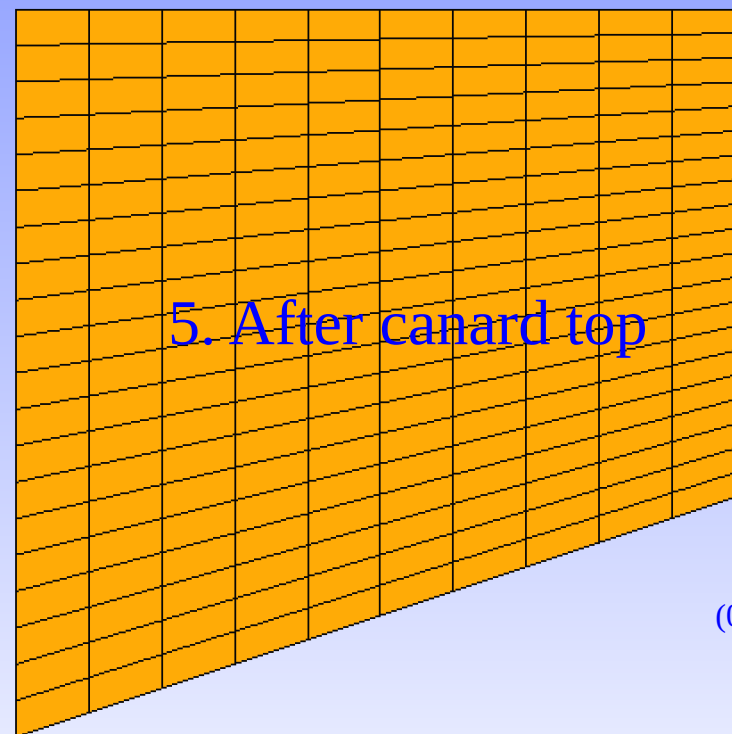
Y4:

0.5

(0.6,0.5)

(0.9,0.5)

Side 3, farfield



5. After canard top

(0.9,0.3)

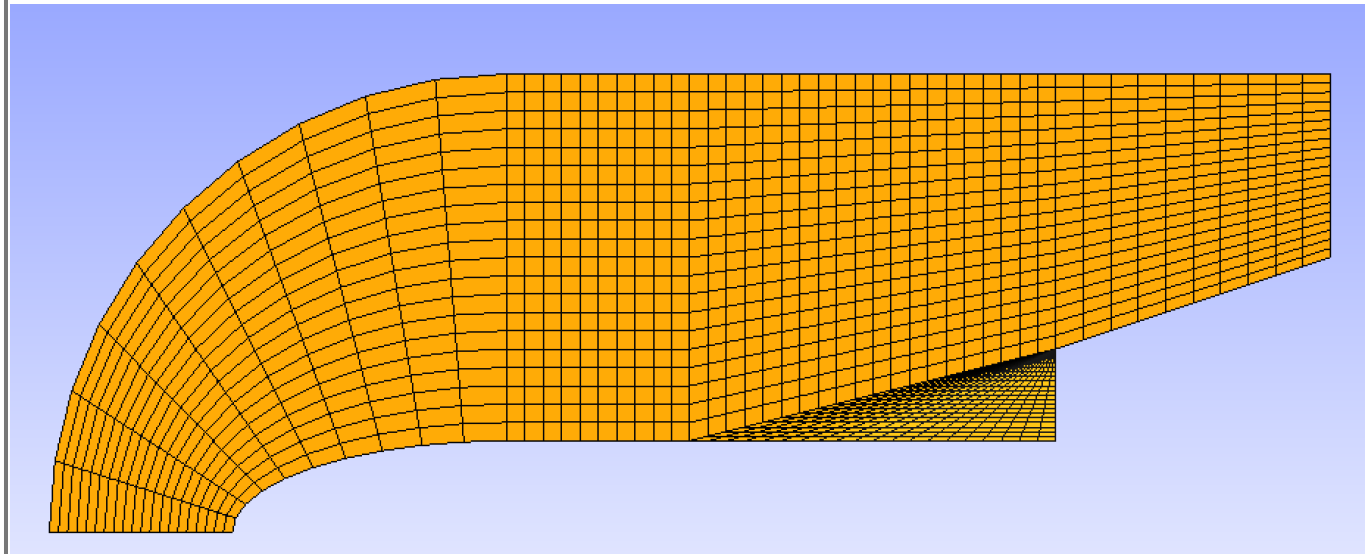
(0.6,0.2)

74 List of...

File Name

- ☒ 1_nose.blk
- ☒ 2_cylinder.blk
- ☒ 3_before_wing.blk
- ☒ 4_canard.blk
- ☒ 5_after_wing_top.blk
- ☐ 6_after_canard_bottom.blk
- ☐ 7_middle_wing_top.blk
- ☐ 8_zero_wing.blk
- ☐ 9_zero_wing_top.blk
- ☐ 10_after_zero_wing_bottom.blk
- ☐ 11_2nd_wing_top.blk
- ☐ 12_2nd_wing_bottom.blk
- ☐ 13_3rd_wing_top.blk
- ☐ 14_3rd_wing.blk
- ☐ 15_after_3rd_wing_top.blk
- ☐ 16_after_3rd_wing_bottom.blk
- ☐ 17_4th_wing.blk
- ☐ 18_after_4th_wing_bottom.blk
- ☐ 19_after_4th_wing_top.blk
- ☐ f14.cbk
- ☒ View selected building blocks mesh
- ☐ View all blocks mesh
- ☐ Save combined building blocks *.cbk

Close



File

Patch Initial & Boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number:

6

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu 0 Straight line ▼ ityb 0 Straight line ▼

slopu (line)

1.0

slopb (line)

0.0

radius (slopu)

1.0

radius (slopb)

0.0

Parabolic power (slopu):

1.0

Parabolic power (slopb):

0.0

X-Axis length (axu):

0.0

X-Axis length (axb):

0.3

Y-Axis length (ayu):

0.0

Y-Axis length (ayb):

0.1

strux

0

strlx

0

dxumin

0.1

dxlmin

0.1

residue

0.0001

stretch

0

factor

0.0

dymin:

0.0

☒ Create wings

number of wings:

3

Cross section:

1 circular arc, ▼

thick

0.05

wing location:

0

Total sweeping elements

60

NACA XXXX

None

☐ Upper wing profile☐ lower wing profile

Node coordinates

node: quad 4 ▼

elex

10

eley

20

Node 1

X1:

0.6

Y1:

0.1

Node 2

X2:

0.8

Y2:

0.1

Node 3

X3:

0.9

Y3:

0.3

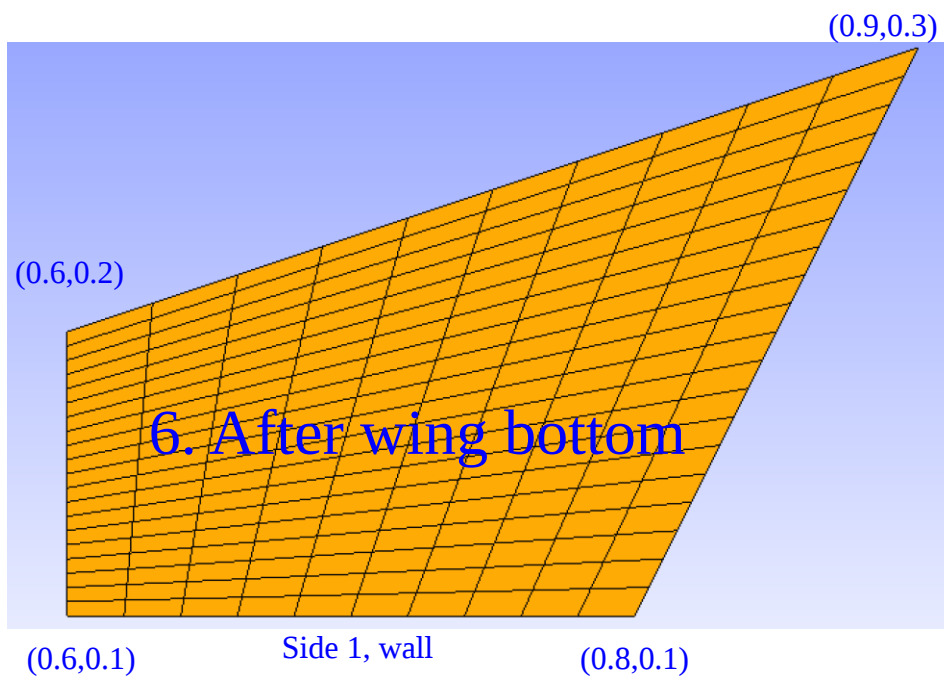
Node 4

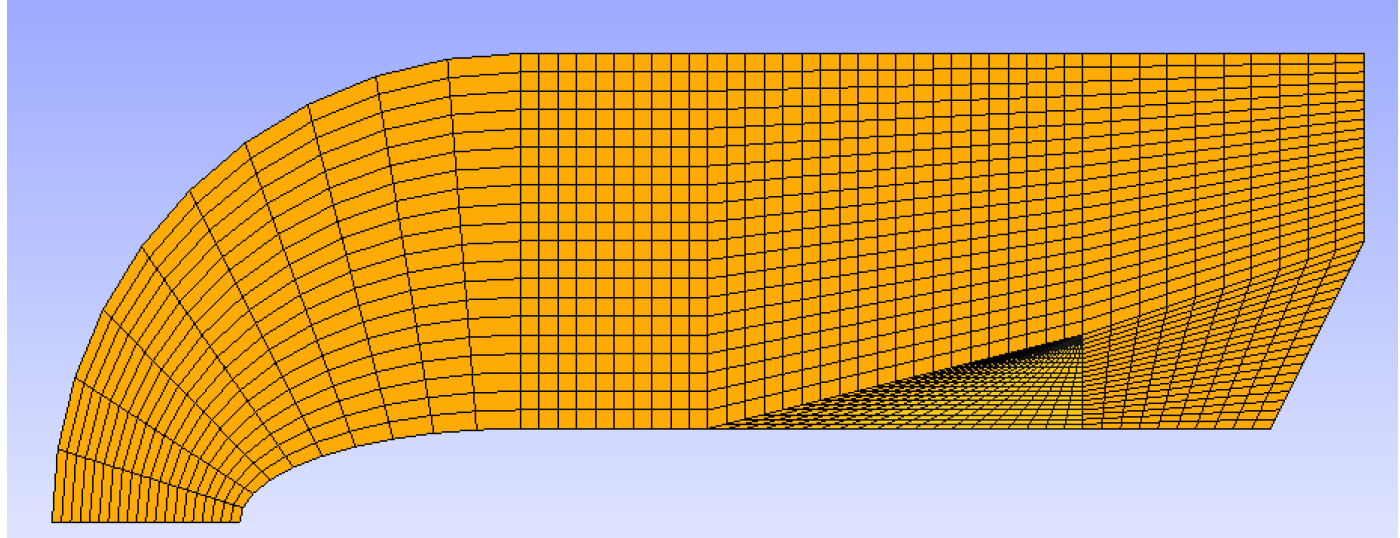
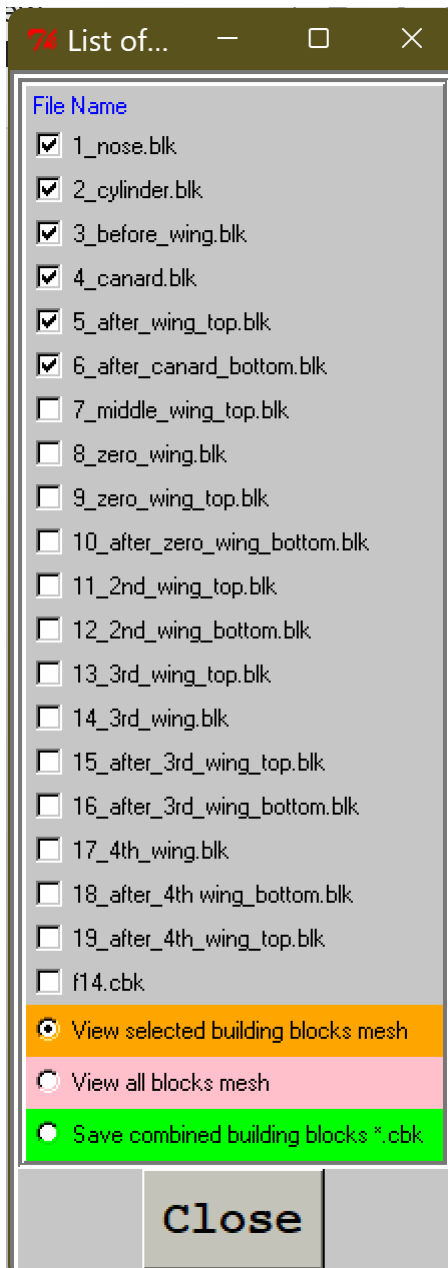
X4:

0.6

Y4:

0.2





*** Patch - FluSol Patch Mesh Generator: Versio...

File

Patch Initial & Boundary conditions

Patch Mesh Generation

View mesh **Assembly blocks**

Region Number: Write Mesh Preview file Close

Part name:

Reset Variables:

Upper Curve (Side 3) Lower Curve (Side 1)

ityu ityb

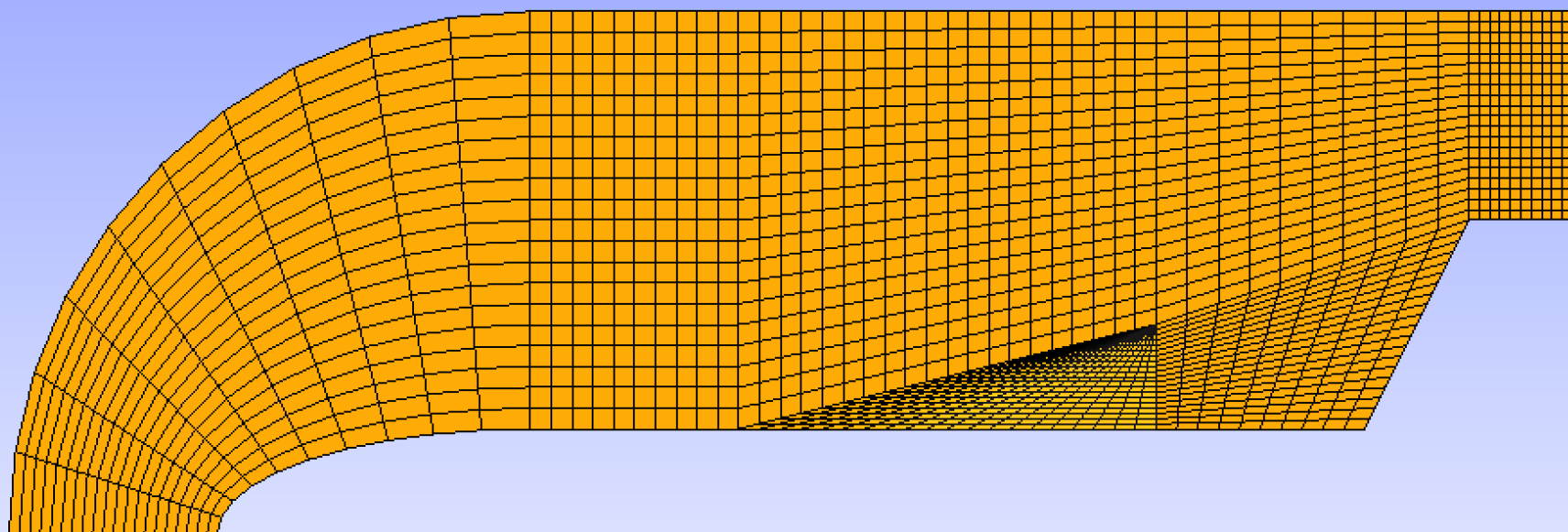
slopu (line)	1.0	slopb (line)	0.0
radius (slopu)	1.0	radius (slopb)	0.0
Parabolic power (slopu):	1.0	Parabolic power (slopb):	0.0
X-Axis length (axu):	0.0	X-Axis length (axb):	0.3
Y-Axis length (ayu):	0.0	Y-Axis length (ayb):	0.1
strux	0	strlx	0
dxumin	0.1	dxlmin	0.1
residue	0.0001	stretch	0
factor	0.0	dymin:	0.0
☐ Create wings		number of wings:	3
Cross section:	1 circular arc, thick	thick	0.05
wing location:	0	Total sweeping elements	60
NACA XXXX	None		
☐ Upper wing profile			
☐ lower wing profile			

Node coordinates

node:

	elex		eley
Node 1	10	X1:	0.9
Node 2		X2:	1.0
Node 3		X3:	1.0
Node 4		X4:	0.9
		Y1:	0.3
		Y2:	0.3
		Y3:	0.5
		Y4:	0.5





File

Patch

Initial & Boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number: 8

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu

0 Straight line

ityb

0 Straight line

slopu (line)

1.0

slopb (line)

0.0

radius (slopu)

1.0

radius (slopb)

0.0

Parabolic power (slopu):

1.0

Parabolic power (slopb):

0.0

X-Axis length (axu):

0.0

X-Axis length (axb):

0.3

Y-Axis length (ayu):

0.0

Y-Axis length (ayb):

0.1

strux

0

strlx

0

dxumin

0.1

dxlmin

0.1

residue

0.0001

stretch

0

factor

0.0

dymin:

0.0

☒ Create wings

number of wings:

3

Cross section:

2 1/2 double v

thick

0.05

wing location:

16

Total sweeping elements

60

NACA XXXX

None

☐ Upper wing profile

☐ lower wing profile

Node coordinates

node: quad 4

elex

10

eley

20

Node 1

X1:

0.8

Y1:

0.1

Node 2

X2:

1.0

Y2:

0.1

Node 3

X3:

1.0

Y3:

0.3

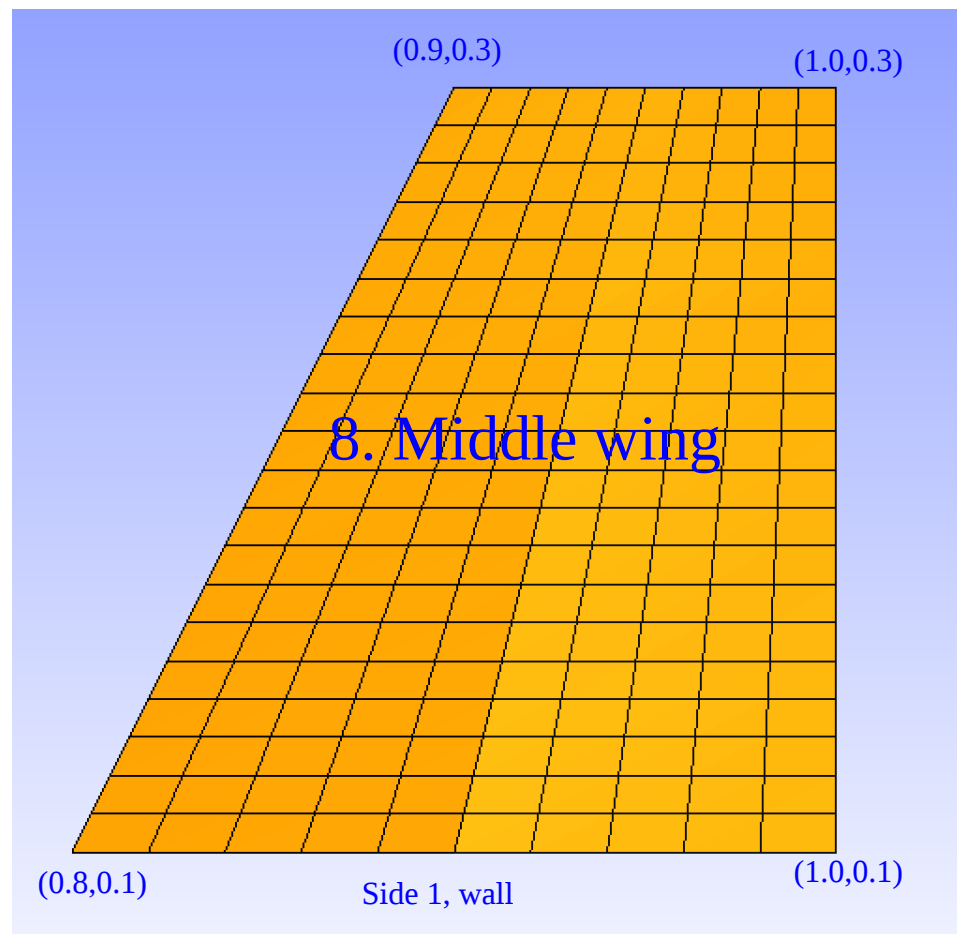
Node 4

X4:

0.9

Y4:

0.3



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File Name

☒ 1_nose.blk

☒ 2_cylinder.blk

☒ 3_before_wing.blk

☒ 4_canard.blk

☒ 5_after_wing_top.blk

☒ 6_after_canard_bottom.blk

☒ 7_middle_wing_top.blk

☒ 8_zero_wing.blk

☐ 9_zero_wing_top.blk

☐ 10_after_zero_wing_bottom.blk

☐ 11_2nd_wing_top.blk

☐ 12_2nd_wing_bottom.blk

☐ 13_3rd_wing_top.blk

☐ 14_3rd_wing.blk

☐ 15_after_3rd_wing_top.blk

☐ 16_after_3rd_wing_bottom.blk

☐ 17_4th_wing.blk

☐ 18_after_4th_wing_bottom.blk

☐ 19_after_4th_wing_top.blk

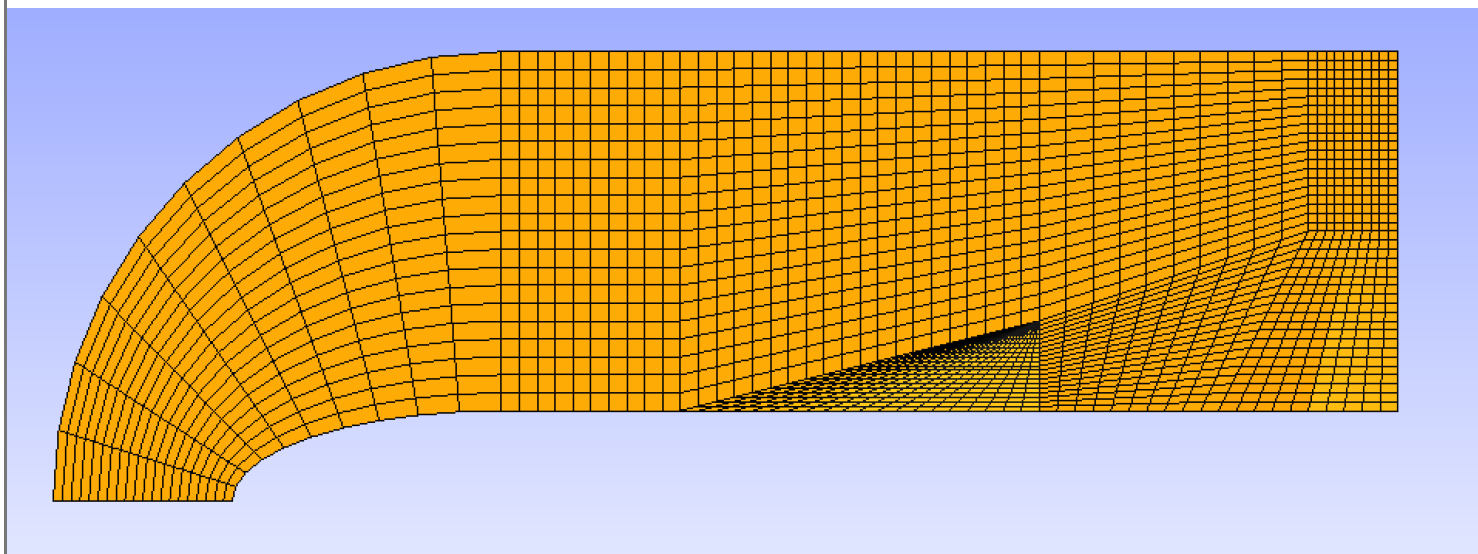
☐ f14.cbk

☒ View selected building blocks mesh

☐ View all blocks mesh

☐ Save combined building blocks *.cbk

Close



FluSol Patch Mesh Generator: Versio...

File

Patch Initial & Boundary conditions

Patch Mesh Generation

View mesh Assembly blocks

Region Number: 9 Write Mesh Preview file Close

Part name:

Reset Variables:

Upper Curve (Side 3)

ityu 0 Straight line ▼

slopu (line) 1.0 radius (slopu) 1.0 Parabolic power (slopu): 1.0 X-Axis length (axu): 0.0 Y-Axis length (ayu): 0.0 strux 0 dxumin 0.1 residue 0.0001 factor 0.0

☒ Create wings

Cross section: 1 circular arc, ▼

wing location: 0

NACA XXXX None

☐ Upper wing profile

☐ lower wing profile

Lower Curve (Side 1)

ityb 0 Straight line ▼

slopb (line) 0.0 radius (slopb) 0.0 Parabolic power (slopb): 0.0 X-Axis length (axb): 0.3 Y-Axis length (ayb): 0.1 strlx 0 dxlmin 0.1 stretch 0 dymin: 0.0 number of wings: 0

thick 0.05

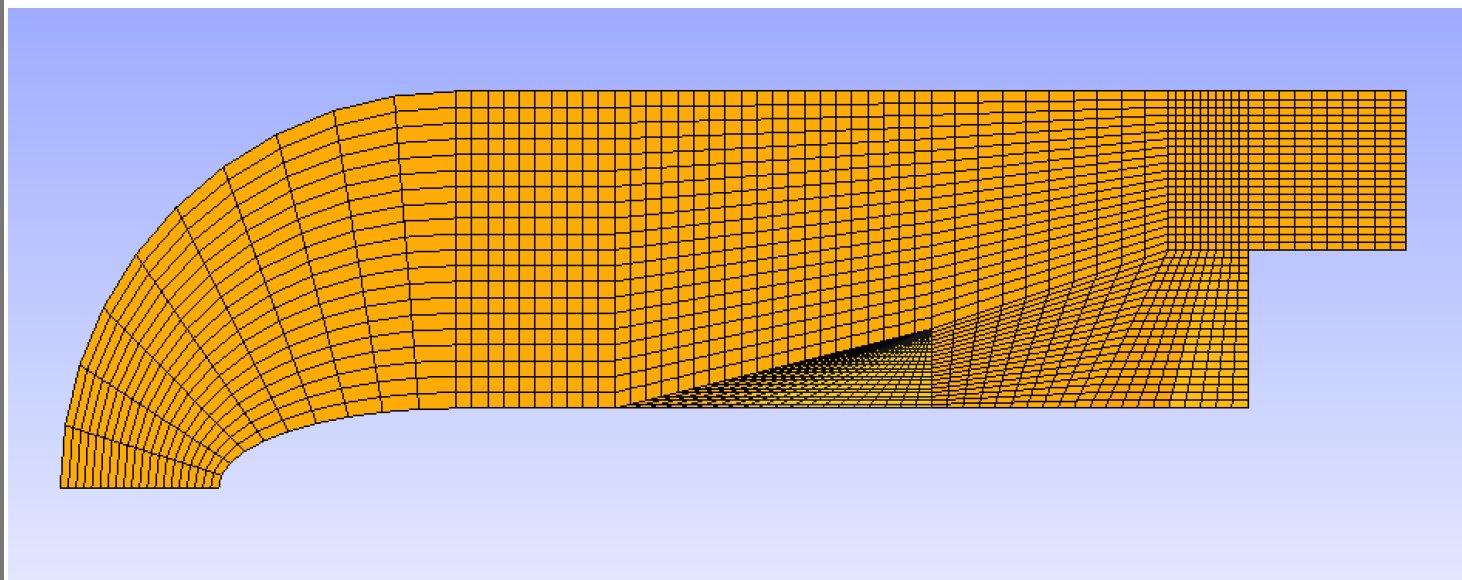
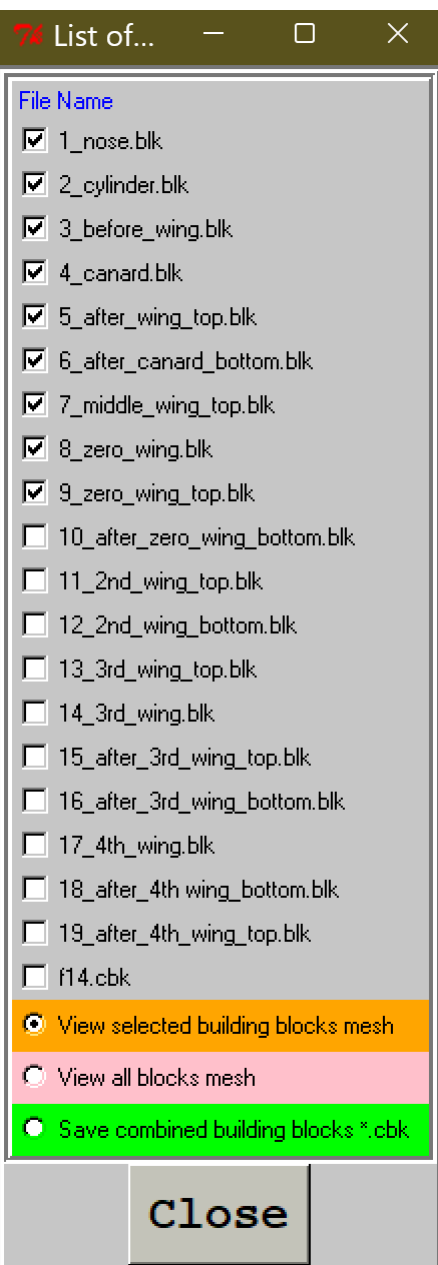
Total sweeping elements 60

Node coordinates

node: quad 4 ▼

	elex		eley	
Node 1	X1:	1.0	Y1:	0.3
Node 2	X2:	1.2	Y2:	0.3
Node 3	X3:	1.2	Y3:	0.5
Node 4	X4:	1.0	Y4:	0.5





File

Patch Initial & Boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number:

10

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu 0 Straight line ▼ ityb 0 Straight line ▼

slopu (line) 1.0

slopb (line) 0.0

radius (slopu) 1.0

radius (slopb) 0.0

Parabolic power (slopu): 1.0

Parabolic power (slopb): 0.0

X-Axis length (axu): 0.0

X-Axis length (axb): 0.3

Y-Axis length (ayu): 0.0

Y-Axis length (ayb): 0.1

strux 0

strlx 0

dxumin 0.1

dxlmin 0.1

residue 0.0001

stretch 0

factor 0.0

dymin: 0.0

☒ Create wings

number of wings: 0

Cross section: 1 circular arc, ▼

thick 0.05

wing location: 0

Total sweeping elements 60

NACA XXXX None

☐ Upper wing profile

☐ lower wing profile

Node coordinates

node: quad 4 ▼

elex 10

eley 20

Node 1	X1:	1.0	Y1:	0.1
Node 2	X2:	1.2	Y2:	0.1
Node 3	X3:	1.2	Y3:	0.3
Node 4	X4:	1.0	Y4:	0.3

(1.0,0.3)

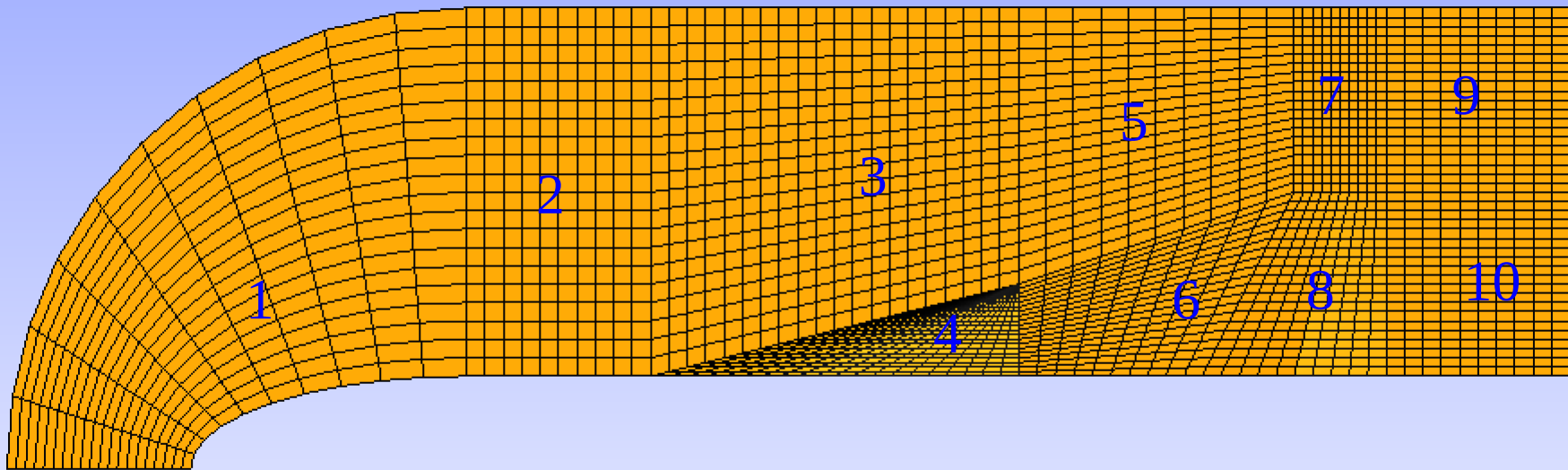
(1.2,0.3)

10. After middle wing bottom

(1.0,0.1)

Side 1, wall

(1.2,0.1)



File

Patch
Initial & Boundary conditions

Patch Mesh Generation
View mesh
Assembly blocks

Region Number: 11
Write Mesh
Preview file
Close

Part name:
Reset Variables:

Upper Curve (Side 3)
Lower Curve (Side 1)

ityu 0 Straight line ▼
ityb 0 Straight line ▼

slopu (line) 1.0
radius (slopu) 1.0
Parabolic power (slopu): 1.0
X-Axis length (axu): 0.0
Y-Axis length (ayu): 0.0
strux 0
dxumin 0.1
residue 0.0001
factor 0.0

slopb (line) 0.0
radius (slopb) 0.0
Parabolic power (slopb): 0.0
X-Axis length (axb): 0.3
Y-Axis length (ayb): 0.1
strlx 0
dxlmin 0.1
stretch 0
dymin: 0.0
number of wings: 0

☒ Create wings

Cross section: 1 circular arc, ▼

wing location: 0

NACA XXXX None

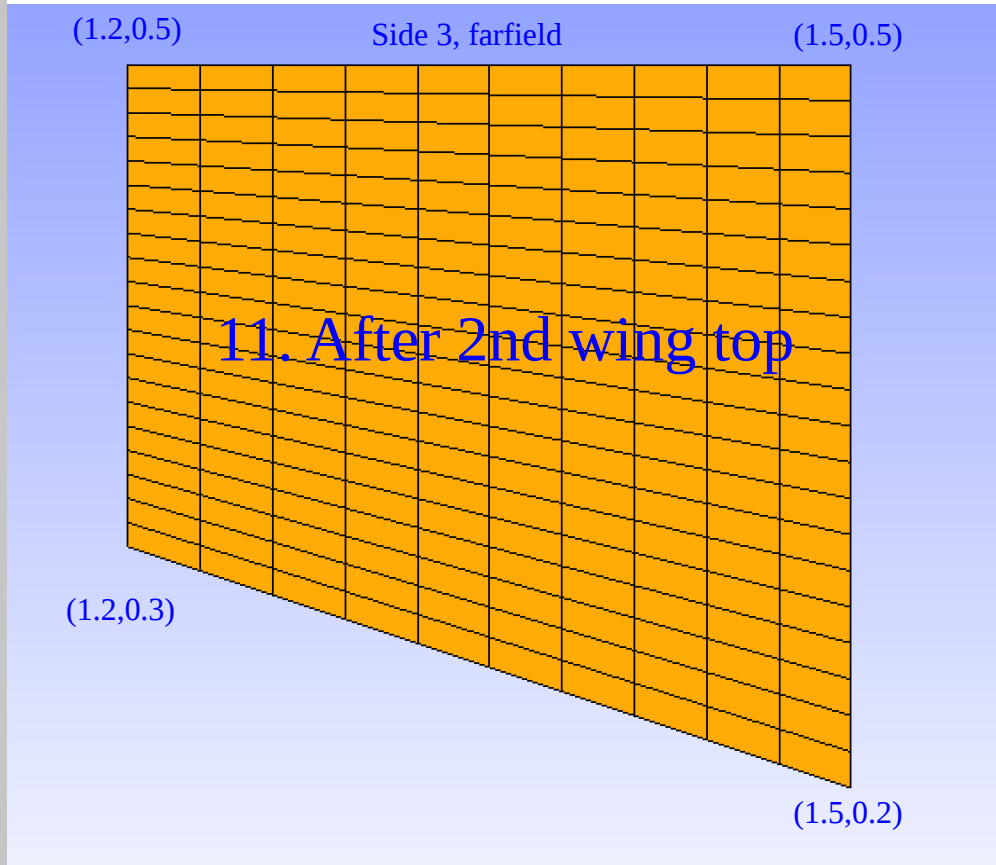
☐ Upper wing profile
☐ lower wing profile

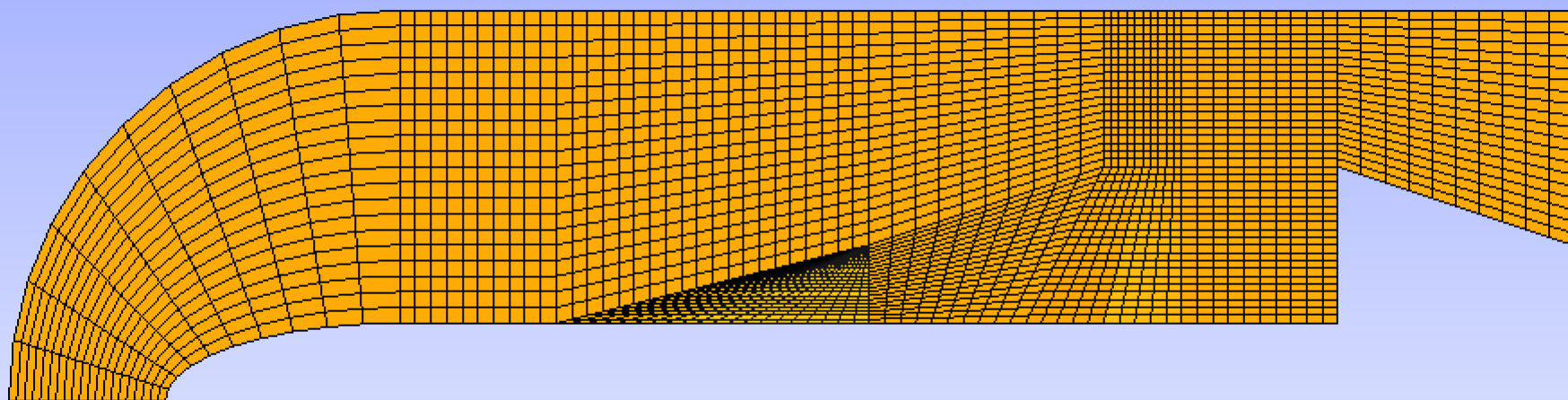
thick 0.05
Total sweeping elements 60

Node coordinates
node: quad 4 ▼

elex 10
eley 20

Node 1 X1: 1.2 Y1: 0.3
Node 2 X2: 1.5 Y2: 0.2
Node 3 X3: 1.5 Y3: 0.5
Node 4 X4: 1.2 Y4: 0.5





File

Patch
Initial & Boundary conditions

Patch Mesh Generation
View mesh
Assembly blocks

Region Number: 12
Write Mesh
Preview file
Close

Part name:
Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu
0 Straight line

ityb
0 Straight line

slopu (line)
1.0
radius (slopu)
1.0
Parabolic power (slopu):
1.0
X-Axis length (axu):
0.0
Y-Axis length (ayu):
0.0
strux
0
dxumin
0.1
residue
0.0001
factor
0.0

slopb (line)
0.0
radius (slopb)
0.0
Parabolic power (slopb):
0.0
X-Axis length (axb):
0.3
Y-Axis length (ayb):
0.1
strlx
0
dxlmin
0.1
stretch
0
dymn:
0.0
number of wings:
0

☒ Create wings

Cross section:
1 circular arc,

wing location:
0

NACA XXXX
None

☐ Upper wing profile

☐ lower wing profile

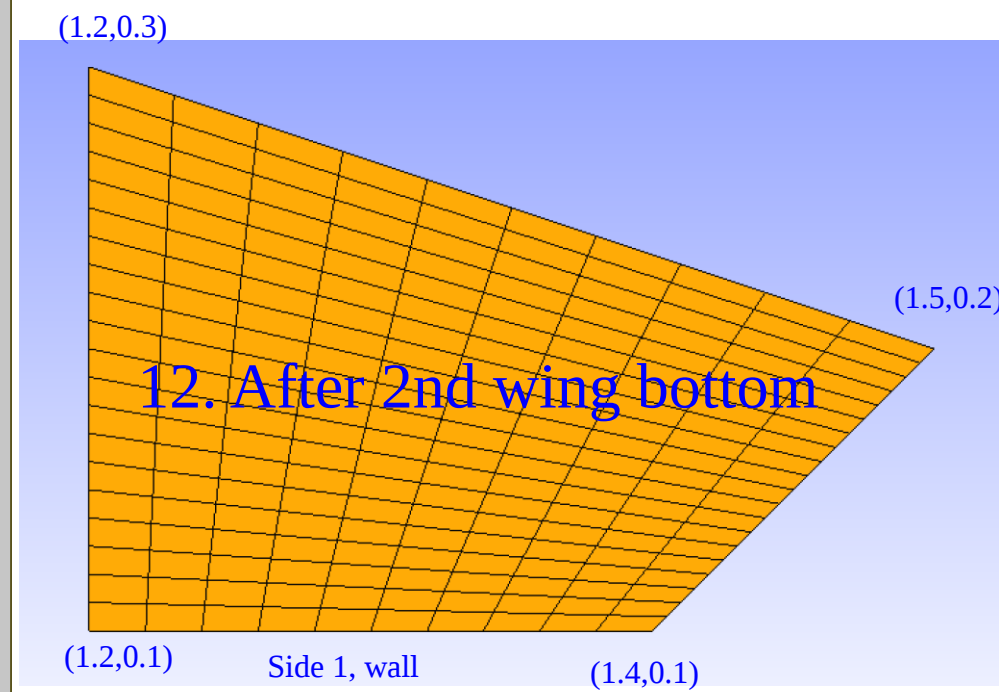
thick
0.05

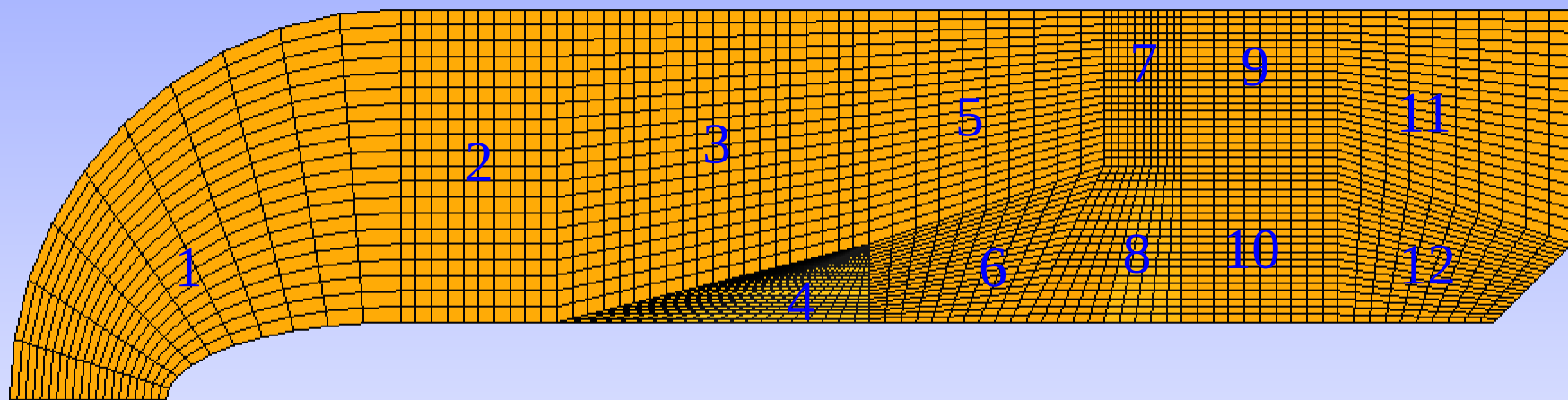
Total sweeping elements
60

Node coordinates
node: quad 4

elex
10
eley
20

Node 1	X1:	1.2	Y1:	0.1
Node 2	X2:	1.4	Y2:	0.1
Node 3	X3:	1.5	Y3:	0.2
Node 4	X4:	1.2	Y4:	0.3





*** Patch - FluSol Patch Mesh Generator: Versio...

File

Patch Initial & Boundary conditions

Patch Mesh Generation

View mesh Assembly blocks

Region Number: 13 Write Mesh Preview file Close

Part name:

Reset Variables:

Upper Curve (Side 3) Lower Curve (Side 1)

ityu 0 Straight line ▼ ityb 0 Straight line ▼

slopu (line) 1.0 slopb (line) 0.0

radius (slopu) 1.0 radius (slopb) 0.0

Parabolic power (slopu): 1.0 Parabolic power (slopb): 0.0

X-Axis length (axu): 0.0 X-Axis length (axb): 0.3

Y-Axis length (ayu): 0.0 Y-Axis length (ayb): 0.1

strux 0 strlx 0

dxumin 0.1 dxlmin 0.1

residue 0.0001 stretch 0

factor 0.0 dymin: 0.0

number of wings: 0

☒ Create wings

Cross section: 1 circular arc, ▼ thick 0.05

wing location: 0 Total sweeping elements 60

NACA XXXX None

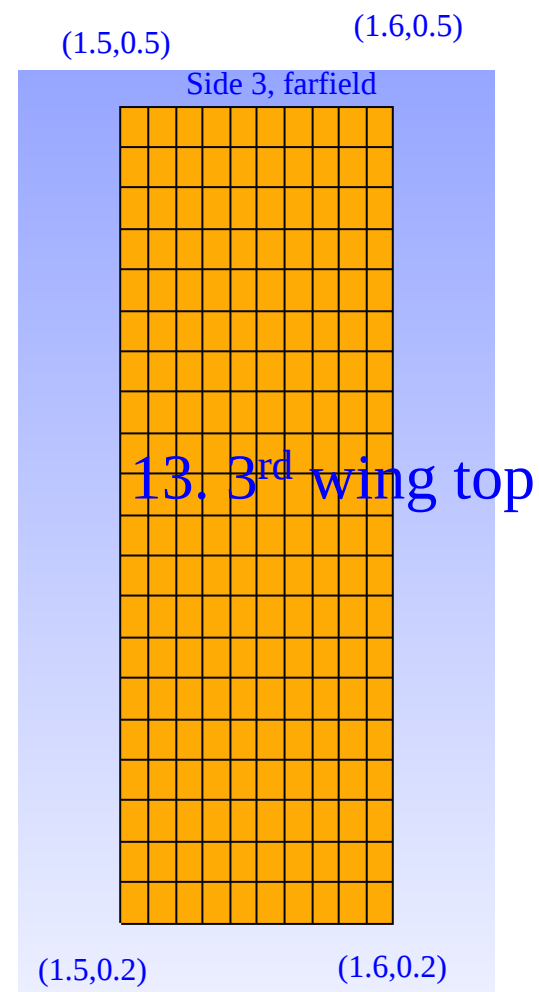
☐ Upper wing profile

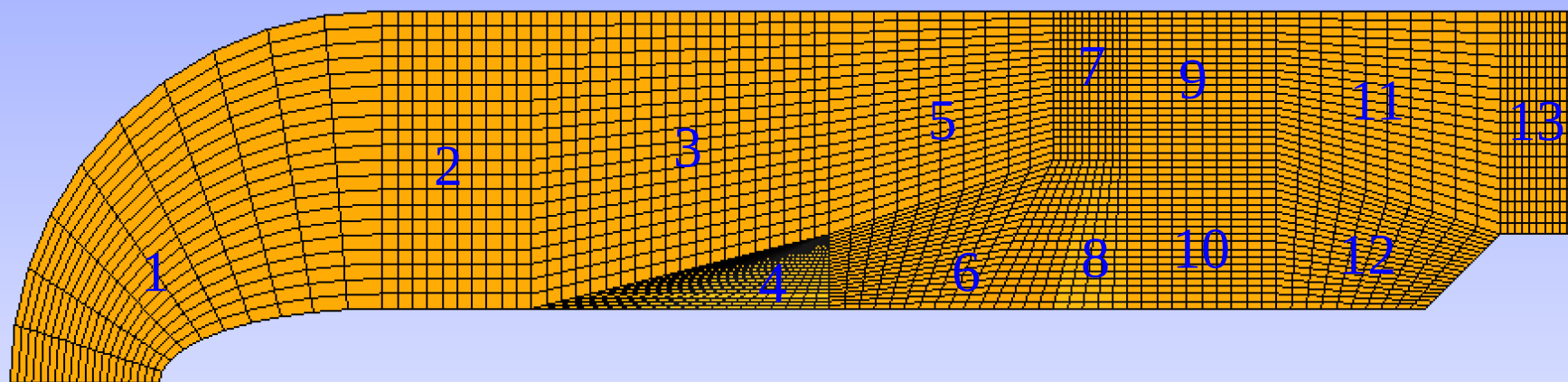
☐ lower wing profile

Node coordinates

node: quad 4 ▼

	elex		eley		
Node 1	X1:	1.5	Y1:	0.2	
Node 2	X2:	1.6	Y2:	0.2	
Node 3	X3:	1.6	Y3:	0.5	
Node 4	X4:	1.5	Y4:	0.5	





File

Patch initial & Boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number: 14

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu 0 Straight line ▼ ityb 0 Straight line ▼

slopu (line) 1.0 slopb (line) 0.0

radius (slopu) 1.0 radius (slopb) 0.0

Parabolic power (slopu): 1.0 Parabolic power (slopb): 0.0

X-Axis length (axu): 0.0 X-Axis length (axb): 0.3

Y-Axis length (ayu): 0.0 Y-Axis length (ayb): 0.1

strux 0 strlx 0

dxumin 0.1 dxlmin 0.1

residue 0.0001 stretch 0

factor 0.0 dymin: 0.0

☒ Create wings number of wings: 2

Cross section: 5 NACA XXXX ▼ thick 0.05

wing location: 25 Total sweeping elements 60

NACA XXXX 2412

☐ Upper wing profile

☐ lower wing profile

Node coordinates

node: quad 4 ▼

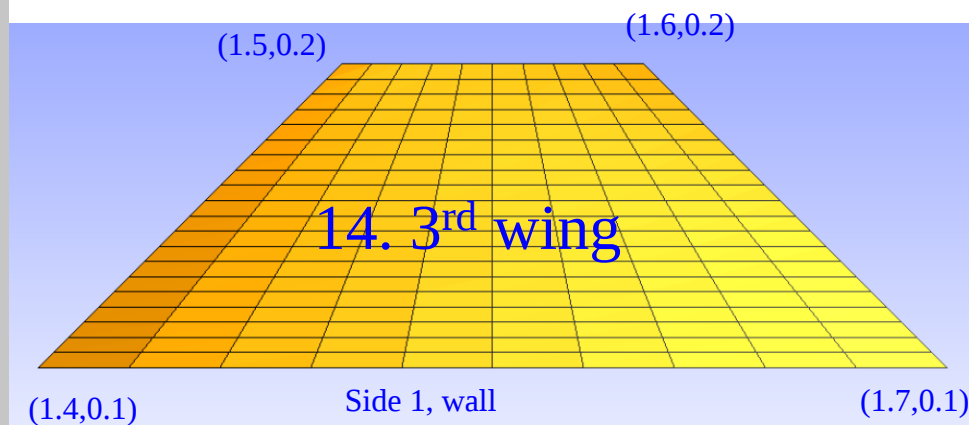
elex 10 eley 20

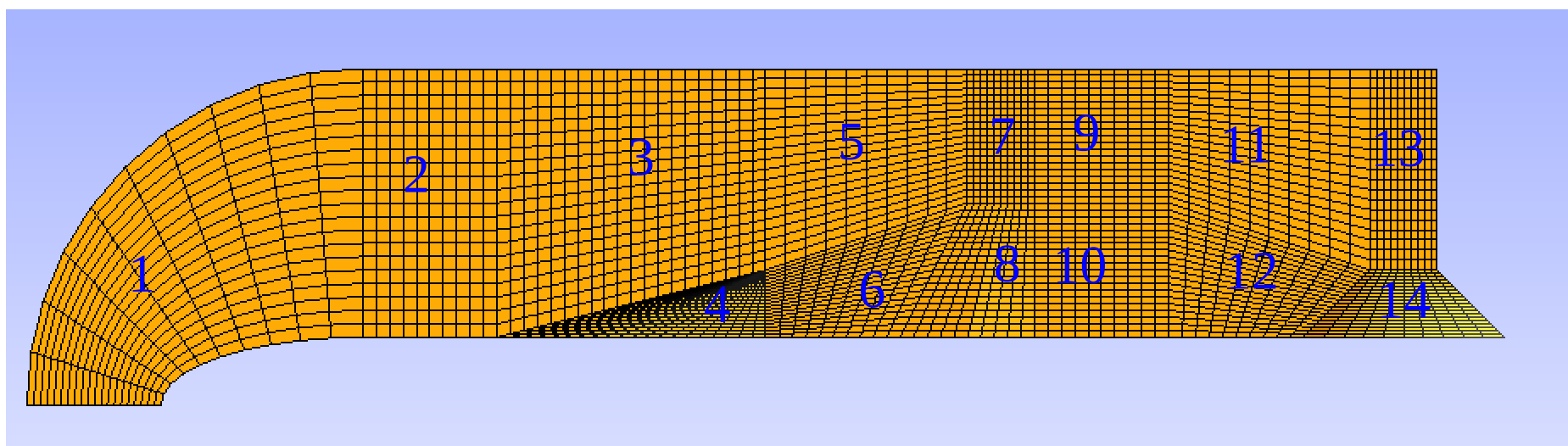
Node 1 X1: 1.4 Y1: 0.1

Node 2 X2: 1.7 Y2: 0.1

Node 3 X3: 1.6 Y3: 0.2

Node 4 X4: 1.5 Y4: 0.2





File

Patch initial & Boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number: 15

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu 0 Straight line ▼ ityb 0 Straight line ▼

slopu (line) 1.0 slopb (line) 0.0

radius (slopu) 1.0 radius (slopb) 0.0

Parabolic power (slopu): 1.0 Parabolic power (slopb): 0.0

X-Axis length (axu): 0.0 X-Axis length (axb): 0.3

Y-Axis length (ayu): 0.0 Y-Axis length (ayb): 0.1

strux 0 strlx 0

dxumin 0.1 dxlmin 0.1

residue 0.0001 stretch 0

factor 0.0 dymin: 0.0

☒ Create wings number of wings: 2

Cross section: 1 circular arc, ▼ thick 0.05

wing location: 0 Total sweeping elements 60

NACA XXXX None

☐ Upper wing profile☐ lower wing profile

Node coordinates

node: quad 4 ▼

elex 10 eley 20

Node 1 X1: 1.6 Y1: 0.2

Node 2 X2: 2.3 Y2: 0.4

Node 3 X3: 2.3 Y3: 0.5

Node 4 X4: 1.6 Y4: 0.5

(1.6,0.5)

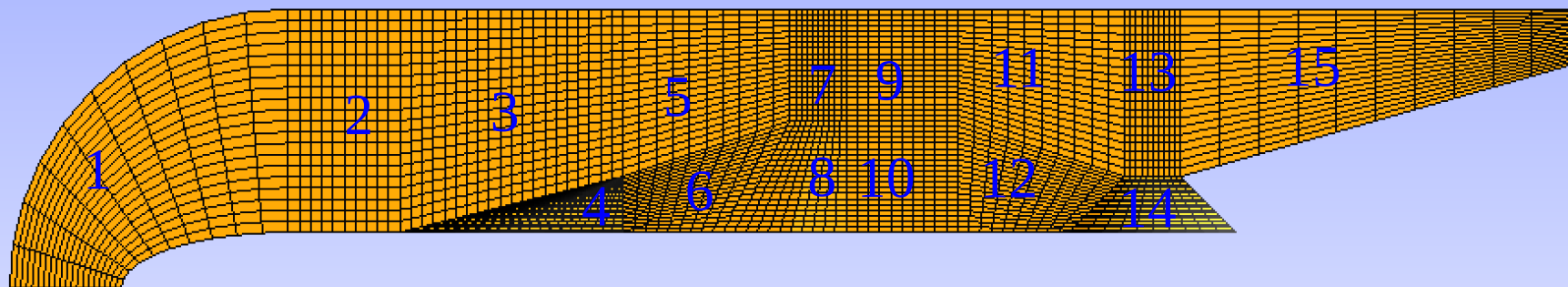
Side 3, farfield

(2.3,0.5)

15. After 3rd wing top

(2.3,0.4)

(1.6,0.2)



File

Patch Initial & Boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number: 16

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu 0 Straight line ▼ ityb 0 Straight line ▼

slopu (line) 1.0 slopb (line) 0.0

radius (slopu) 1.0 radius (slopb) 0.0

Parabolic power (slopu): 1.0 Parabolic power (slopb): 0.0

X-Axis length (axu): 0.0 X-Axis length (axb): 0.3

Y-Axis length (ayu): 0.0 Y-Axis length (ayb): 0.1

strux 0 strlx 0

dxumin 0.1 dxlmin 0.1

residue 0.0001 stretch 0

factor 0.0 dymin: 0.0

☒ Create wings number of wings: 2

Cross section: 1 circular arc, ▼ thick 0.05

wing location: 0 Total sweeping elements 60

NACA XXXX None

☐ Upper wing profile

☐ lower wing profile

Node coordinates

node: quad 4 ▼

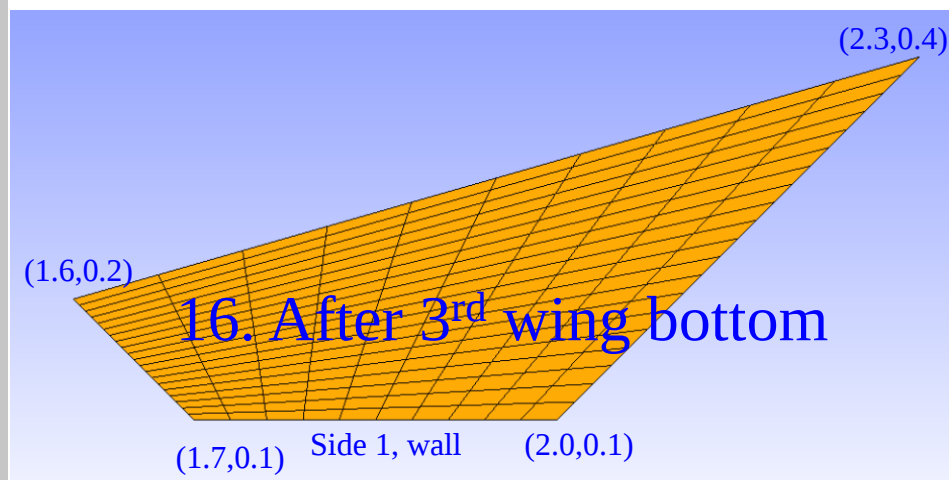
elx 10 eley 20

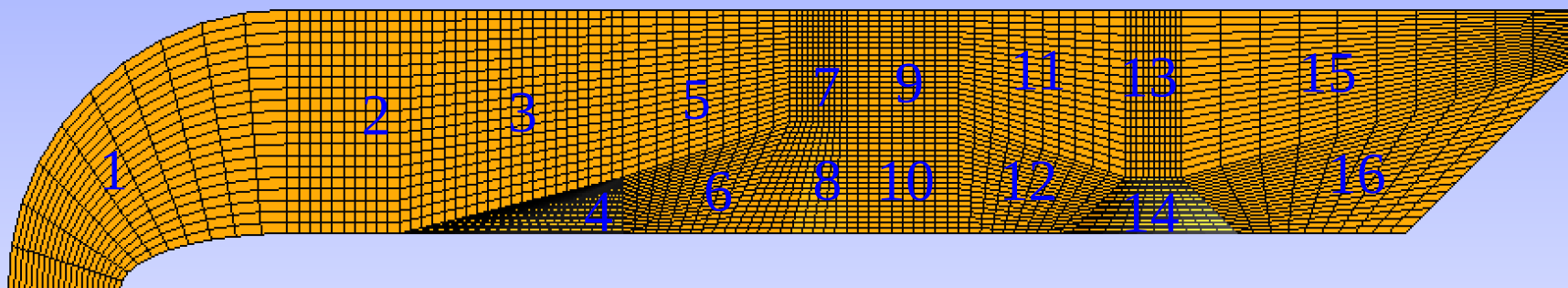
Node 1 X1: 1.7 Y1: 0.1

Node 2 X2: 2.0 Y2: 0.1

Node 3 X3: 2.3 Y3: 0.4

Node 4 X4: 1.6 Y4: 0.2





File

Patch initial & boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number:

17

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu

0 Straight line

ityb

0 Straight line

slopu (line)

1.0

slopb (line)

0.0

radius (slopu)

1.0

radius (slopb)

0.0

Parabolic power (slopu):

1.0

Parabolic power (slopb):

0.0

X-Axis length (axu):

0.0

X-Axis length (axb):

0.3

Y-Axis length (ayu):

0.0

Y-Axis length (ayb):

0.1

strux

0

strlx

0

dxumin

0.1

dxlmin

0.1

residue

0.0001

stretch

0

factor

0.0

dymin:

0.0

☒ Create wings

number of wings:

4

Cross section:

1 circular arc.

thick

0.05

wing location:

12

Total sweeping elements

60

NACA XXXX

None

☐ Upper wing profile

☐ lower wing profile

Node coordinates

node:

quad 4

elx

10

eley

20

Node 1

X1:

2.0

Y1:

0.1

Node 2

X2:

2.5

Y2:

0.1

Node 3

X3:

2.3

Y3:

0.4

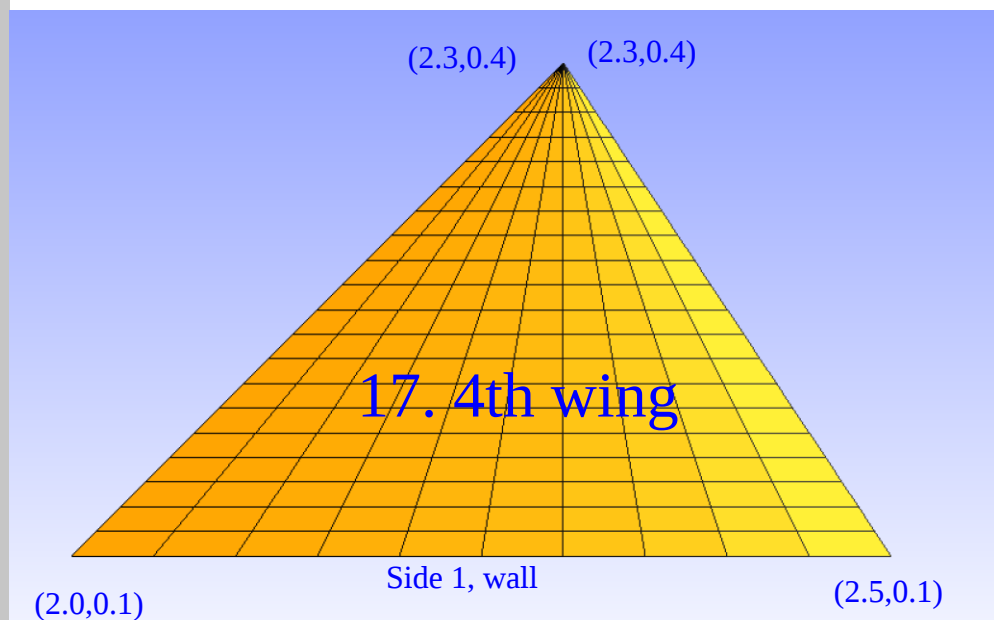
Node 4

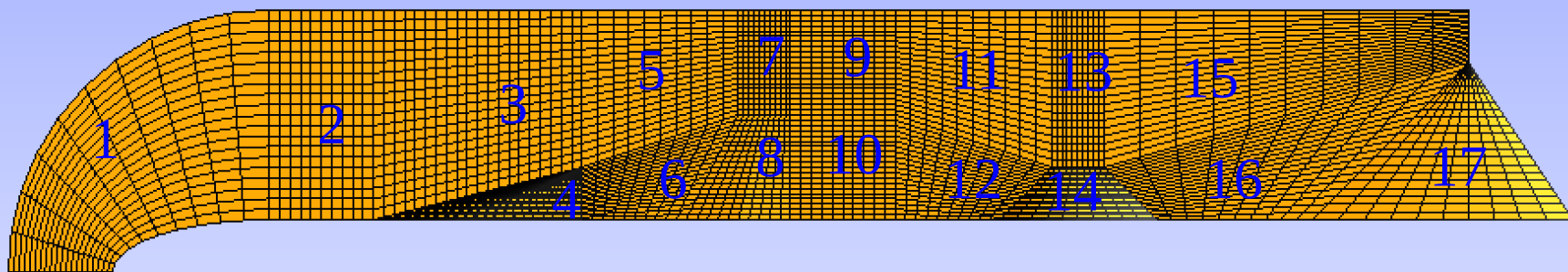
X4:

2.3

Y4:

0.4





File

Patch Initial & Boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number: 18

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu 0 Straight line ▼ ityb 0 Straight line ▼

slopu (line) 1.0 slopb (line) 0.0

radius (slopu) 1.0 radius (slopb) 0.0

Parabolic power (slopu): 1.0 Parabolic power (slopb): 0.0

X-Axis length (axu): 0.0 X-Axis length (axb): 0.3

Y-Axis length (ayu): 0.0 Y-Axis length (ayb): 0.1

strux 0 strlx 0

dxumin 0.1 dxlmin 0.1

residue 0.0001 stretch 0

factor 0.0 dymin: 0.0

☒ Create wings number of wings: 3

Cross section: 1 circular arc, ▼ thick 0.05

wing location: 0 Total sweeping elements 60

NACA XXXX None

☐ Upper wing profile

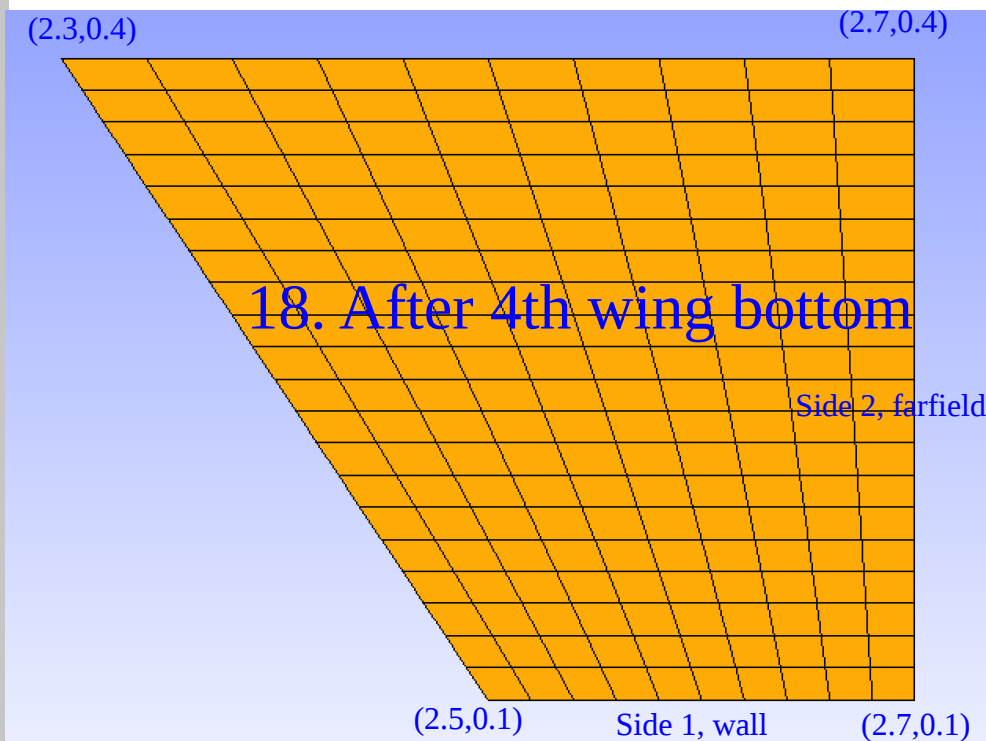
☐ lower wing profile

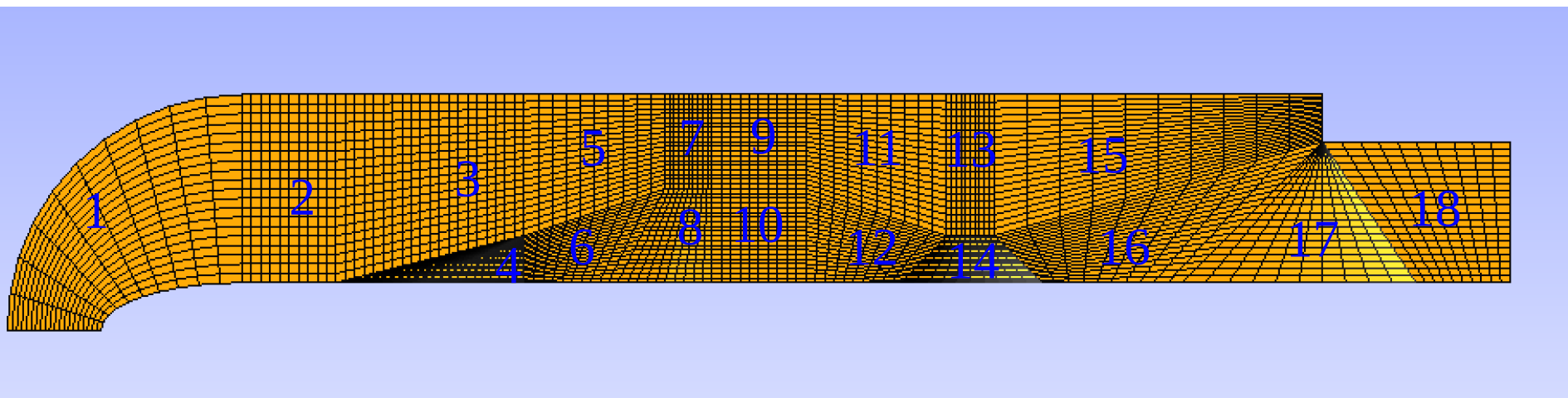
Node coordinates

node: quad 4 ▼

elx 10 eley 20

Node 1	X1:	2.5	Y1:	0.1
Node 2	X2:	2.7	Y2:	0.1
Node 3	X3:	2.7	Y3:	0.4
Node 4	X4:	2.3	Y4:	0.4





File

Patch Initial & Boundary conditions

Patch Mesh Generation

View mesh

Assembly blocks

Region Number:

19

Write Mesh

Preview file

Close

Part name:

Reset Variables:

Upper Curve (Side 3)

Lower Curve (Side 1)

ityu

0 Straight line

ityb

0 Straight line

slopu (line)

1.0

slopb (line)

0.0

radius (slopu)

1.0

radius (slopb)

0.0

Parabolic power (slopu):

1.0

Parabolic power (slopb):

0.0

X-Axis length (axu):

0.0

X-Axis length (axb):

0.3

Y-Axis length (ayu):

0.0

Y-Axis length (ayb):

0.1

strux

0

strlx

0

dxumin

0.1

dxlmin

0.1

residue

0.0001

stretch

0

factor

0.0

dymin:

0.0

☒ Create wings

number of wings:

3

Cross section:

1 circular arc,

thick

0.05

wing location:

0

Total sweeping elements

60

NACA XXXX

None

☐ Upper wing profile

☐ lower wing profile

Node coordinates

node:

quad 4

elx

10

eley

20

Node 1

X1:

2.3

Y1:

0.4

Node 2

X2:

2.7

Y2:

0.4

Node 3

X3:

2.7

Y3:

0.5

Node 4

X4:

2.3

Y4:

0.5

(2.3,0.5)

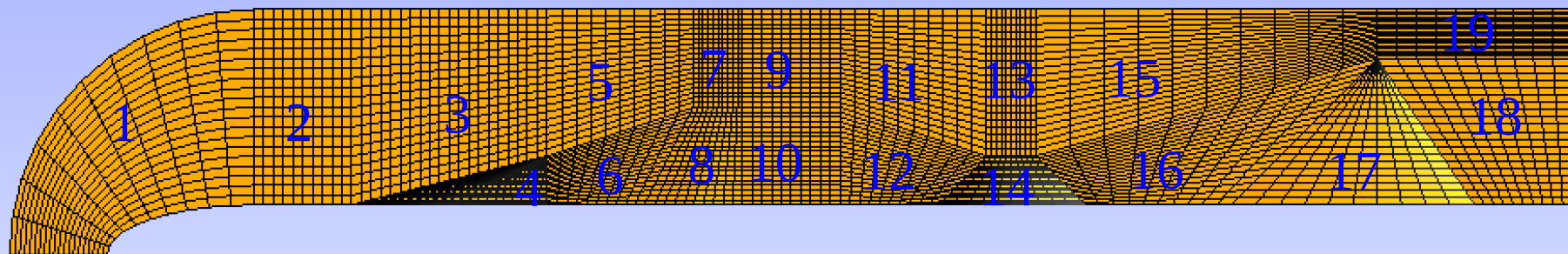
Side 3, farfield

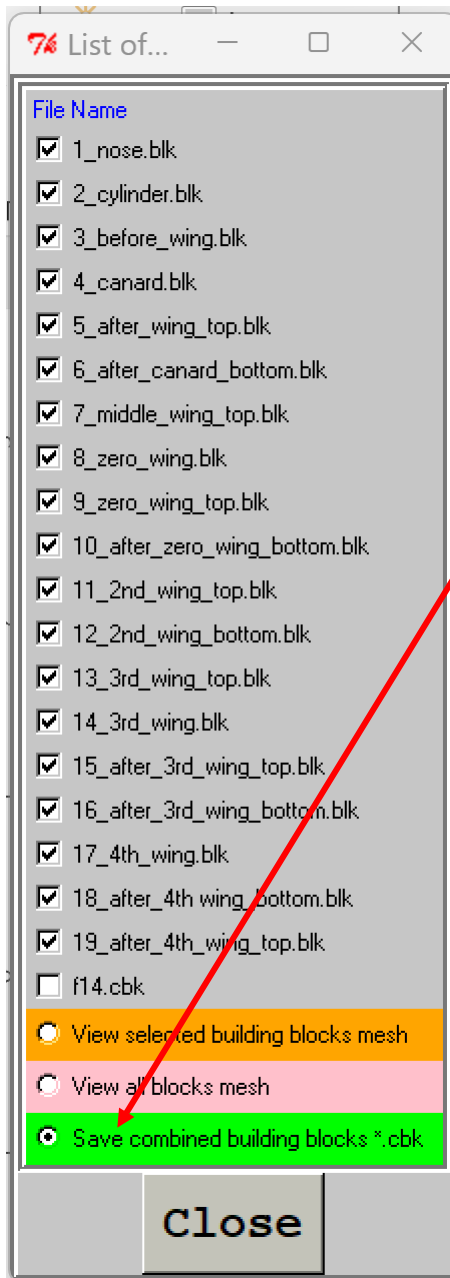
(2.7,0.5)

19. After 4th wing top

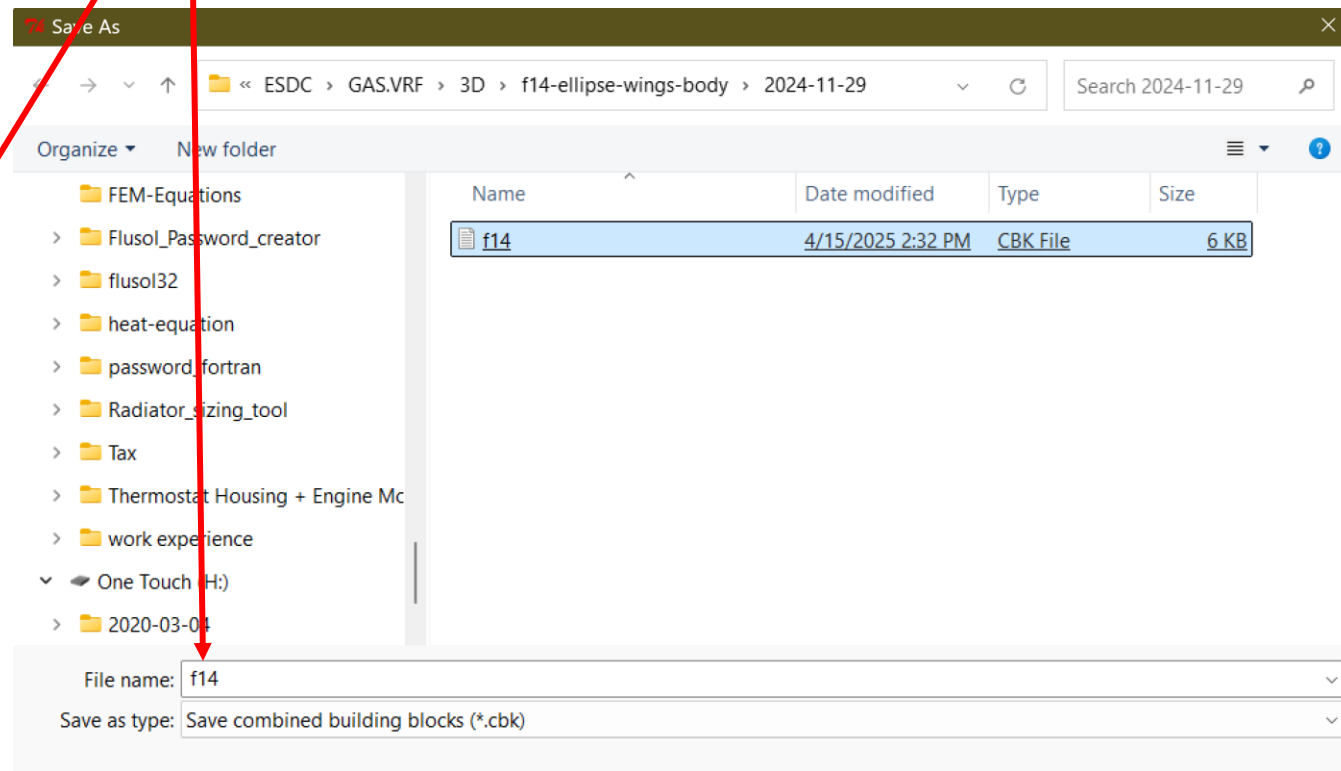
(2.3,0.4)

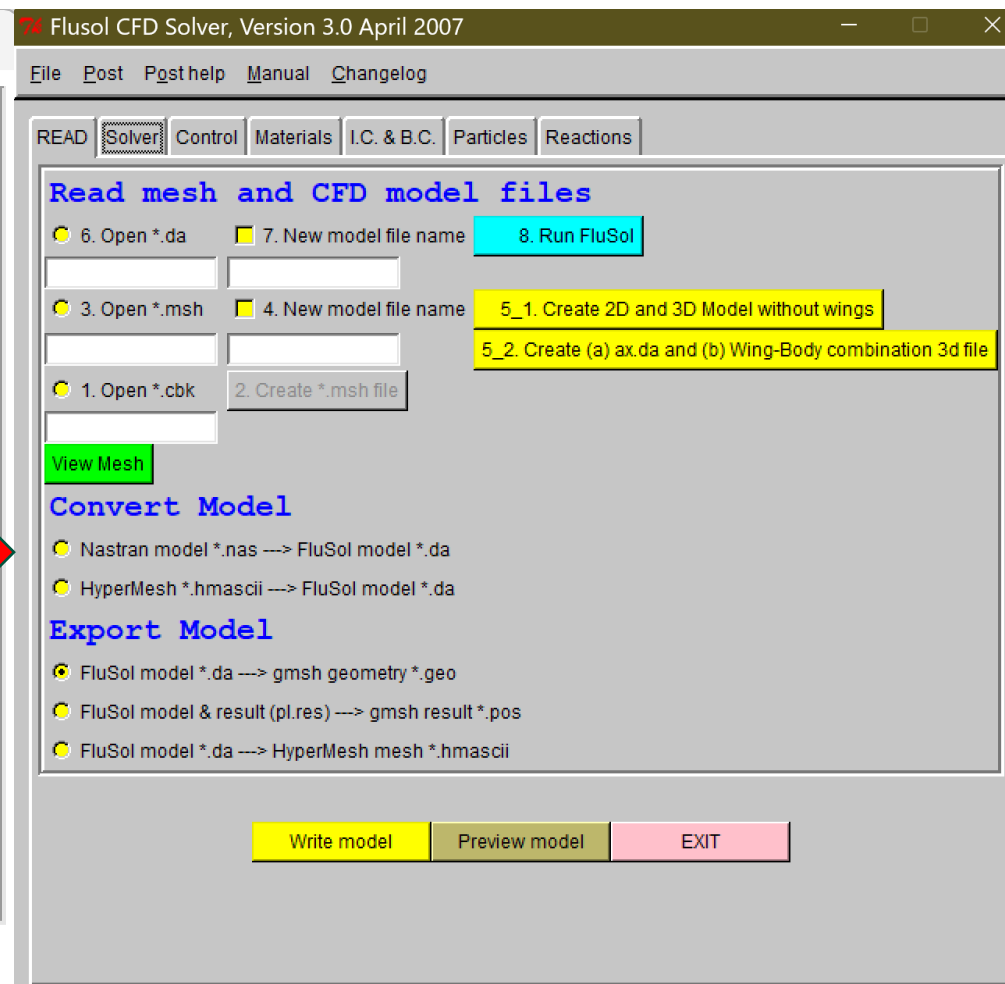
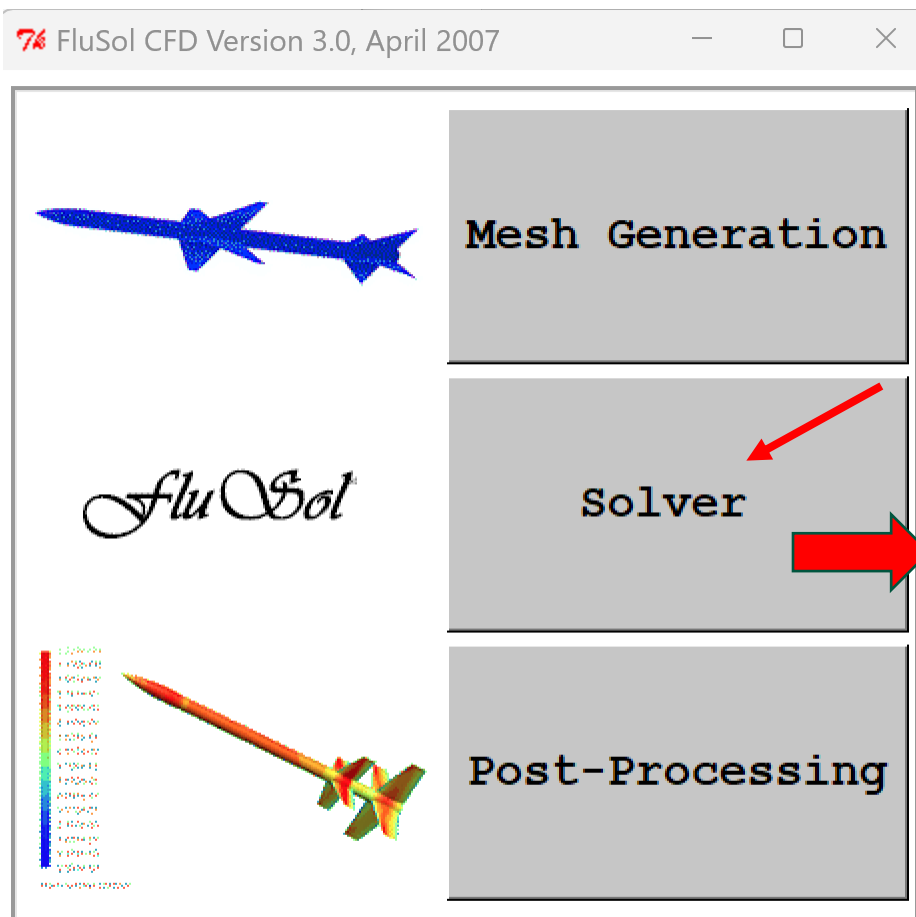
(2.7,0.4)

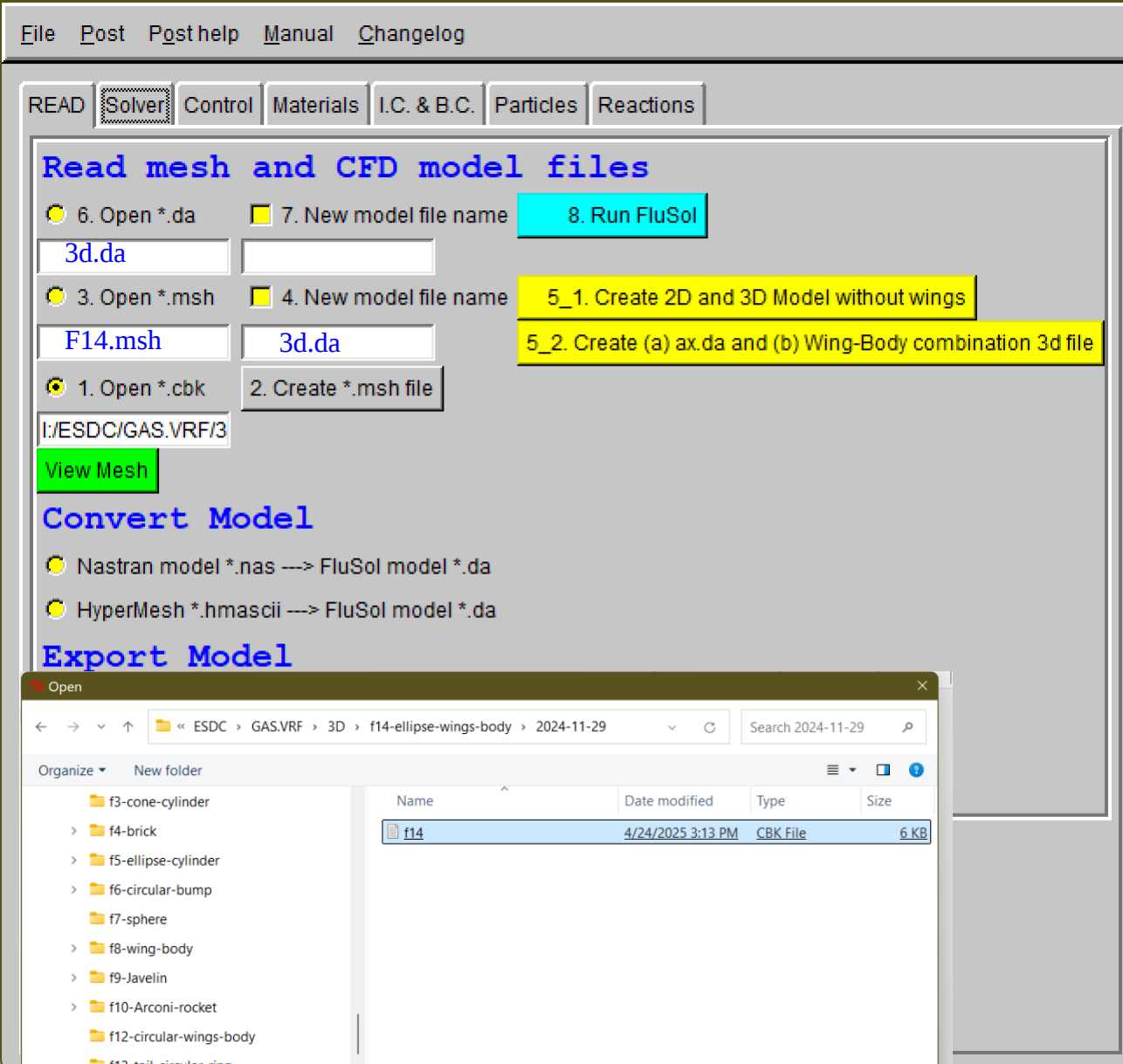




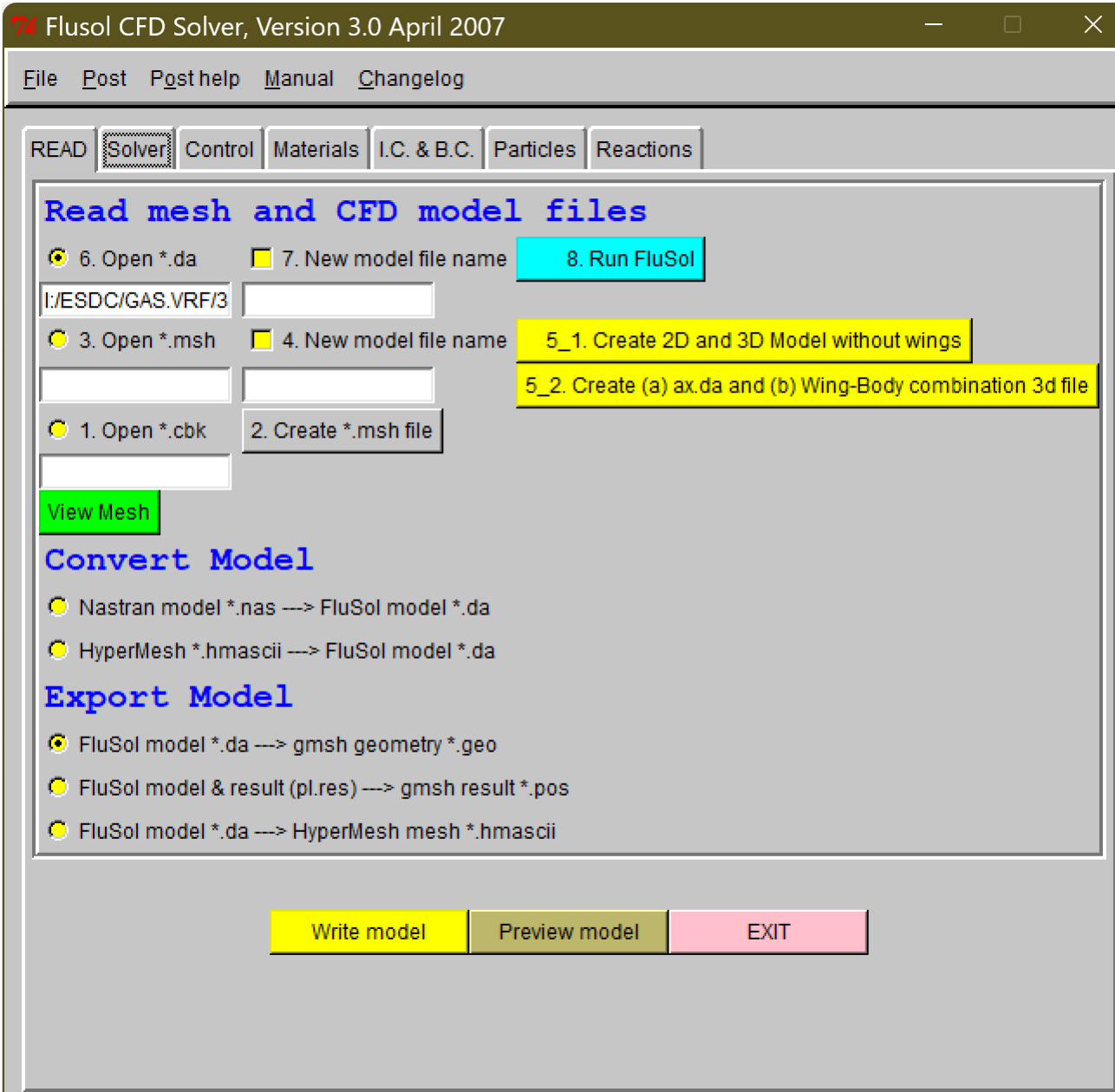
1. Select all .blk file and save as a single file
2. F14.cbk is the file name to store all .blk files



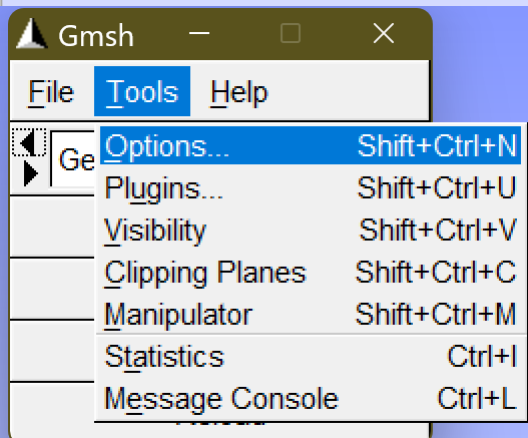
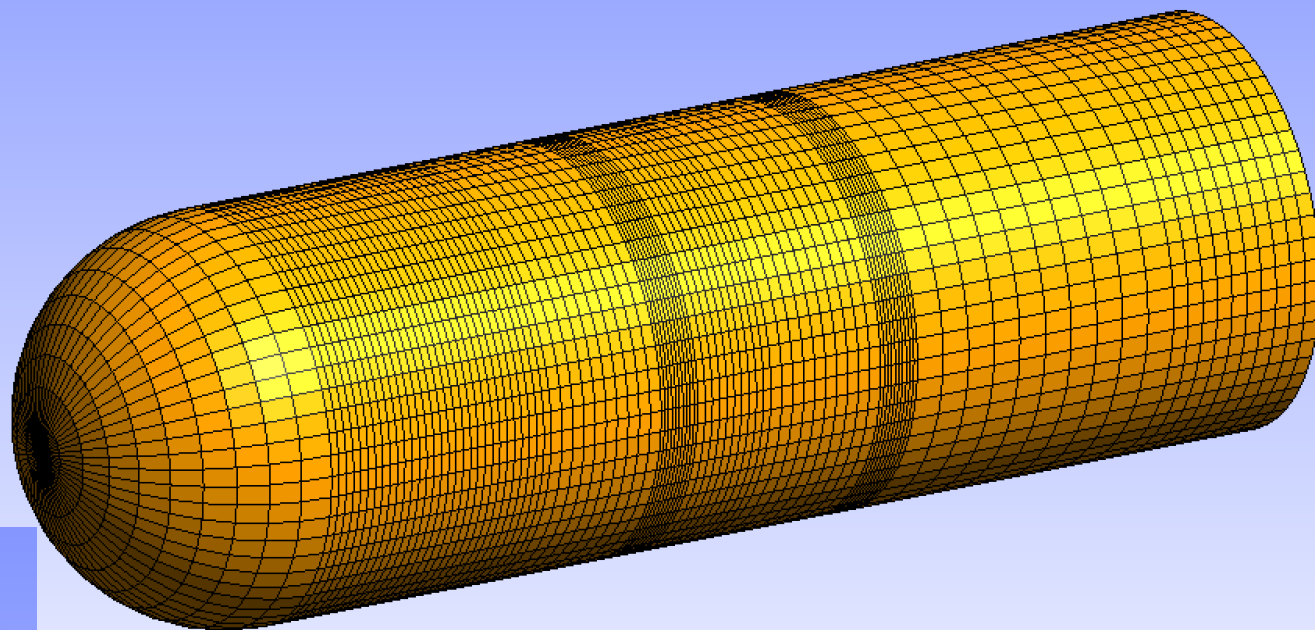
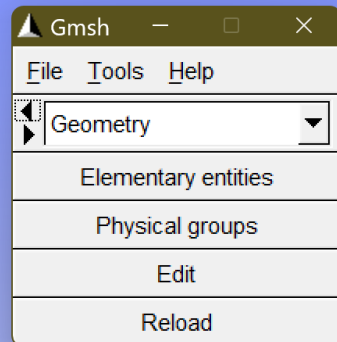


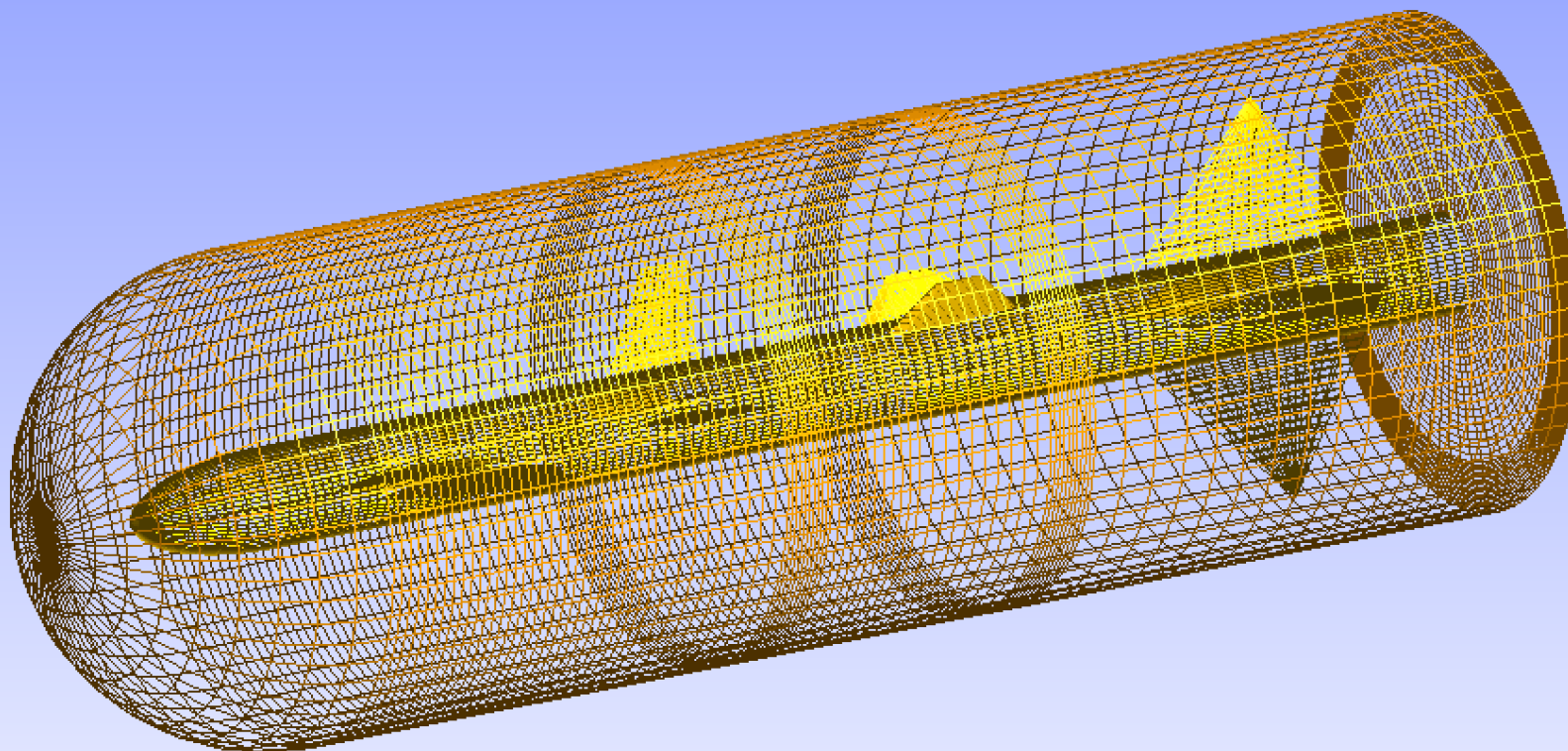
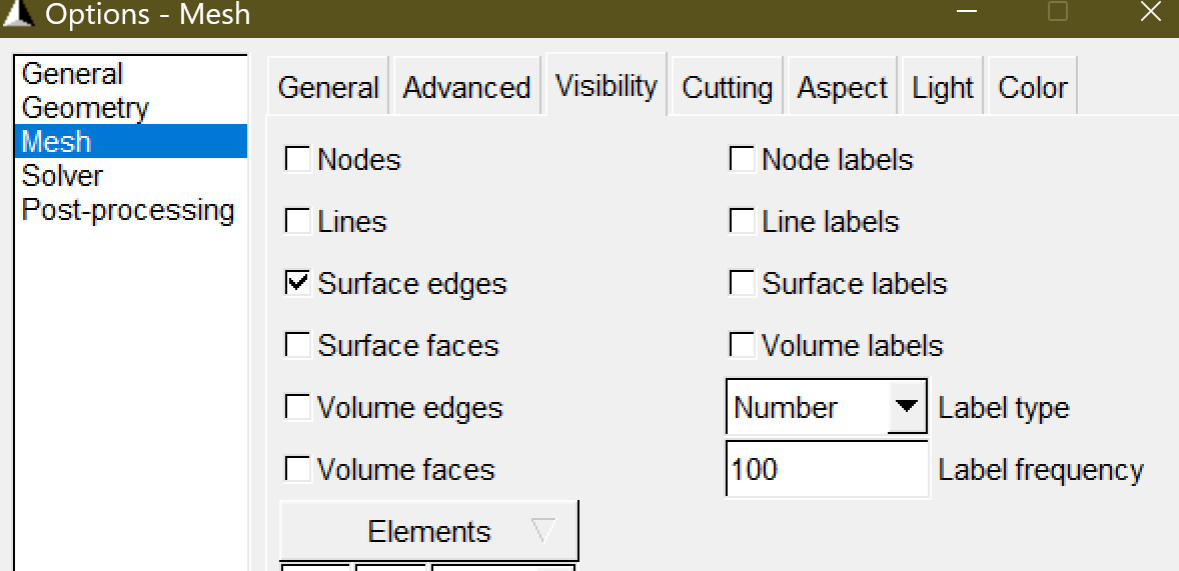


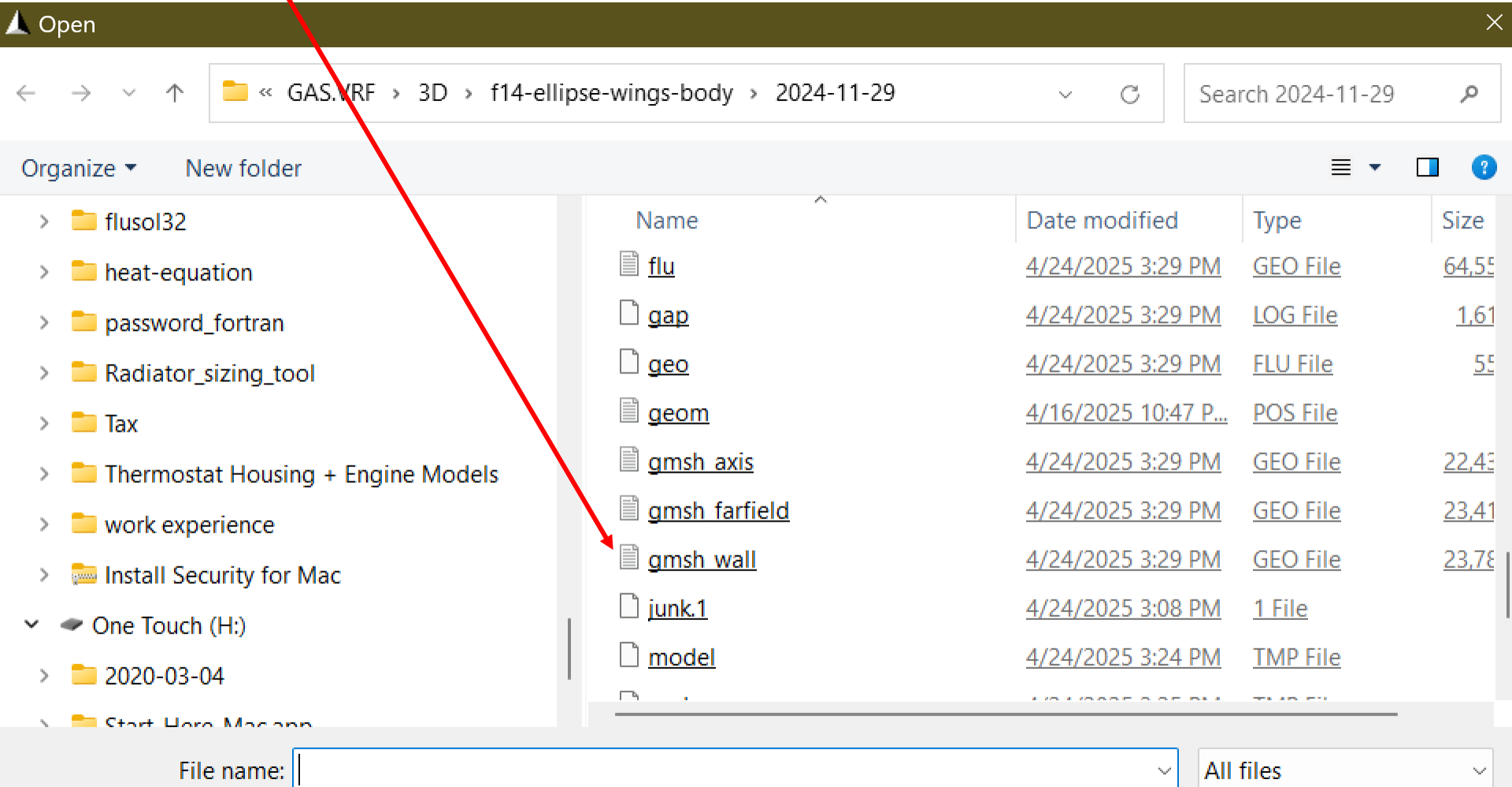
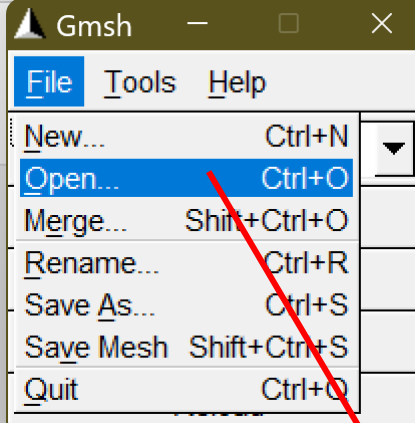
1. Click “1. Open *.cbk” to open the f14.cbk file
2. Click “2.Create *.msh file”
3. Click “3. Open *.msh file” to select f14.msh file
4. Click “4. new model file name” to give 3d.da file name
5. Click “5_2 Create”
6. Then FluSol will generate a 3d.da CFD model file

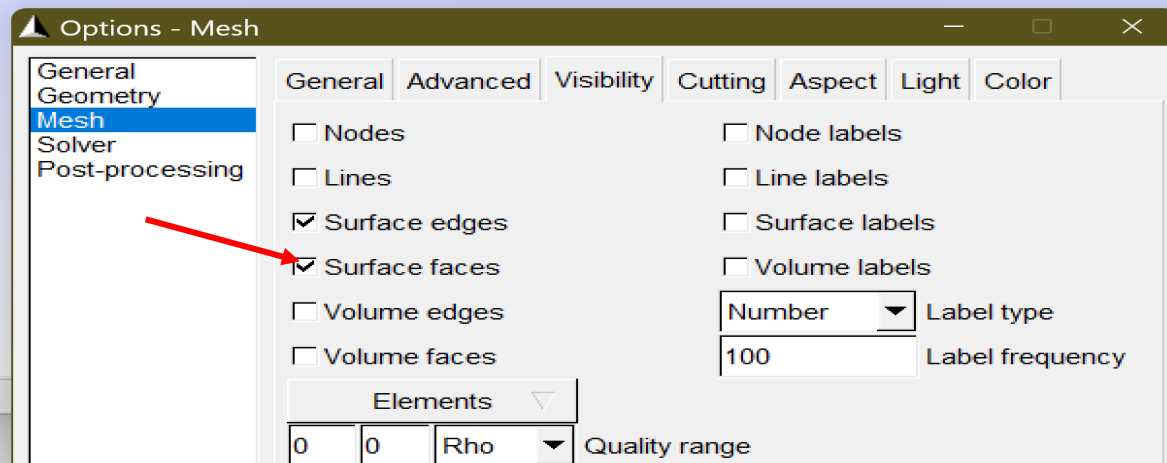
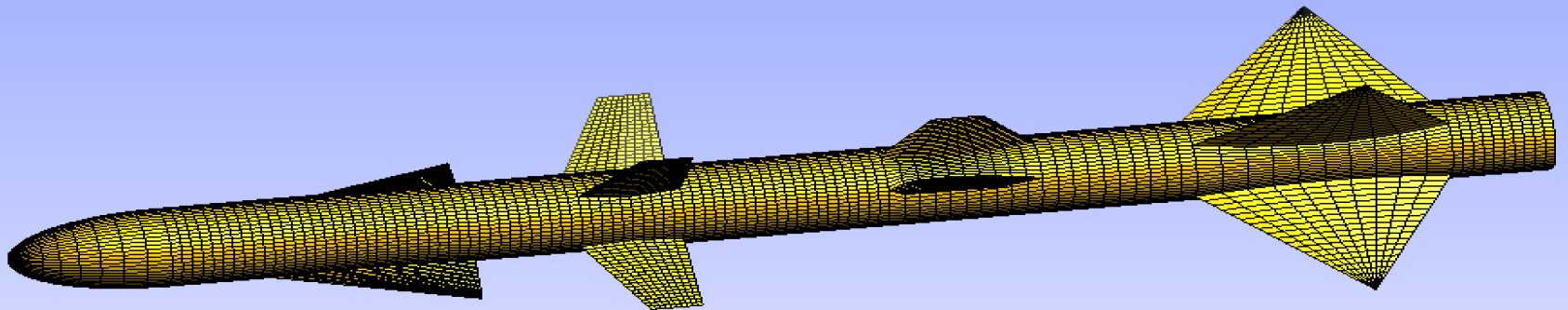
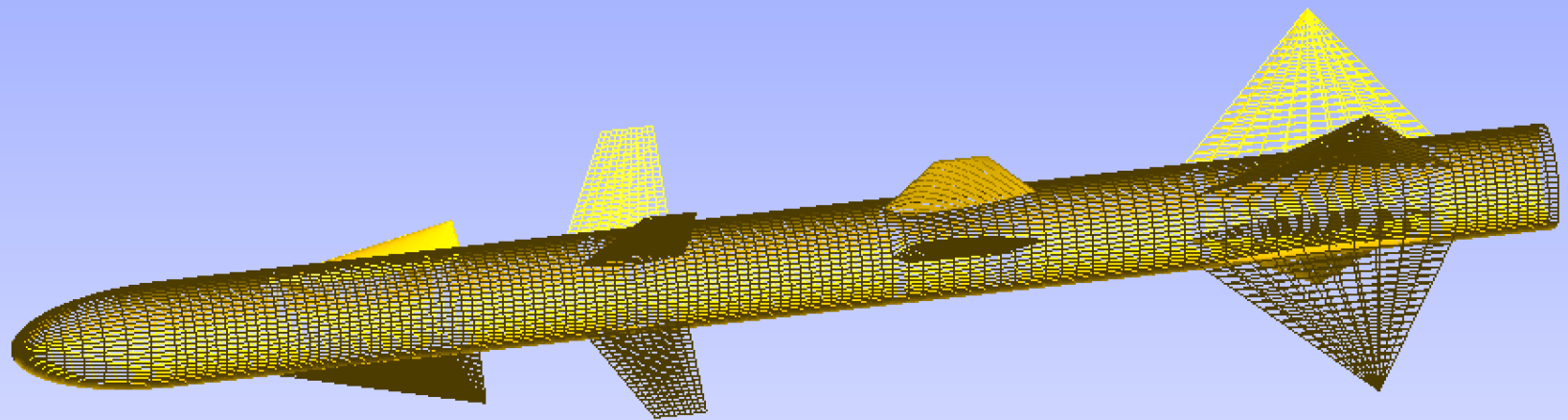


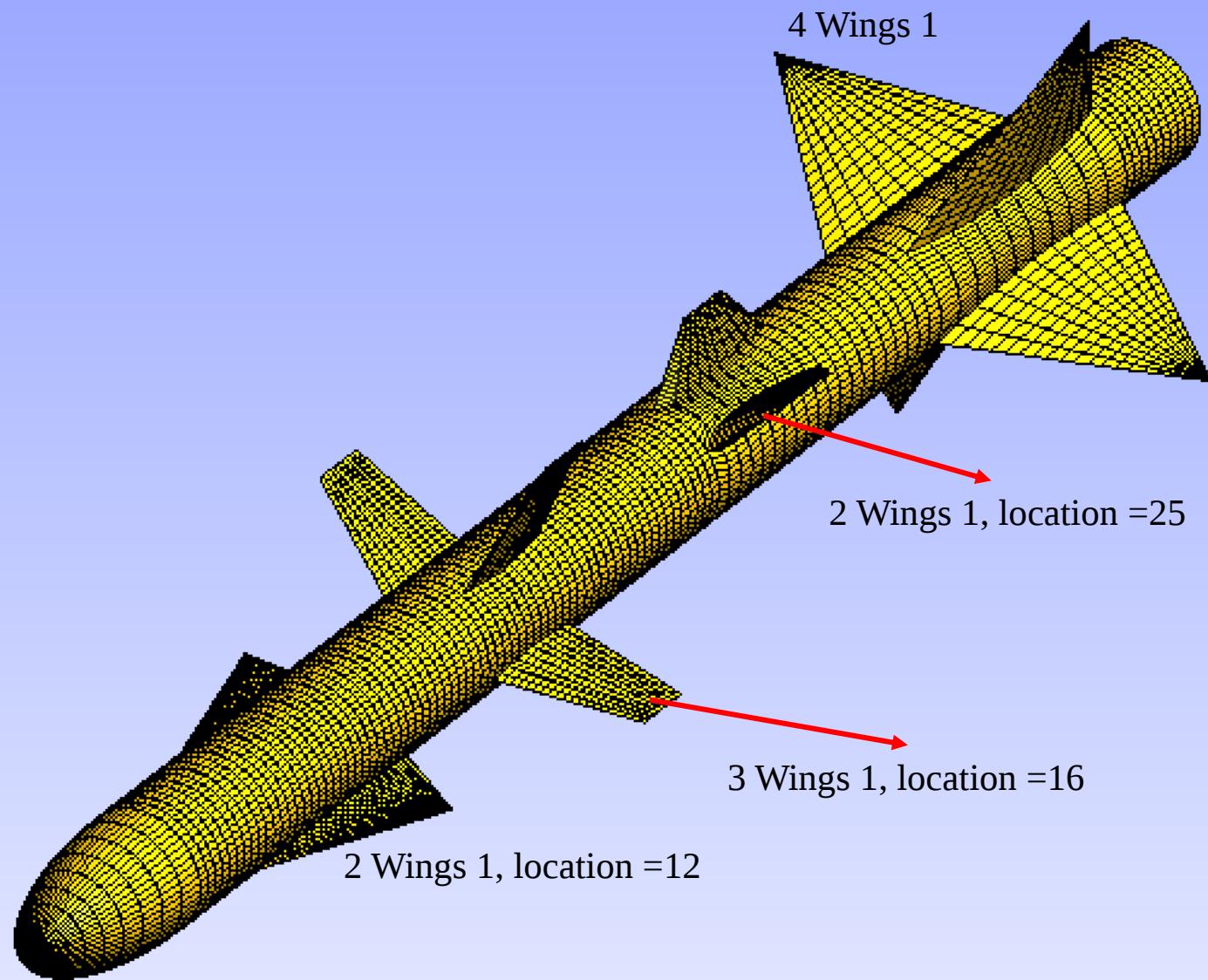
1. Click “6. Open *.da” to open the 3d.da file
2. Click “View Mesh” to see the farfield and solid wall pictures











Solver Block

☒ Title description

3D wings body combination CFD model

Solver	Compressible Flow	▼
Dimension	3D	▼
Arti	pressure	▼
Memory	store in ram	▼
Convert	none	▼
File	flu	

☐ Conical Flow☐ transient☒ Adapt = on☐ Restart= 0 or 1☐ Ishape =0 or 1☐ Save boundary normal☐ Save shape functions☒ Inviscid flow calculation☐ Viscous flow calculation☒ Lift☒ Wall☐ Wing☐ Ele☐ Node☐ Upwind☐ Grid☐ Steady

Flusol CFD Solver, Version 3.0 April 2007

Execution Control Parameters

iter	1500
nprint	1500
npow	1
residue	1.00000e-005
alpha	1.0
dtime	0.00000e+000
fmach	1.00000
refl	1.00000
refu	1.00000
redn	1.00000
repr	0.714285
reft	1.0
rarea	1.0
nfar	local one-dimensional ap ▼

READ Solver Control Materials I.C. & B.C. Particles Reactions

Initial and Boundary Conditions

- ☒ *element type View
- ☐ *mesh View
- ☐ *sweep View
- ☐ *chemical View
- ☐ *plane View
- ☐ *bvlr View
- ☒ *initial conditions View
- ☒ *face of boundary conditions View
- ☒ *boundary conditions View
- ☐ *output control View
- ☐ *ckinitial conditions View
- ☐ *ckbcd conditions View
- ☐ *particle initial View
- ☐ *trace particles View
- ☐ *material property View

Initial Conditions

Initial Conditions							
Begin	End	Increment	Density	ux	vy	wz	pressure
1	261001	1	0.10000E+01	1.19543364	0.104586891	0.00000E+00	0.71428E+00

0 Add Lines Save Cancel

$= 1.2 \cos(5 \text{ degrees}) = 1.19543364$

$= 1.2 \sin(5 \text{ degrees}) = 0.104586891$

File Post Post help Manual Changelog

READ Solver Control Materials I.C. & B.C. Particles Reactions

Read mesh and CFD model files

☒ 6. Open *.da ☐ 7. New model file name **8. Run FluSol**

I:/ESDC/GAS.VRF/3

☒ 3. Open *.msh ☐ 4. New model file name 5_1. Create 2D and 3D Model without wings

 5_2. Create (a) ax.da and (b) Wing-Body combination 3d file

☒ 1. Open *.cbk 2. Create *.msh file

View Mesh

Convert Model

☒ Nastran model *.nas ----> FluSol model *.da

☒ HyperMesh *.hmascii ----> FluSol model *.da

Export Model

☒ FluSol model *.da ----> gmsh geometry *.geo

☒ FluSol model & result (pl.res) ----> gmsh result *.pos

☒ FluSol model *.da ----> HyperMesh mesh *.hmascii

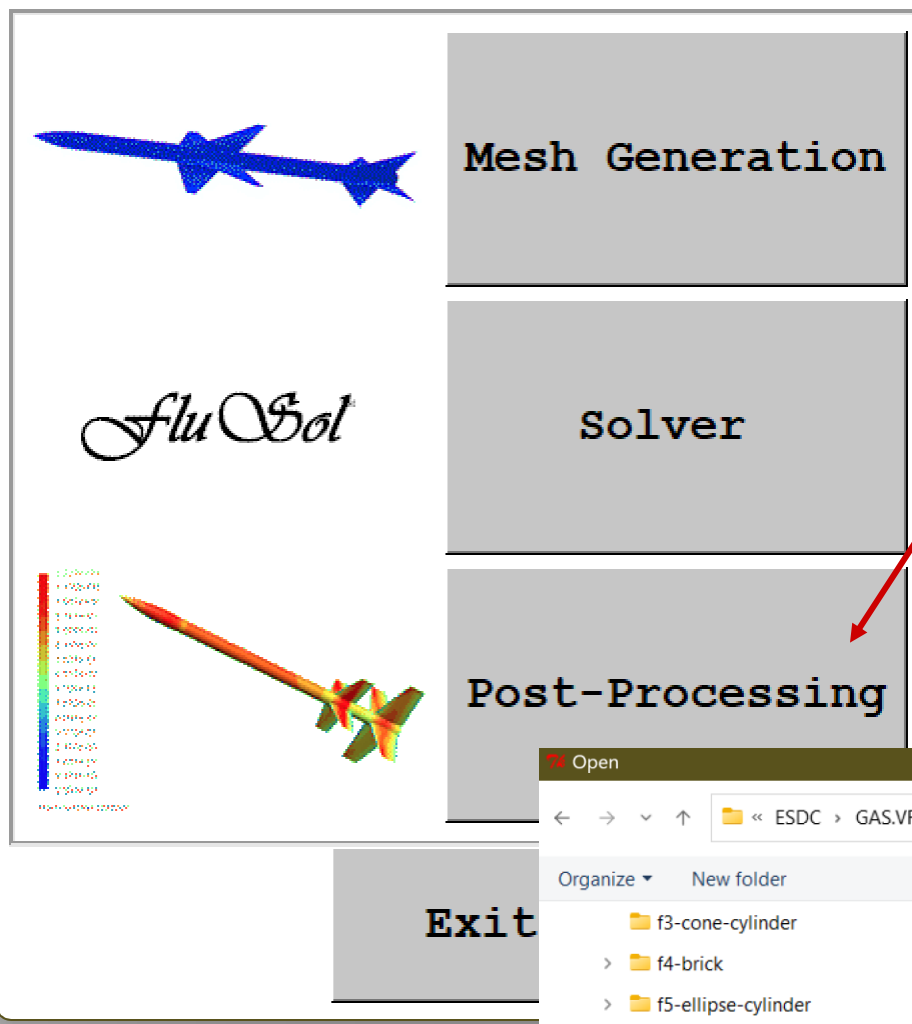
Write model **Preview model** **EXIT**

Click "8. Run Flusol"

```
Capacity Option = 163

-----
----- FluSol -----
----- A General Purpose Fluid Flow Solver -----
----- 3D Computational Fluid Dynamics Program -----
----- Version 1, Jan. 2025 -----
----- (c) Copyright -----
----- Email :contact@cf-d-rocket.com -----
----- Or -----
----- Text : 0911832214 -----
----- Taipei, Taiwan R.O.C -----
-----

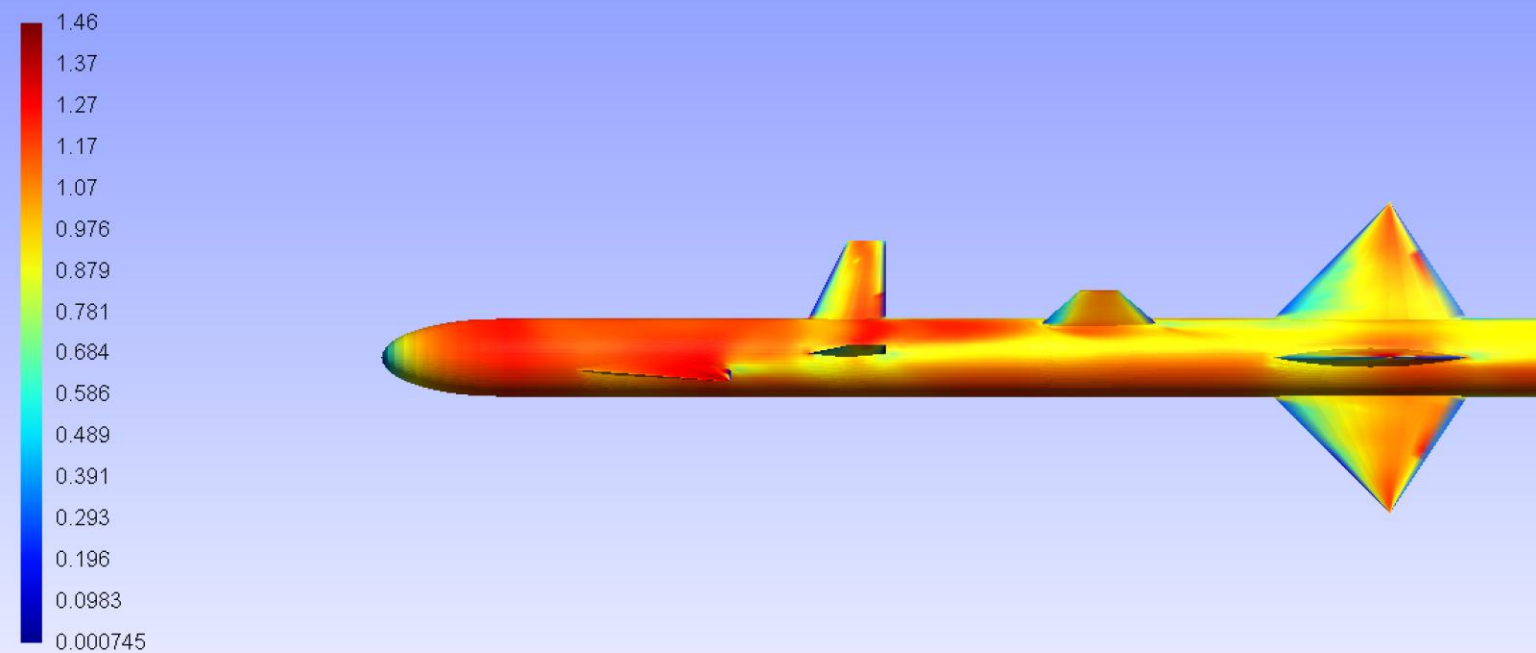
*****
***** Expiration Date: 2025/12/31 *****
*****
```



Click, Post-processing after finishing run

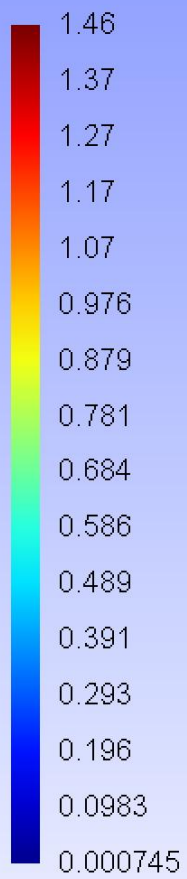
Diagram illustrating the Post-Processing workflow steps:

- (1) Click on the **Post-Processing** button in the main interface.
- (2) In the **Open** dialog, navigate to the folder structure: **ESDC > GAS.VRF > 3D > f14-ellipse-wings-body > 2024-11-29**.
- (3) Select the file **surf_mach_number_00001500** from the file list.
- (4) Click the **Plot** button to generate the post-processed visualization.

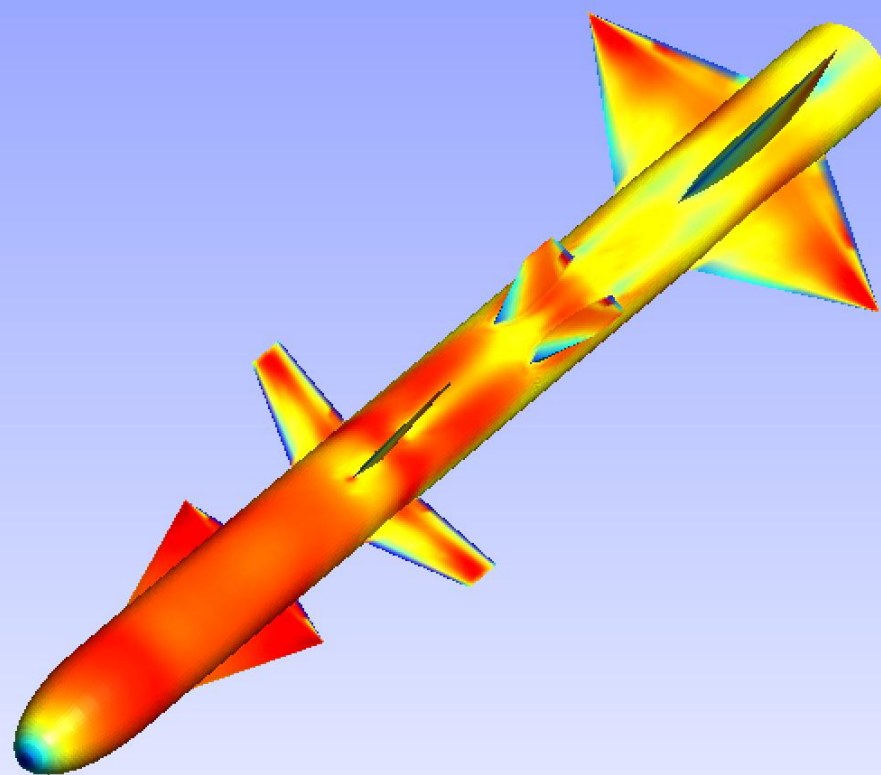


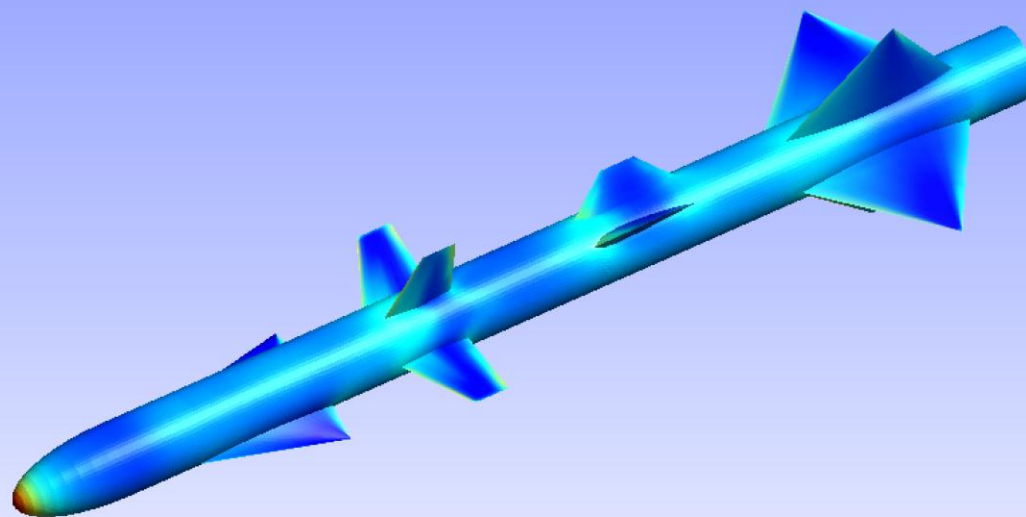
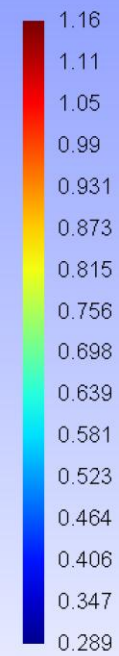
Mach number contour plot

Y
Z X



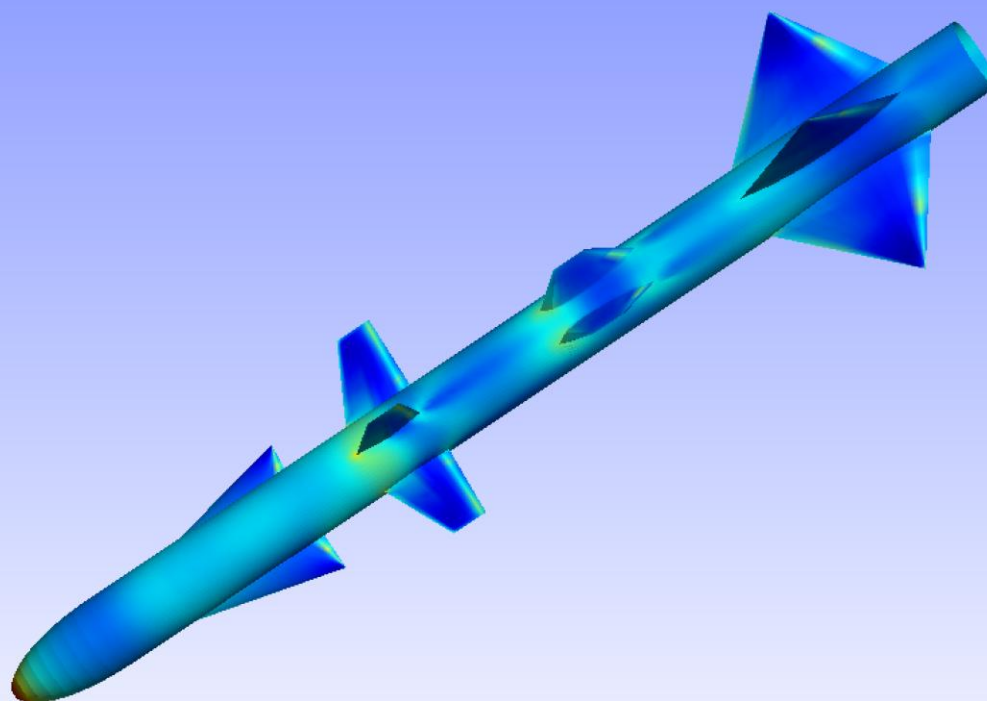
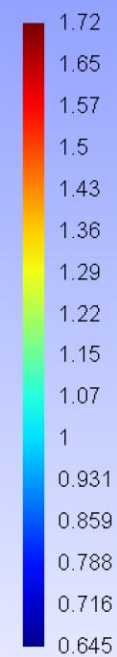
Mach number contour plot





Pressure contour plot





Density contour plot

