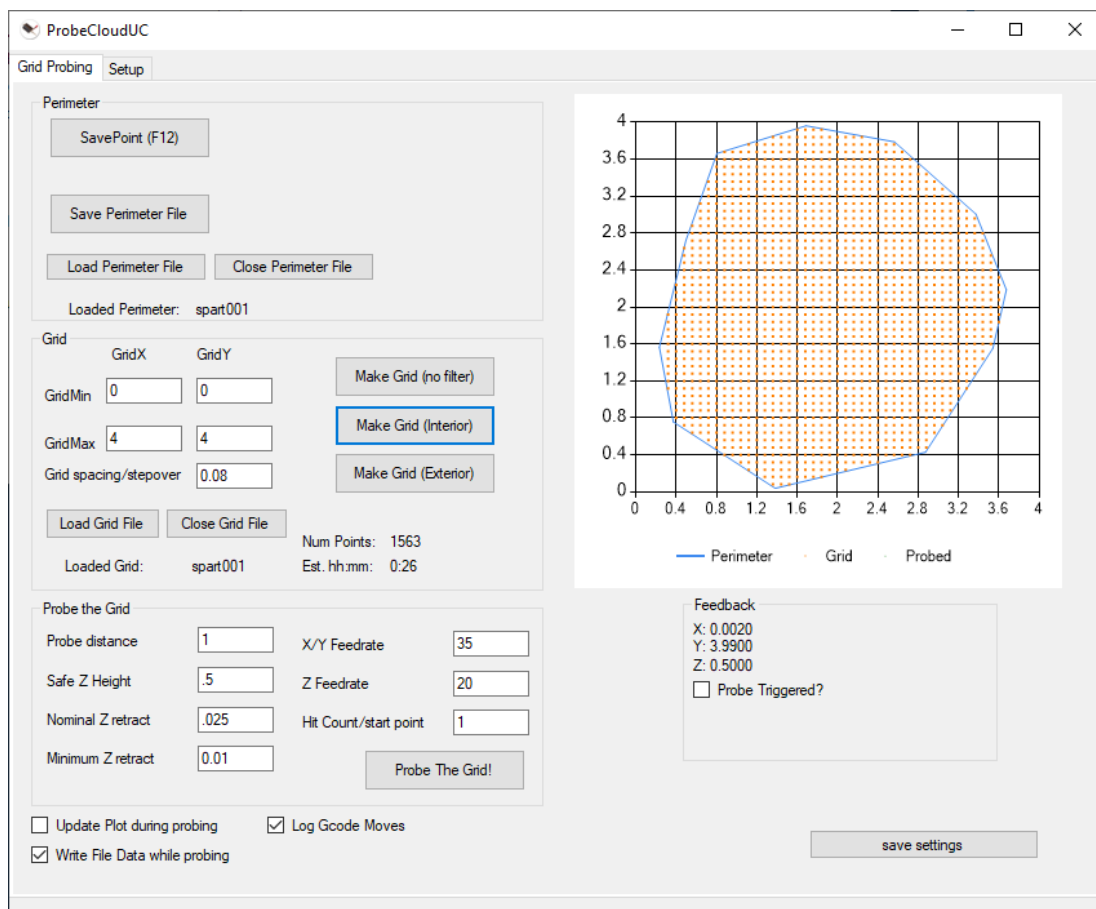


## ProbeCloudUC – V1.000

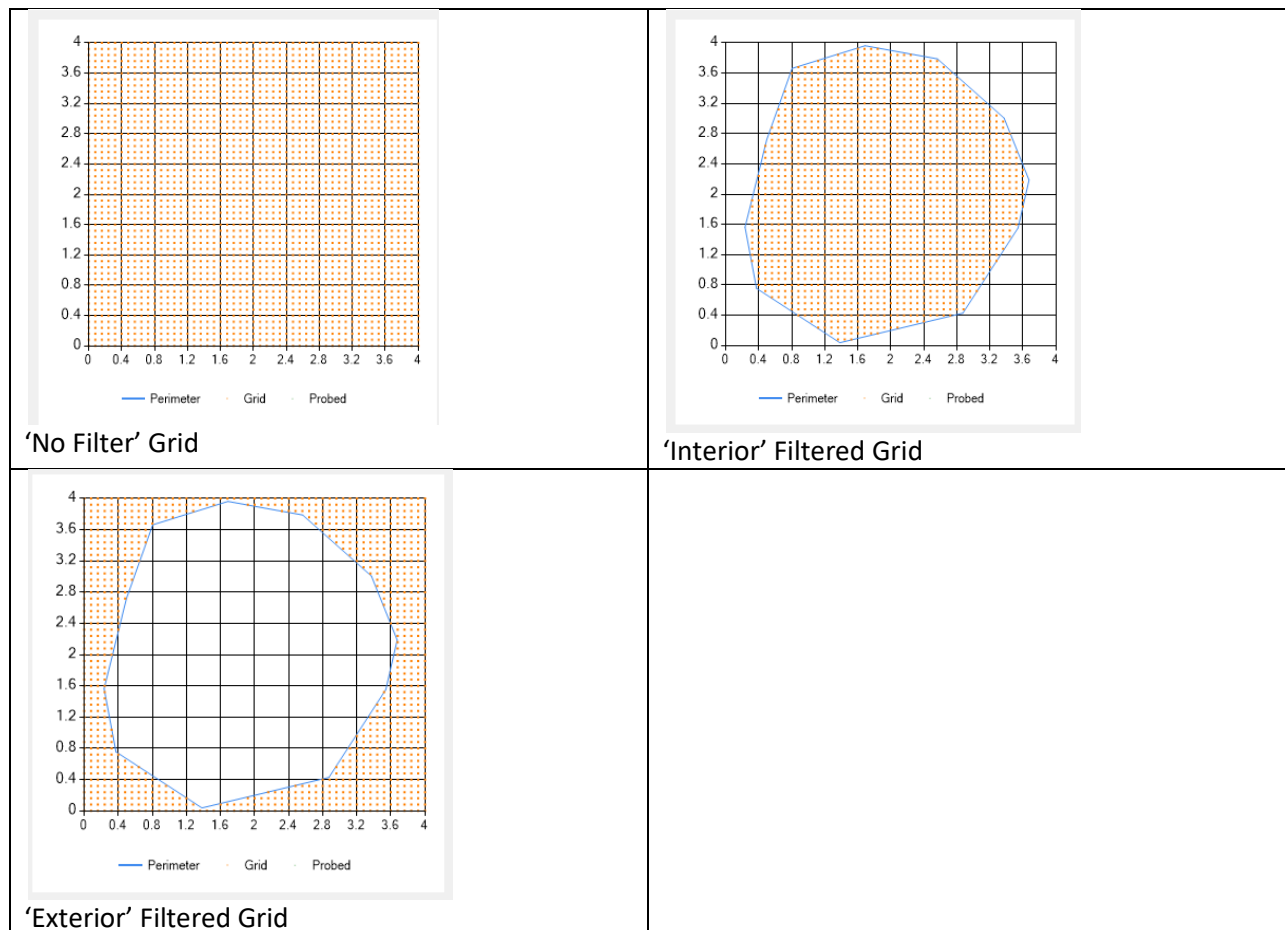
ProbeCloudUC is a plugin written to perform 'digitizing' of an item and make a text based point cloud file. It performs a similar functionality to any 'digitize' routine with a 'bed of nails' probing approach, but It also provides the following capabilities that are of benefit when probing thousands and thousands of points:

- Ability to define a perimeter that is used to filter probing areas to cover. Ability to Preview probing area, and define the probe areas as inside or outside of the perimeter. This can greatly reduce wasted probing time collecting points you don't want or need.
- Ability to stop and re-start at a position and continue writing to the same file. Probing 100,000 points can take a long time, now you can break your probing up into several sessions.
- Adaptive retracting. The probing routine doesn't just probe from a set 'safe Z' plane height, but rather tracks as closely to the surface of the part as you choose, only retracting to a higher Z level when necessary
- Ability to have the plugin send you an email (or a text if you set it up to email to a special address that forwards to your cell number). Now you don't have to wonder if the probing has stalled or hit a snag, the plugin will notify you if it has an error or an EStop event occurs before the finish!



The rough steps to utilize the plugin are as follows:

1. After placing your item on the table, set a x/y 0,0 location to the lower left corner area of the part. Ideally, home the machine before setting 0,0 so you can return to the point.
2. Jog around the part manually, stopping at locations which define a containment perimeter. Hit the 'Save Point (F12)' button to collect points. When done, hit 'Save Perimeter File' button, and give it a name (fname). a file called fname\_perim will be saved into the ProbeCloud folder in the plugins folder.
3. Define the GridMin/GridMax values for x and y to define the extents that bounds your part and perimeter. Enter a stepover value, which defines the spacing in the X and Y direction between rows and columns of points. As this number shrinks, the number of points will go up very quickly. *A known issue is that the plotting becomes very slow as the number of points gets over 50,000. This will be worked on in future versions.*
4. Use the buttons to make a grid, either 'No Filter', 'Interior', or 'Exterior' to define points to record (orange points indicate probe locations). These will create the points, and save into a file called fname\_grid, which is also to be saved into the ProbeCloud folder in the plugins folder. Once the '\_grid' file is made, you're ready to probe the part!



5. Fill in the following boxes with values pertinent to your units and machine. Values are in basic dimensionless units, so put in speeds and distances for inches or metric, whichever is correct for your setup. (Note: values shown below are used on a setup that is in INCHES, use your own proper values as necessary!)

Probe the Grid

Probe distance

1

X/Y Feedrate

35

Safe Z Height

.5

Z Feedrate

20

Nominal Z retract

.025

Hit Count/start point

1

Minimum Z retract

0.01

Probe The Grid!

☐ Update Plot during probing

☒ Log Gcode Moves

☒ Write File Data while probing

<b>Probe Distance</b>	<b>Value not important, make sure it is larger than z height. It is the distance the plugin will attempt to probe in Z direction.</b>
<b>Safe Z</b>	Pick a value that is above your part some distance. This sets a plane that the probe tip will retract to when necessary only (ie, if it hits the edge of part during x/y move)
<b>Nominal Z retract</b>	This is the distance that the probe tip will retract nominally from the surface (following the z probe move) to move to the next point. The plugin is constantly altering this value to larger and smaller values depending on the determined 'slope' of the surface.
<b>Minimum Z retract</b>	This is the absolute minimum distance that the probe tip will retract from the surface (following the z probe move) to move to the next point. The plugin is constantly altering this value to larger and smaller values depending on the determined 'slope' of the surface, this value sets absolute minimum bound.
<b>X/Y Feedrate</b>	This is the federate (in your units) to move at during X/Y moves to the next points. All X/Y moves are done as G31 probe moves at this feedrate
<b>X/Y Feedrate</b>	This is the federate (in your units) to move at during Z probe move (when sampling surface and recording data). All Z moves are done as G31 probe moves at this feedrate
<b>Hit Count/Start Point</b>	This value is used at the initial running to tell the plugin what point to start at. After probing has begun, this value increments up with every point recorded. Thus you can stop and restart the routine. If you want to start over, just set the value back to 1 before hitting 'Probe the Grid!'
<b>Update Plot during probing</b>	Use this to enable/disable plotting the points in green as they are collected. I recommend turning this off if the number of points is large (>10,000), as the screen update slows the probing process
<b>Log GCode Moves</b>	This enables/disables creating a file called fname_gcode_log.txt in the ProbeCloud directory. This logs every single GCode command sent to UCCNC. It's really only necessary when debugging the program.

### Write File Data while probing

This enables/disables writing the data to a file called frame\_out.txt. The output file is a comma delimited file that has the x, y, z points recorded for use in you CAD or meshing program such as mesh lab. This should always be on, unless you are just testing things out.

### Probe The Grid!

This starts the plugin probing routine. The text on the button changes to 'STOP', so hitting it again will stop/pause the routine. Hit button again to restart. Note that the routine will run until, it is manually stopped, all points in the \_grid file are collected, or an EStop/Feedhold occurs.

### Miss Tolerance (settings tab)

This value, in your length units, is used to determine if the probe did not hit an object on a move where it was not supposed to (such as moving in X/Y to next point). Keep value small (number shown below is meant for inch units)

### Hit Tolerance (settings tab)

This value, in your length units, is used to determine if the probe did hit an object on a move where it was supposed to (such as probing in Z to hit surface). Keep value small (number shown below is meant for inch units)

### Save Settings

Writes a 'probecloud.xml' file in ProbeCloud folder which saves all user inputs/text boxes/check box selections

The screenshot shows the 'ProbeCloudUC' application window with the 'Setup' tab selected. The interface is divided into several sections:

- Email Settings:** Includes a checkbox for 'Enable sending email / text messages?'. Below it are text boxes for 'Sender's Mail Server' (containing 'smtp.gmail.com or whatever your server is....'), 'SMTP Account Login' (containing 'your\_login@youremail.com'), 'SMTP Account Password' (containing 'YourPassword'), and 'SSL Port (587 or 465 typical)' (containing '587'). A note states: 'Note: Information entered here is NOT encrypted, and will be saved as plain text in the settings.xml file! Use only if you are OK with that. Also note, Gmail accounts will need setting for 'less secure' app turned on in your account settings.'
- Recipient Information to send Text Message or Email:** Includes text boxes for 'Recipient's ten digit phone number' and a dropdown for 'Recipient's Cellular Carrier'. A button 'Set TextMsg Address to email address' is present. Below is a 'To Address (email or text)' text box containing 'you@youremail.com'.
- Subject Line:** A text box labeled 'Subject:'.
- Message Text (140 characters max):** A large text area for the message content.
- Send Test Msg:** A button with a tooltip that reads: 'This button will send a test message of the text entered in above subject/message boxes. Automatic messages will be sent during probing if setup correctly and enabled'.
- Probing settings:** A section at the bottom left with two text boxes: 'Miss Tolerance' (containing '0.002') and 'Hit Tolerance' (containing '0.002').
- save settings:** A button at the bottom right.

If you choose to use it, this plugin can be setup to send an email message on various errors, or when the probing successfully completes!

**I'll state this up front**, the email server info such as login and password are not encrypted, they are saved as plain text in the probecloud.xml settings file, and if you use a Gmail account, you will have to set your account to allow 'Less Secure' Apps to allow messages to send by Gmail. I recommend setting up a spare 'junk' email account to use with this feature.

<b>Enable sending email/text msg</b>	<b>Checkbox enables/disables sending of messages. Up to user to use if they want to.</b>
<b>Senders mail server</b>	This is the SMTP server to send through, something like smtp.gmail.com (depends on your account you want to use)
<b>SMTP account Login</b>	This is the account, typically same as your email address you are using account from
<b>SMTP Account Password</b>	This is the password for your email account
<b>SSL Port</b>	This is the Port for the email server. I've found 587 to be typical for non-secure use
<b>Recipients ten digit phone number</b>	This plugin only sends email; however, you may have the ability to send yourself a text via your cellular provider supplying a proper email address to route through. If you have this info, put your phone number here
<b>Recipients Cellular Carrier</b>	This pull down has a number of canned cellular provider email addresses to use with your cell number. If none are familiar, you'll have to check with your cell provider. For me, I have TMobile, so the pull down I use is @tmomail.net. Press the button to automatically set the 'To Address' box with the phone number and the carrier info
<b>To Address (email or text)</b>	This is the email address to send all messages to. It can be a standard email address, or it can be a phone number w/ carrier address (for example, 8881234567@tmomail.net
<b>Subject Line &amp; Message text</b>	Enter some text here; it is ONLY used during the sending of 'Test Msg' button.
<b>Send Test Msg</b>	This sends the 'test message' only. You'll either get a 'success' message if sent, or some error information which means something relative to your server settings/login is incorrect.

During the actual probing, you will get a message sent if:

- The target is 'missed' and probing stops
- The probe 'sticks' on in triggered state
- An ESTOP or Feedhold happens
- The probing completed successfully (yay!)

Thanks for checking out this plugin!

Eric Brust

Questions/comments/feedback: [eabrust@craftycnc.com](mailto:eabrust@craftycnc.com)

