Draw Split Tool

This item splits or subdivides a polygonal mesh by simply drawing over a sequence of edges to split or subdivide. The edges where the drawn stroke crosses the mesh will be split or subdivided at the crossing points. Click on the tool's shelf button or Sacred Tool icon to invoke the tool, hit <ENTER> or simply switch to another tool to exit. Modifier keys (i.e. <SHIFT> & <CONTROL>) pressed while drawing the stroke enables other tool features as well.

QUICKY GUIDE

Since it seems that all the mouse-button/modifier combinations may be somewhat daunting to remember, this little table will summarize the tool's functions in a nutshell, hopefully making things clearer and easier to remember:

Mouse Button/Control Held?	Left Mouse Button	Middle Mouse Button
NO, CTRL RELEASED	"Splits" all edges that are drawn over, WITHOUT any "vertex - snapping".	"Subdivides" all edges drawn over. For *single* slice subdivides, new verts are moved to where stroke crosses edges.
YES, CTRL PRESSED	"Splits" all edges that drawn over WITH "vertex-snapping" at stroke's start/end.	Same as above (i.e. <CONTROL> has NO effect when drawing with the MMB).

IMPORTANT IMPROVEMENTS AND RELEASE NOTES:

The tool's "toolButton" now is implemented as a "shelfButton", to avoid a regressive 4.0 bug.

CONTROLS:

The tool's features can be explained as its controls are being described here.

Starting and ending draw stroke on the *same face*: This is how you "cycle" a split (i.e. the last edge's new split vert(s) will

automatically be connected to the first edge's new split vert(s) with a new edge between them).

Left-mouse button (LMB) vs. Middle-mouse button (MMB):

- Drawing with the LMB "splits" the mesh at the edges drawn over.
- Drawing with the MMB "subdivides" the mesh at the edges drawn over.

Pressing <ENTER>: Exits the Draw Split Tool, and returns to the regular "Select Tool".

<BACKSPACE> OR <DELETE> KEYS: Abort the current drawn stroke (especially in "line mode"), WITHOUT completing split/subdivide.

POINT-CLICKS: Quickly pressing and releasing a mouse button WITHOUT DRAGGING invokes a few extra tool features:

- Point-clicking WITHOUT holding any modifiers will select ANOTHER mesh for the tool to operate on. Doing this on "empty space" simply DESELECTS the current selected poly mesh (i.e select "nothing"). This also resets the list of "new vertices" generated by the split/subdivide which is used for the "Select New Verts Upon Exit" feature.
- Point-clicking while holding <CONTROL> and using the "left mouse button" (LMB) will toggle ON/OFF "backface culling" for the current selected poly mesh. If you wish to split "right THROUGH" your selected mesh, then you'd want backface culling OFF. And if you desire to split only "at the SURFACE" the edges belonging to only those faces in the mesh "facing you" - then you'd want backface culling ON.

Point-clicking while holding <CONTROL> and using the "middle mouse button" (MMB) will toggle ON/OFF "vertex display" on the current selected poly mesh. It is a good idea to have the vertices of a mesh displayed, especially for "Subdivisions>1" when doing "splits" (i.e. LMB drawing), or when doing "subdivides" (i.e. MMB drawing).

MARQUEE-SELECTING: With "nothing" selected, this tool operates like the regular Maya (marquee) Selection Tool,

but only "poly meshes" can be selected (i.e. simply mouse-button press and drag a selection box around the mesh that you wish to split/subdivide).

PRESSING MOUSE BUTTON: Starts the draw stroke or selection marquee.

DRAGGING: Dragging the mouse while holding down a mouse button simply draws the stroke used for splitting or subdividing the selected mesh. However, in "line mode" (see below), dragging will also interactively "place" the endpoint of the most recent "line segment" on the stroke which would be "floating around" until you release the mouse button, finalizing the line segment.

RELEASING MOUSE BUTTON: Ends the draw stroke - clears it from view, then computes and does the split/subdivide. Also, when <SHIFT> is held down, "line mode" is invoked each time a mouse button is released.

<SHIFT> MODIFIER: As mentioned right above, holding down <SHIFT> and releasing a mouse button will invoke "line mode". "Line mode" puts the tool into a state that allows you to append "straight line segments" to the draw stroke. "Multiple" line segments in the same stroke is possible (simply keep <SHIFT> held down throughout). Note that after you release the mouse button while holding <SHIFT>, you are merely letting the tool know that you are in "line mode" (and note how the stroke does not yet end and the split is not yet computed). In order to actually "drag out a segment", you must KEEP ON HOLDING <SHIFT> while dragging. If you do not, then line mode ceases, and the stroke draws normally again. This is how you can move in and out of line mode within the same stroke. The line can only be seen with the LMB or MMB pressed. In short, ALWAYS HOLD DOWN A MOUSE BUTTON WHILE DRAGGING OUT A LINE SEGMENT!

<CONTROL> MODIFIER: You're probably going to be using this modifier the most. It can do several things:

- Holding <CONTROL> on a "LMB PRESS" enables "vertex-snapping". It snaps the "start" of your draw stroke to the "closest vertex from the mouse position where the mouse button was pressed" WITHIN THE POLY FACE YOU CLICKED OVER (i.e. the face the stroke begins at). The resultant split will start at the snapped vertex, with the benefit of NOT introducing any new vertices at that snapped vertex.
- Likewise, holding <CONTROL> on a "LMB RELEASE" enables "vertex-snapping", but this time snapping the *END* of the draw stroke to the "closest vertex from the mouse position where the mouse button was released" WITHIN THE POLY FACE YOU RELEASE OVER (i.e. the face the stroke ends at).
- See above to see how <CONTROL> affects "point-clicks".
- Hold down BOTH <SHIFT> *AND* <CONTROL> together to SIMULTANEOUSLY have "line mode" AND "vertex-snapping" together.
- Holding down BOTH LMB *AND* MMB simultaneously only serves a minor purpose, and that is to complete the stroke while still in "line mode" WITHOUT HAVING TO RELEASE <SHIFT>. For instance, say you're holding down <SHIFT> and dragging around to place the stroke's end line segment on your draw stroke. Normally, in order to complete the stroke (and hence compute the split/subdivde), one would FIRST "release <SHIFT>", THEN release the mouse button. But this tool has been designed so that you can complete the tool by holding down the *OTHER* mouse button, and releasing the "original" mouse button to end the stroke while in line mode. Just a minor little tidbit of a feature. Some also find this little mouse manoever somewhat "therapeutic" in an odd little way. :)

TOOL OPTIONS:

Double-click on the tool's shelf button or Sacred Tool icon to

reveal the options window. If you find that for certain options, the value you desire goes beyond a slider's range, you can try typing the value into the slider's "numeric field" instead.

"Min Draw Sample Size": This tool's algorithm works by sampling the mesh with "selection voxels", or little boxes that are created as you draw. This setting sets the smallest possible size of these voxels. It is suggested that you play around with different sizes to see which one works best for you. Default is set at "25" pixels. Larger sample sizes give a better chance of successful splits, but leave "clunkier/segmented" draw strokes. Try NOT to set this to be TOO SMALL (e.g. 2, etc...), but it may be necessary, especially when splitting really tight/convoluted areas in a mesh.

"Multi-Slices": New to this version, the tool can now have "multiple adjacent splits" occur within a single draw stroke that is, to have "multiple slices". This option indicates the "number of slices" that each stroke will split/subdivide each "edge split path" into.

"Multi-Slice Dropoff Power": When "Multi-Slices" is set to be >=2, the "spacing" of the slices is determined from the *closest endpoint* from where the stroke crosses each edge for each edge drawn over. This setting sets how the spacing "drops off" from the closest endpoint. The default is "1.0", which is a "linear" dropoff, meaning the spacing between each slice with be "uniform". Values >1.0 means spacing distances between slices "further away" from the closest endpoint will be "greater" than slice distances "closer to" the closest endpoint and greater values will yield more dramatic dropoff. Values <1.0 do the exact opposite. Warning: Please do NOT set this option to be *EXACTLY 0.0*!

"Subdivisions": The number of split intervals between each edge that was split.

"Edge-Snapping": Checking this option ON indicates that for each stroke, the split/subdivide distances on each edge will snap to specific values, specified by the next options. Checking the option

OFF (default) means the split distances are dictated by where the draw stroke crosses each edge.

"Edge-Snapping Type": There are TWO kinds "edge-snapping":

- The first kind of edge-snapping is by "Closest Endpoint", which snaps splits along all drawn over edges, by a "fixed distance" that is measured from the *CLOSEST VERTEX* ON EACH EDGE FROM WHERE THE DRAW STROKE CROSSED THE EDGE.

The second is by "Edge Intervals", which breaks each edge drawn over by the draw stroke, into an integer number of evenly spaced "intervals". The split will snap to the *END OF AN INTERVAL* WHOSE END IS CLOSEST TO WHERE THE DRAW STROKE CROSSED THE EDGE.

"Snapping Endpoint Offset": Applies only for "Closest Endpoint" edge-snapping. It specifies the "distance from the closest vertex to snap to" that the split should be offset from. For instance, a value of 0.5 means that the splits will snap exactly in the "middle" of all edges drawn over. Values range from 0.0 to 1.0, but BE CAREFUL SETTING THIS TO *EXACTLY* 0.0 OR 1.0! This may lead to "invalid splits", and thus SPLIT FAILURE!

"Number Of Snap Intervals": Applies only for "Edge Intervals" edge-snapping. It specifies the "number of imaginary intervals to divide up an edge" for snapping. For instance, if you set it to "3", your splits will snap to 0, 0.333, 0.666 and 1.0. For "10", it would be 0.0, 0.1, 0.2, ... , 1.0, and so forth. Setting a value of "1" is strongly NOT recommended, and be careful when dragging TOO CLOSE to the edge endpoint verts when using "Edge Interval" edge-snapping (i.e. you'll end up splitting consecutive edges with split distances of 0.0 or 1.0, which could cause split failure).

"Select New Verts Upon Exit": For each new split/subdivide, the new vertices introduced to the mesh can be automatically selected for the user upon exiting the Draw Split Tool (i.e. choosing ANOTHER tool). Choosing one of the following settings for this option will affect

the new selection in the following manners: 1)Choosing "Never" means the new vertices will NOT be selected. Exiting the Draw Split Tool simply retains the current mesh being split/subdivided as the final selection. 2)Choosing "Last Split" (default) will select only the vertices generated by the MOST RECENT split/subdivide, upon exiting the Draw Split Tool. 3)Choosing "All Splits On Mesh" will select ALL vertices generated by ALL split and/or subdivide operations done on the current mesh, *SINCE THE LAST TIME THE MESH WAS SELECTED*.

"Auto Backface Culling": If checked ON, this Will always automatically turn ON "backface culling" on ALL poly meshes in the scene when this tool is invoked, and will also automatically turn it OFF when exiting the tool. You would want it checked ON if you're splitting/subdividing only those edges belonging to faces "facing you" (i.e. split "at the surface" only), and you'd want it checked OFF when splitting/subdividing *RIGHT THROUGH* the selected mesh. Default is set to "ON".

TIPS:

- To end your draw stroke while in "line mode", RELEASE <SHIFT> *BEFORE* YOU RELEASE THE MOUSE BUTTON (this gets a lot of users!).
- When in doubt, WORK IN "WIREFRAME MODE"! When you're unsure of which parts of the mesh are actually being split/subdivided by the draw stroke while working in shaded mode, simply hit that good 'ol trusty "4" key.
- Use "Show->Isolate Select" when backface culling just doesn't cut it for clearing all but the "front" faces from view (e.g. say you're modeling the "thigh" of a really shredded, muscular character and you only wish to split edges at the "front" of the thigh but NOT the back of the leg, and you find that turning "backface culling ON" will remove from view, certain edges that are part of the extensively folded thigh muscles at the front that you DO WANT to split - solution: select only those faces that make up the

"front" of the thigh, do a "Show->Isolate Select" and turn "backface culling OFF").

- For real "tangled, hard-to-get-to" areas of a mesh, heck, just use the regular "Split Polygon Tool", which is great for splitting in such regions.
- Keep your eye on the Maya Command-Line to get feedback while using this tool, such as "backface culling" status, etc...
- For "Subdivisions>1", the spacing of the split "facepoints" (between the split "edgepoints") will be more evenly spaced between the split edgepoints if you draw more "slowly and steadily" (i.e. don't draw TOO quickly).
- Smaller "Min Draw Sample Sizes" are less precise, but keeps the draw stroke smoother. Larger sample sizes (also equivalent to drawing faster) yields more precise split/subdivide distances, but leaves "clunkier" draw strokes.
- If you're finding that the new split/subdivide points don't exactly line up with where the drawn stroke crosses each edge, then reposition your view to look at the mesh's face "dead on", and NOT "at an angle" (i.e. as "perpendicular" as you can to all the faces, so you can see "as much of the face" as possible), or use an "orthographic view".
- When you decide to "cycle" a split by having the start and end of the draw stroke end up on the same face, make sure that the start and end of the draw stroke "ARE AS CLOSE TOGETHER AS POSSIBLE TO EACHOTHER". This will make the facepoint splits in that final split interval more "evenly spaced" and less "tangled".

KNOWN LIMITATIONS:

- When upgrading to a new version of this tool, some users have reported crashes on the first usage of this tool. To solve this, "reset" the tool, then immediately exit and re-launch Maya.
- You should NOT draw over the same edge more than ONCE in the same stroke, otherwise the split may fail (i.e. "doubling-backing" over the same edge). The only exception to this is drawing over the same first/last edge, which is another alternative to "cycling" a split.
- Sometimes some faces at the back of the mesh are not FULLY cleared by backface culling. This is another good reason for working in "wireframe

mode", to see and spot these sometimes occurring "rogue back faces".

- Avoid zooming too far in or out, which causes the edges to be too dense or too sparse. This will lead to "imprecision errors" which causes the splits/subdivides to generate unexpected results or fail altogether.
- You CANNOT simultaneously "cycle" the split (i.e. stroke starts and ends on same face) AND "vertex-snap" (i.e. holding <CONTROL> at start and/or end of stroke) within the SAME STROKE.
- When drawing over - and thus splitting THROUGH a "layered mesh" - one that requires "multiple split paths" for the "same stroke", the stroke will ONLY snap to the layer of faces/vertices that's *CLOSEST* TO YOUR VIEW (i.e. the "front-most" split path, which is the only one visible to you in shaded mode).
- Currently, the stroke-edge crossings do NOT affect where the "multi-slices" should be spaced from (it should!).When splitting (i.e. drawing with LMB) with single-slices and setting Subdivisions>1, drawing *TOO FAST* may yield very unevenly spaced, and sometimes even tangled "facepoints" in the split.
- Be careful vertex-snapping the start of the stroke and the end of the stroke TO THE *SAME VERTEX*. This has been known to yield invalid geometry, even leading to crashes! Use TWO separate strokes instead, to achieve the cycle in the split. This only occurs "sometimes", and this is just a "heads-up", for you to keep an eye out for these situations.