



3DXpert™ for SOLIDWORKS®

Adjust model for 3D Printing

Positioning - Orientate the part

14,0200,1599,1024(SP2)

In this document, we will learn about **Positioning - Orientate the part.**

Position and Orientate a Body means that we move and rotate the body to fit our 3D printing considerations.

Typical considerations are:

Reducing the printing time, which can be done by searching for minimum height.

Using a minimum tray area to maximize the quantity of parts on tray

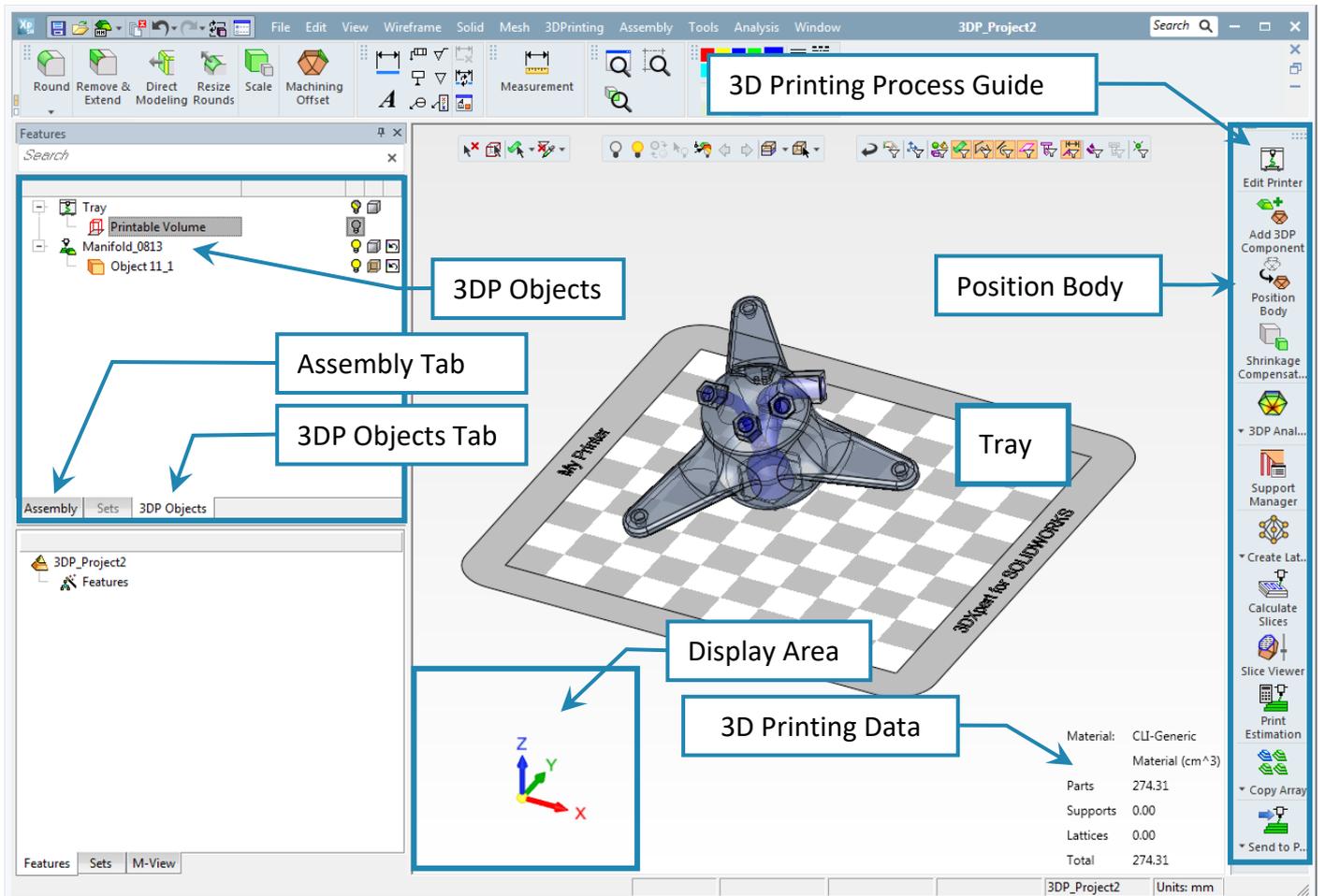
Minimizing the number of supports to reduce post printing work.

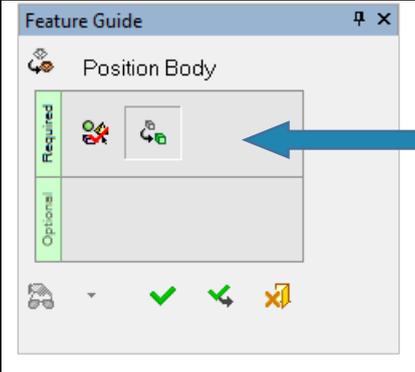
In the **Position Body** command it is possible to use dedicated analysis tools based on these criteria, or position the part(s) manually.

 Notice/ Remember		Left mouse button name is " pick "
		Middle mouse button name is " Exit "
		Right mouse button name is " Click "

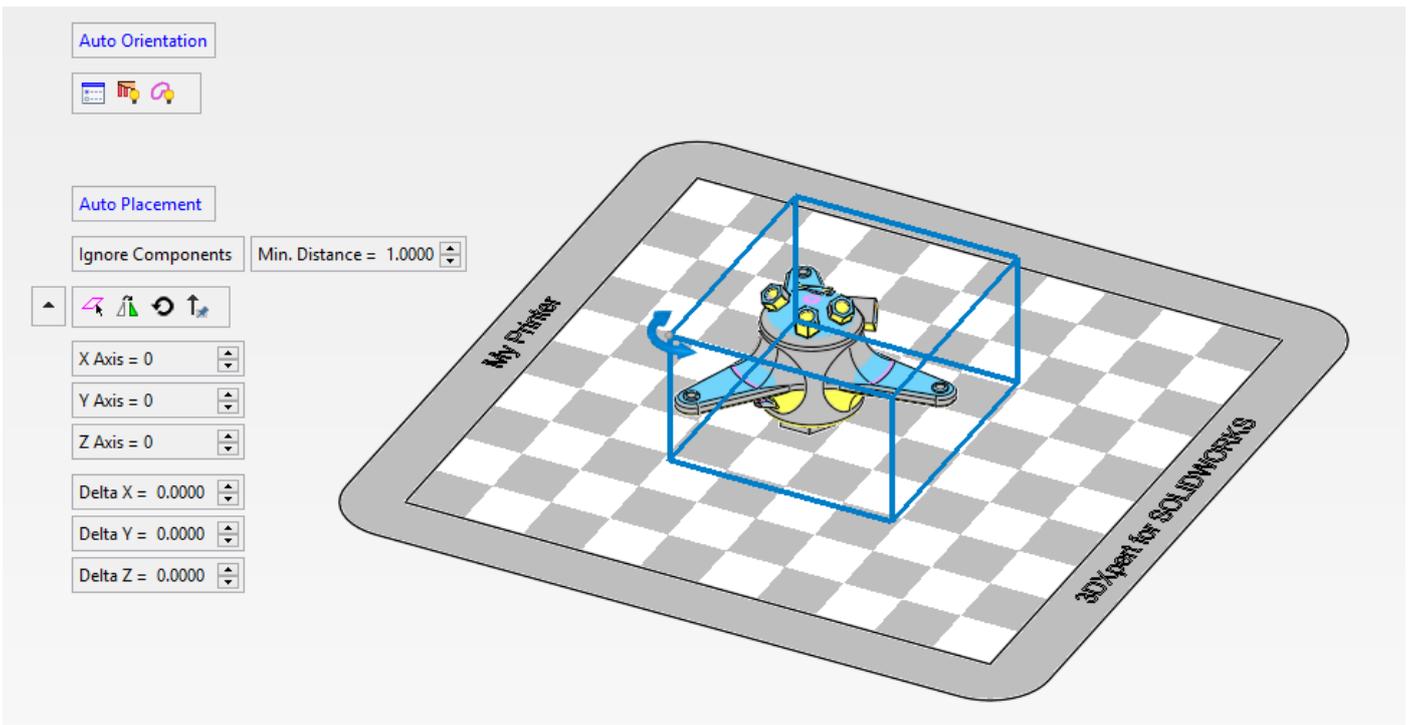


From the 3D Printing Process Guide access **Position Body** command.



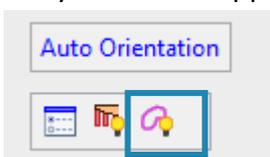
	Position Body	
	1) Pick object 2) Position Body	
		"Preview" the result without executing
		To approve and finish use the "OK"
		To approve and continue use the "Apply" .
		"Cancel" – exit the comand without keep changes

After lunching the **Position Body** command, the screen will look as in the image shown here. Note that if any portion of the body is under the tray, the body immediately "jumps" so the lower point of the body will be at tray level (if **Above Tray** parameter=0).

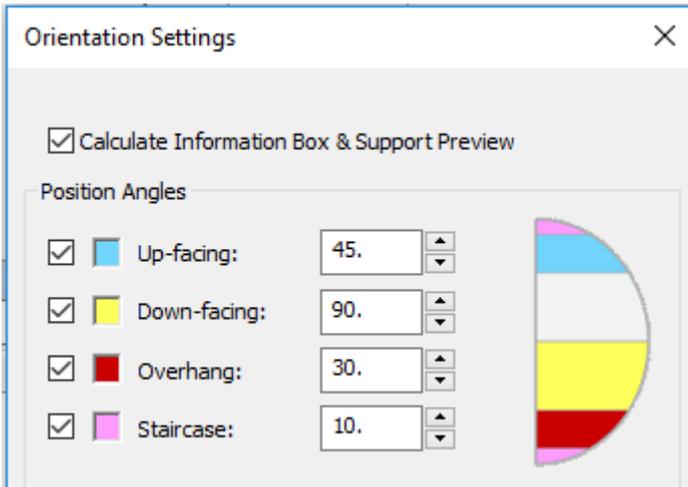


Notice at this time that:

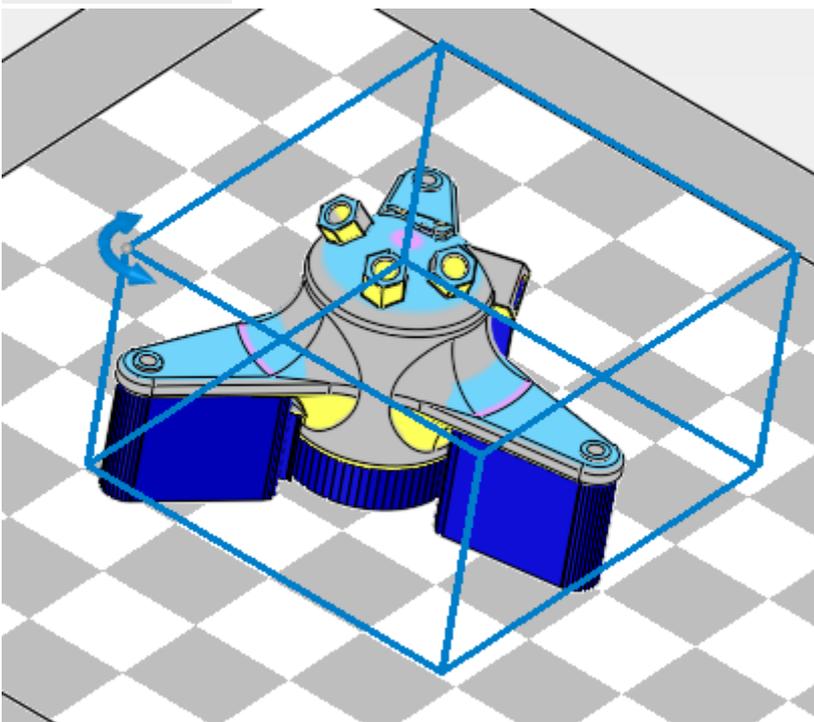
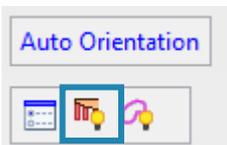
- A bounding box appears around the body, it serves also for better understanding of the available printer volume and of the body rotation.
- Body silhouette appears on the tray (if the icon to show silhouette is clicked)



- The model is colored according to the settings of the position angles :



- You can show a quick preview of the supports. This preview serves as a guide to the amount of supports that may be required.



Overhanging Angle

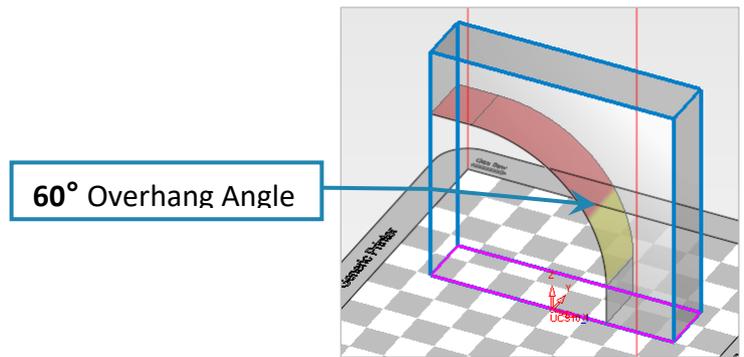
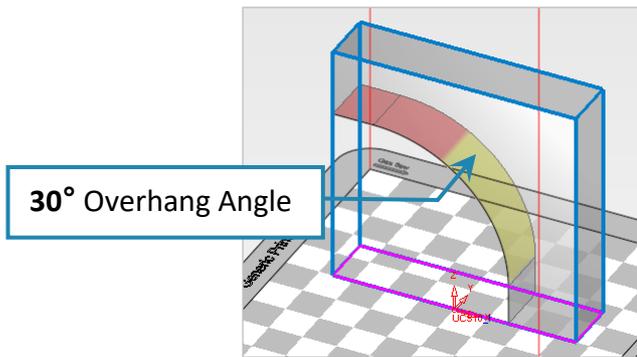
Overhang Angle = 30

The **Overhang Angle** defines the degree of overhang after which some support structure should be added to areas of the Body.

The angle is measured from the horizon.

The Red color represents areas that require supports while the Yellow areas are also not verticals but considered as areas that do not require any supports.

Any orientation change in body position will automatically update the result **Overhang Angle** analysis, reflected by of Red and Yellow colored areas.

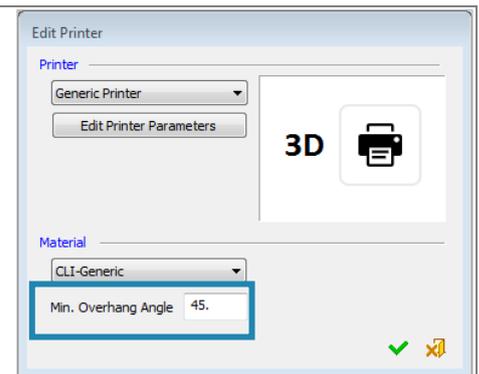


It is possible to choose the color visual mode – distinct or continues.



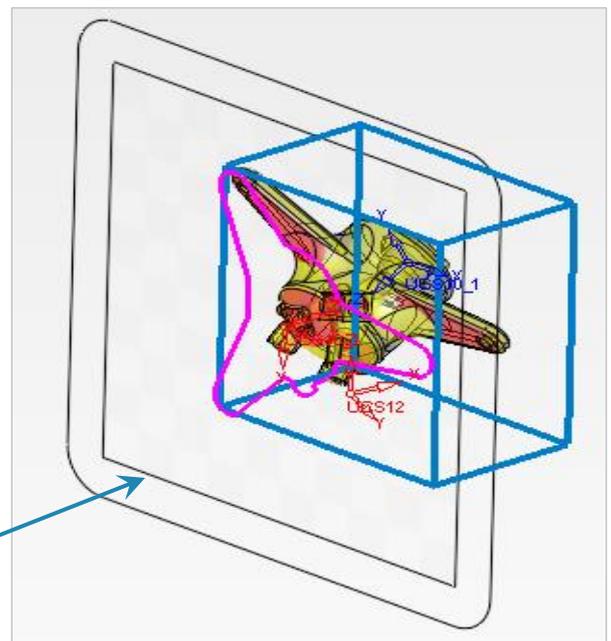
Please notice:

*The **Overhang Angle** is predefined through the **Edit Printer** command and can be changed at any time. The angle within the **Edit Printer** command can be different from the angle which is in the **Position Body** command that is used for any body needs.*



At any time, it possible to explore and examine the analysis results from every direction, rotate, zoom and pan the display. Notice that if the point of view is from the bottom of the tray, the tray becomes transparent.

ISO View from the bottom



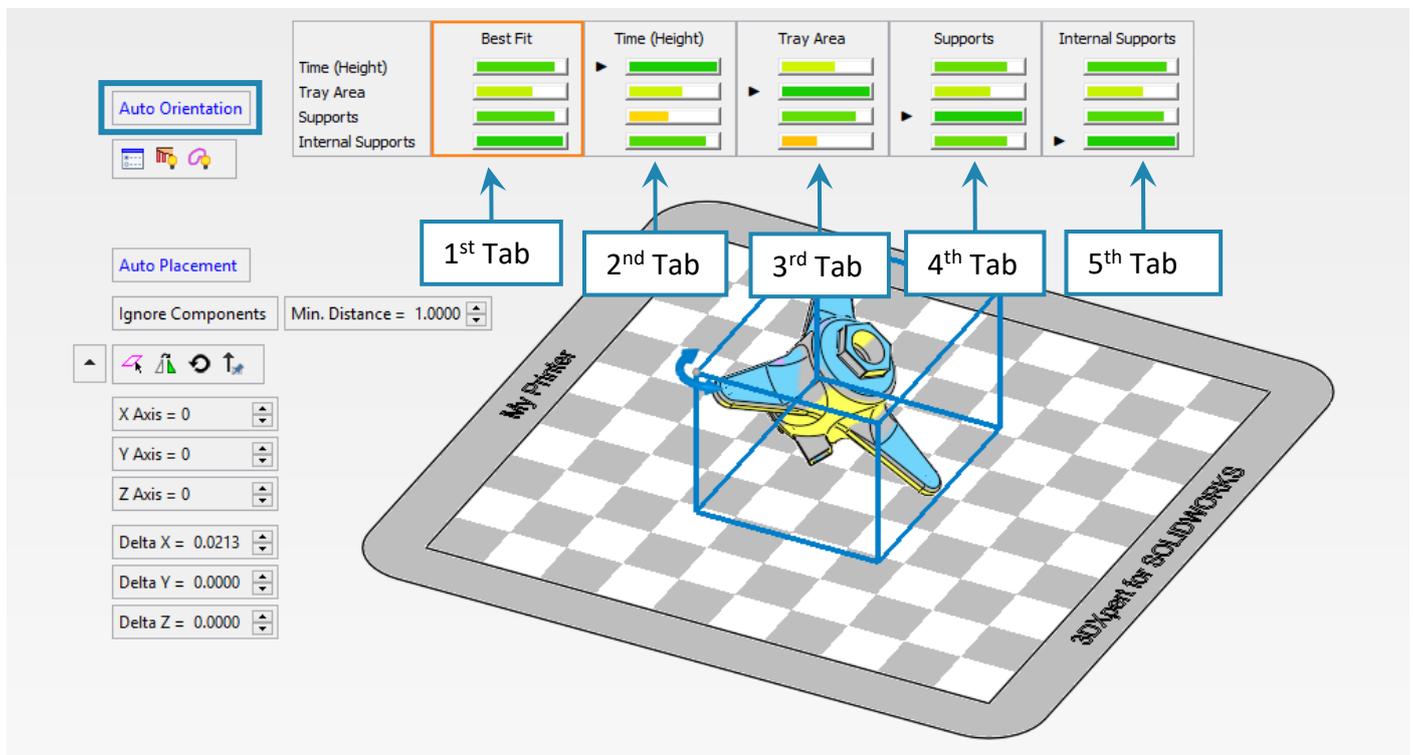
Auto Orientation

Auto Orientation

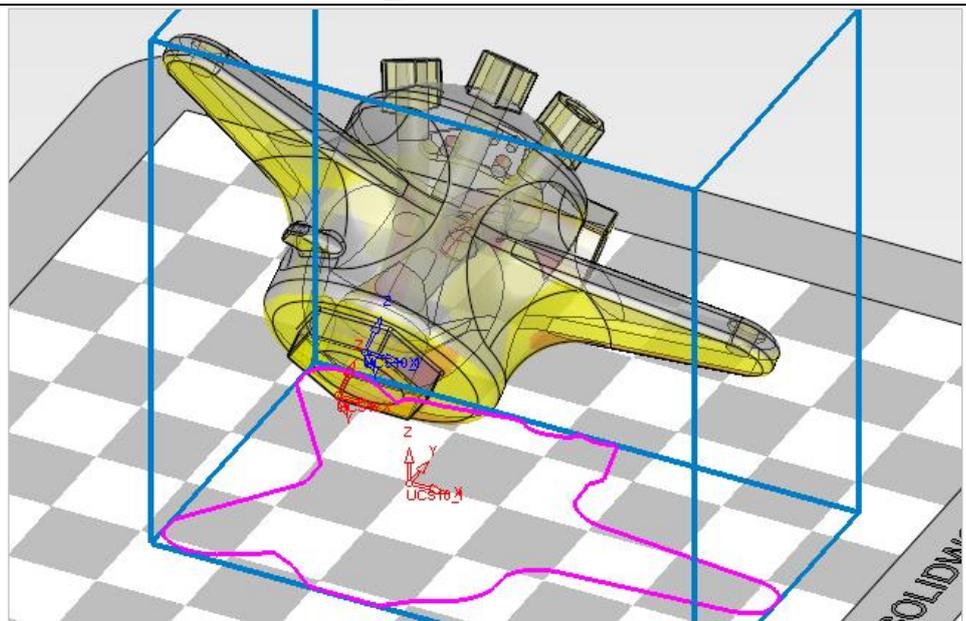
Auto rotate and move according to chosen analysis method:

In this mode the system analyzes five different priorities and for each priority it analyzes what is the condition of the other options. As a result, **picking** each tab changes the body position.

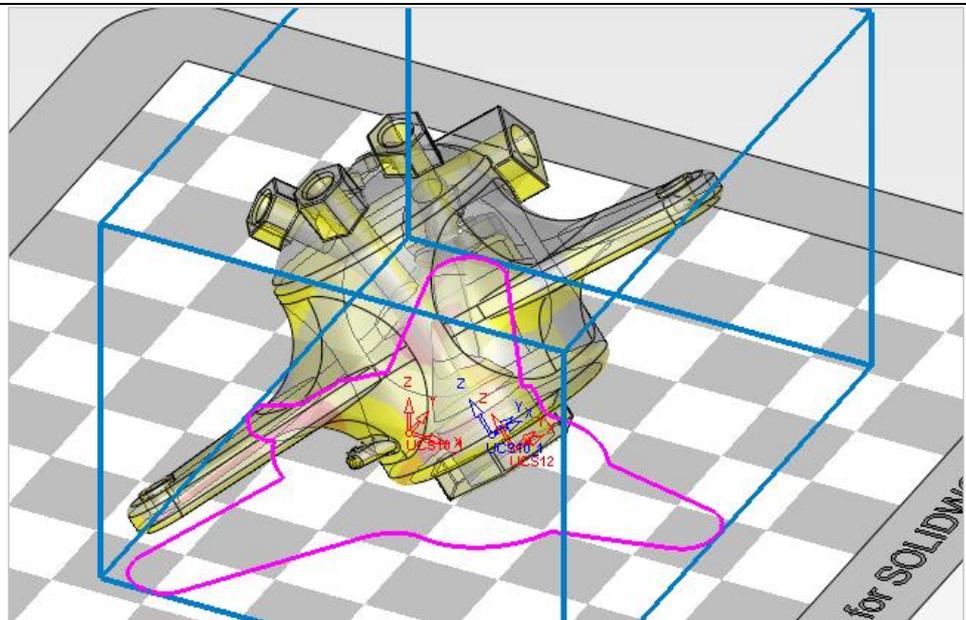
- **Best Fit** will analyze the position and orientation according to the user's settings in the Preferences. Time, tray area, supports and internal supports having weight of importance taken in considerations.
- **Minimize Time** will analyze a position and orientation according to minimum z height.
- **Minimize Tray Area** will analyze a position and orientation according to a minimum tray area consumption.
- **Minimize Supports** will analyze a position and orientation based on minimum number of supports needed.
- **Minimize Internal Supports** will analyze a position and orientation according to a minimum internal supports required (internal support may be hard to remove later).



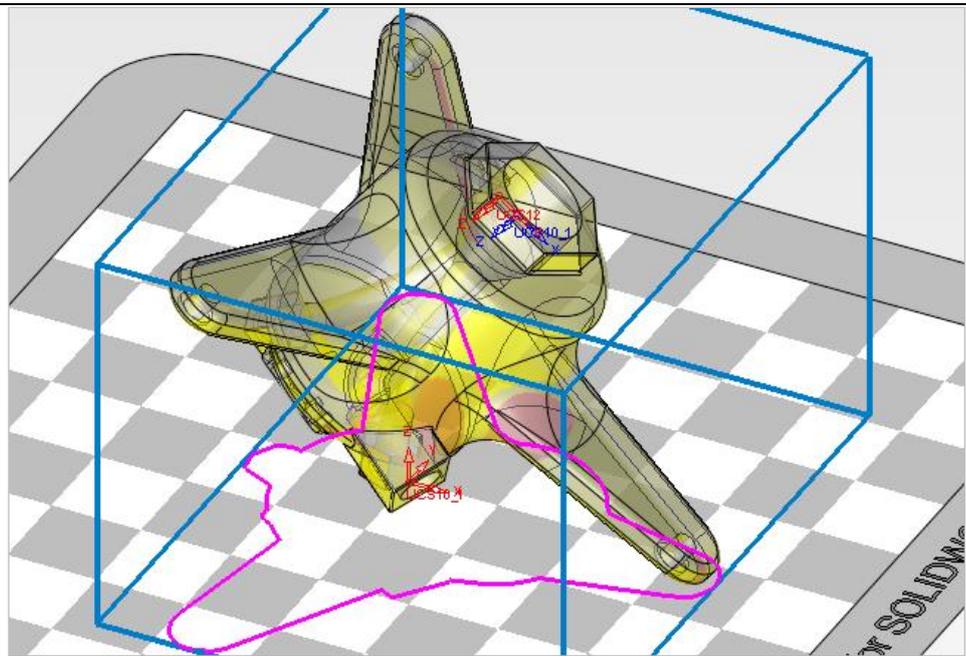
Time (Height)	<input type="text" value=""/>
Tray Area	<input type="text" value=""/>
Supports	<input type="text" value=""/>
Internal Supports	<input type="text" value=""/>



Time (Height)	<input type="text" value=""/>
Tray Area	<input type="text" value=""/>
Supports	<input type="text" value=""/>
Internal Supports	<input type="text" value=""/>

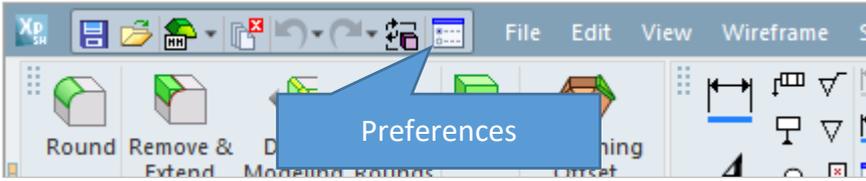


Time (Height)	<input type="text" value=""/>
Tray Area	<input type="text" value=""/>
Supports	<input type="text" value=""/>
Internal Supports	<input type="text" value=""/>

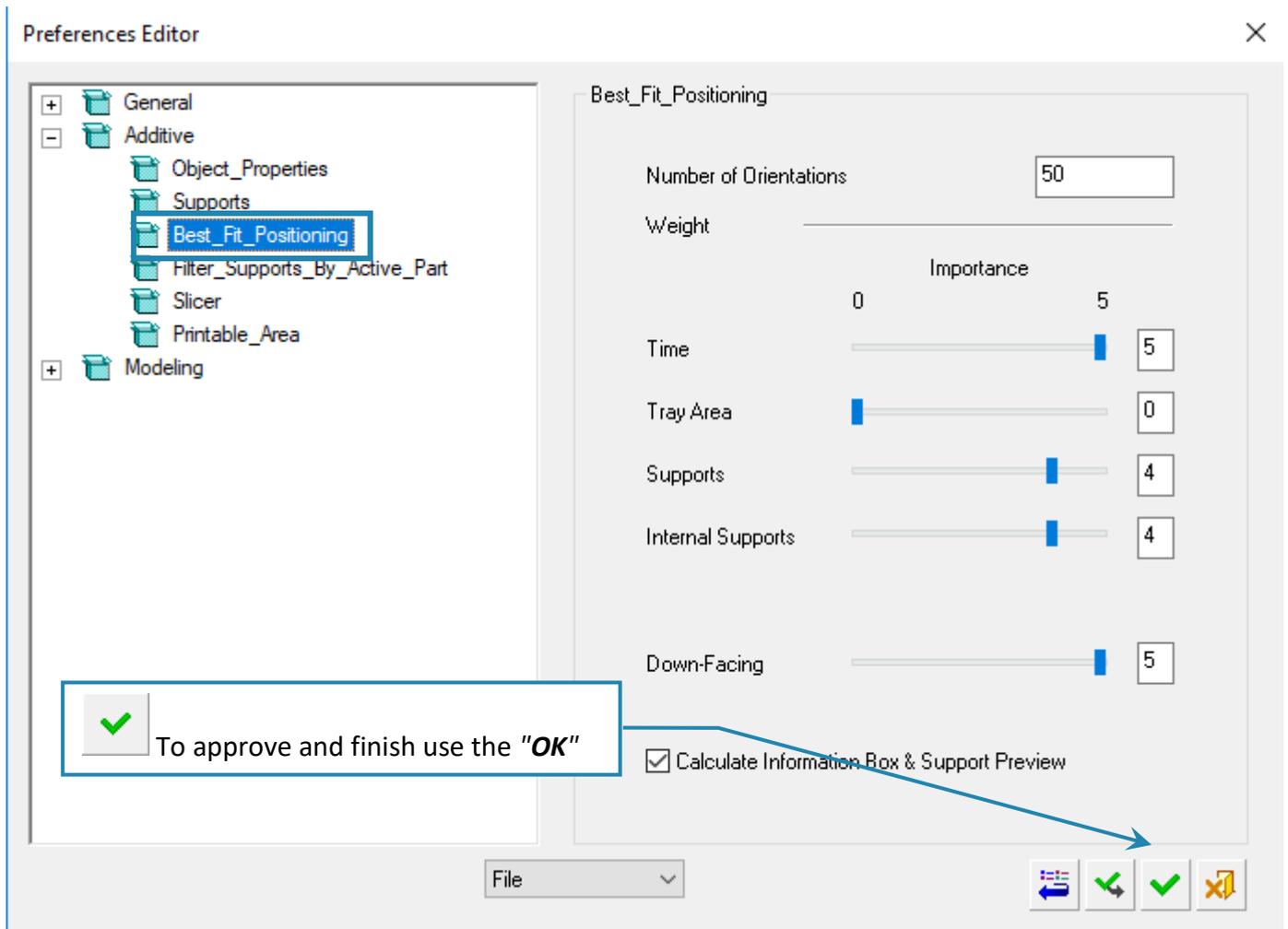


Best Fit will analyze the position and orientation in accordance what the user has set in the preference. Time, tray area, supports and internal supports having weight of importance taken in considerations.

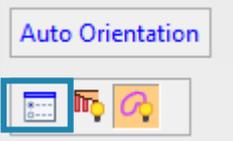
While a 3DP Project is open, **pick** from the Quick Accesses Toolbar the Preferences  command,



As the Preferences Editor window opens up, browse as shown here to get the appropriate window – Best_Fit_Positioning.



You can enter the best fit from the screen



Orientation Settings ✕

Calculate Information Box & Support Preview

Position Angles

<input checked="" type="checkbox"/>	 Up-facing:	<input type="text" value="45."/>	<input type="button" value="▲"/> <input type="button" value="▼"/>
<input checked="" type="checkbox"/>	 Down-facing:	<input type="text" value="90."/>	<input type="button" value="▲"/> <input type="button" value="▼"/>
<input checked="" type="checkbox"/>	 Overhang:	<input type="text" value="30."/>	<input type="button" value="▲"/> <input type="button" value="▼"/>
<input checked="" type="checkbox"/>	 Staircase:	<input type="text" value="10."/>	<input type="button" value="▲"/> <input type="button" value="▼"/>



Overhang colors

Continuous mode

Distinct mode

Best Fit

	0	Importance	5	
Time	<input type="range" value="5"/>			<input type="text" value="5"/>
Tray Area	<input type="range" value="0"/>			<input type="text" value="0"/>
Supports	<input type="range" value="4"/>			<input type="text" value="4"/>
Internal Supports	<input type="range" value="4"/>			<input type="text" value="4"/>



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Please notice:

if is used, the changes will be applied only in this file,

if is used, the changes will be applied in this file and all new documents.

Set parameters between 0 and 5 using the slider or edit box. The Best Fit analysis will run based on the Number of Orientations (50 is the default) and the best result will be displayed.

Positioning - Orientation

At any time, the body can be moved or rotated.

Those motions can be done by entering the desired values to the appropriate fields or dynamically on screen.

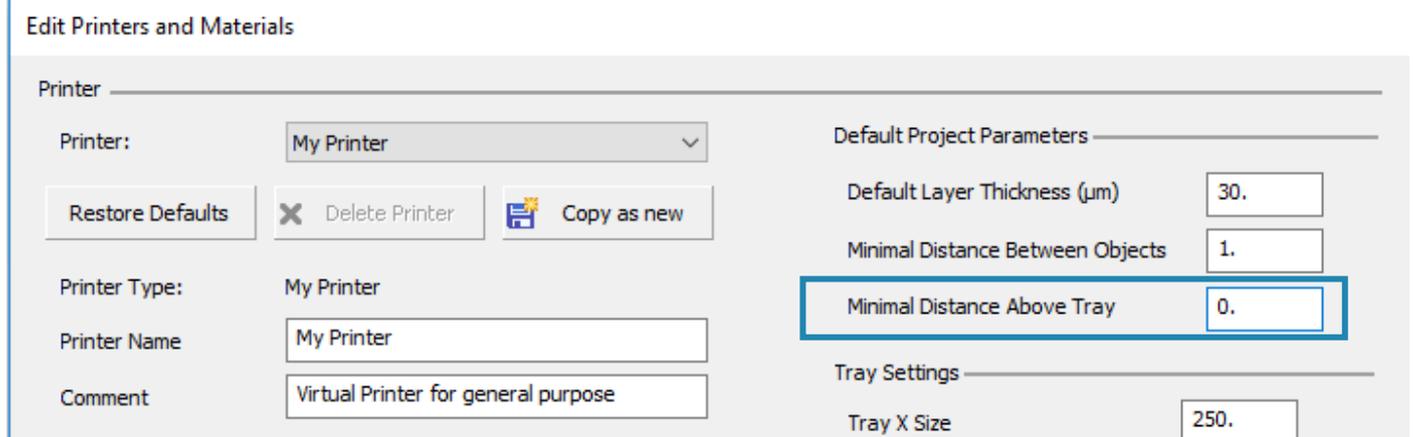
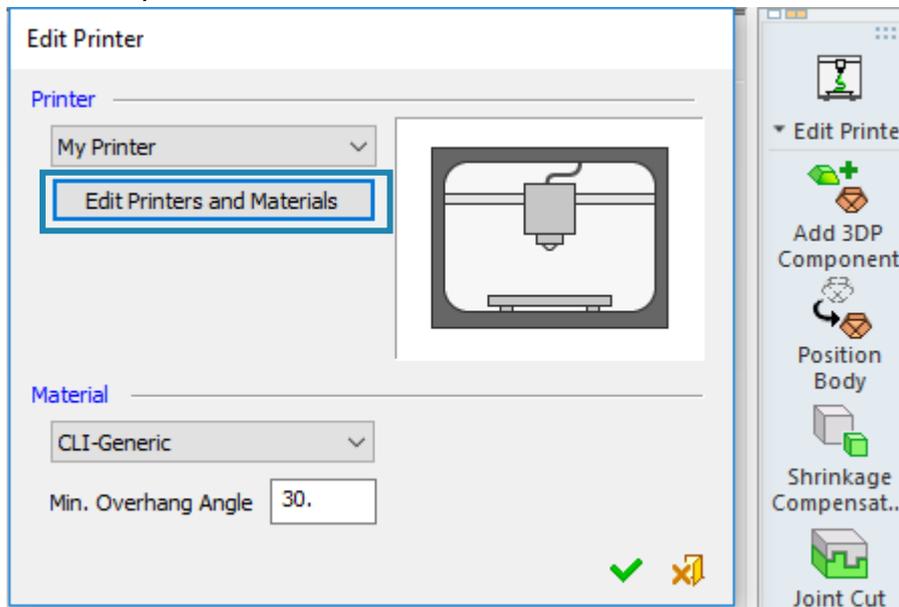
No matter what kind of motions are used, the body cannot escape out of or under the tray, or in other words, of the printable area (the checkered pattern).

If during its rotation, the part protrudes below the tray, the part jumps to within the tray area once the mouse is released and the Body silhouette will appear again.

Above Tray = 0.0000

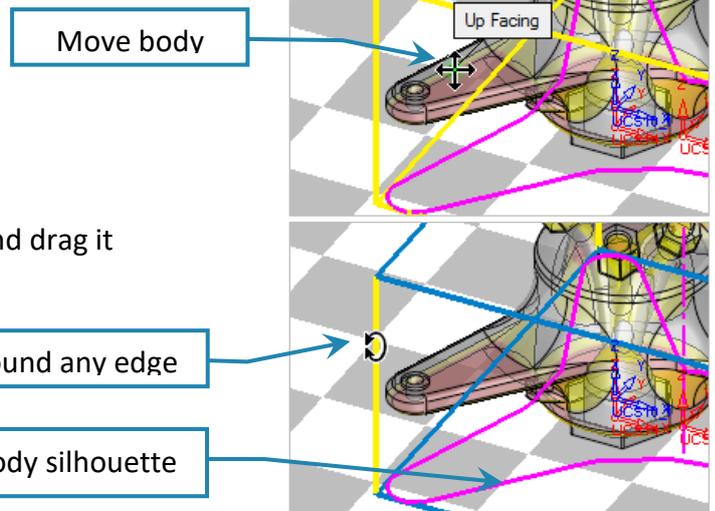
Above Tray ≥ 0 set the minimal distance between the part and the tray. This is the distance between the part's lowest point and the tray.

To set the Above Tray value, enter 'Edit printers and Materials' and set the value for 'Minimal Distance Above Tray':



The bounding box (together with the part) can be moved and rotated dynamically.

To move the box dynamically, **pick** the part and drag it around the tray.

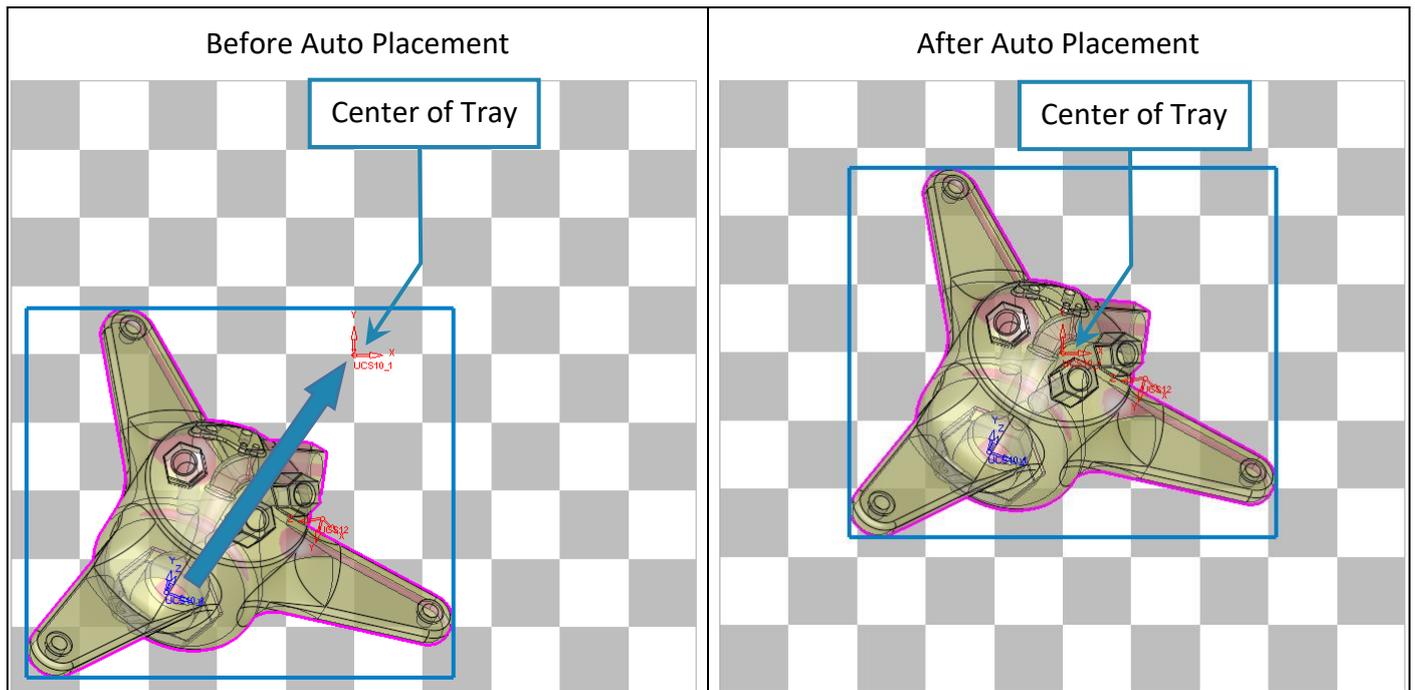


To rotate the box, **pick** any of the edges of the box and drag it to rotate it.

Auto Placement

Auto Placement

Auto Placement will move the bounding box (together with the part) without changing the Orientation. The movement will be from the center of the bounding box to the center of the tray. Above Tray value will be kept.

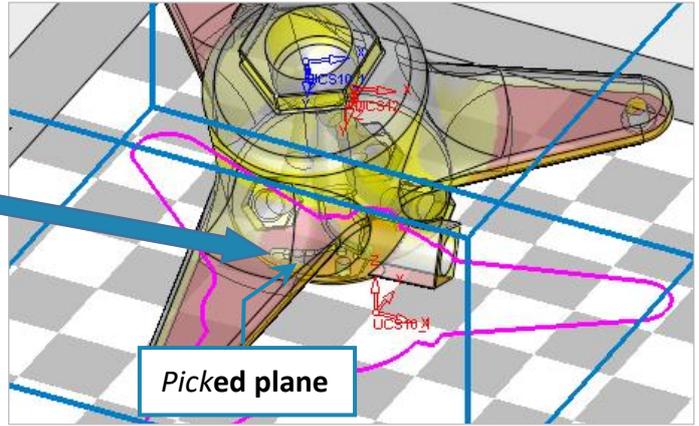
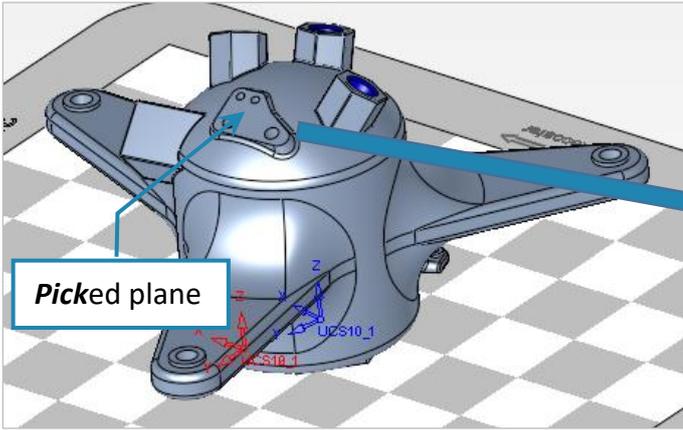


Flip Flip rotate the body upside down (and vice versa).

Reset Orientation **Reset Orientation** allows at any time to reset the body Orientation to the same Orientation like when the part was originally added.

Select Plane **Select Plane** pick a specific plane and set it parallel to the tray.

This is useful when you wish to have a specific orientation so that a particular face will be tangent to the tray.



Consider Components Minimum Distance = 1.0000

The options **Consider Components** and a **minimum distance** are used when positioning more than one part to a current 3DP Project, or use Ignore Components.



To approve and finish use the "OK".
The **Position Body** command can be invoked as many times as needed.