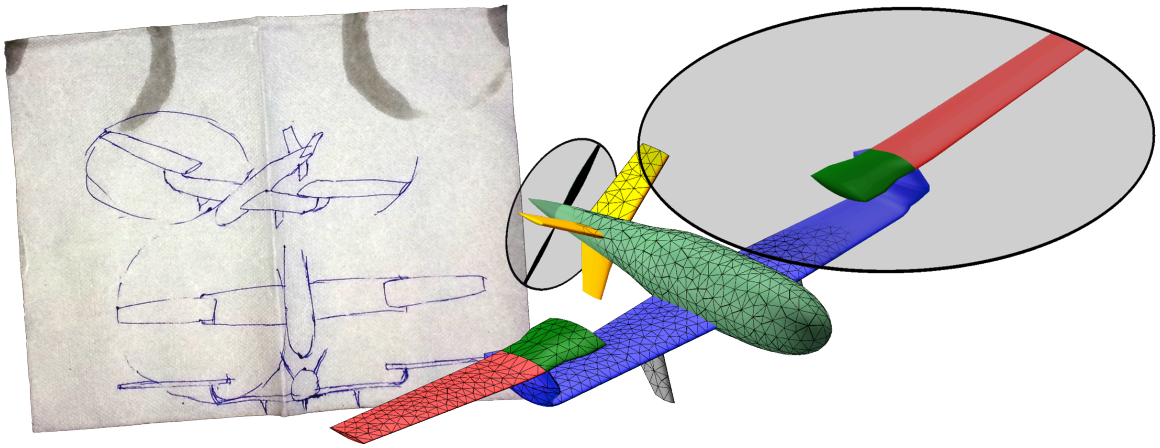
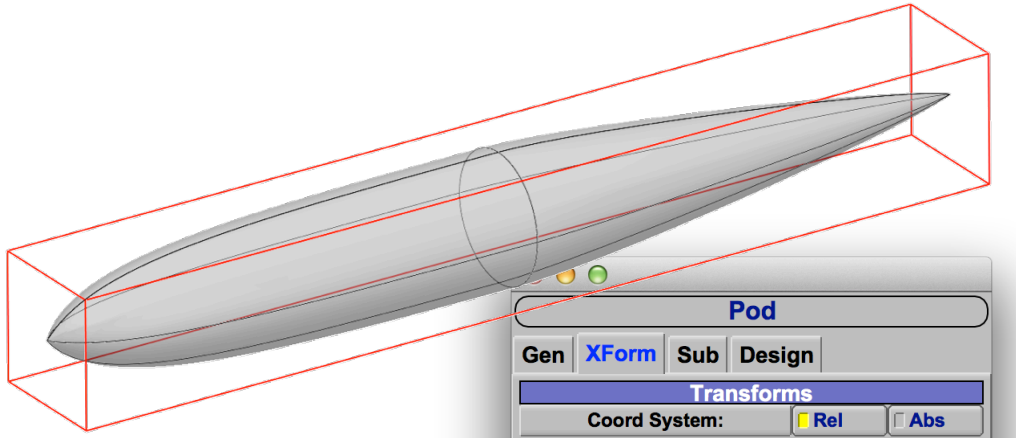


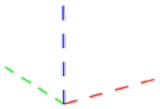
Attachment, Hinge/Slider, Symmetry, and Sub-Surfaces

Rob McDonald

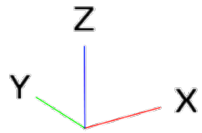
Attach Point

Every component is attached to (or placed in) the model by locating its attach point and positioning the component relative to that point

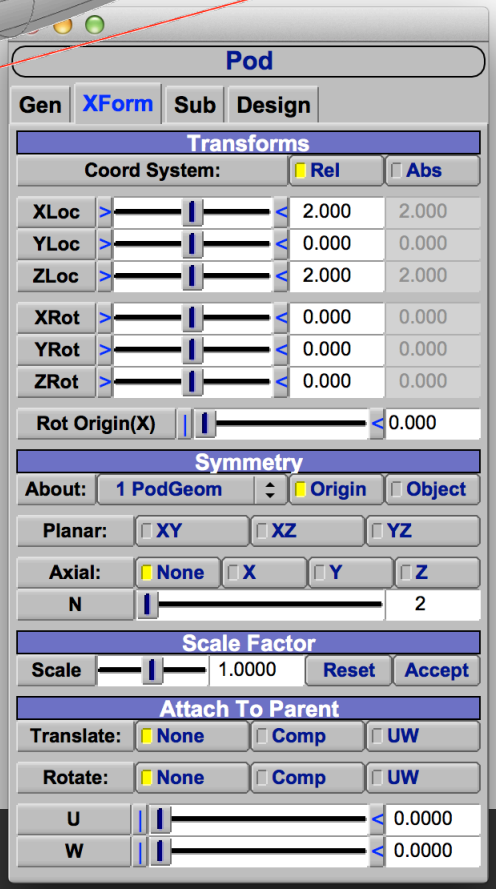




Attach Point, only shown when selected. (new in v3.9.0)



Axis Orientation RGB - XYZ



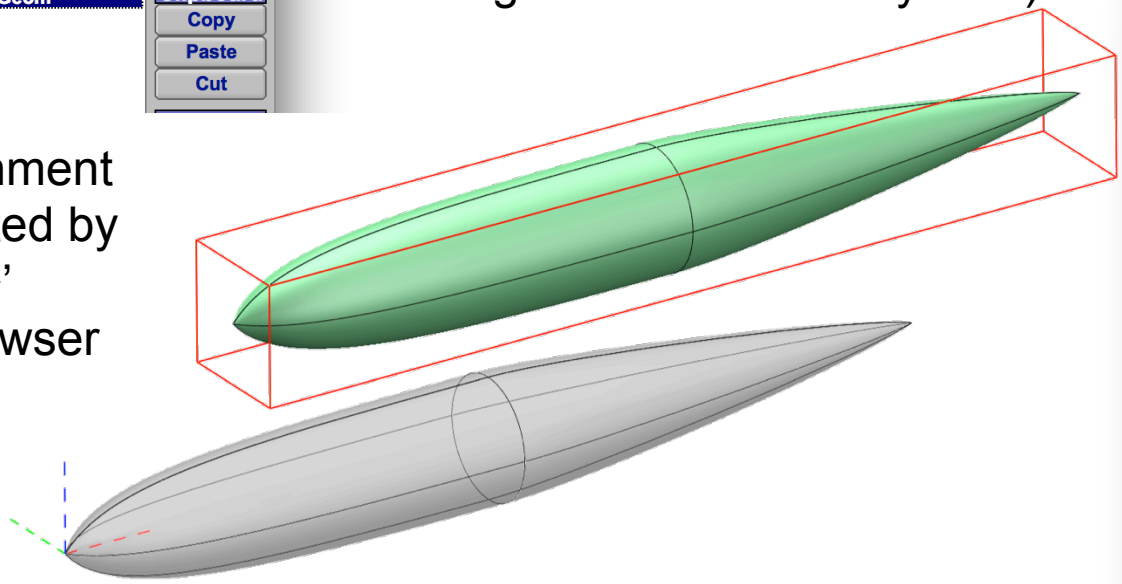
Attach to Parent (Comp)

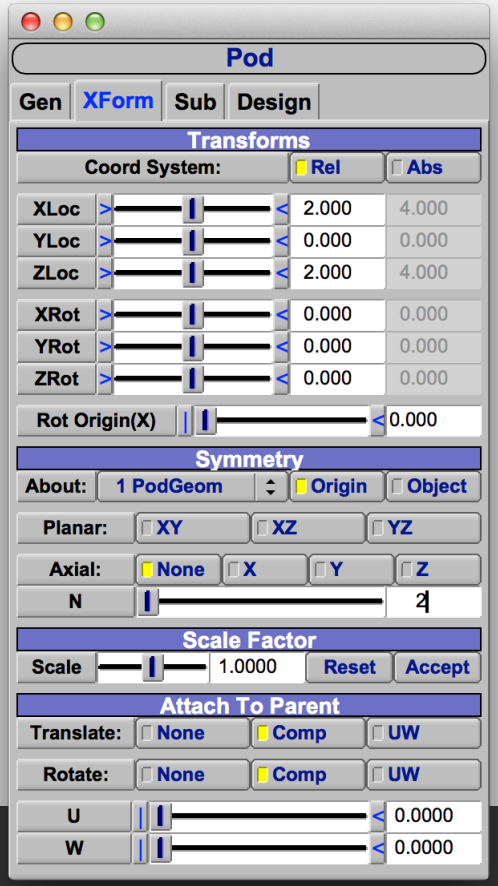
Attachment translates/rotates the attach coordinate system

(None means attach to global coordinate system)

Attachment indicated by '^'

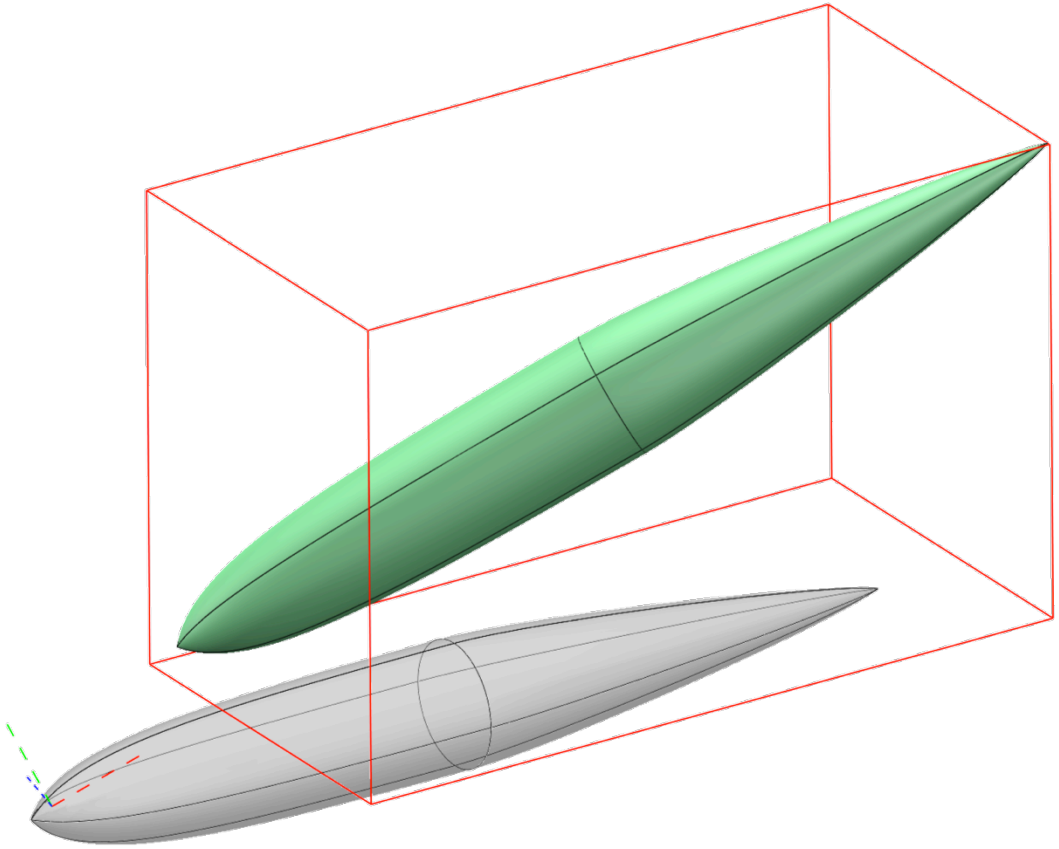
in browser





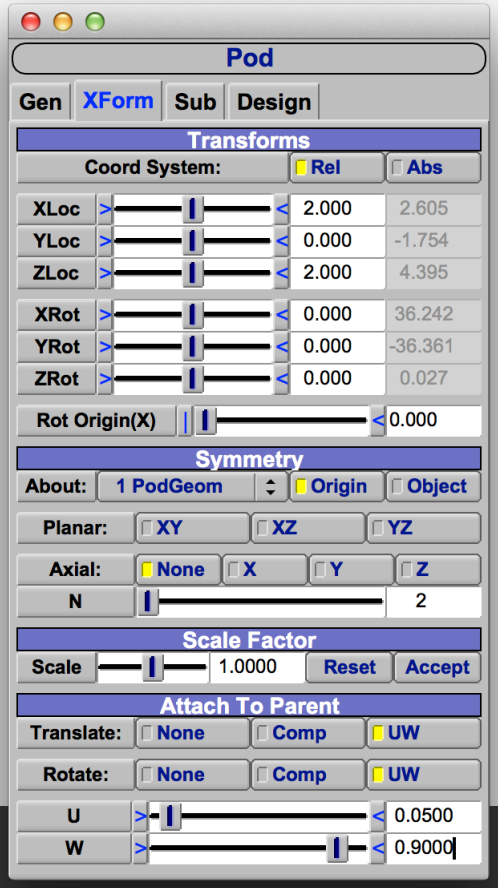
'Comp' attaches to parent's origin

Attach to Parent (UW)



U,W coordinates
run [0,1] along surface

‘UW’ attaches
to parent’s surface



Rel vs. Abs

Attached components *always* move when their parent moves.

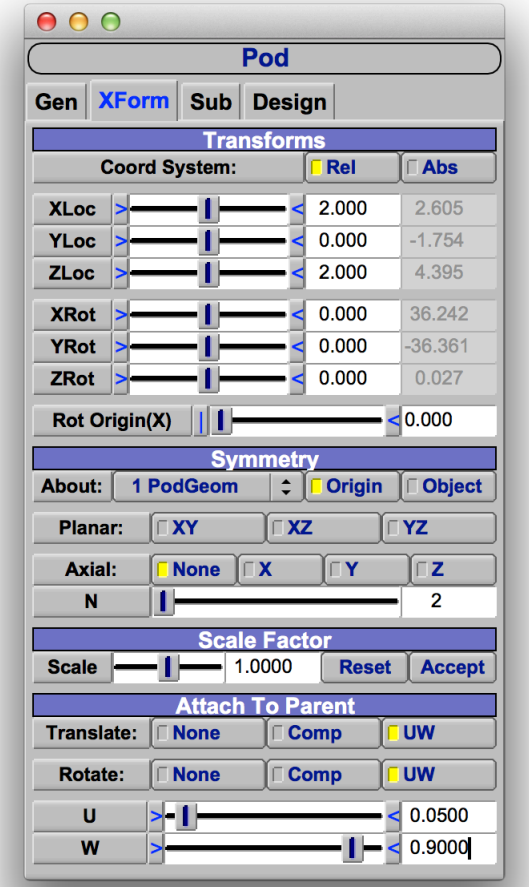
‘Rel’ sets the position/rotation relative to the attach point.

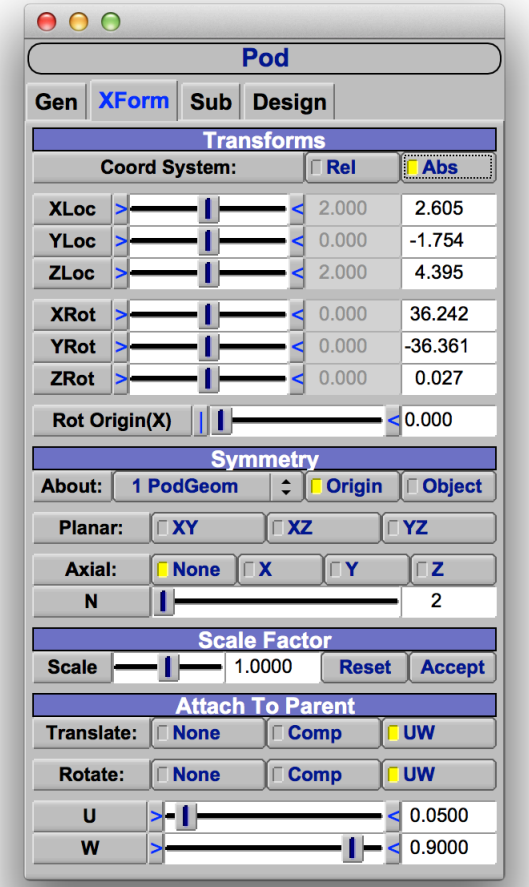
‘Abs’ sets the position/rotation in global coordinates.

When ‘Rel’ is selected, changing attachment moves component.

When ‘Abs’ is selected, component stationary as attachment changes (sometimes confusing).

Changing between ‘Abs’ and ‘Rel’ can be very powerful.



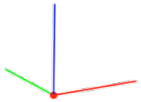


Blank

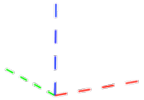
'Blank' components are a way to insert a new coordinate system.

Useful for positioning, mass properties, and grouping.

Blank shown as feature line or when selected



Attach Point only shown when selected.



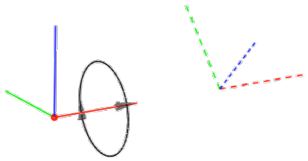
Hinge (and/or Slider) (new v3.9.0)

'Hinge' components are a way to add simple motion to a model.

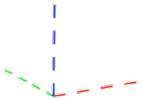
Children of 'Hinge' components are *forced* attached.

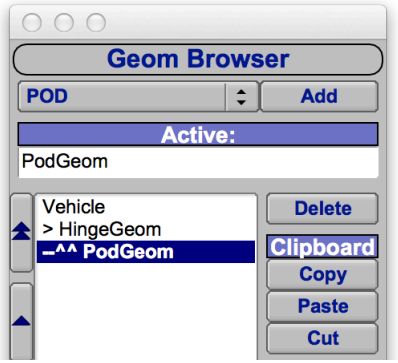
Hinge Fixed Side shown as feature line or when selected

Hinge Motion Side shown as feature line or when selected



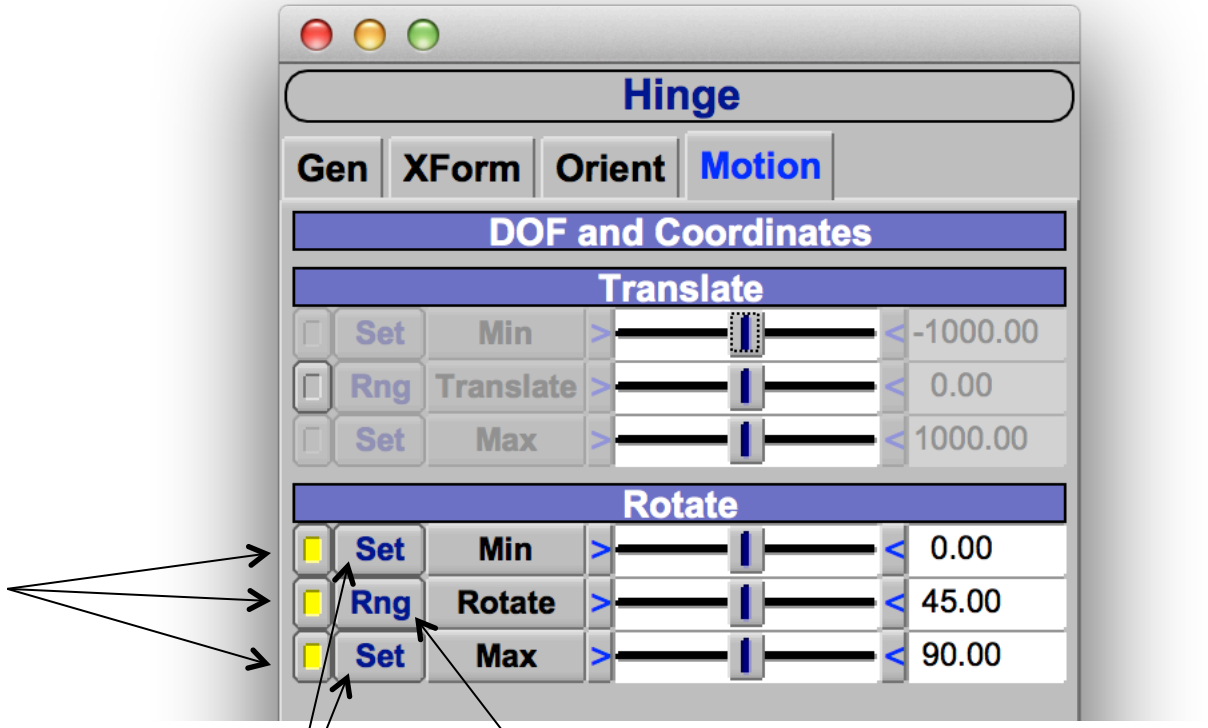
Attach Point only shown when selected.





Forced attachment indicated by '^^' in browser

Hinge Motion Control



Activate/Deactivate motion and limits

Set limits to current position

Set slider range to limits

Hinge Orientation

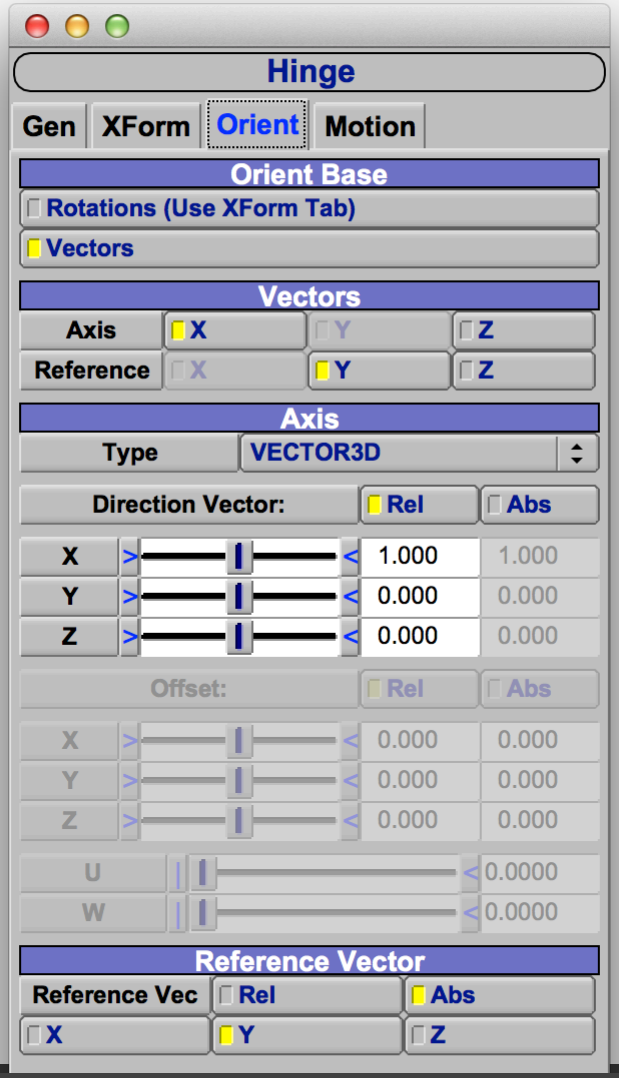
Orient using XForm

Orient using a vector specified in this GUI

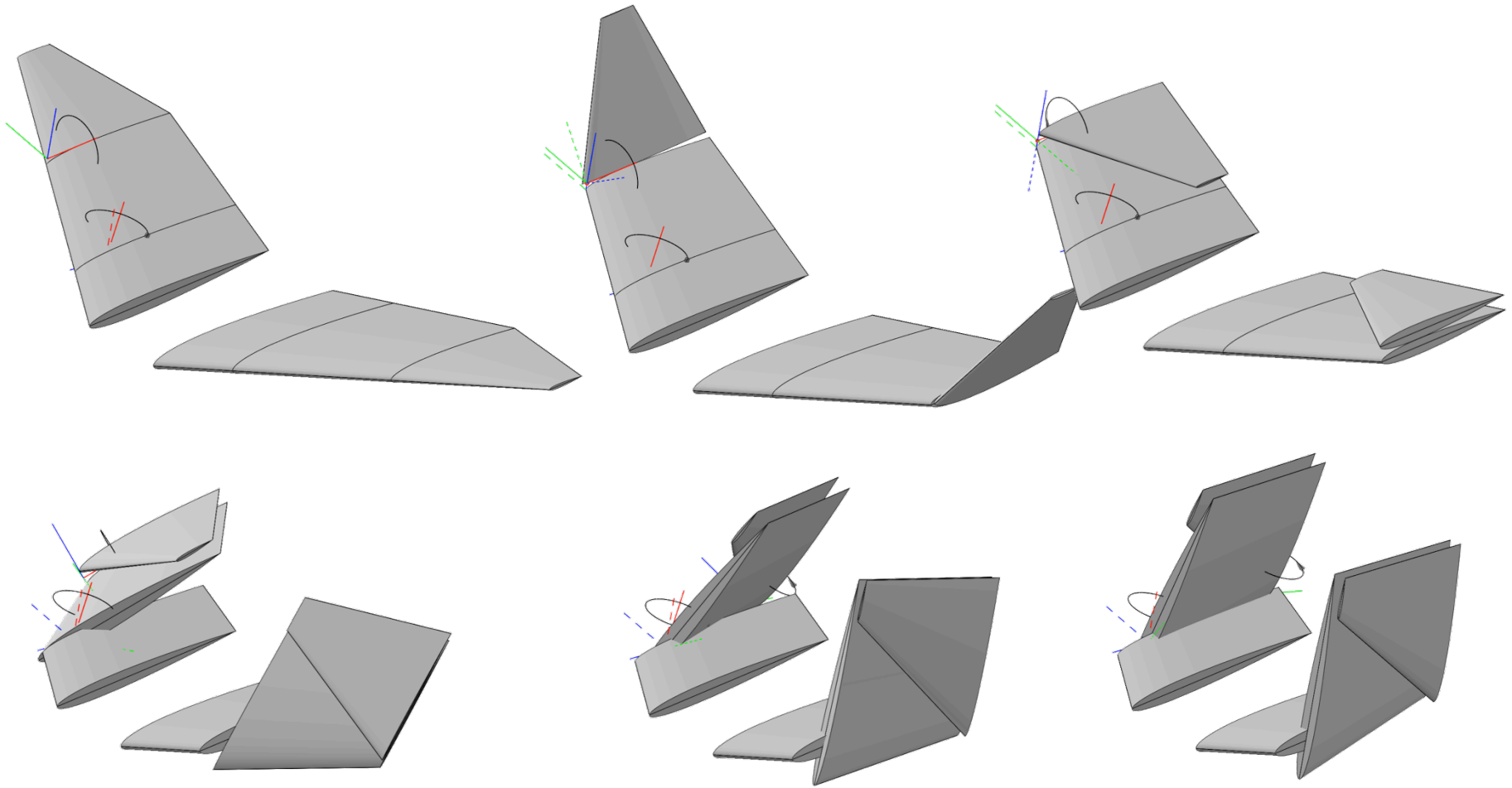
Six ways to specify vector

3D Vector
To 3D Point
To Point on Surface
Along Surface U-Direction
Along Surface W-Direction
Normal to Surface

Reference vector sets orientation

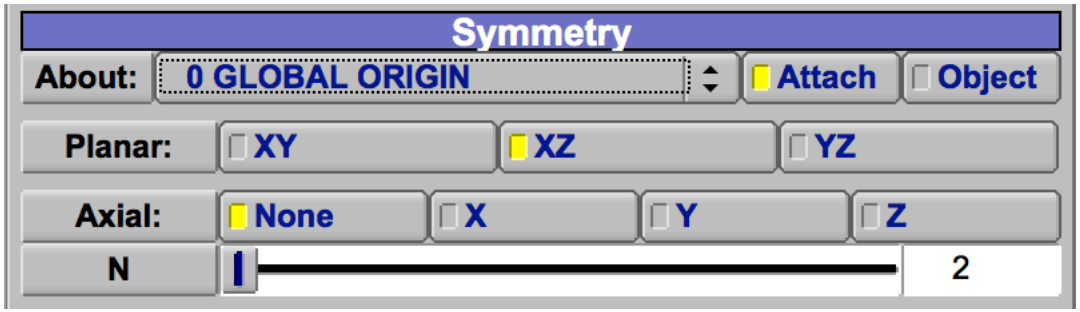


Example



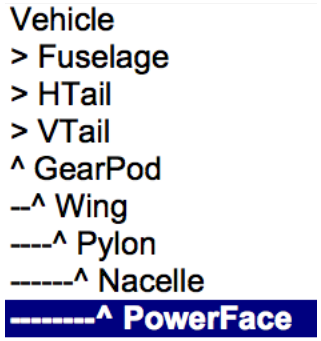
Symmetry

Components can be symmetric about any plane (XY, XZ, YZ) or axis (X, Y, Z) of any ancestor attach point or object.

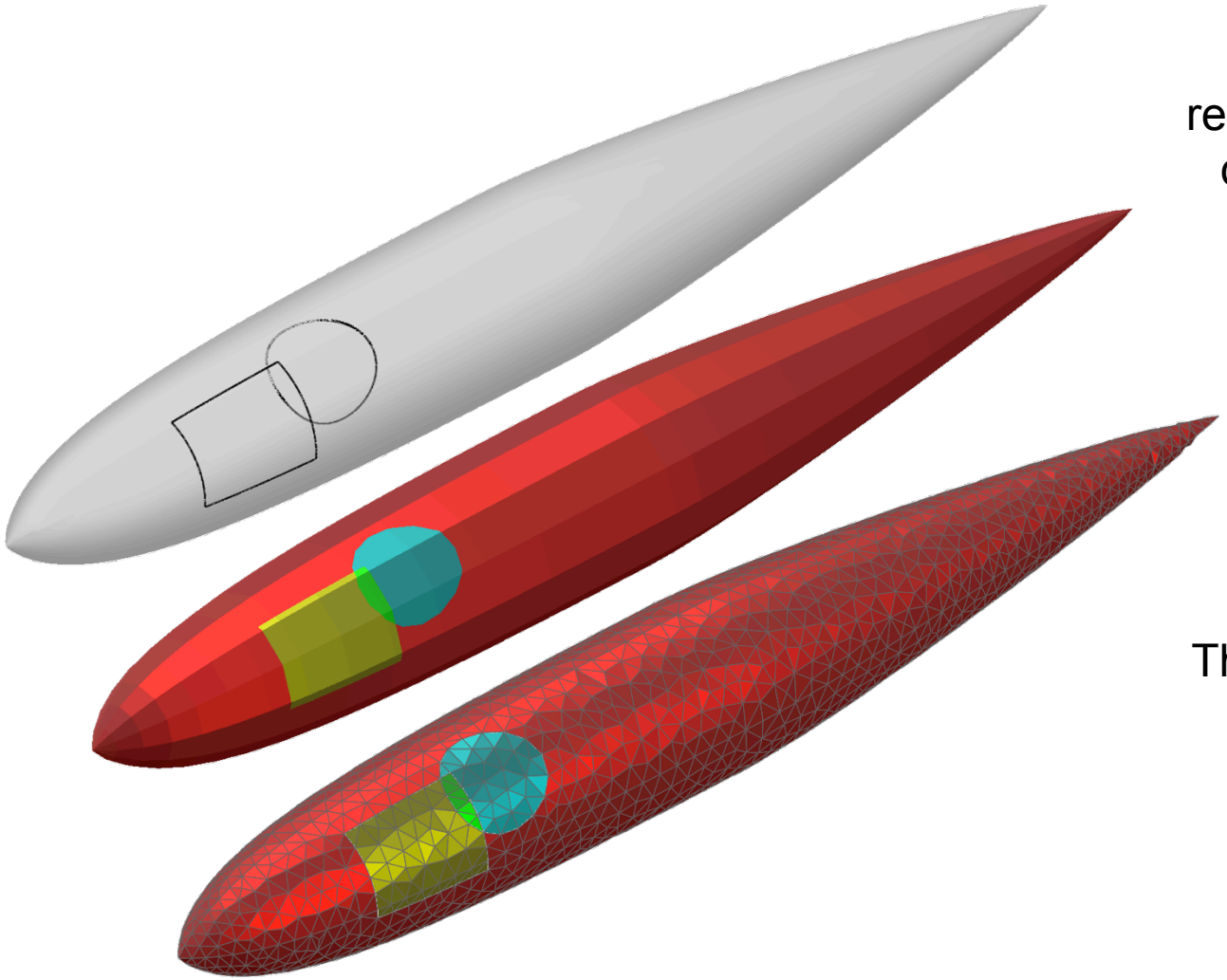


Global origin is 0

Ancestors numbered by generation



SubSurfaces



Subsurfaces are rectangles, ellipses, or lines defined in (U, W) coords *on* a surface.

They can represent are honored by CompGeom, CFDMesh, and DegenGeom.

They can be used to model inlet/outlet BC's, control surfaces, material properties, etc.

Questions?

Practice