DRAWALONG

## *Extend the native SU Line Draw Tool*

USER MANUAL – v1.0

1. Overview

DrawAlong is a standalone script which is part of **FredoTools**. It allows Drawing lines as Edges or Guide lines / points.

DrawAlong is similar to the native Sketchup Draw tool but provides some additional features:
- Additional inferences (centers of arc, face, component / group)
- Additional auto-lock directions
- Lock of custom direction
- Draw along Direction, with possibility to pick and choose direction in the model
- Draw along Plane, with possibility to pick and choose plane in the model
- Draw Edges with predefined properties (soft, smooth, hidden)
- Draw with Construction Lines and Construction Points
- Copy and Divide mode
- Remote inferences (on points and directions)
- NO inferences (with Alt modifier)

When you launch **DrawAlong**, a button palette is displayed. Note that almost all functions are also available from the keyboard shortcuts, mouse and contextual menu.
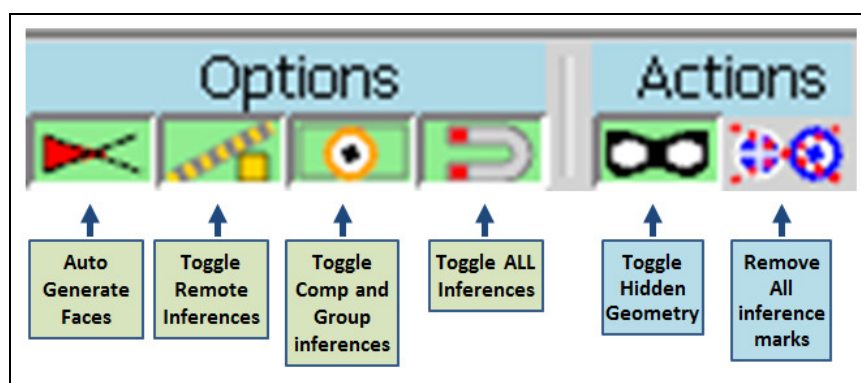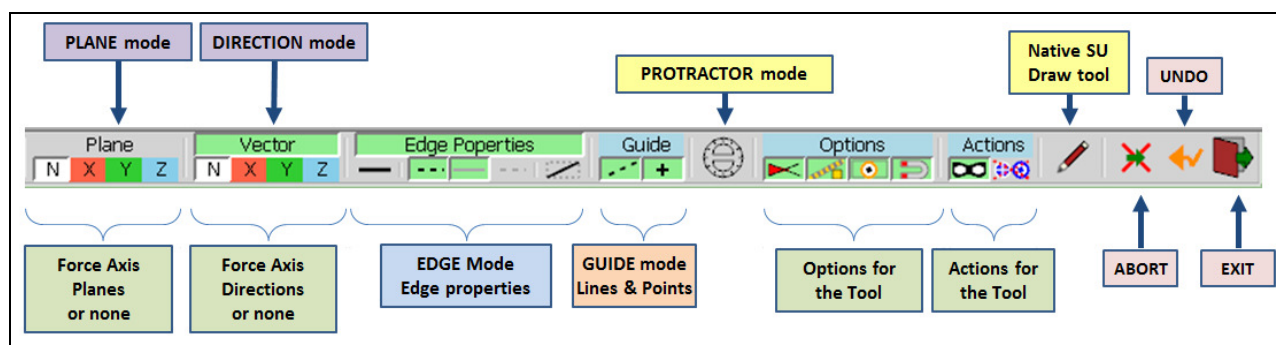
DrawAlong offers 2 working modes:
- **EDGE mode**: as in the native tool, you draw with Edge, except that you can also preset the edge properties (Smooth, Soft, Hidden and Diagonal)
- **GUIDE mode**: you can draw with Guide Lines, Guide Points or both

DrawAlong provides several modes for constraining the movement:

- **VECTOR mode**: movement is constrained along a line (degrees of freedom = 1).
- **PLANE mode**: movement is constrained by a plane specified by its normal (degrees of freedom = 2)
- **LOCK mode**: you can temporarily lock the current direction
- **INFERENCE Directions**: depending on the origin picked, DrawAlong will provide some sticky directions (like axes, follow edge, …)
- **PROTRACTOR mode**: direction can be specified by an angle from previous edges or some reference directions.

The buttons in the palette allows to set constrain on axes, but there are other ways to impose a direction or a plane via the keyboard and mouse.

DrawAlong fully supports Ctrl-Z (and Ctrl-Y) for **Undo** within the plugin.

## 2. Drawing Methods

Drawing with Edges

As in the native tool, **DrawAlong** allows to draw a single edge or a sequence of edges. The conventions are as follows:

- If you click down, drag and then release, you draw a single edge
- If you click down then release on the same position, you start a sequence of edges.
- However, there are cases where the tool will stop the sequence:
  - When the edge is drawn between two existing vertices (as in the SU tool)
  - When you double-click on the target
  - When you move the target over the origin and click

The above applies when you draw with Guide lines.

Edge Properties

You can preset the edge properties for drawing. This may be helpful when you modify or extend a mesh or a TIN.
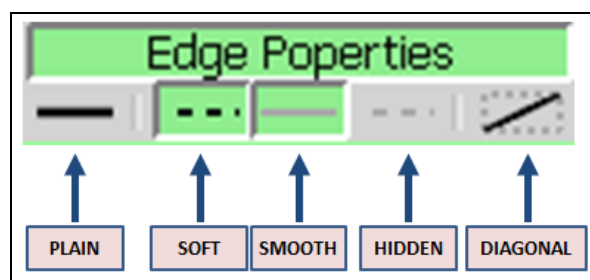
For convenience you can cycle through common sets of properties using the **TAB** key: Plain, Soft, Smooth+Soft, Diagonal.

Note: Diagonals are defined with thomthom's convention, that is Soft + Smooth + not Cast - Shadows.
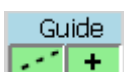
Drawing with Guide lines and Guide Points

Select the Guide mode. You can choose to draw with Guide lines, Guide Points or both. Drawing with Guide points only will still show a direction interactively, in order to use the inference mechanism.

3. Additional Inferences

DrawAlong implements the basic inferences of the SU native Move tool (endpoints, midpoints, edges, faces, etc…) at top level or embedded in components / groups. It does offer additional ones:

Additional Inference Points

- **Center of Arcs and Polygons:** when hovering the mouse over an arc or a polygon (as considered by Sketchup), the center of the arc or polygon is displayed (as a red cross **+**) and can be used as an inference for origin and target.

- **Center of Faces:** when hovering the mouse over a face, the center of the face is displayed (as a blue cross **+**).

- **Center and Corners of Components / Groups**: when hovering the mouse over the elements of a component or group, the center and bounding lines of its bounding box are displayed. This works at any level of embedding. The center of bounding box is useful because it may be physically hidden within the component / group. With **DrawAlong**, you can still pick it in all cases. The center and corners of the bounding box can be used for origin and target.

- **Anchor and Leader of Text Labels** (if this matters!)

Additional Inference for on-the-fly direction lock

When you move the mouse for picking the target from the origin, **DrawAlong** automatically detects certain privileged directions and make them sticky. The native SU Move tool only locks direction on model axes. **DrawAlong** detects axes but also provides additional sticky directions, depending on the origin:

- **On Edge or midpoint of Edge** → direction of the edge
- **At Vertex** → directions of all edges at vertex
- **On Face** → direction of the face normal
- **Component / Group Bounding box** → local axes if different from model axes
- **On Guide Line** → direction of the guide line

Each inference has a dedicated visual mark, color and tooltip.

NO Inferences

You can select the origin and target with **NO inference at all**. Use the **ALT** key, in toggle mode or pressed down (or palette button, or contextual menu), to set / unset this NO inference mode.

Note that when you hover the mouse over a face, **DrawAlong** record the plane of the face to be used later as a reference if you pick a point in the empty space.

Remote Inferences

This feature is slightly different from what the native Sketchup tool offers. The intention here is to provide an **explicit way to use remote points and directions to guide the Move**, but also to be able to **enter a distance value in the VCB** (as opposed to the SU remote inferencing which is not controlled by the user and where you cannot type the distance in the VCB).

Origin From a Remote Point

Hover the mouse over a vertex, edge midpoint, guide point and wait for about 1 second. A small yellow mark ▢ will appear at this *Remote Point*. Then, if you move the mouse and its position is roughly aligned with a characteristic direction of the Remote Point (ex: edge direction) or an axis, a yellow dashed line -- will appear.

The distance is indicated in the VCB. You can type a new distance to set the origin.
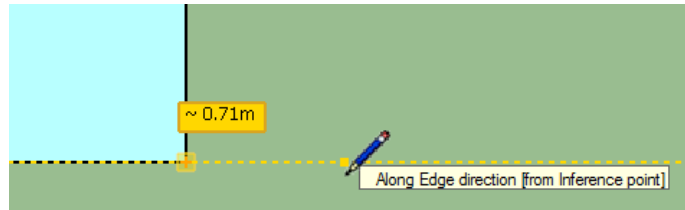

Target From a Remote Point

The mechanism is similar. The distance is indicated in the VCB. You can type a new distance to set the Target by reference to the Remote Point.
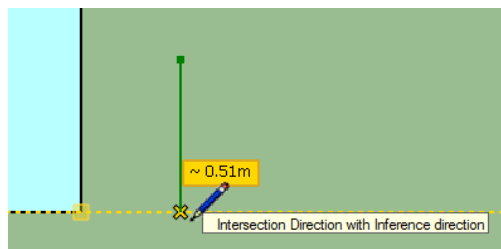
Target From a Parallel direction

When in Target mode, hover the mouse over an edge or guide line and wait for about 1 second. The edge or guide line will be highlighted in yellow, indicating the *Reference direction*. Then, if you move the mouse and the line origin-target is roughly parallel with this Reference direction, then it will appear as a yellow dashed line -- and be sticky.
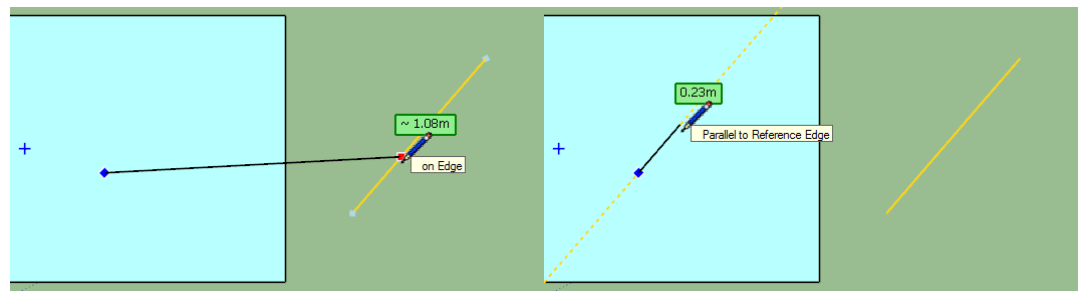

Hover over edge – wait 1 second   *Use the direction to place the target*
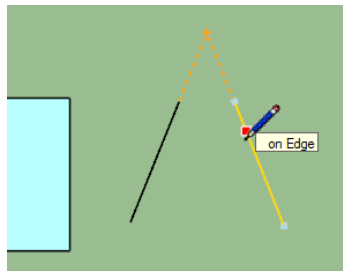
Intersection from 2 Reference directions

This mode allows highlighting the intersection of 2 reference directions, such as the crossing point of the edge directions.
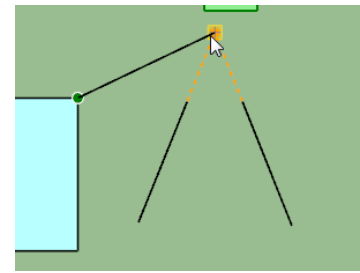
1) **Select the first set of reference directions** by hovering the mouse over a point or an edge / guide line, as seen above (i.e. hover and wait 1 second for the yellow mark)

2) **Select a second set of reference directions** (hover, wait 1 second). The intersections of the two set of reference directions will be shown in orange. These intersections can be selected to place the origin or target.
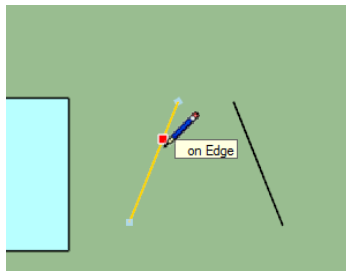
Select first direction   *Select second direction*   *Use the intersection to place*
                               Intersection is shown   *the Target*

Disabling / Enabling Remote Inference

You can toggle this mode via a dedicated button in the palette

4. Locking Direction and Plane

**DrawAlong** offers two modes for constraining permanently the movement:

- – **Vector mode**: Movement follows a direction
- – **Plane mode**: Movement is constrained on a plane

A locked direction is always indicated by a *colored guide line* crossing the whole screen.

Locking the Current direction

When you move the mouse to pick the target, you can lock the current direction origin-target by pressing / releasing SHIFT. This function is <u>available whether you are in Vector mode or in Plane mode</u>.

The direction is locked and you can freely adjust the offset by dragging the cursor or via the VCB. This is useful if you wish to set the direction by a point in the model, but you still want to control the length of the created edge.
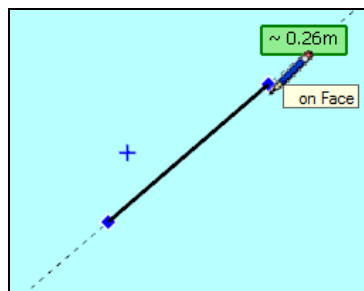
Lock Current Direction (Shift)

To unlock the direction, press Shift again or Arrow down.

Locking Axes direction

This is set via the Arrow keys (or buttons in the palette X, Y, Z, as well as contextual menu):

- – **Arrow Right**:   X axis
- – **Arrow Left**:   Y axis
- – **Arrow Up**:   Z axis
- – **Arrow Down**:   Unlocked all constrained directions or plane

In Vector mode, you fix a direction of the selected axis

In Plane mode, you fix the plane whose normal is along the selected axis. A small transparent plane appears:
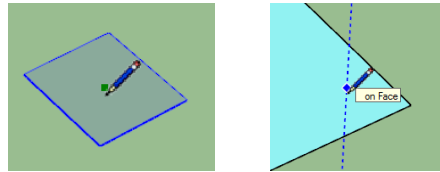
Switching between Plane mode and Vector mode

You can set the current mode via the button in the palette ('Vector' or 'Plane').

If you press an Arrow key, you will stay in the current mode when the key pressed is different from the direction already set or there is no constrained direction.

For instance, if you press Arrow Left and the current direction is locked on the X axis, then you do not change the mode. Same if there was no mode set (button 'N' highlighted).

You will change the mode when you press the same Arrow key as the direction already defined.

For instance, if you press Arrow Left and the current direction is locked on the Y axis, then you will change the mode. Same if there was no mode set (button 'N' highlighted) and you press Arrow Down.

Picking a Custom Direction and Plane in the model

You can set a direction or plane by picking it from elements anywhere in the model.

This can be done by just hovering over the element and either pressing **ENTER** or making a **Long-Click**. In Origin mode, you can also press SHIFT.

**In Vector mode**

− Picking an Edge or a midpoint → direction of the edge

− Picking a Face → direction is the normal to the face

− Picking a Guide Line → direction is the line of the guide line
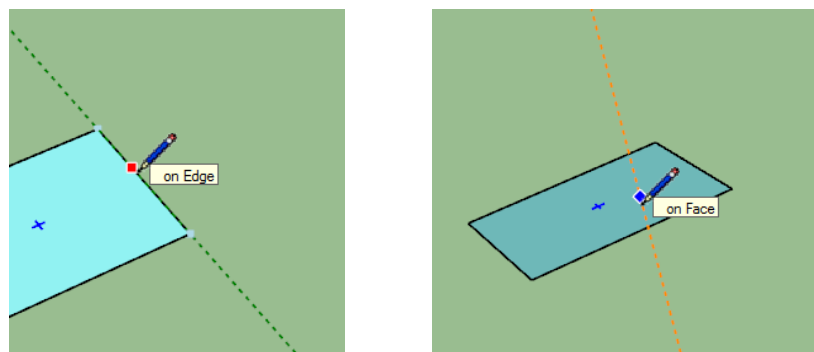
In Plane mode

- Picking an Edge or a midpoint → plane perpendicular to the edge
- Picking an Vertex with 2 Edges → plane defined by the 2 edges
- Picking an extremity (vertex with one edge) → plane perpendicular to the edge
- Picking a Guide Line → plane perpendicular to the guide line
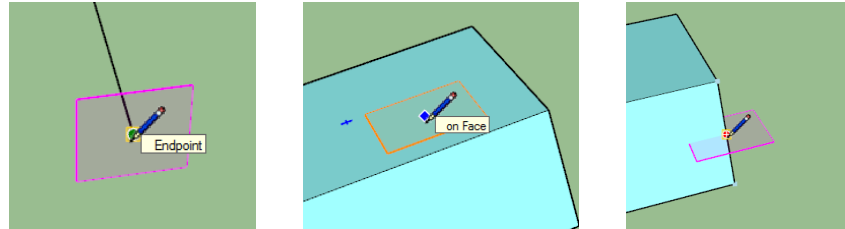
To unset the constrained direction or plane, just press **Arrow Down**.

Note: when you draw lines along a plane, the degree of freedom is 2. As far as possible, **DrawAlong** tries to detect the intersection of the plane with linear elements such as edges and guide lines.

5. Post-Drawing adjustment - VCB

Important: *space* or *semi-comma ';'* are used as separators in the VCB, because the dot and comma are reserved as valid decimal separators for international users.

At any time during or right after the drawing, you can adjust parameters via the VCB in a similar manner to the native SU tool.

- **Length of segment or Distance for remote inferencing**: just type the **numeric value**,
    a) without unit means in current model units, ex: *33.5* or *3'4"*
    b) with units, ex: *3.2cm*

- **Specified Coordinates**: you can type the coordinate of a point to specify the origin or target by entering its coordinate value along each axis. For instance *3 4 5* will set the origin or target to a point with coordinates 3 in X, 4 in Y and 5 in Z.

    You do not need to enter all values and use the semi-comma ';' as separator when non-ambiguous: ex: *;;4* will set the point [0, 0, 4] (*0 0 4* would work as well), *50.3;* will set the point [50.3, 0, 0], noting that *50.3 0* would work as well).

- **Multiple segments**: in the same spirit as the SU Move tool:
    o **Multiple of segment**: **n* or *nx* are supported, ex: **3* or *3x*
    o **Divide of segment**: */n* is supported, ex: */3*
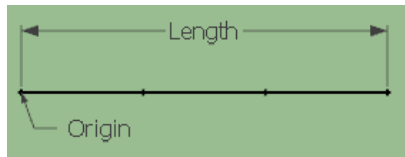
    <u>Symmetrical generation</u>: If you type a **negative value** (ex: **-3*, *-3x*, */-3*), then multiple segments are generated <u>on each side</u> of the original copy.
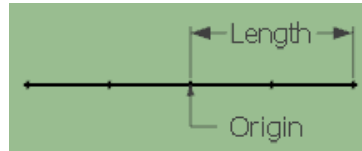

3 segments in Multiple → *3
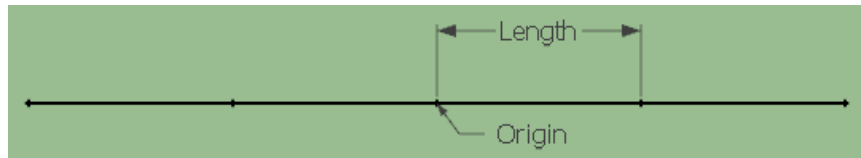
2 segments in Multiple on each side ➔ ***-2**

3 segments in Divide ➔ **/3**

*2 segments in Divide on each side* ➔ **/-2**

6. Protractor Mode

The Protractor mode is activated by Ctrl (down or in toggle) or via the dedicated button in the palette. It is usually set on when you pick the origin, but it can also be activated when drawing to the target.

The plane and direction of the protractor are determined by the placement of the origin. When you pick the origin, the plane is based:
- on the face underneath, if any,
- or the plane defined by 2 edges at a vertex,
- or a plane containing the picked edge,
- or the Horizontal plane in other cases.

When you mouse over a corner, move slightly the cursor to pick the right face and edge to set the plane and direction of the protractor.
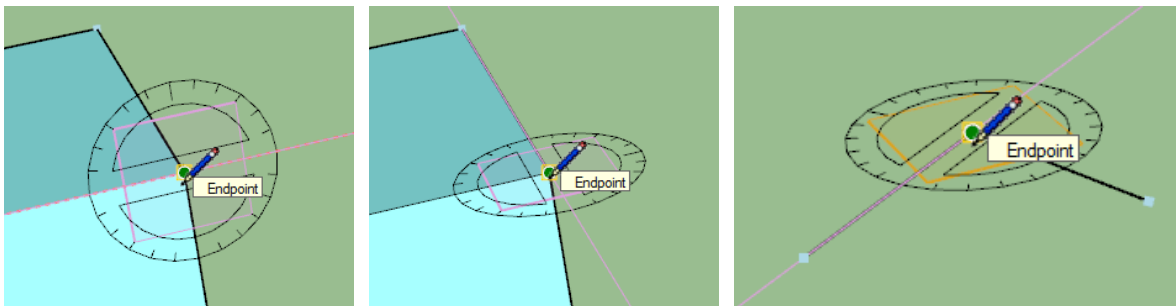

In Protractor mode, you implicitly draw in the plane of the protractor. The angle of direction is rounded to multiples of 15 degrees. This stickiness is attenuated when you move the cursor away from the center of the protractor. Inferences are still available, but restricted in the plane of the protractor.

At any time, you can type an angle in the VCB, with the suffix convention:
- d for **degrees**, ex: 90d or 25.2d
- g for **grades**, ex: 100g (which is 90°)
- r for **radians**, ex: 1.57r (which is roughly 90°)
- % for **slope**, ex: 100% (which is 45°)

When you specify an angle via the VCB, the corresponding direction is just locked and you can continue to draw the same segment. It is automatically unlocked for the next segment.
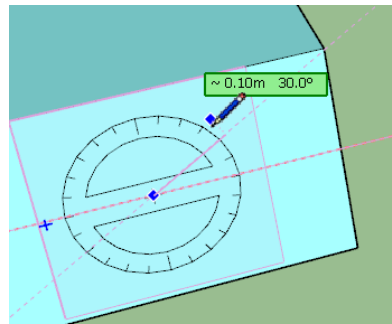
Note that you can combine both the angle and segment length in the same VCB input, for instance 30d 1.52m. This will create a segment at 30°, of length 1.52m, and continue the sequence from the end point.

7. Auto Generation of Faces

When you draw edges in loop, or when the new-created edges cross other existing edges, you may be in situation where faces can be automatically generated. This is the default behavior of the Sketchup Line tool. In **DrawAlong**, this feature is supported, but there is a button to enable / disable it.

8. Repeating Drawing

Once you have drawn an edge or guide, you can create the same segment from another origin by double-clicking on a new point. Note that if you double-click in the empty space, you will instead exit DrawAlong.

9. Default Parameters for DrawAlong

You can adjust the **precision for picking** and the **angle for auto-locking the directions**, as well as the **delay for remote inferencing** in the **Default Parameters dialog box of LibFredo6**:

Inference settings for Origin - Target picker		
Precision for Picking (in pixel)	7	
Angle for alignment on privileged directions (in degree)	6	
Delay for activating Remote points for inference (in second)	1.0	

Note that these parameters are shared with other plugins, such as MoveAlong.