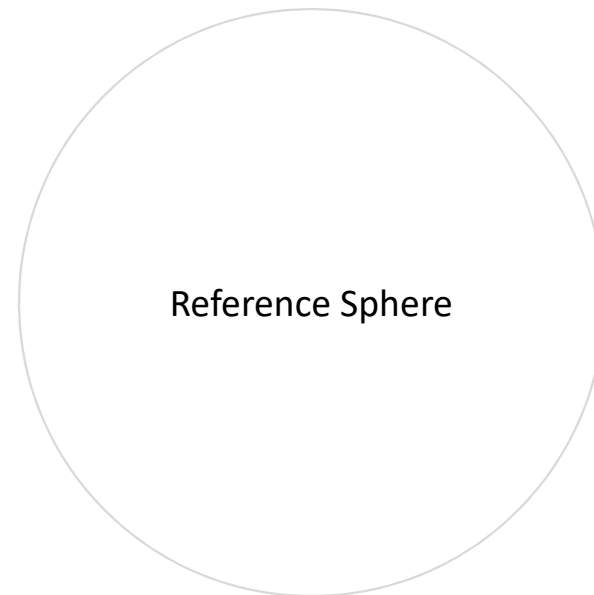
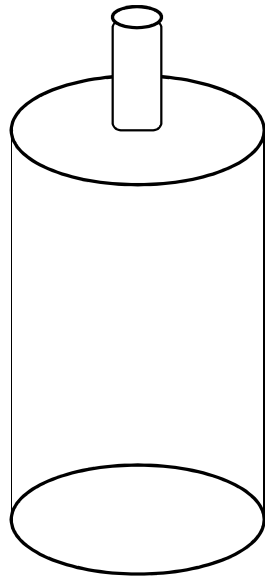


# Cylindrical Stylus

How to calibrate in CALYPSO



- In CALYPSO there is an instruction that defines the following for qualifying a cylinder probe in **Manual** mode:
  - *Note: When qualifying a cylindrical stylus, the first point must be probed in the shaft direction. This point serves only to determine the shaft direction and therefore will not be probed again during the CNC qualification. Then you must probe three points on the cylindrical stylus in a circle and the next three points in a circle that is offset with respect to the first circle. After that, you can make any further probings as you wish.*
  - *The number of probing and support points is displayed in the Qualify Stylus window. With **Delete**, you can remove the points “backwards” one after the other.*
  - *If you do not set a support point after the last probing point, a retraction will be set automatically during the CNC run later.*
  - *If the sum of projection angles is greater than 15 degrees, window automatically appears during the run. You can change the angles and confirm the changes with **OK** in this window. This allows you to adjust the values so that the shaft direction of the stylus is as close to perpendicular as possible with respect to the calculated equatorial plane of the reference sphere and shaft probing is avoided.*
  - *CALYPSO qualifies the stylus according to the mode selected. The results are show in the **R, S, X, Y, and Z** fields*  
*(see → [About the results of stylus qualification](#))*

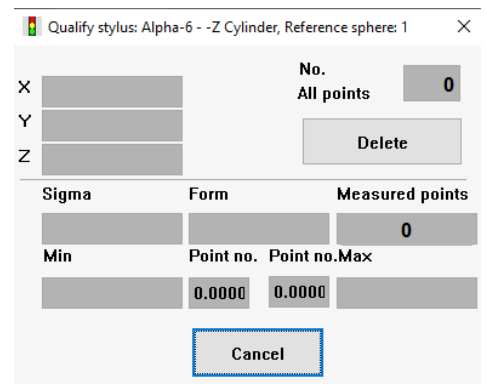
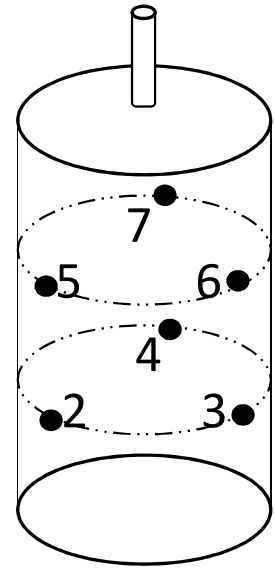
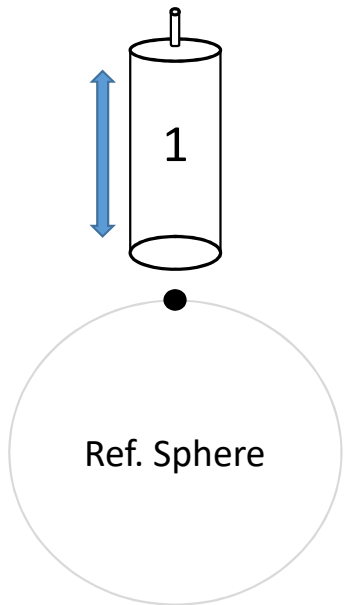
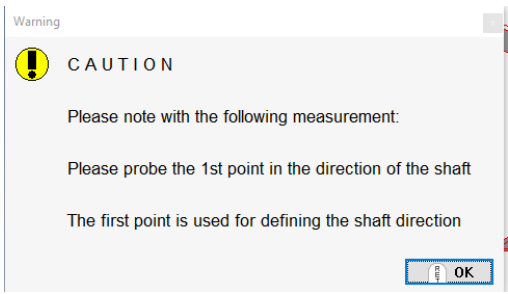
- *Note: When qualifying a cylindrical stylus, the first point must be probed in the shaft direction. This point serves only to determine the shaft direction and therefore will not be probed again during the CNC qualification. Then you must probe three points on the cylindrical stylus in a circle and the next three points in a circle that is offset with respect to the first circle. After that, you can make any further probings as you wish.*

\*Taken from Manually Qualifying Styli

So what this looks like is:

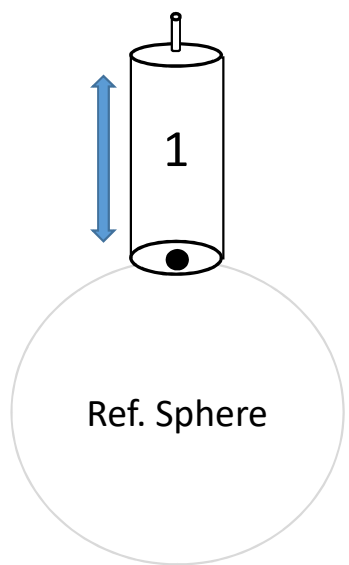
- Probe the reference sphere
  - This establishes the shaft direction

- Probe points 2, 3, & 4
  - These are for the first circle path
- Probe points 5, 6, & 7
  - These are for the secondary circle path



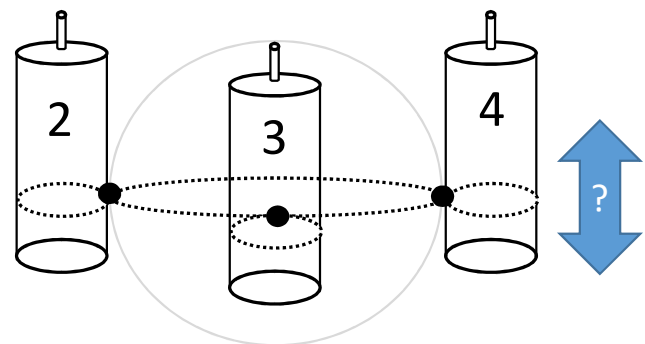
- Note: When qualifying a cylindrical stylus, the first point must be probed in the shaft direction. This point serves only to determine the shaft direction and therefore will not be probed again during the CNC qualification. Then you must probe three points on the cylindrical stylus in a circle and the next three points in a circle that is offset with respect to the first circle. After that, you can make any further probings as you wish.*

First probing point



How can I ensure that I am on center?

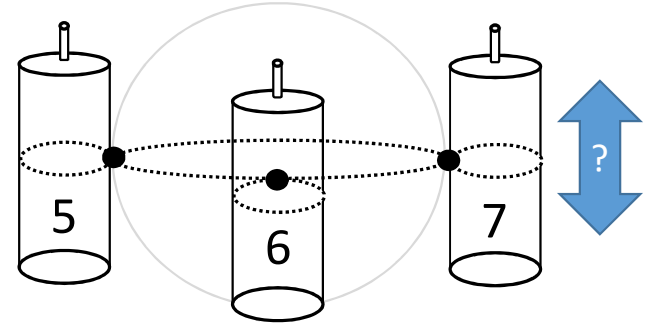
First circle path



How should I determine the depth of each circle?

Is there a way to control these depths?

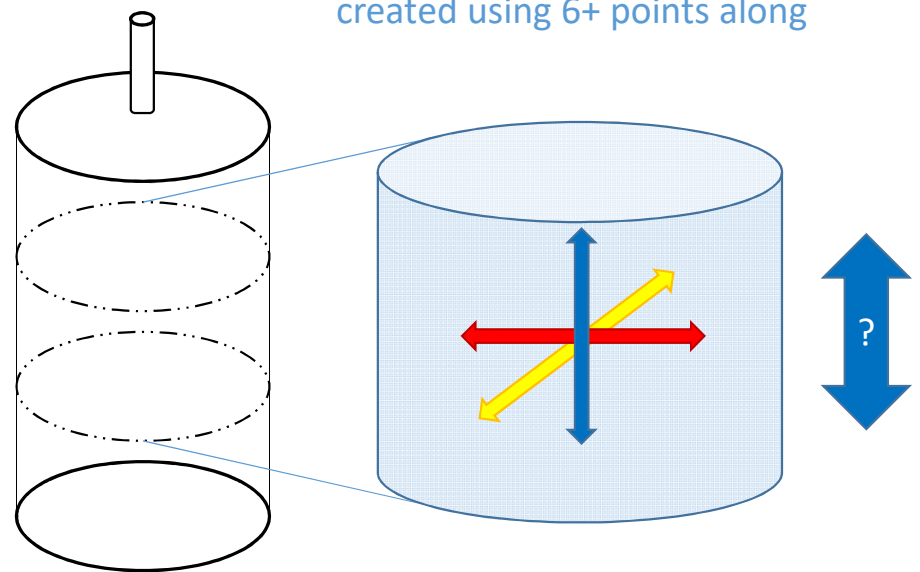
Second circle path



How do I control these depths?

- Note: When qualifying a cylindrical stylus, the first point must be probed in the shaft direction. This point serves only to determine the shaft direction and therefore will not be probed again during the CNC qualification. Then you must probe three points on the cylindrical stylus in a circle and the next three points in a circle that is offset with respect to the first circle. After that, you can make any further probings as you wish.*

A cylindrical stylus is now created using 6+ points along



The X & Y is straight forward, however how is the Z determined?

Qualify stylus: Alpha-6 - -Z Cylinder, Reference sphere: 1

X		No. All points	0
Y		Delete	
Z			
Sigma	Form	Measured points	
		0	
Min	Point no.	Point no.Max	
	0.0000	0.0000	
Cancel			

- Note: When qualifying a cylindrical stylus, the first point must be probed in the shaft direction. This point serves only to determine the shaft direction and therefore will not be probed again during the CNC qualification. Then you must probe three points on the cylindrical stylus in a circle and the next three points in a circle that is offset with respect to the first circle. After that, you can make any further probings as you wish.

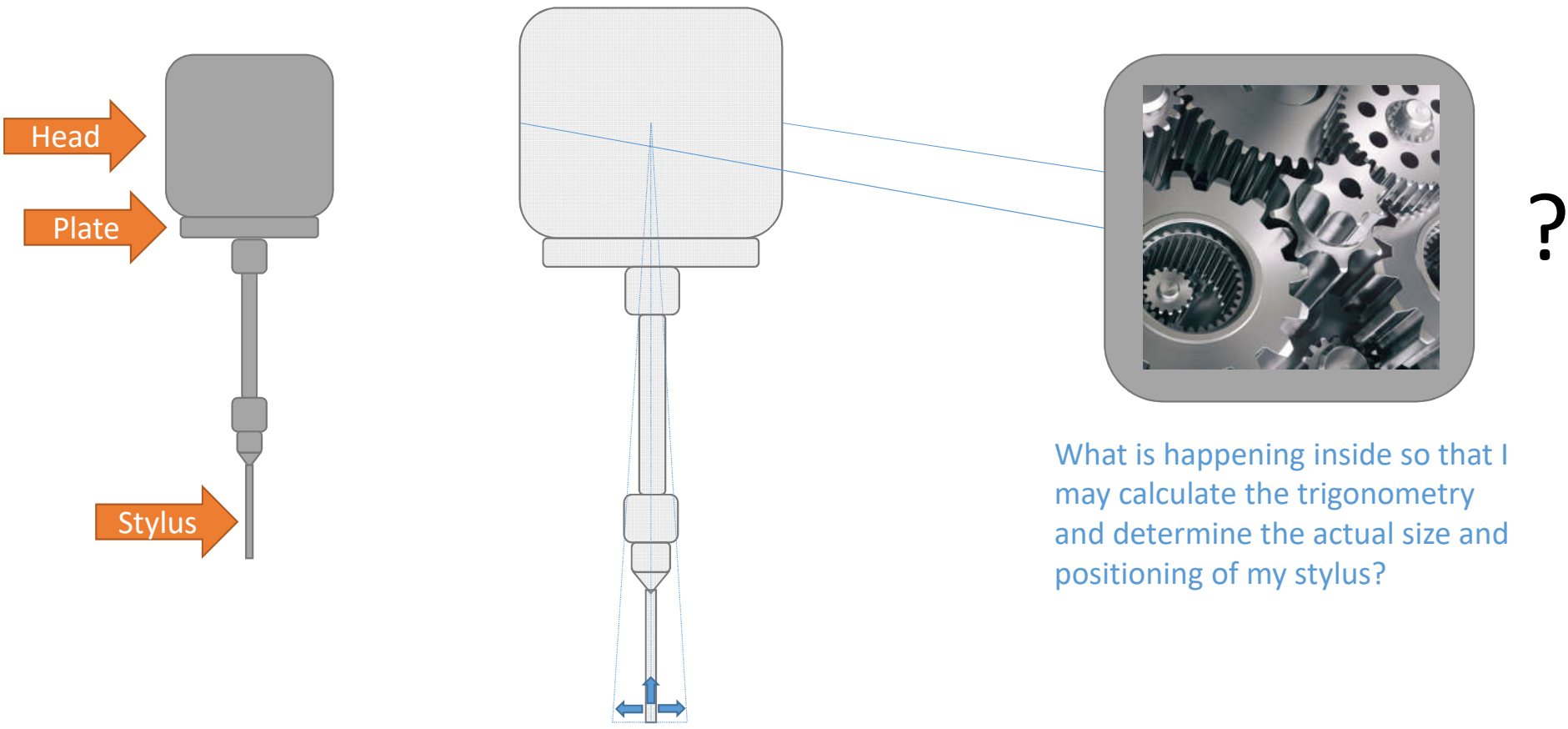
Once this is completed, often times there is a sigma error that is generated by CALYPSO. It is a single value; however, when going into the interface there are **R**, **S**, **X**, **Y**, and **Z** fields.

Geometry											
Name	No.	X	Y	Z	Radius	X Vector	Y Vector	Z Vector	Shaft rad.	Taper Ang.	
1 -Z	1	0.000004	0.000003	-37.903152	0.300000	-0.000000	0.000000	-1.000000	0.000000	180.000000	
2 +Y	2	0.000004	29.300002	-8.603149	0.300000	0.000000	1.000000	0.000000	0.000000	180.000000	
3 +X	3	29.300003	0.000003	-8.603149	0.300000	1.000000	-0.000000	0.000000	0.000000	180.000000	
4 -Y	4	0.000004	-29.299996	-8.603149	0.300000	-0.000000	-1.000000	-0.000000	0.000000	180.000000	
5 -X	5	-29.299995	0.000003	-8.603149	0.300000	-1.000000	-0.000000	-0.000000	0.000000	180.000000	

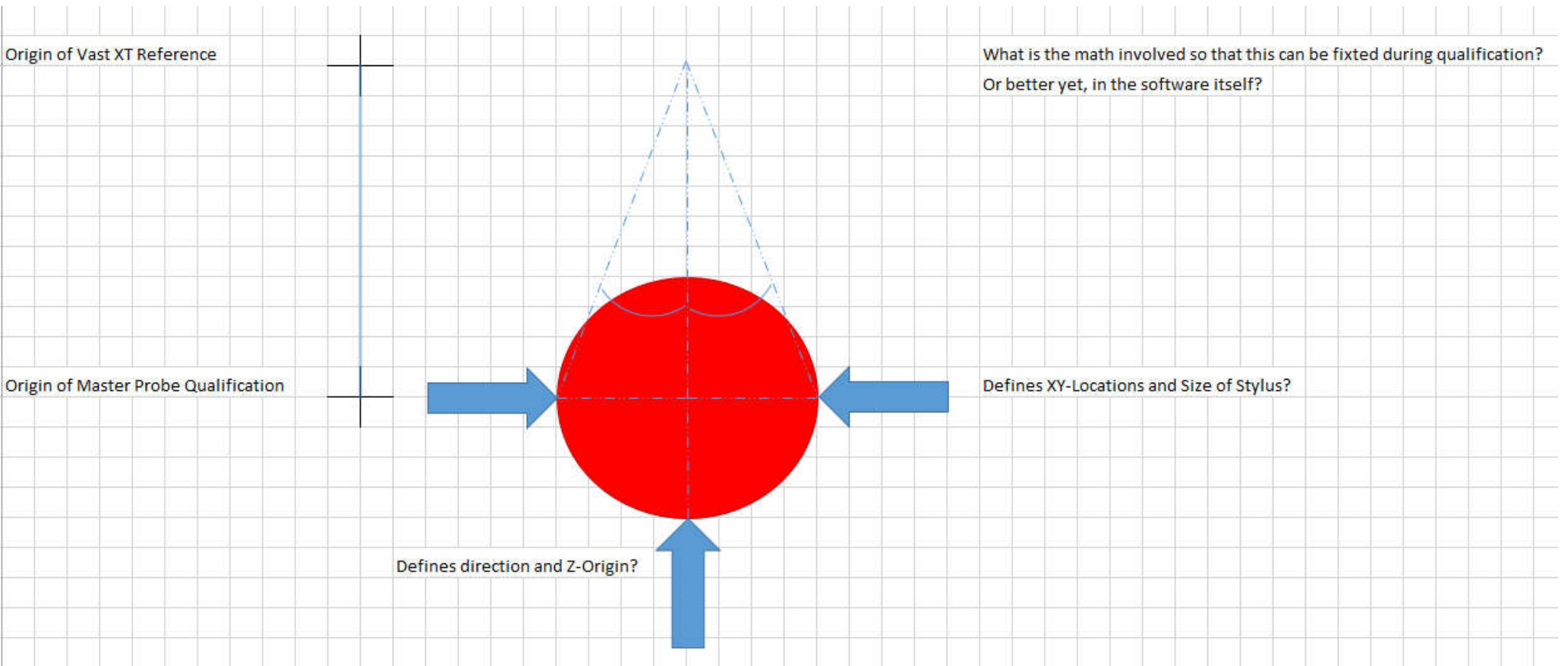


How can that sigma value be applied?

- *If the sum of projection angles is greater than 15 degrees, window automatically appears during the run. You can change the angles and confirm the changes with **OK** in this window. This allows you to adjust the values so that the shaft direction of the stylus is as close to perpendicular as possible with respect to the calculated equatorial plane of the reference sphere and shaft probing is avoided.*

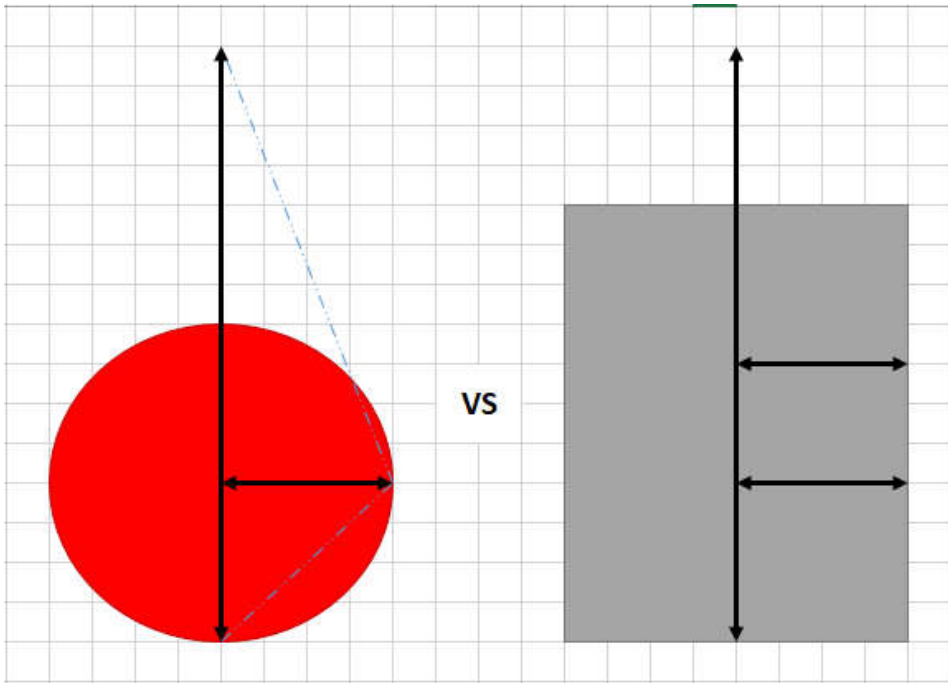


What is happening inside so that I may calculate the trigonometry and determine the actual size and positioning of my stylus?



Can someone please break down the math for me?





Can someone please break down the math for me?

If I follow the work instruction made using a program (great instruction btw "Creating Disc Probe for VAST-XXT), I can correct for the sizes and X, Y, Z, R, etc. through iterative program cycles.

But couldn't I just have the trig mapping laid out and get one value and adjust all others accordingly?

In the event of adjusting my Z so that the origin is at the tip of the flat stylus, wouldn't that cause cosign error for my size since I'd be offsetting my apex (Z-Swing Origin) of my triangle for that calculation?

It also requires me to create a duplicate configuration if I want the Z length of the cylindrical stylus to be inwards from the end for measuring using the sides of the stylus.

Can CALYPSO adjust their Disc and Cylinder qualification? If there's a drop down, there's a new set of equations calculating the location/size/etc. of the stylus.