

OpenVSP with GoCart

TIPS & TRICKS TO MAKE USING VSP WITH GOCART EASIER



Troublemakers

Wings


- Shared faces
- Wingcaps
- Dihedral

Tessellation Refinement

- CompGeom
- Intersect

Nacelles

Accessories/Details

- Engine cores
 - Wing-tip missiles
 - Landing gear
- 

Wings – Shared Faces

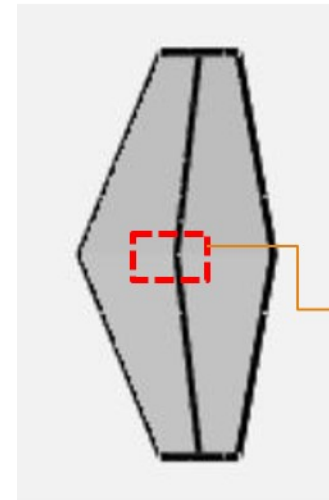
VSP 2.0 vs. 3.0

- Wings meshed together vs. individually

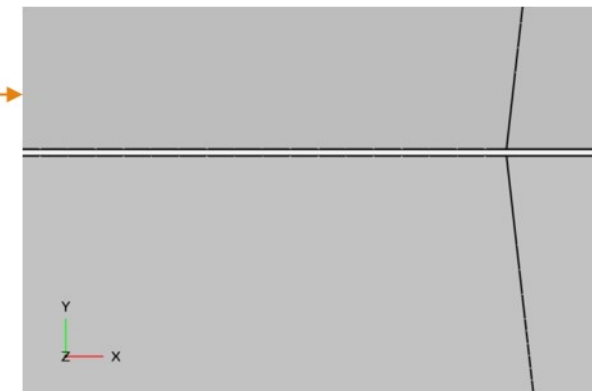
Cart3D

- Un-intersected *.tri files
- Cannot intersect non-watertight wings

Trick: “Nudge” wing-halves apart (in VSP)



Wing					
Gen	XForm	Sub	Plan	Sect	Airfoil
Transforms					
Coord System:		<input type="checkbox"/> Rel	<input checked="" type="checkbox"/> Abs		
XLoc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	49.355	49.355
YLoc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.001	0.001
ZLoc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000
XRot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000
YRot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000
ZRot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000

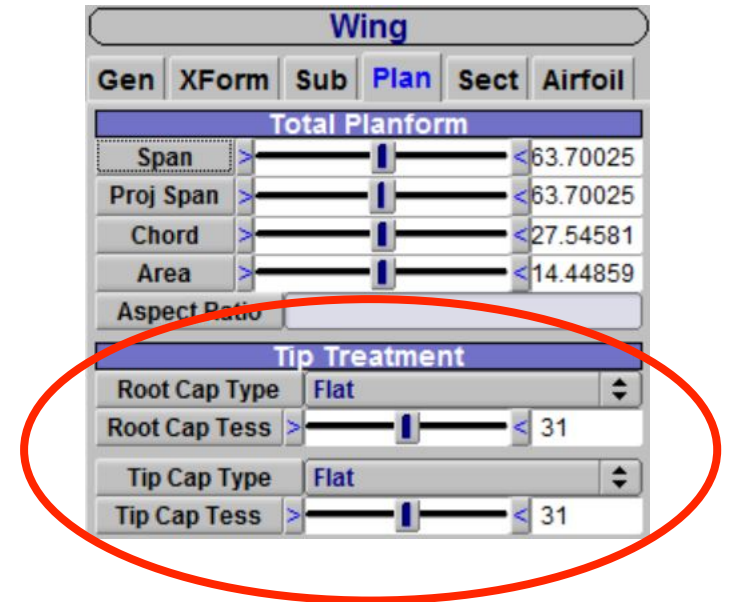


Wings – Tip & Root Caps

Watertight wing-bodies

- Need to “cap” ends of wings
- VSP automatic caps
 - Simple, easy, robust
- Manual closed wing sections
 - Flexible, less easy, less robust
- Shared faces
 - Root caps don't save you from shared symmetrical faces

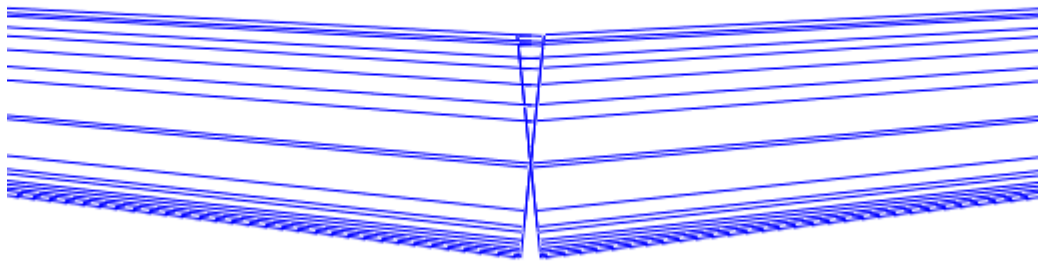
Tip: Cap your wings before exporting to Cart3D.



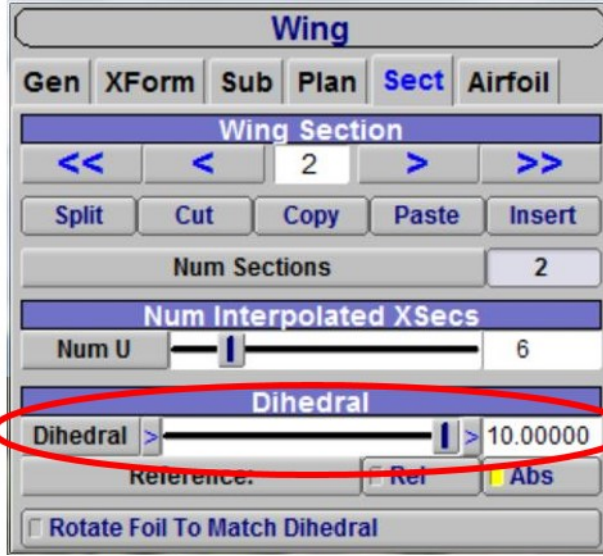
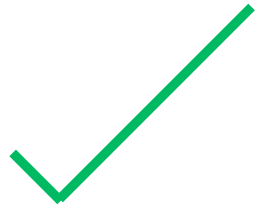
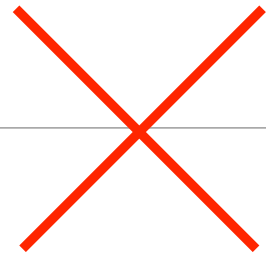
Wings – Dihedral

Rotating wing-bodies using 'X Rot' causes overlapping @ the plane of symmetry

Nudging by $\sim +0.001$ Y-Loc no longer sufficient



Tip: Use VSP's 'Dihedral' setting, rather than manually rotating the wings with X Rot



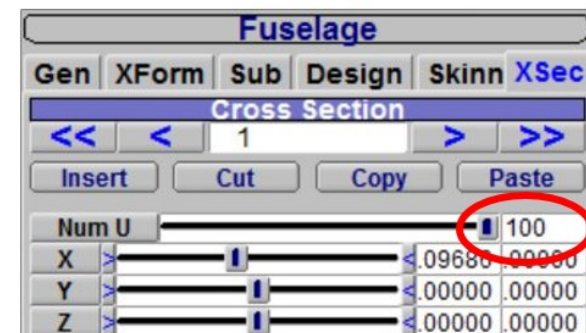
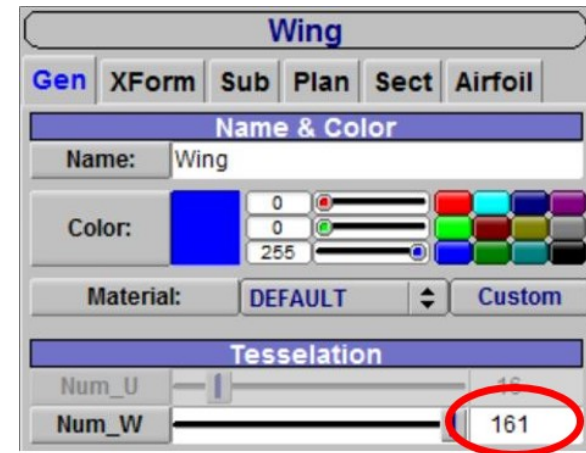
Tessellation Refinement

CompGeom may slow down with lots of tessellations

Cart3D's 'Intersect'

- Handles geometries with many tessellations quickly
- Allows for smoother discretization of surface geometry

Tip: For larger models, export un-intersected *.tri files to Cart3D



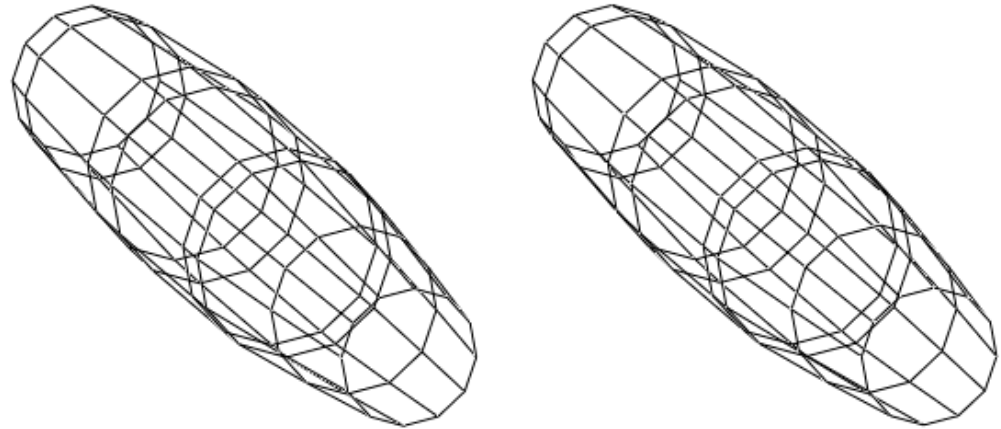
Nacelles/Shell-bodies

Nacelles or other features must be watertight

'Open' Fuselage shell-bodies won't be accepted by Cart3D

Trick: Build water tight Nacelles by:

- **Using 'Ducts' OR**
- **Over-laying exact duplicates &...**
- **Reducing diameter of interior cross-sections**
- **(The first and last X-sec must be identical)**



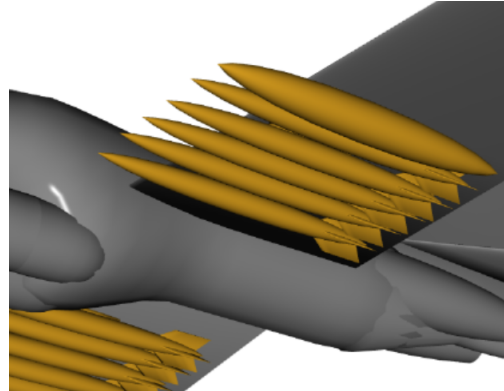
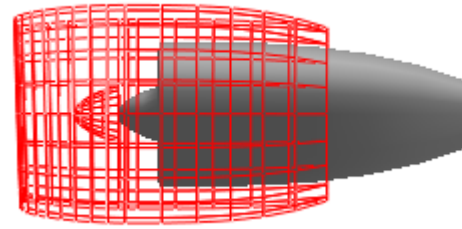
Model Complexity

VSP makes building pretty models easy

Pretty isn't always practical for CFD

Simple models are easier to fix & easier to solve.

Tip: Remove details that aren't important to the flow solution



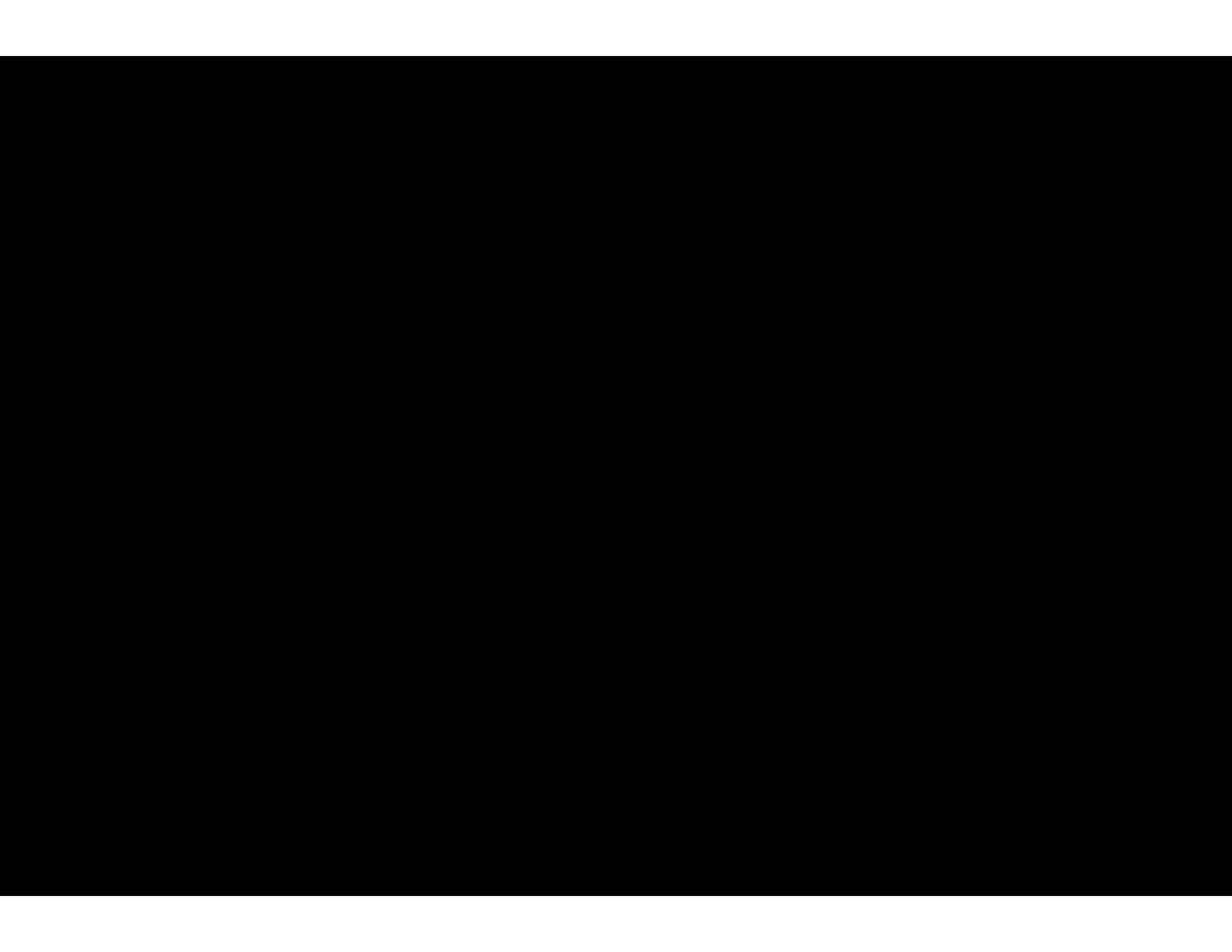
Other helpful hints

CompGeom will prevent *breakTris* from working in Cart3D

breakTris enables separate tagging/manipulation of watertight features in a single component

Tip: Export un-intersected *.tri files if you want to use breakTris later on.

Tip: Only export *.stl files after using CompGeom



Questions?

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