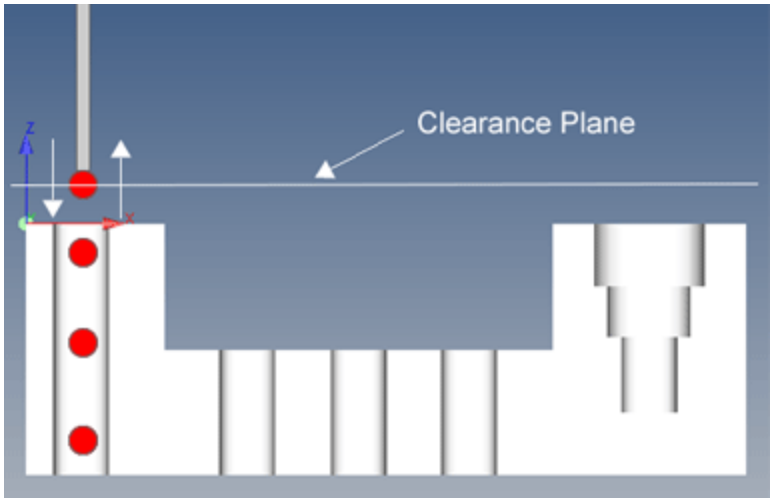
CALYPSO Tip: Using Clearance Planes

By Phil Adair, Applications Engineer

What is a Clearance Plane?

A Clearance Plane is a feature within CALYPSO that allows the stylus system to navigate around a workpiece as it moves from feature to feature. Clearance Planes are set by the programmer for a measurement plan and are managed by CALYPSO for all features in that measurement plan. Little intervention is required by the programmer to optimize the navigation with Clearance Planes, but sometimes a particular part requires some help.



Clearance Plane

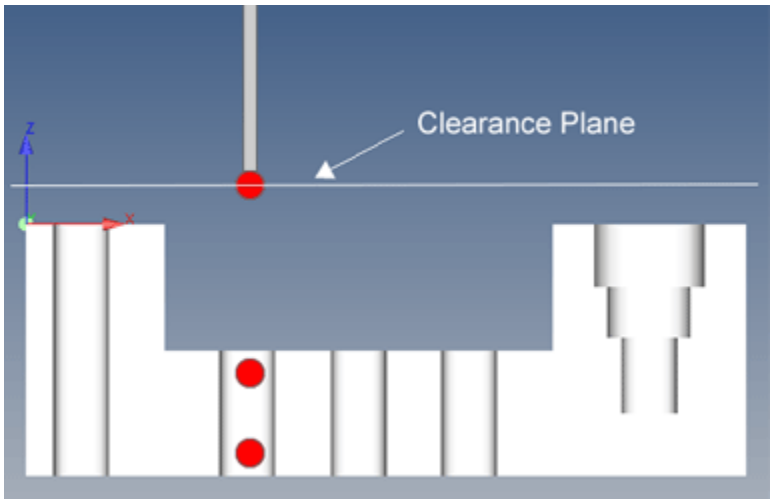
Managing Motion

If we were using the basic settings, after measuring the feature, the stylus would retract all of the way out of the feature up to the clearance plane. It would move over to the next feature, measure it, and then retract to the clearance plane. Is this the most efficient path for the stylus to travel?

Need Support?

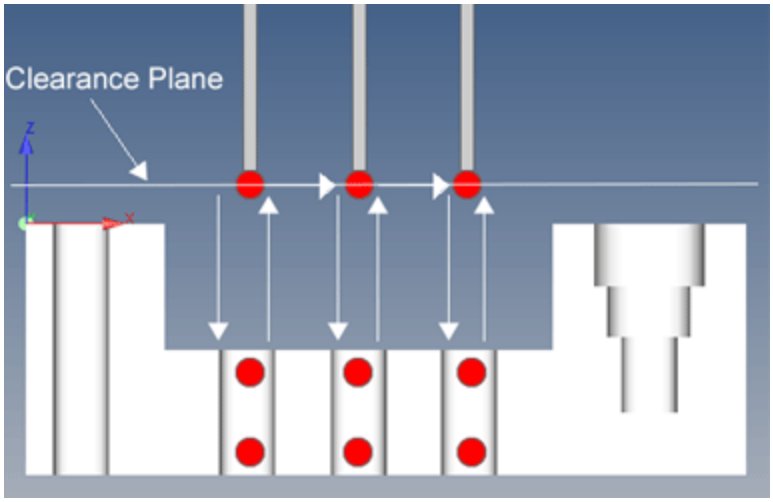
For CALYPSO Support, call our software hotline:
USA: (800) 327-9735
CA/MX: (763) 744-2600

U-SOFT: (440) 892-9277
Scanware: (607) 435-8128
Metrologic: (248) 426-9090



Managing Motion

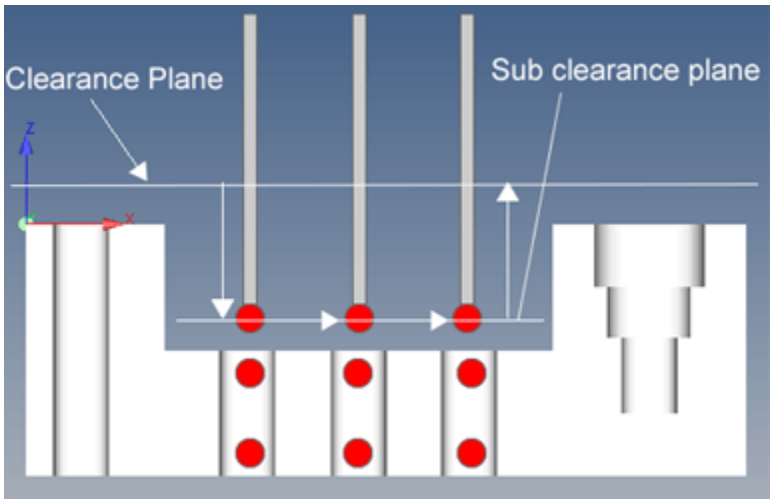
You can see from the example how much time is spent moving the probe through space. Using Sub Clearance Planes, there is an opportunity to reduce this motion, and the cycle time of measurement.



Managing Motion

What is a Sub Clearance Plane?

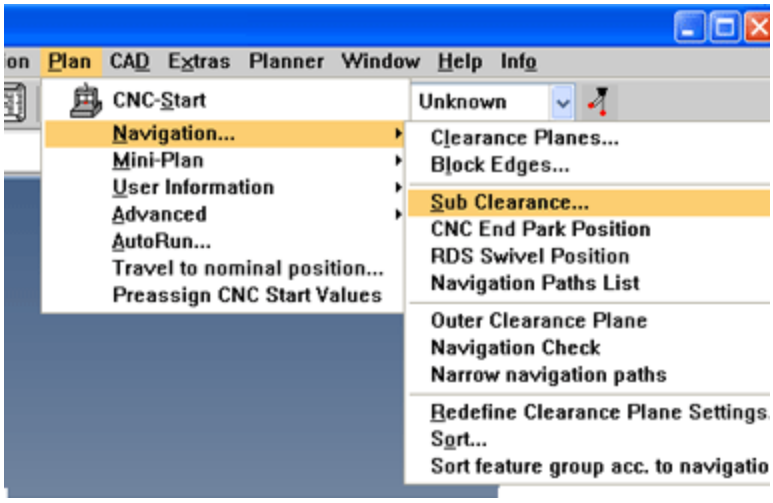
A Sub Clearance Plane (SCP) is a secondary Clearance Plane that can be nested within the parent Clearance Plane. The SCP can be selected for a group of features that share a common Clearance Plane, offering an intermediate level of navigation which reduces motion between features.



Sub Clearance Plane

How do I set a Sub Clearance Plane?

Go to the Plan menu option, select Navigation and then select Sub Clearance from the drop down menu.



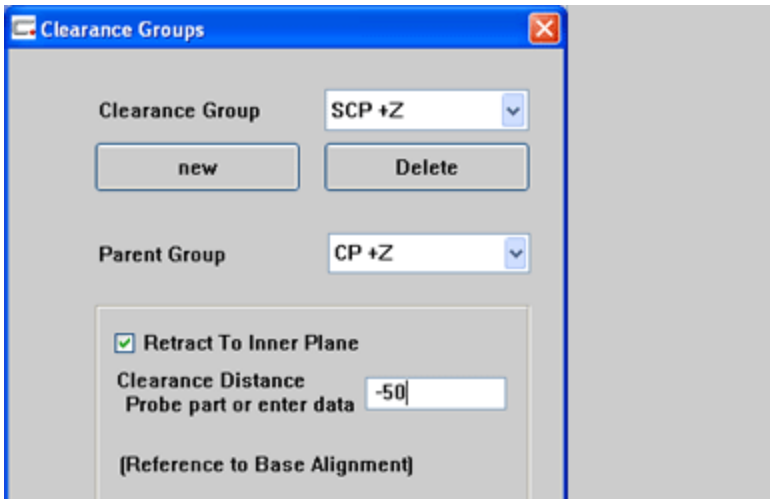
Setting a Sub Clearance Plane

How do I define the Sub Clearance Plane?

Select SCP +Z as the name of an available sub clearance element. Select the clearance plane that will become its parent. Make sure that the “retract to inner plane” is checked. Enter a value, relative to the base alignment, that you wish to be associated with the sub clearance plane. In other words, how far away from the part should the probe retract? To review these settings, we are telling Calypso that a Sub clearance value has

been assigned to SCP +Z and that its location is 50mm below 0 in Z. What did we accomplish?

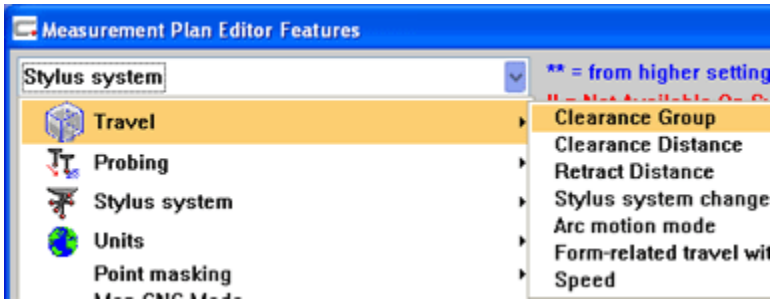
- A Sub Clearance Plane called SCP +Z was created.
- SCP +Z is offset from the Z origin, -50mm.
- We want the active stylus to retract to this SCP for a defined feature.



Defining a Sub Clearance Plane

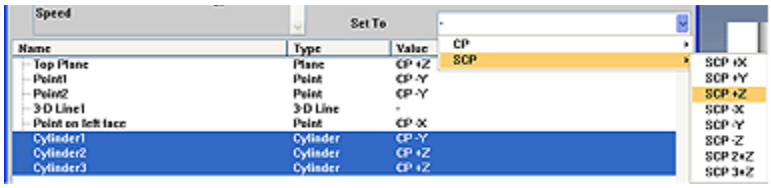
How do I use an SCP in a feature?

After creating the SCP, from within the Feature Settings editor select Travel, then Clearance Group.



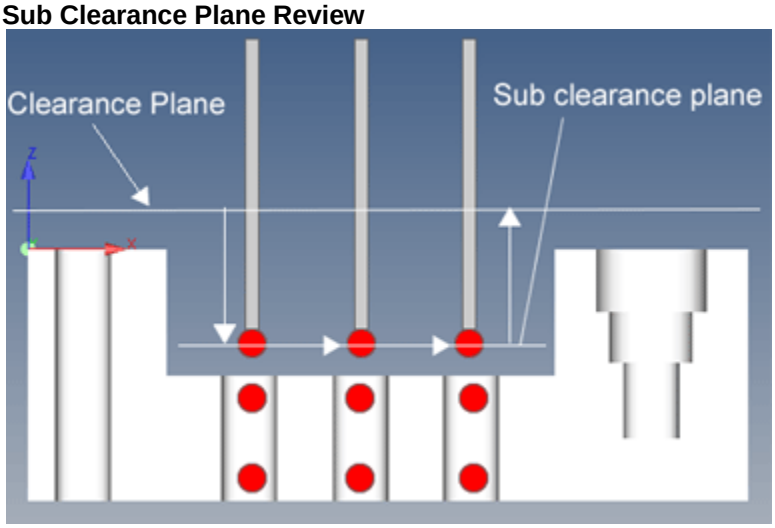
Travel, Clearance Group

Highlight the three cylinders and from the Set To drop down select the Sub Clearance Plane to be assigned to the features. The next time that the program is run SCP +Z will be used to move the stylus from one feature to the next.



Three Cylinder Selection

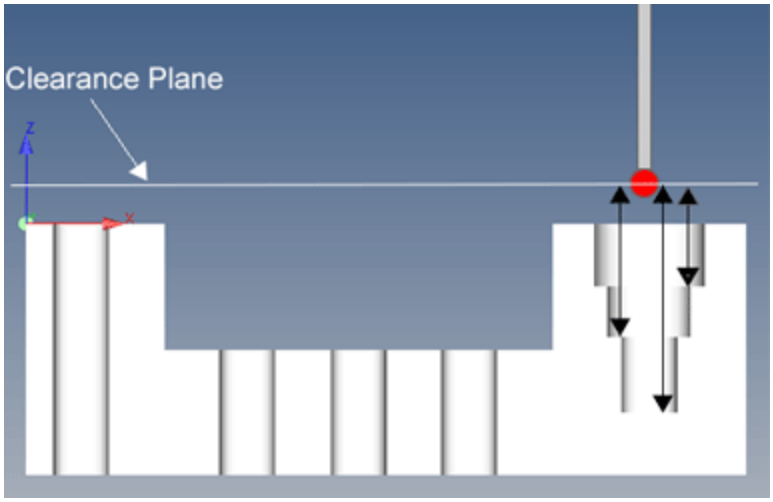
Sub Clearance Plane Review



Sub Clearance Plane Review

How else can we use Sub Clearance Planes?

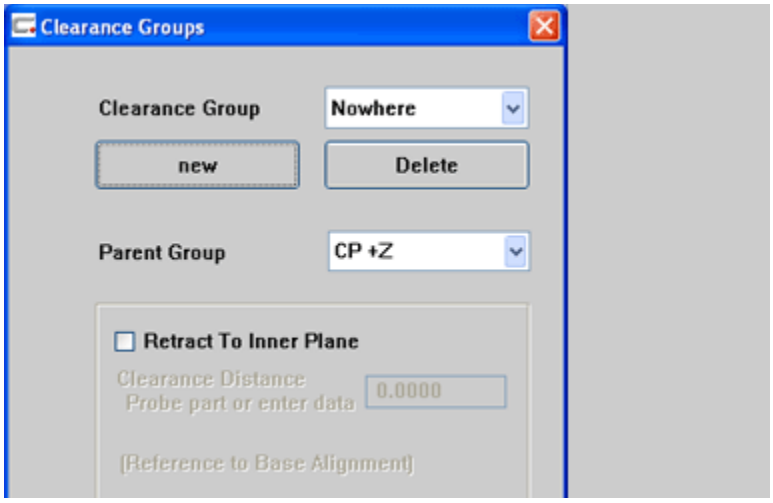
This same technique can be used for a group of cylinders that are coaxial. By using SCP to navigate between the features in the example, all 3 cylinders can be measured without removing the stylus from the bore.



Other ways of using Sub Clearance Planes

Inside Cylinders

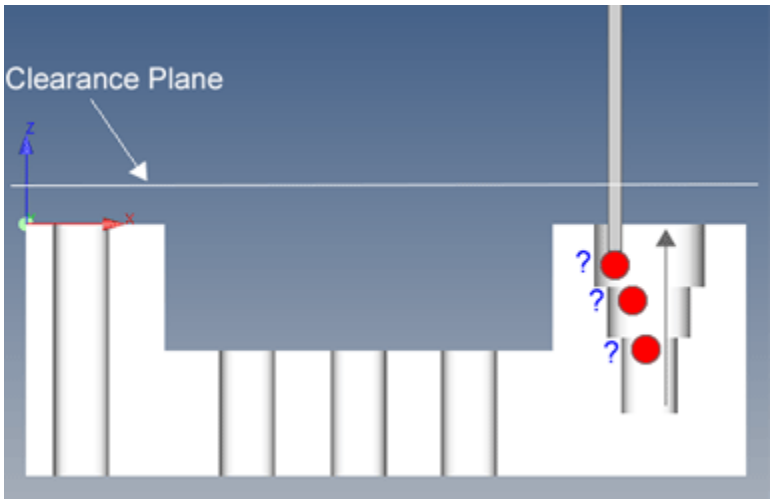
Select New inside the SCP dialog and name the SCP. For Example, Nowhere. In this case, we will not select Retract to Inner Plane, or set a retract value. This creates what is called a Null Clearance Plane. A clearance plane with no offset. As we did previously, go into the Feature settings editor and assign the new Sub Clearance Plane. You will notice that the name that we assigned to the Sub Clearance Plane has been added to the list.



Inside Cylinders

How does it work?

At the end of each cylinder, CALYPSO reviews the navigation settings we have defined. Since we have selected the SCP Nowhere, the stylus system seamlessly moves from feature to feature based on our settings. Upon completing the final measurement, the stylus system will exit the bore and return to the parent Clearance Plane of +Z.


Clearance Plane
Z
X
?
?
?