Vespidae Component Dictionary

1. CurveTools

Tools for manipulating geometry in Rhino. This includes clipping tools and soon slicing tools and tools for filling / clearing pockets.

Boolean	Performs boolean operations, or *Clipping*, on polygons using the ClipperLib. The operations include intersection, union, difference and xor. See this for more documentation on the different operations.
Offset	Offsets polylines using the Clipper Library offset algorithm. Supports multiple offsets[1] in same operation. Solution will be transformed to the XY plane of the first given polyline
Sort Curves	Sorts curves in first Y direction and then X direction. The sorting algorithm currently uses the first point of each polyline when sorting.
Slicer	*Under development.* Slices Breps into slices of 2D polygons.

2. Actions

Actions-components converts sets of polylines into Vespidae-actions and tags them with relevant metadata. For example, the ExtrudeAction tags each polyline with an extrusion-parameter that sets the extrusion rate for each move. This metadata is applied by the solvers and visualizers in step 3.

	Creates ExtrudeActions that is tagged with relevant metadata.

ExtrudeAction	**ex(extrusion)** extrusion flowrate multiplier. Extrusion amount is calculated by: `distance x 0.01 x ex` **s (speed)** - speed of move. Translates to `F_speed_` in gcode. **t(temperature)** - extruder temperature. Translates to `S_temperature` in gcode.
MoveAction	*General purpose movement actions.* **s(speed)** - speed of move. Translates to `F_speed_` in gcode. **to (tool_id)** - tool number to execute move with. Translates to `T_toolId_` **gInj (gcodeInjection)** - injects gcode prior to the move. The gcode is added when the action is translated to gcode in step 3.
ZpinAction	*under development*
Sort Actions	*Sorts action according to input criteria. So far this includes sorting by x-y and z-directions.* **actions** - actions to be sorted. **sort (sort type)** - Sorting options: 0: x-direction, 1: y-direction, 2: z-direction. **flip**- flips the sorted list.

3. Solve

Solvers are used to compute and derive programs (sequence of actions) from sets of Actions. Solvers are also used when converting Actions into gcode

	Takes lists of actions and transforms them into a list of executable Actions, adding travel moves between each

Solver Actions	*action.* **Vobj (Vespidae Actions)** - Input actions to the solver. **rh (retract height)** - Retract height between the moves. **ts (travel speed)** - Travel speed between moves. **pr (partial retract)** - enables partial retract between Actions where possible[2].
Solver Gcode	*Takes lists of actions and converts all actions into a single gcode file.* **Vobj (Vespidae Actions)** - Input actions to the solver. **h (header)** - inject header gcode. **f (footer)** - inject footer gcode.
ExposePaths	*Visualizes Vespidae Actions in the Rhino Workspace.*

4. Communicate

UploadGcode	*Uploads gcode directly to a Duet controller. Requires a network connection to the duet and that the duet is running DWC.*

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1. Only component ↩
2. the algorithm checks if the next Actions z-height is the same as the current Actions z-height. If yes, it will do a partial retract currently predefined to .2 mm. ↩