Creating a Low Poly Aeroplane Set for Games: Part 1

by Karan Shah 24 Aug 2016

Difficulty: Beginner Length: Long Languages: English

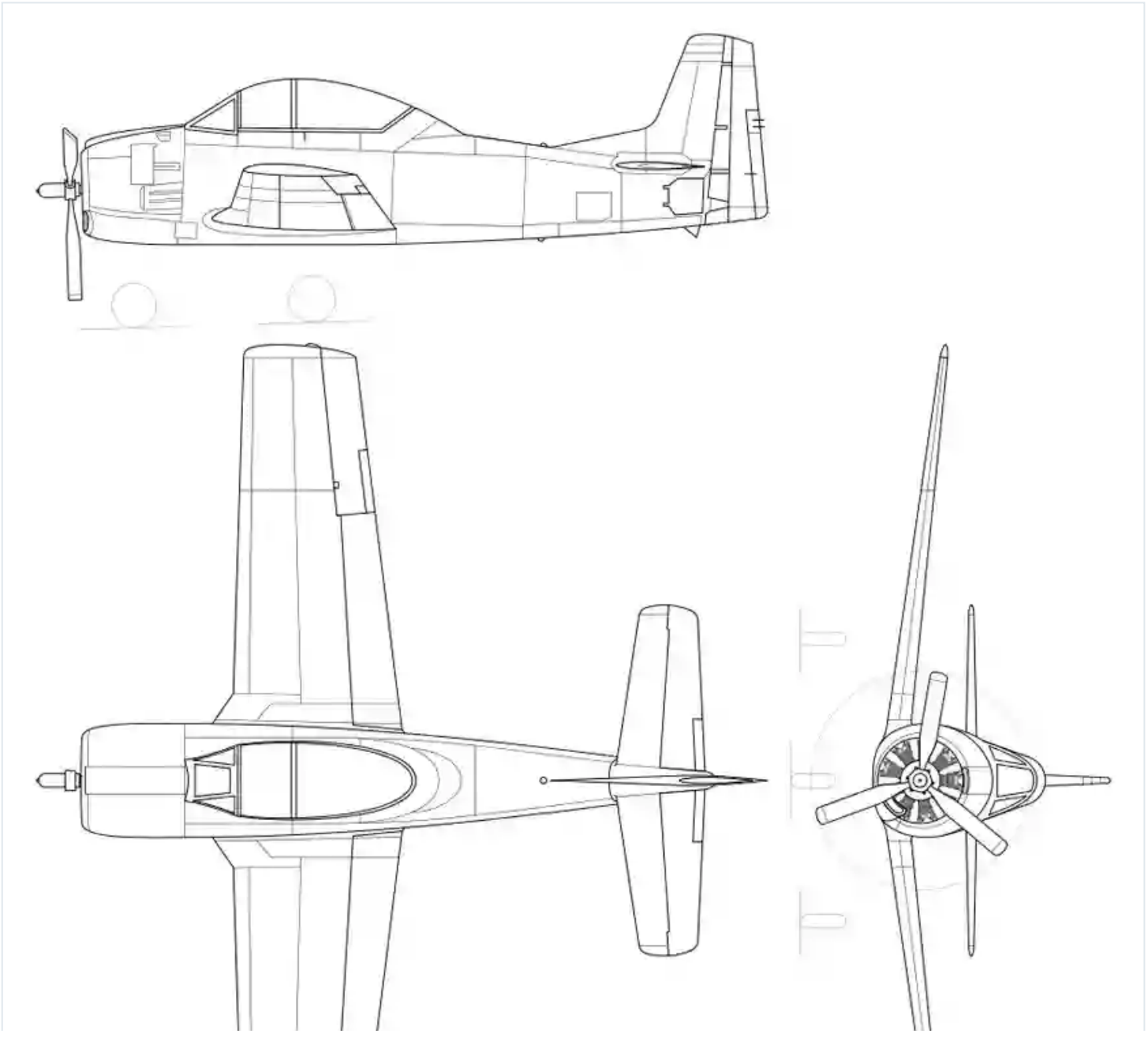
Modeling Blender Game Art

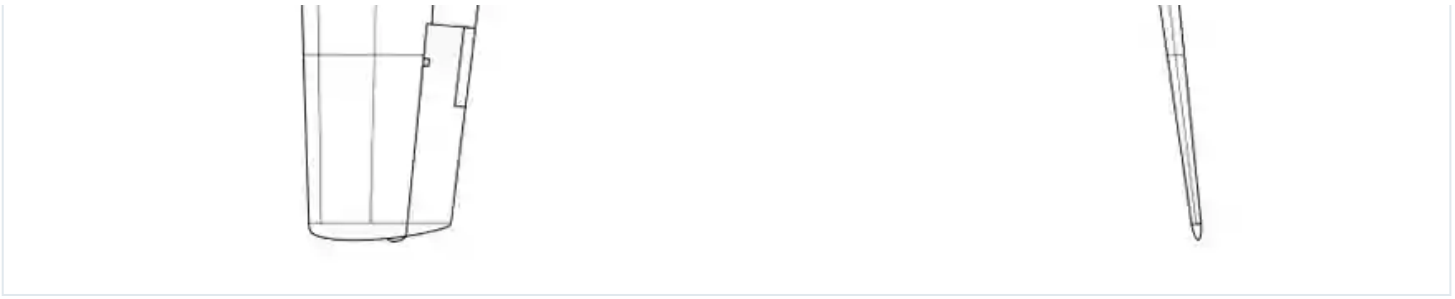
What You'll Be Creating

Setting up Reference Images

Step 1

I used the image from *Kaboldy* via Wikimedia Commons as reference for modelling the plane. You can download it in various resolutions.



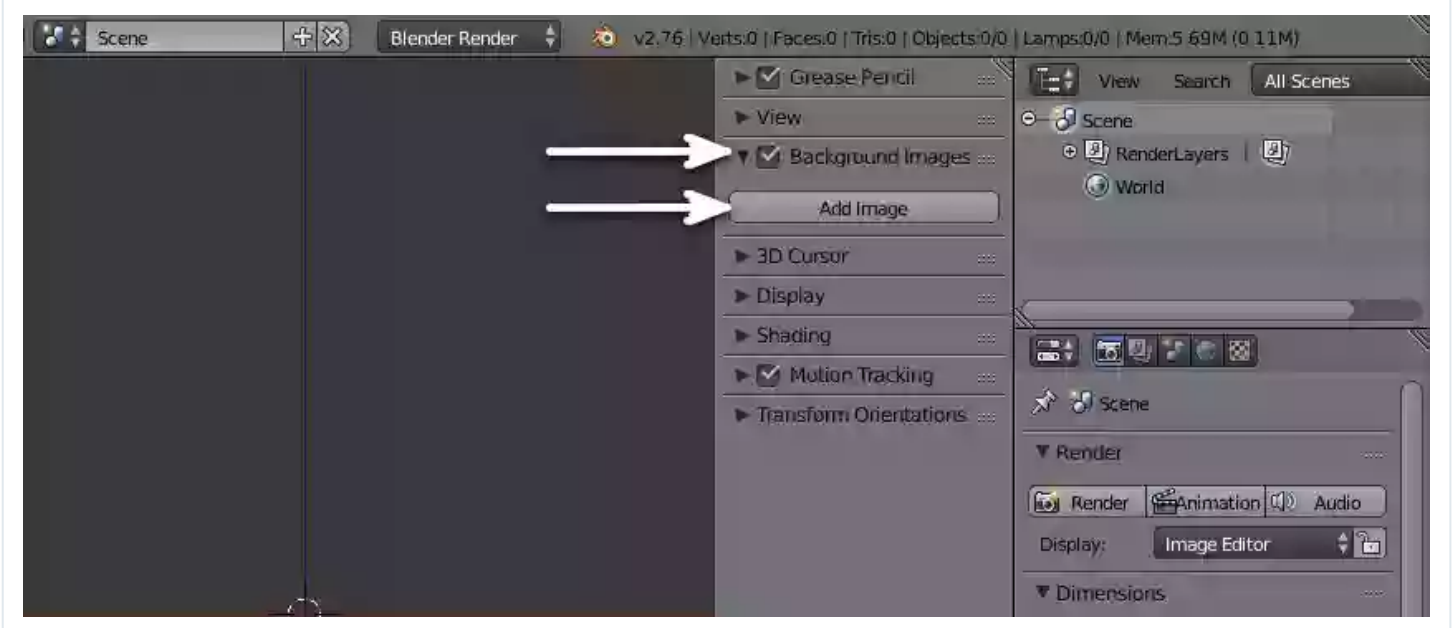


Aeroplane reference image

Step 2

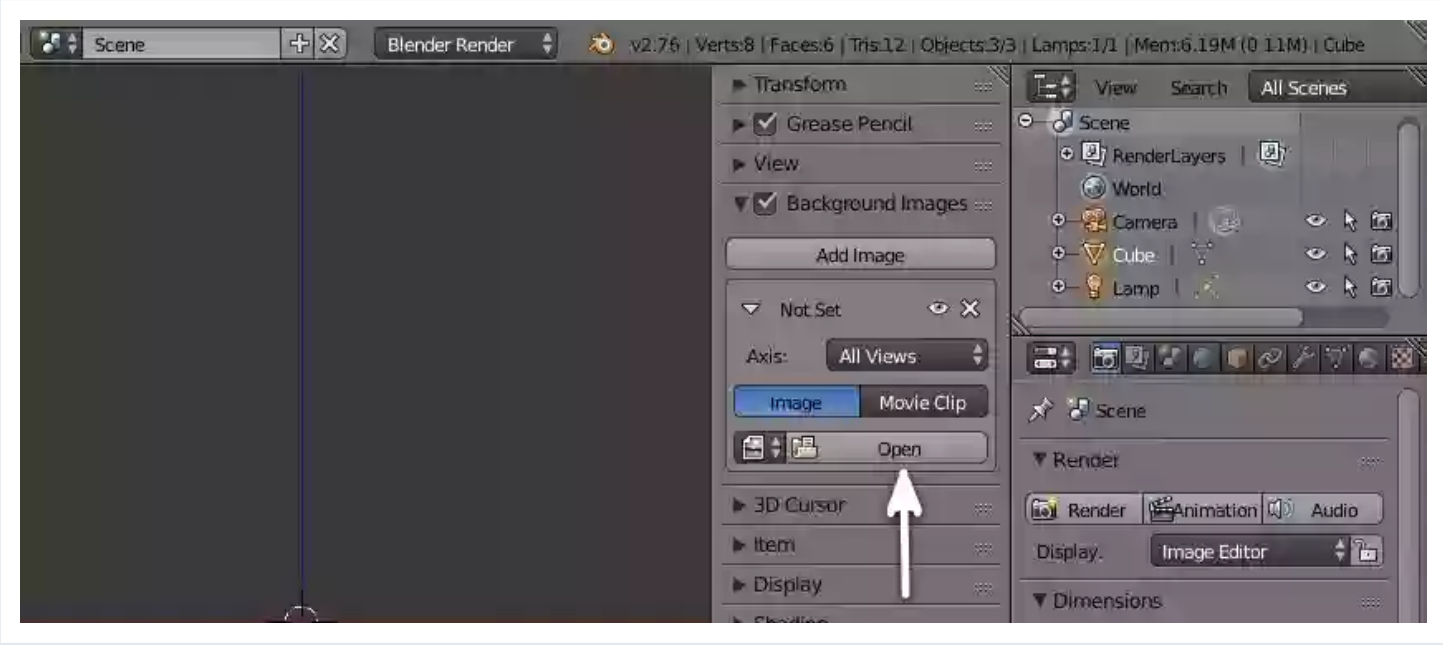
In a new file, press **A** to select all objects and then press **Del** to delete them. Press **N** to bring out the properties panel.

Tick the **Background Images** checkbox and press the **Add Image** button.



Add background image

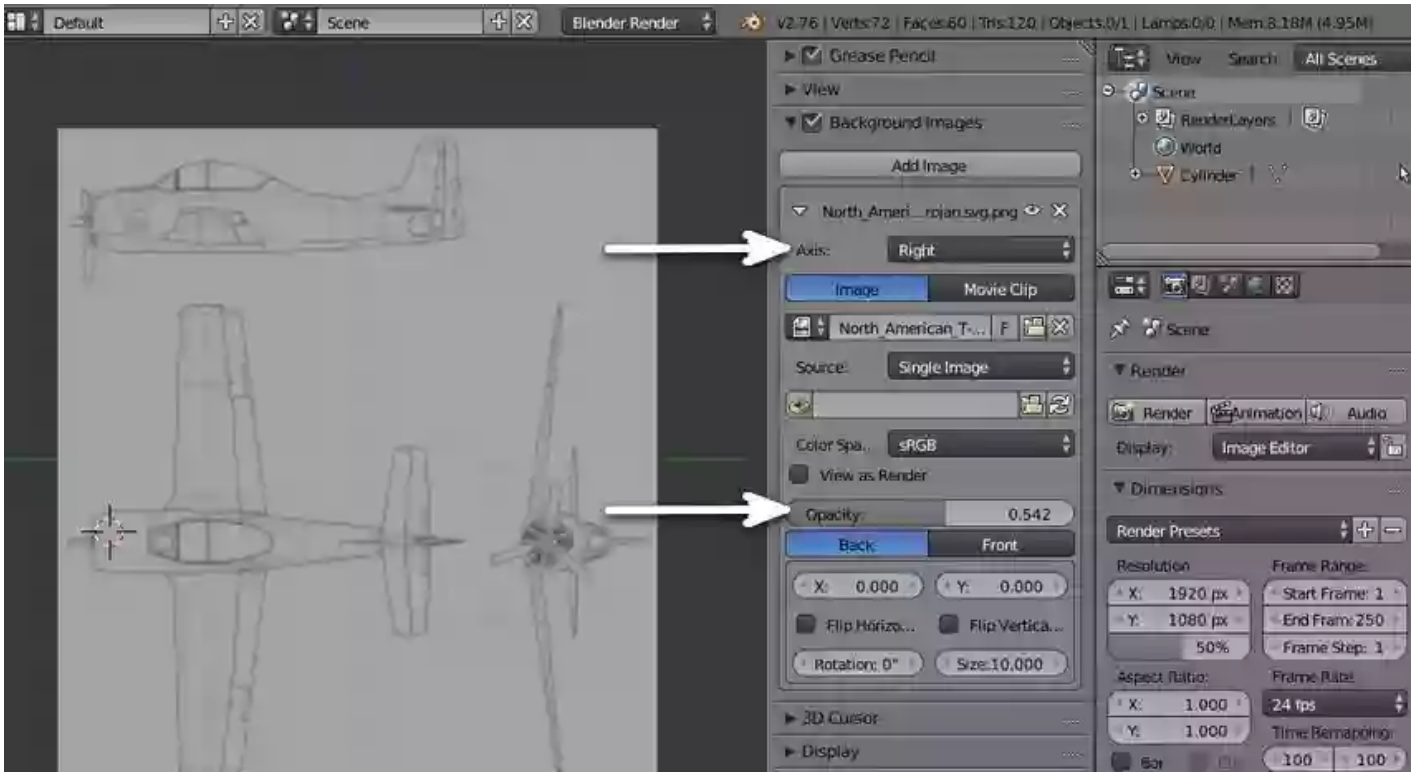
Click on the **Open** button and browse for the reference image.



Open and browse reference image

With the mouse in the **3D viewport**, press **3** on the number pad to get into right view. Press **5** on the number pad to toggle off perspective view.

In the **Background Images** panel, select **Right** for **Axis**. This will make the image appear only in the right view. You can also adjust the opacity slider to make the image more transparent.

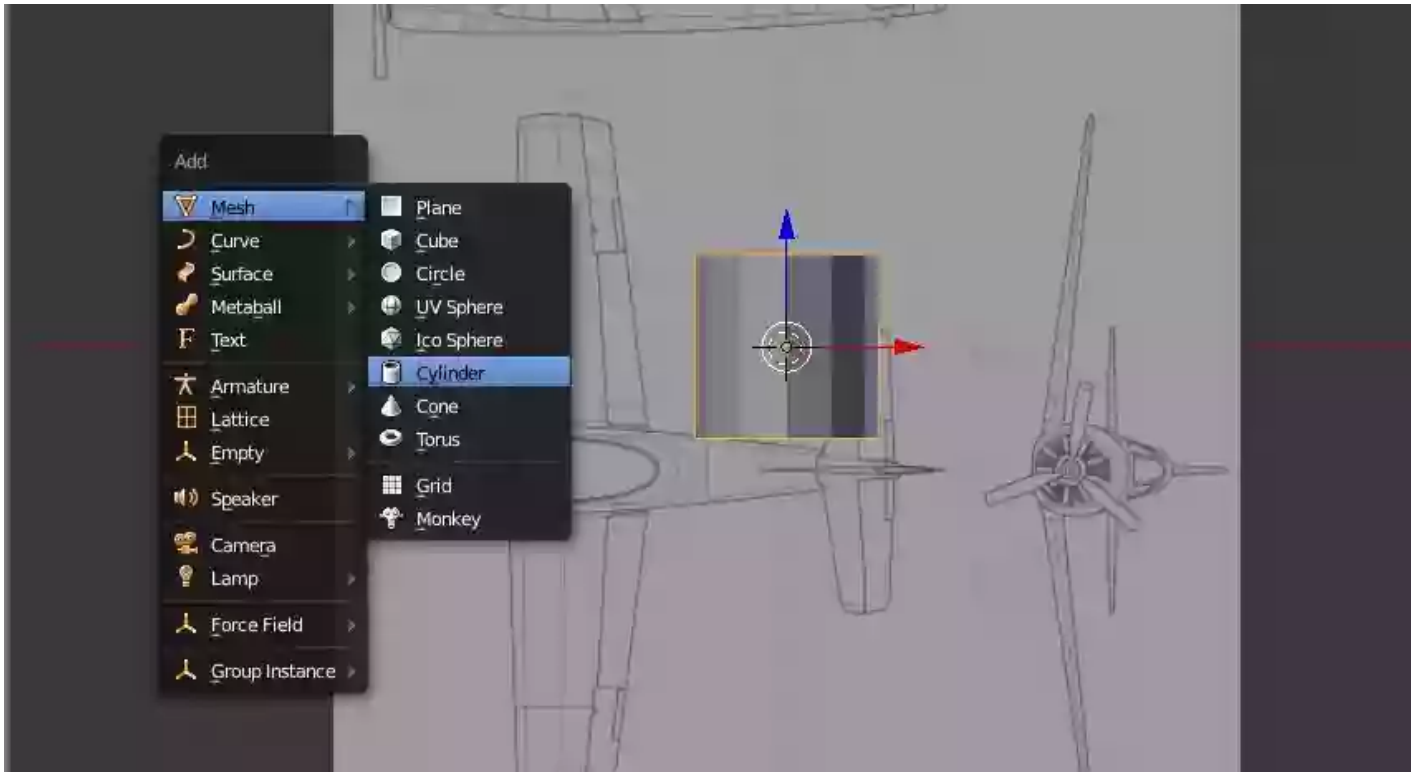


Background image settings

Modelling the Aeroplane

Step 1

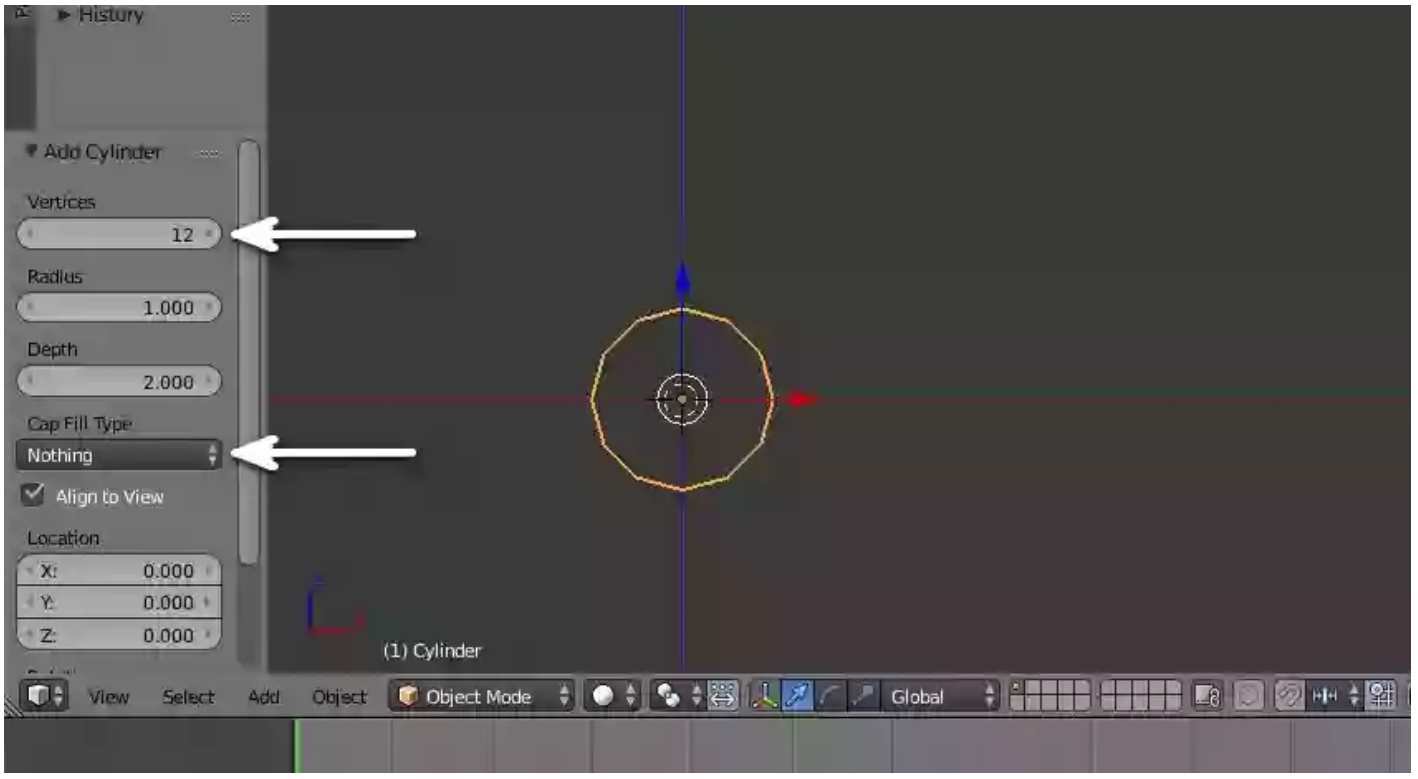
Press **Shift-A** and add a **Mesh**>**Cylinder**.



Add a cylinder

Press **1** on the number pad to get into front view. In the tool shelf, reduce the **vertices** to **12**, and **Cap Fill Type** to **Nothing**.

Check the **Align to View** checkbox. This will make the cylinder face the viewer.

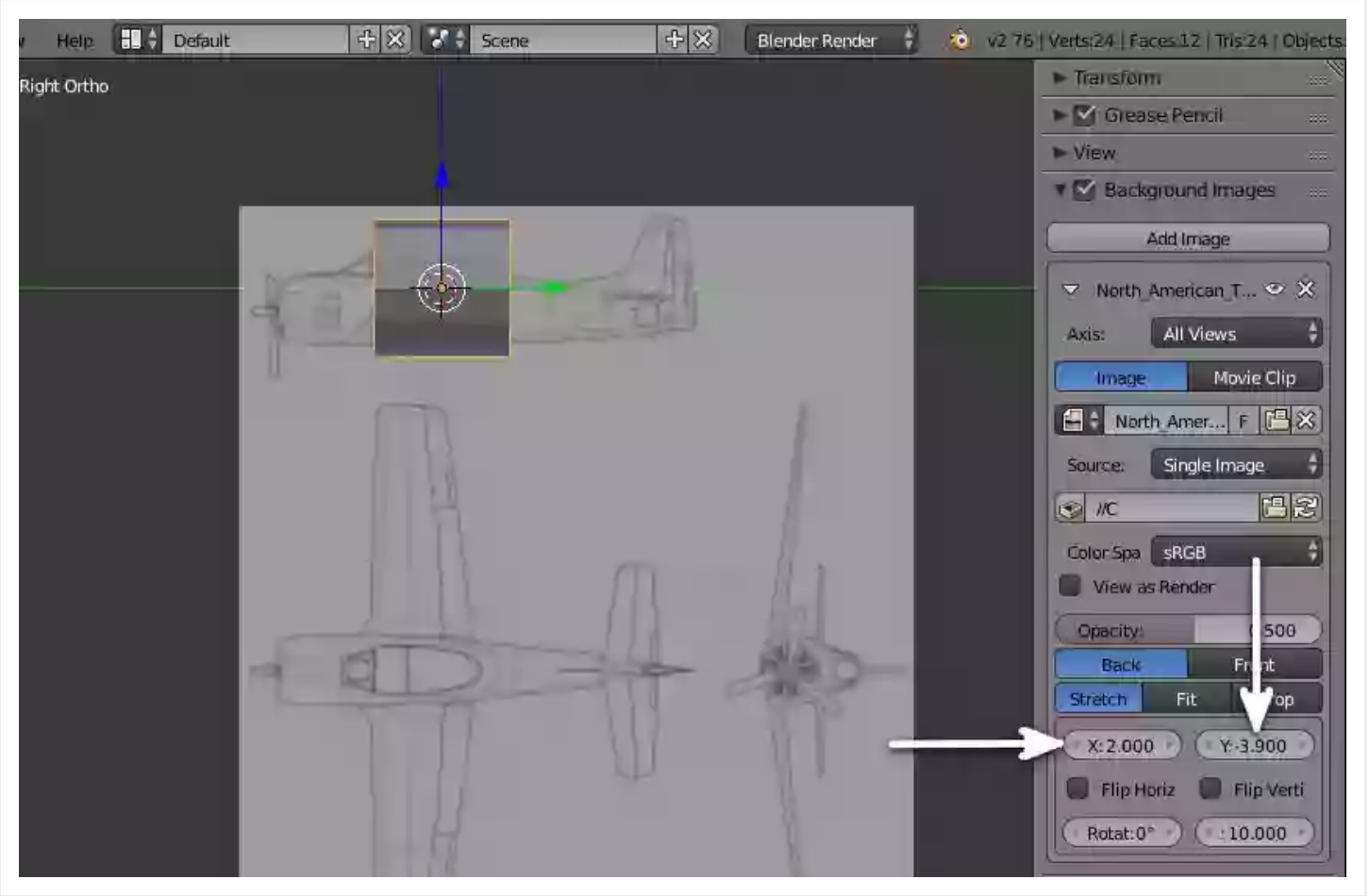


Cylinder settings

Step 2

Press **3** on the number pad to get into side view (right).

In the **Background Images** panel, drag the **X** and **Y** sliders to position the image such that the side view of the plane, in the image, is aligned with the cylinder.

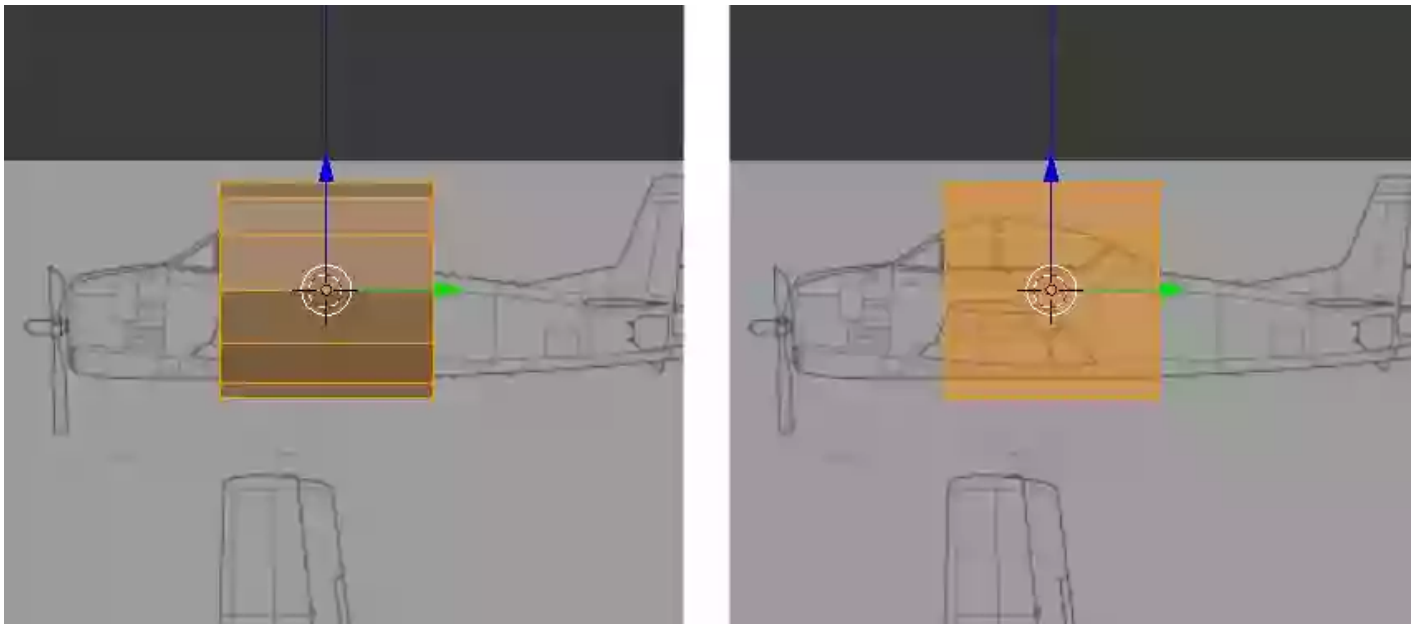


Background image settings

Step 3

Secondary-click on the cylinder to select it. Press **Tab** to enter edit mode.

Press **Z** to toggle on wire frame mode to see the background image though the mesh.

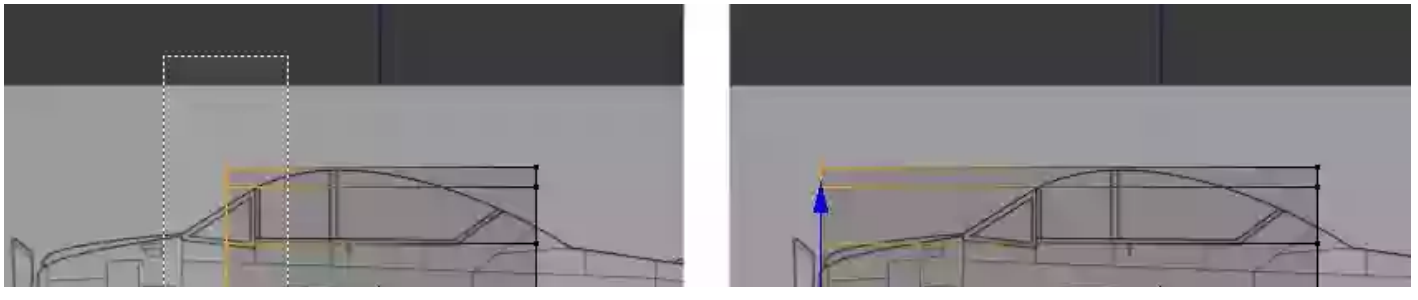


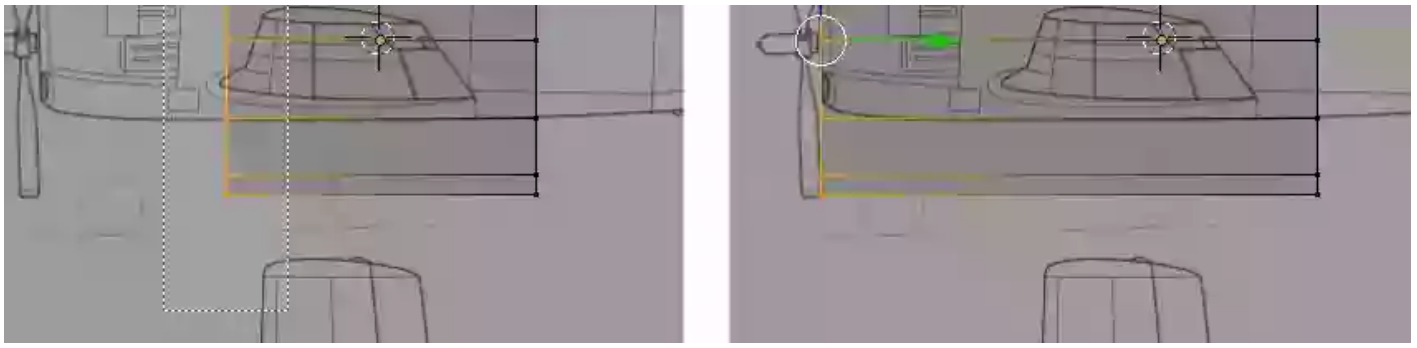
Switch to wire-frame mode

Step 4

Press **B** and drag select the front vertices. Ensure you select the vertices on the other side as well.

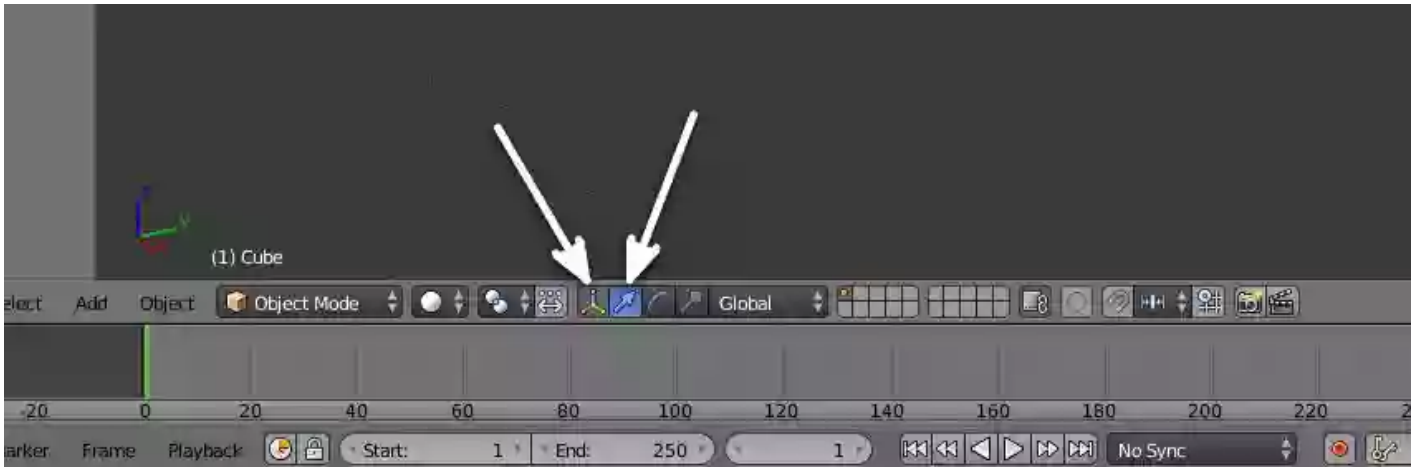
Press **G** key and move the selected vertices to the front part of the aeroplane in the background image. You can also use the arrow manipulators to move the selection.





Edit mode

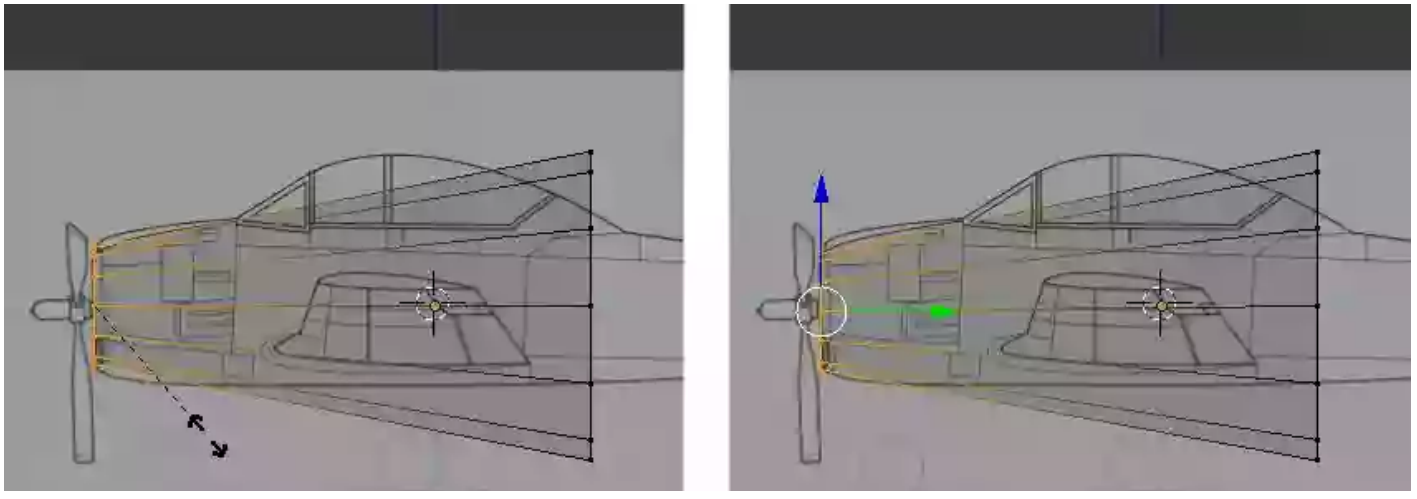
You can toggle on/off the arrow manipulators by clicking on the widget button in the header of the 3D viewport.



Select arrow manipulator

Step 5

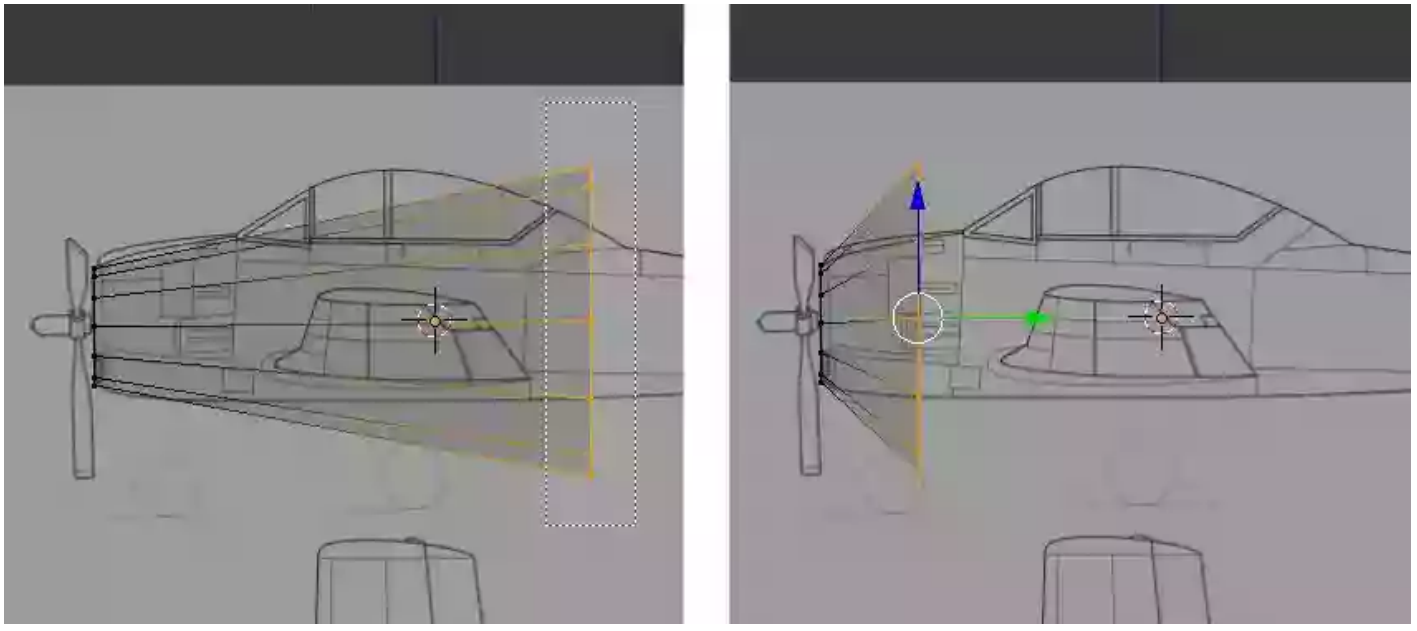
With the front vertices selected, press **S** to scale them down, matching the reference image. Primary-click to confirm.



Scale down edge loop

Step 6

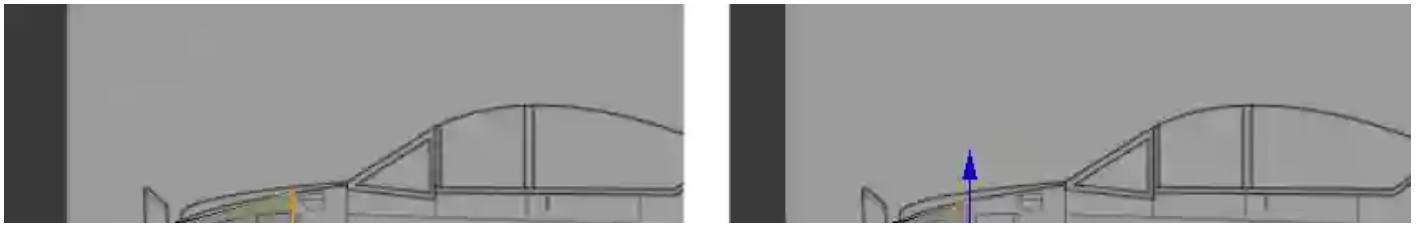
Press **A** to deselect the vertices. Press **B** key and drag select all the vertices at the other end. Move them at the middle of the engine. You can either press the **G** key to move or use the arrow widgets.

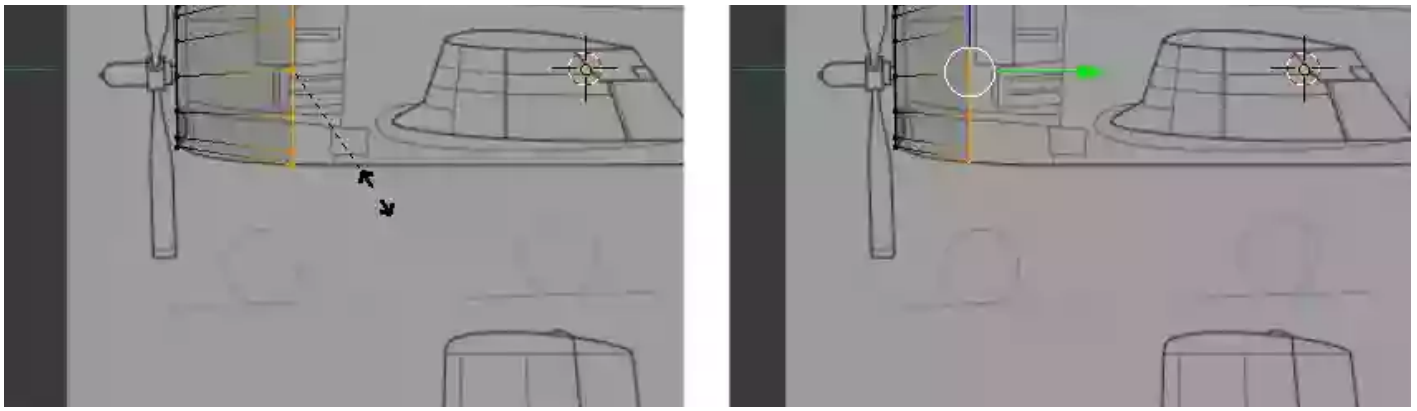


Move vertices to match reference

Step 7

With the vertices selected, press **S** key and scale them down to match the reference image.

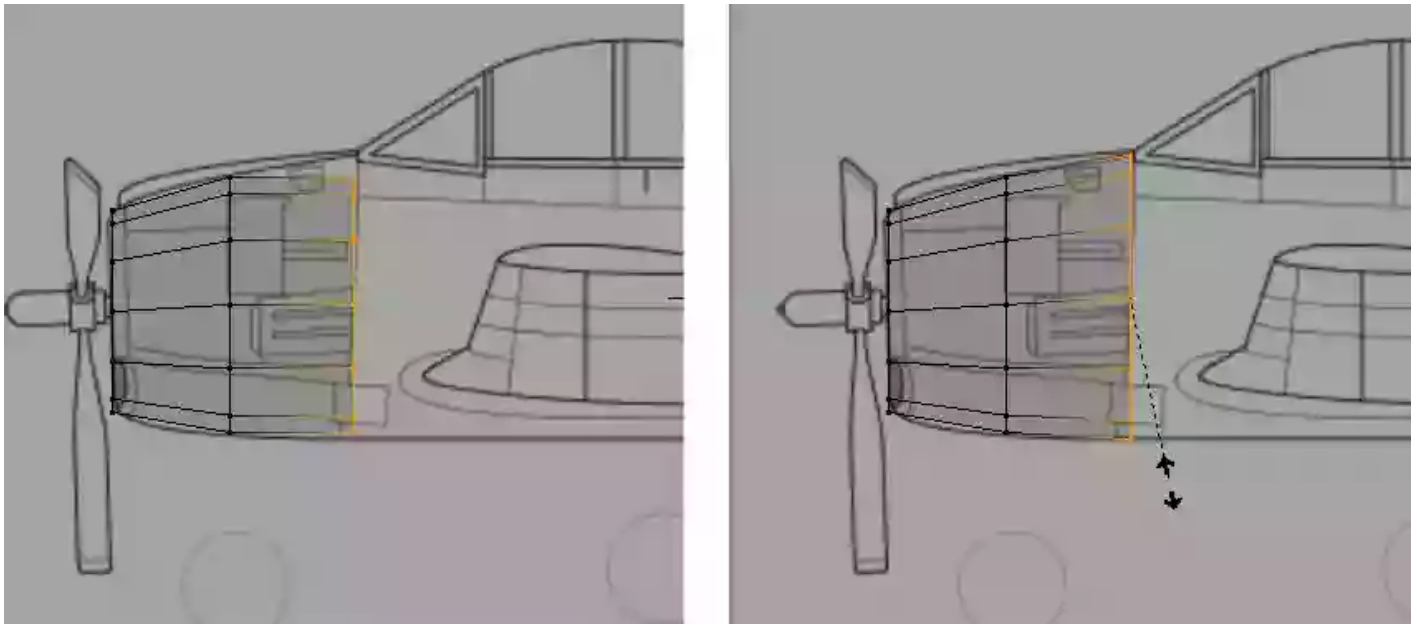




Scale and move the vertices

Step 8

Press **E** to extrude the selected vertices. Move the mouse and then left click to confirm the position. Press **S** and scale the new vertices to match the height of the plane in the background image.

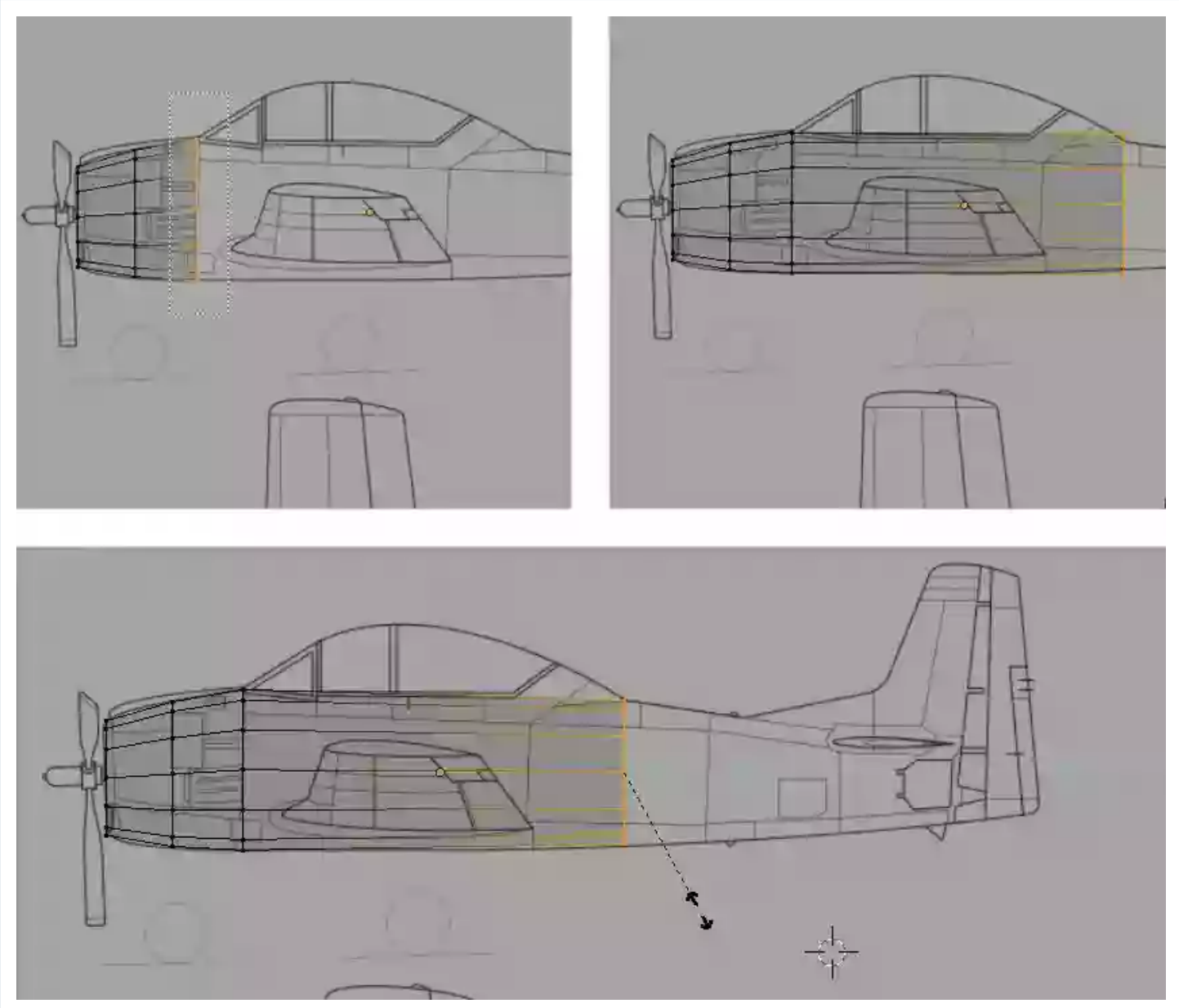


Extrude vertices and scale them

Step 9

Similarly, select the end of the cylinder and press **E** to extrude. Move the mouse so that the new set of vertices are at the end of the cockpit.

Primary-click to confirm the position and then press **S** to scale them.



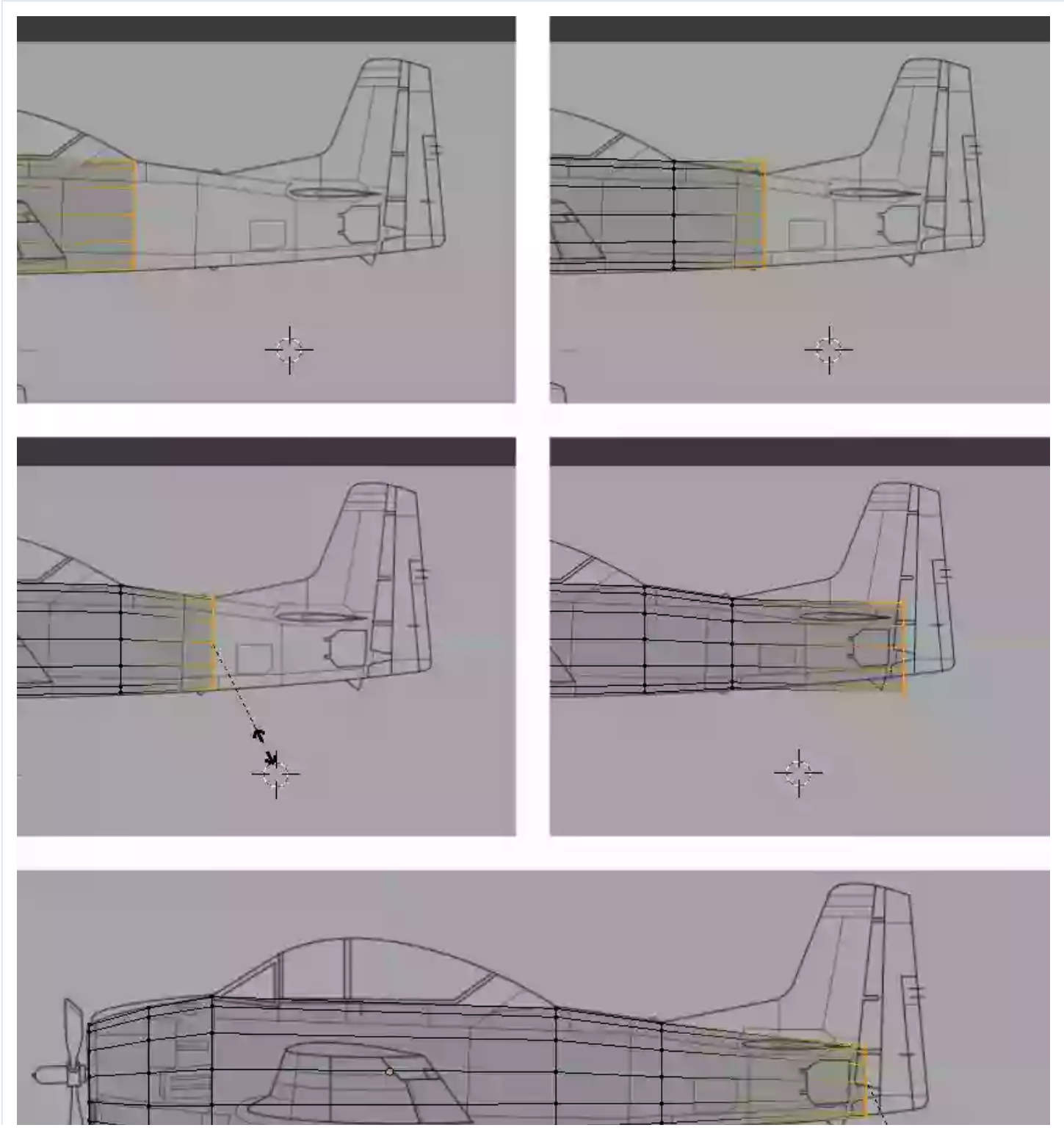
Extrude vertices and scale them

Step 10

With the same extrude and scale method, construct the rest of the aeroplane's body.

Extrude to the beginning of the tail. Scale to match the reference image. Extrude one more time to the end of the aeroplane.

Press **S** to scale it down.

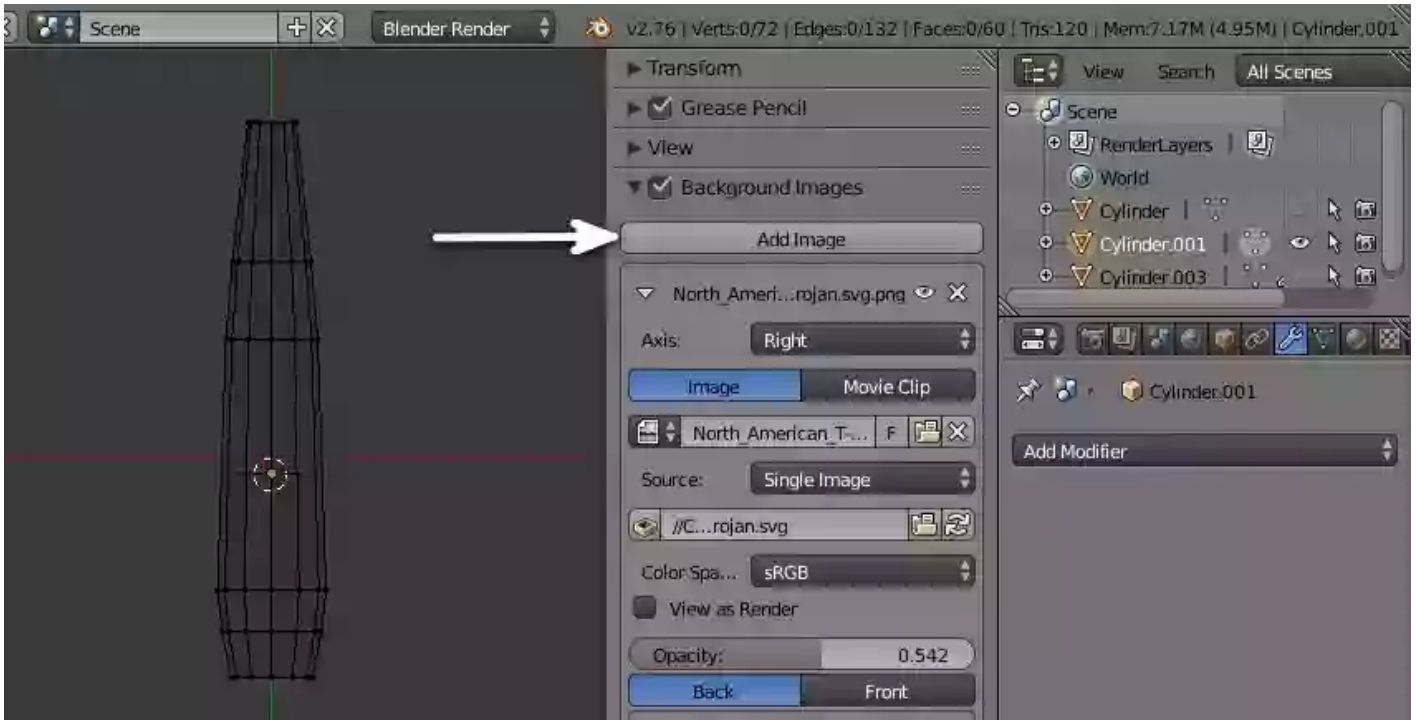


Extrude the mesh to form the body

Step 11

Press **7** in the number pad to get into top view.

Press **N** to open properties panel and uncheck the **Background Images**, click on the **Add Image** to add new background image.

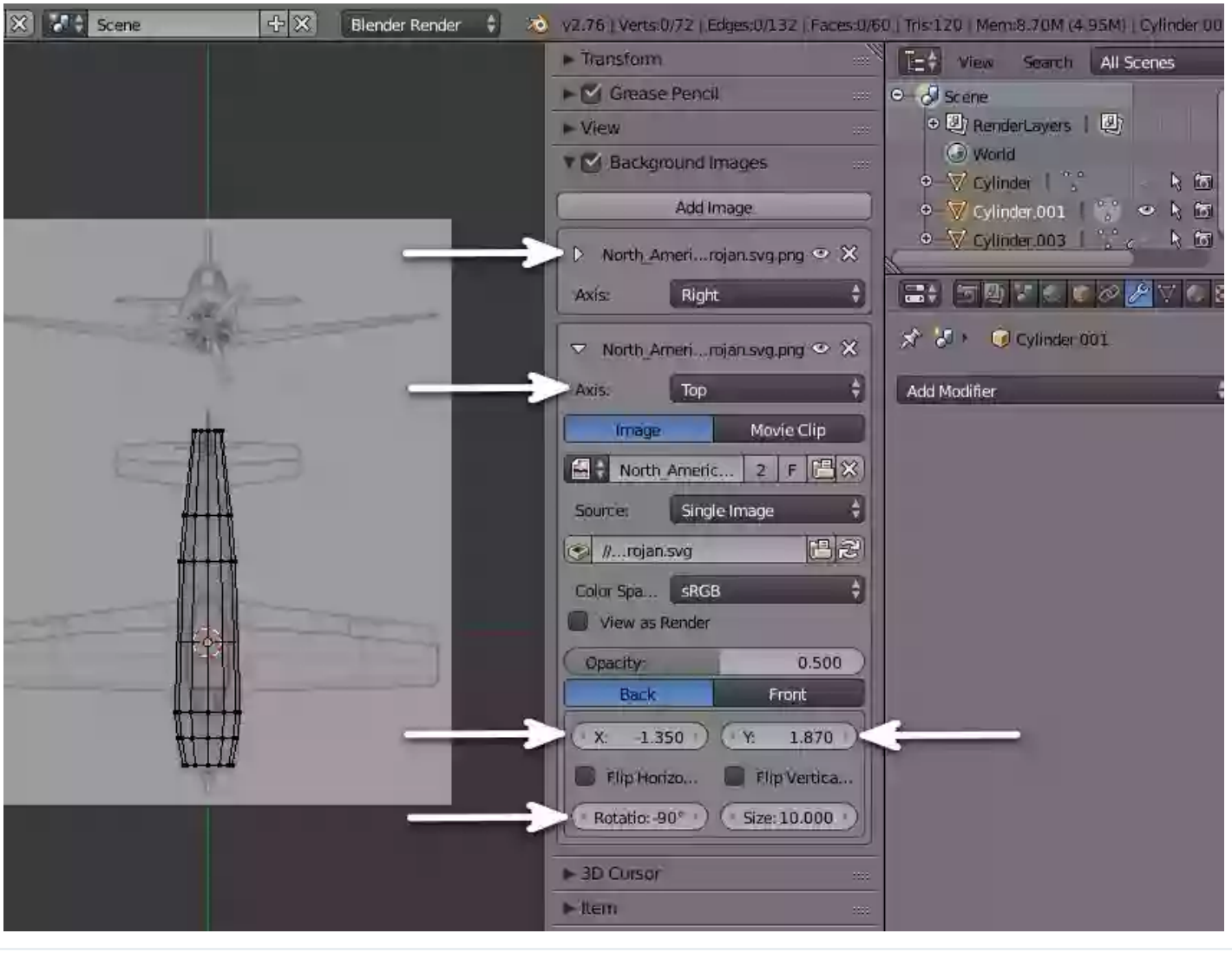


Add background image for top view

Press the triangle button beside the first background image settings, to collapse the panel. In the new image panel,

- Choose **Top** for the **Axis**. This will make this image appear only in the top view
- Use the **X** and **Y** slider to move the reference image so that the top view in the image is aligned with the mesh

- In the **Rotate** option, lift click and type **-90** to rotate the background image, to match the angle of the model



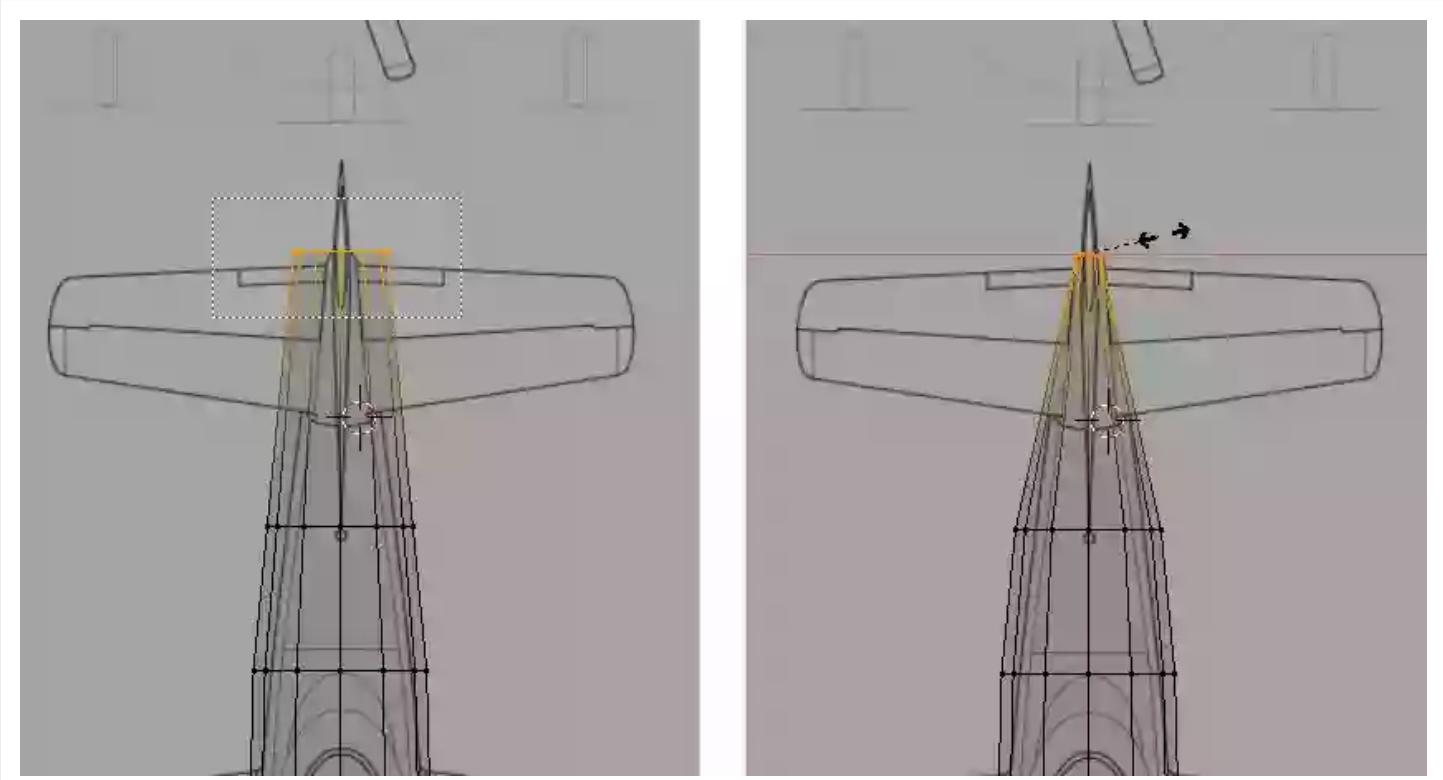
Background image settings

Step 12

Press **A** to deselect any selected vertices.

Press **B** and drag select the vertices at the end of the plane. Scale it down only along the X axis to match the background image.

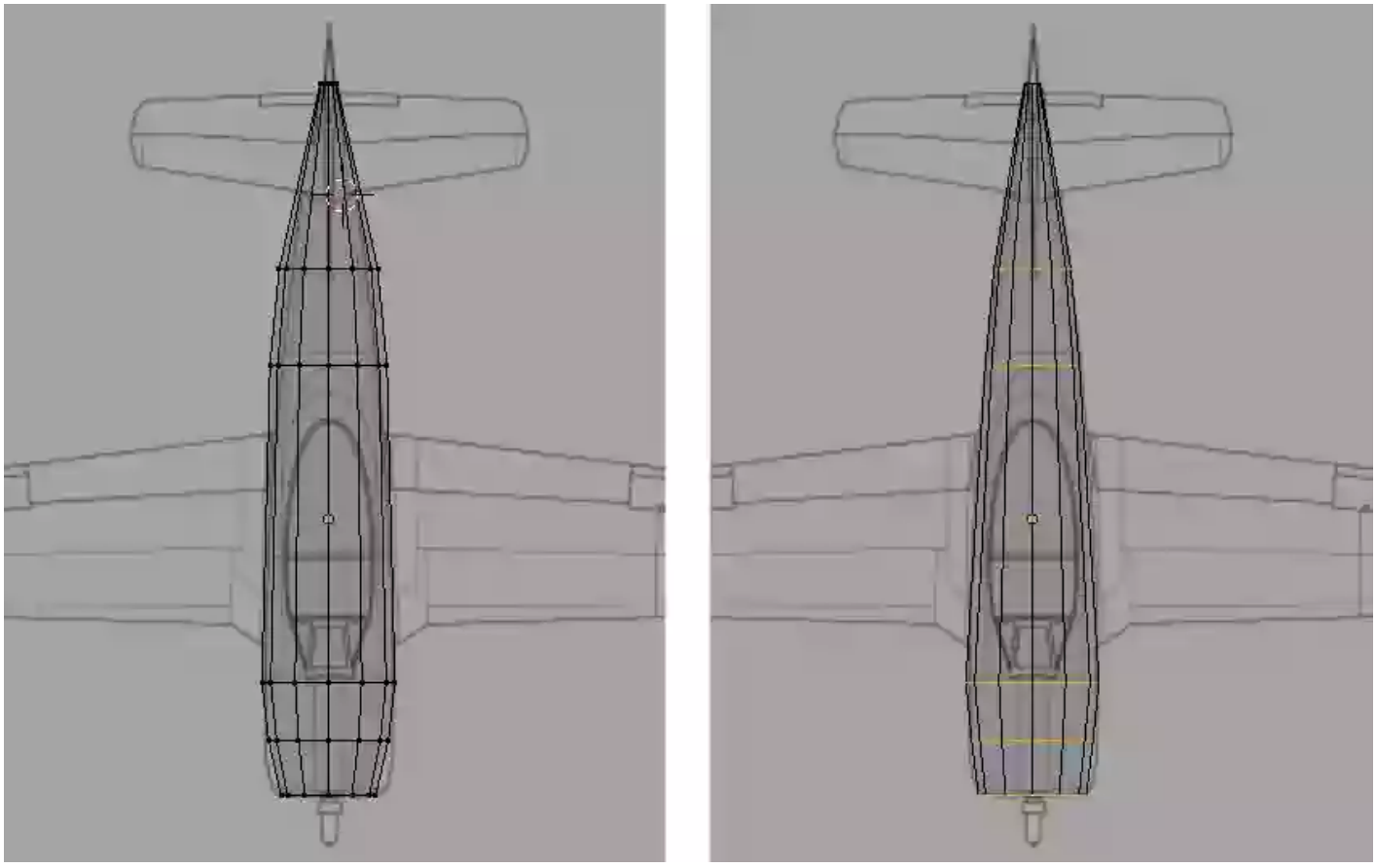
Press **S** and then **X** to scale in X axis. Primary-click to confirm.



Edit mesh from top view

Step 13

Similarly select and scale rest of the rows to match the reference from top view. Press **A** to deselect the vertices.

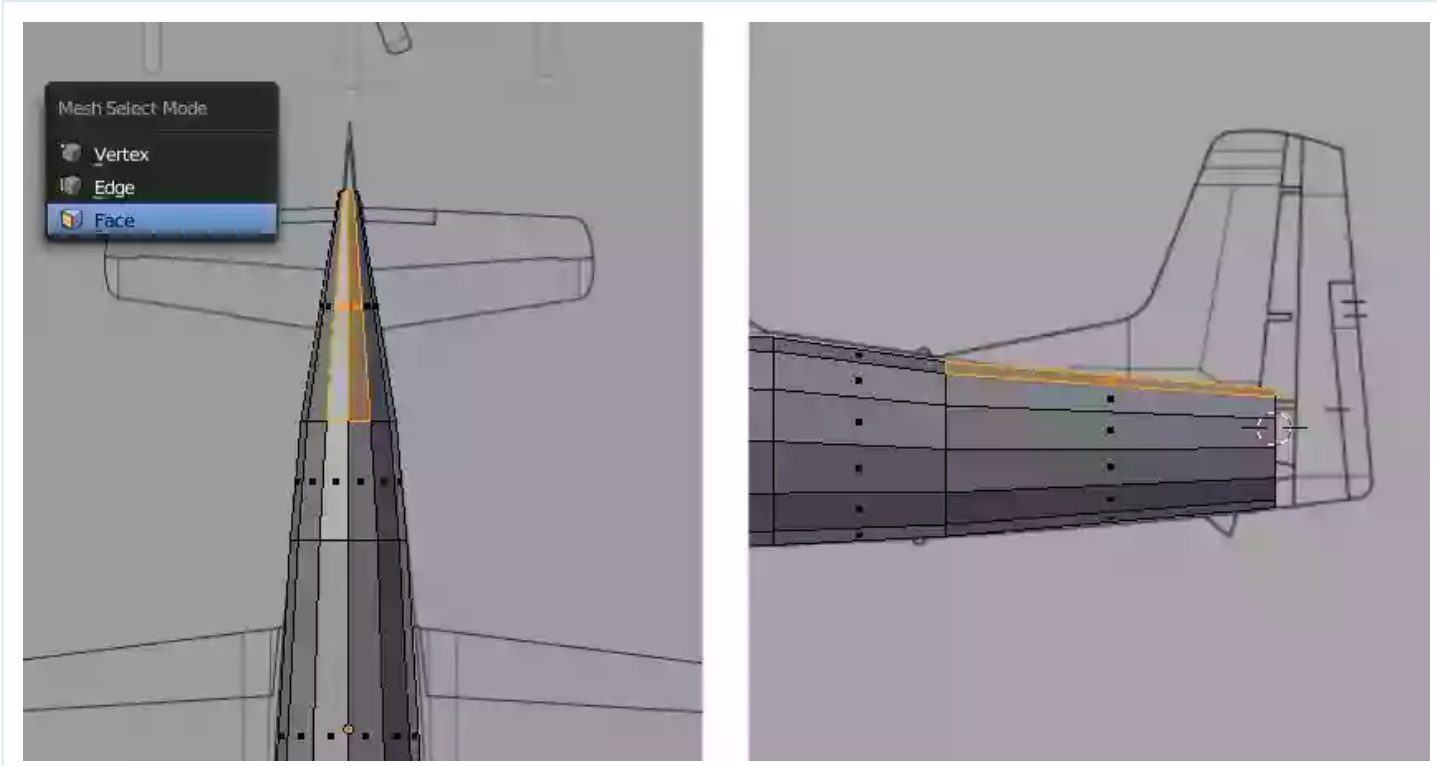


Edit mesh from top view

Step 14

Press **Ctrl-Tab** and select **Face** select mode. Select the two faces as shown in the image, which will be the base of the tail, the fin and rudder.

You can toggle between solid and wire-frame mode by pressing **Z** key on the keyboard.

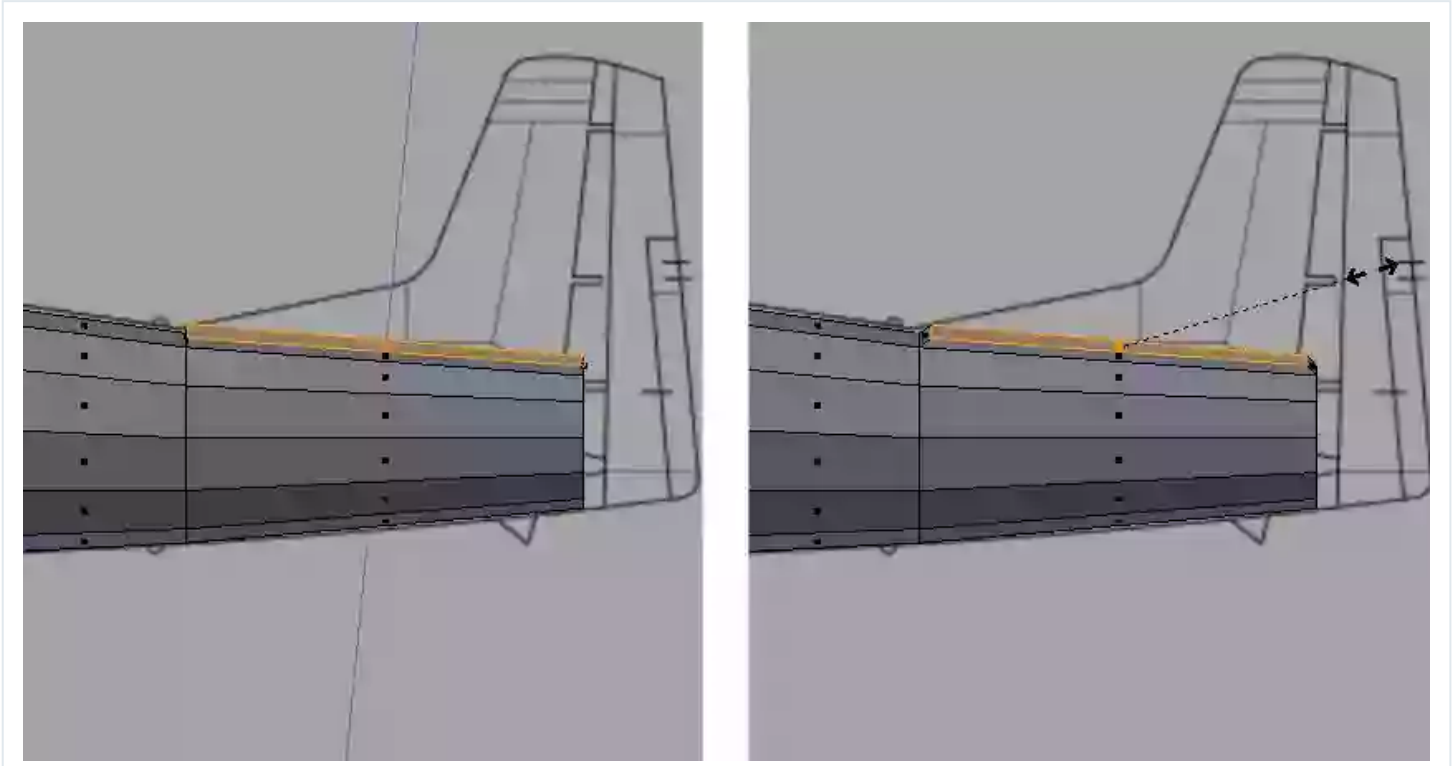


Select last two faces

Step 15

Press **3** in the number pad to get into side view. With the vertices/faces selected, press **E** to extrude them.

Move the mouse just a little bit and then primary-click to confirm the position. Press **S** and scale them down a bit. Primary-click again to confirm the scale.

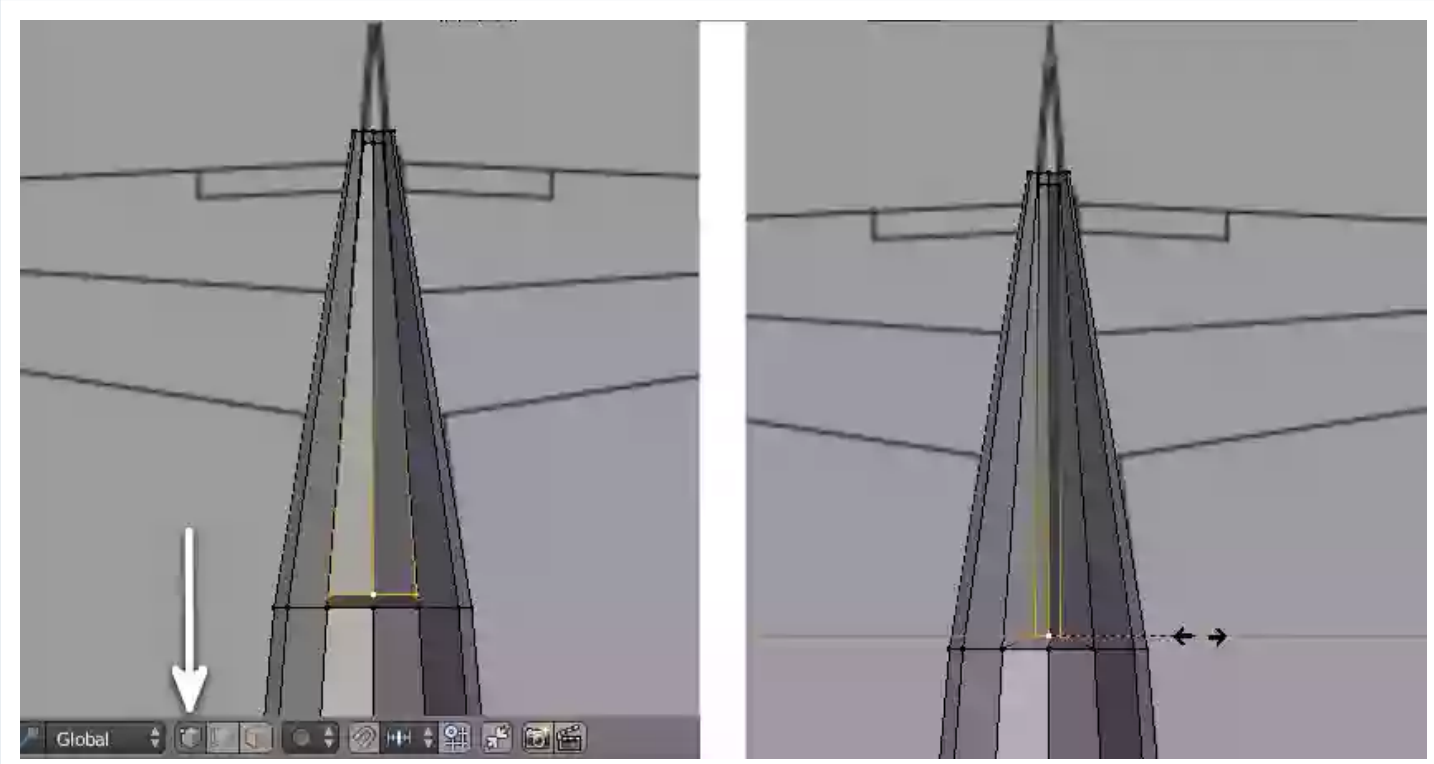


Extrude and scale selected faces

Step 16

Go back to top view by pressing **7** on the number pad. Click on the **Vertex** select mode in the header or press **Ctrl-Tab** and select **Vertex** select mode. Press **A** and deselect the vertices.

Hold **Shift** and then right click on the front three vertices of the tail to select them. Press **S** and **X** to scale them along the X-axis to reduce and match the width.

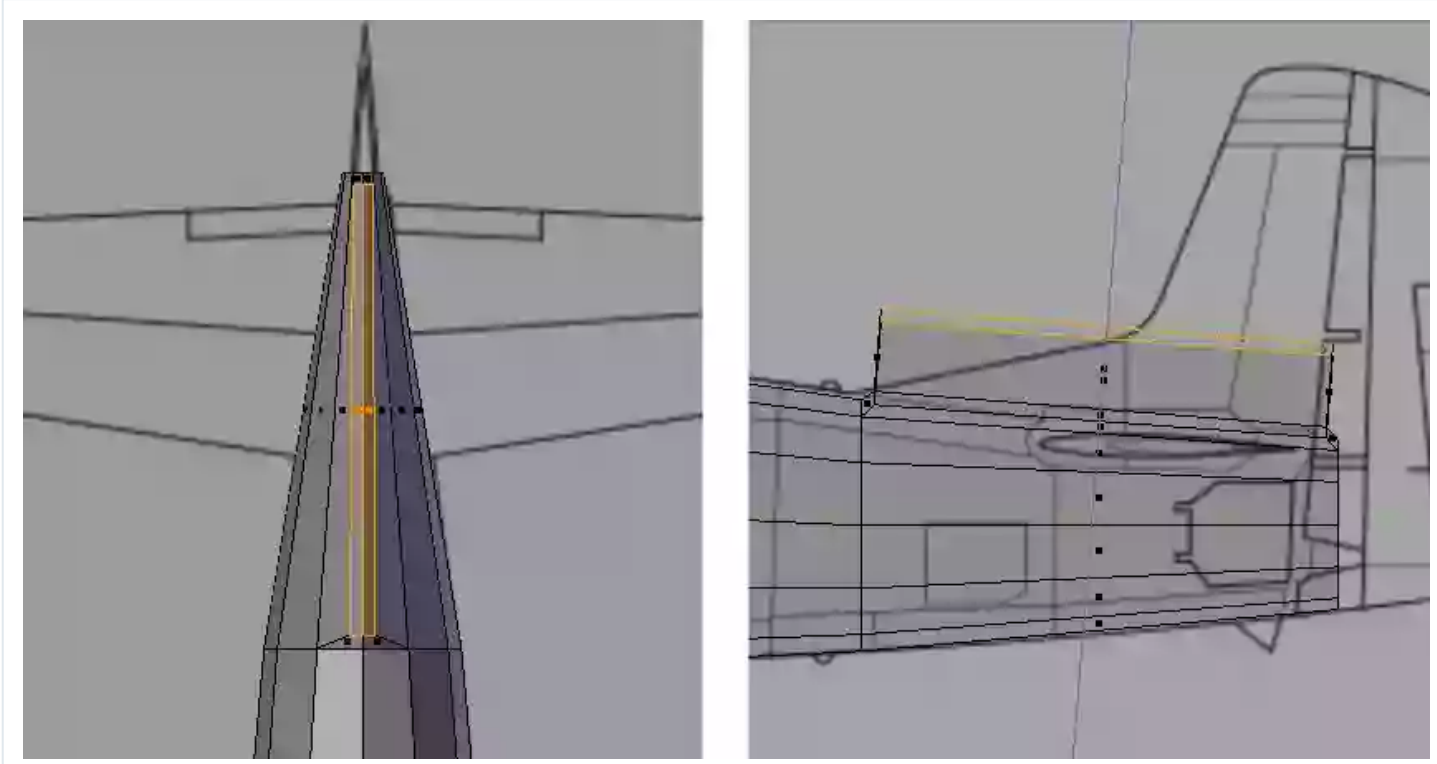


Tweak the vertices

Step 17

Select the top two face of the tail, or the top six vertices. Hold **Shift** and then secondary-click on the vertices for multiple selection. Press **3** in the number pad to get into side view.

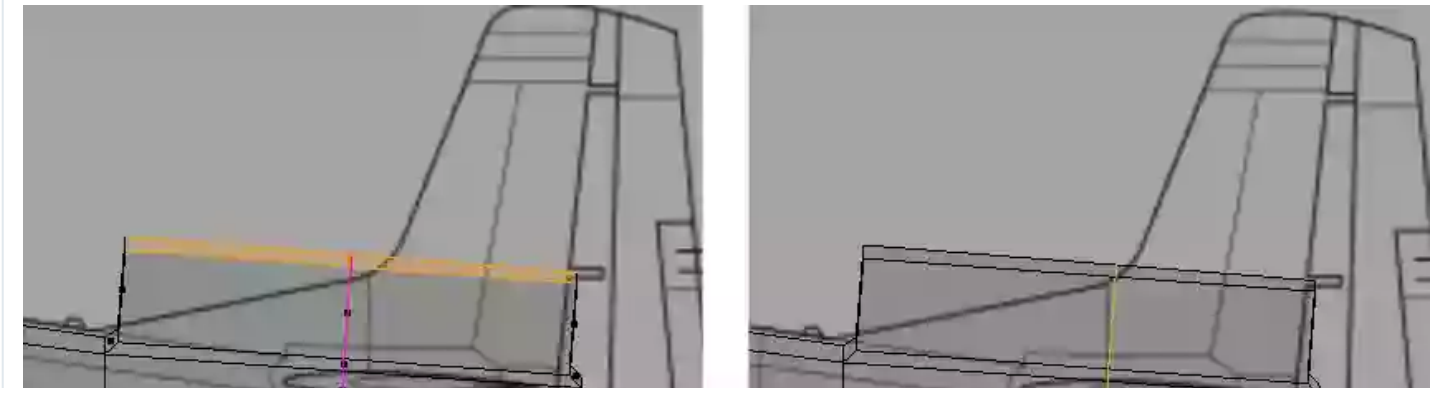
Press **E** and extrude the tail. Primary-click to confirm.

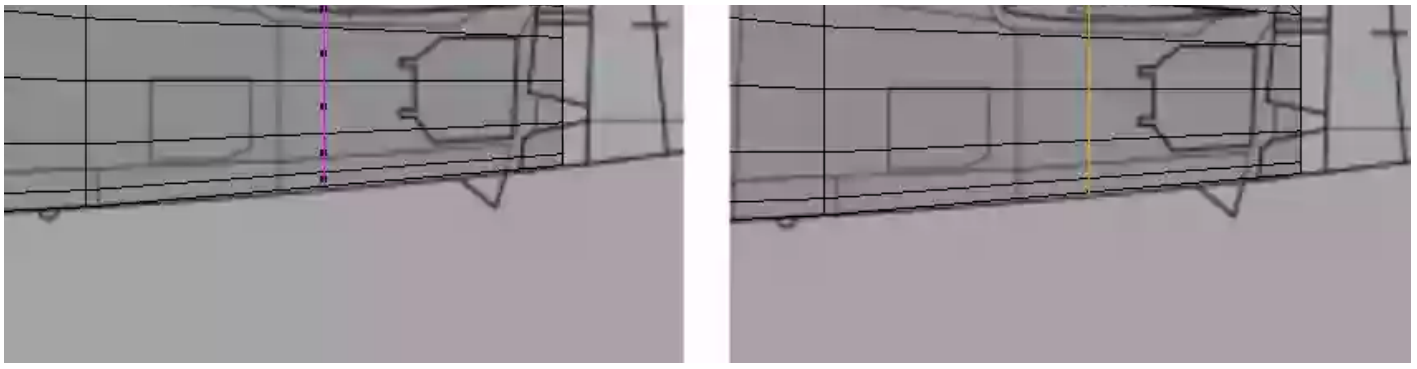


Extrude out the tail

Step 18

Move the mouse over the back part and press **Ctrl-R** to create a loop of vertices. Primary-click twice to confirm the loop cut.

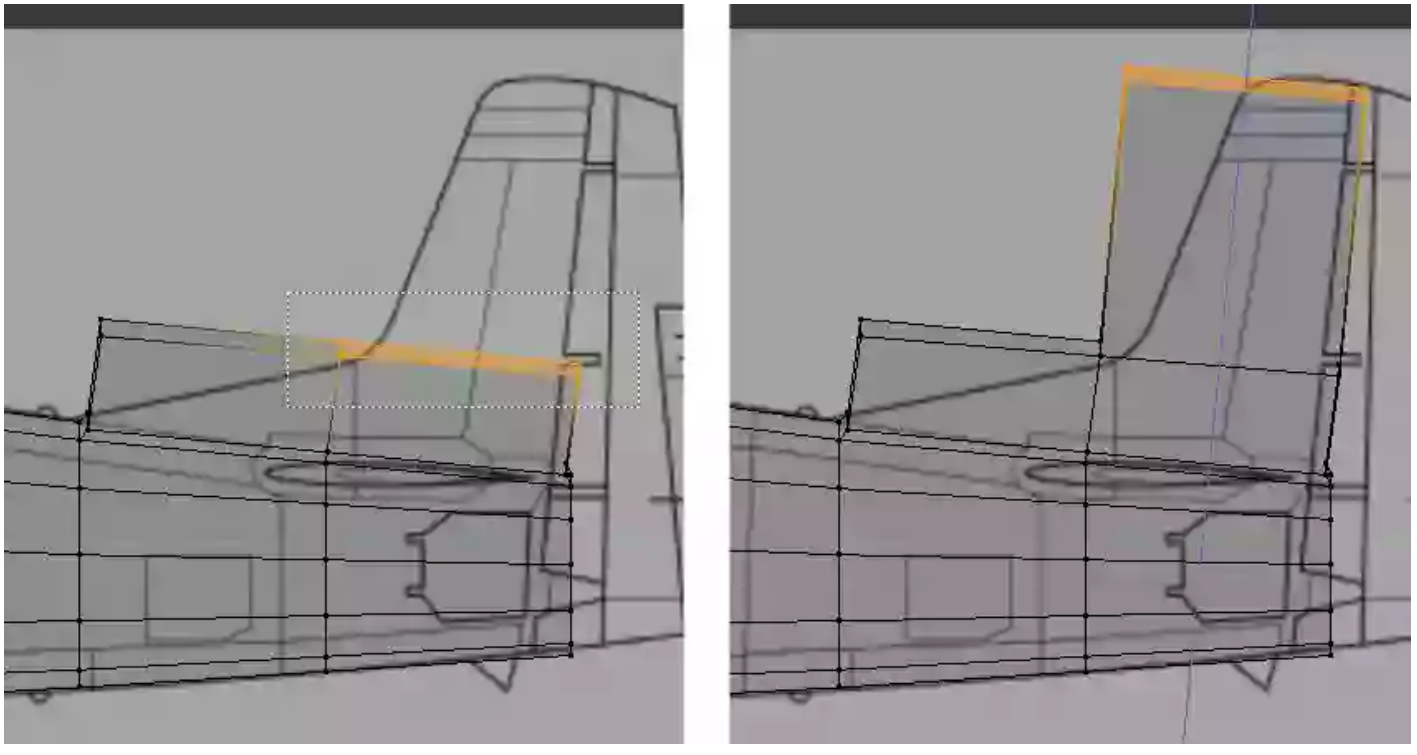




Create a loop cut

Press **A** to deselect the vertices. Press **B** and drag select the vertices of the tail as shown in the image.

Press **E** to extrude. Move the mouse till the new faces match the tip of the tail of the reference image.

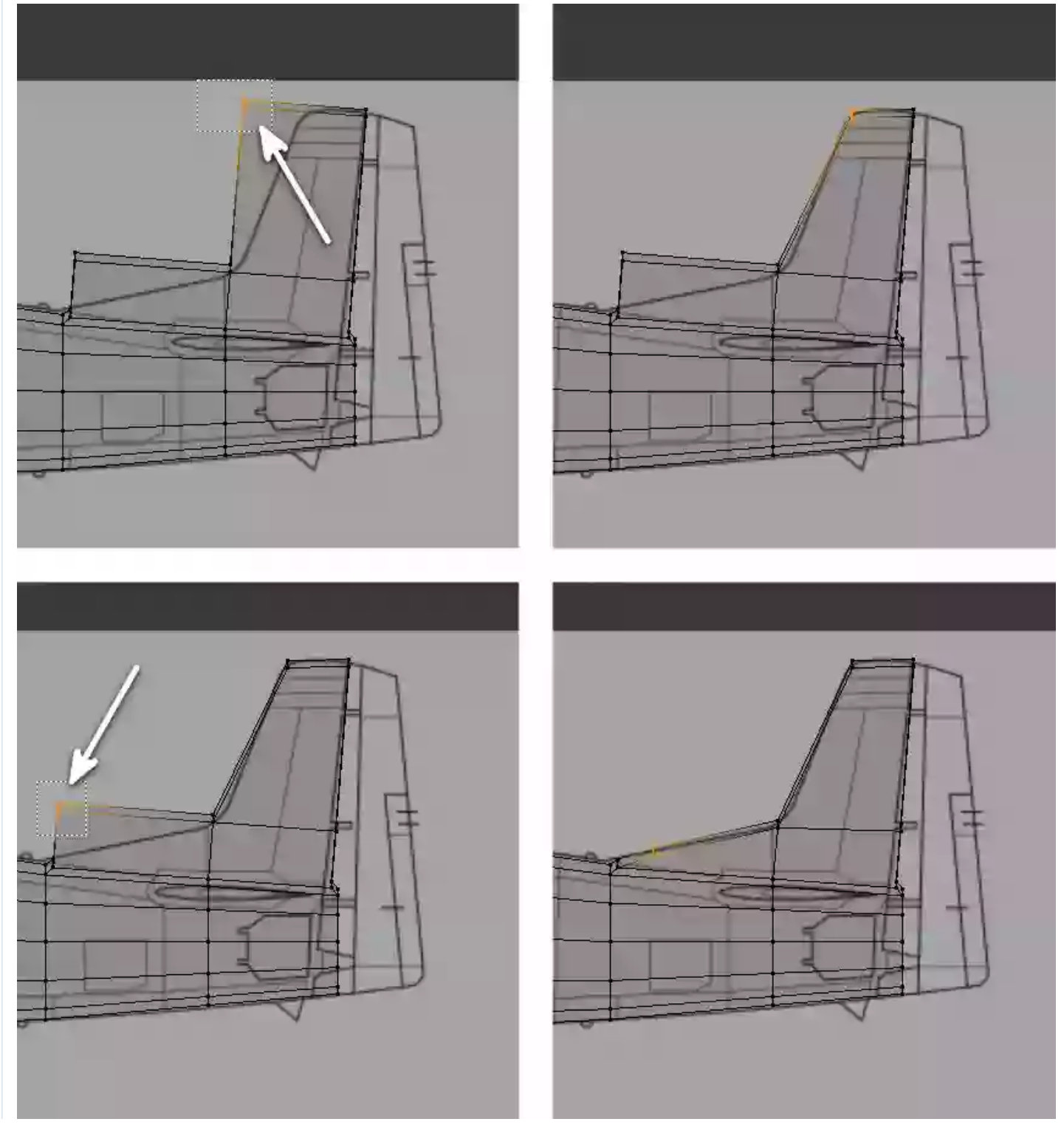


Select and extrude the face

Step 19

- Press **A** to deselect any selected vertices.
- Press **B** and drag select the front part of the tail.

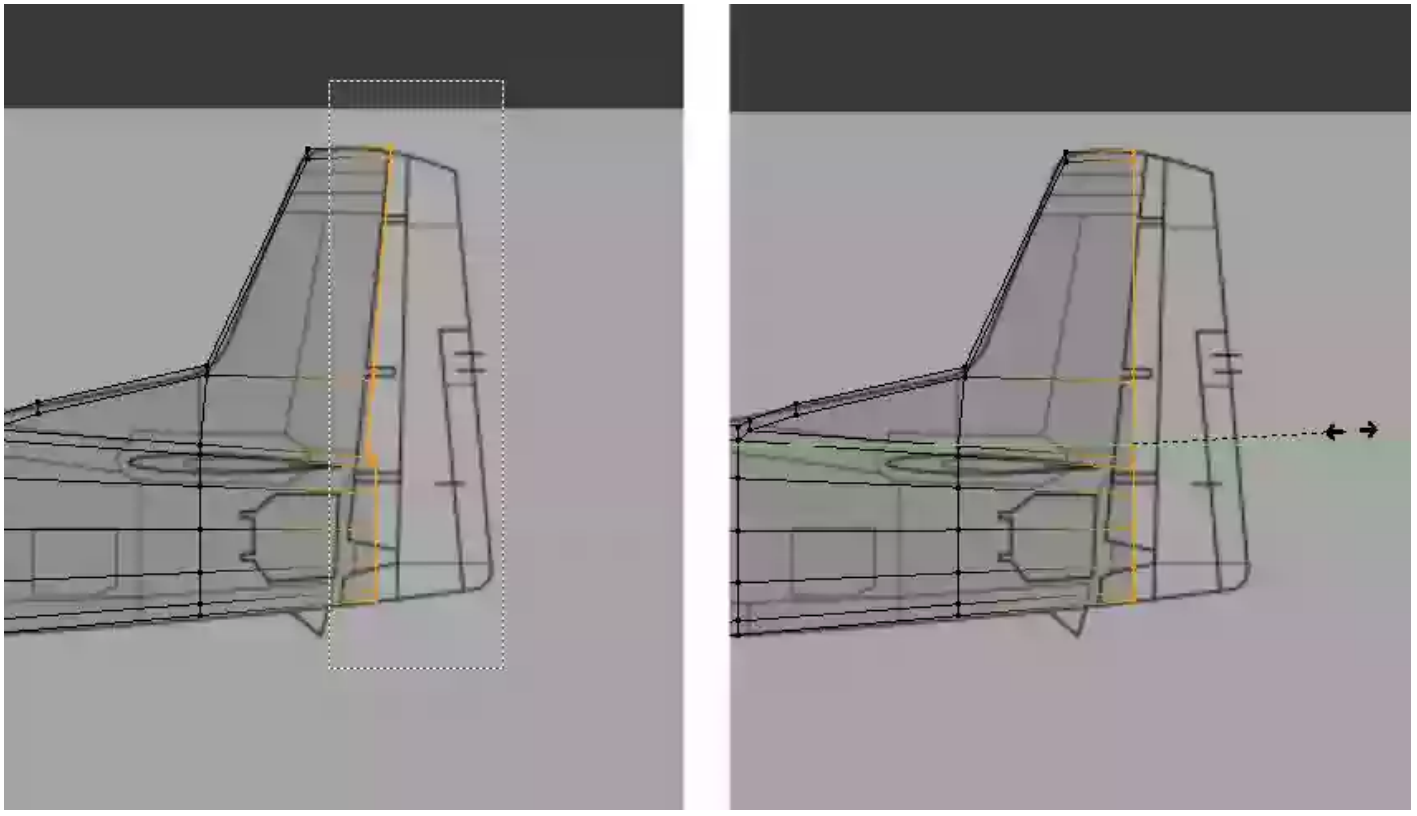
- Press **G** and move them to match the background image.
- Press **A** to deselect the vertices.
- Again press **B** to drag select the front part of the tail.
- Press **G** and move them to match the reference.



Tweak the vertices to create tail

Step 20

- Press **A** to deselect the selected vertices.
- Press **B** and drag select the rear vertices of the plane.
- Press **S** and then **Y** to scale them along the y axis and then press **0**. This will align all the selected vertices in a straight line.



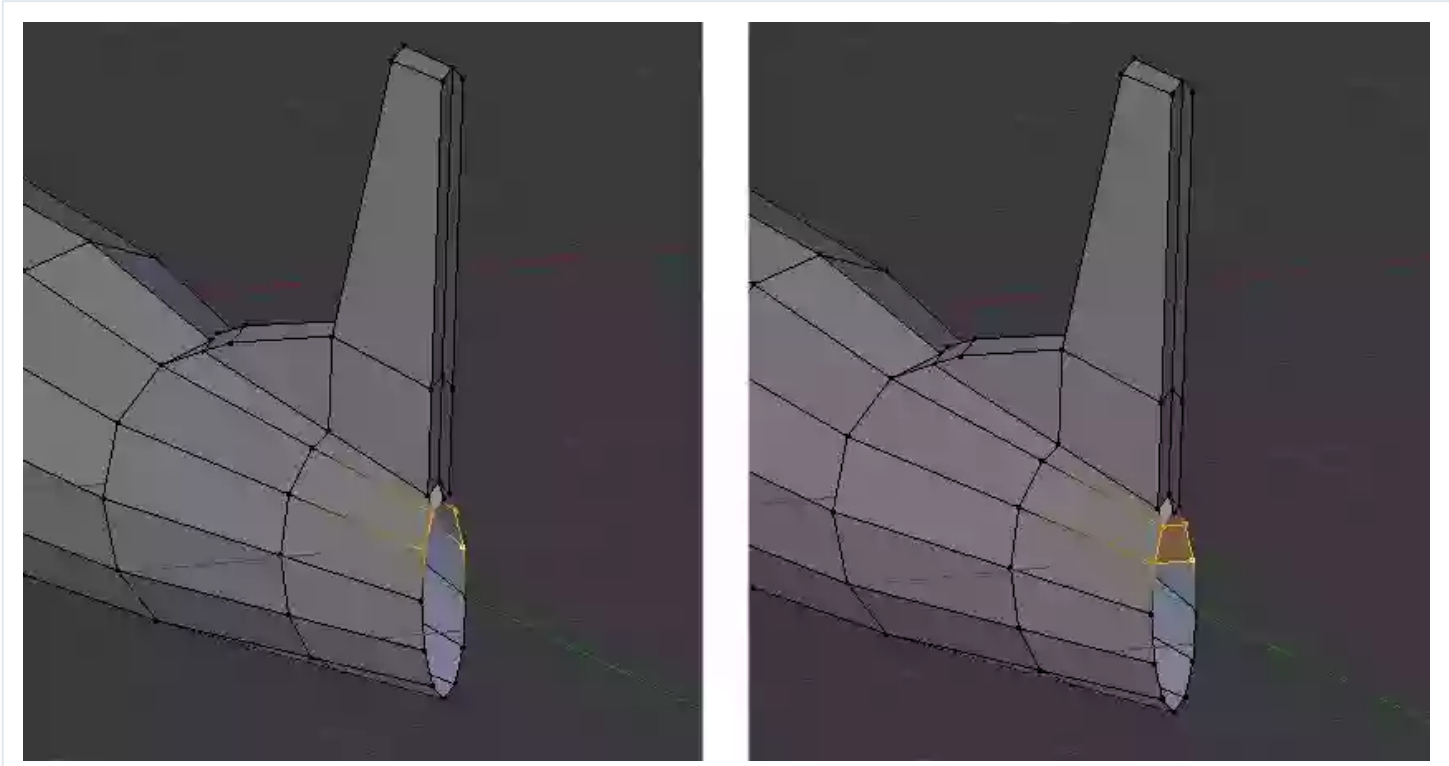
Tweak the back part

Step 21

Press **A** to deselect the vertices. In the 3D viewport, drag with middle mouse button to rotate the view.

Select the four vertices as shown in the image. Hold **Shift** and then secondary-click on four vertices to select them.

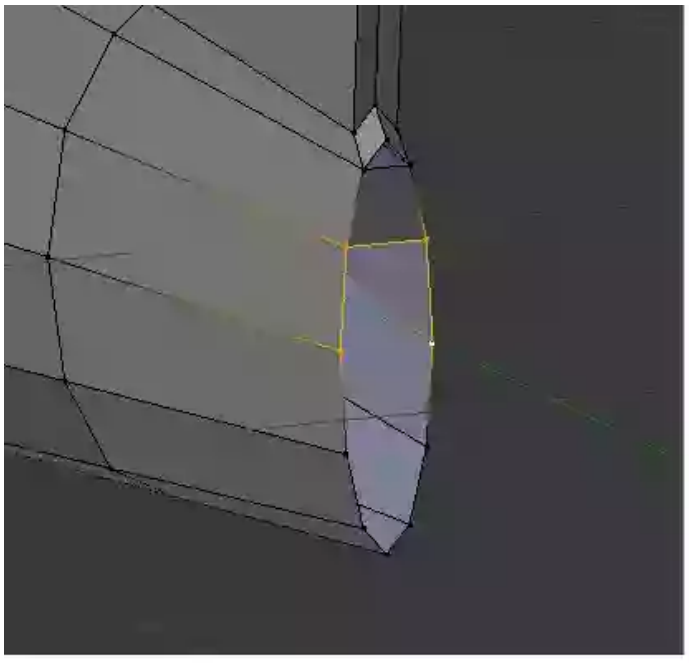
Press **F** to make a face in between them. You need to fill and close hole of the mesh.

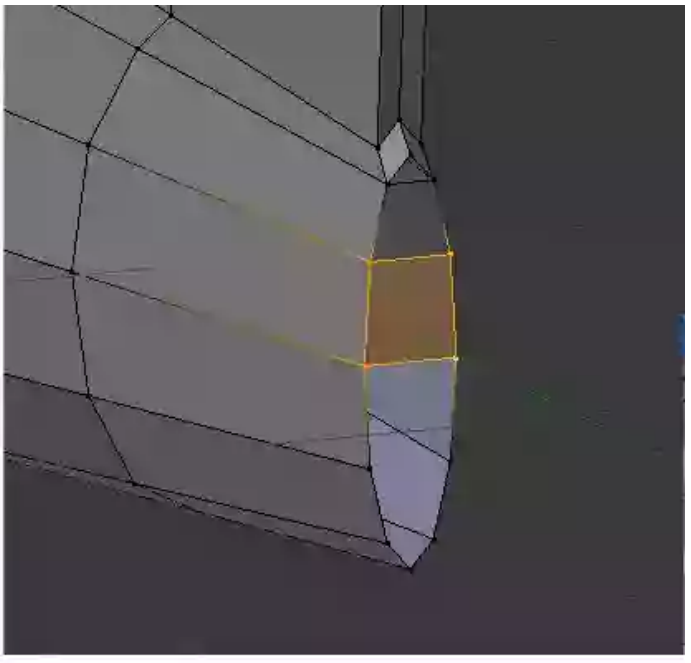


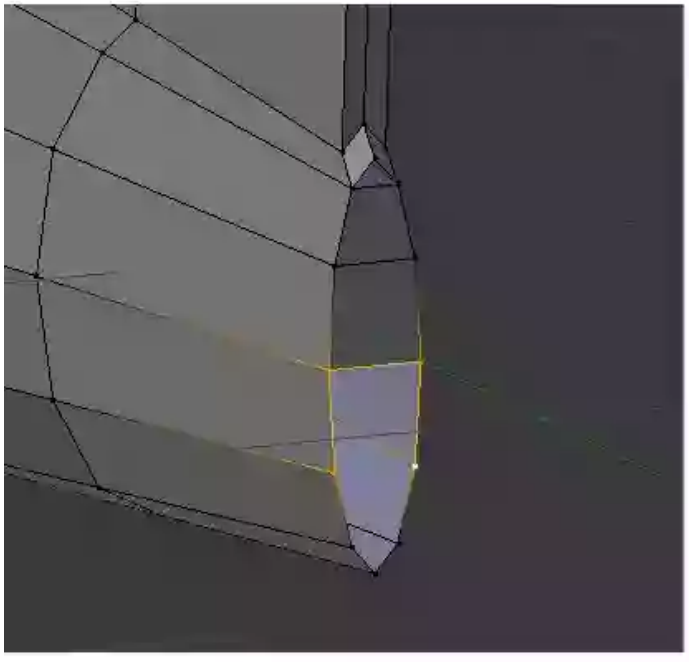
create face and fill the gap

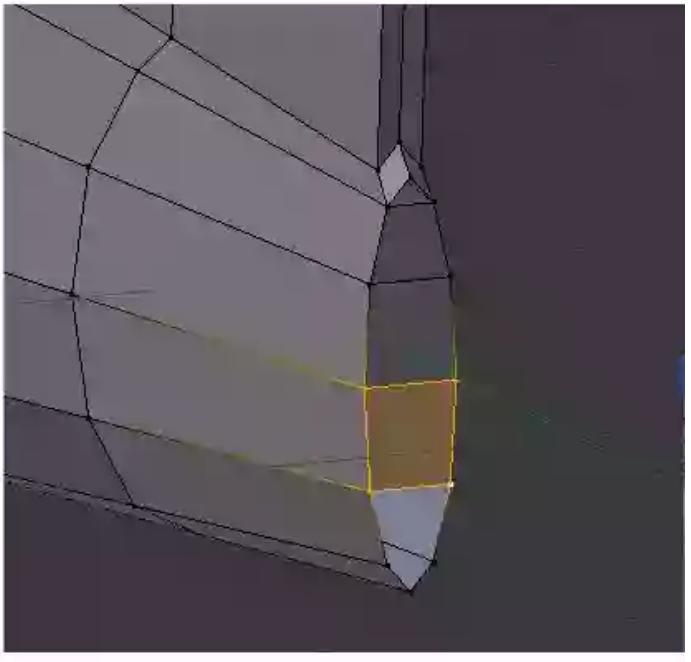
Step 22

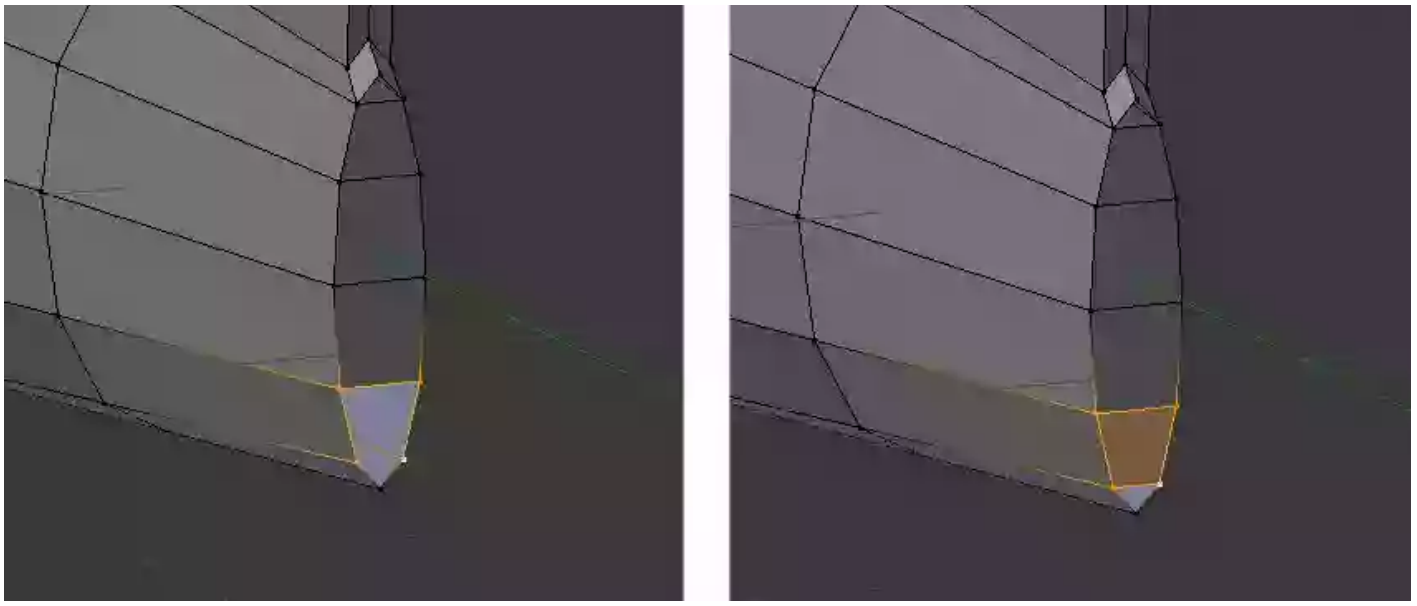
Select the next four vertices and press **F** to create a face. Repeat the same process for next two faces. You need to deselect any previous selection by pressing **A** before selecting new vertices to create face.







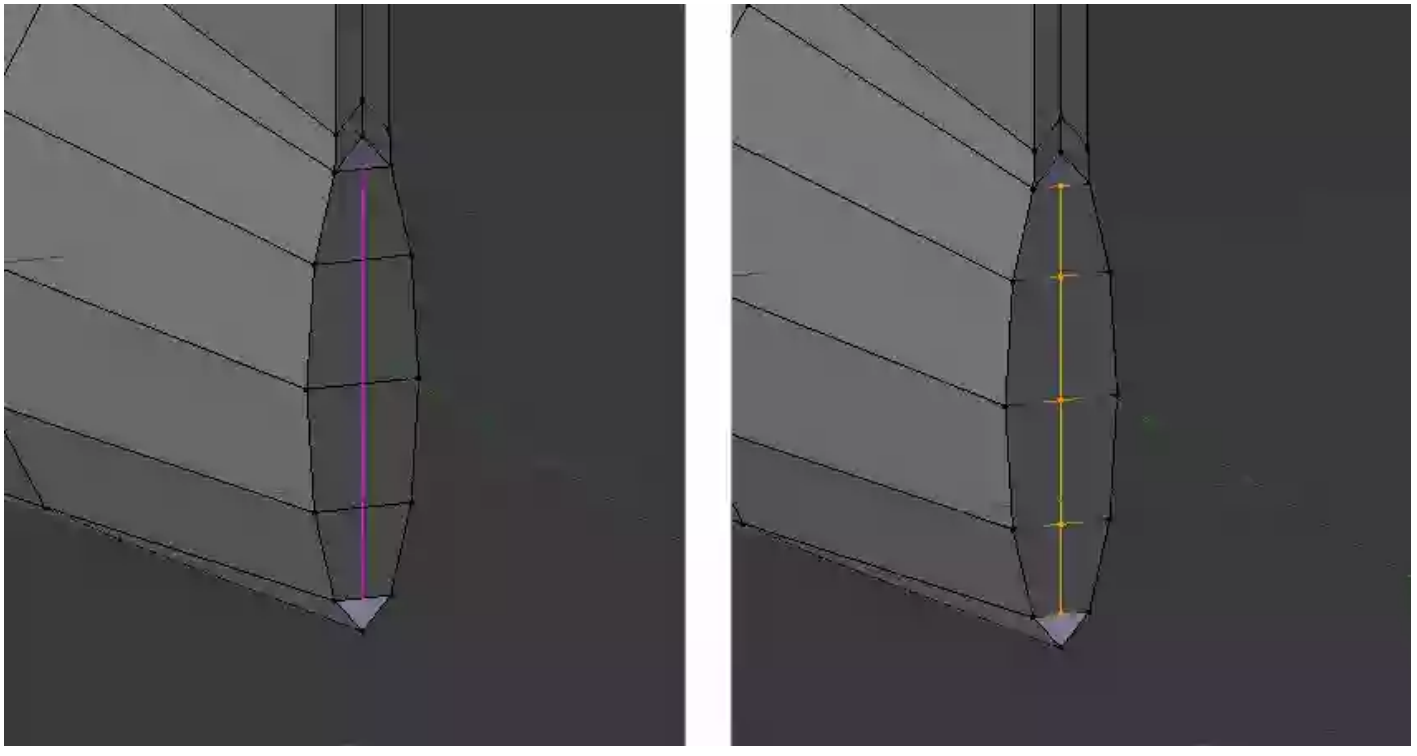




create face and fill the gap

Step 23

Press **A** to deselect the selected vertices. Move the mouse over the newly created faces and press **Ctrl-R** to create a loop cut. Primary-click twice to confirm the position.

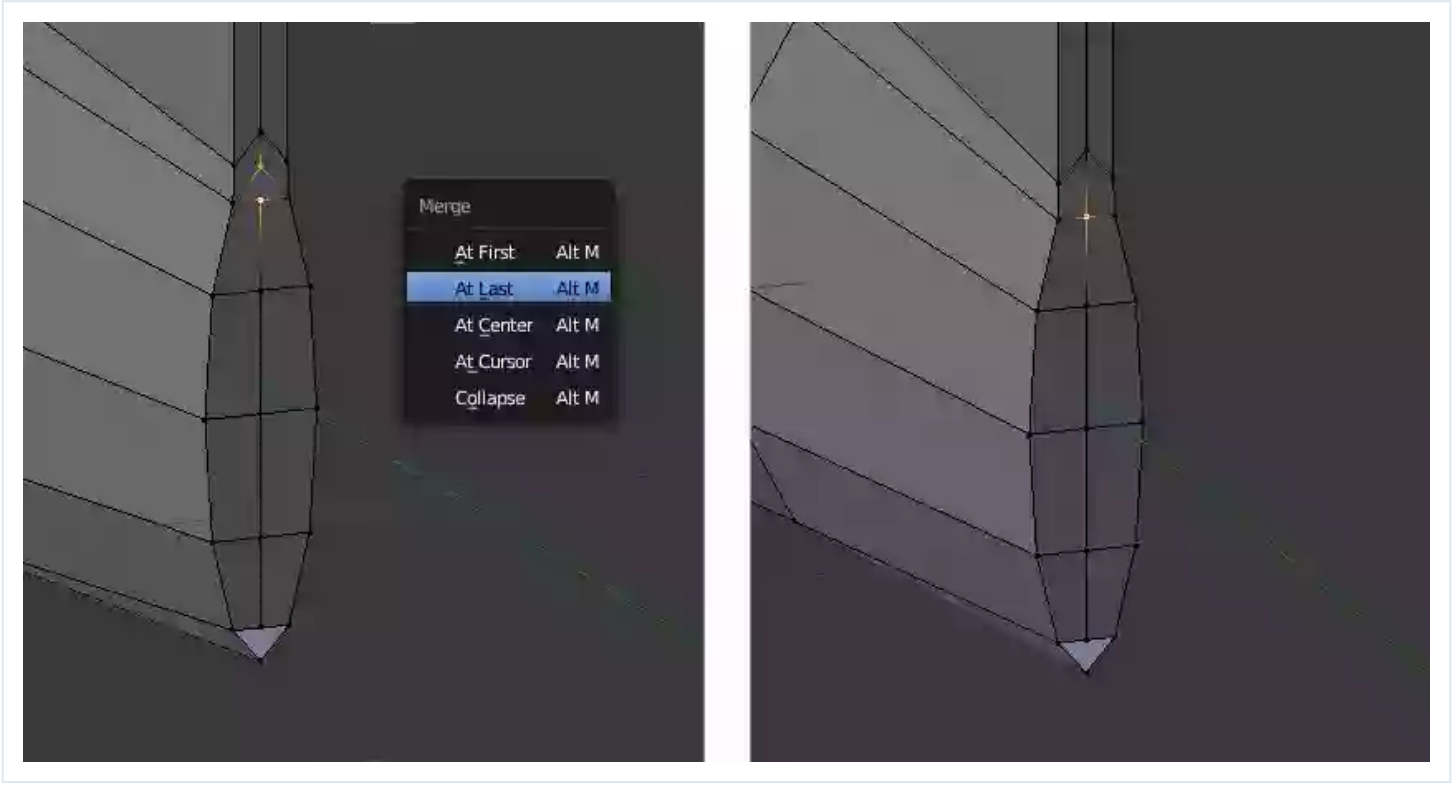


Create a loop cut

Step 24

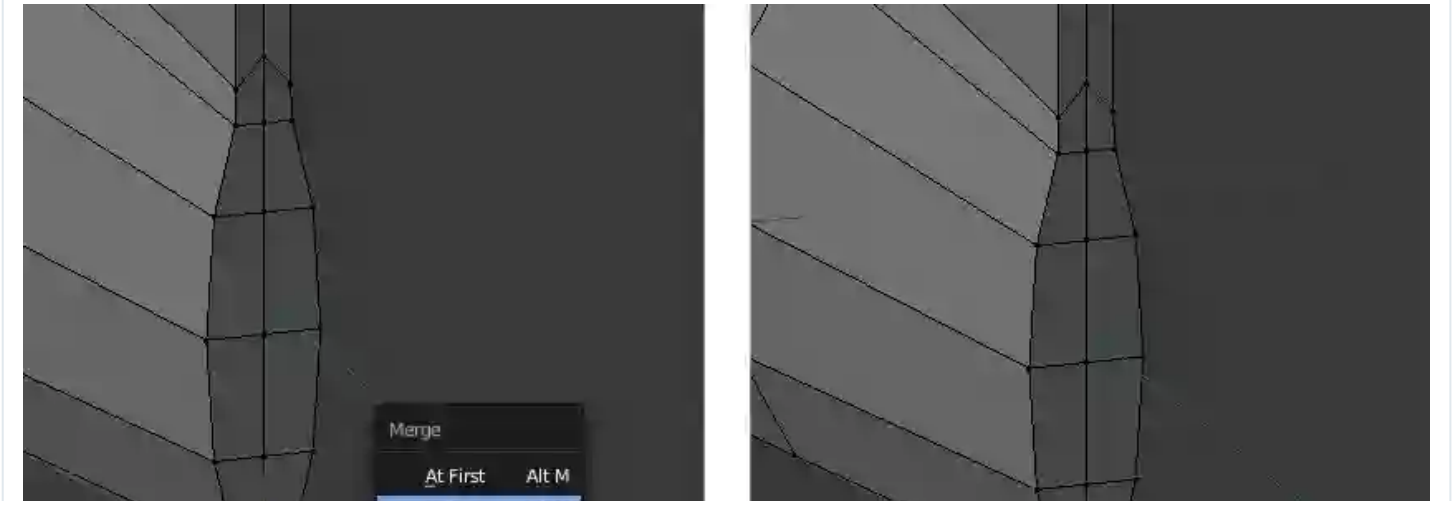
Press **A** to deselect the points. Hold **Shift** key and secondary-click on the top vertex and then the bottom vertex as showing in the image and press **Alt-M** to merge.

In the pop up select **At Last.** This will merge the points at the last selected vertex.



Merge selected vertices

Similarly merge the bottom two vertices at last point.

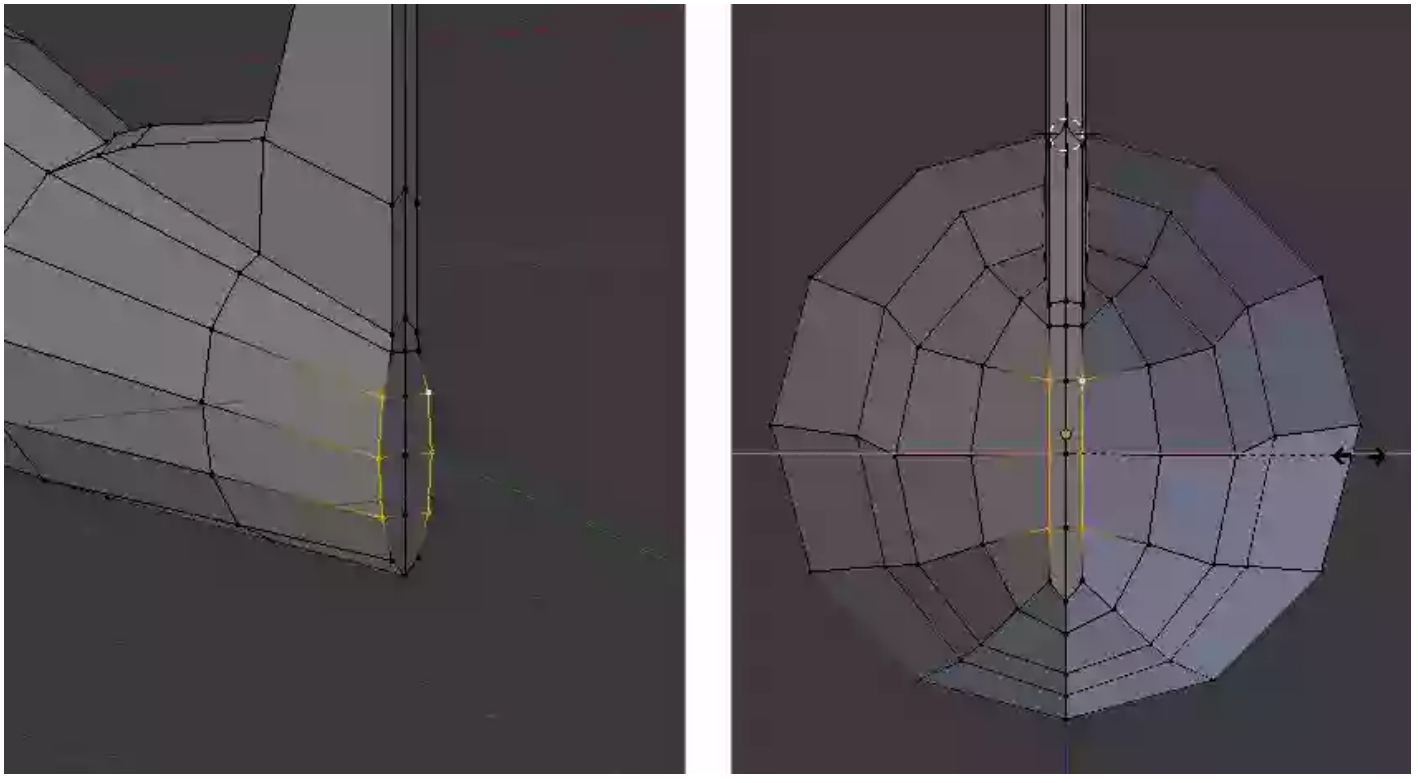


Merge selected vertices

Step 25

Select the vertices as shown in the image and align them in a straight line. You can either move them one by one or by selecting them all and then use the **S** key to scale them down in the back view.

Press **Ctrl-1** to get into back view.



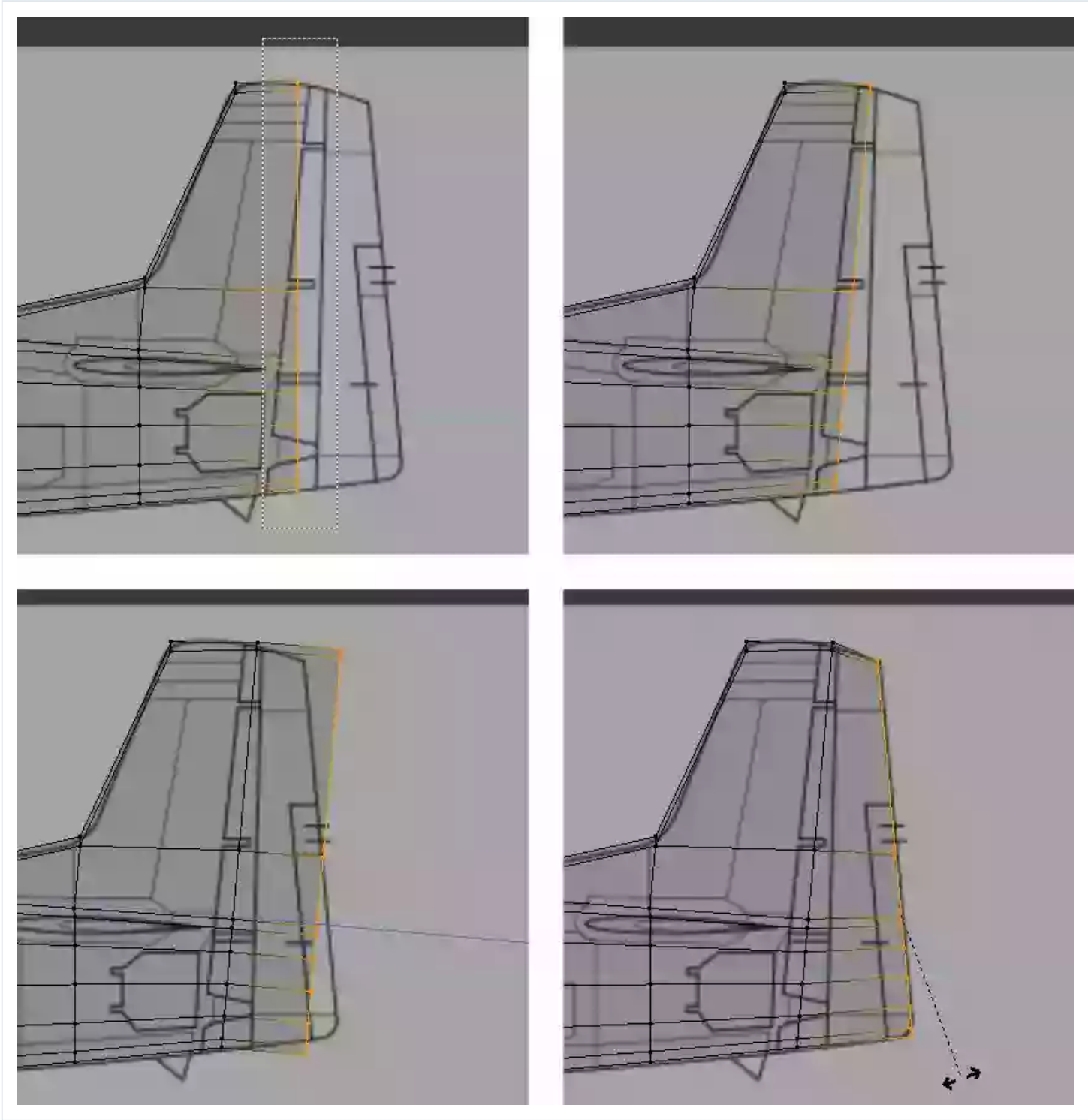
Tweak the vertices

Step 26

- Press **A** to deselect any selected vertices.
- Press **B** and drag select the last row of vertices.
- Press **R** to rotate it so that it matches with the reference image.

- Press **E** and extrude another set till the end.
- Press **R** again to rotate the new extruded set of vertices according to the background image.

You can scale or move individual set of vertices to give it the desired shape.

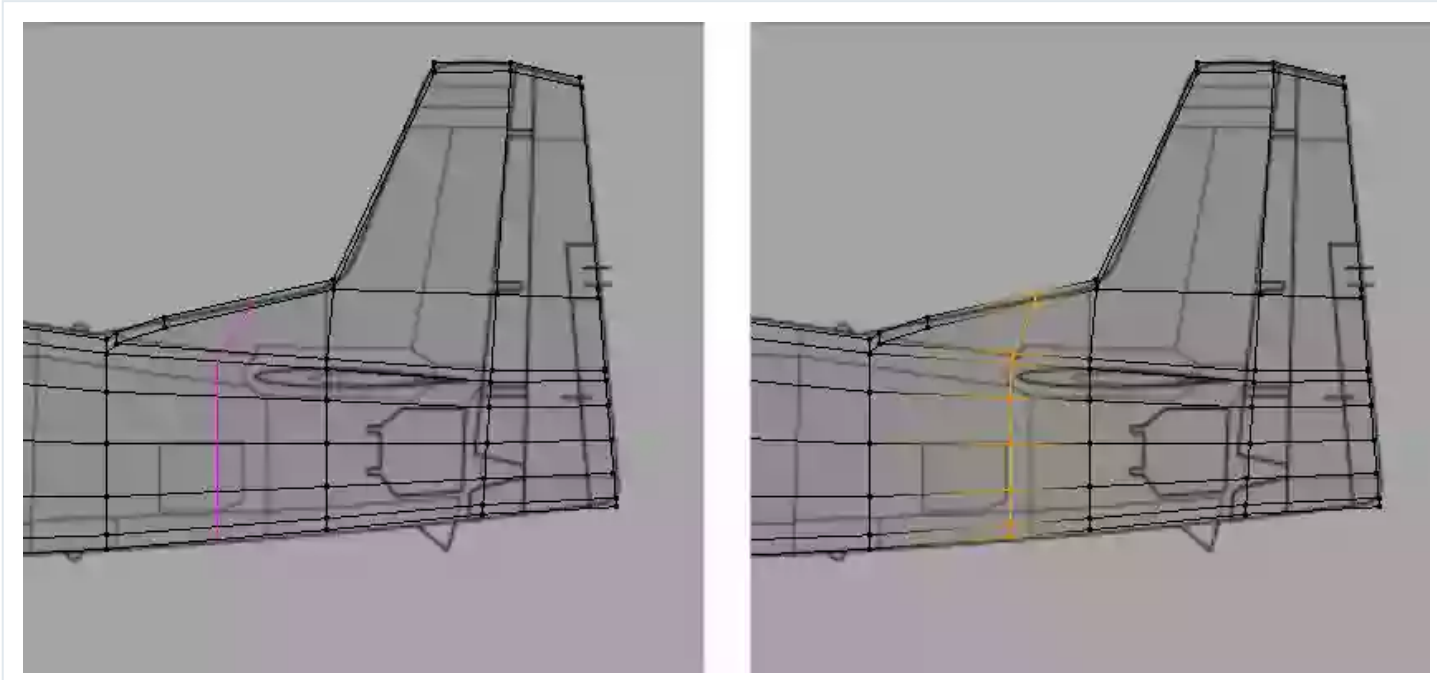


Select and extrude the faces to create rudder

Step 27

Move the mouse over the area below the tail and press **Ctrl-R** to add edge loop. Primary-click to confirm and then drag the mouse such that the new loop is at the beginning of the tail wing.

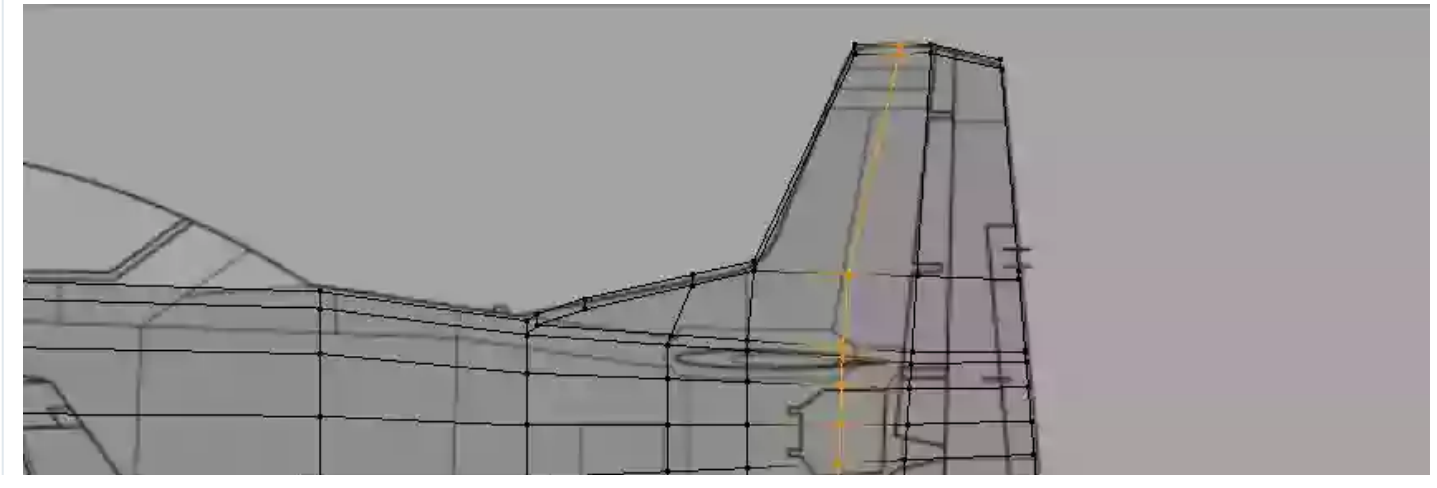
Primary-click again to confirm.



Create a loop cut

Step 28

Similarly add another edge loop such that it goes through the rear end of the tail wing.



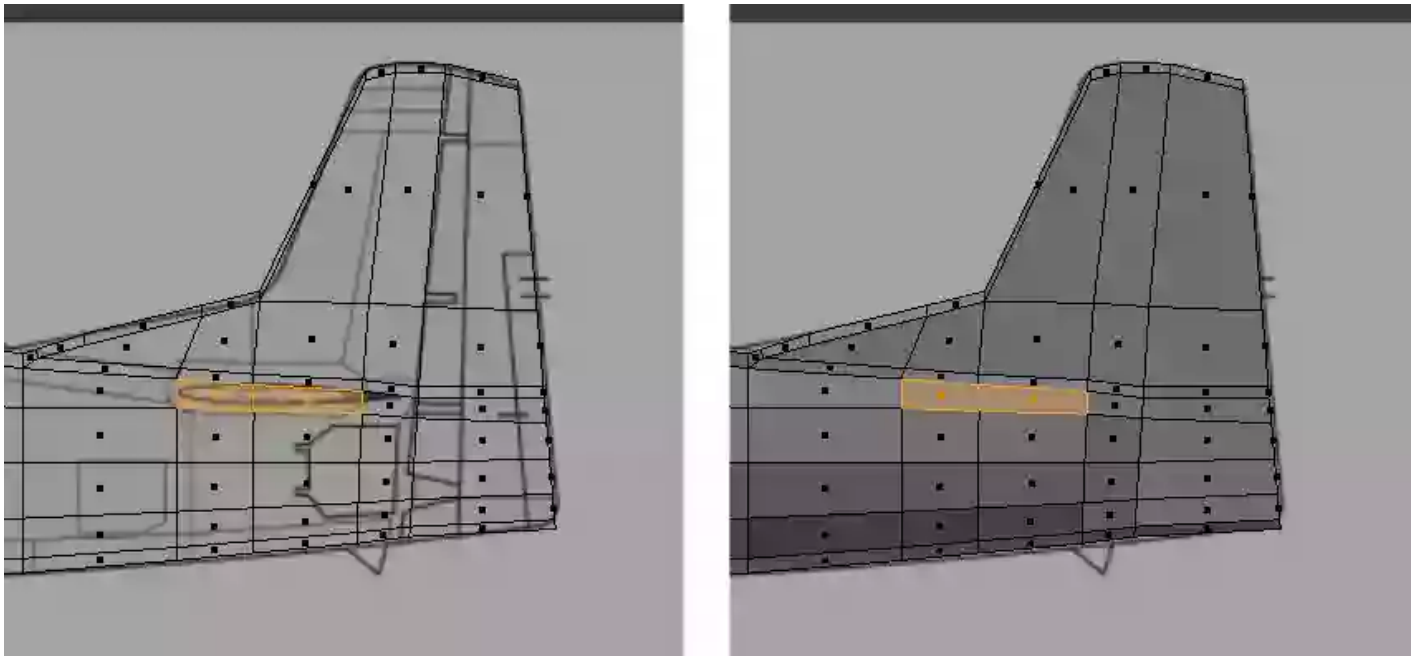
Insert another loop cut

Step 29

Press **Ctrl-Tab** and select face select mode.

Press **Z** to toggle off wire frame mode.

Hold **Shift** and then secondary-click on the two faces from where you will extrude the wings.

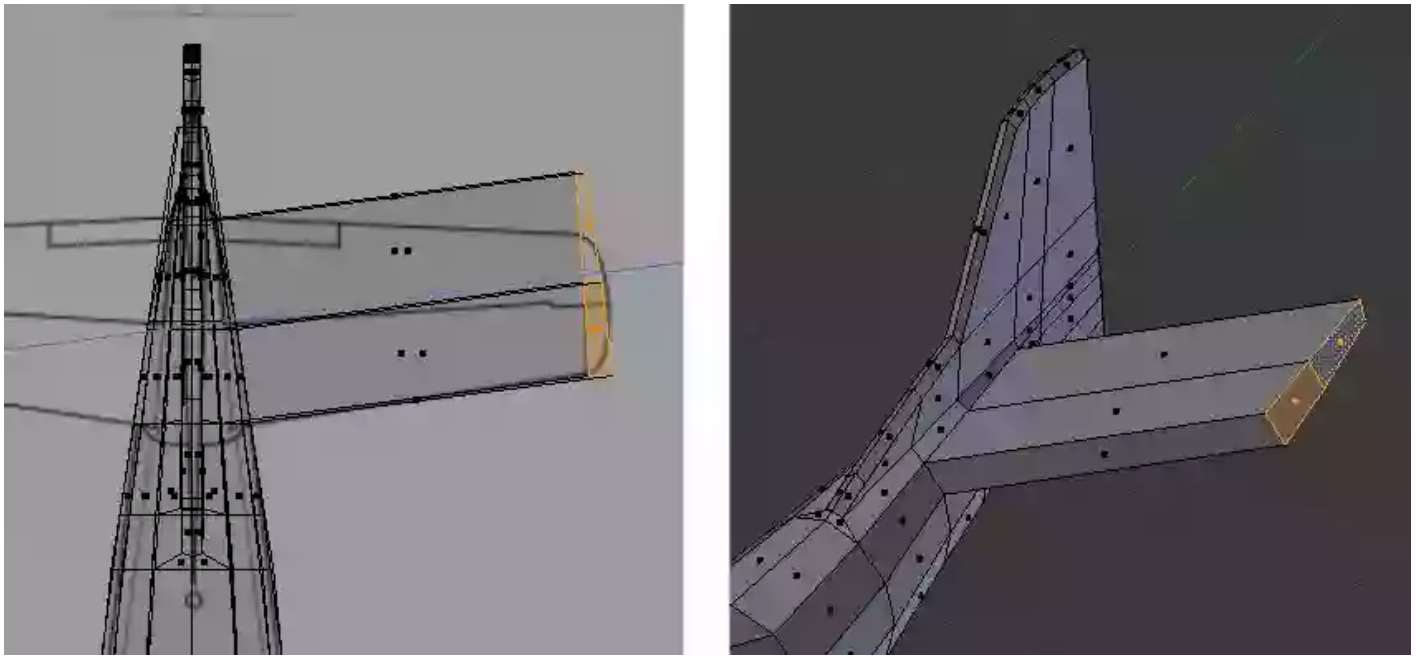


Select two faces

Step 30

Press **7** on the number pad to go to top view.

Press **E** and extrude out the tail wing.

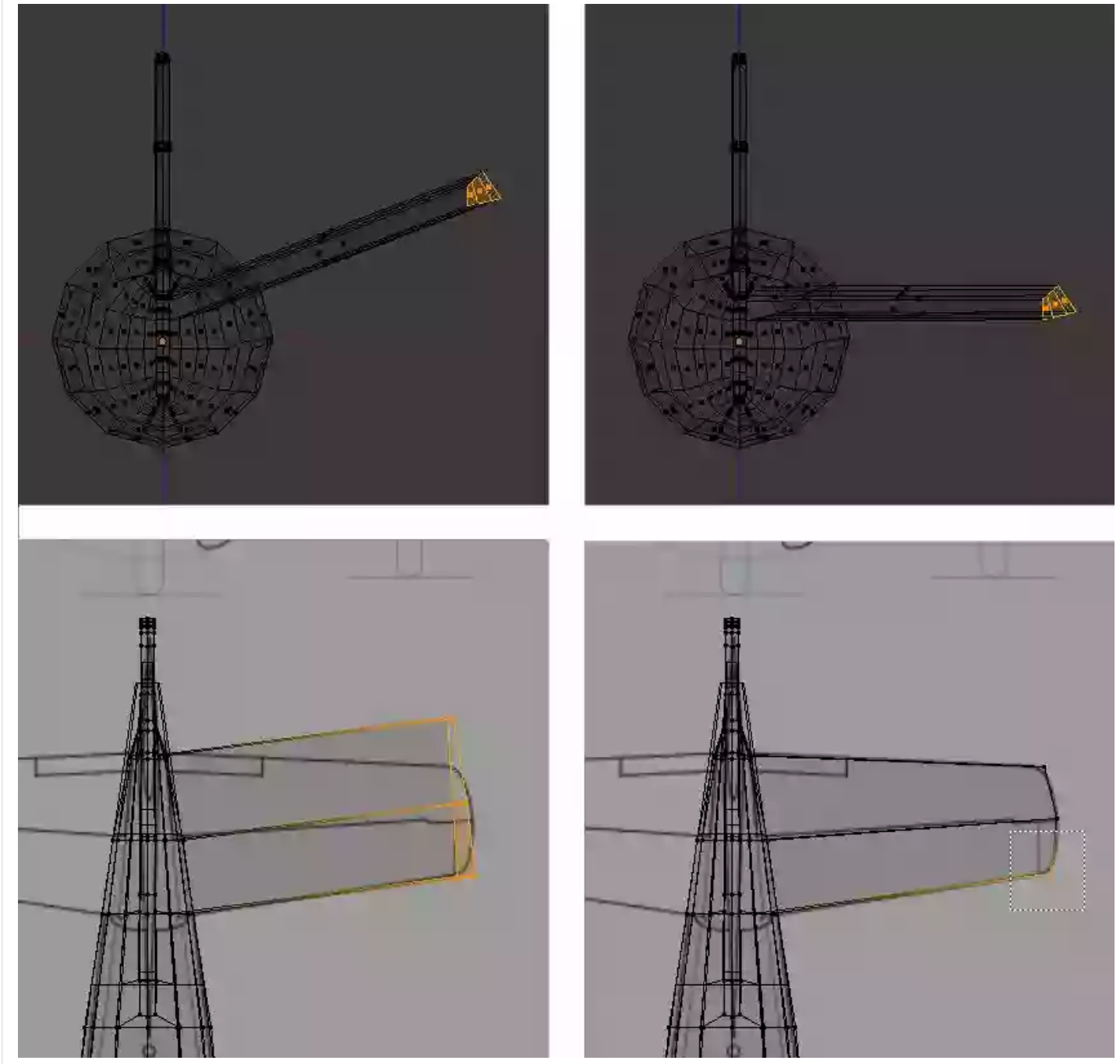


Extrude faces to create wings

Step 31

- Press **1** on the number pad to get into front view.
- With the new extruded faces selected, press **G** and move it down.
- Use the **Z** key to toggle on wire frame mode.
- Press **7** in the number pad to get into top view.
- Press **Ctrl-Tab** and select **Vertex** select mode.
- Press **B** and drag select the vertices and then hit **G** key to move them.

Adjust and match them with the reference.

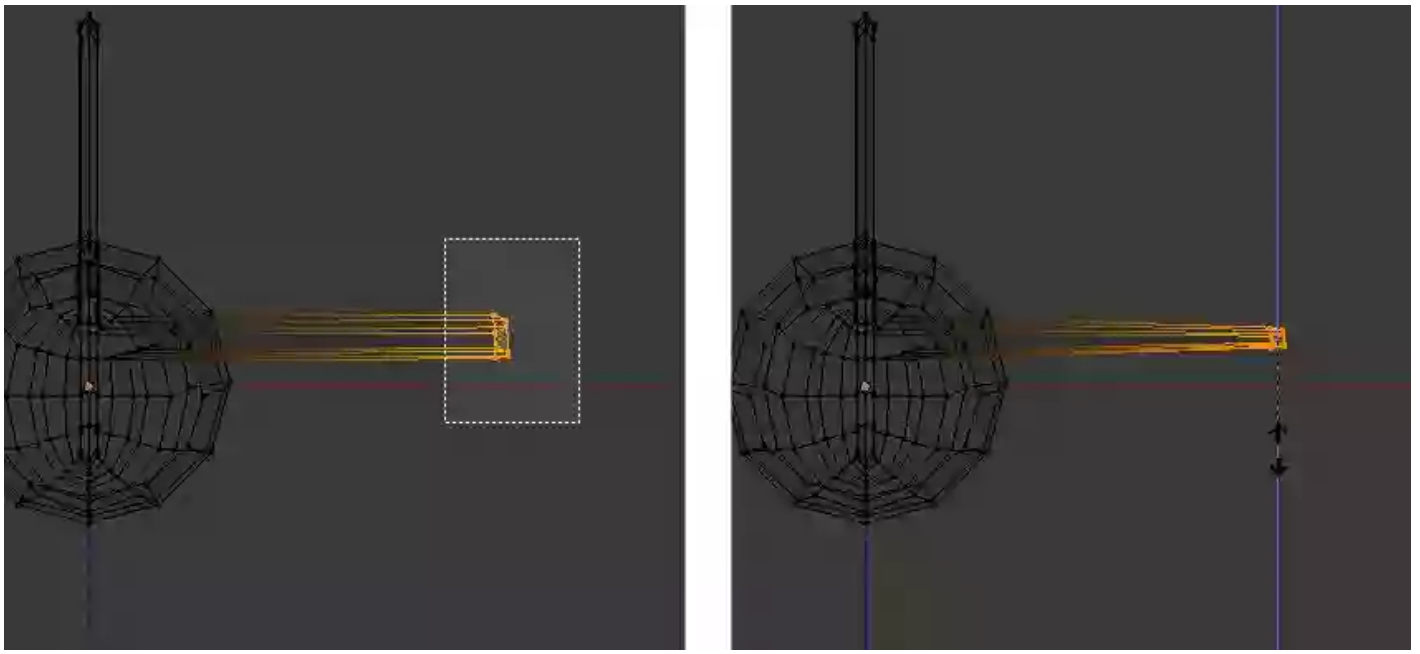


Tweak the vertices to match the reference

Step 32

Step 32

In the front view select the edge of the wing and press **S** to scale them down to reduce its thickness.



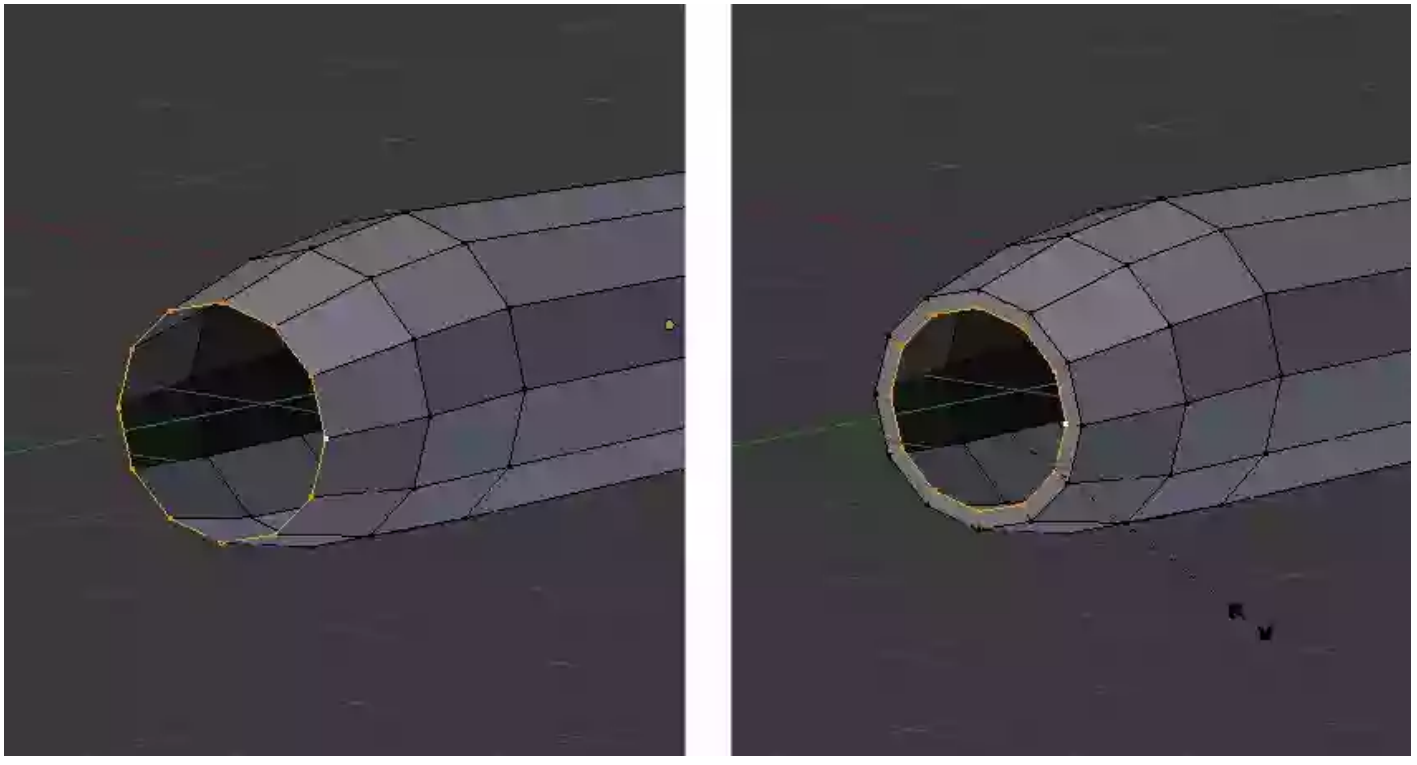
Scale down the selected faces

The rear part is almost done. The wing on the other side will be generated by using the mirror modifier but at a later stage.

Airplane body

Step 33

- Press **A** to deselect any selected vertices. Move the mouse over the front edge loop.
- Hold down **Alt** and then secondary-click on the front edge to select the complete edge loop.
- Press **E** and then secondary-click so that the extruded vertices stays at their origin.
- Press **S** and scale the new points down.
- Primary-click to confirm.

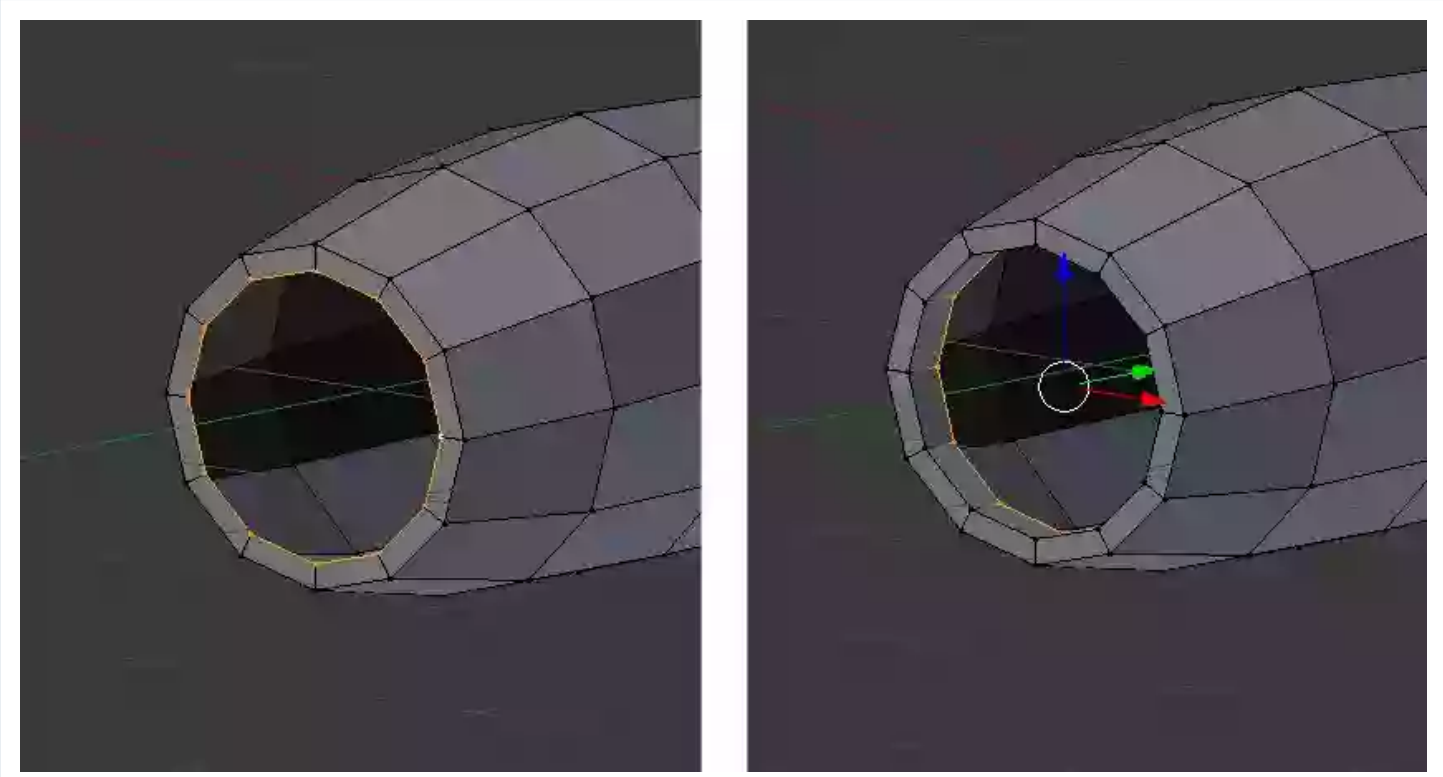


Extrude and scale done front vertices

Step 34

With the new points selected, press **E** again to extrude them

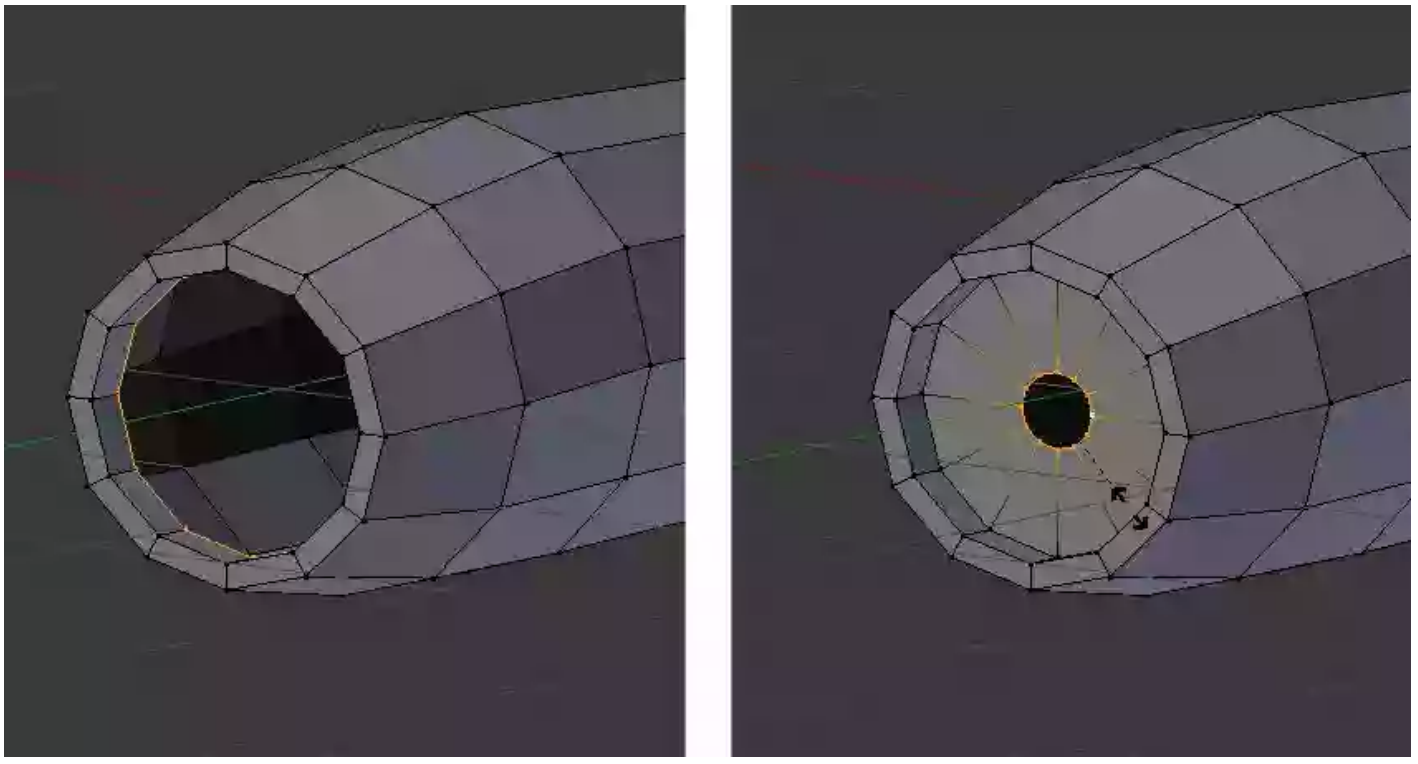
inward just a little bit. Primary-click to confirm the position.



Extrude vertices inwards

Step 35

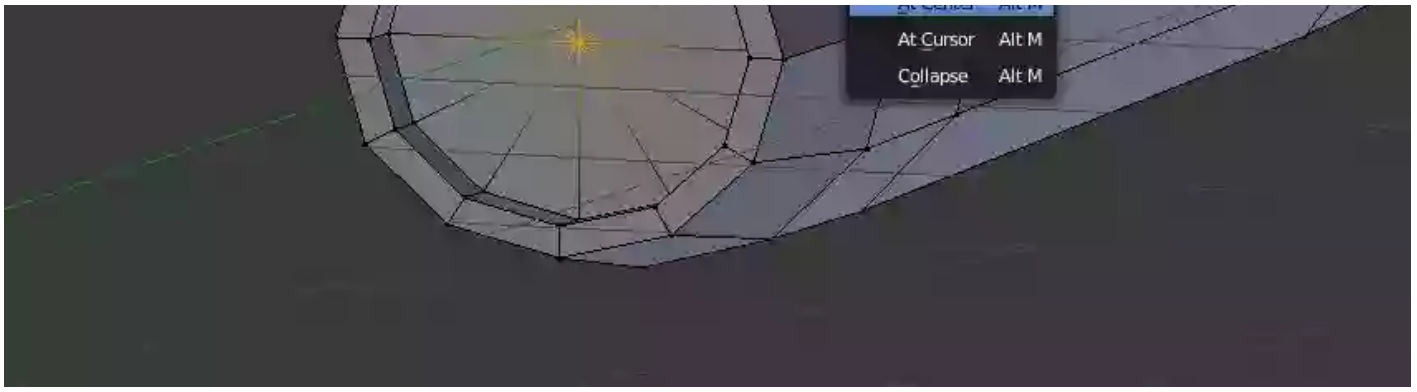
With the edge loop selected, press **E** to extrude them and then secondary-click so that the new points stays at their origin. Press **S** to scale them down.



Scale down selected vertices

Step 36

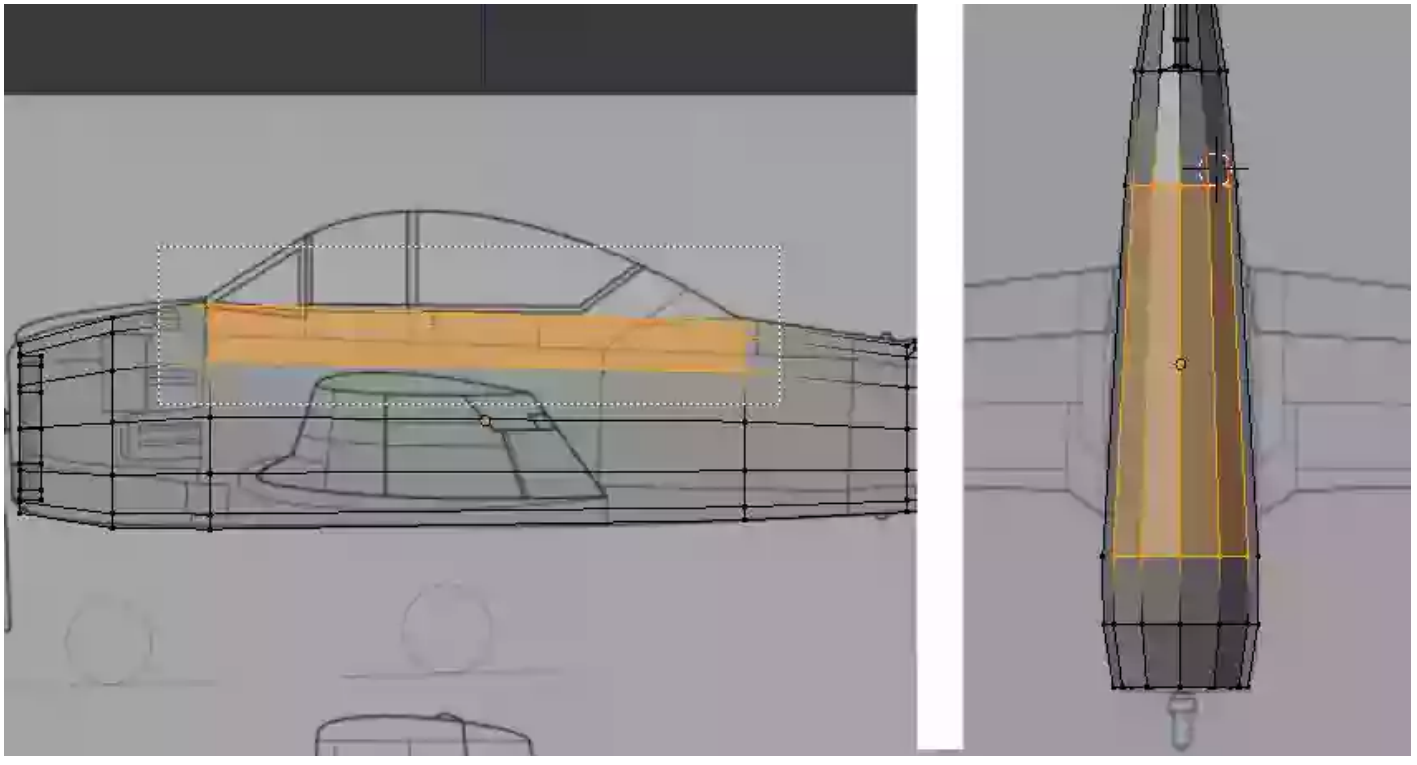
Press **Alt-M** to merge them. In the pop up select **At Center** to merge the vertices at the center.



Merge selected vertices at center

Step 37

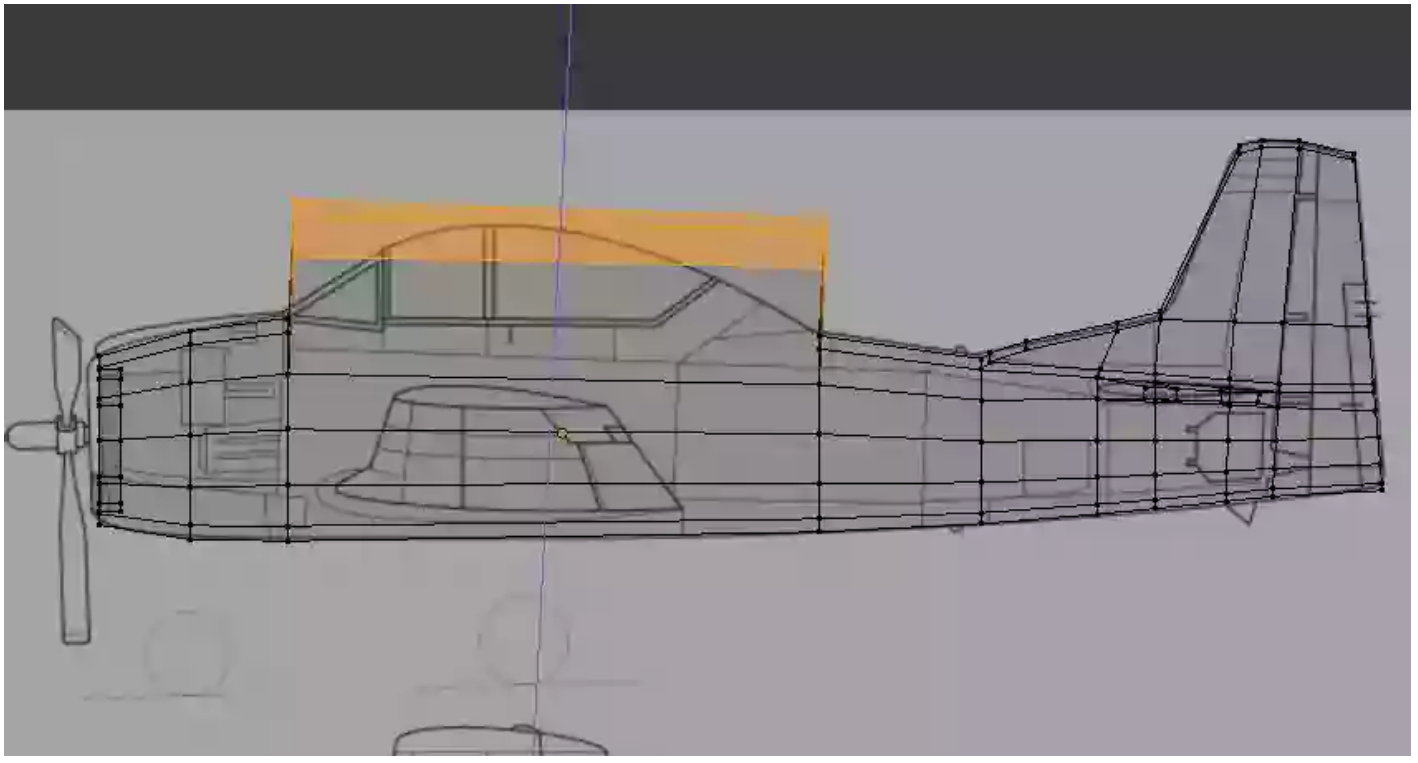
- Press **3** in the number pad to get into side view.
- Press **A** to deselect any selected vertices.
- Press **B** and drag select the top **8** vertices as shown in the image.



Select top vertices

Step 38

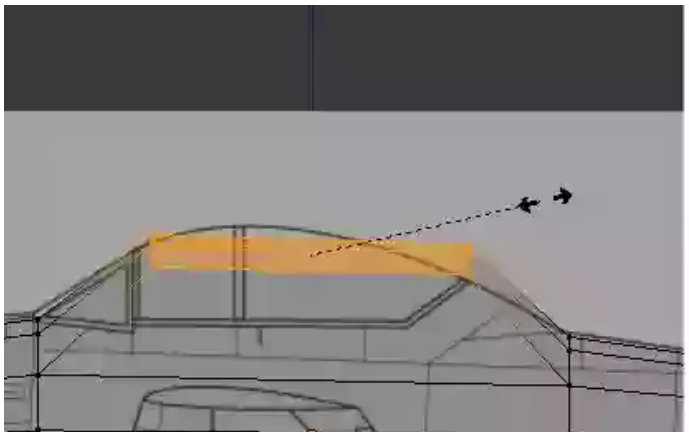
Press **E** to extrude them till the top of the cockpit.

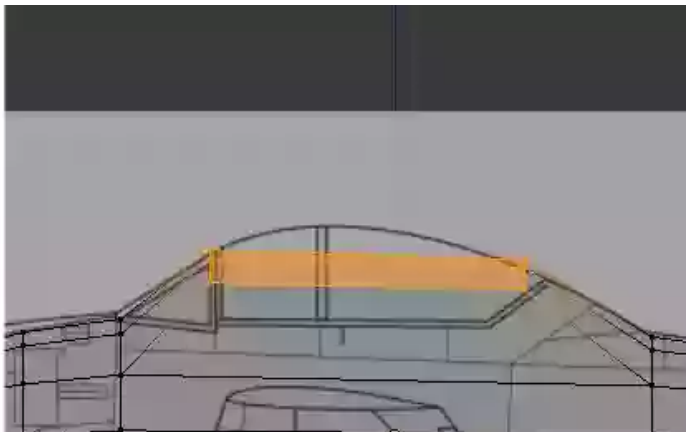


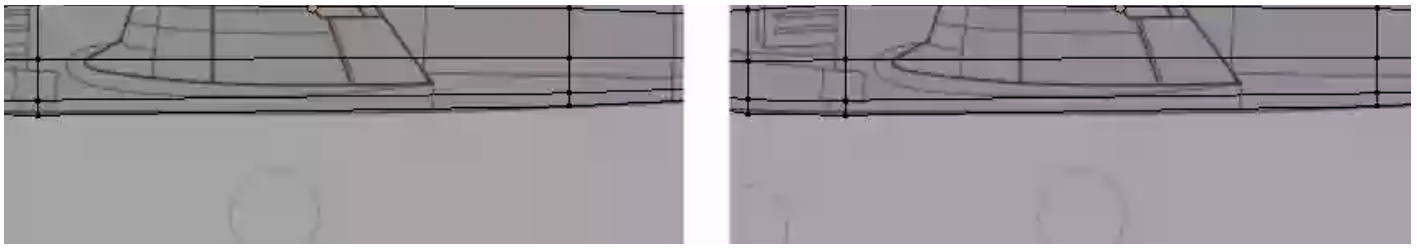
Extrude selected vertices

Step 39

With the new vertices selected, press **S** and scale them down.





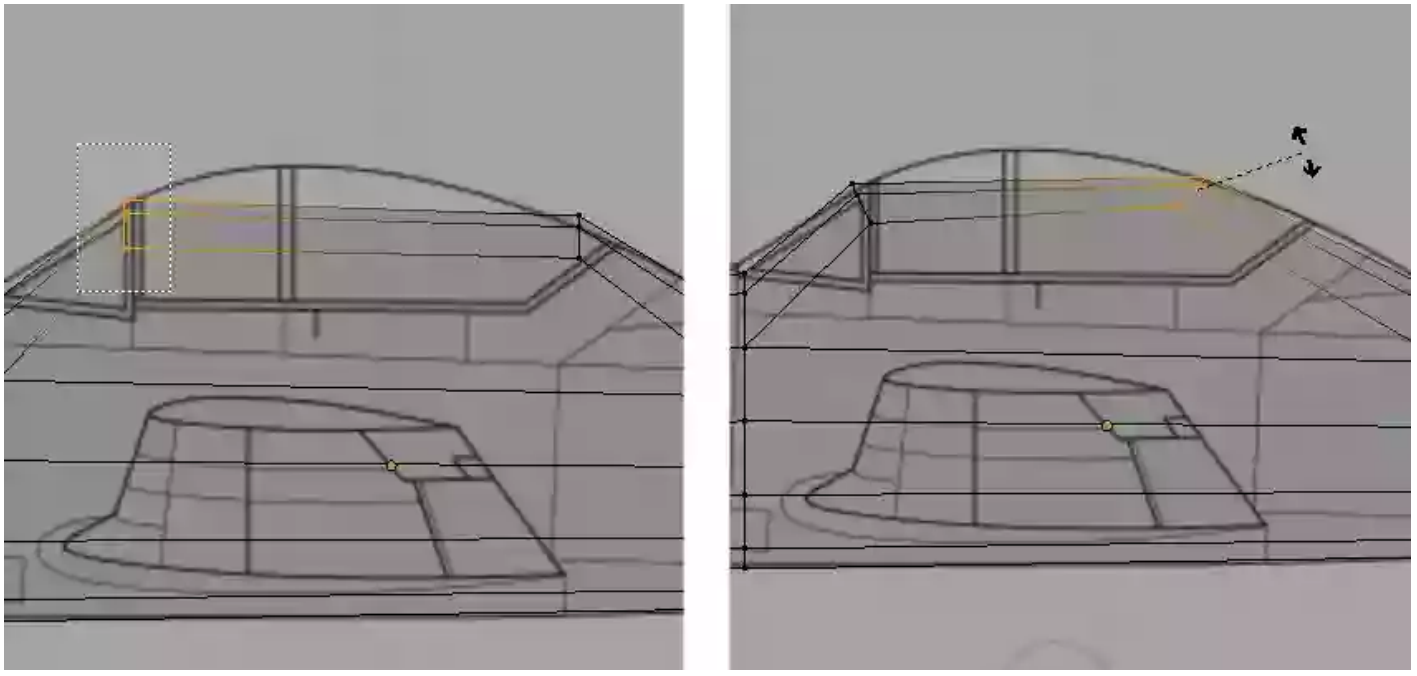


Scale down to match the reference

Step 40

- Press **A** to deselect the selection.
- Press **B** and drag select the front vertices.
- Press **R** and rotate them. Left click to confirm.

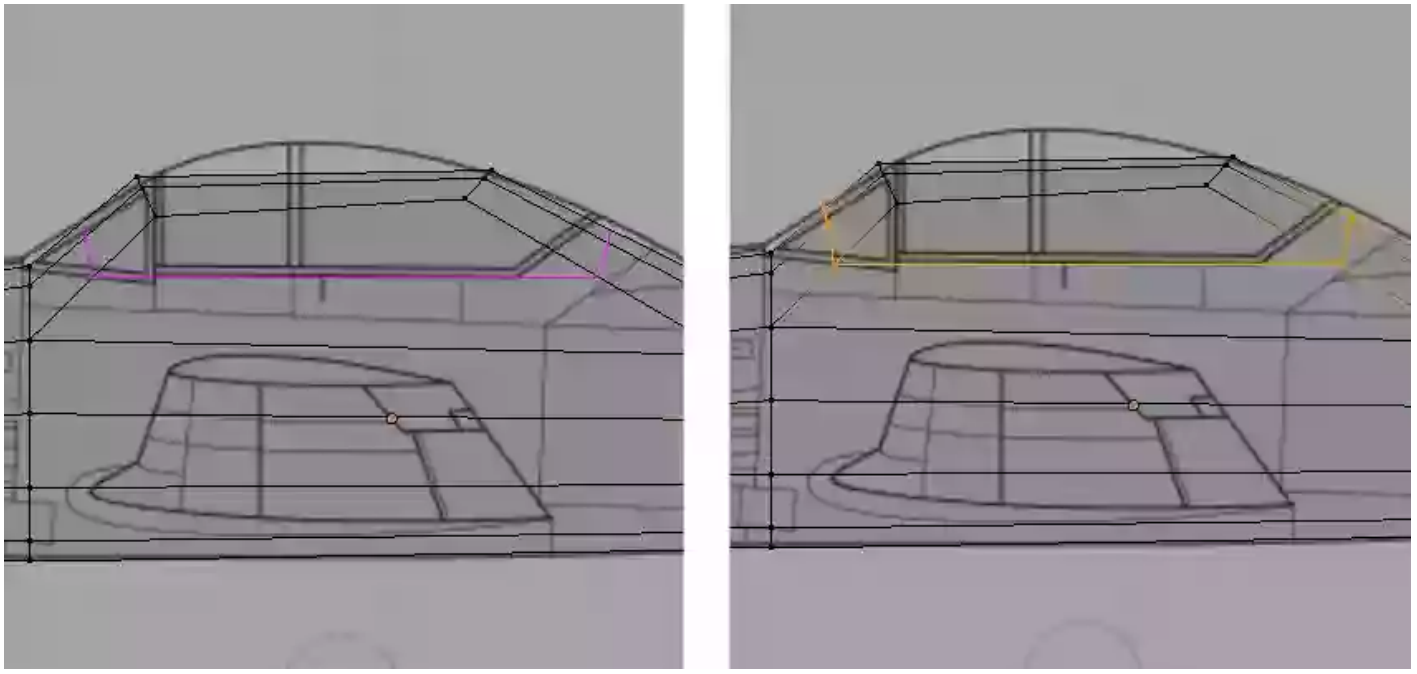
Do the same for the rear part.



Select and rotate vertices

Step 41

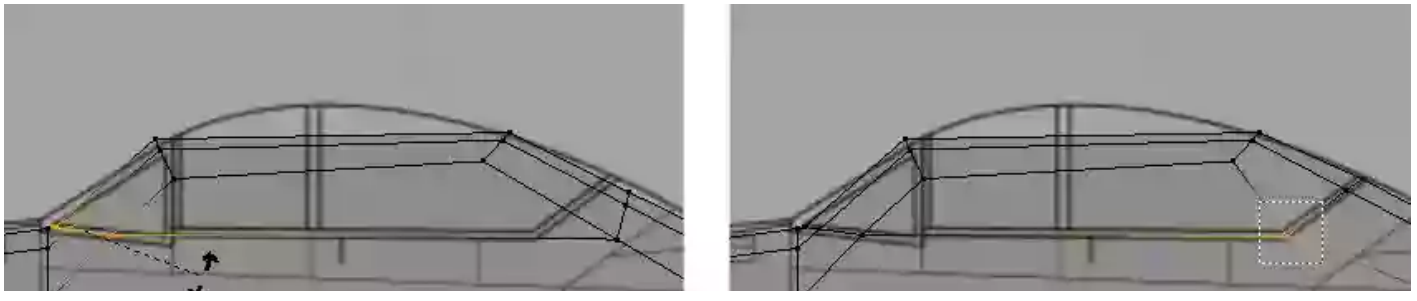
Press **Ctrl-R** to create an edge loop as shown in the image.
Primary-click twice to confirm.

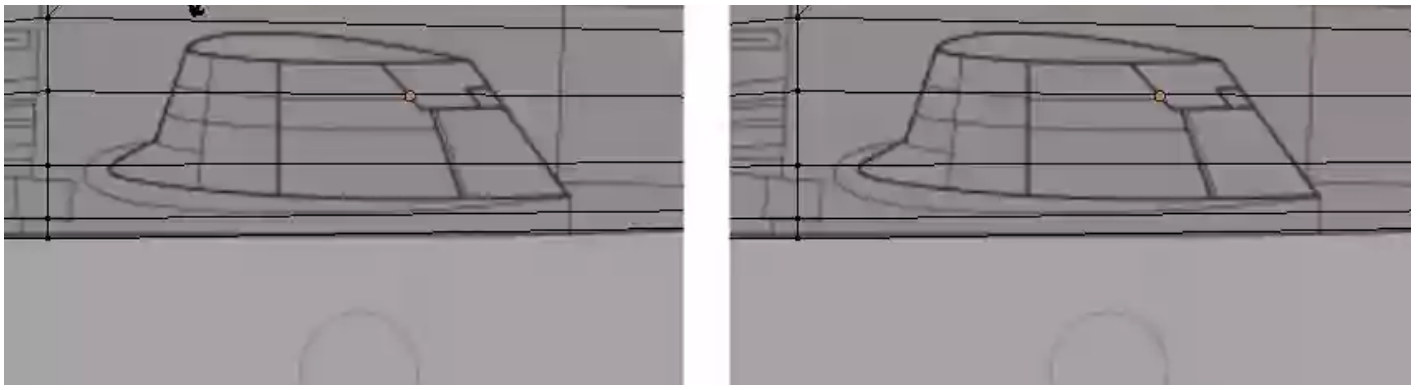


Add a new loop cut

Step 42

- Press **A** to deselect the vertices.
- Press **B** and drag select the front vertices and press **R** to rotate it.
- Press **A** again to deselect them.
- Press **B** to drag select the vertices as shown in the image and press **G** to move them to the edge of the cockpit.



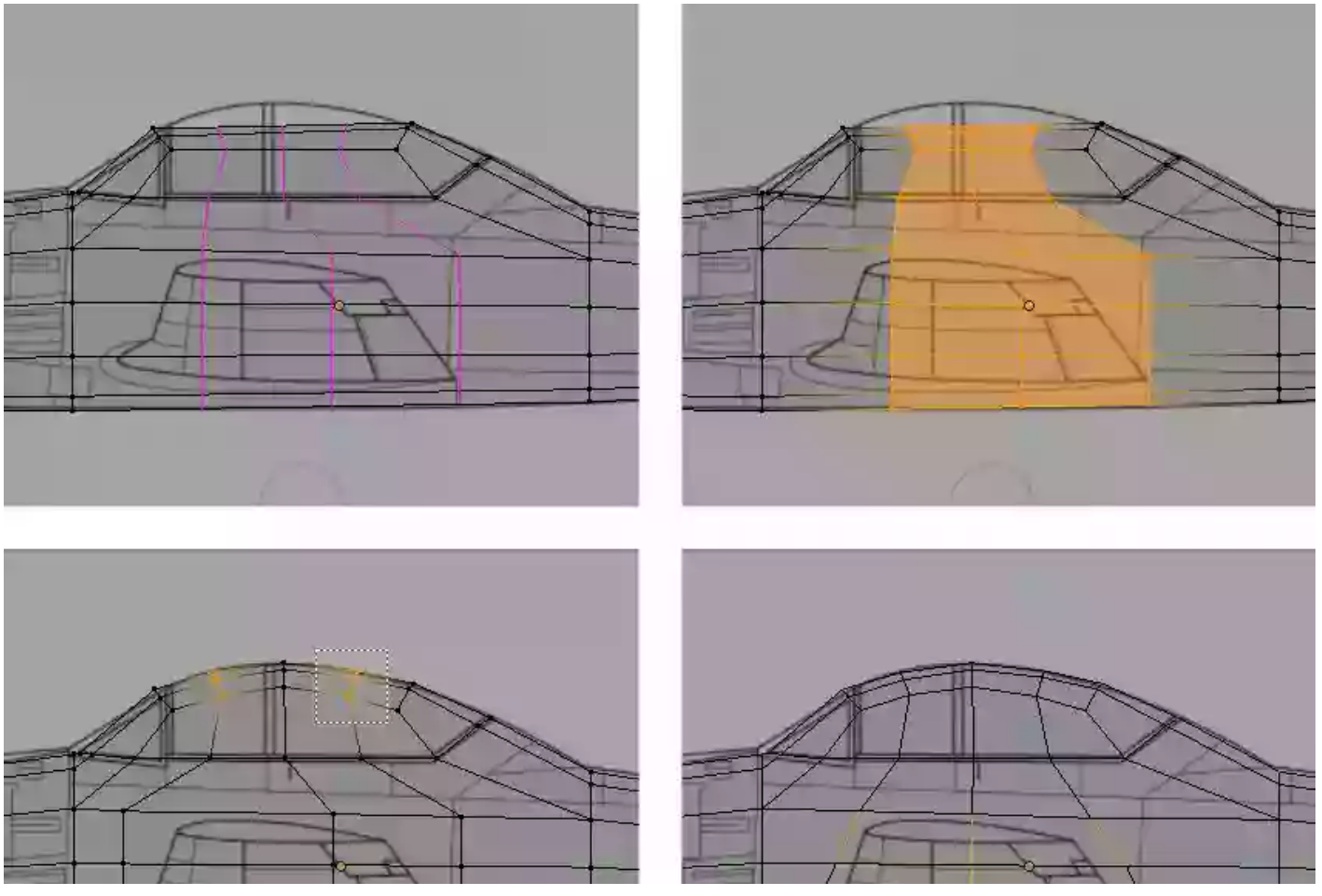


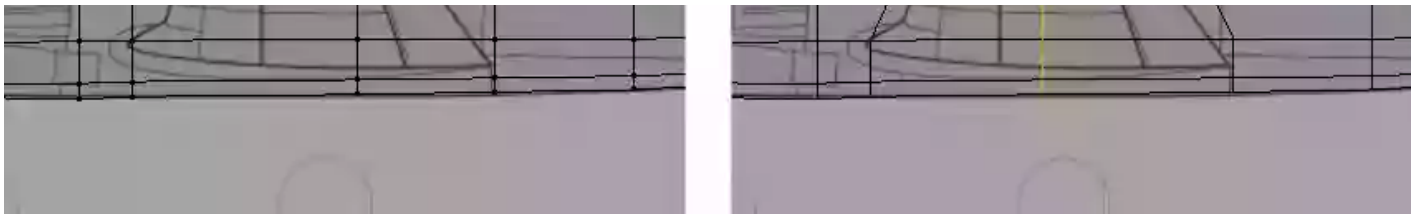
Select and tweak vertices

Step 43

Move the mouse over the cockpit and press **Ctrl-R**. Use the mouse scroll wheel to increase the number of loops cuts to three.

Primary-click twice to create edge loops. Press **A** to deselect the vertices. Select and move them to match the smooth shape of cockpit.





Add three loop cuts and adjust them

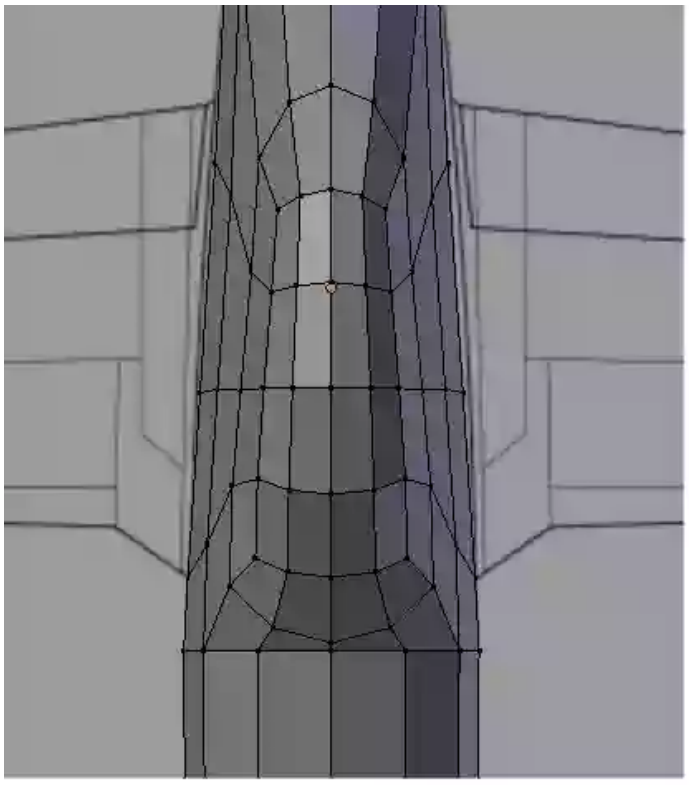
Step 44

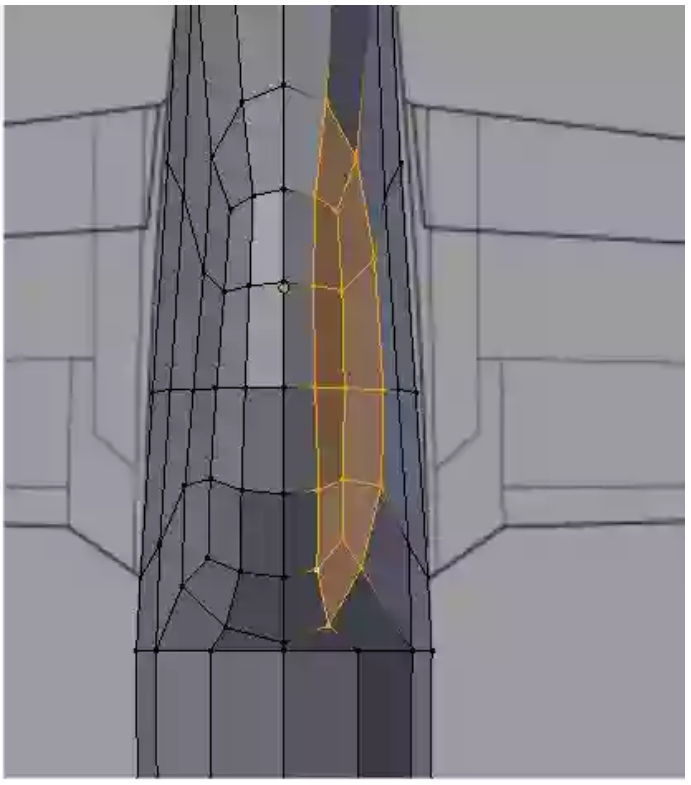
Press **7** on the number pad to get into top view. Select and move the vertices of the cockpit (only one side) to give it a nice round shape.

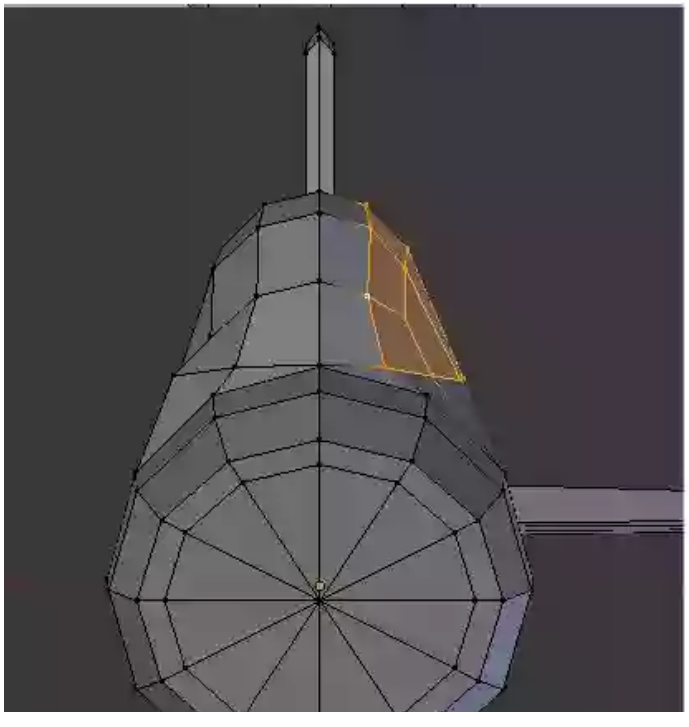
You don't have to match the symmetry as we will do it later with help of mirror modifier.

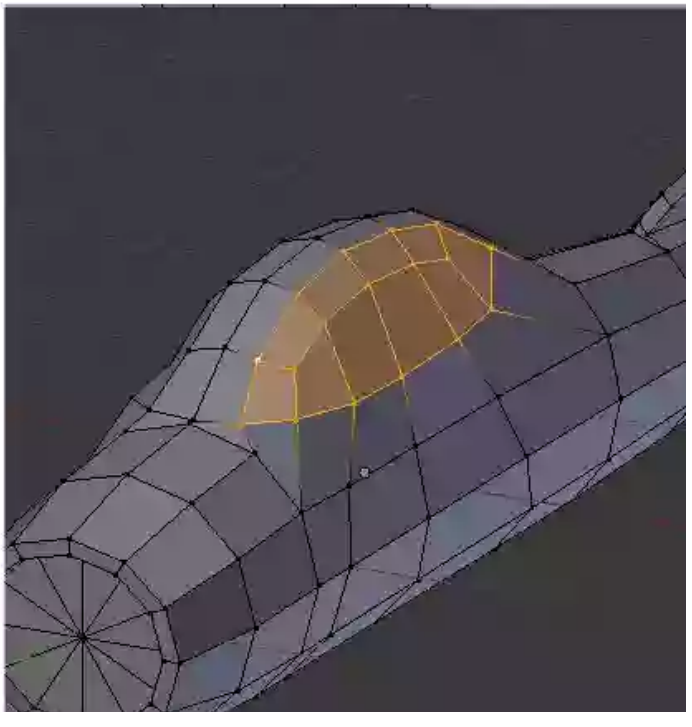
Secondary-click to select and **G** key to move. Check from front side as well.

Press **1** in the number pad to get into front view.





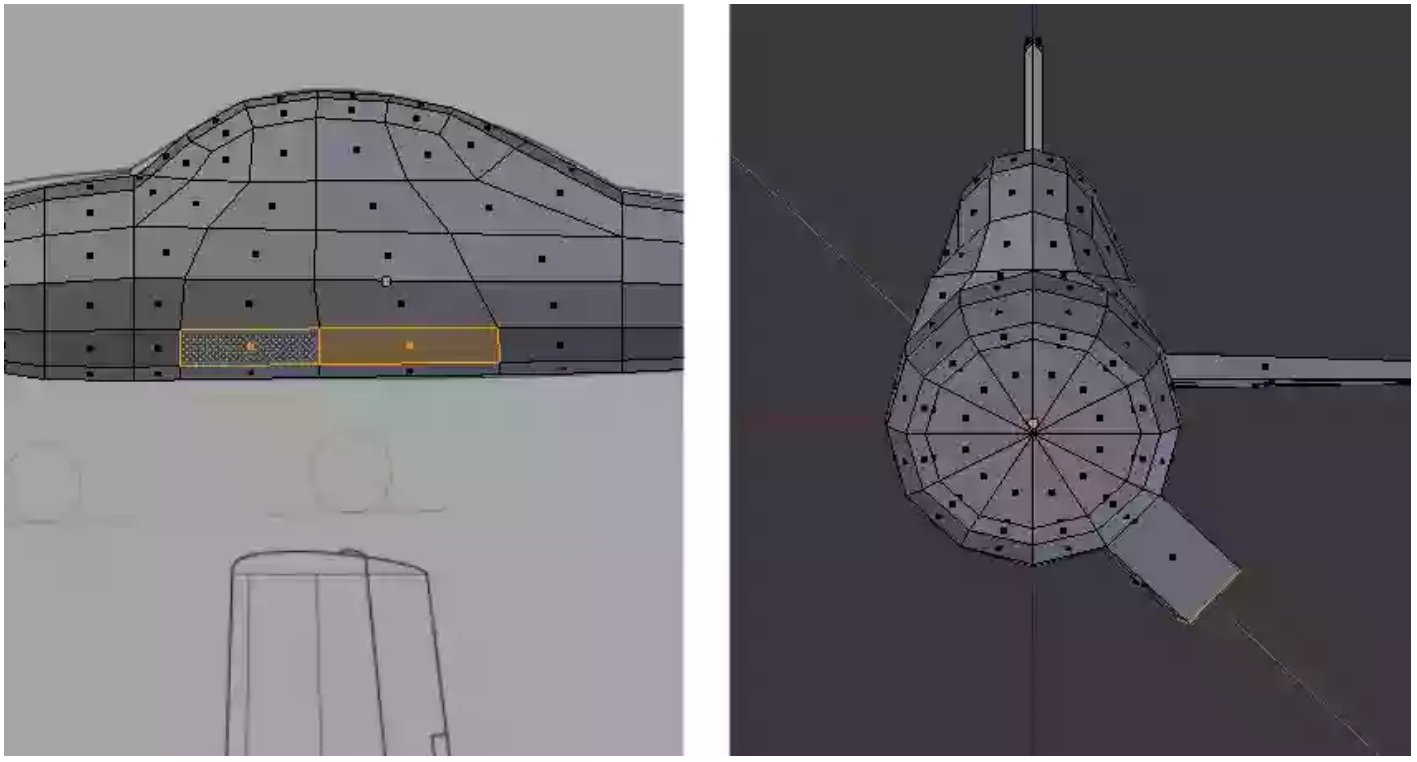




Give round shape to the cockpit

Step 45

Press **Ctrl-Tab** and select **Face** as select mode. Hold **Shift** and right click on the two faces as shown to select them. Press **1** in the number pad to get into front view. With the faces selected press **E** to extrude them.

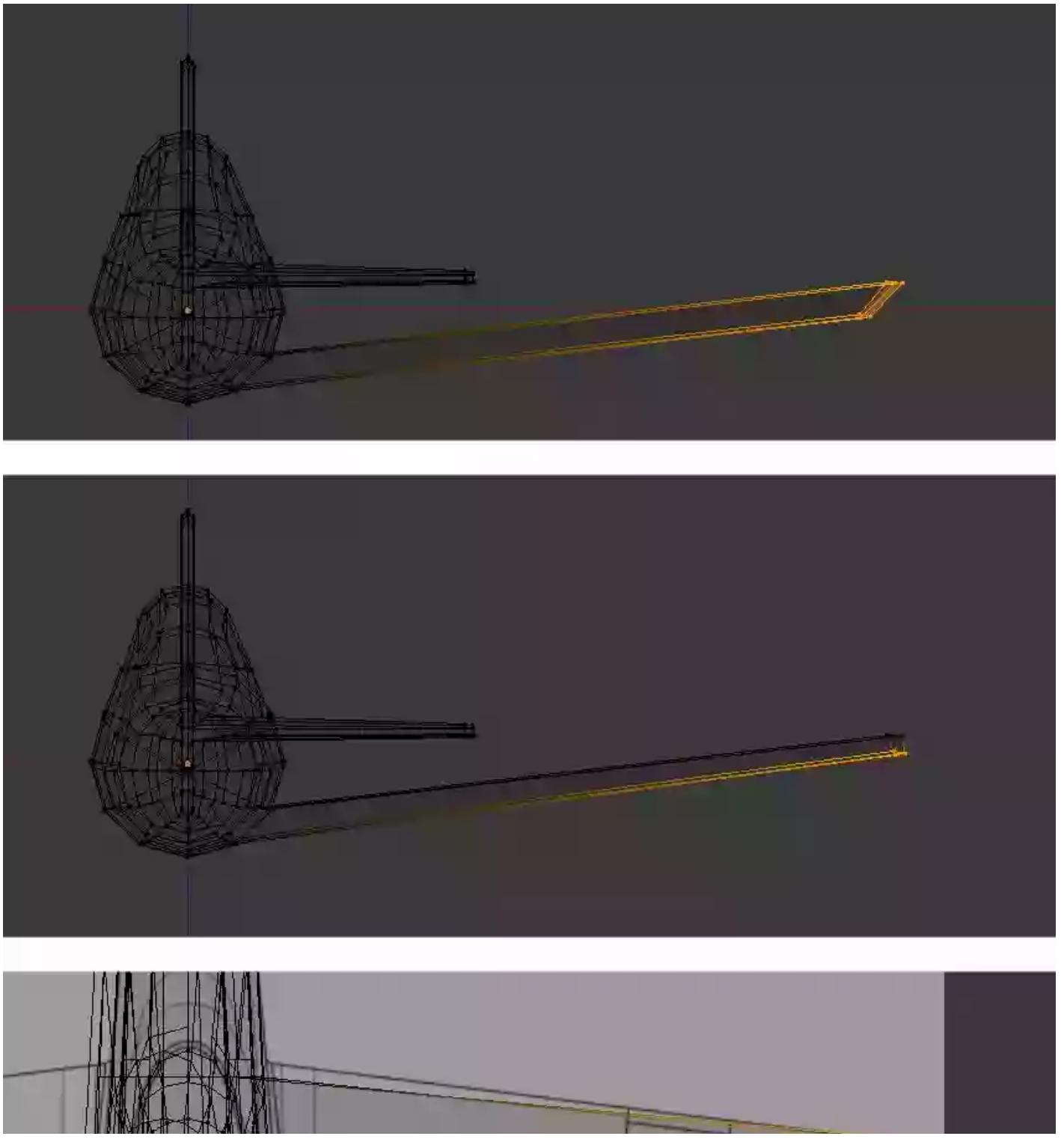


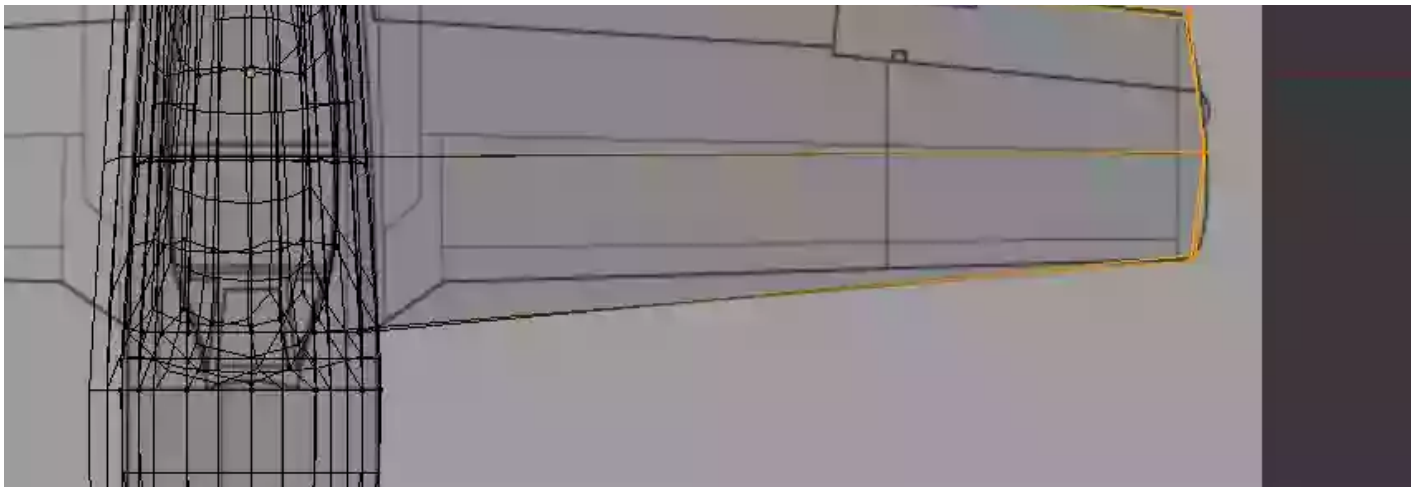
Select two faces and extrude them

Step 46

- Press **Z** to toggle to wire-frame mode.
- Press **A** to deselect the vertices.
- Press **Ctrl-Tab** and select vertex select mode.
- Press **B** and drag select the bottom vertices of the extruded wing and press **G** to move them upwards to make the wing slim.
- Press **7** in the number pad to get into top view.

Select and move the vertices of the wing to match the background image.

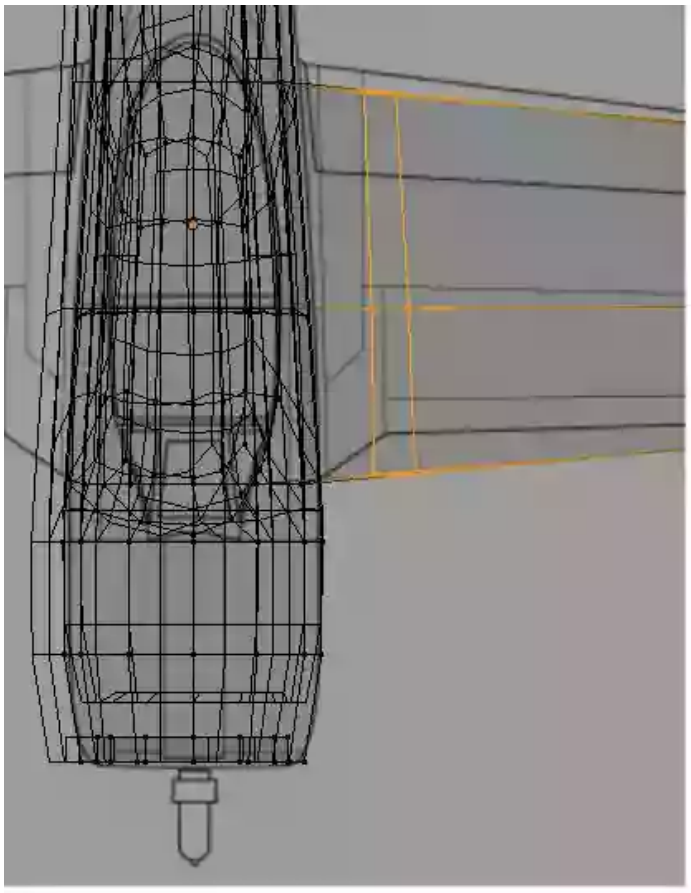


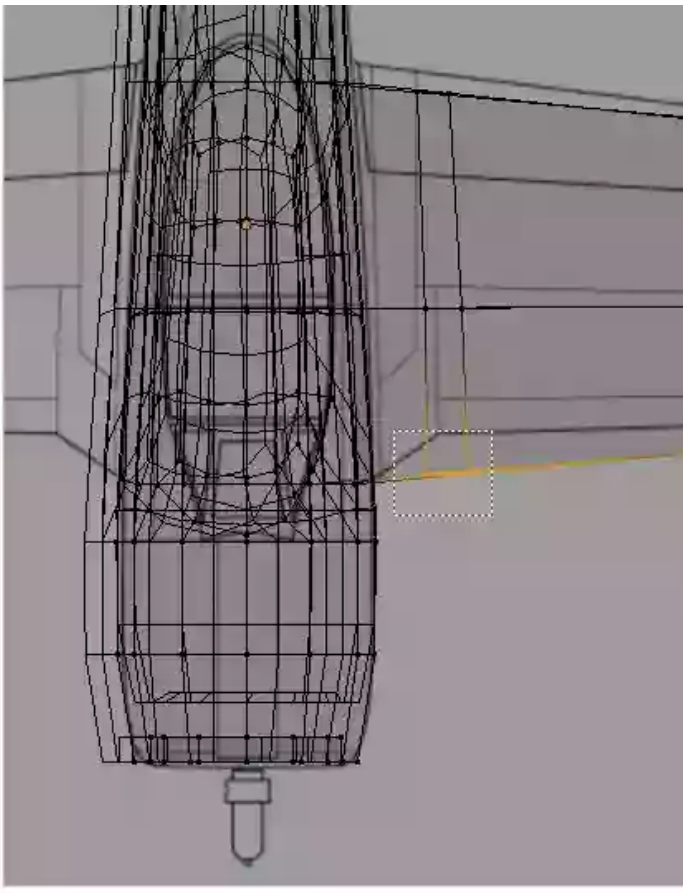


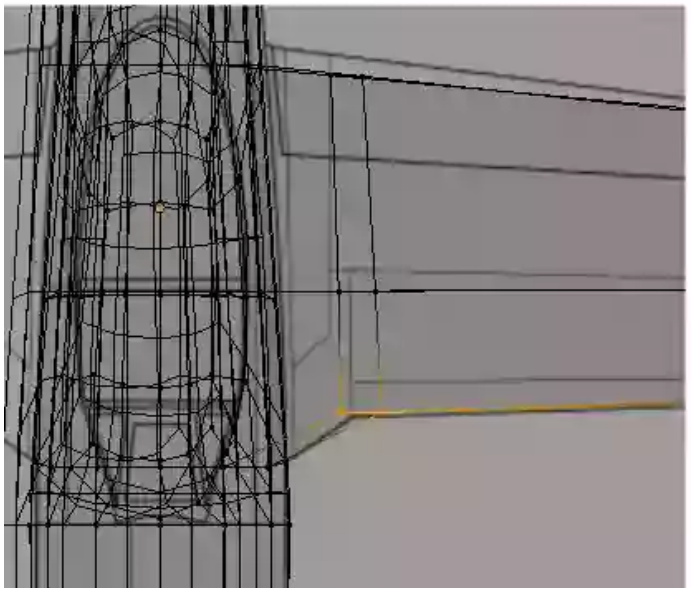
Tweak the vertices to match reference

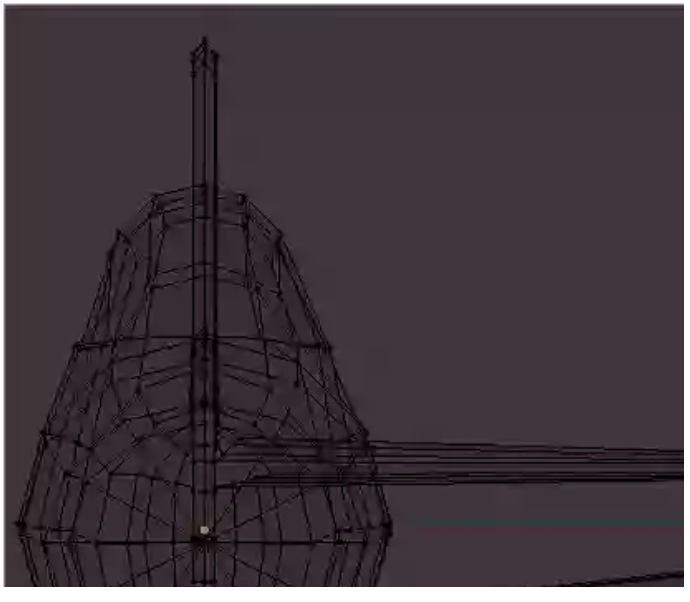
Step 47

- Press **Ctrl-R** to add an edge loop on the wing.
- Press **A** to deselect the vertices.
- Press **B** and drag select the front two vertices.
- Press **G** and move the vertices to match the image.
- Press **1** to get into front view and tweak the bottom vertices







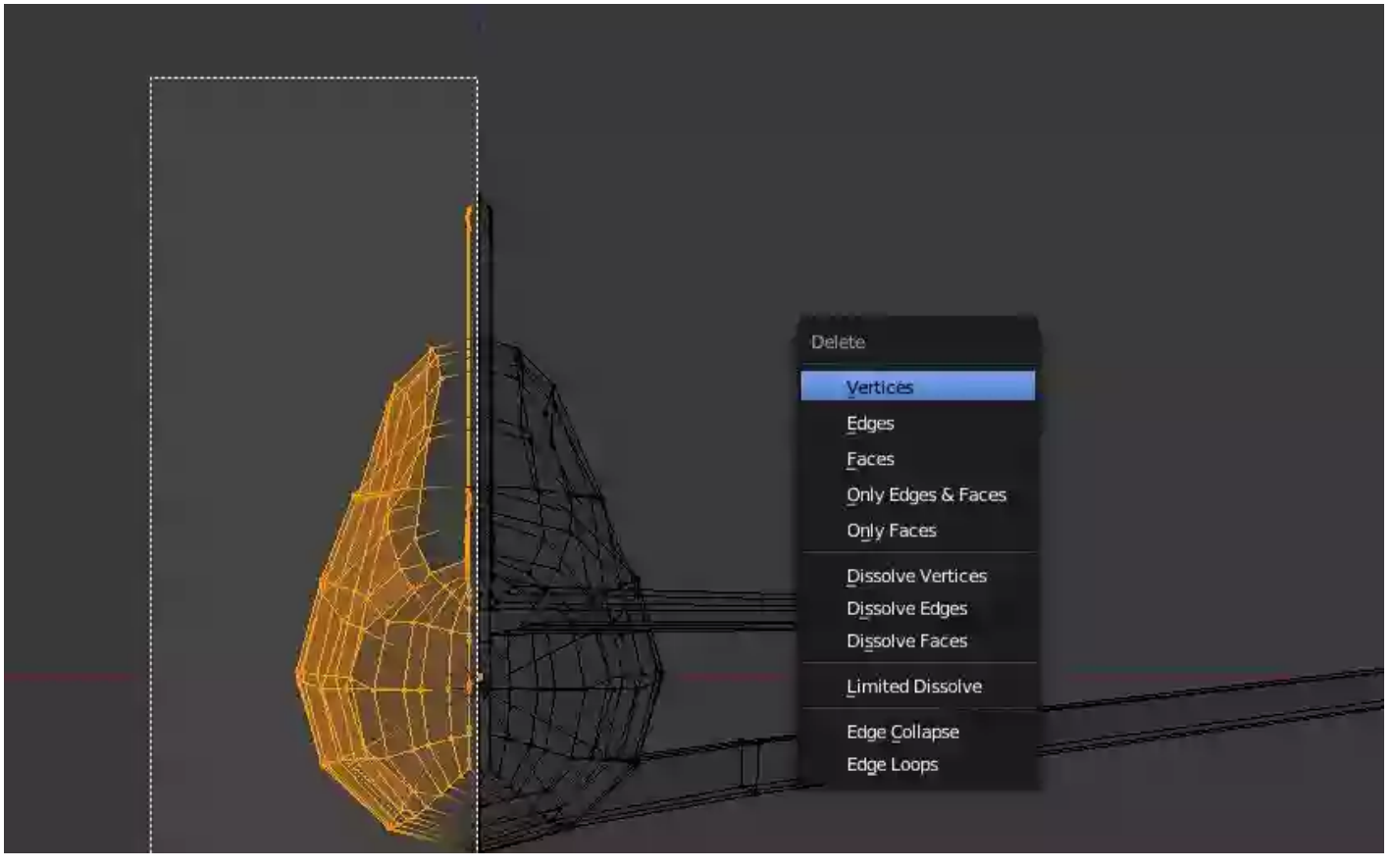


Tweak the vertices of the wing

Creating the Other Side With Mirror Modifier

Step 1

- Press **A** to deselect the selected vertices.
- Press **1** on the number pad to get into front view.
- Press **B** and drag select all the vertices of one side.
- Ensure you don't select any center vertices.
- Press **Del** to delete them.
- In the pop up select **Vertices**.

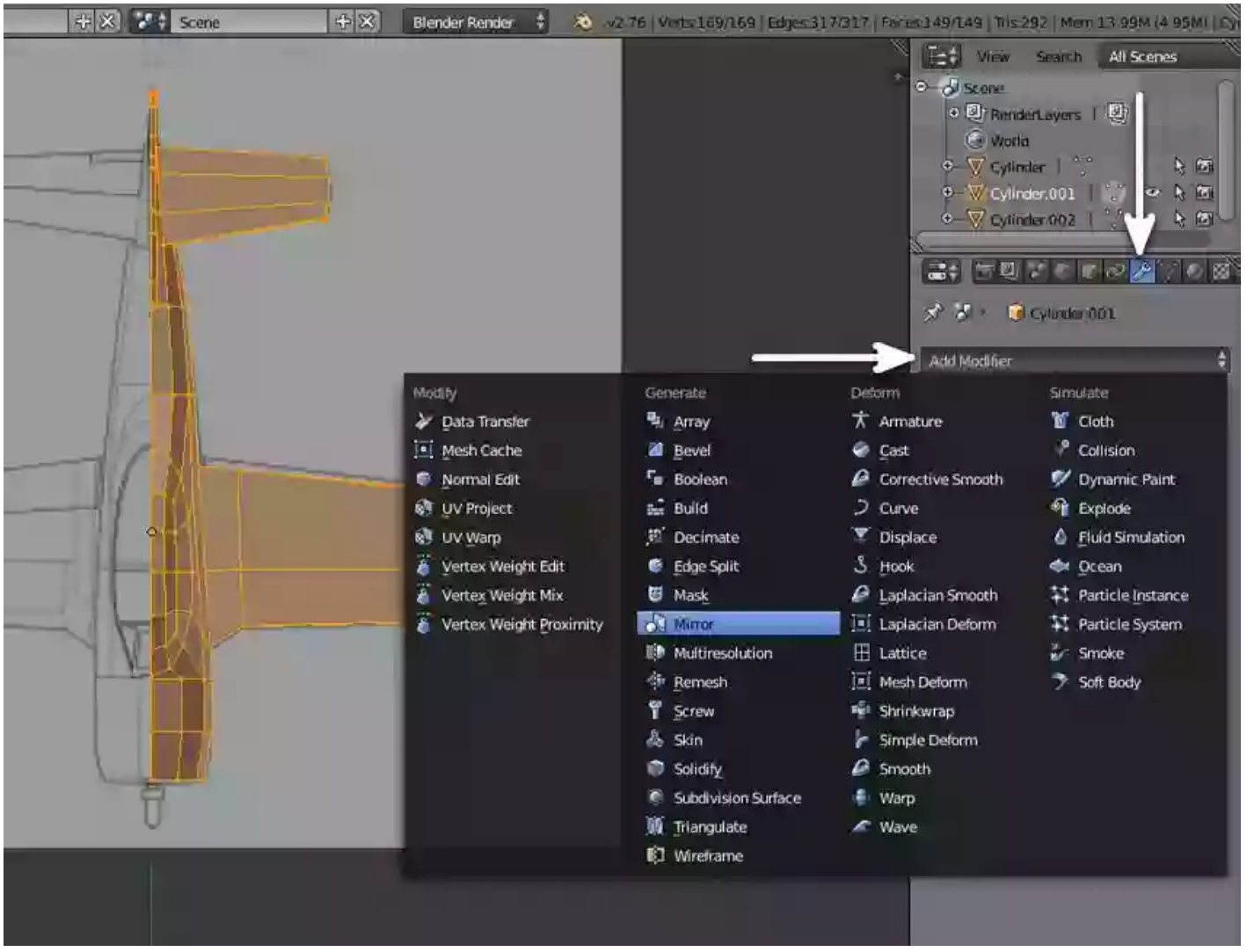


Select all vertices on the left side

Step 2

Click on the modifiers button in the properties window.

Click on **Add Modifier** and select **Mirror**.

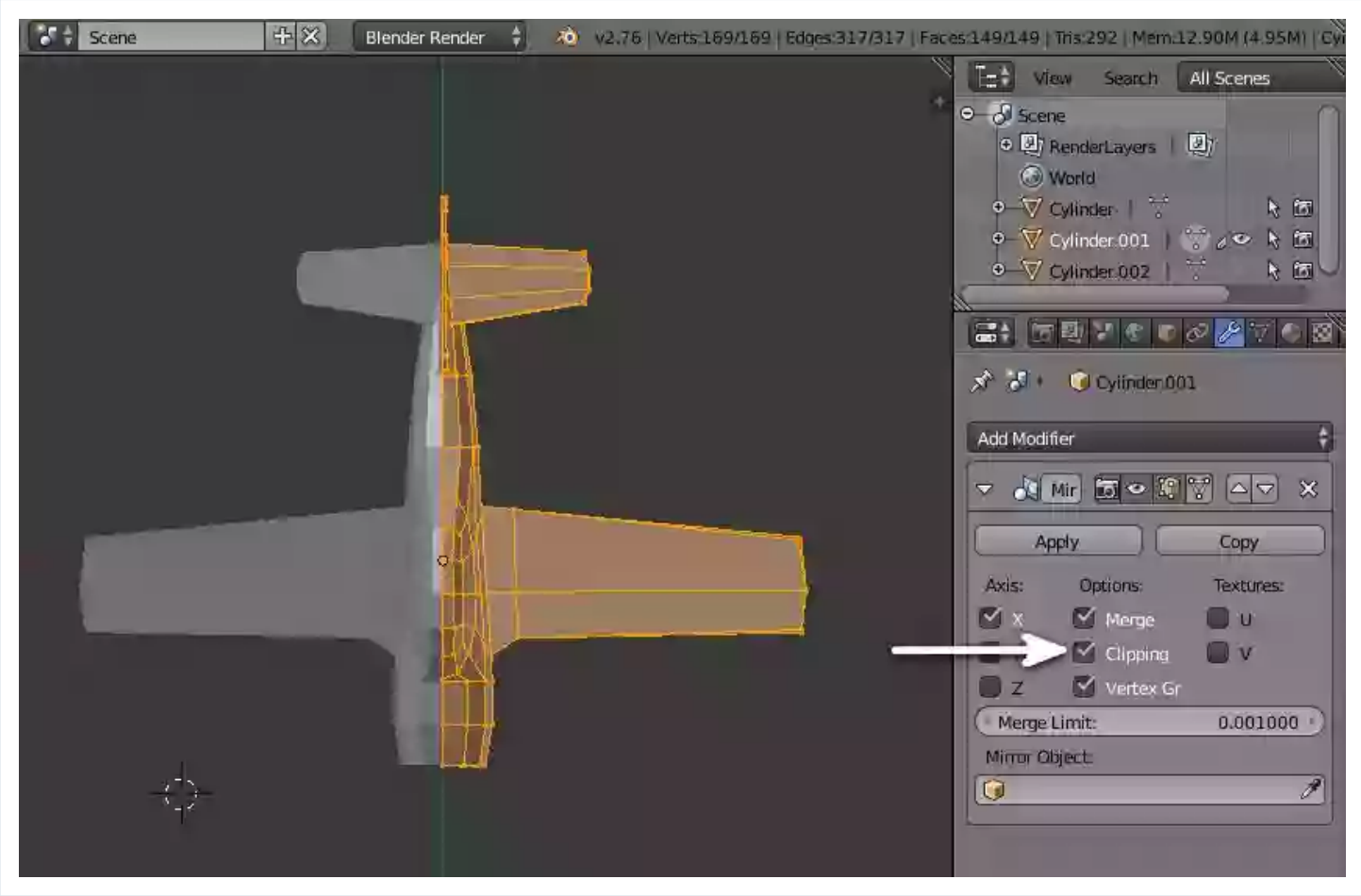


Add mirror modifier

Step 3

In the Mirror Modifier settings, tick the **Clipping** checkbox.

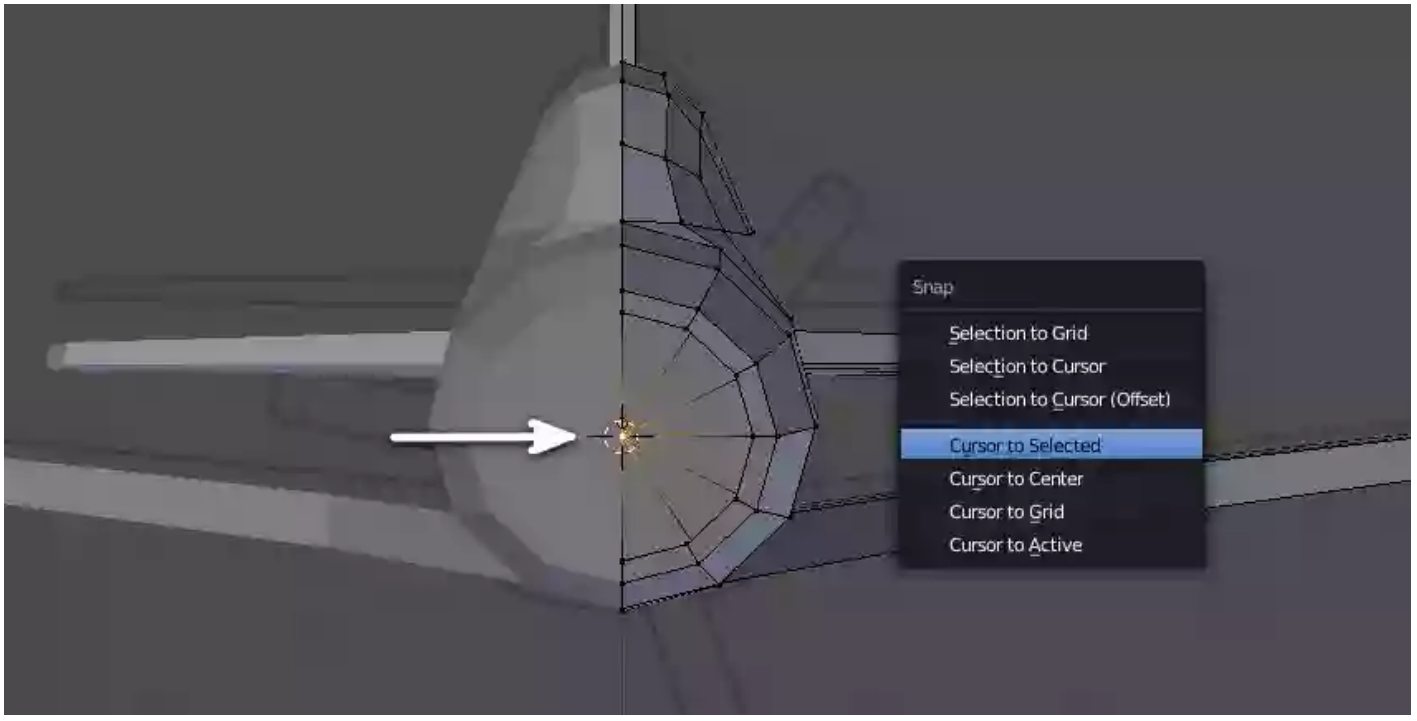
This will make the center vertices stick to each other and prevent any vertices to go through the center line.



Turn on clipping

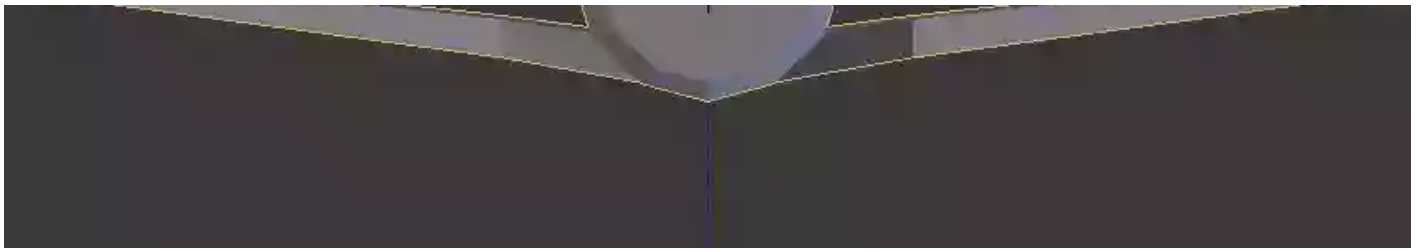
Modelling the Propeller

- Step 1
- Secondary-click on the center vertex to select it.
- Press **Shift-S** and select **Cursor to Selected**.
- This will snap the 3D cursor to the selected point.



Snap cursor to selected vertex

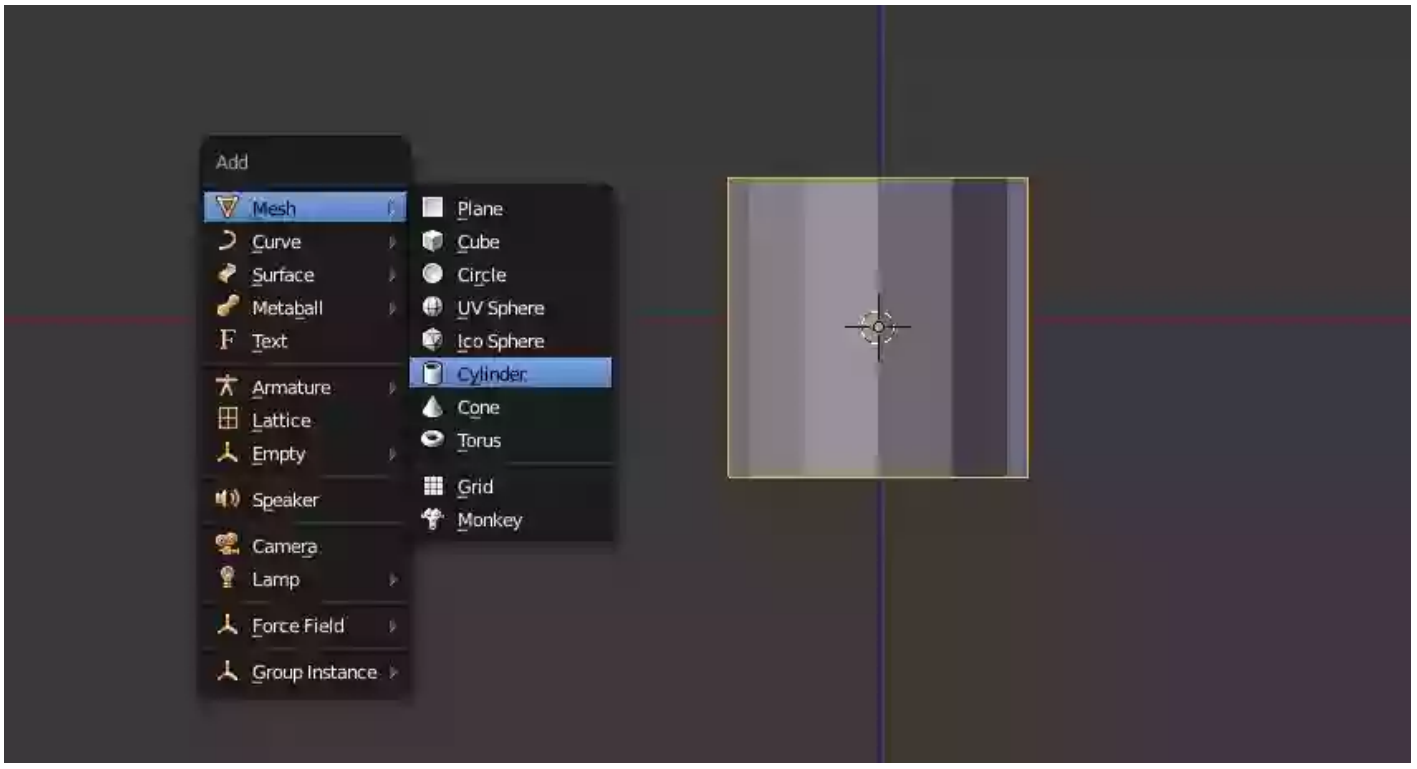
Press **Tab** to exit edit mode. You need to create the propeller as separate object as the aeroplane has mirror modifier assigned.



Exit edit mode

Step 2

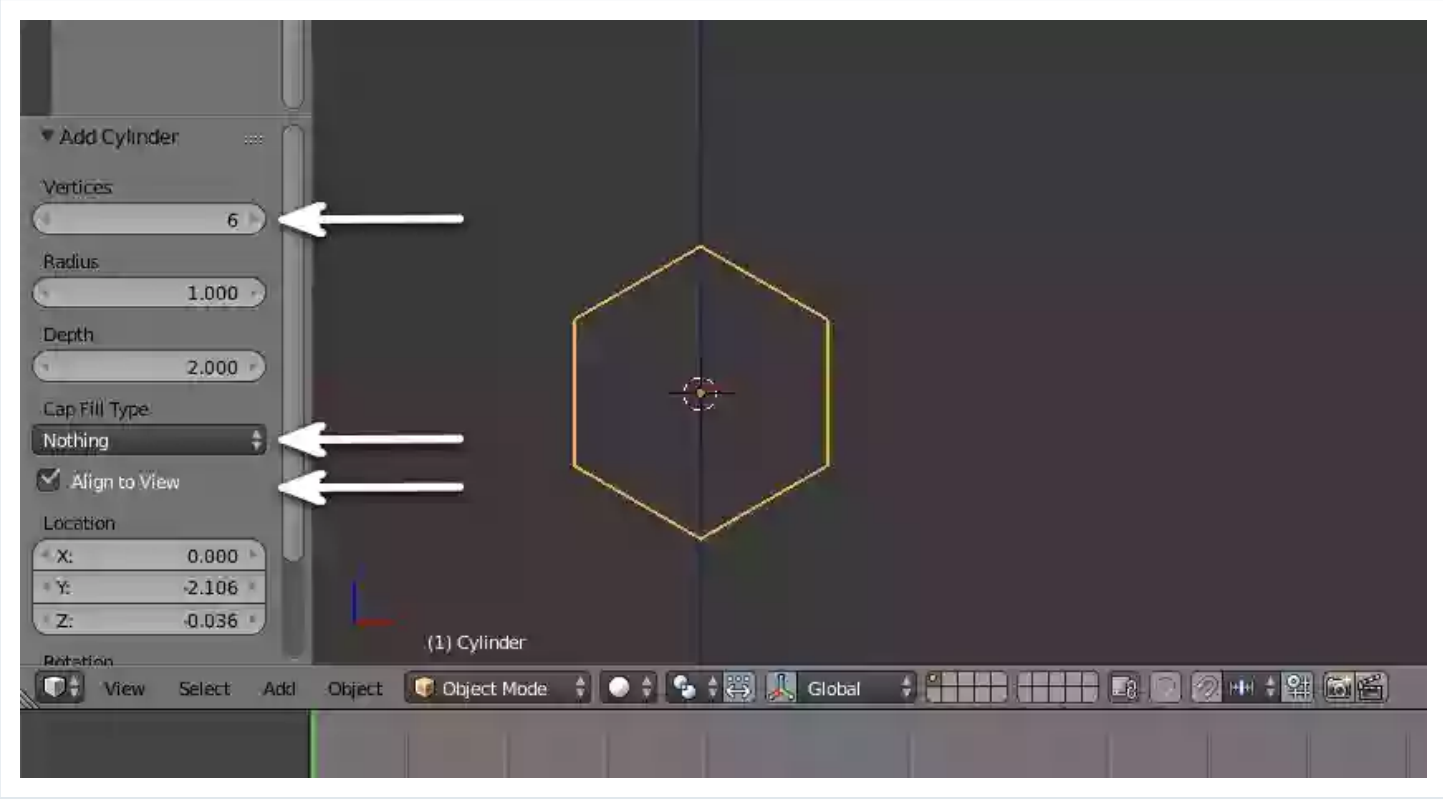
Press **Shift-A** and add **Mesh**>**Cylinder**.



Add a cylinder

In the toolshelf, reduce the **Vertices** to **6**, select **Nothing** for **Cap Fill Type**.

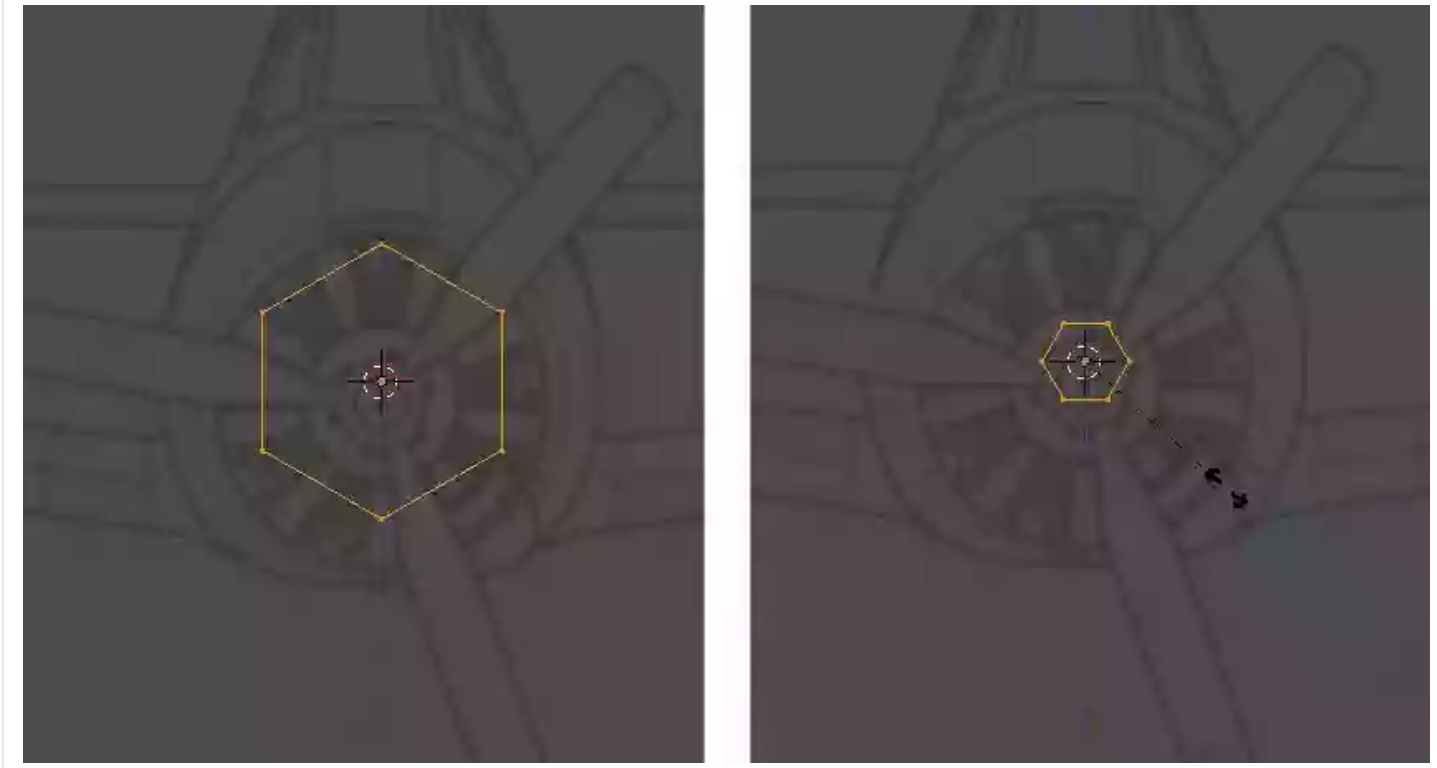
Tick the **Align to View** checkbox. This will make the cylinder face the view.



Cylinder settings

Step 3

With the cylinder selected, press **Tab** to enter edit mode. Select all vertices with **A** key and press **S** key to scale them down. Move the mouse and then left click to confirm.



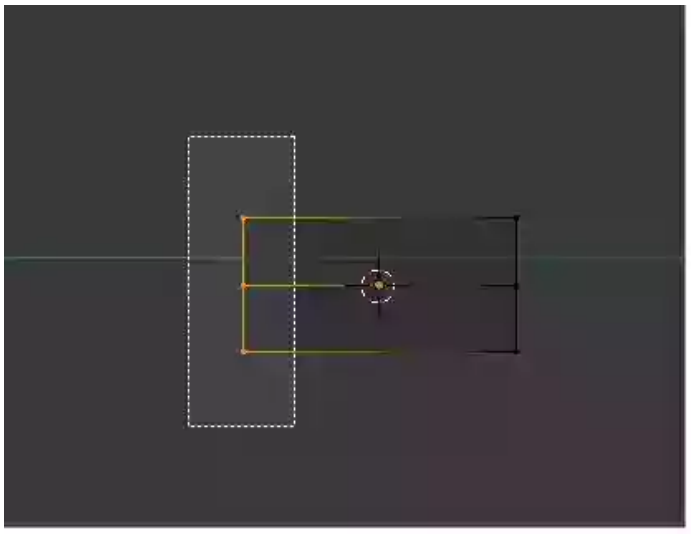
Scale down the cylinder in edit mode

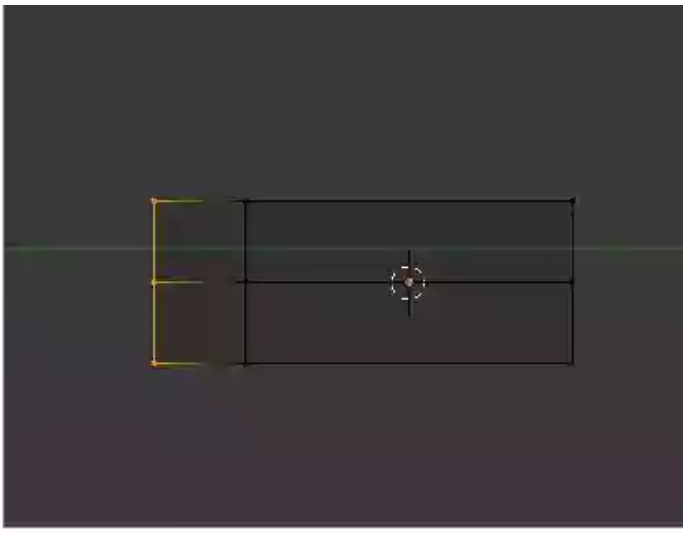
Step 4

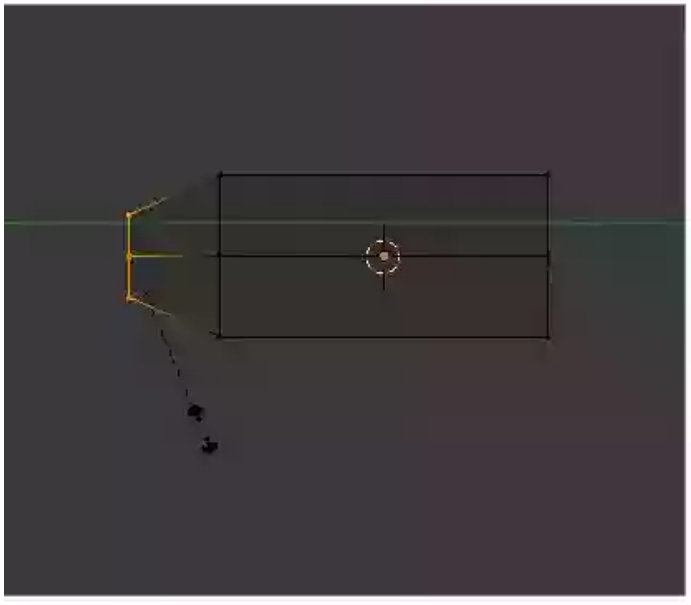
- Press **3** in the number pad to get into side view.
- Press **A** to select all vertices.
- Press **S** and then **Y** to scale the mesh along the Y axis. Primary-click to confirm.

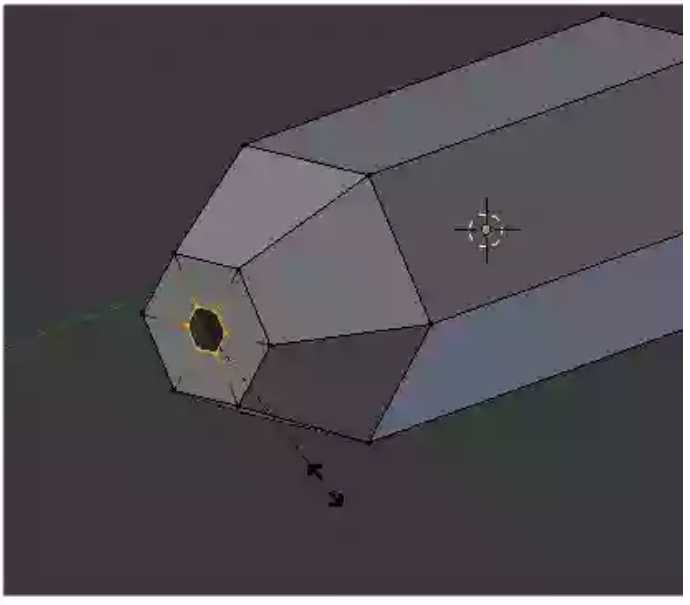
Scale it up along the Y axis

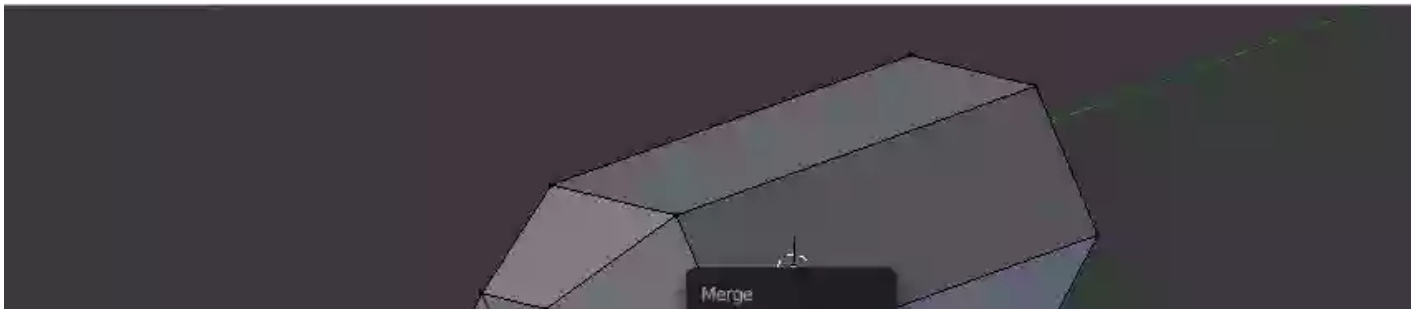
- Step 5
- Press **A** to deselect all vertices.
- Press **3** in the numpad to get into sideview.
- Press **B** and drag select the front row of vertices.
- Press **E** to extrude them.
- Press **S** and move the mouse to scale down the new extruded face.
- Primary-click to confirm.
- With the new vertices selected, press **E** again to extrude it and then secondary-click so that the new vertices stays at their origin.
- Press **S** and scale them down.
- Primary-click to confirm.
- Press **Alt-M** and select **At Center** to merge the selected vertices at their center.

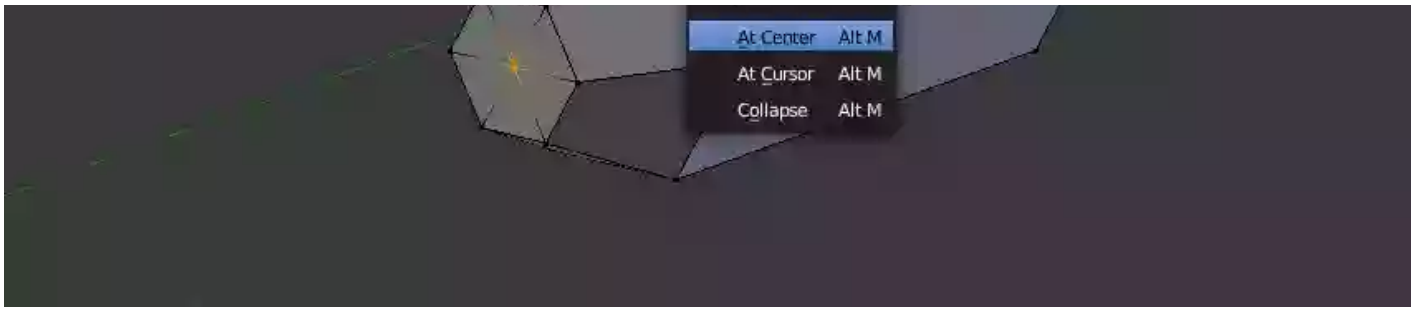








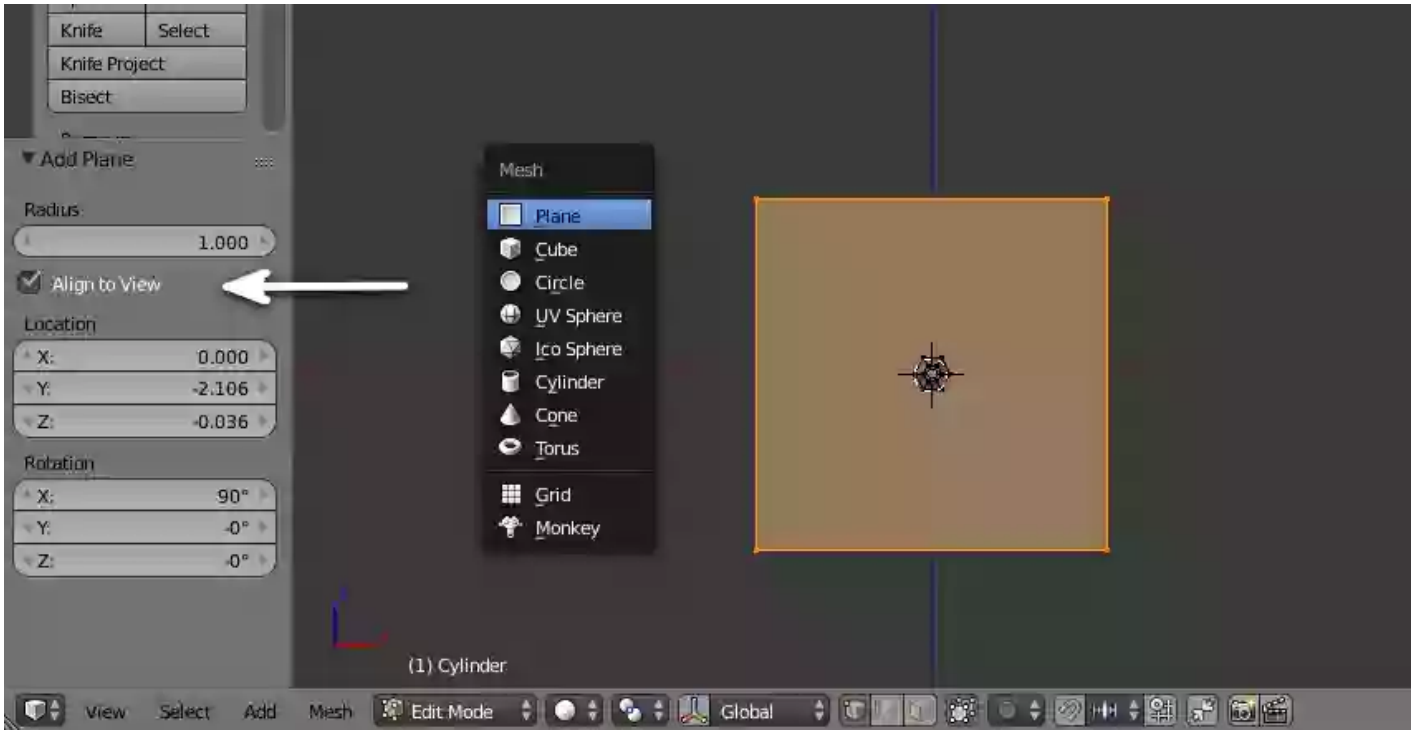

Merge



Model the front part

Step 6

- Press **1** in the numpad to get into front view.
- Press **Shift-A** and add a **Plane**.
- Tick the **Align to View** checkbox.



Add a plane

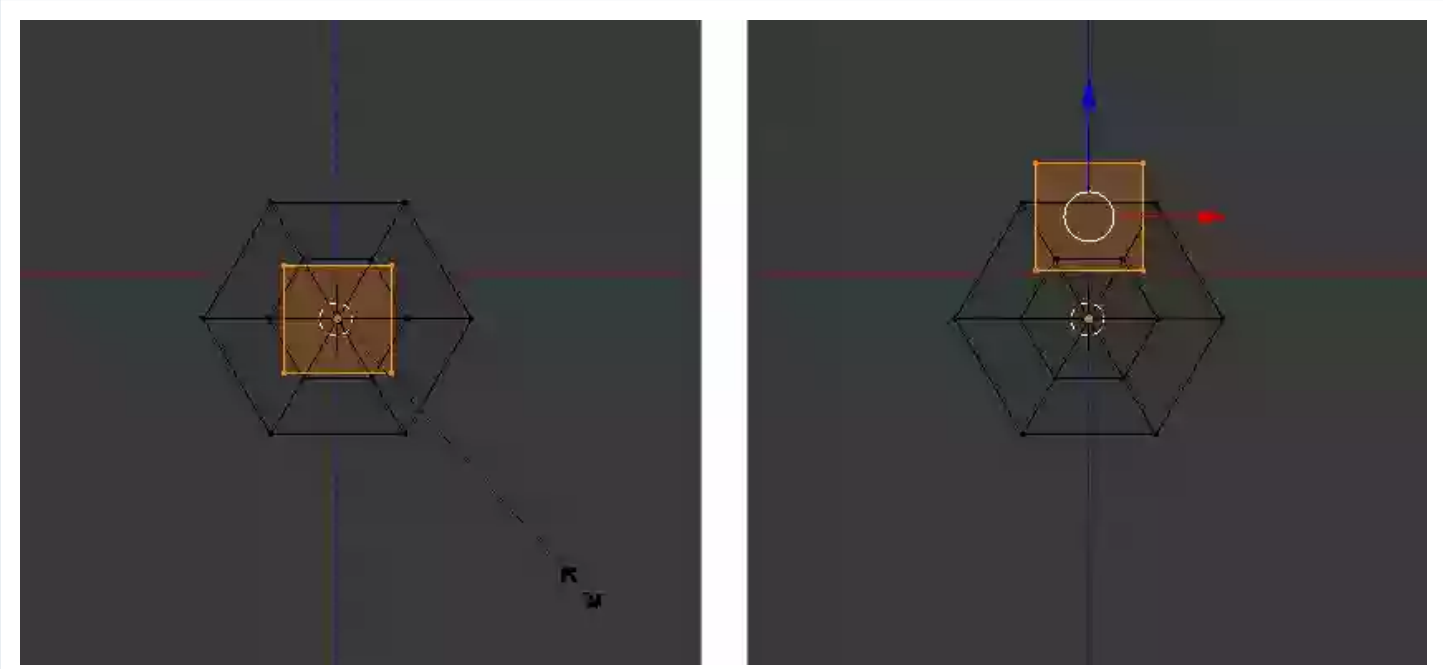
Step 7

Press **S** and scale the plane down.

With the plane selected, Press **G** and then **Z** to move the plane along the Z axis.

You can also use the arrow widget to move

You can also use the arrow widget to move.



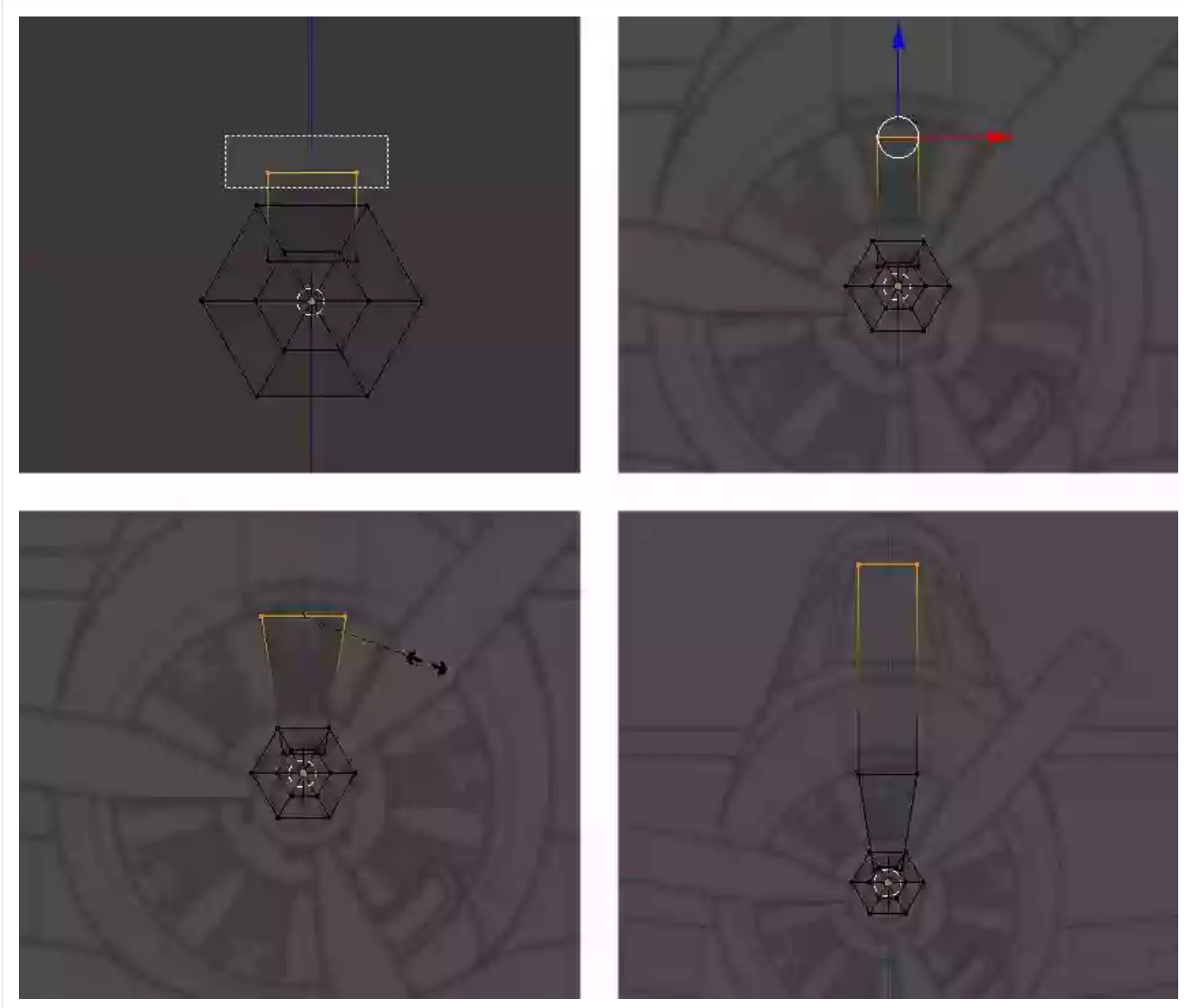
Scale and move the plane

Step 8

Press **A** to deselect the vertices.

Press **B** button and drag select to top two vertices of the plane.
Use the arrow widget and move them upwards.

With the vertices selected, press **S** and scale them a little bit.
Finally press **E** to extrude the edge till it reaches the desired length. Primary-click to confirm.

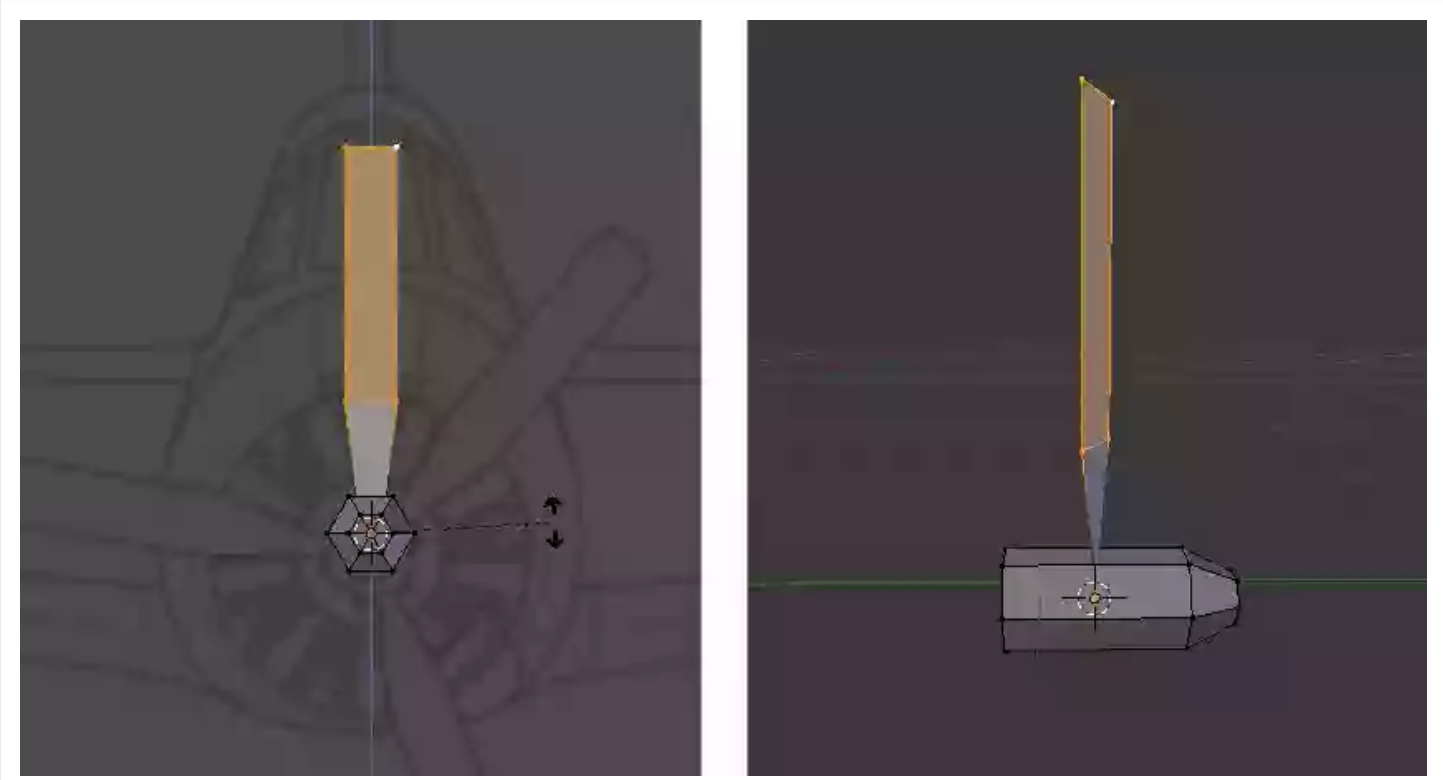


Create the blade of the propeller

Step 9

Press **B** and drag select the top four vertices of the blade. Press **R** and then **Z** to rotate the selected face along the **Z** axis. Twist it

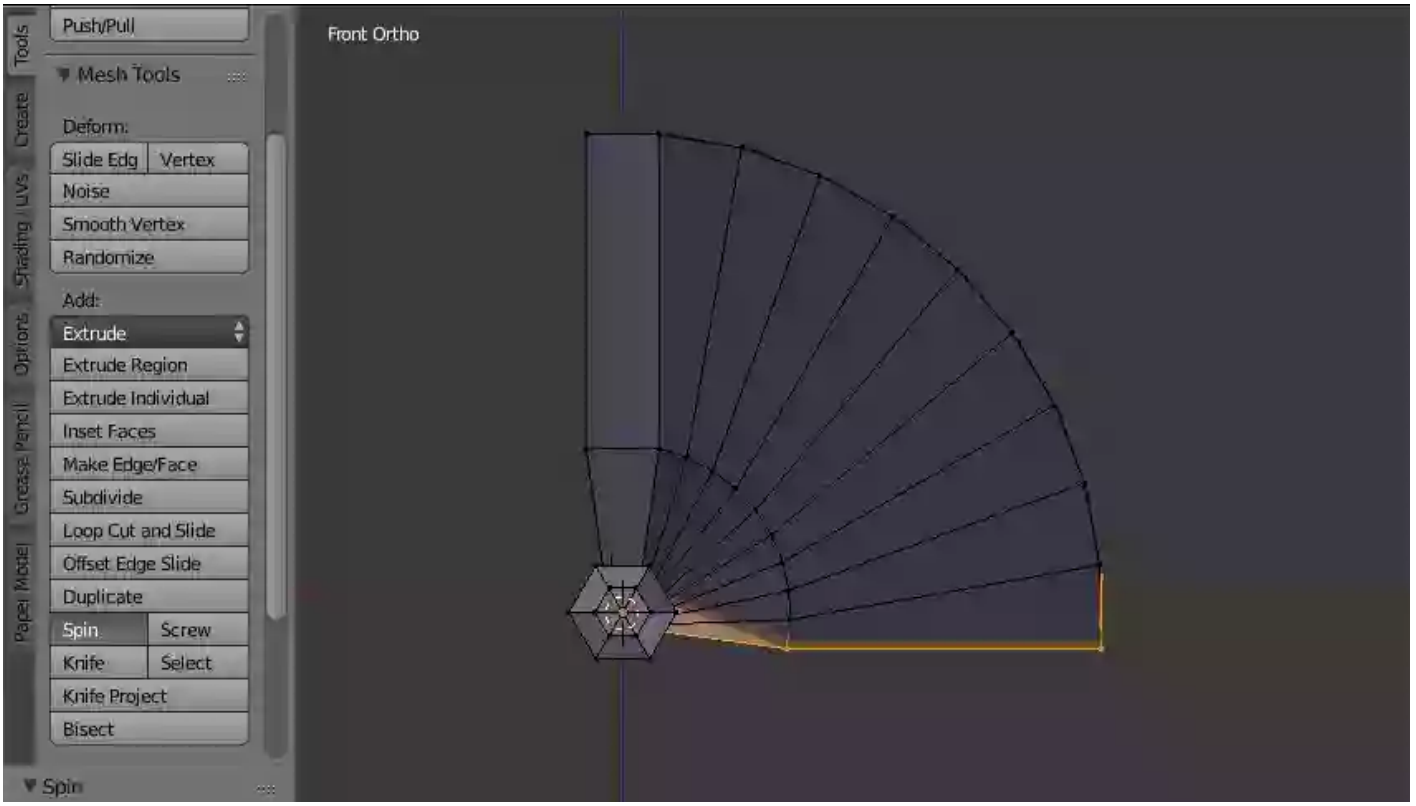
just a little bit. Primary-click to confirm.



Twist the blade

Step 10

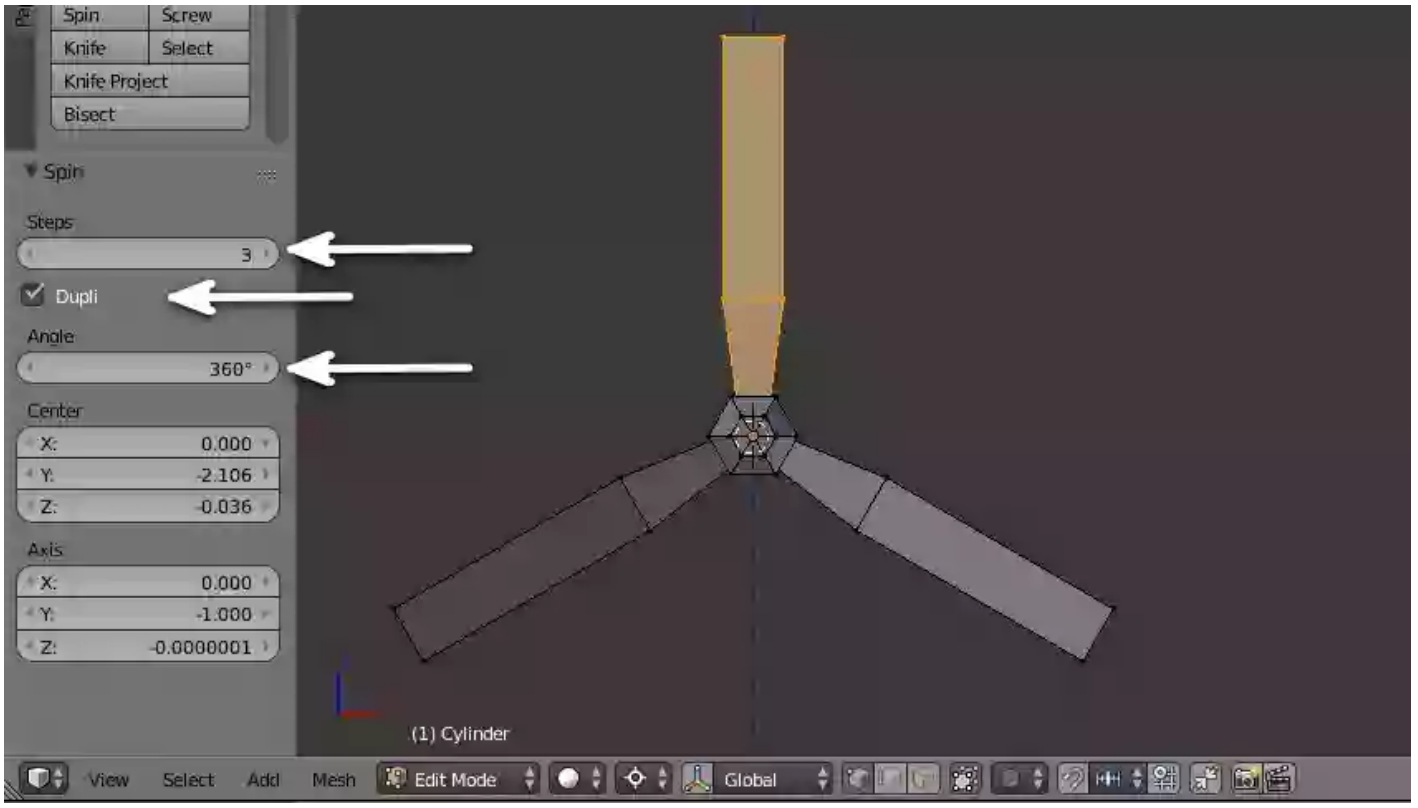
Move the mouse over the plane. Press **L** to select all connected vertices. In the toolshelf, Click on the **Spin** button.



Duplicate and spin the blade

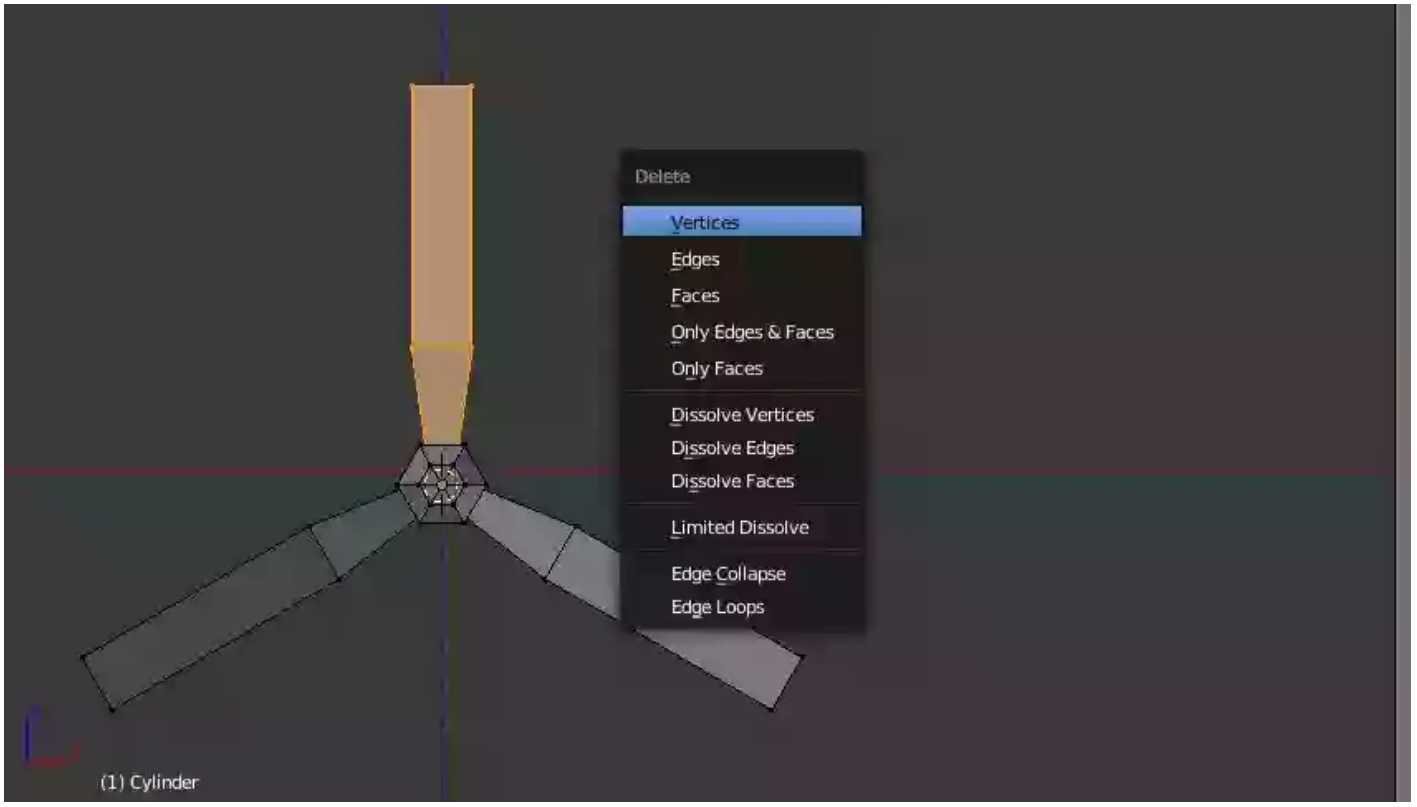
At the lower part of the toolshelf, reduce the spin **Steps** to **3**, tick the **Dupli** checkbox so that the generated mesh are the new and duplicated. Click on the **Angle** value and type **360**.

You will notice that the blade is now duplicated three times within a circle.



Spin settings

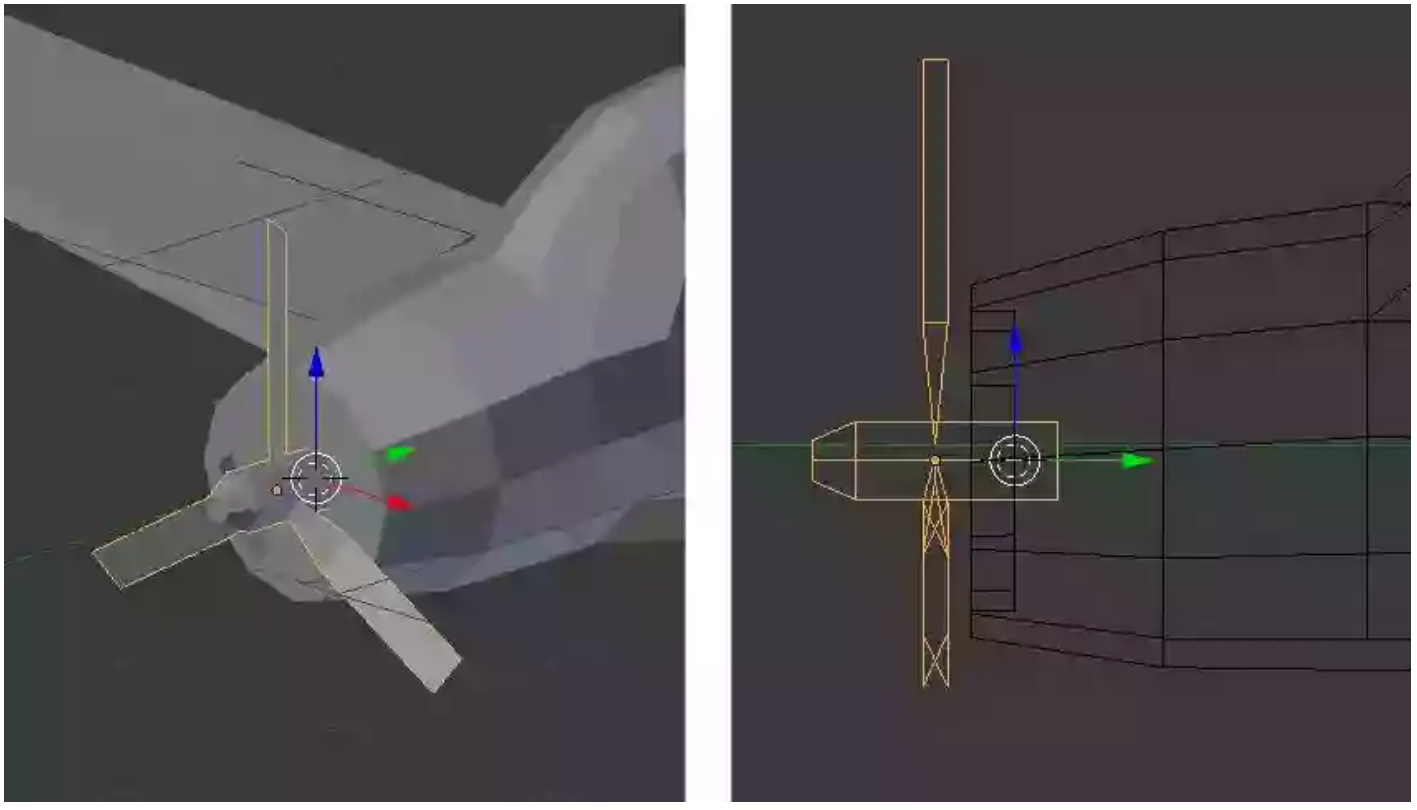
The original blade can be deleted. With the blade selected, press **Del** button and select **Vertices** in the **Delete** menu.



Delete extra vertices

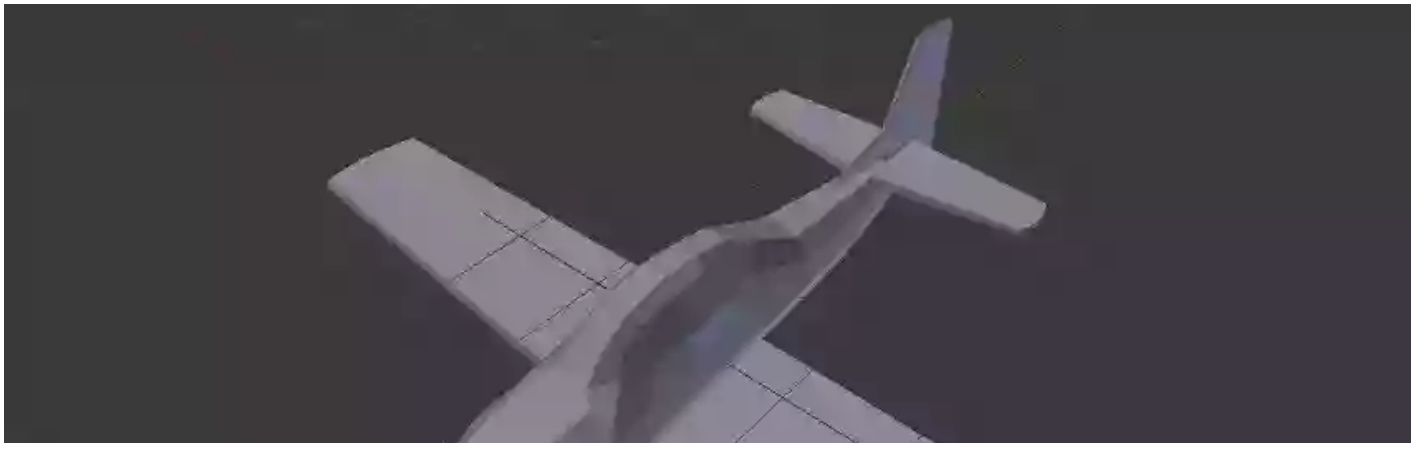
Step 11

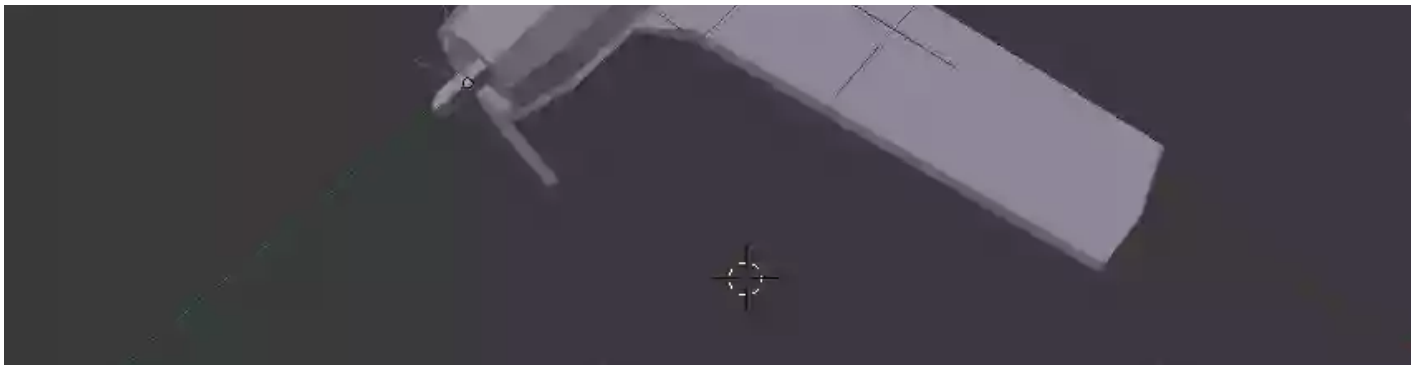
Press **Tab** to exit edit mode. In the right view move the propeller object so that it is little bit inside the main plane body.



Move the propeller

The plane model is now ready for UV Mapping and texturing.





Airplane model is ready

In the next part of the tutorial, I'll show you how to texture and map the aeroplane model.

Karan Shah

Karan Shah is a 3D Artist and Animator from India. He is a BFA Graduate with specialization in sculpture. An inclination towards the digital medium made him a self taught computer artist. He is a currently freelancing..

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