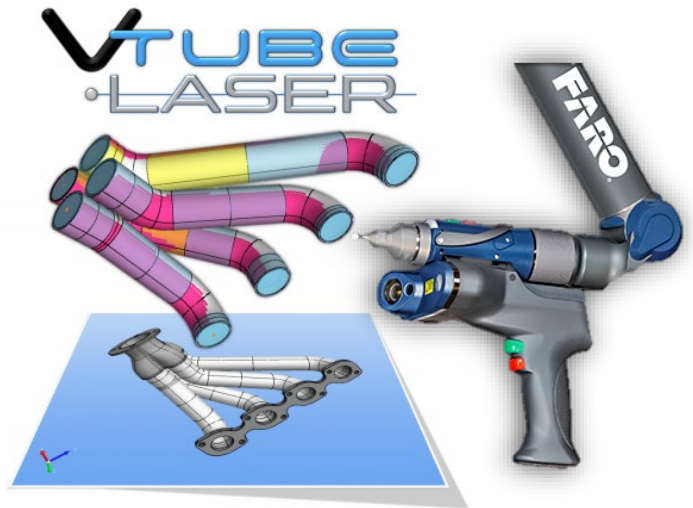


VTube-LASER Guide for FARO QUANTUM INITIAL SETUP TRAINING

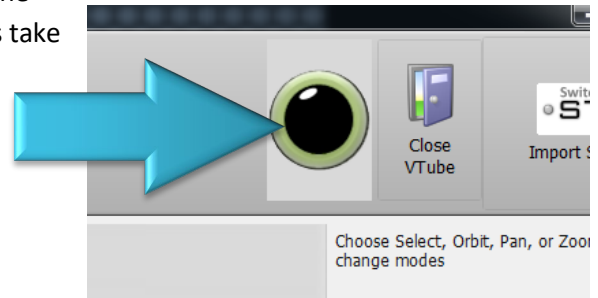
This training guide shows how to setup VTube-LASER for use with a FARO ScanArm.



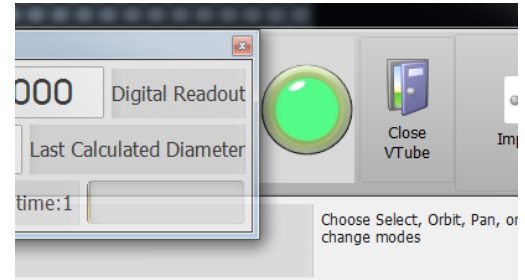
1. This document assumes that VTube-LASER has been installed and activated on your computer. VTube-LASER requires a USB key that controls licensing. Be sure that the USB key is plugged into one of the USB ports.
2. If it is not already installed, install the FARO driver to your VTube-LASER computer. VTube-LASER needs the FARO driver in order to connect to the FARO arm. You can find a FARO driver here:
<https://www.advancedtubularsupport.com/faro-arm-drivers.html>
3. Load the FAROArm Manager software, turn the FARO arm on, then initialize the encoders using this display:
4. This document assumes that the FARO probe and scanner have been compensated to the FARO arm you are using. The compensation steps are not covered in this document.



5. Start VTube-LASER, then click on the black LED in the upper right corner. The connection will sometimes take 7 to 10 seconds for the initial connection.



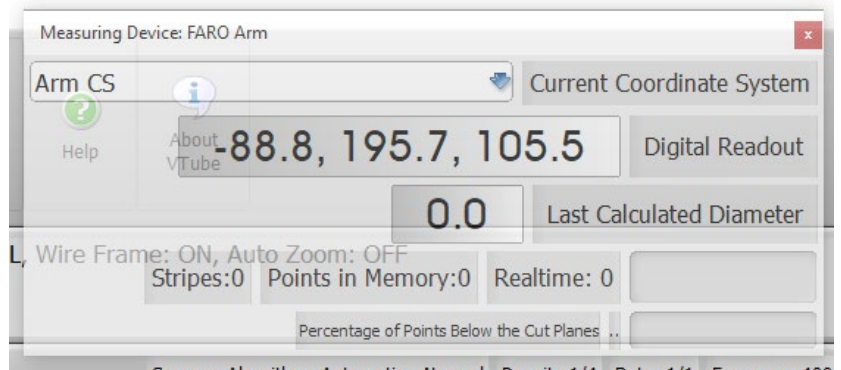
When the connection to the arm is active, the LED turns green, you will hear a connection sound, and the transparent DRO (Digital Readout) window will appear.



6. Pull the arm away from its resting position and watch the values in the DRO (Digital Readout) move.

This is the **DRO (Digital Readout)**:

If the laser scanner is on, then point the scanner about 6 to 8 inches from any object, and you will see XYZ data change in the DRO.

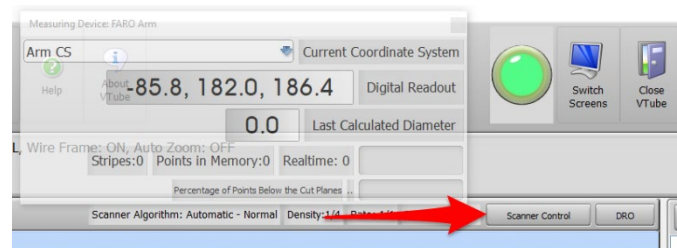


Even if the laser is not on, then should see the XYZ data changing whenever you move the arm. In this mode, the data will represent the **center of the ball probe**.

If the DRO values do not move, this indicates that VTube-LASER is not properly connected to the arm. This occasionally occurs at the first attempted connection. This connection issue can be resolved by clicking on the green LED to toggle it to off, then click on it again to reconnect.

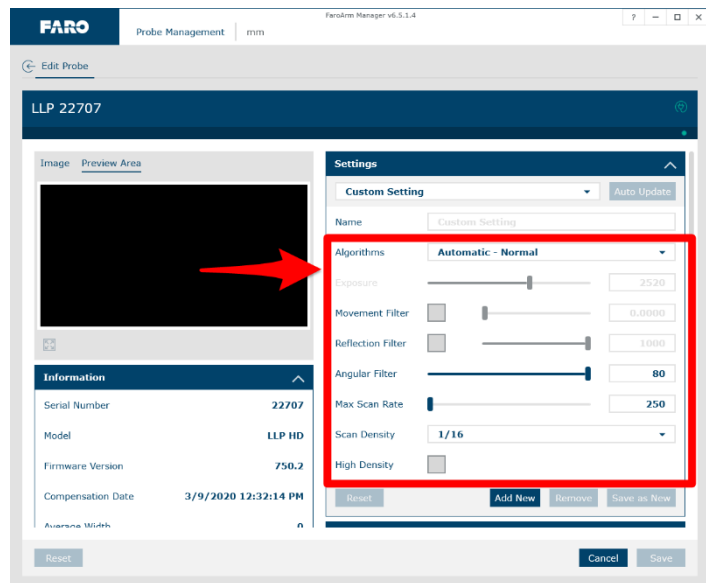
7. If you are using a scanner (rather than the ball probe), then click on the FARO

Scanner Control button. The FARO Laser Line Probe Control window will load.



8. We recommend that you set this scanner to these values:
 - a. Algorithm: Normal
 - b. Movement Filter: Disable
 - c. Reflection Filter: Disable
 - d. Angular Filter: Keep it high
 - e. Max Scan Rate: Low
 - f. Scan Density: 1/6 for tubes > 1" OD. Use 1/8 or 1/4 for smaller tubes
 - g. High Density: Disable

The most important setting is to disable the Reflection Filter. It stops data from coming into VTube-LASER when moving the scanner along the tube straights.



9. If you are scanning a highly reflective part in a very bright environment (like bright halogen lights), then you might also try the HDR (High Dynamic Range) algorithm.
10. Save the changes (see arrow 4 in the image above) and then press the close button in the upper right corner or press the "Edit Probe" text on the upper left to close the menu.

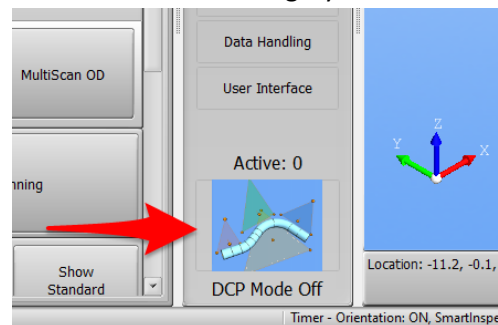
11. VTube-LASER can measure a part on a flat surface using the Cut Plane feature. Cut Planes will remove any laser points beyond the measured plane. However, please be careful about what kind of surface you use for Cut Planes. For example, shiny or glass Cut Planes will not work well.

The issue with Cut Planes is not lack of flatness, but that surfaces can create phantom flyer points even with the “FAROBlu” laser. Care must be taken to mitigate this problem for demos by paying attention to the type of Cut Plane surface. If the Cut Plane surface is at all reflective or has chamfered holes, then it will probably cause issues. If this is the case, then be prepared to mount the tube in a part holder to bring it off the table for measuring.

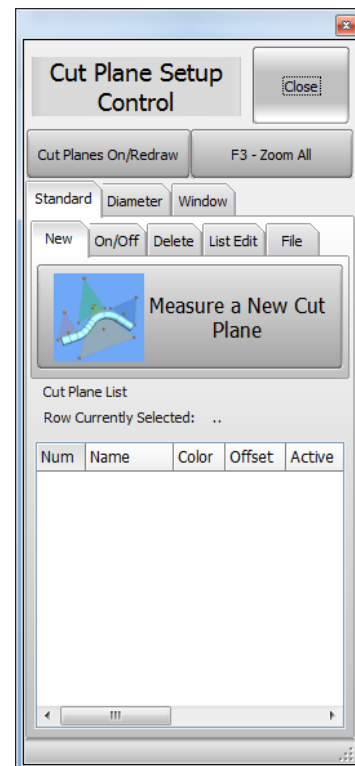
Flat-colored darker surfaces are excellent. We prefer to use black rubber mat for our Cut Plane surface. Concrete floors are an excellent surface. Dark grey granite surfaces are good. Avoid scanning over embedded threaded holes on the granite tables.

If you choose to use a Cut Plane, then follow these steps:

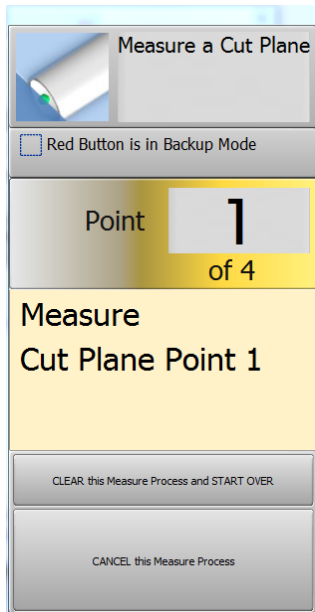
Click on the **Cut Plane icon** at the bottom of the navigate pane.



12. Press the **Measure a New Cut Plane** button in the NEW tab.



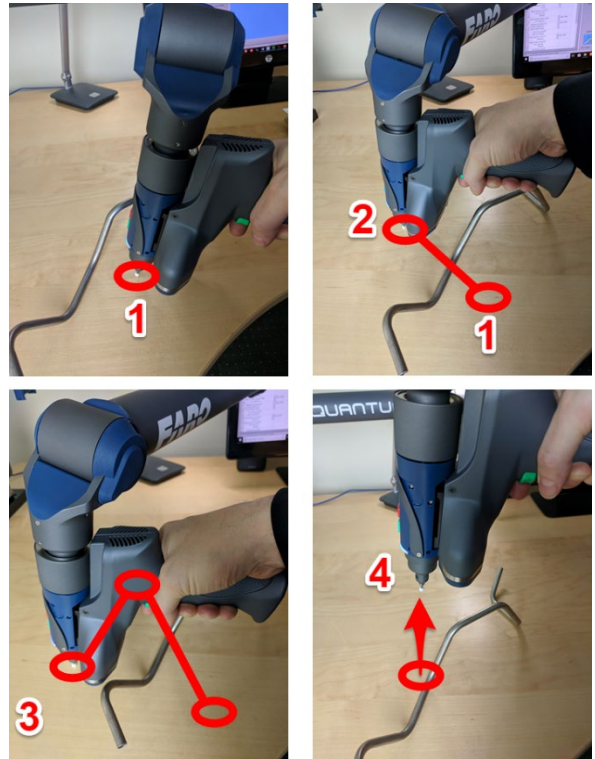
13. Press the GREEN button for all four points.



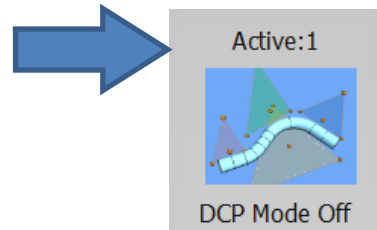
Take the first three points on the plane of the table surface using the GREEN button.

Take the last point more than 1 millimeter above the table also with the GREEN button.

Again , do NOT push the red button for the fourth point. Press the green button for all four points.



14. The **Active** label in the Cut Planes icon will now show "1".

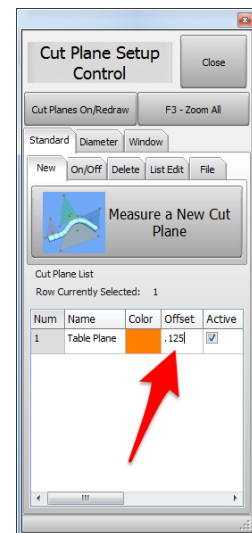


15. Enter an offset for the new cut plane of up to half of the diameter of the tube.

An offset is important, or the scanner may pickup surface outliers. The greater the offset, the less chance of outliers.

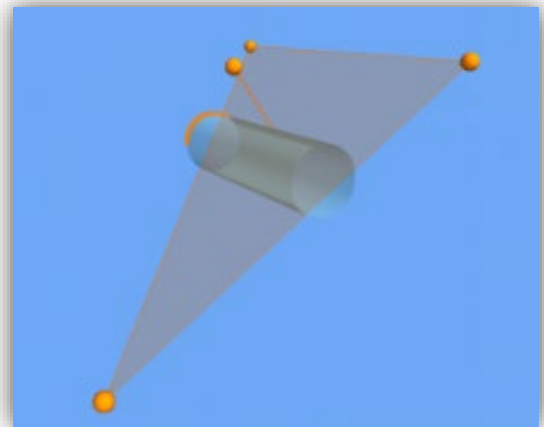
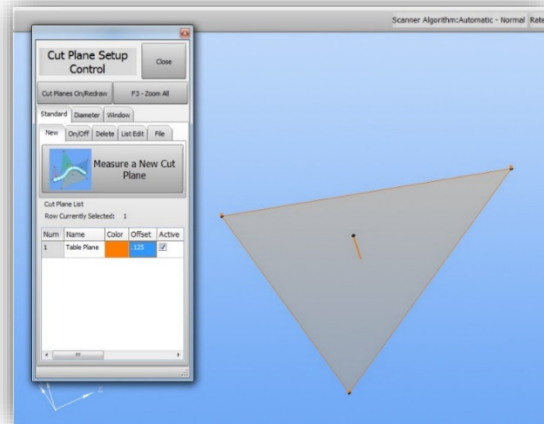
For most tables, we recommend 0.125" or 3 mm as a starting offset value. Some surfaces may require a larger value.

Enter the offset, then press the **Enter** button to allow the value to be entered into memory.



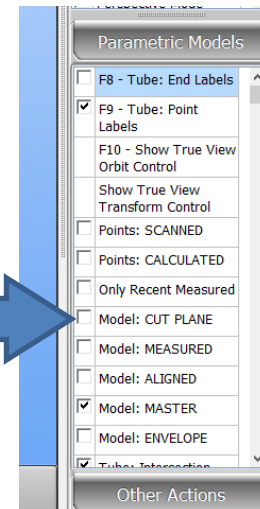
16. Things To Know About Cut Planes

- Cut Planes are always stored until you delete or change them – even if you shut VTube-LASER down.
- Cut Planes are only used for laser scans. They are **IGNORED when using the ball probe.**
- Make changes to the Cut Plane at any time during any other measurement.
- You can add as many cut planes as you want.
- You can activate or deactivate the cut planes any time. Each cut plane has its own active switch and offset value.
- If you move the arm relative to the table, then you will need to remeasure the cut planes – or the cut plane will be in the wrong place relative to the table.



- The Cut Plane model will display in the viewport when it is first measured. We recommend that you switch the Cut Plane model OFF in order to allow for better “Zoom All” of the tube geometry during measuring.

Turning off the model will not turn off the Cut Plane – just the model of the Cut Plane in the viewport. Uncheck the Model: CUT PLANE checkbox, then press F2 to redraw the viewport with no Cut Plane model.



18. Next, let's learn about the "DCP" (Diameter Cut Plane)

The DCP feature allows VTube-LASER to ignore the tails of the LASER that are too far from the tube that is nearest to the scanner. This removes objects behind the first tube closest to the probe. DCP can not only remove unwanted objects from the scanned data, it can also remove unwanted flyer points that enter the data.

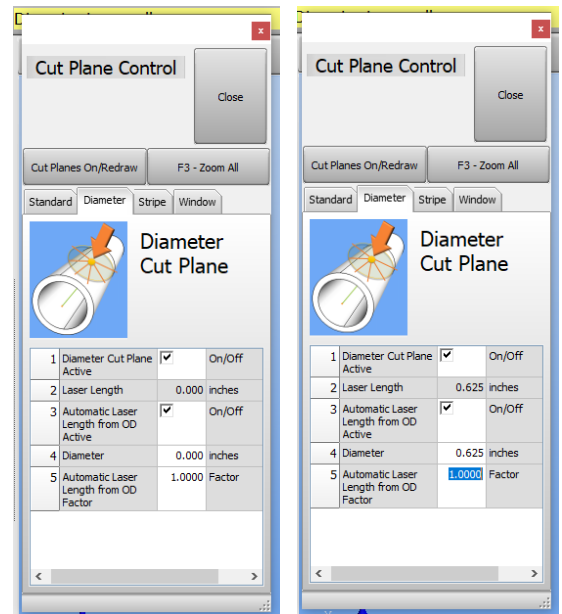
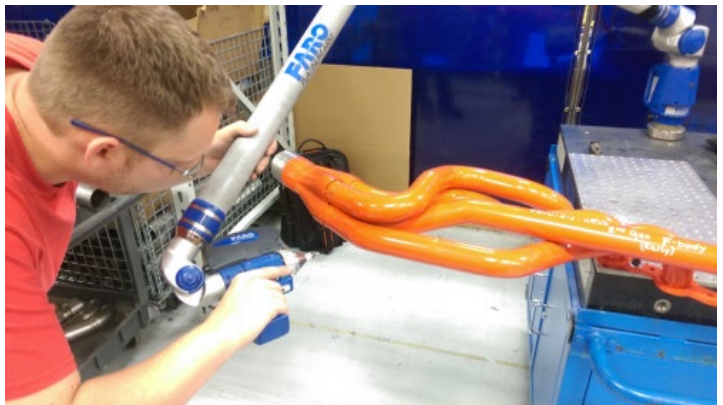
When in DCP AUTO MODE, DCP relies on the diameter value to know how much LASER LENGTH should be used – so it is important to have the diameter set to the actual value before you measure using the DCP command.

If you turn DCP on, and also enable the **Automatic Laser Length from OD** feature, then AUTO mode will be active. In that case, be careful to enter the actual nominal DIAMETER, and the Length FACTOR in row 5 should be normally 1.0 to 2.0.

If the LASER LENGTH is ever ZERO, then no scan data will be allowed into VTube-LASER. **Also, if the LASER LENGTH values are too short, then the cylinder calculations will fail. Be sure that the laser length is at least 0.75 of the current tube diameter.**

This image from Holley Performance is a sample of how the DCP feature can help measure parts that are close to each other.

This operator is using the VTube-LASER DCP feature to measure only one straight at a time – even though the laser is crossing multiple tubes.



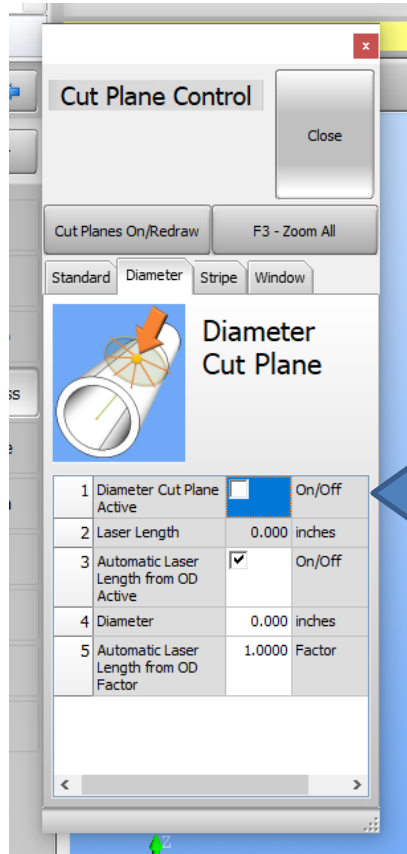
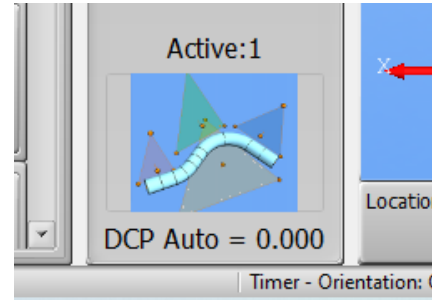
19. Here are important notes about DCP.

- a. DCP only works when the scanner is active - **not the ball probe**
- because it requires multiple points per scanned line to work.
- b. DCP only applies to **cylinder scans** and **bend profile scans**. **It does not have any effect on END scans.**

20. If the DCP is on, then turn it OFF.

Click on the blue tube on the bottom of the navigation pane.

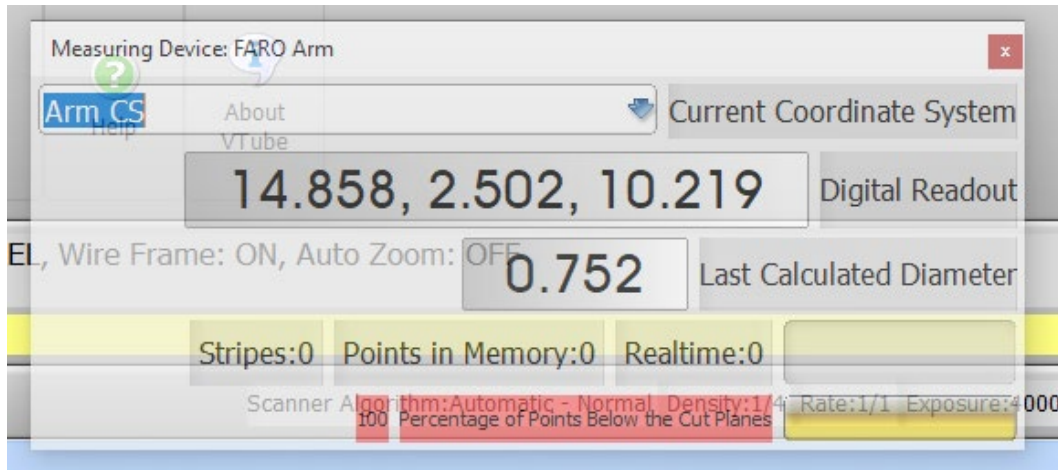
Click on the Diameter tab.
Switch the Diameter Cut Plane off.



Close this window. The DCP Mode will say "DCP Mode Off" at the bottom of the navigation pane.



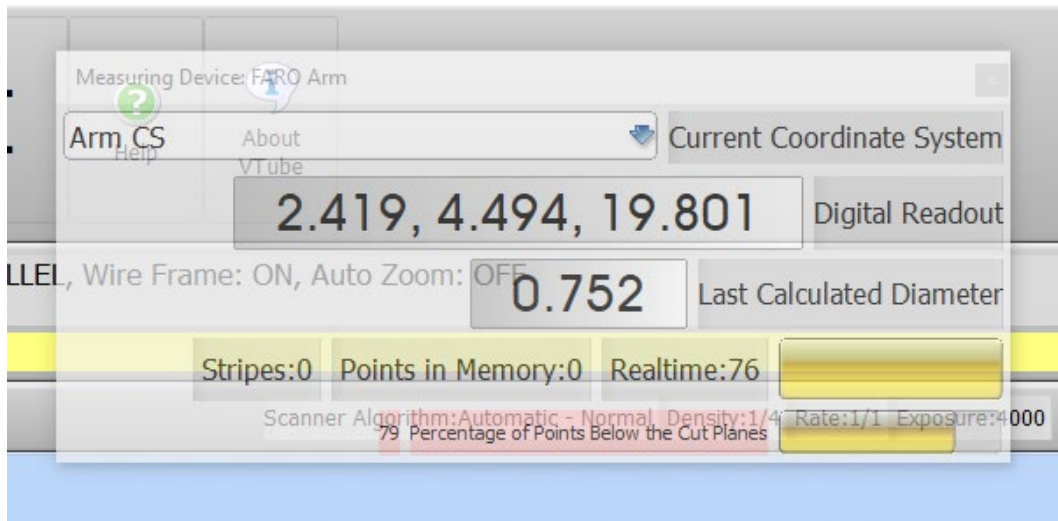
- 21. Test for a good CUT PLANE setup by aiming the laser at the table and watching the bottom part of the DRO. It should show “100 Percentage Points Below the Cut Plane” everywhere you point the laser at the cut plane like this:



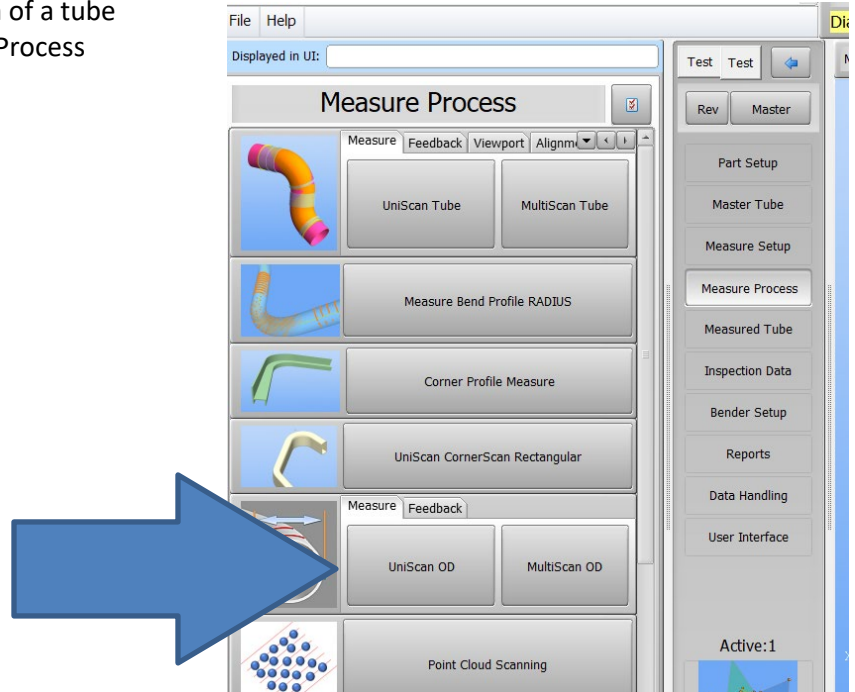
You can also look for the solid RED to know that the Cut Plane is setup properly.

Be sure that no part of the table allows for the Realtime point value to go above zero. If it does, then it is important to either remeasure the Cut Plane or increase the Cut Plane offset until VTube-LASER no longer shows Realtime data when scanning the Cut Plane surface.

- 22. Place a tube on the Cut Plane. Aim the laser at any part of the tube. When in range, you will see that some points are now allowed into VTube-LASER. See the Realtime point count in the DRO:

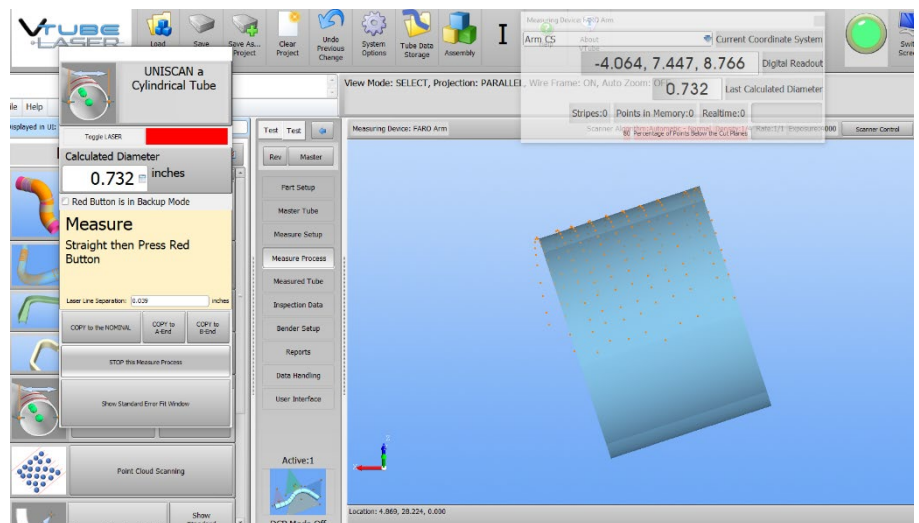


23. Next, perform a simple scan of a tube straight using the Measure Process **UniScan OD** button.



24. Scan a straight, then let VTube-LASER calculate the cylinder. When you scan, you must hold the green button down.

This does NOT operate like programs like PolyWorks where you press and release to start the scanning, then press and release to stop the scanning. You must keep the green button pressed while scanning. The moment you let go of the green button, VTube-LASER will understand that you are finished with the straight and will attempt to calculate the cylinder centerline.



(This automatic calculation when you let go of the button is how the standard setup acts. You can also setup VTube-LASER to require the red-button press when you are finished with a cylinder scan.)

25. When you've completed this setup, then follow the steps in the next document "**20200327_VTube-LASER_How_To_Measure_With_FARO_Training**" to learn how to perform the demonstration. The document and a parallel video can be found here:

<https://www.advancedtubularsupport.com/vtube-laser-faro-docs.html>

This is the end of the training setup.