



How To ?

\$ + K Modeling a P-38 Lightning Fighter



Lockheed P-38 Lightning model

In this tutorial you will create the exterior of a WWII classic warplane, the Lockheed P-38 Lightning. You'll use primitive objects and modifiers to create the parts. You'll use viewport background bitmaps as a guide to shape your plane.

Note: This tutorial is a basic tutorial, but we suggest that you do this after completing the [Getting Started tutorial](#). You'll need to know how to select objects and vertices and navigate around the viewports.

Finding the Files

Most of the tutorial topics ask you to begin by loading a starting file. You will find these files in the subdirectories under *gmax\tutorials*. These scene and map files are not installed as part of the basic **gmax** install. You get these files when you download and install *gmax_tutorials.exe*. If you can't find a file, trying searching for it using Windows Explorer or My Computer; you might have inadvertently installed the files to a different location.

Note that this tutorial is an exception, in that it doesn't ask you to load many starting files, due to a peculiarity in the behavior of viewport backgrounds. It does ask you to load some bitmaps which you should find the *gmax\tutorials\P38* directory.

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\$ + K Setting Up Units

The first task is to change the modeling units to feet and inches. Since the P-38 is a vintage US plane, the specifications are in US standard measurement types. As a default, **gmax** is set to generic units, so you'll need to change this.

Set up units of measurement

- 1 From the Customize menu, choose Units Setup.

The Units Setup dialog appears.

- 2 Choose US Standard, then click OK.

Now when you create anything, the dimensions will be displayed in feet and inches.

- 3  In the Create panel, on the Object Type rollout, click Cylinder.

Look at the Parameters rollout; the values are now displayed in feet and inches.

The next step is to set up the viewport backgrounds.

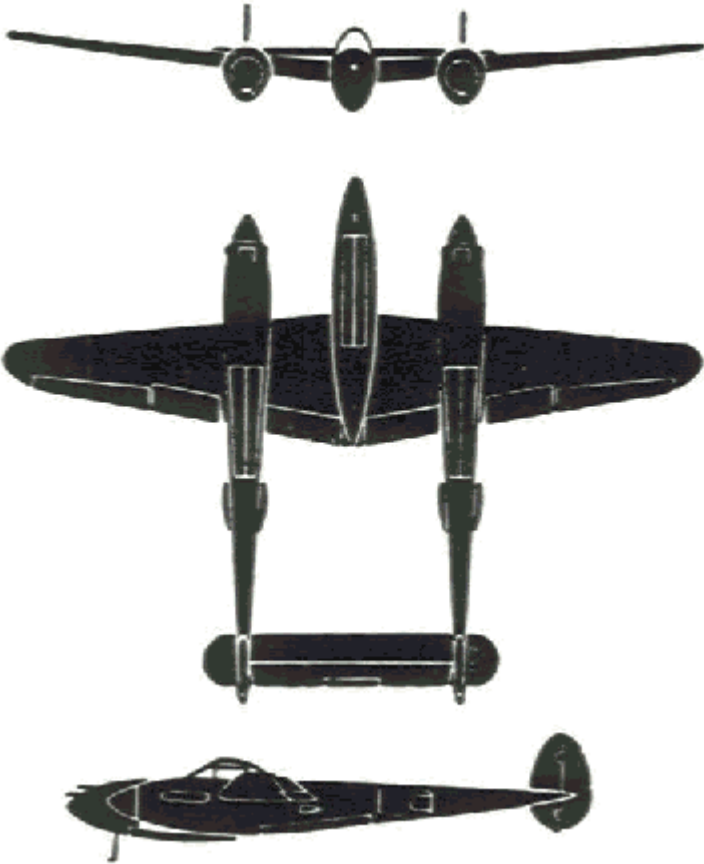
Next

[Setting Up Viewport Backgrounds](#)

\$ + K Setting Up Viewport Backgrounds

You can load images or drawings in viewport backgrounds to use as patterns for building your warplane. Each viewport can have its own background, so you can load a corresponding image in the Front, Side, and Top viewports to guide you as you build the model.

In general, when modeling something you've previously visualized or seen, it's best to start with sketches from several different viewpoints, such as top, side, and front. Also, the drawings should all be to the same scale, if possible. In this exercise, you'll use three drawings of an P-38 Lightning taken from WWII plane-spotting cards.

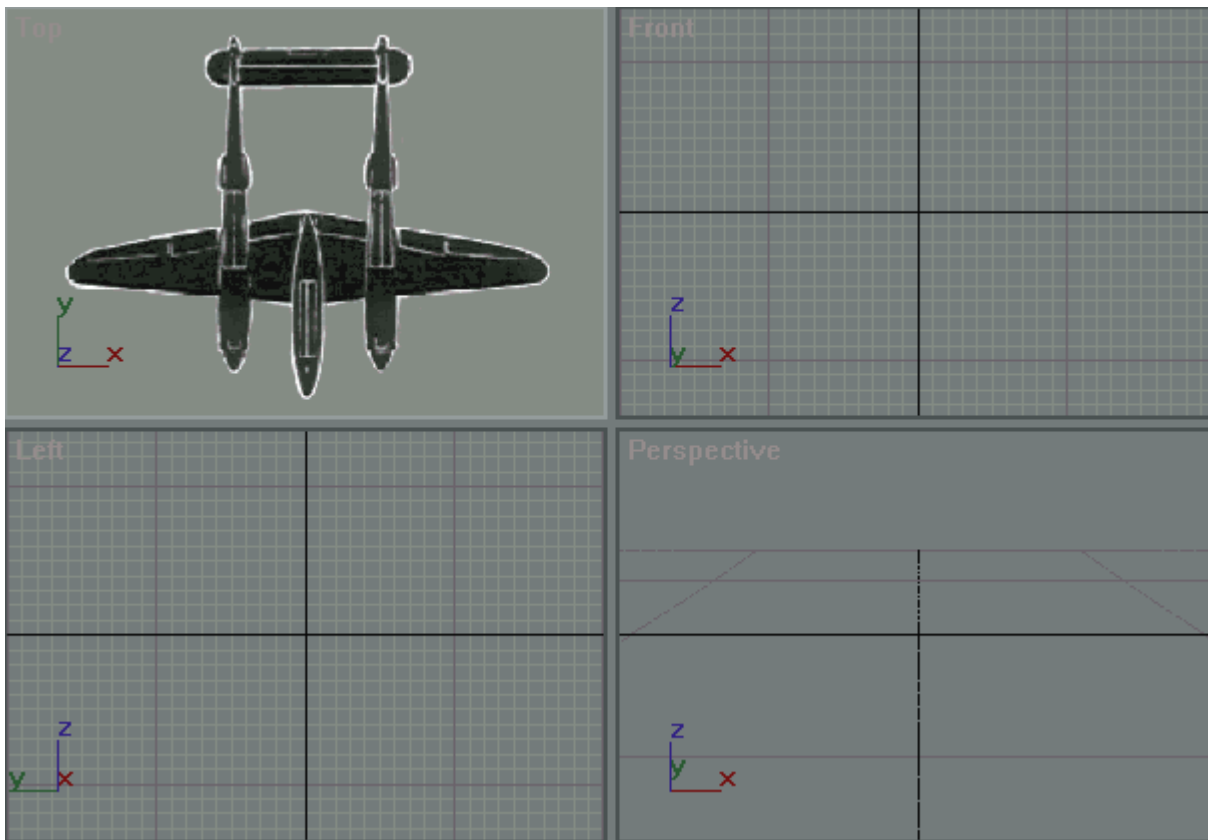


Three views of the P-38 Lightning from plane-spotting card

Set up viewport backgrounds

- 1 Activate the Top viewport.
- 2 On the menu bar, choose Views > Viewport Background.
- 3 In the Viewport Background dialog's Background group, click Files.
- 4 Navigate to the `\gmax\tutorials\p38` directory and choose `p38topview.jpg`.
- 5 In the Aspect Ratio group, choose Match Bitmap. Click Apply.

A sketch of the top view of the fighter is visible in the Top viewport.



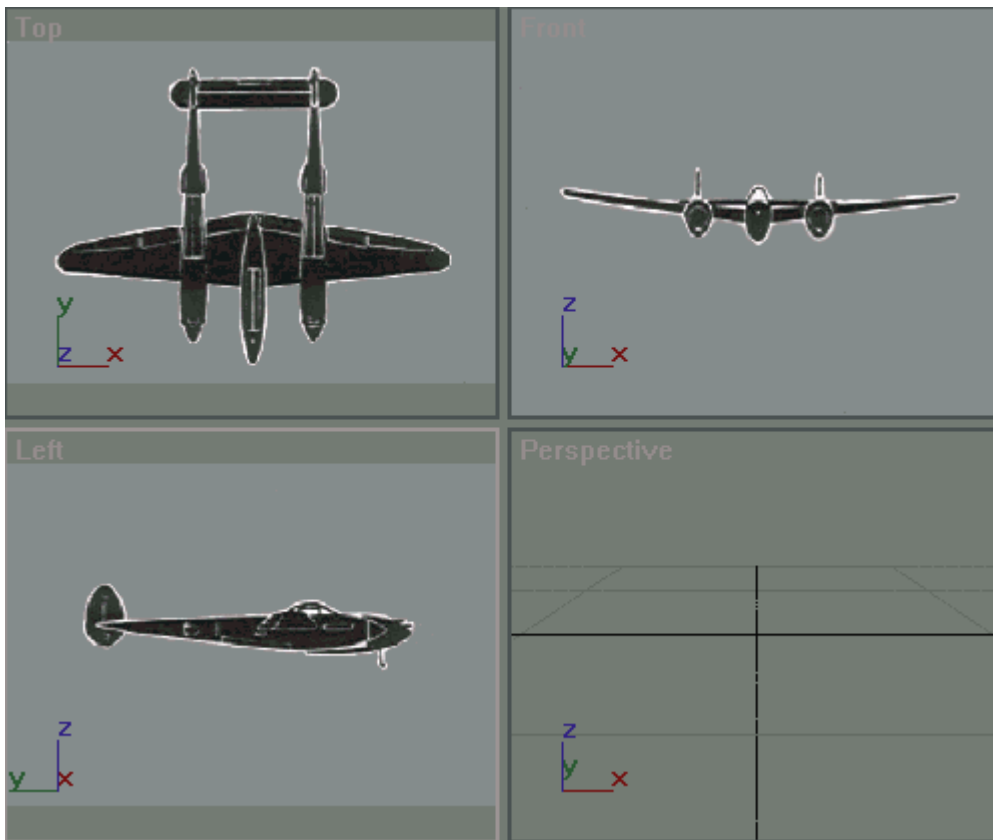
Top viewport displays the Top view background image.

- 6** Click OK to close the Viewport background dialog.
- 7** Turn off the grid display by pressing the **G** key.
- 8** Choose Views > Viewport Background to again open the Viewport Background dialog.
- 9** In the Apply Source And Display To group, click the arrow by the Viewport field, and choose Left. The Left viewport should become active.
- 10** Click Files and choose *p38leftview.jpg* for the Left viewport. Again, choose Match Bitmap. Click OK. Turn off the grid display again.



Top and Left viewports with background images

- 11** Click the Front viewport, then choose Views > Viewport Background. Click Files again and choose *p38frontview.jpg* for the Front viewport. Choose Match Bitmap, then click OK. Turn off the grid display. The three images are displayed in the appropriate viewports



Zoom the background images

You can zoom and pan the background images in the viewport if you want to center or enlarge them. To zoom or pan the background images do the following:



- 1 Activate the viewport, then choose Views > Viewport Background.
- 2 Make sure Match Bitmap is on, then turn on Lock Zoom Pan.

Now you can use the zoom or pan buttons in the viewport navigation controls to make the background image larger or shift it horizontally or vertically.

- 3 Be sure to turn Lock Zoom Pan off when you finish with each image.

Tip: **gmax** automatically turns on Lock Zoom Pan when you maximize a viewport or save your work and exit the program. Sometimes the background image can shift out of alignment with your geometry when this happens. This is inconvenient, but there is a workaround.

If you open up a saved file and the background has shifted do the following:

-   Use the viewport navigation Zoom and Pan buttons to make the background images the correct size and position in the viewports.
- Turn off Lock Zoom Pan, and then use the same navigation tools to align the geometry with the bitmaps. You can use CTRL+ALT+B to toggle Lock Zoom Pan.
- After doing this, don't maximize, zoom, or pan the viewport.

Turning display of the Tab panel on or off can also cause viewport backgrounds to shift.

Next you will make a calibration box, to make sure the 3 viewports are in the same scale, and that the plane will be an appropriate size .

Calibrate the viewports

The P-38 has a wingspan of 52 feet, and a length of 37'10". With the wheels extended, it has a height of 9'10". You'll use this information to make a box of that size, then align the viewports to that box.

- 1 Activate the Top viewport.



- 2 In the Create panel, on the Object Type rollout, click Box.

The Box button turns orange to show it's active and ready to create.

- 3 Open the Keyboard Entry rollout, and enter the following values:

- Length: **37'10"**
- Width: **52'0"**
- Height **9'10"**

Tip: You can use the Tab key to move from one field to the next.

- 4 Once these values are entered, click Create.

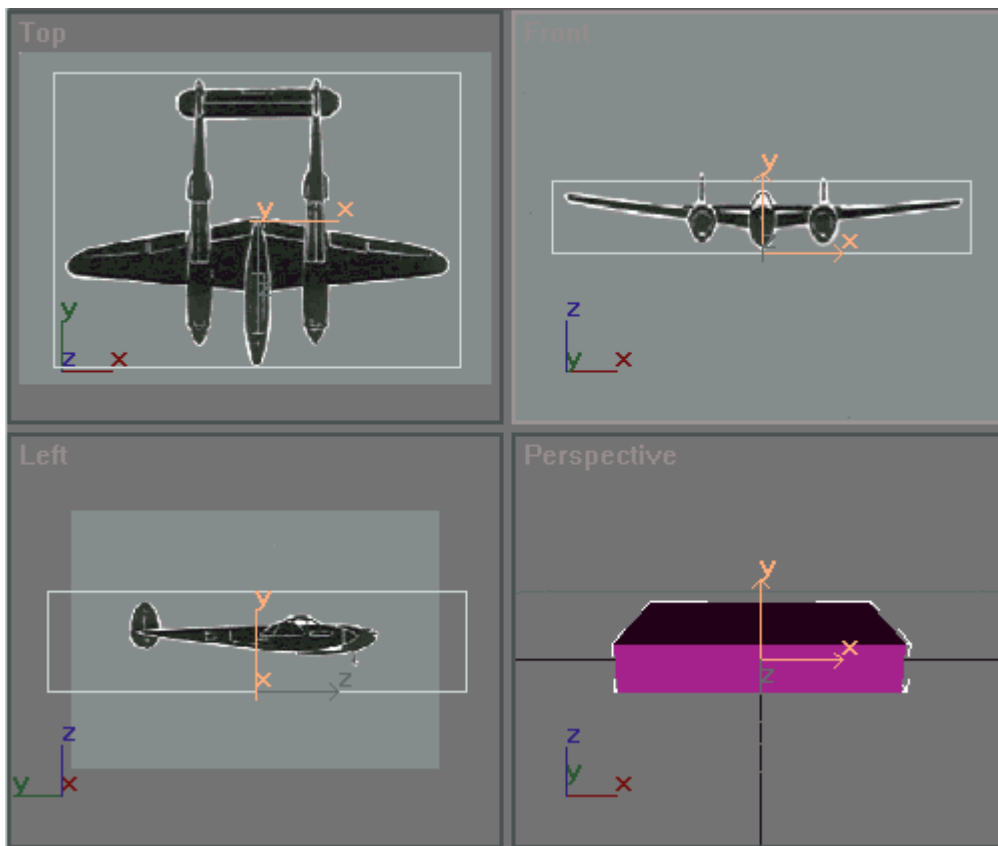
A box appears in the viewports.

- 5 In the command panel, name the object **calibration box**.





- 6 In the viewport navigation controls at the bottom-right corner of the interface, click Zoom extents all.

The box is now visible and centered over the three background bitmaps. It doesn't matter if your box is a different color than the one in the illustration.



Calibration box centered over the background images

Now starting with the Top viewport you will zoom and pan each view to match the box and the bitmap background.

- 7  In the viewport navigation controls, click Zoom. Zoom the Top viewport until the width of the box matches the width of the wings. Match the wingspan as closely as you can.
- 8  Click Pan in the viewport controls, and then pan the viewport to center the box over the bitmap vertically. It won't be perfect, the two rudders will extend slightly beyond the calibration box.



Top viewport aligned with calibration box

- 9 Zoom the Front viewport. Again match the wingspan first using zoom, then pan to adjust the vertical height. You'll have to imagine where the wheels should be, they aren't illustrated in the plane-spotting card.



Front viewport aligned with calibration box

- 10 Now repeat for the Left viewport.



Left viewport aligned with calibration box

All three viewports are now calibrated so the picture in the viewport represents the approximate dimensions of the P-38.

Hide the calibration box

- 1 You don't need the calibration box now, so you can hide it. To do so, select the box in any viewport, right-click, and then choose Hide Selection from the quad menu.
You can always unhide the calibration box and repeat the above procedure to recalibrate. To unhide the box, go to the Display panel and choose Unhide By Name, then in the dialog, select the box.
- 2 Save your work as **myp38_backgrounds.gmax**.


Next

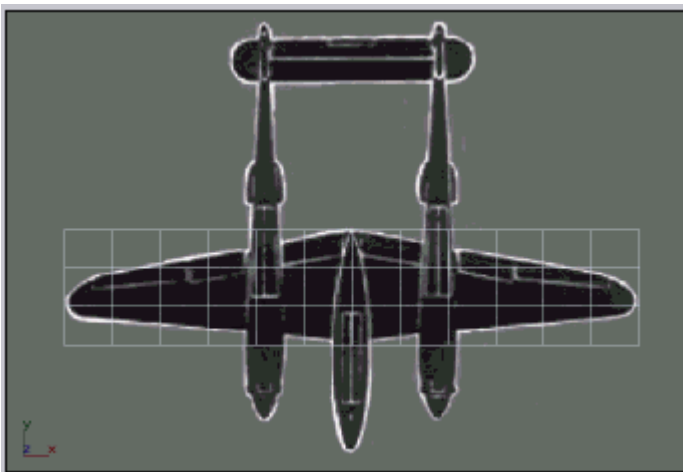
[Creating the Wings](#)

\$ + K Creating the Wings

There are many different modeling approaches you could take to building the wings. Here, you'll use a Box primitive with a Taper modifier. You'll be continuing from the previous section, [Setting Up Viewport Backgrounds](#).

Create the wings using a box

- 1  In the Create panel, on the Object Type rollout, click Box.
- 2 In the Top viewport, do the following to draw a box from upper left to lower right, approximately around the front wingspan:
 - Click once at the upper left, then drag to the lower right with the mouse button down. As you move the mouse, the values for length and width change in the parameter fields.
 - When you release the mouse button, you have set the length and width of the box, and now are setting the height, which you can see increasing in the Perspective viewport. Moving the mouse up creates a positive height, moving down creates a negative height. As you move the cursor the values change in the parameter fields.
 - Click again to set the height.
- 3 In the Create panel, you can immediately adjust the values in the Parameters rollout. Enter the following values:
 - Length Segs=**3**
 - Width Segs=**12**
 - Height Segs=**3**



Box with 12 width segments

You need to increase the number of segments so the modifiers for tapering and bending the wings will work correctly.

- 4 You can also make adjustments to the dimensions of the box at this time. Edit the Width so it is exactly **52'**, Length so it is **10'**, and make the wings' height an even **1** foot.
- 5 In the Name and Color rollout, type **wings**.

The object is now named *wings*.


Now you'll change the shape of the wings using a Taper modifier.

Add a taper modifier

- 1 Activate the Top viewport, and make sure the wings are selected.
- 2 From the menu bar, choose Modifiers > Parametric Deformers > Taper.
An orange taper gizmo appears in the viewport over the box.
- 3 On the command panel, in the Taper Axis group, change the Primary value to **X**.
- 4 In the same group, turn on Symmetry.
- 5 Set the amount of the taper to **-1.3**.

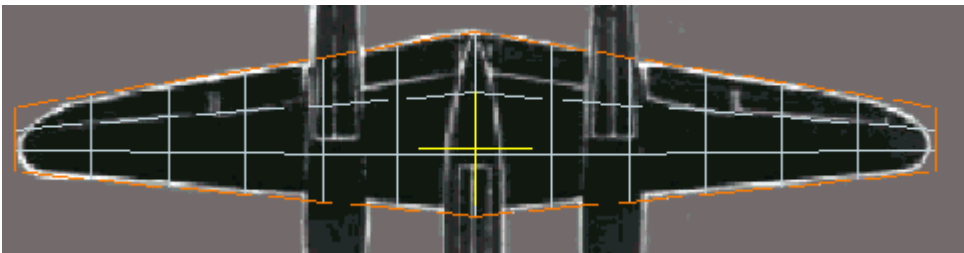
Now the box is starting to resemble the wing shape.

Next you'll move the Taper Center to affect the wing's shape.

- 6  In the modifier stack display, expand the Taper hierarchy by clicking the box marked with a plus sign. When the Taper expands, click Center.

At the Center sub-object level, you can adjust the location of the center of the Taper. Moving a modifier's center can alter its results.

- 7 In the Top viewport, move the center of the taper forward along the Y axis toward the nose of the plane, until the wings' shape more closely matches the background bitmap.



- 8 When you've finished moving the center, click Taper in the modifier stack to turn off the Center sub-object selection.
- 9 The Taper has affected the height of the wings. In the modifier stack, click Box, then increase the wing height to **1'5"**.
- 10 In the Front viewport, move the wings up so they are centered over the background bitmap.



Move the wings up in the Front viewport.

Next you'll convert the box to an editable polygon object, and then move some vertices to round the wings.

Convert the box


- 1 Save your file as **my_p38_wings.gmax**.

It's good to save your file before you convert your object. Since the conversion removes the stack parameters, saving will allow you to return to this point in the future.

- 2 In any viewport, select the box.
- 3 Right-click and choose Convert to: > Convert to Editable Poly.

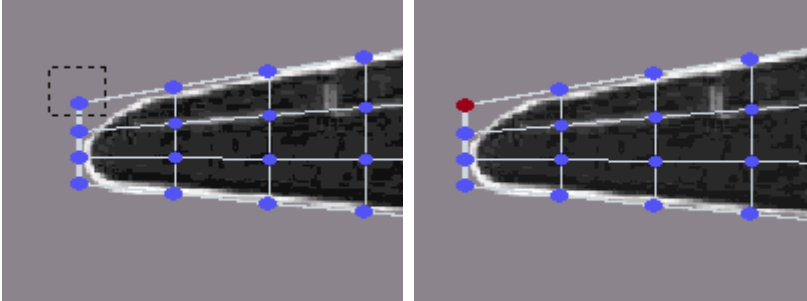
The box is now an editable poly object.

Round the wingtips


- 1  In the Selection rollout on the command panel, click Vertex.

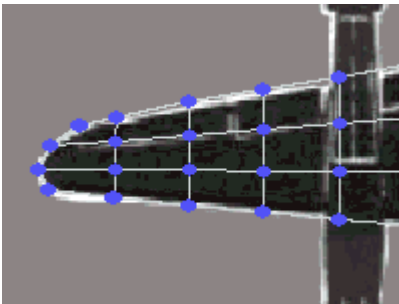
Look at the box in the top viewport with vertex selection on. Each dot you see is actually four vertices lined up on top of each other. So when you want to select and move them, you need to drag a selection window, rather than clicking them. Otherwise you will only select one vertex, rather than all of them.

- 2 In the Top viewport, draw a selection rectangle to select the vertices in the upper-left corner of the wing.



Use a selection rectangle rather than clicking.

- 3  On the main toolbar, click Select And Move. Then move the vertices in the top view so the ends of the wingtips are rounded. Use the Transform gizmo to restrict the vertex movement to a single axis or plane.



Move vertices to round wings.

- 4 Now, in the Top viewport, slowly go around the outline of the wing moving the blue dots to within the black shape of the P-38 wingspan. Use the Transform gizmo's Y arrowhead to move the vertex selection only in Y. Use the Transform gizmo corners to move the points at the end to create the rounded wingtip.

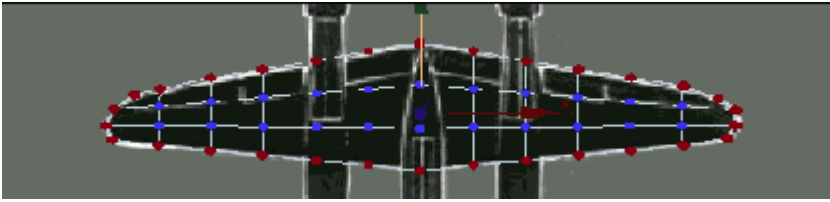


The wings need have their edges tapered and narrowed. Here's the process to do this.


Taper the wing edges


In the top viewport you need to select all the vertices on the outside edges of the wings. You can accomplish this by using the selection rectangle with the CTRL key.

- 1 Hold down the CTRL key and use the selection rectangle to slowly build up the selection set, as in the following illustration:



Select these red vertices on the exterior edges of the wings.

- 2  Click Lock Selection on the status bar or press **SPACEBAR** to lock the vertex selection. This prevents you from losing the selection if you inadvertently click elsewhere in a viewport.00

- 3  On the main toolbar, expand the Scale flyout, and choose Non-Uniform Scale.
- 4 In the Left viewport, scale all the edges about the Y axis, so the wings are narrowed. Use the Transform gizmo, when the Y turns yellow, you are scaling only along the Y axis. Watch the status bar while you scale. It changes as you move the mouse. Scale to **30** (percent).



Narrow the edges using Non-Uniform Scale.

- 5  Turn off Lock Selection.

Next, you'll add a Bend modifier to the wings.

Add a Bend modifier

- 1 In the Selection rollout, click Vertex to turn it off.
- 2 Click the arrow to the right of the Modifier List. In the drop-down list, find the Parametric Modifiers group, and choose Bend.
- 3 Set the Bend Axis to **X**.
- 4 Change the Bend Angle to **-15**.



Bend the wings up.

- 5** Just for fun, spin the Direction spinner. Watch the wings stroke in the air. Right-click or press CTRL+Z to undo when you're done having fun.
- 6** Save your work as **myp38_wing.gmax**.

Next, you'll add the stabilizers and rudders. These are easy to do.

Next

[Adding the Stabilizer and Rudders](#)

\$ + K Adding the Stabilizer and Rudders

Continue from the previous lesson, [Creating the Wings](#).

The next step is to add the horizontal stabilizer and the twin rudders. You'll use cylinders and editable poly techniques to build these pieces.

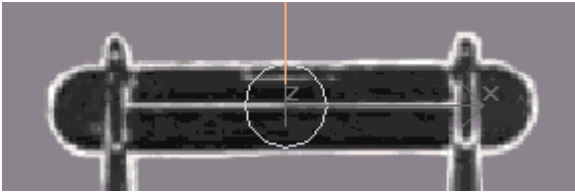
Add the horizontal stabilizer

- 1 Click the Top viewport to activate it.



- 2 In the Create panel, click Cylinder.

- 3 In the Top viewport, drag out a cylinder in the center of the horizontal stabilizer. When you release the mouse button, you are setting the height of the cylinder. Moving the mouse upward gives a positive height; moving it downward gives a negative height. Give it a positive height.



Create a cylinder to make the stabilizer.

- 4 Edit the Parameters, as follows:

- Radius=**2'2"**
- Height=**0'2"**
- Height Segments=**1**
- Sides=**12**

- 5 In the Name and Color rollout, type **stabilizer**.

Naming your objects proves useful later.

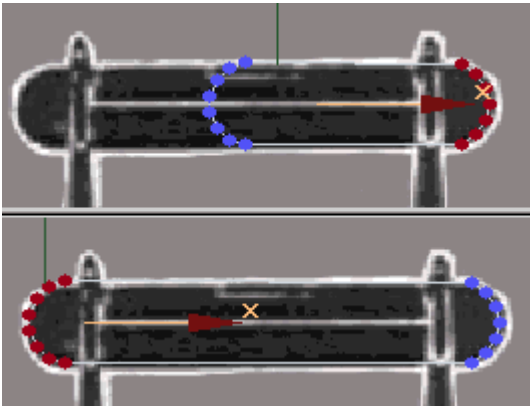
- 6 Right-click the cylinder and choose Convert to: > Convert to Editable Poly.



- 7 In the Modify panel, on the Selection rollout, click Vertex.

Now the vertices are visible in the cylinder.

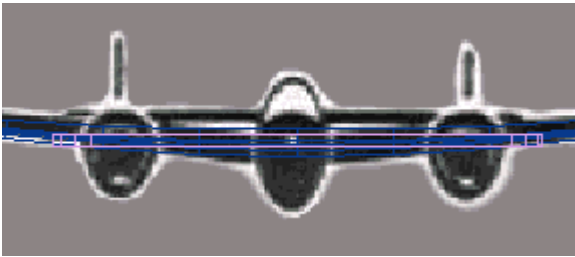
- 8 Select half the vertices, and move them to the right. Select the other half of the vertices and move them to the left.



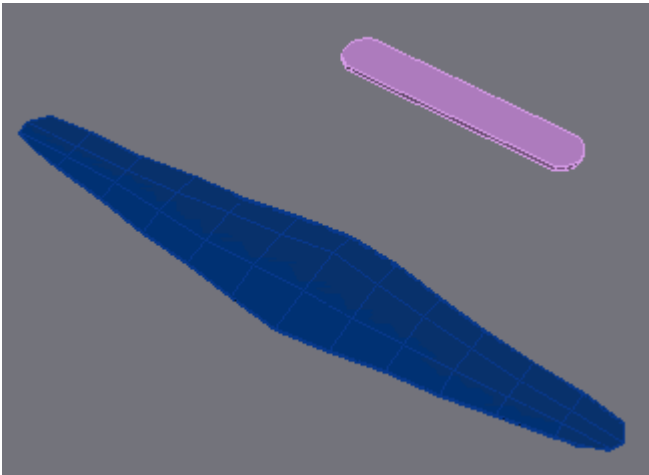
Move the vertices to match the top view of the stabilizer.

9  Click Vertex selection again to turn it off.

10 In the Left viewport, raise the stabilizer up so it is at the correct height.



Raise up the stabilizer.



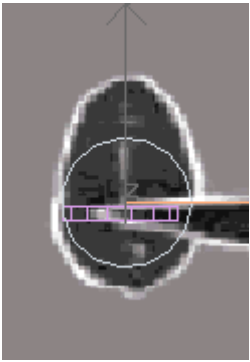
Wingspan and stabilizer in Perspective viewport

Next, you will make the twin rudders.


Create the twin rudders

Again you'll use cylinders converted to editable poly objects. In this case, you'll use the soft-selection feature when you select and move vertices.


- 1** Click the Left viewport to active it.
- 2** On the Create panel, turn on Cylinder.
- 3** In the Left viewport, draw a cylinder over the rudder.



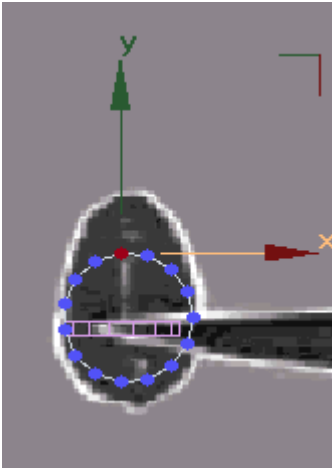
Start with a cylinder to make the rudder.

- 4 Change the cylinder Height parameter to **2"**.
- 5 In the Name And Color rollout, enter the name **rudder**.
- 6  Click the Modify panel tab, and then right-click the Cylinder in the modifier stack. Choose Convert To: Editable Poly.

The modifier stack no longer shows the cylinder; it now shows Editable Poly instead.

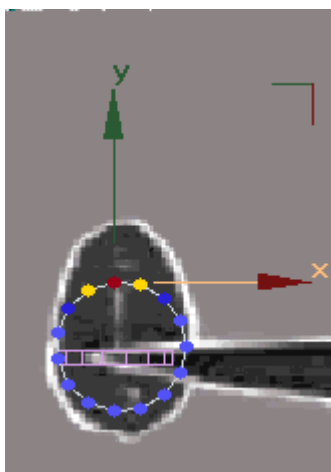
- 7  In the Selection rollout, click Vertex.
- 8 In the Left viewport, drag a selection window around the top vertices.

There is a single red dot in the viewport.



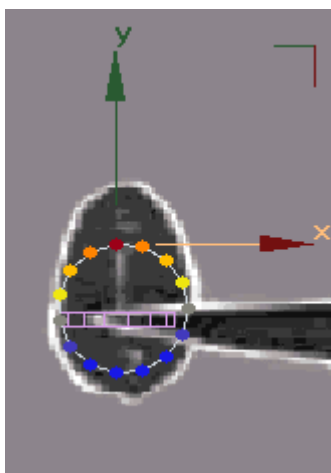
Select the top vertex

- 9 Open the Soft Selection rollout, and turn on Use Soft Selection.
Now the red dot is flanked by yellow dots.

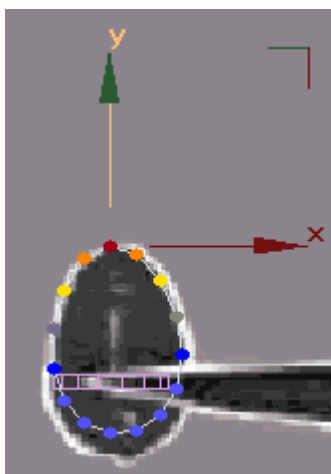


Soft Selection display

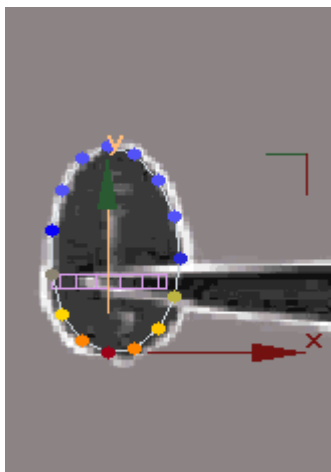
- 10** In the Soft Selection rollout, increase the Falloff value to **5'**.
The selection expands in the viewport.



- 11** Using the Transform gizmo, move the selection upward to shape the rudder.



- 12** Select the bottommost vertex, and move it down to finish the shape.



13 In the modifier stack, click Editable Poly to turn off sub-object selection.

14 In the Top viewport, select and move the rudder to the left into position.

Clone the twin rudder

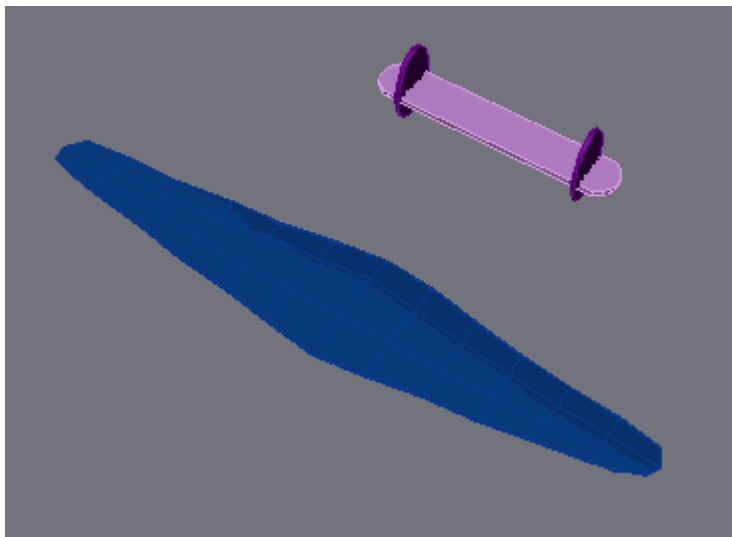
You can create a clone by holding down the SHIFT key while you move, rotate, or scale any object. Here, you'll make the twin rudder using this clone feature.

1 Hold down the SHIFT key, and move the rudder to the righthand position.

The Clone objects dialog appears.

2 Name the object **starboard rudder** and click OK.

The second object is visible in the viewports.



Wings, stabilizer, and twin rudders

3 Save your work as **myp38_02.gmax**.

The next step is to create the twin fuselages that hold the engines and the fuel tanks.

Next

[Creating the Fuselages](#)

\$ + K Creating the Fuselages

The P-38 was a deadly aircraft because it had twin fuselages, each housing an engine and a fuel tank. The warplane could sustain damage to either side, and still fly, thus presenting a formidable challenge to an opponent in a dogfight. In this section, you'll model the twin fuselages using the same techniques you've already practiced on the wings. You'll also use the Extrude and Bevel features to create the engine coolant radiator housings.

Create the fuselage

- 1 Continue from the previous lesson, [Adding the Stabilizer and Rudders](#).



- 2 On the Create panel, click Cylinder.

The Cylinder button turns orange, showing it is active and ready to use.

- 3 In the Front viewport, drag a cylinder out over the left fuselage so the radius approximates that in the background image.

Don't worry about the height, you'll adjust that in a moment. Set the height to any value. It doesn't matter.

- 4 Edit the Cylinder parameters, as follows:

- Radius=**1'10"**
- Height=**33'7"**
- Height Segments=**6**
- Cap Segments=**1**
- Sides=**10**

- 5 In the Name and Color rollout, enter the name of the object as **supercharger**.

- 6 In the Top viewport, move the cylinder so it is over the left fuselage.



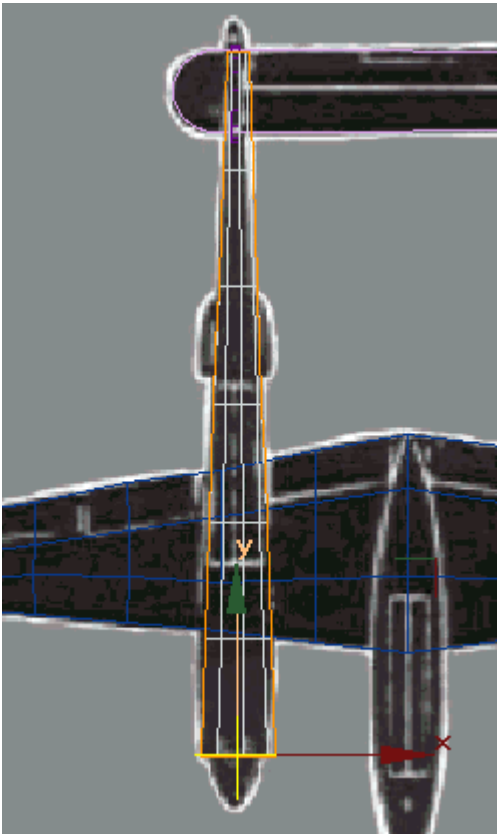
- 7 Go to the Modify panel. From the Modifier List, find the Parametric Modifiers group, and choose Taper.

- 8 In the modifier stack, expand the Taper hierarchy so the Center and Gizmo are visible, then click the Center to select it.

- 9 In the Top viewport, move the center so it is at the front of the cylinder.

- 10 In the stack, click Taper to turn off sub-object selection.

- 11 Now adjust the taper Amount to **0.8**.



**Tapered fuselage aligned with background image
(The front of the fuselage is just behind the rounded propellor hub.)**




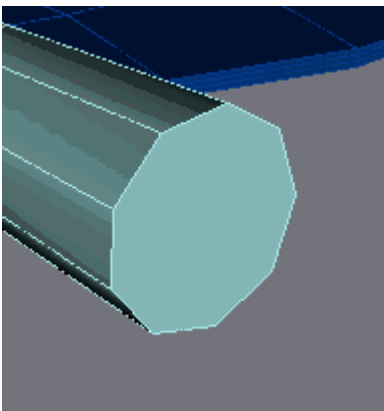
- 12** In the Front viewport, rotate the fuselage about its Y axis so the left and right sides are vertical.



To further shape the fuselage, you'll repeat the same technique as before. Convert to Editable Poly, then select rows of vertices and move them into position over the background image.

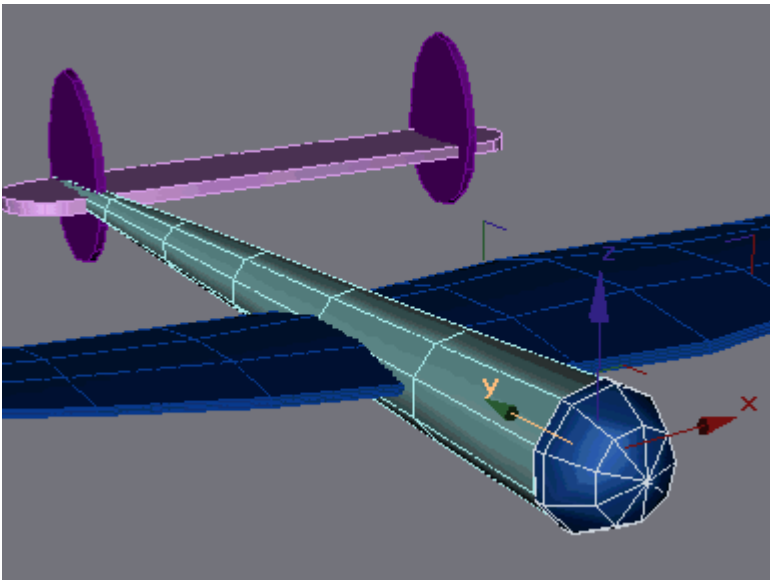
Add the propeller hub spinner

The propellor hub cap is called the spinner, and you'll create this component using a hemisphere and AutoGrid at the end of the cylinder.

- 1**  Zoom into the Perspective viewport so you have a close view of the front end of the cylinder. Right-click the viewport label, and set the shading mode to Smooth+Highlights and Edged Faces.





- 2  Go to the Create panel. In the Object Type rollout, click to turn on Sphere.
- 3 Turn on AutoGrid, the check box below Object Type. Now move your cursor over the surface of the end of the cylinder.
An axis tripod follows your cursor, showing you where the sphere will be drawn.
- 4 In the Parameters rollout, turn on Base To Pivot.
This lets you draw a sphere off the end of the cylinder.
- 5 Move your cursor over the end of the cylinder, and draw a sphere.
It doesn't matter what size; you will adjust the parameters after you draw it.
- 6 Edit the Parameters, as follows:
 - Segments=**10**
 - Hemisphere=**0.5**
 Now instead of a sphere, there is a hemisphere.
- 7 Rotate the hemisphere so the ten segments of the cylinder and the hemisphere are at the same angle.
- 8  On the main toolbar, click the Align button, then click the cylinder. In the Align Position (World) group, turn on X Position and Z Position. This aligns the hemisphere and the cylinder.
- 9 Adjust the radius of the hub so it matches that end of the cylinder. Don't spend too much time on this, it's all going to change in a few steps.



Spinner hub aligned to the end of the fuselage

Finish the fuselage shape



- 1 Select the fuselage cylinder object and right-click. Choose Convert To: > Convert To Editable Poly from the quad menu.
- 2  In the Selection rollout, click Vertex.
- 3  In the Left viewport, select a column of vertices and then on the main toolbar, choose Non-uniform scale from the scale flyout. Non-uniform scale them closer together, watching the bitmap as a guide. Then

right-click, choose Move from the quad menu, and position the row.

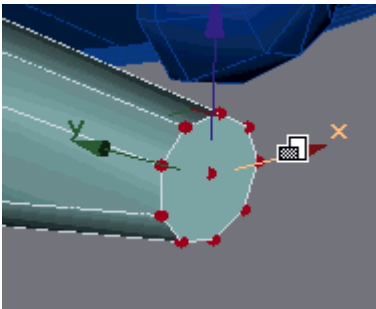
- 4 Repeat this process for all seven columns of vertices in the Left viewport, so the outline of the fuselage matches the background more closely.



Select one column at a time, scale, then move.

- 5  Click the Vertex selection button to turn it off, then select the hemisphere in the viewport.
- 6 Move the propellor spinner away so you can see the end of the fuselage.
- 7  Select the cylinder again and turn on Vertex selection.
- 8 Select the vertices in the end of the cylinder and non-uniform scale them about the X axis only. Use the Transform gizmo X arrowhead, and watch the coordinate display in the status bar. Scale down to **60** percent along the X axis.

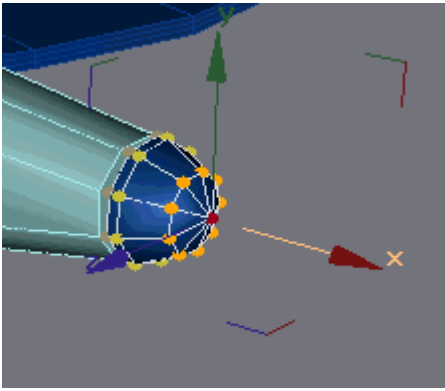
This returns the end of the cylinder to a more circular shape.



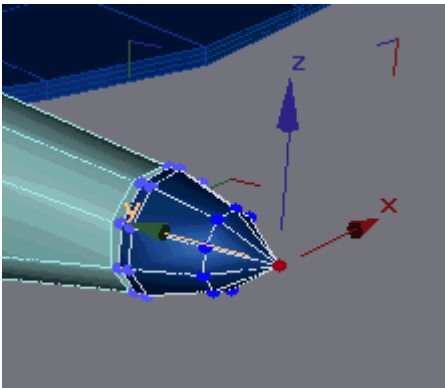
- 9 Turn off sub-object selection by clicking Vertex again in the Selection rollout, then move the hemisphere back into place. Change its radius so it fits over the end of the fuselage again.

Finish the propeller spinner

- 1 Collapse the hemisphere to an editable poly by right-clicking, and choosing Convert to: Convert to Editable Poly.
- 2 In the Perspective viewport, select the vertex in the center of the hemisphere.
- 3 In the Soft Selection rollout, adjust the Falloff so the second ring of vertices turns yellow, but the last rows do not. Move the selection forward along the Y axis.




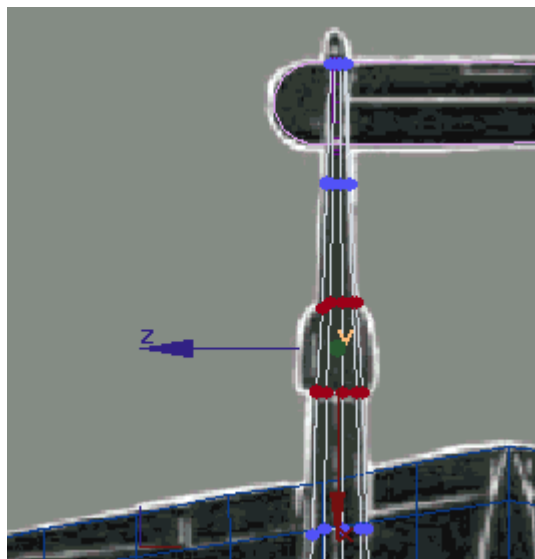
- 4 Lower the soft selection so only the vertex at the tip is selected, and move the tip forward to form the bullet shape.



The fuselage is almost finished. There is a blister on either side of the fuselage that serves as the exhaust waste gate outlet. You'll create this next, using the Extrude and Bevel features.

Create the exhaust gate outlet


- 1 Turn off Vertex selection for the propeller hubcap, and then select the fuselage.
- 2  Turn on Vertex selection for the fuselage.
- 3 In the Top viewport, select the third row of vertices from the top and move them down so they are at the end of the exhaust gate.
- 4 Select the fourth row and move them up, so they are positioned at the start of the exhaust gate.



Select and move these red vertices.

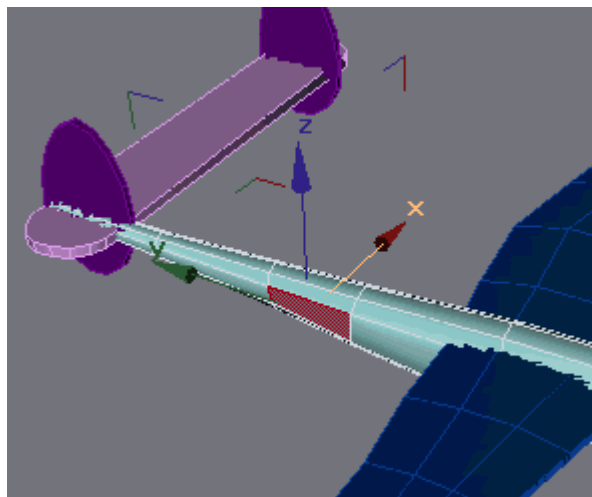
The vertices now line up in the top view, but need adjustment in the left view.

- 5 In the Left viewport, scale the selected vertices smaller along the Y axis, as necessary against the profile of the background image.


- 6  In the Selection rollout, choose Polygon.

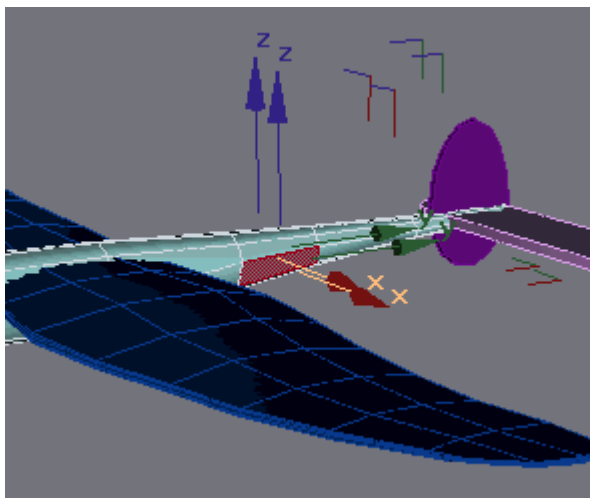
This lets you select polygons instead of vertices.

- 7 Select the polygons shown in the illustration below. Click to select the first polygon, then hold down the CTRL key. Right-click the Perspective viewport label, and be sure you have Smooth + Highlights and Edged Face chosen. You can also choose Configure and then in the Viewport Rendering options group, turn on Shade Selected Faces.



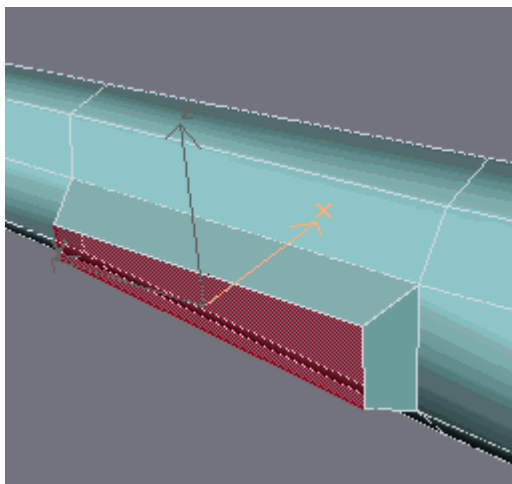
Select this polygon.

- 8  Use the Arc-Rotate button in the viewport navigation controls to see the other side of the fuselage, and select the second polygon.

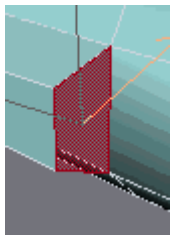


Add this polygon to the selection.

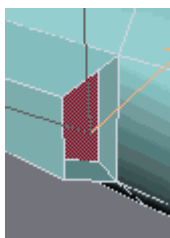
- 9** In the Edit Geometry rollout, turn on Bevel, then move your cursor over the selected polygon in the Perspective viewport.
- 10** Drag the bevel out so the Extrude field is approximately **0'6"**. When you release the mouse button, you are setting the Outline value. Create a Outline amount of approximately **-1"**.



- 11** Now select the newly created polygon at the front of the exhaust gate.



- 12** Bevel this face inward, with the extrusion about **-0'2"**, and the Outline very slight.



13 Click Bevel again to turn it off.

14 In the modifier stack, click Editable Poly to turn off sub-object selection.

Next, you'll clone the fuselage and spinner to make the second side.

Clone the fuselage

1 Select the fuselage, if it isn't selected already.

2 Hold down the CTRL key and click the propeller spinner.

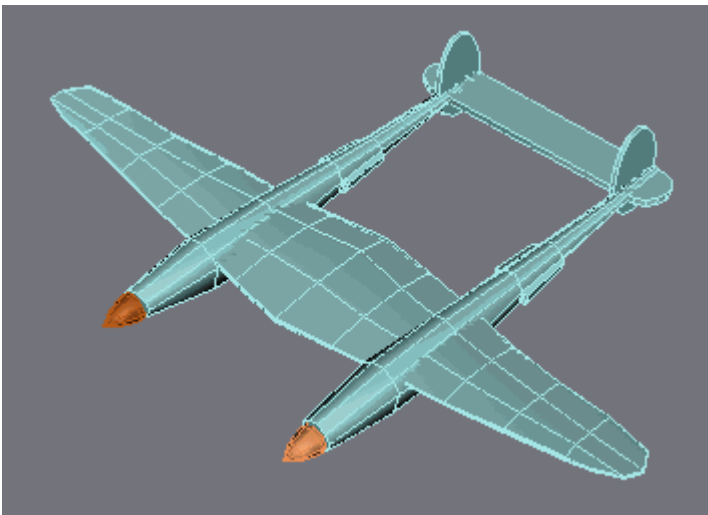
Now both objects are selected.

3 In the Top viewport, hold down the SHIFT key and move the selected objects to the right.

The Clone Options dialog appears.

4 Name the clone **starboard supercharger**.

Tip: Feel free to change the colors of all the objects so the plane looks more realistic.



P-38 wings and twin engines

5 Save your work as **myp38_nogondola.gmax**.

All that remains is the central gondola and canopy.

Next

[Creating the Gondola](#)

\$ + K Creating the Gondola

The plane is starting to look like a P-38, but it's missing the central gondola, the pilot cockpit, and canopy. You will create the gondola using the same techniques you learned when you shaped the fuselage.


Load a start file

- Continue from the previous lesson, [Creating the Fuselages](#), or you can load *gm_p38start_gondola.gmax* found in the *gmax/tutorials/P-38* directory.

Note: If you load the file you will need to adjust the viewport backgrounds by following these steps:

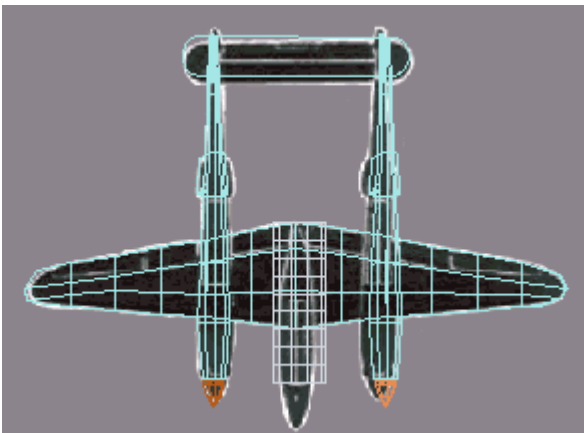
- Click in a viewport.
- Zoom and pan until the background image is the appropriate size and position.
- From the menu bar, choose Views > Viewport Background.
- In the Current group, turn off Lock Zoom Pan, then click Apply and OK.
- Zoom until the scale of the geometry matches the size of the background image.
- Pan to align the geometry with the background image.
- Do this for the Top, Front, and Left viewports.

Create the gondola


- 1  Go to the Create panel, and on the Object Type rollout, click to turn on Cylinder.
- 2 In the Front viewport, drag out a cylinder over the gondola, until the radius approximately matches the background image.

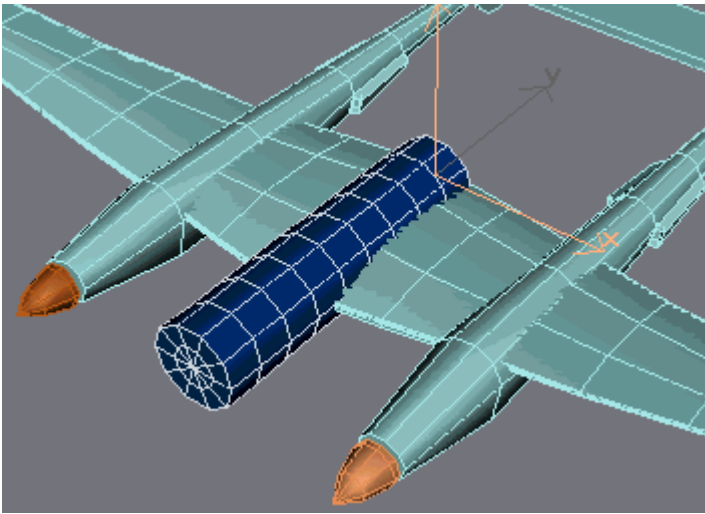
Watch in the Top viewport as you drag out the height of the cylinder, since the Front viewport will not show any difference.

- 3 Edit the Cylinders Parameters, as follows:
 - Height Segments=**9**
 - Cap Segments=**2**
 - Sides=**10**
- 4 In the Name And Color rollout, name the object **gondola**.
- 5 Move the gondola object in the Top viewport so the end lines up with the edge of the wing.






Line up the cylinder with the rear edge of the wings.

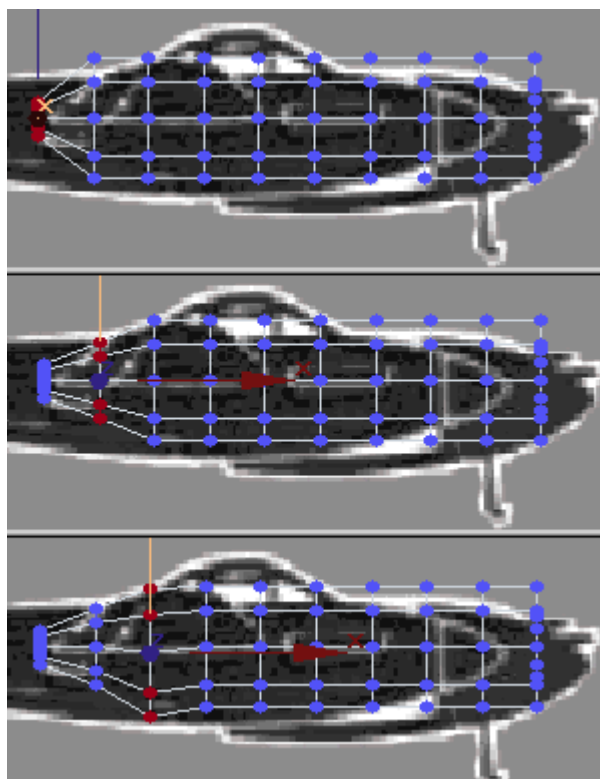
- 6**  On the Modify panel, adjust the height of the cylinder so it is even with the end of the twin fuselages, as illustrated below.



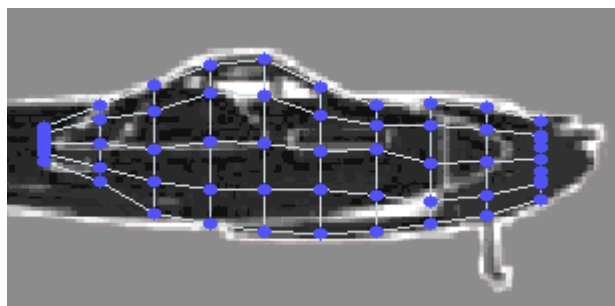
Start with a cylinder.

Shape the gondola

- 1**  Go to the Display panel, and hide everything but the gondola by clicking Hide Unselected in the Hide rollout.
- 2**  Go to the Modify panel. In the modifier stack, right-click Cylinder and choose Convert To: Editable Poly.
- Now you can reposition the vertices over the background images.
- 3**  On the Selection rollout, click Vertex.
- 4** Now go one row at a time, in the Left viewport and do the following:
- Select a row of vertices.
 - On the main toolbar, choose Non-Uniform Scale from the Scale flyout.
 - Scale them to the approximate size to match the background image.
 - Move them down to match the background image as well. Alternate between scaling and moving until they are correct.

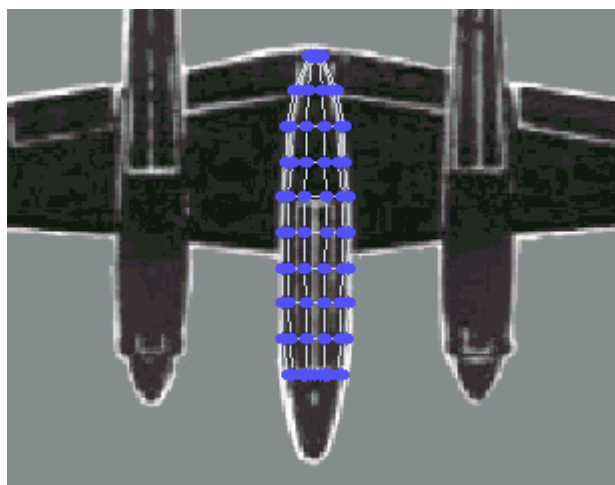


Scale and move the vertices to match the background.



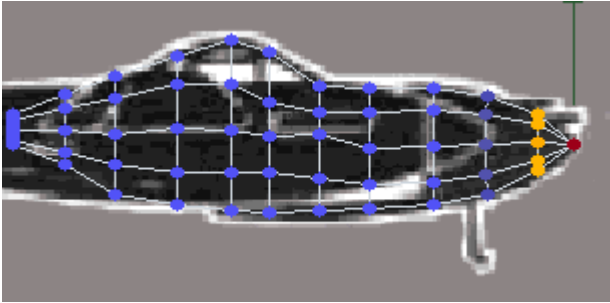
Placement of vertices from Left viewport

- 5 Activate the Top viewport and repeat the previous process. Select one row at a time and position the vertices over the background image using Scale and Move tools. Using the Transform gizmo, scale each row only along the X axis.

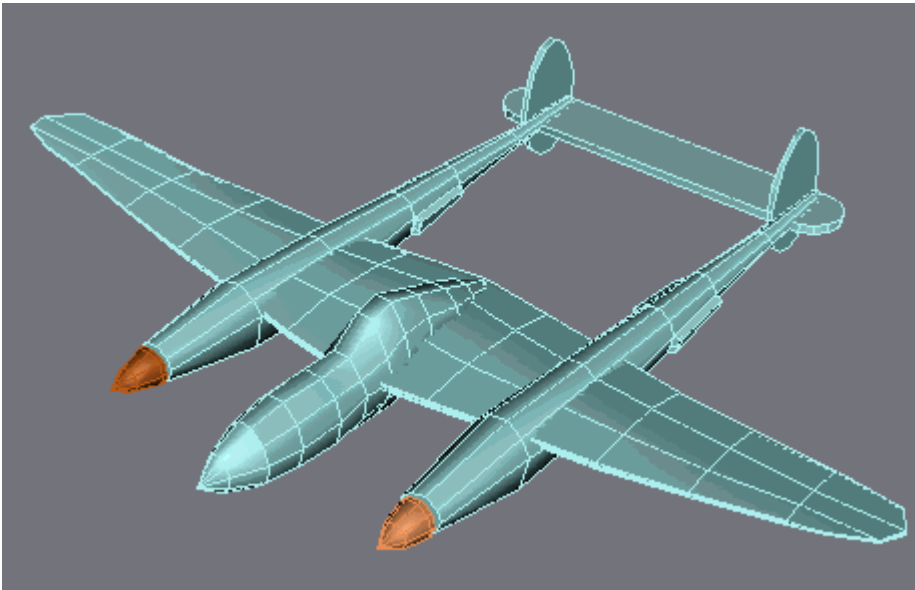


Vertex placement from the Top viewport

- 6 In the Left viewport, scale columns of vertices to match the outline of the cockpit.
- 7 To create the nose, select the single vertex at the center of the cylinder cap, then turn on Soft Selection and adjust the Falloff so the next ring of vertices turns yellow. Now move the soft selection out toward the nose. Turn off Soft Selection, and move the single end vertex to create the point.




- 8 To unhide the rest of the airplane, on the Display panel, choose Unhide By Name. Select all the components you have created (everything except the calibration box).
- 9 Change the color of the object to match the rest of the plane.
- 10 Make adjustments as needed. Select the row of vertices at the rear of the gondola and move them up along the Z axis in the Perspective viewport, so the rear taper is visible above the wing.

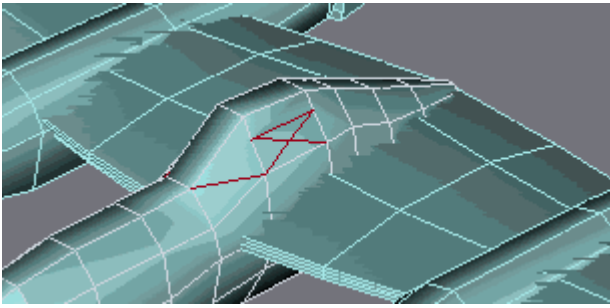


P-38 with gondola

Add the canopy

You can create the canopy using a couple of editable poly tools. You'll cut and chamfer to create the last piece of the P-38.

- 1 In the Perspective viewport, zoom in so you can see a close view of the cockpit area.
- 2  On the Selection rollout, click Edge, then turn on Ignore Backfacing.
- 3 On the Edit Geometry rollout, turn on Cut.
- 4 Cut new edges into the cockpit. Click to set the beginning of an edge, then move to mouse to draw the new edge. Click again to set the end of the edge.

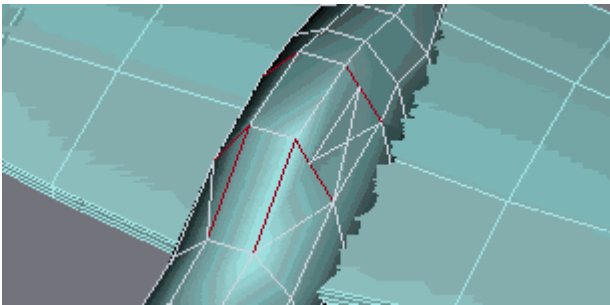


Cut these new red edges into the canopy.

- 5** Click Cut again, to turn it off.

You can chamfer edges to create the metal frame of the canopy.

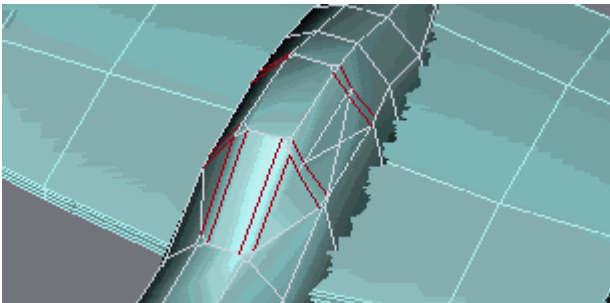
- 6** Select the edges above the forward windshields, as illustrated below.



Select these red edges.

- 7** In the Edit Geometry rollout, turn on Chamfer. Using the Chamfer spinner, increase the chamfer value while watching the viewport.

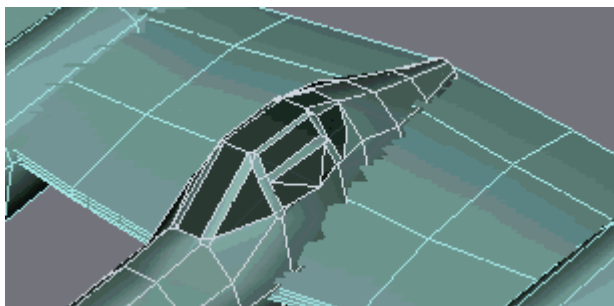
This creates the metal windshield supports.



Chamfer edges to create windshield supports.

- 8** You can repeat this technique of cutting and chamfering as needed to finish the canopy. We won't walk you through every step, now that you know the technique.

You can apply a transparent material to the canopy faces for extra detail. If you don't know how to create materials and apply them to polygons, see [Adding Materials and Mapping](#) .



P-38 gondola with completed canopy.

Of course there are lots more details you could add to this plane, such as propellers, machine guns, and landing gear. Feel free to continue on your own.



Propellers and machine guns added

- 9 Save your work as **myp38.gmax**. Or you can open the completed file [p38_lightning.gmax](#).

Modeling_a_P-38_Lightning_Fighter
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 ± GMAX_P-38:0
 K Modeling a P-38 Lightning Fighter
 # Setting_up_units
 \$ Setting Up Units
 ± GMAX_P-38:0
 K Setting up units
 # Setting_up_Viewports_Backgrounds
 \$ Setting Up Viewport Backgrounds

± GMAX_P-38:0

K Setting up Viewport Backgrounds

Creating_the_Wings

\$ Creating the Wings

± GMAX_P-38:0

K Creating the Wings

Adding_the_Stabilizer_and_Rudders

\$ Adding the Stabilizer and Rudders

± GMAX_P-38:0

K Adding the Stabilizer and Rudders

Creating_the_Superchargers

\$ Creating the Fuselages

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K Creating the Superchargers

Creating_the_Gondola

\$ Creating the Gondola

± GMAX_P-38:0

K Creating the Gondola



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