Values for the .tmd file

This tutorial is made for someone who is able to build a 3D model of a model airplane using the 3D modeling software **Metasequoia** and who wants to create a model for the **aerofly RC 7** or **RC 8**.

The tutorial shows you how to get the most important values for the sections **rigidbody**, **aerofuselage**, **aerowing**, **rotatingbodygraphics** and **hingedbodygraphics** in the **.tmd** file.

To learn how to make an RC 8 model out of an RC 7 model please read the tutorial

'How to convert a model from aerofly RC 7 to RC 8'

To adapt your own model take a .tmd file of an Ipacs RC 7 or RC 8 (or one of my models) model similar to your model.

You have to create some additional boxes and surfaces in the .mqo file which are only necessary to transfer the values from Metasequoia to the RC 7 / RC 8 .tmd file and should not be part of the .tgc or .tmb file!

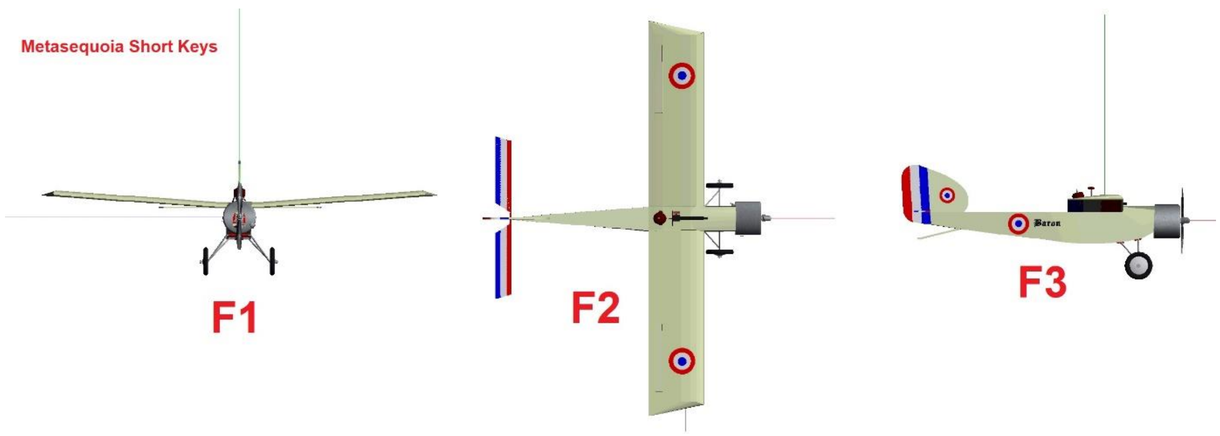
To illustrate this procedure I created a new .mqo file called baron-physics.mqo. This .mqo contains the complete model and the additional boxes and surfaces.

I also created an Excel table (baron.xlsx) which allows you to get the values you need for the .tmd file.

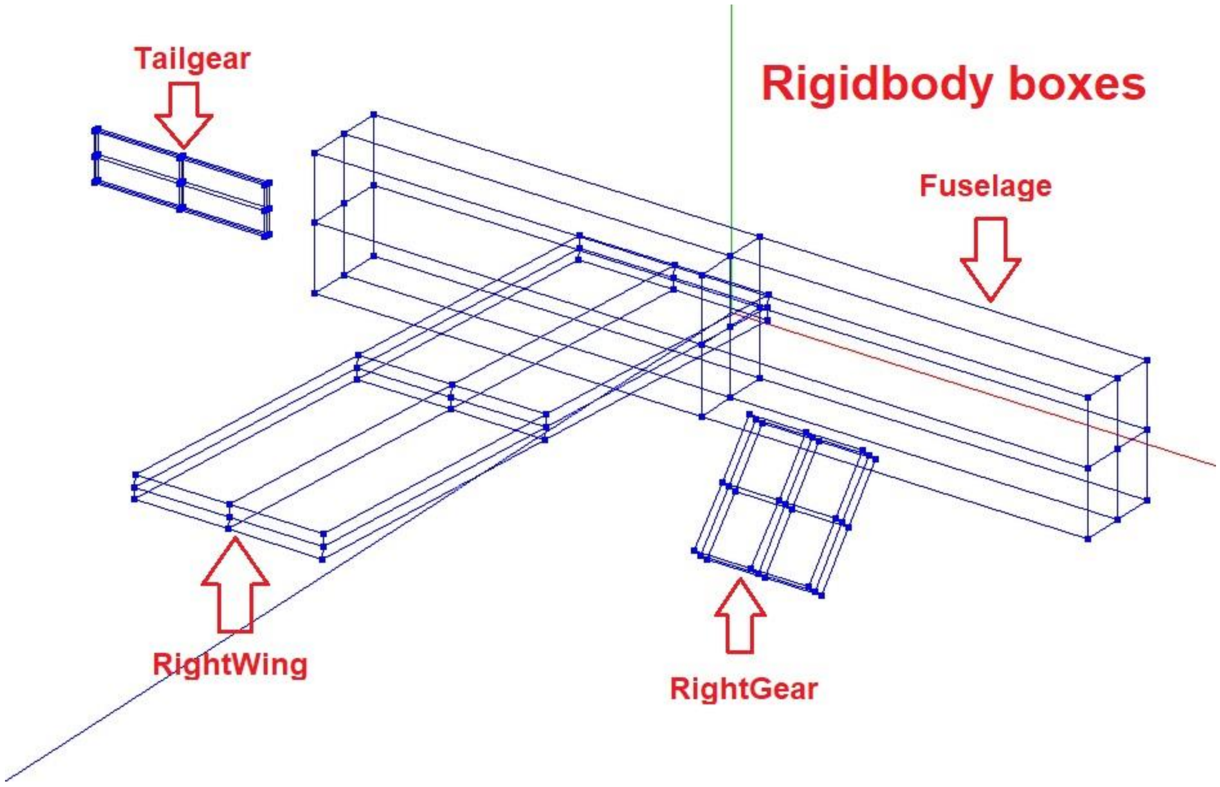
The models by Jean-Pierre (jparia), which were created with the help of these tutorials, can be downloaded here: http://jaria.free.fr/aerofly

To have the same view to the model like me you should customize your Metaseqoia as shown below.

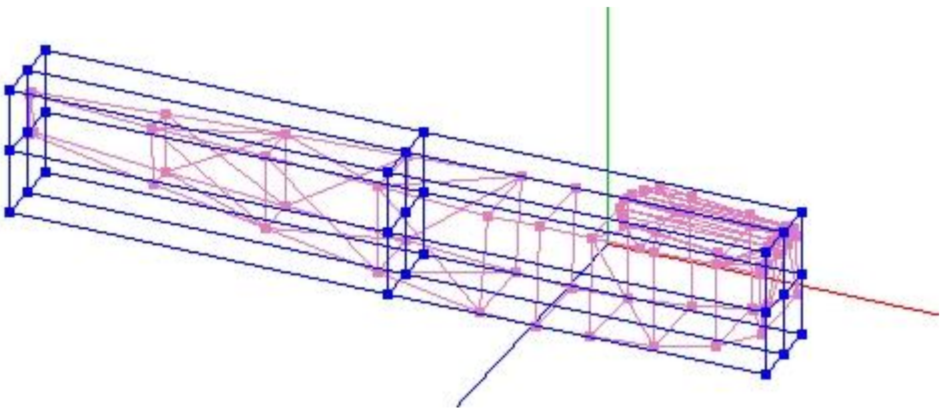
Metasequoia General configuration (short-keys)



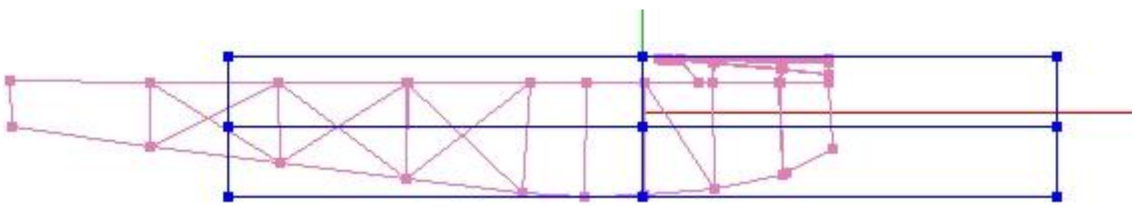
Rigidbody



The **Rigidbody boxes** should have the dimensions of the object, e. g. the Fuselage:



The **middle** of the **RigidbodyFuselage** box however should be placed in the **CG** (center of gravity):

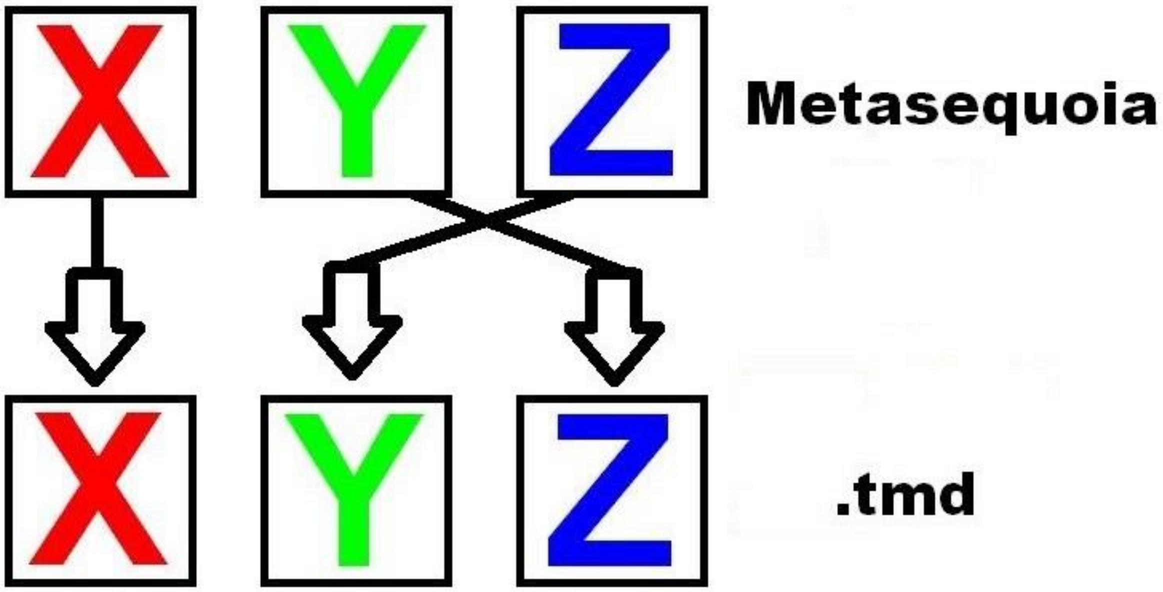


For the .tmd file we need 2 entries, InertiaLength and R0:

```
<[vector3_float64][InertiaLength][0.980100 0.108500 0.164400]>
<[vector3_float64][R0][-0.000200 0.000000 -0.016500]>
```

Please notice!

The axis in Metasequoia and the .tmd file are different:



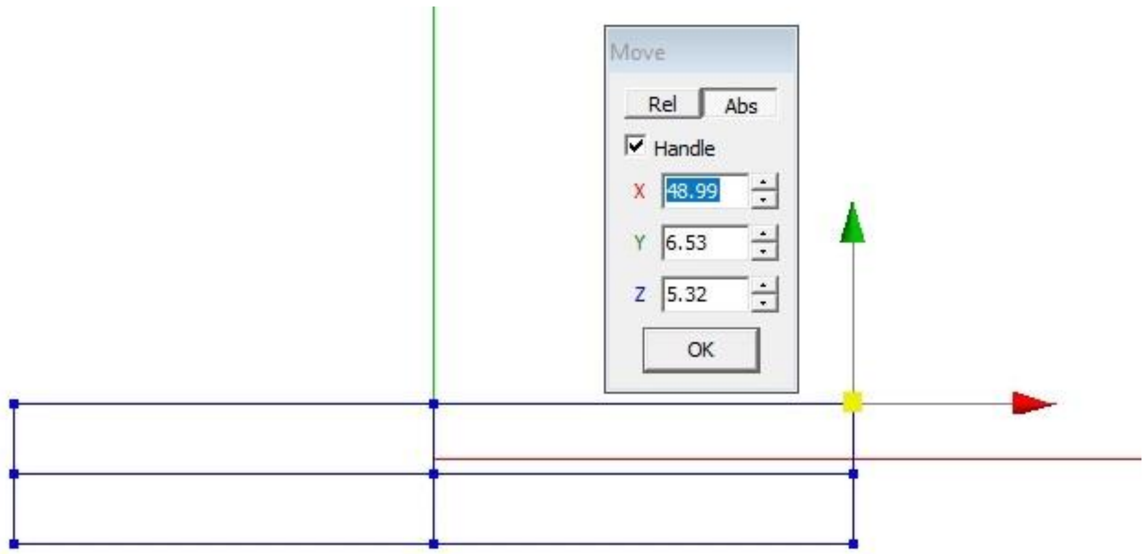
To get the values you need the Excel file baron.xlsx.

Here an example for the Rigidbody Fuselage:

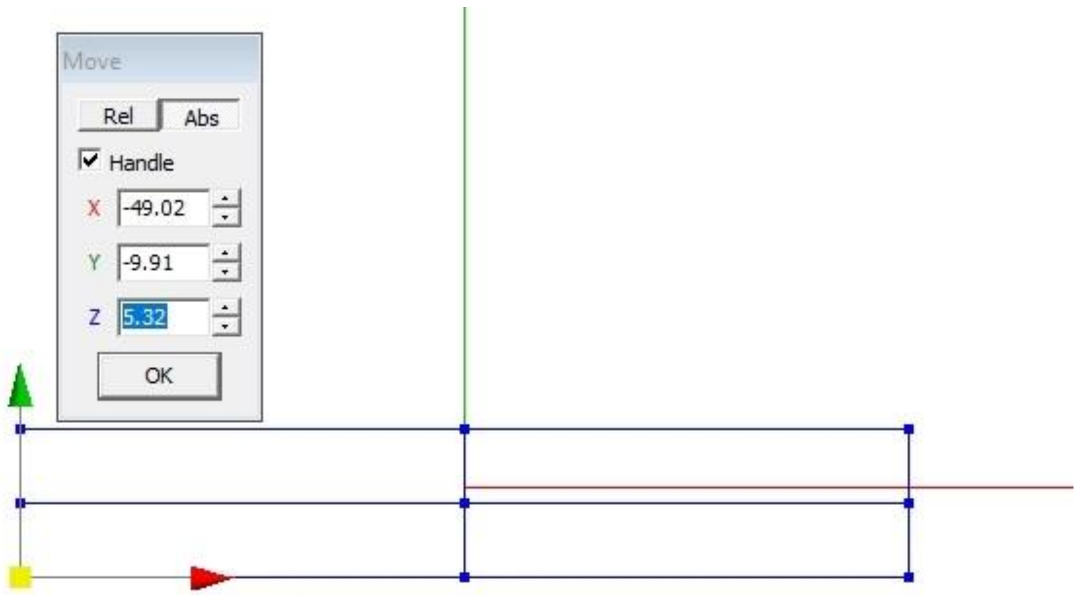
rigidbody Fuselage							
				tmd file			
Metaseqoia			Inertia Length			R0	
					(middle of the box / CG)		
F3-right	F3-left	(f3 / X)		Metaseqoia	X	Y	Z
48.99	-49.02		0.980100		-0.02	-1.65	0
F1-right	F1-left	(f1 / Z)					
-5.53	5.32		0.108500	tmd file	X	Z	Y
F3-top	F3-bottom	(f3 / Y)			-0.000200	0.000000	-0.016500
6.53	-9.91		0.164400				

Take the values from Metasequoia as shown below:

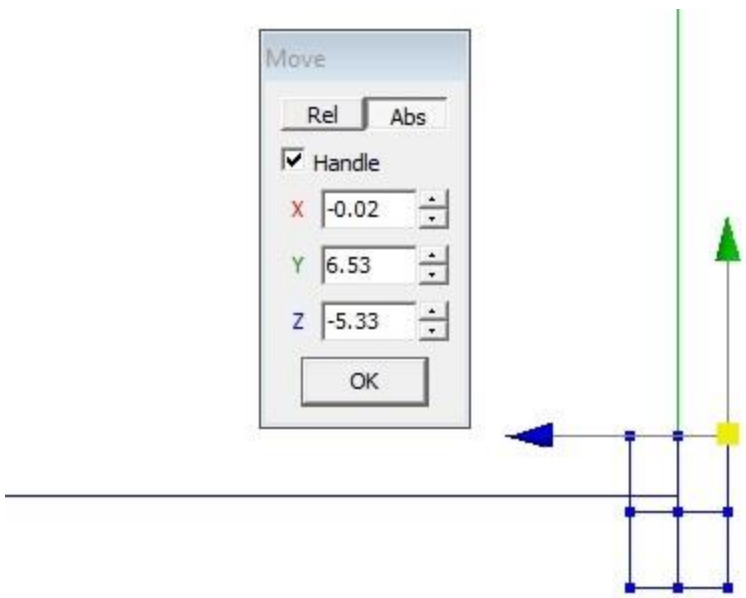
F3-right



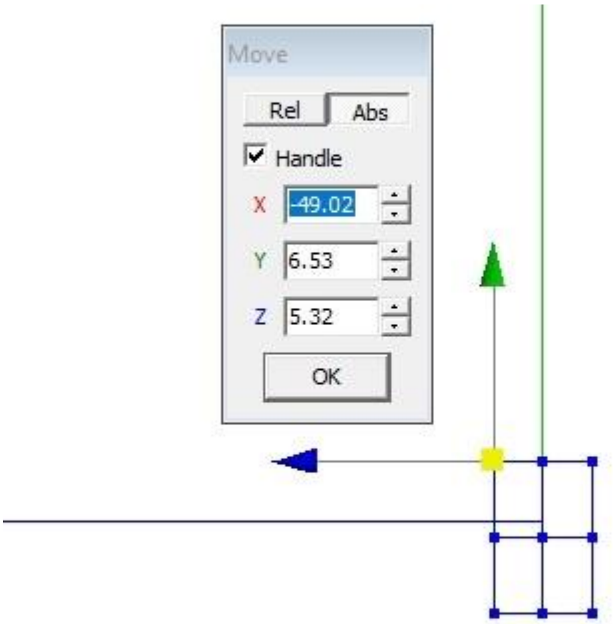
F3-left



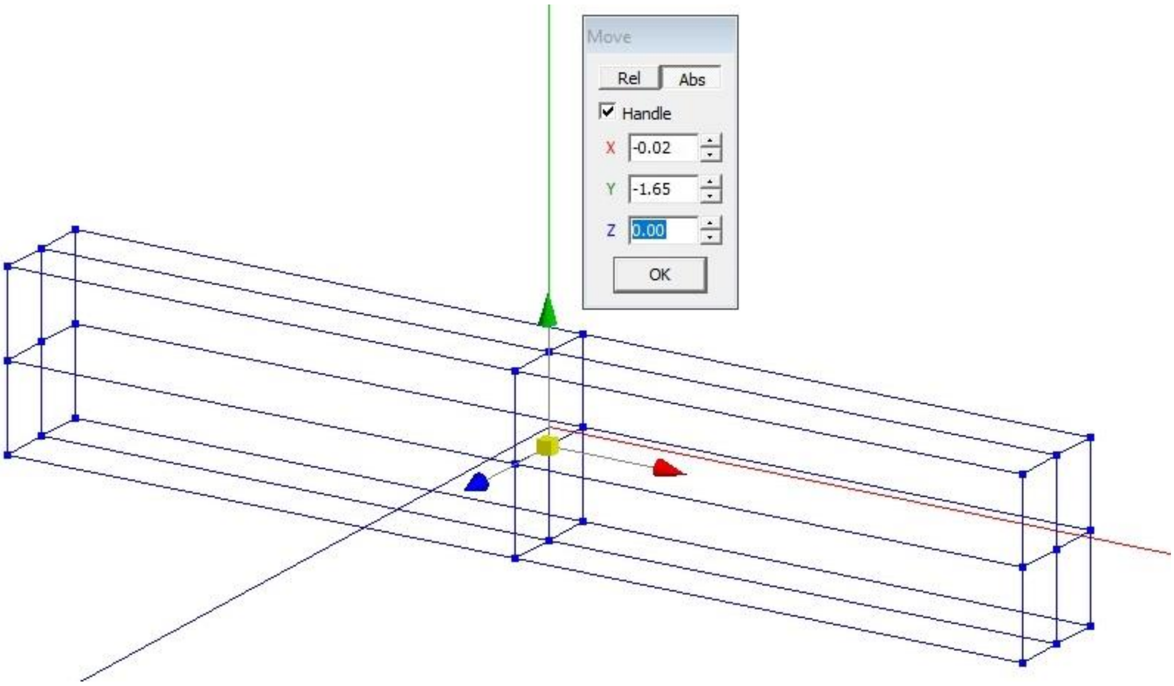
F1-right



F1-left

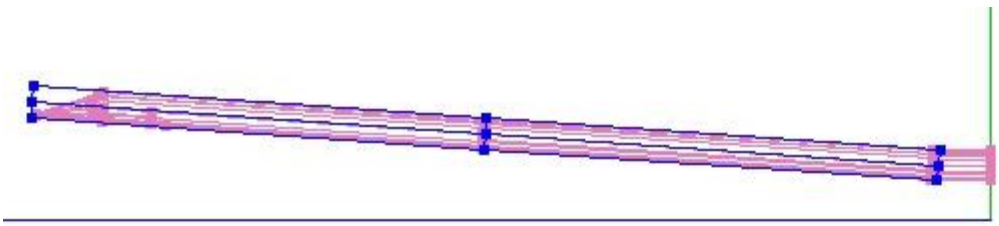


Middle of the box

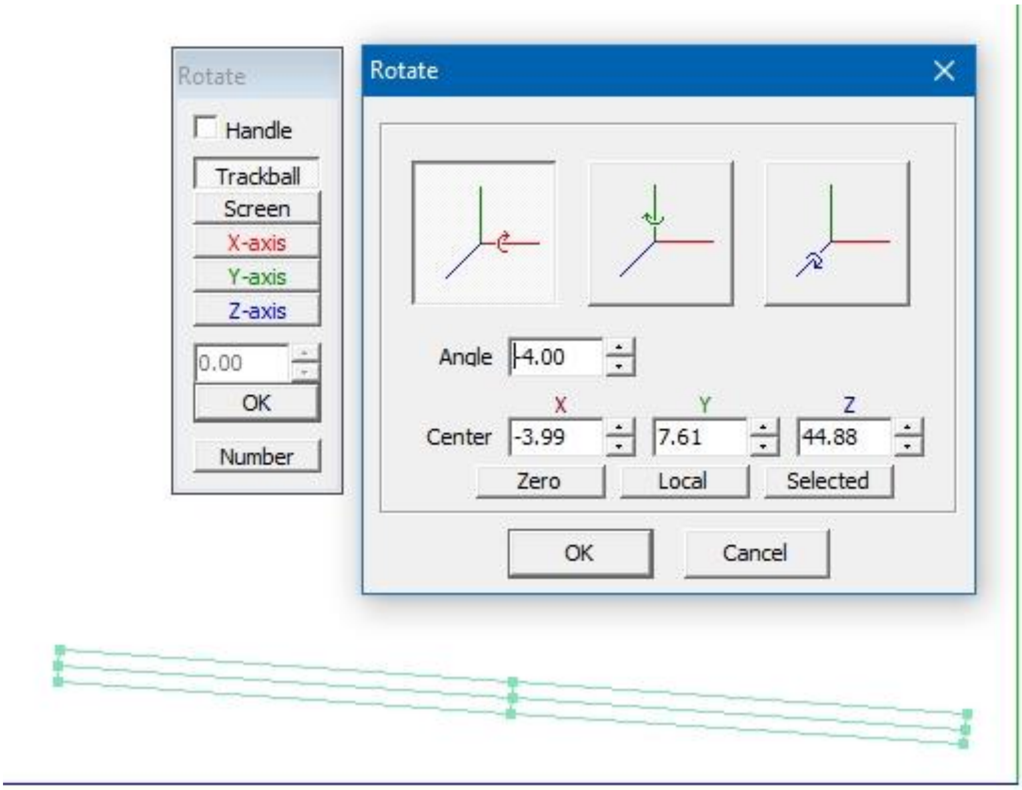


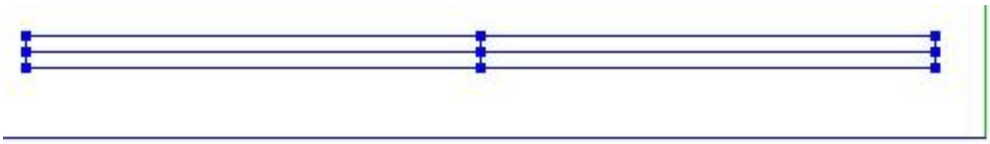
Rigidbody RightWing

For the Rigidbody RightWing we need a third parameter, as the wing has an angle of 4 degrees about the x-axis:



At first you should set the rigidbody to **0 degrees**:





Now you can take the values as shown in the Excel file (similar to Rigidbody Fuselage) and put them into the .tmd file.

			rigidbody RightWing			
			Inertia Length	R0 (middle of the box)		
F2-right	F2-left	(f3 / X)				
7.95	-15.94		0.238900	-4	7.61	44.88
F2-top	F2-bottom	(f2 / Z)				
4.73	85.22		0.804900	-0.040000	-0.448800	0.076100
F1-top	F1-bottom	(f3 / Y)				
9.01	6.21		0.028000			

Don’t forget to set the rigidbody back to 4 degrees!

The third parameter is **B0** and here you place the values for the angle of 4 degrees.

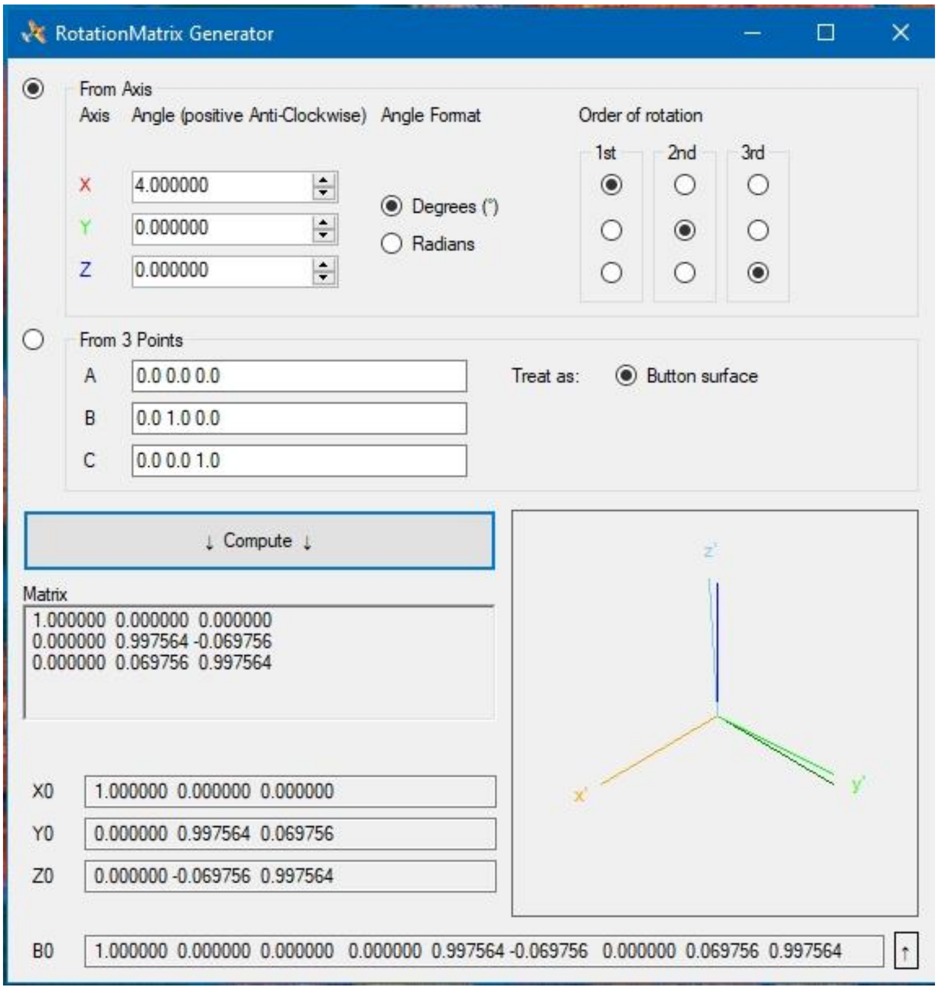
To do this you need a tool from Jan (Jet-Pack):

Rotation Matrix Generator

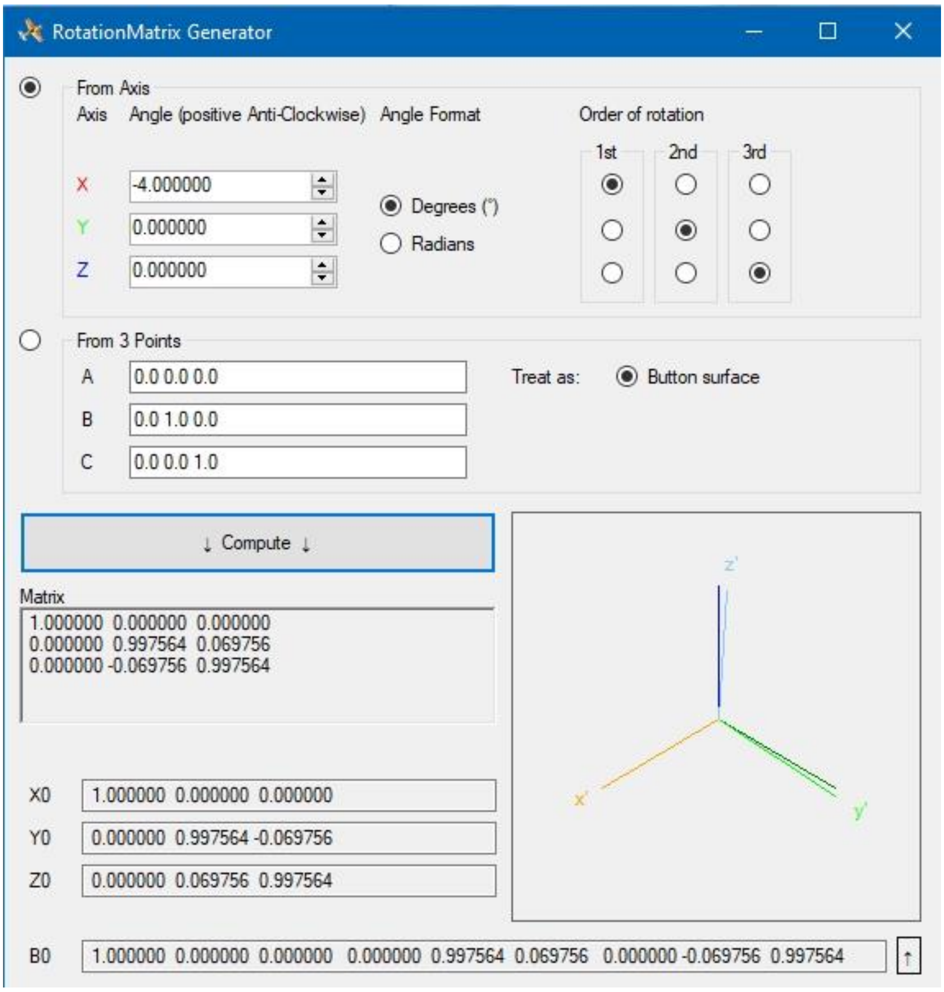
You will find it in the folder ‘equipment’.

Set **X** to **4 degrees**, Press **Compute** and put the last line **(B0)** to the .tmd file (Rigidbody RightWing).

<[matrix3_float64][B0][1.000000 0.000000 0.000000 0.000000 0.997564 -0.069756 0.000000 0.069756 0.997564]>



For Rigidbody LeftWing the angle is -4 degrees:

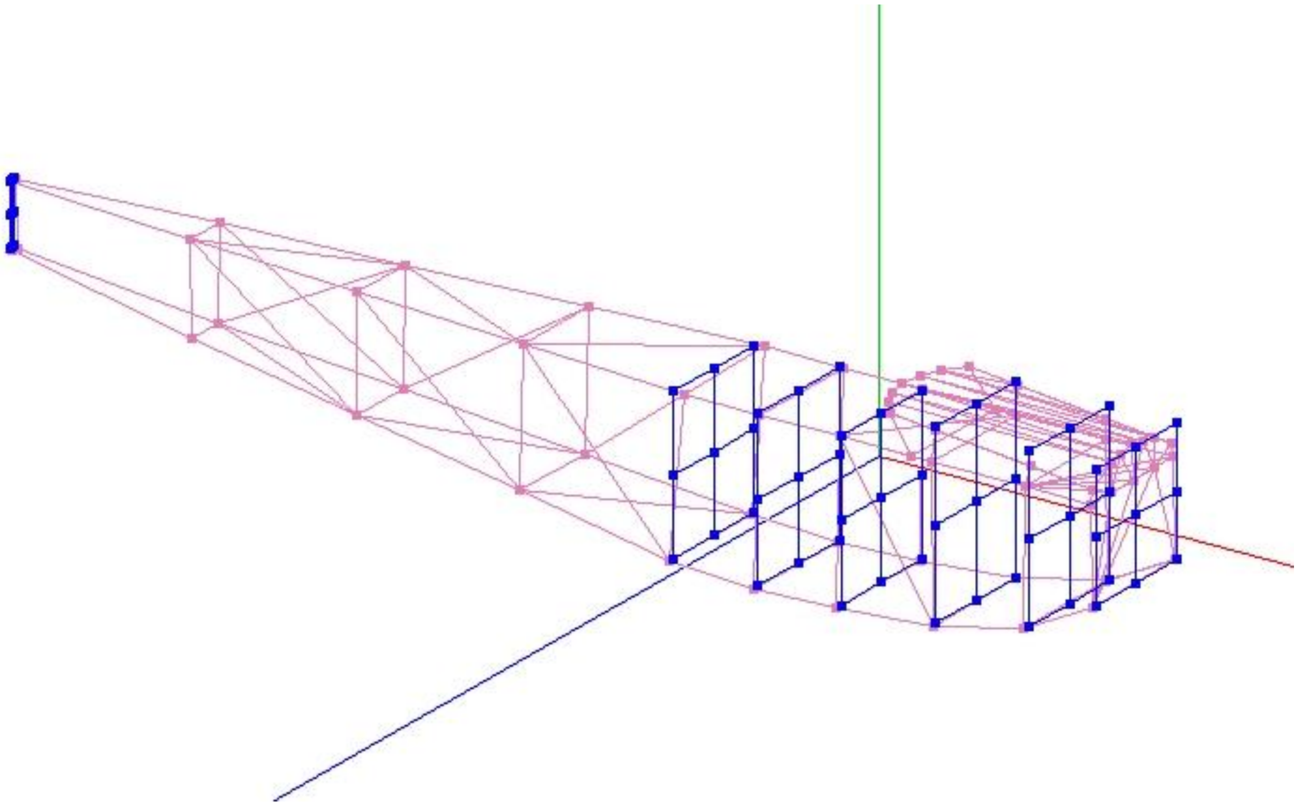


The same procedure has to be done for the **Rigidbody RightGear** and **Rigidbody Leftgear**, but there the angle is 40 and -40 degrees.

aerofuselage

Aerofuselage Fuselage															
		Meta													
middle	F1														
		1		2		3		4		5		6		7	
Station X		28.28		22.47		14.43		6.21		-0.92		-8.24		-68.9	
Station y		0.87		-0.6		-1.45		-3.08		-3.15		-3		1.04	
Station Z		0		0		0		0		0		0		0	
		left		left		left		left		left		left		left	
Station Width	F1/Z	5.1		5.1		5.1		5.1		5.1		5.1		0.31	
		top	bottom	top	bottom	top	bottom	top	bottom	top	bottom	top	bottom	top	bottom
Station Hight	F1/Y	6.16	-4.42	6.19	-7.39	6.16	-9.06	3.48	-9.36	3.53	-9.84	3.49	-9.49	3.65	-1.58
Aerofuselage Fuselage															
		RC 7 / RC 8													
		1		2		3		4		5		6		7	
Station X		0.282800		0.224700		0.144300		0.062100		-0.009200		-0.082400		-0.689000	
Station y		0.000000		0.000000		0.000000		0.000000		0.000000		0.000000		0.000000	
Station Z		0.008700		-0.006000		-0.014500		-0.030800		-0.031500		-0.030000		0.010400	
Station Width		0.102000		0.102000		0.102000		0.102000		0.102000		0.102000		0.006200	
Station Hight		0.105800		0.135800		0.152200		0.128400		0.133700		0.129800		0.052300	
Station Shape		1		1		1		1		1		1		1	

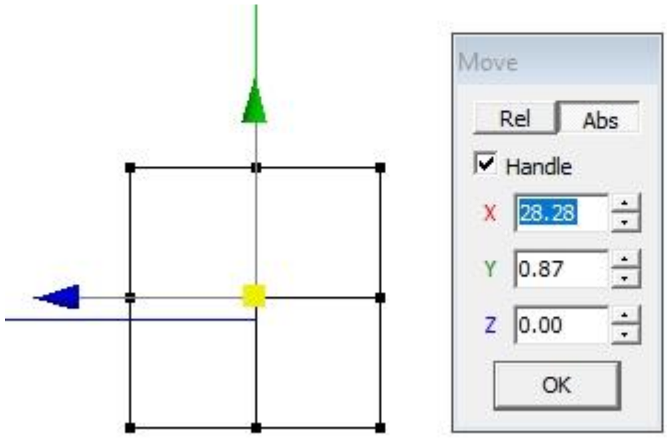
To get the values for the aerowing fuselage, we need some surfaces that show the shape of the fuselage.



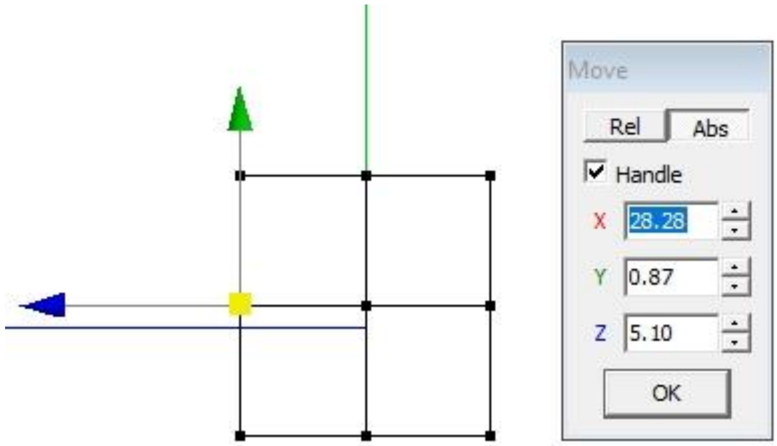
The first one at the front of the fuselage I called **CutFuselage1** and the last **CutFuselage7**.

Using the attached Excel file you can see how to get the values (CutFuselage1).

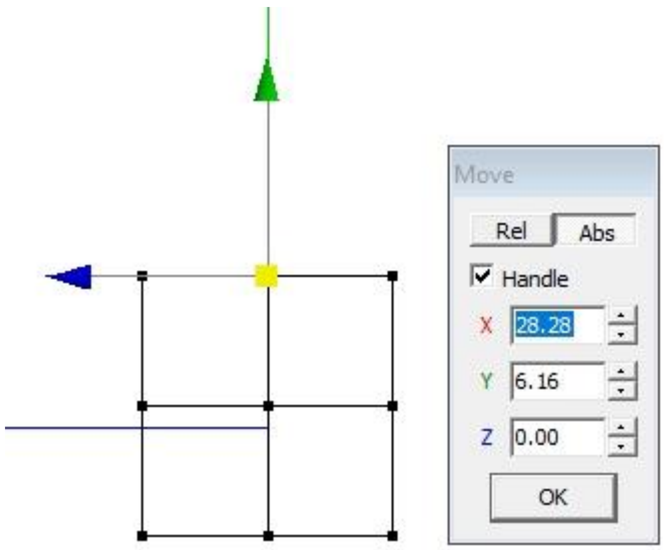
F1-middle



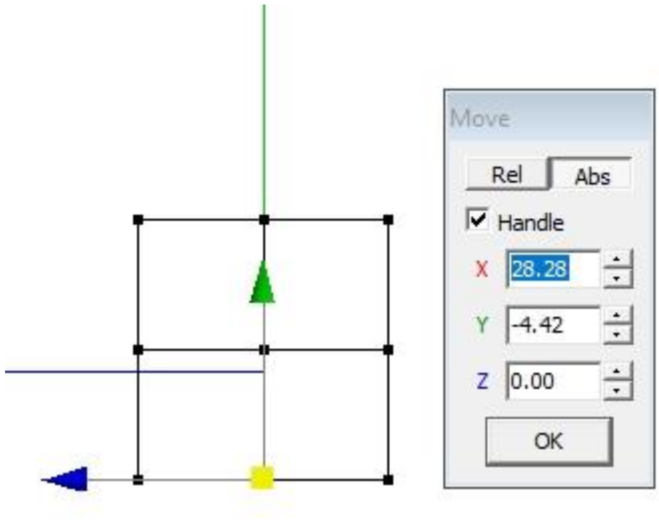
F1-left



F1-top



F1-bottom

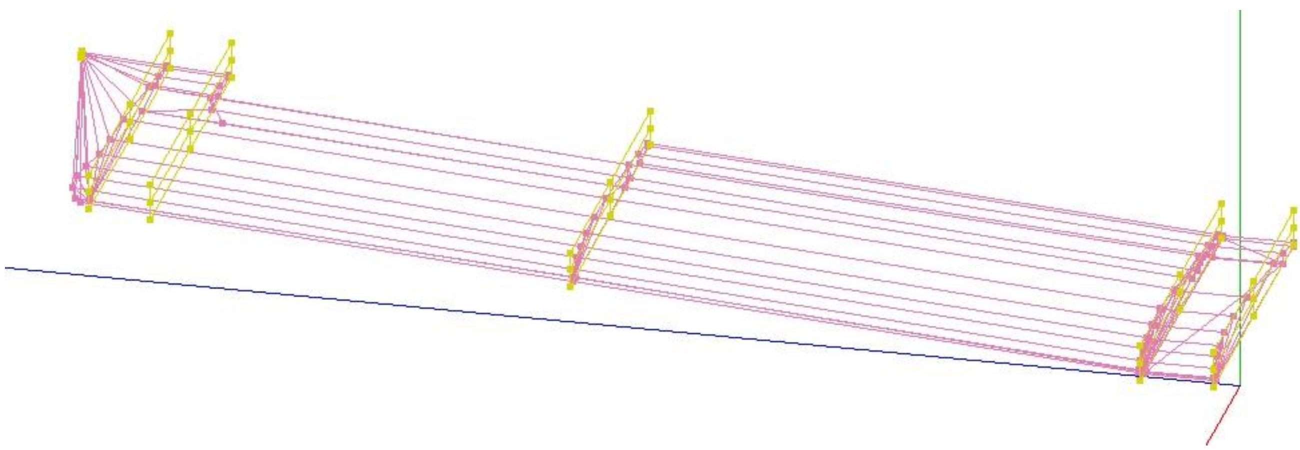


Proceed this for the CutFuselage2 to CutFuselage7.

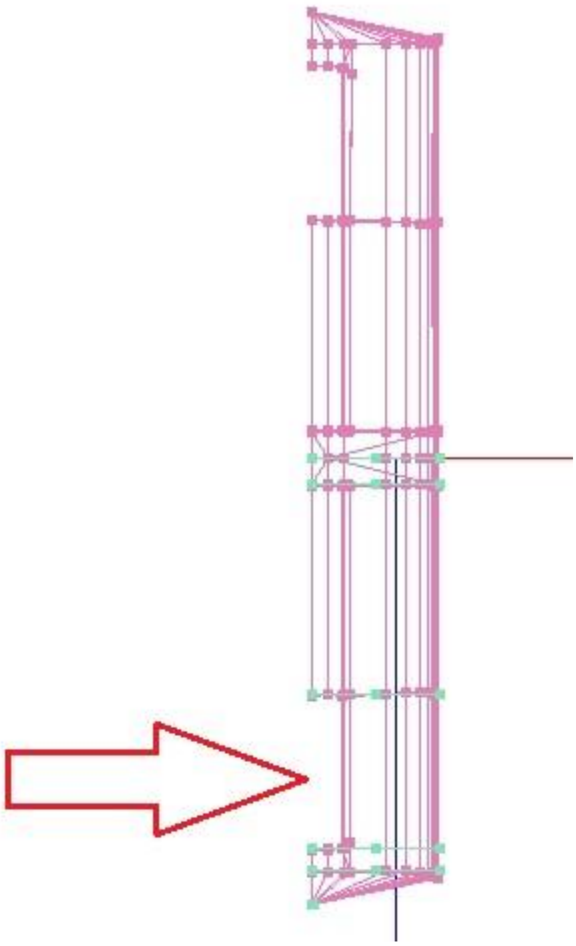
Now you can put the values from the file baron.xlsx to the .tmd file.

```
<[string8][object][aerofuselage]
    <[string8][Name][FuselageAero]>
    <[vector3_float64][R0][0 0 0]>
    <[vector3_float64][X0][1 0 0]>
    <[vector3_float64][Y0][0 1 0]>
    <[vector3_float64][Z0][0 0 1]>
    <[string8][Body][Fuselage]>
    <[list_float64][StationX][0.282800 0.224700 0.144300 0.062100 -0.009200 -0.082400 -0.689000]>
    <[list_float64][StationY][0 0 0 0 0 0 0]>
    <[list_float64][StationZ][0.008700 -0.006000 -0.014500 -0.030800 -0.031500 -0.030000 0.010400]>
    <[list_float64][StationWidth][0.103800 0.103800 0.103800 0.103800 0.103800 0.103800 0.008000]>
    <[list_float64][StationHeight][0.105800 0.135800 0.152200 0.128400 0.133700 0.129800 0.052300]>
    <[list_uint32][StationShape][1 1 1 1 1 1 1]>
    <[float64][Cdx][1.1]>
    <[float64][Cdy][2.8]>
    <[float64][Cdz][3]>
    <[float64][Cly][3.5]>
    <[float64][Clz][2.1]>
    <[float64][Cm][0]>
    <[float64][Offset][0]>
    <[bool][HasSwimmer][false]>
>
```

aerowing



The surfaces **CutRightWing1** to **CutRightWing6** describe the wing and the position of the aileron.



The 6 surfaces devide the RightWing into 5 sections. The aileron is positioned in section 3.

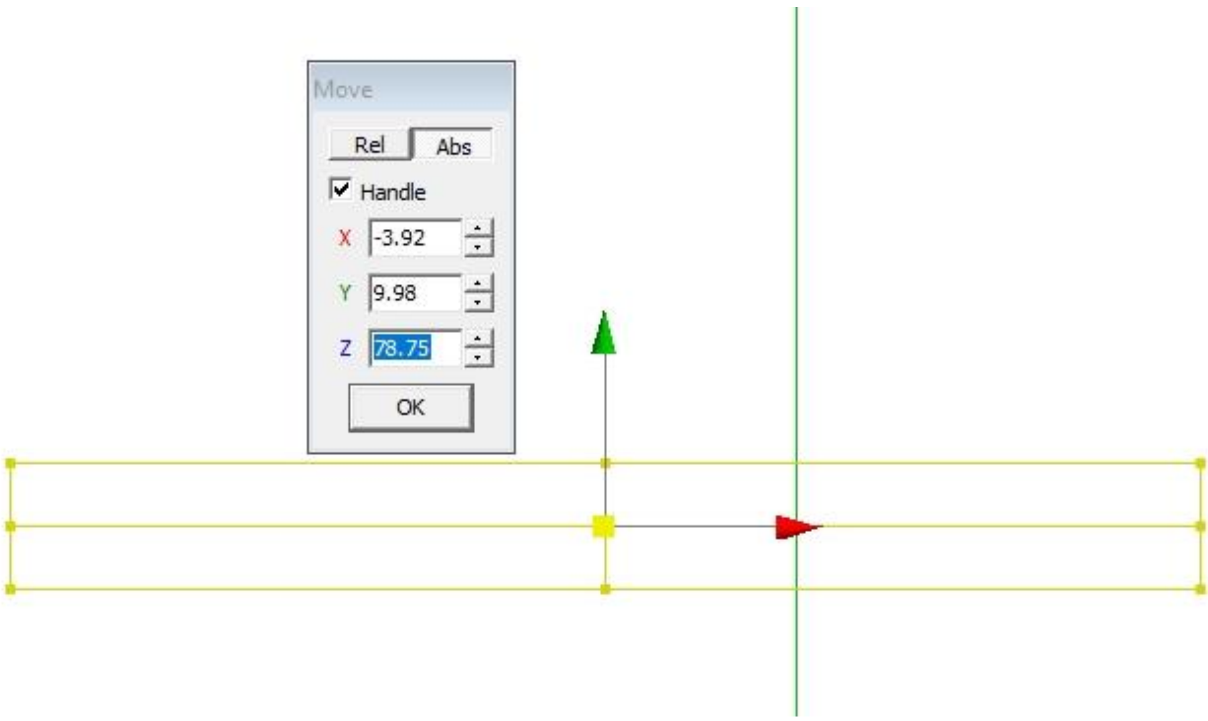
In the .tmd file the sections are in the parameter StationFlap:

`<[list_uint32][StationFlap][0 0 1 0 0 0 ]>`

If you have **ailerons**, the section(s) must be **1**, if you have additional **flaps**, it must be **2**.

The other values you get similar to aerofuselage, but with **F3** instead of **F1**.

F3-middle



aerowing RightWing														
Meta														
		1	2	3	4	5	6							
Station Y	**F3** / middle / **Z**	84.90	78.75	74.49	45.09	5.12	0.00							
Station LE	**F3**/ right / **X**	-9.58	14.10	14.10	14.10	14.10	14.10							
Station TE	**F3** / left / **X**	-10.10	-10.20	-10.20	-10.20	-10.20	-10.20							
Station Z	**F3** / middle / **Y**	9.20	9.98	9.68	7.62	4.75	4.76							
		aerowing RightWing							aerowing LeftWing					
RC 7														
		1	2	3	4	5	6		6	5	4	3	2	1
Station Y		-0.849000	-0.787500	-0.744900	-0.450900	-0.051200	0.000000		0.000000	0.051200	0.450900	0.744900	0.787500	0.849000
Station LE		-0.095800	0.141000	0.141000	0.141000	0.141000	0.141000		0.141000	0.141000	0.141000	0.141000	0.141000	-0.095800
Station TE		-0.101000	-0.102000	-0.102000	-0.102000	-0.102000	-0.102000		-0.102000	-0.102000	-0.102000	-0.102000	-0.102000	-0.101000
Station Z		0.092000	0.099800	0.096800	0.076200	0.047500	0.047600		0.047600	0.047500	0.076200	0.096800	0.099800	0.092000
Station Flap		0	0	1	0	0	0		0	0	1	0	0	0

The values for **RightWing** go from **1 to 6** (minus), for the **LeftWing** from **6 to 1** (plus)
The same way you get the values for **Right**- and **LeftStabilzer**, as well as for the **Stabilzer**.
StationFlap for Right-/LeftStabilizer are the sections for the elevator (0 = no elevator, 1 = elevator) and for the Stabilizer it's the rudder.
Please notice: The number of entries for an aerowing section is limited to 8!

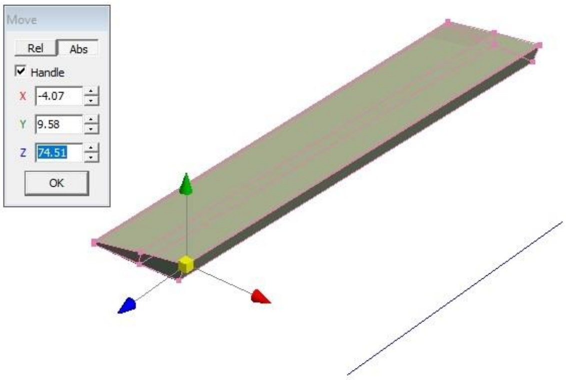
hingedbodygraphics

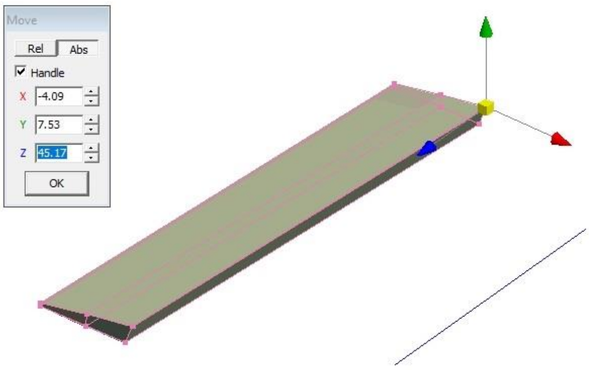
In this partition you define the rotation axis and pivot (rotating point) for Right and Left Aileron, Right and Left Flap, Right and Left Elevator and the Rudder.

With another brand-new libre office tool from Jan (special thanks to him!) you need only two points on the rotating axis to get axis and pivot at the same time!

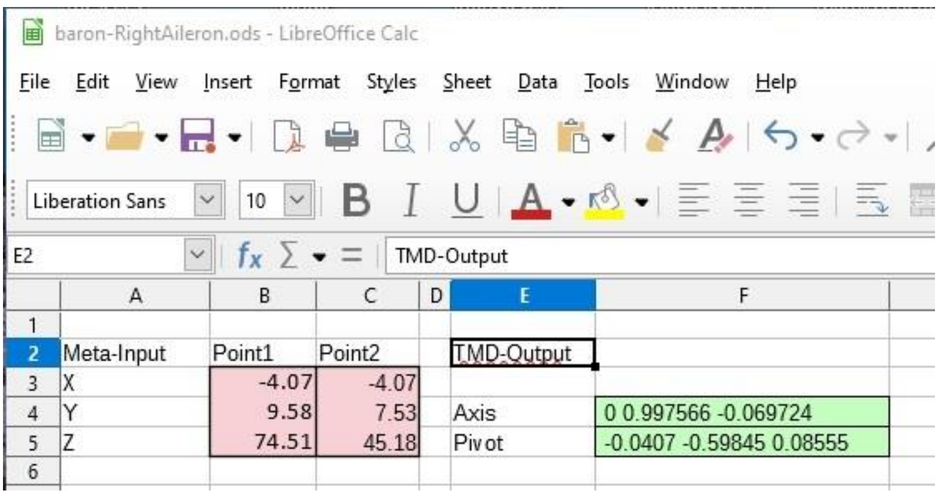
To use the .ods-sheets you need to install the free office suite LibreOffice from
https://www.libreoffice.org/download/download/

Open your mqo file and search the object RightAileron, then pick Point1 and Point 2.

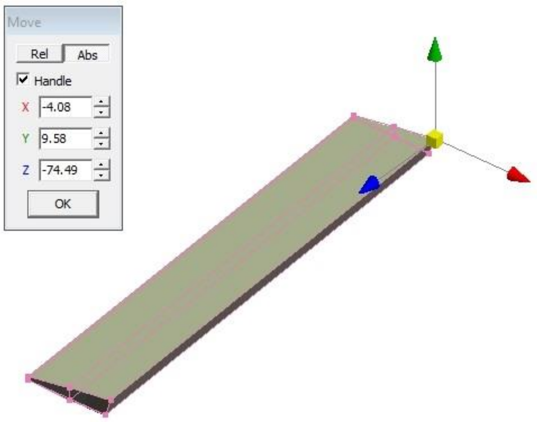


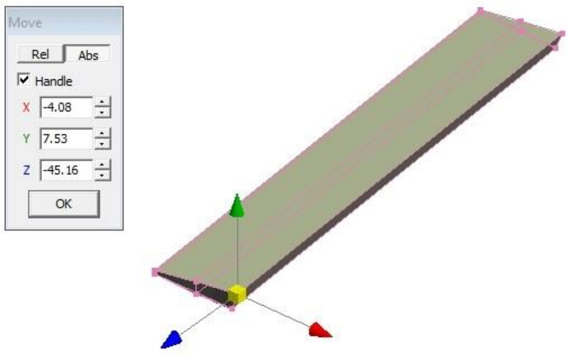


Put the x, y, z entries into the tool:



Do the same for the LeftAileron:





baron-LeftAileron.ods - LibreOffice Calc

E2 TMD-Output

	A	B	C	D	E	F
1						
2	Meta-Input	Point1	Point2		TMD-Output	
3	X	-4.08	-4.08			
4	Y	9.58	7.53		Axis	0 -0,997566 -0,069724
5	Z	-74.49	-45.16		Pivot	-0,0408 0,59825 0,08555
6						

Then put the values for Axis and Pivot into the tmd file:

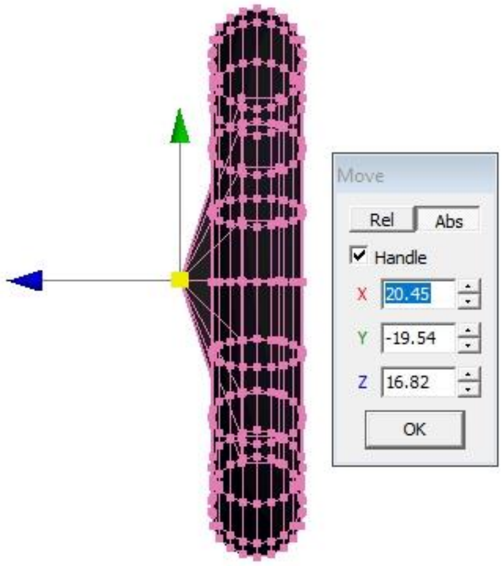
baron.tmd

```
<[string8][object][hingedbodygraphics]
    <[string8][Name][LeftAileron]>
    <[string8][GeometryList][ LeftAileron ]>
    <[uint32][PositionID][LeftWing.R]>
    <[uint32][OrientationID][LeftWing.Q]>
    <[uint32][AngleID][ServoLeftAileron.Output]>
    <[vector3_float64][Axis][  0 0.997566 0.069724 ]>
    <[vector3_float64][Pivot][ -0.0408 0.59825 0.08555 ]>
    <[float64][AngleMax][1]>
>
<[string8][object][hingedbodygraphics]
    <[string8][Name][RightAileron]>
    <[string8][GeometryList][ RightAileron ]>
    <[uint32][PositionID][RightWing.R]>
    <[uint32][OrientationID][RightWing.Q]>
    <[uint32][AngleID][ServoRightAileron.Output]>
    <[vector3_float64][Axis][  0 0.997566 -0.069724]>
    <[vector3_float64][Pivot][ -0.0407 -0.59845 0.08555]>
    <[float64][AngleMax][1]>
>
```

Now you can use one of the example sheets, e. g. baron-RightAileron.ods to calculate the values for Elevator and rudder, and, if available, flaps.

rotatingbodygraphics

RightWheel Pivot



rotatingbodygraphics

RightWheelHull