Mitutoyo

mcosmos

MCOSMOS C2
CMM Software Tutorial

MiCAT

Mitutoyo Intelligent Computer Aided Technology

the standard in world
metrology software

cmm

MCOSMOS Overview

- MCOSMOS:
  - "Mitutoyo Controlled Open System for Modular Operation Support"
- Modular CMM software system
  - For Both CNC and Manual CMMs
  - Three Levels: 1,2,3
  - Optional Modules Available
- Provides CMM control, measurement and evaluation
- Runs on Microsoft® Windows® XP Pro or Windows® 7

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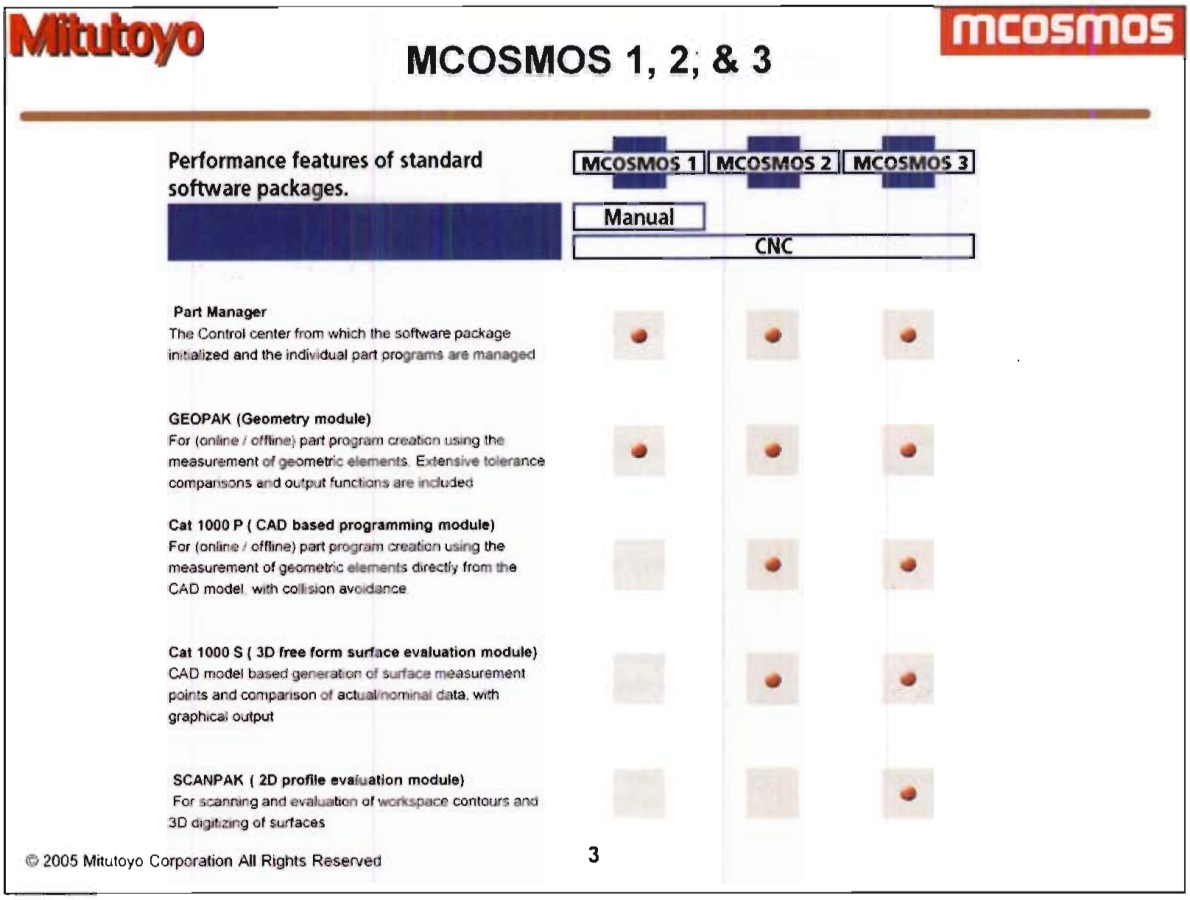

- Level 1 Manual Day 1, and 2
- Level 1 CNC Day 3, and 4
- Level 2 Day 5
- Level 3 1 Day at a later time for Manual
  2 Days at a later time for CNC
- Note: level 3 training to take place once lower levels are used, and understood.
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Content : C2 CAT1000P/S

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Startup (Part Manager)
- Single import of CAD model
  - CAD file types
  - Import settings
  - Feature file
  - Model settings
  - Mirror plane
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  - Update/ Remove
  - CAD model View
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  - Cylinder
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  - Creating coordinate systems
  - Clearance height
  - Creating alignments
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  - Collecting part data
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Surface analysis
- Points on a surface
- Multiple surfaces
- Graphic reports point/ surface data

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Cat 1000 P/S: Overview

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- Mitutoyo's Cad Model based online / offline part programming package
- Allows easy manipulation of the CAD Model for creating local coordinate systems
- Allows an easy development of CMM probing path for Planes, Cylinders, Cones, Spheres, Circles, Lines, Points and compound or simple curved surfaces from your Cad Models
- Includes Collision avoidance, and Automatic Probe selection
- Provides transfer of nominal, and tolerance values from your CAD Model to Geo Pak for evaluating, and reporting
- Runs on Microsoft® Windows® XP Pro or Windows® 7

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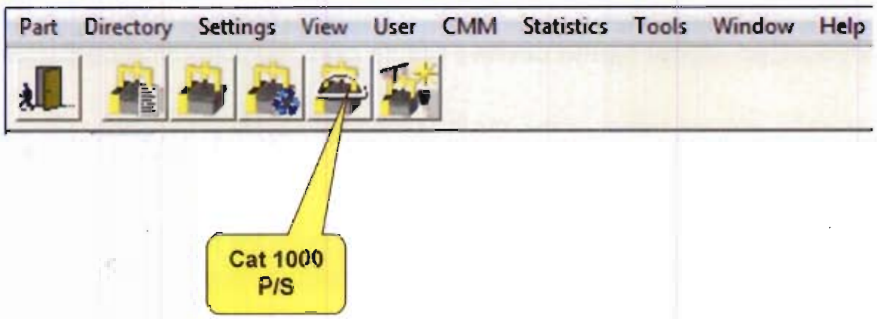
Cat 1000 P/S Tools



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- To enter into Cat 1000P/S select the Cat 1000 P/S Icon.
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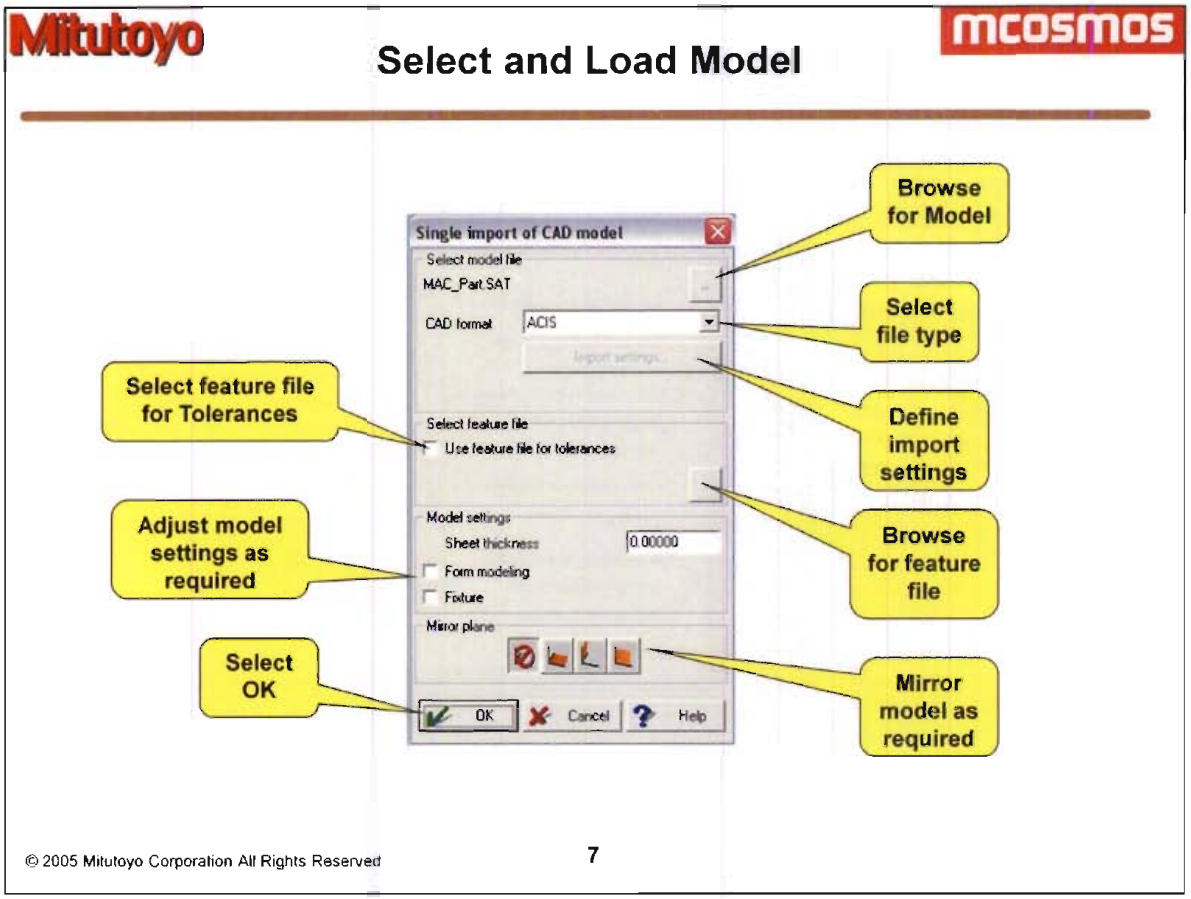

- Enter into Cat 1000 P/S Cad will open with the Single Import dialog.
- Click on the browser to browse for the desired model
- Select the model format, ACIS is preferred. File type may also be selected in the browser.
- Define the import settings for your model format note: ACIS has no settings to adjust.
- Select feature file for Tolerances.
- Adjust Model settings as required.
  - Sheet thickness will subtract skin thickness from model.
  - Form modeling will add skin thickness.
  - Select fixture if you have a model of the fixture in use.
- Mirror your model as required.
- Once complete, select OK to import the requested model.
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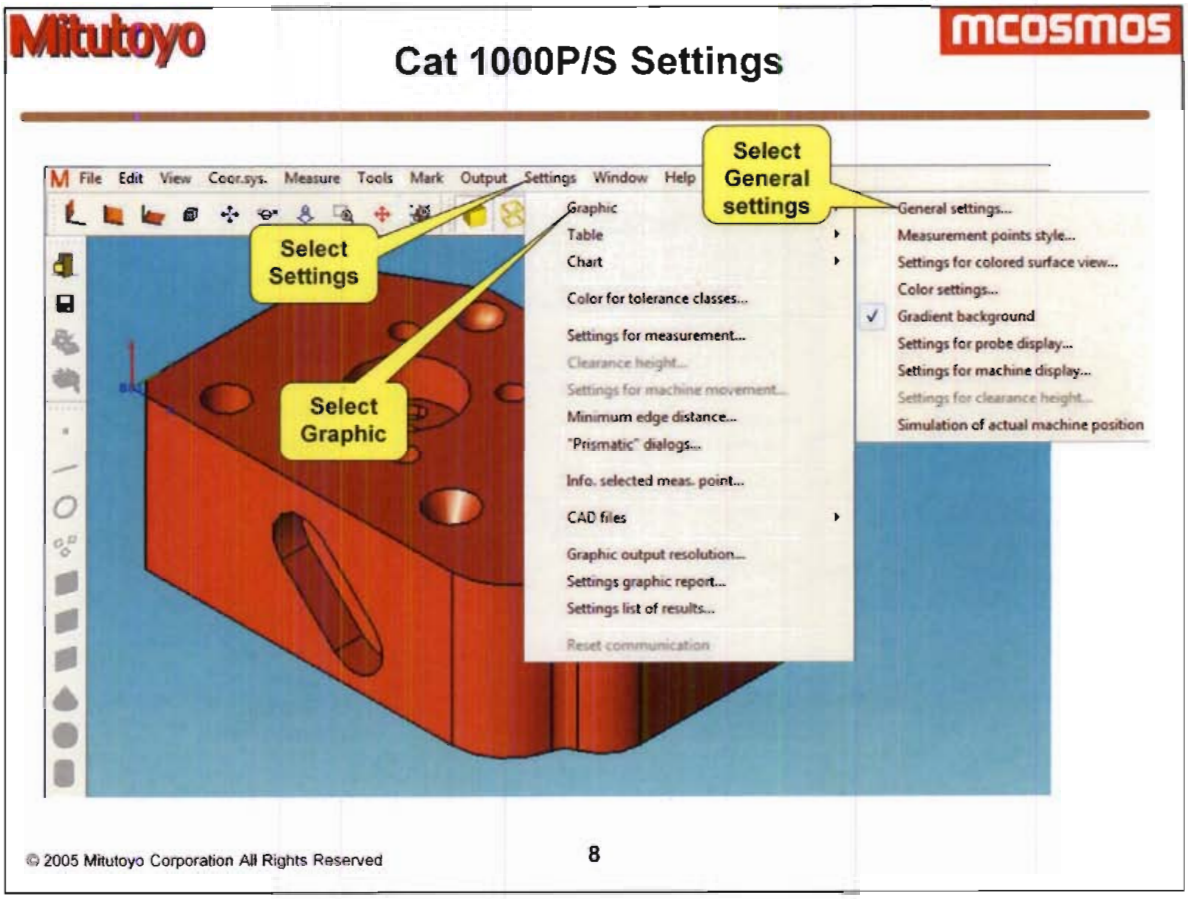

- Select Settings.
- Select Graphic.
- Select General settings.
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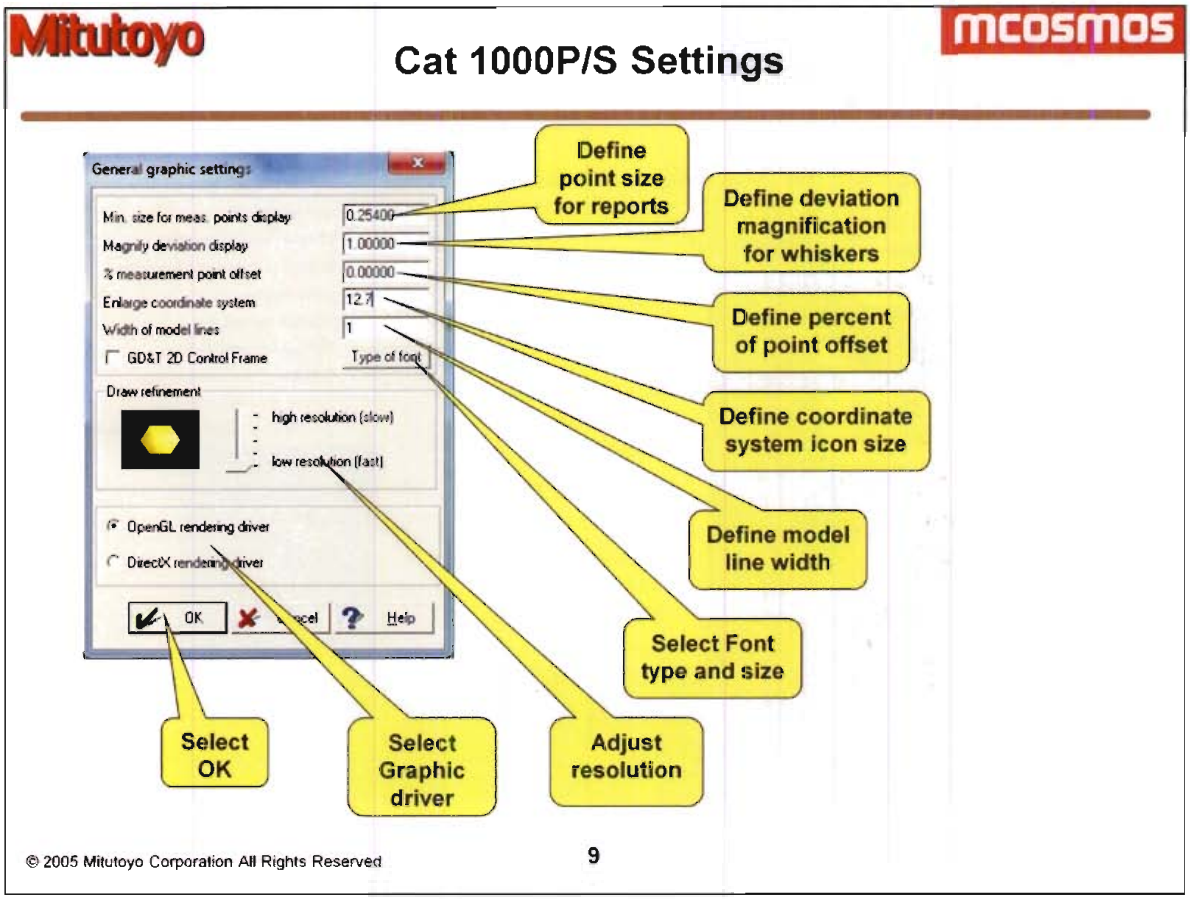

- Minimum size for measured point display defines the size of measured points for Graphic reporting.
- Magnification deviation display will magnify deviation lines (Whiskers).
- % measurement point offset will move the center of point representation closer or further from the part.
- Enlargement of Coordinate system defines the size of the coordinate system icon in the current units.
- Width of model lines defines the width of lines for the wire frame and path.
- Font type defines the font type and size for some Graphic reporting.
- Draw refinement will adjust the resolution not recommended.
- Open GL driver is provided Direct X rendering driver must be loaded
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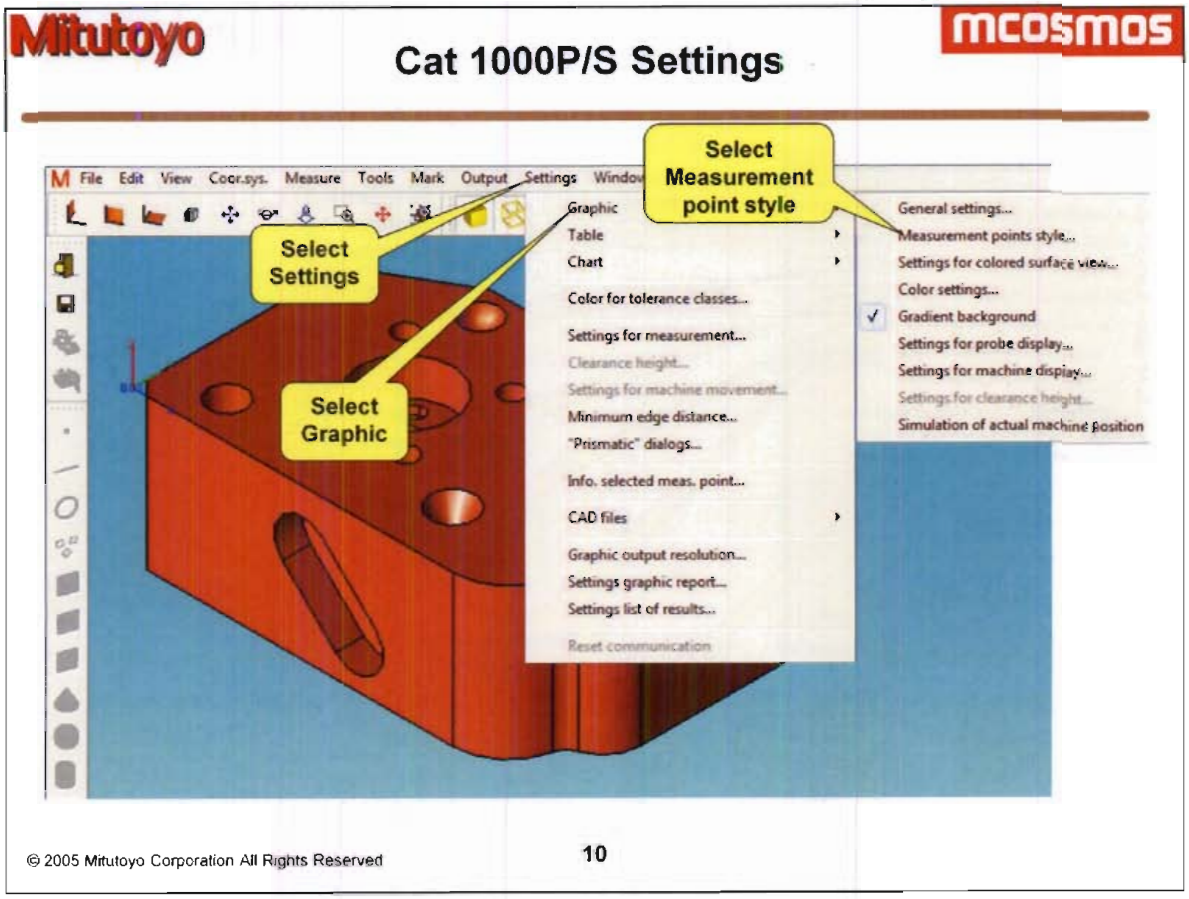

- Select Settings.
- Select Graphic.
- Measurement point style.
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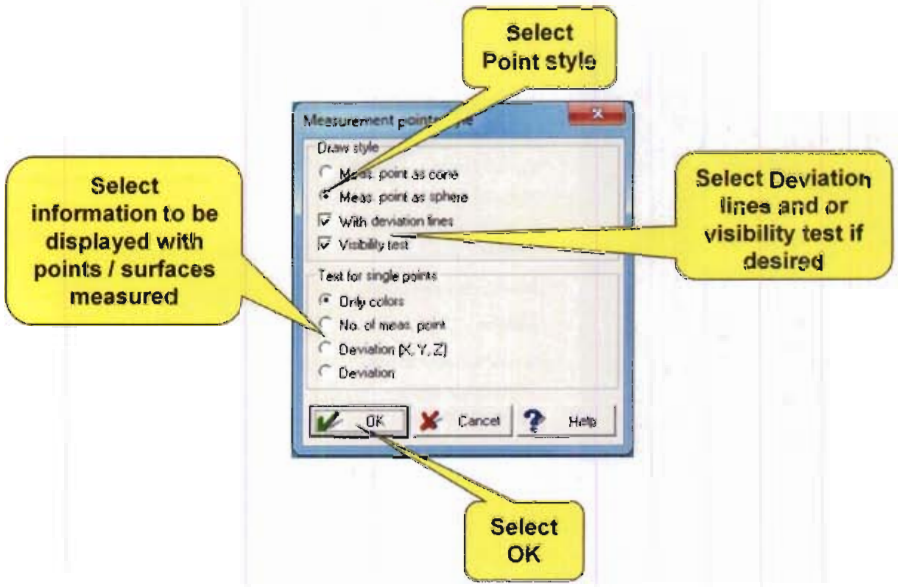
Cat 1000P/S Settings



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- Select style of points Cones or spheres.
- Select with or without Deviation lines (Whiskers).
- Select the text to be added to measurement points / surface points.
  - Only colors
  - No. of point in collection sequence
  - Deviation (X, Y, Z) provides deviations from Model nominal
  - Deviation provides surface normal deviation form Model nominal
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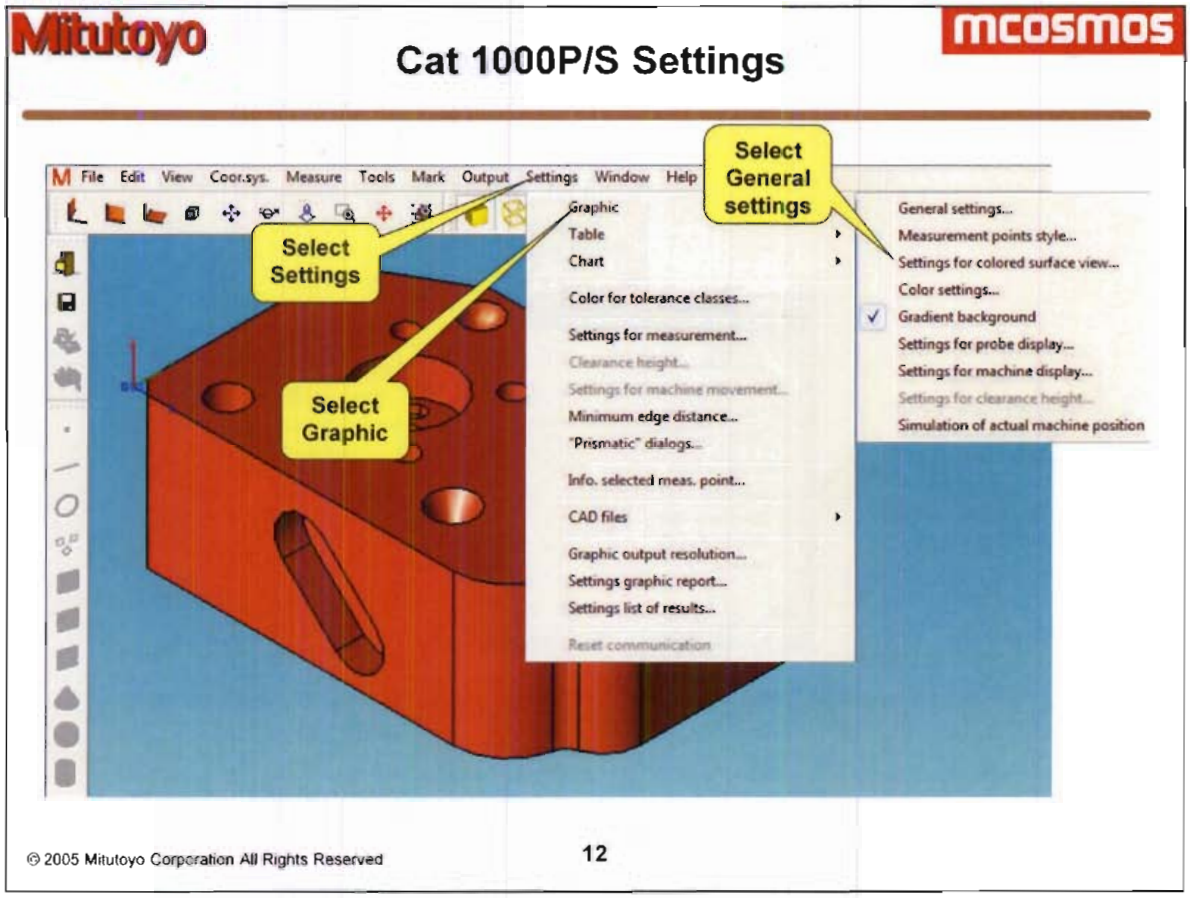

- Select Settings.
- Select Graphic.
- Select Settings for colored surface view.
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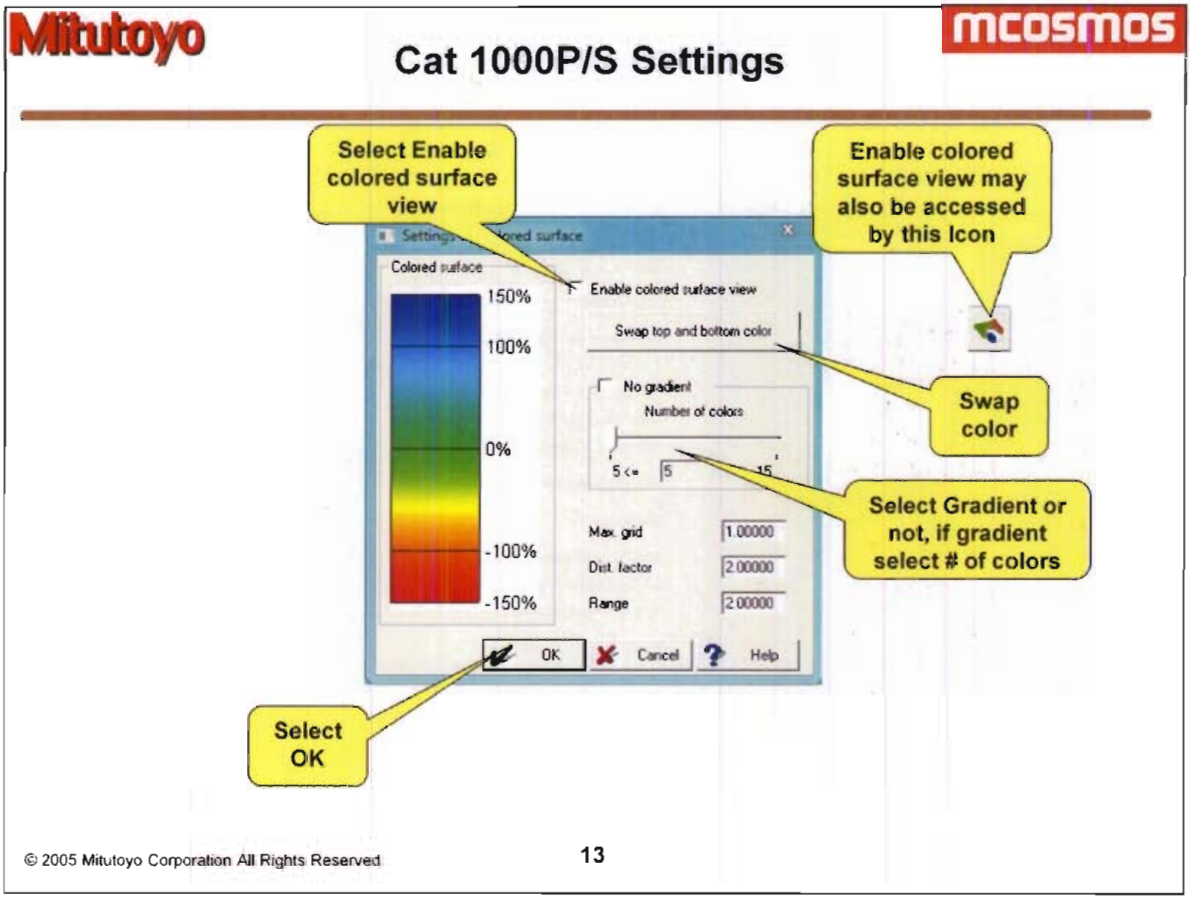

- Enable colored surface view also available from the toolbar.
- Swap colors from top to bottom.
- Select gradient or not. Gradient offers distinct color vernation changes verses smooth transitions.
- If Gradient is selected use sliding bar to set the number of colors
- Upon completion select OK.
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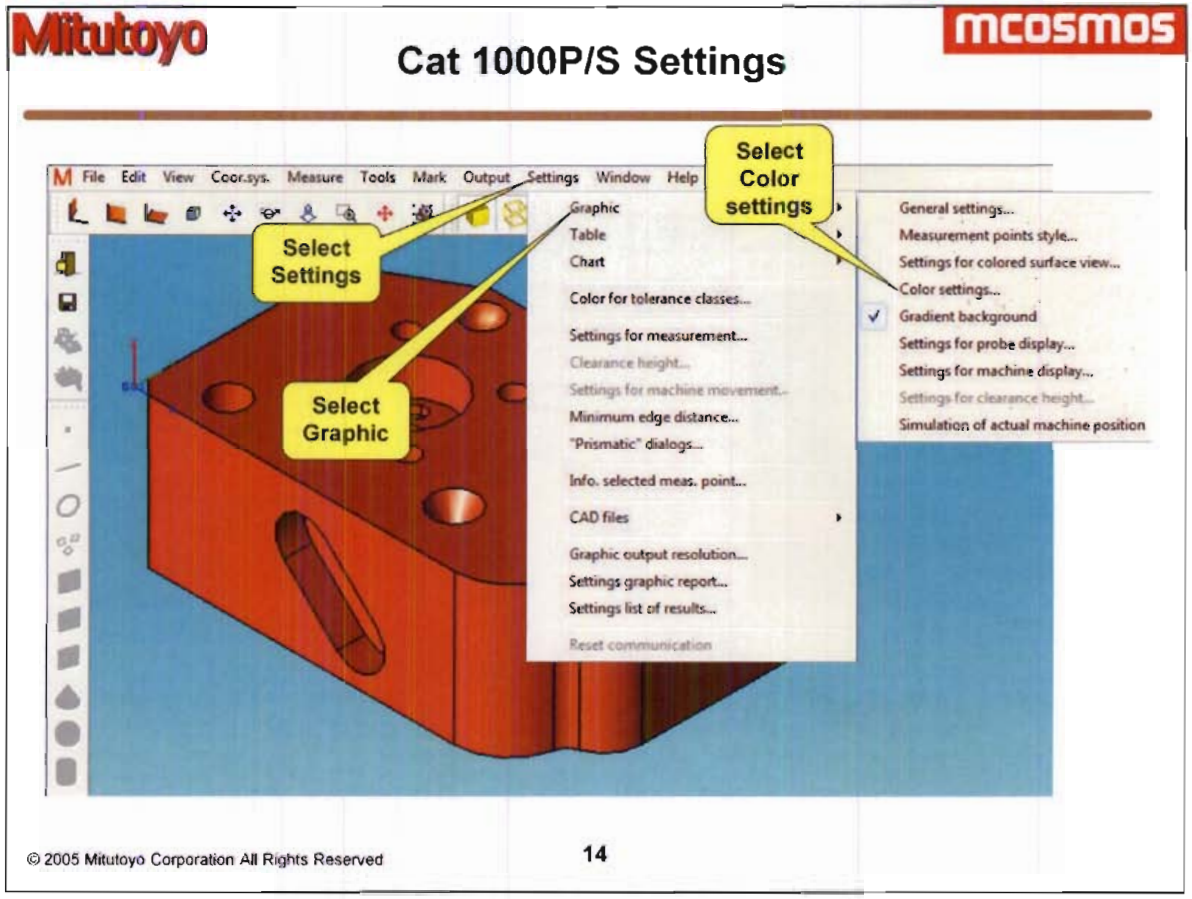

- Select Settings.
- Select Graphic.
- Select Color settings.
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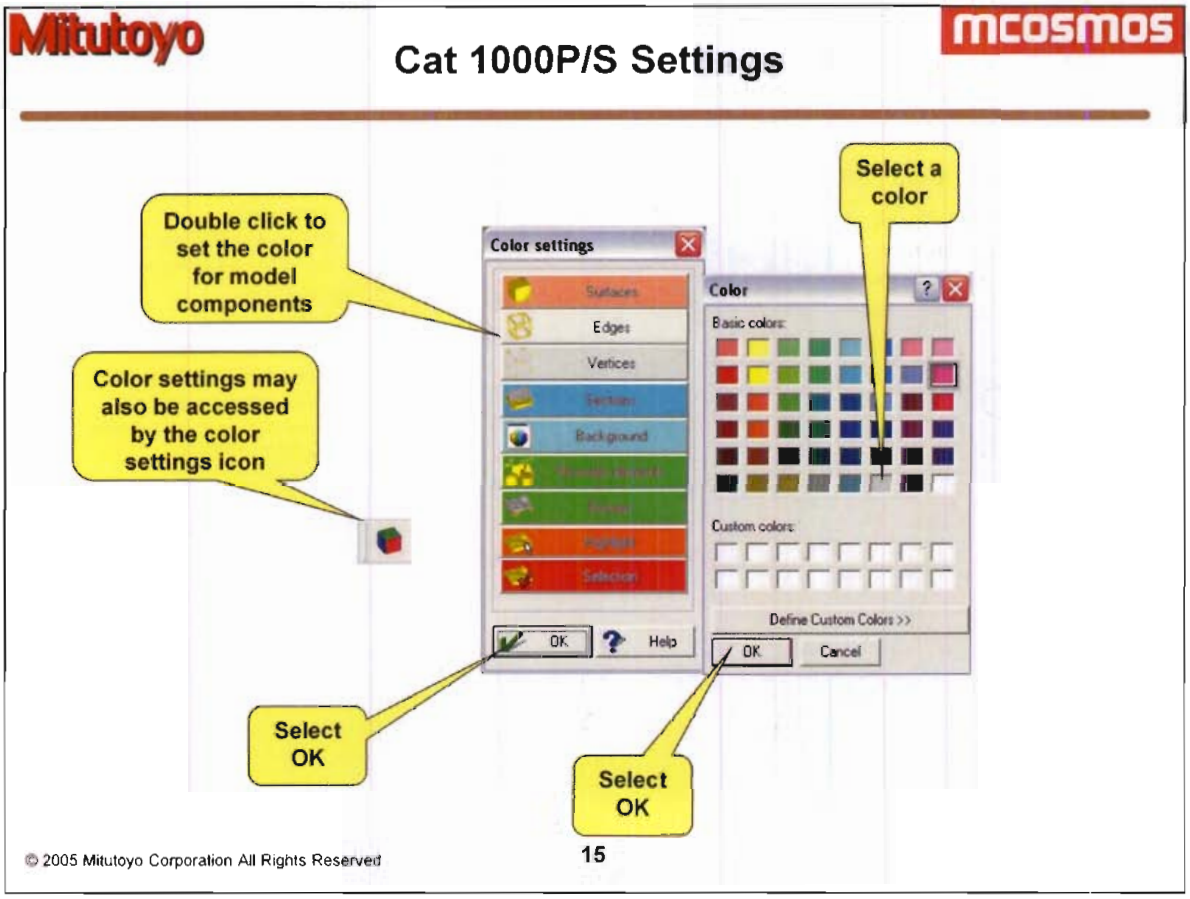

- Set the color for model components, be careful not to conflict with colors used in the path. To change color double click on the color to be changed.
- Select a new color.
- Select OK.
- Upon completion select OK.
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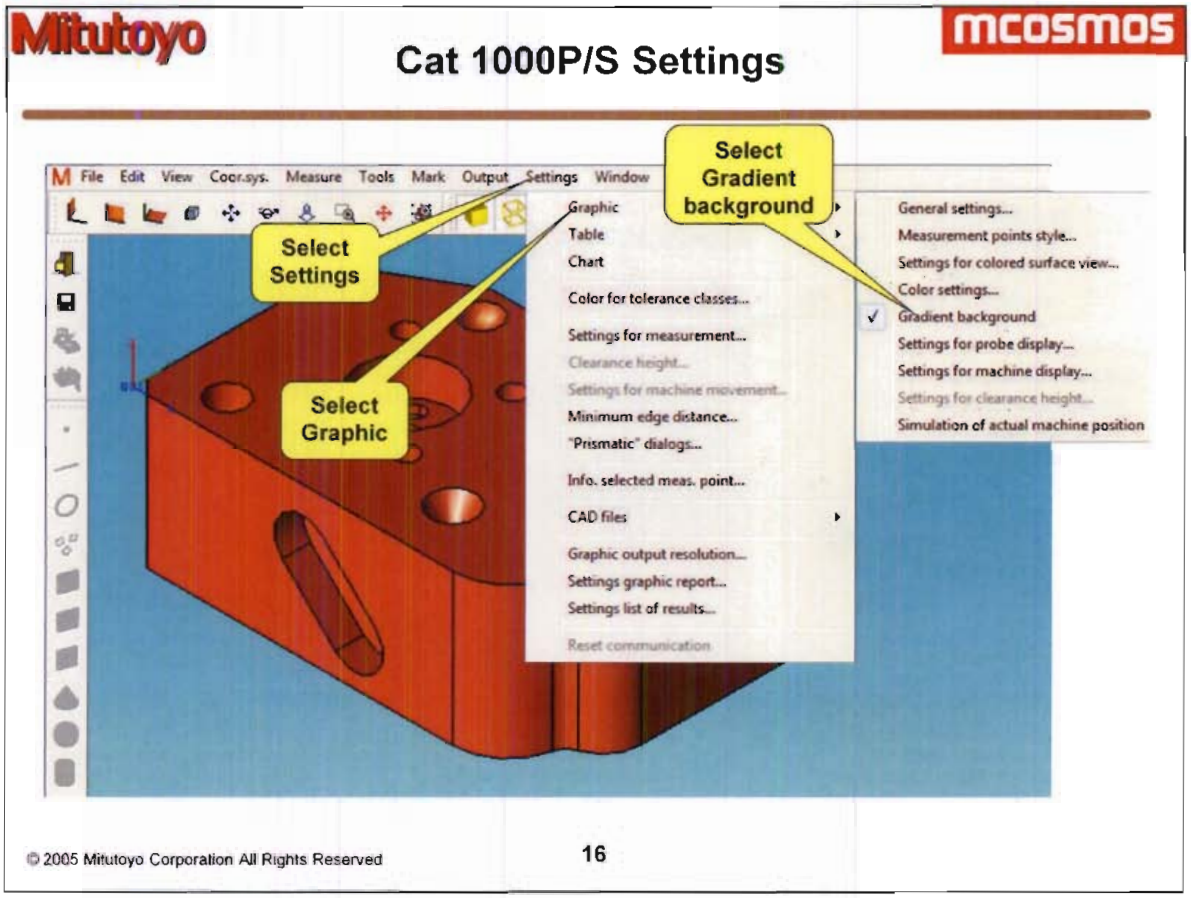

- Select Settings.
- Select Graphic.
- Select Gradient background to change from a solid color to a transition of shade from light at the bottom to darker at the top.
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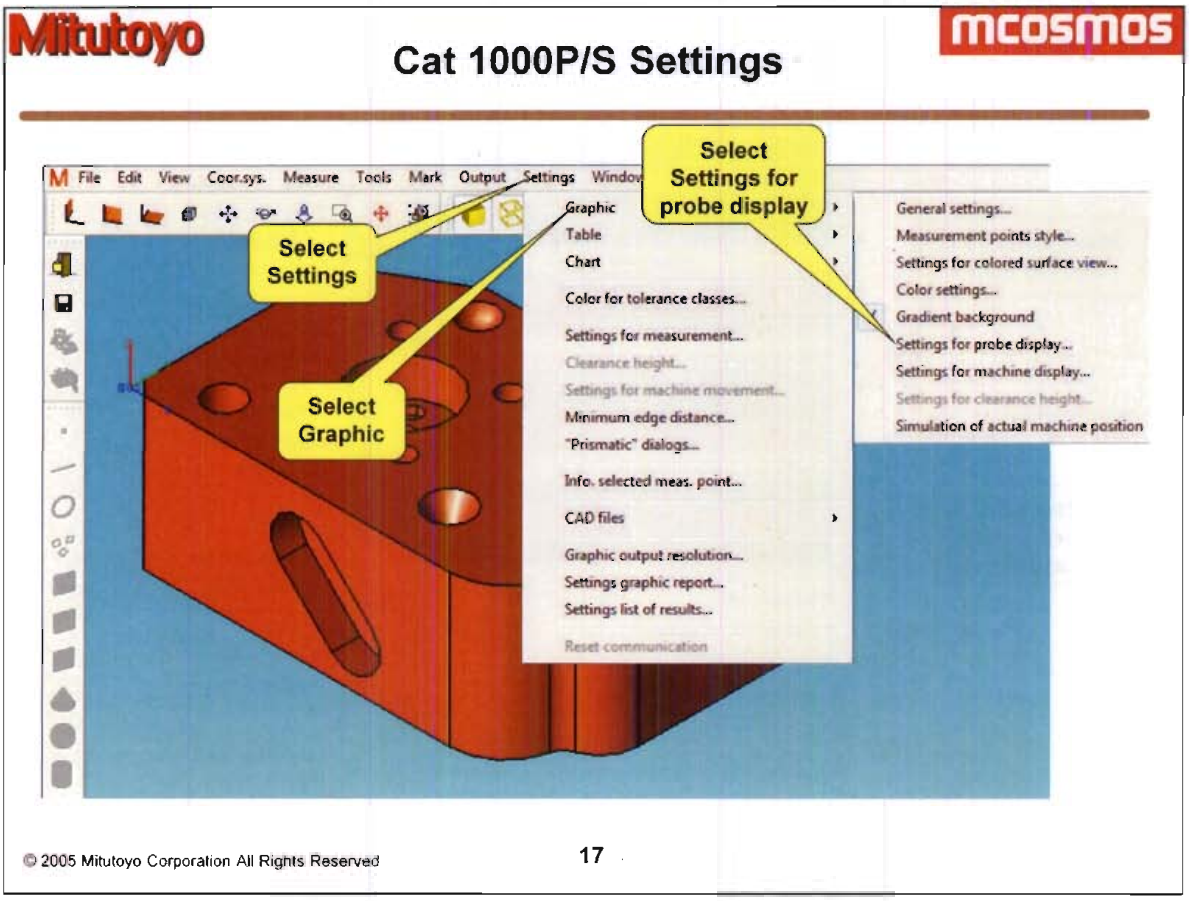

- Select Settings.
- Select Graphic.
- Select settings for probe display.
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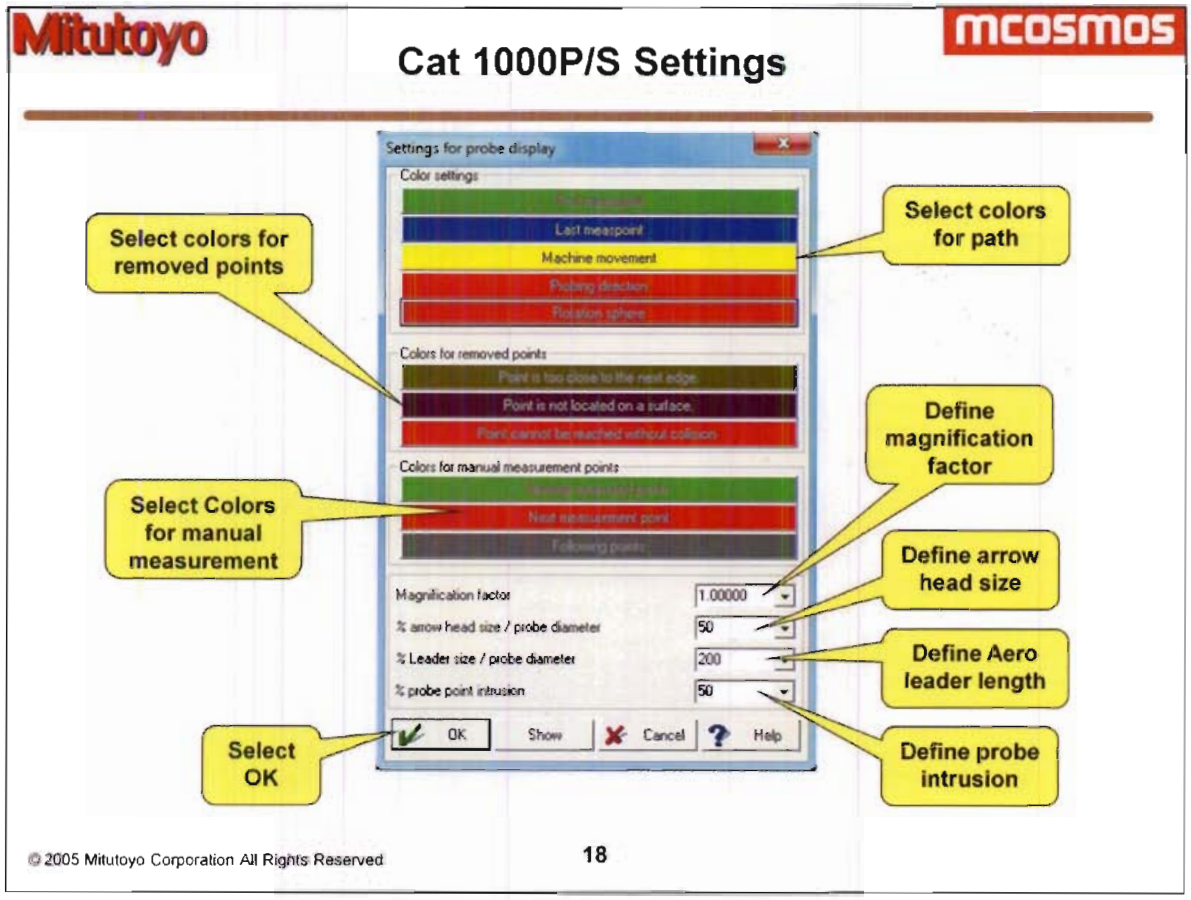

- Set the color for path being careful not to conflict with the color of model components. Using the same procedure as color for model.
- Set colors for removed points.
- Define magnification factor to define the probing point size.
- Define arrow head size as a % of probing point size.
- Define arrow leader length as a % of probing point size.
- Define probe point intrusion (how far the probe point intrudes into the model).
- Upon completion select OK.
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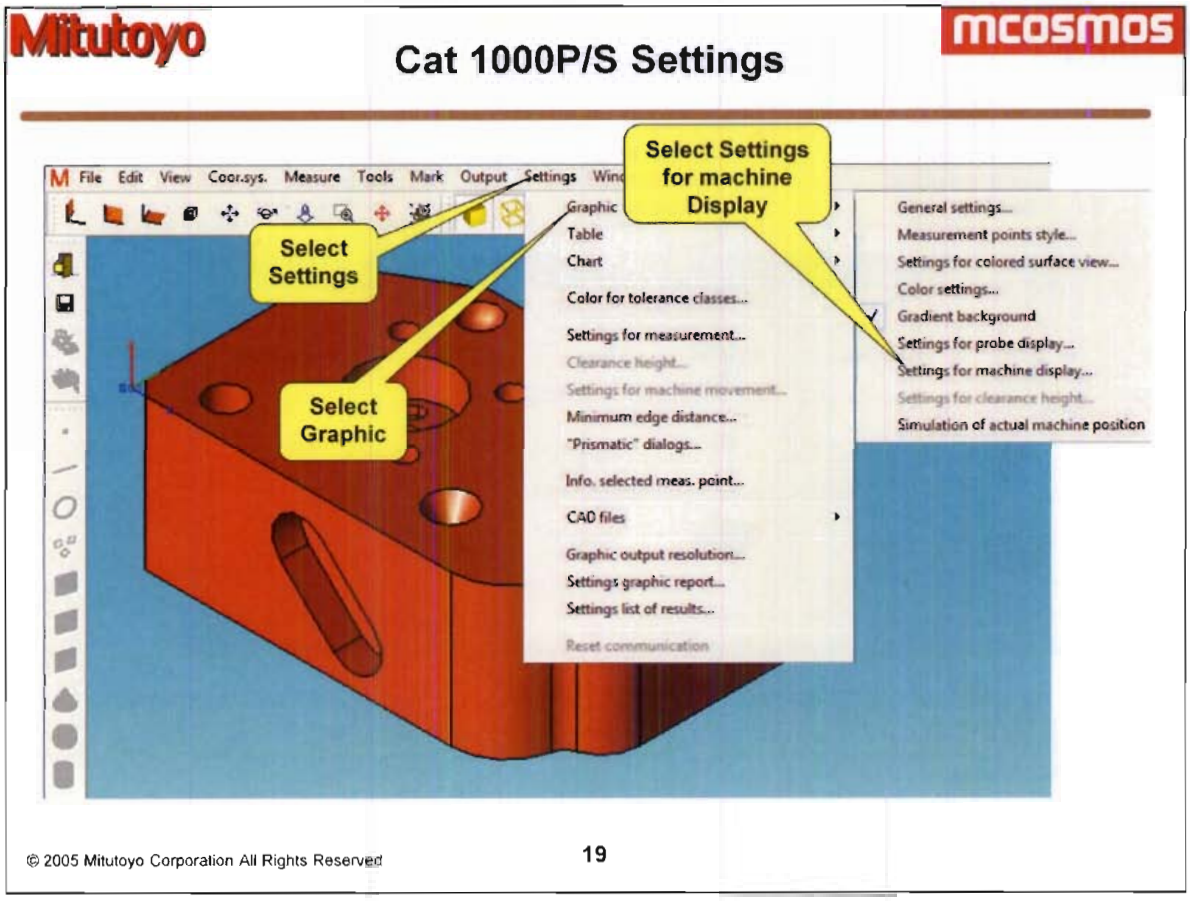

- Select Settings.
- Select Graphic.
- Select settings for machine display.
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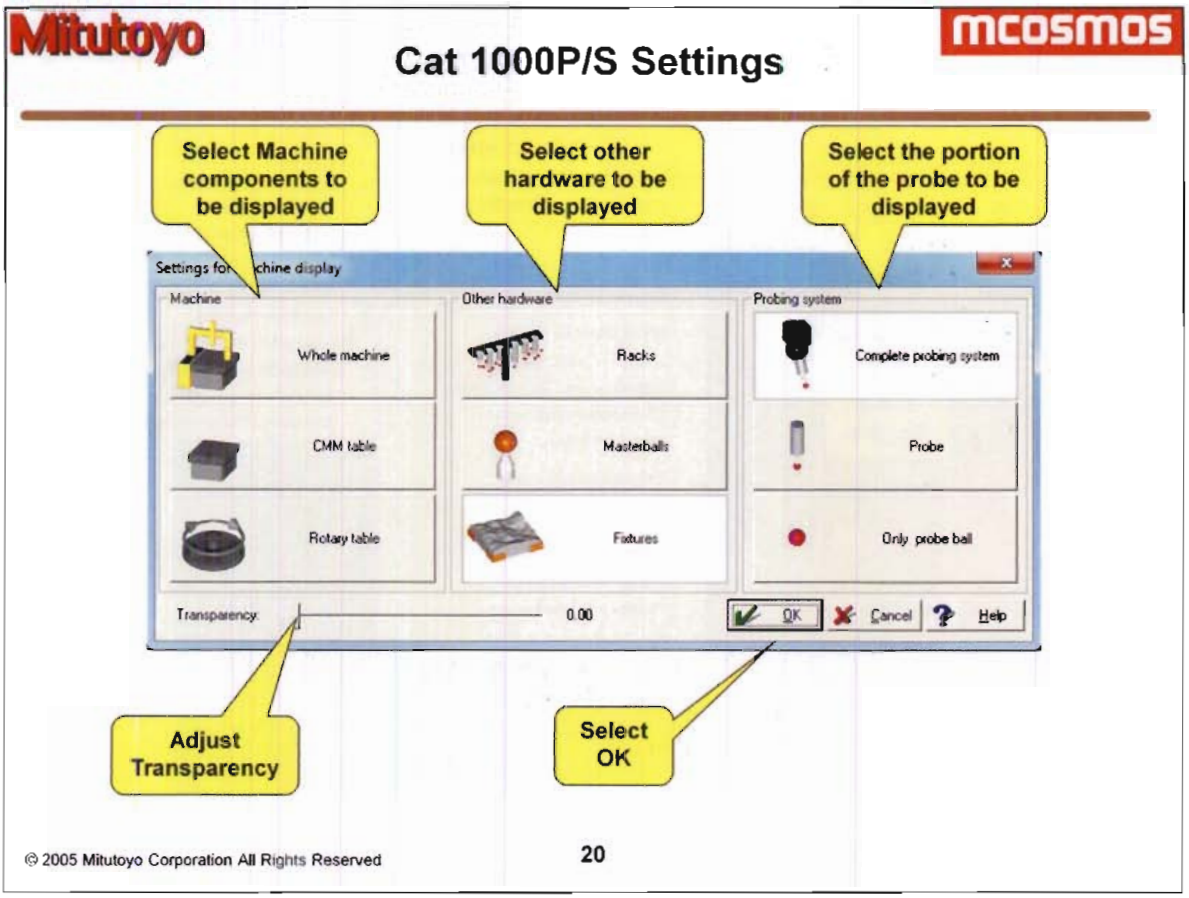

- Select Machine components to be displayed in the CAD system.
- Select the hardware components to be displayed in the CAD system.
- Select the portion of the probe to be displayed in the CAD system.
  Note: The current loaded / built probe will be displayed.
- Upon completion select OK.
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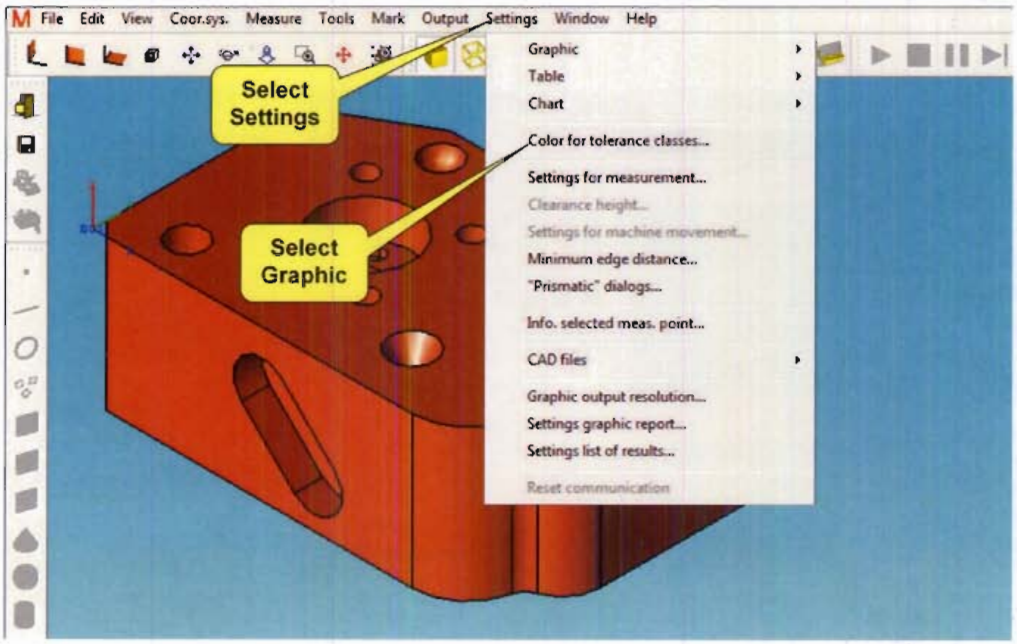
Cat 1000P/S Settings



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- Select Settings.
- Select Color for tolerance classes.
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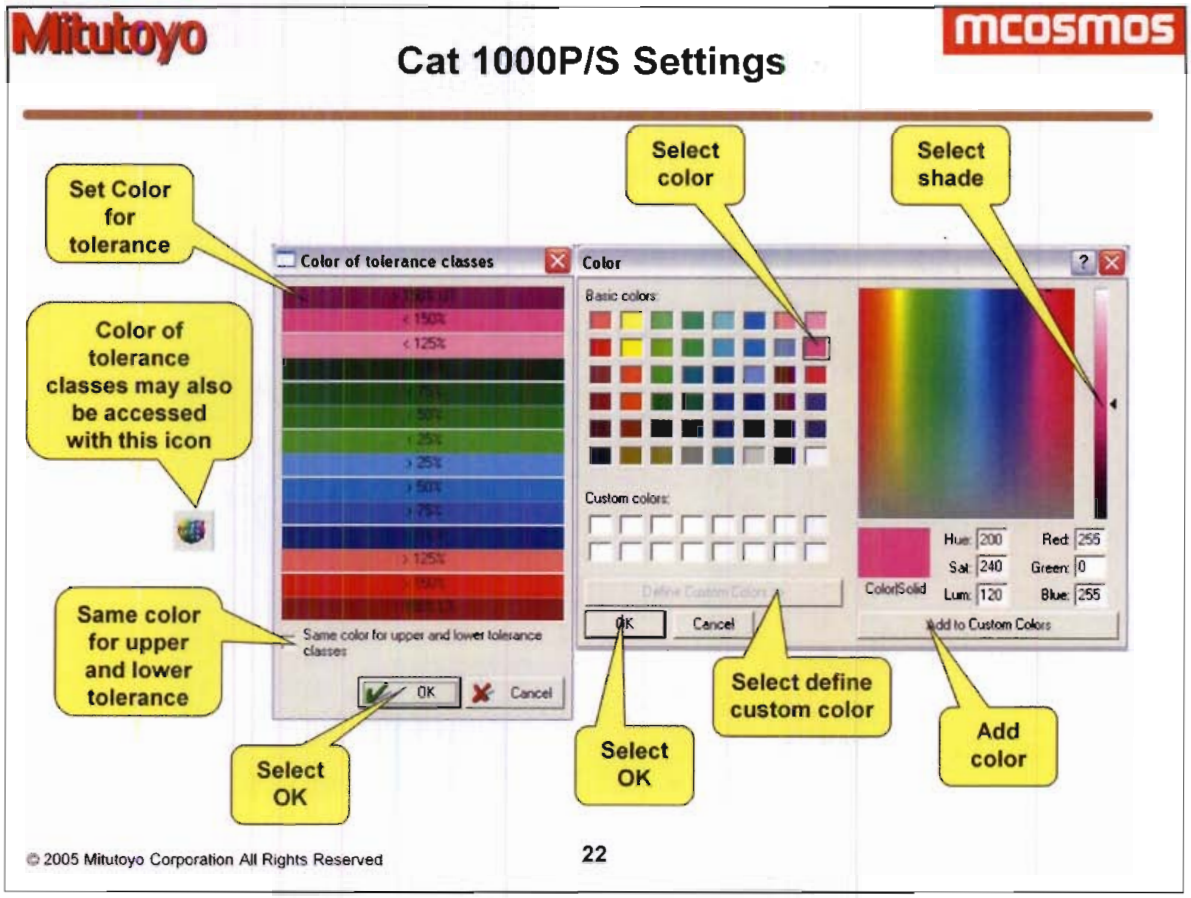

- Select a color for a tolerance class double click on it to customize the color.
- A color chart will appear select a color.
- If you wish to adjust the shade select define custom color.
- Select the shade and add the color these shades may be applied in any color selection.
- Select OK this will apply your choice to the chart .
- Continue until all colors are defined to your satisfaction.
- If the same color for plus deviation is to be applied to minus deviation select Same color for upper and lower tolerance.
- Select OK Upon completion.
- These colors will be represented in graphic reports as balls or cones at each surface point.
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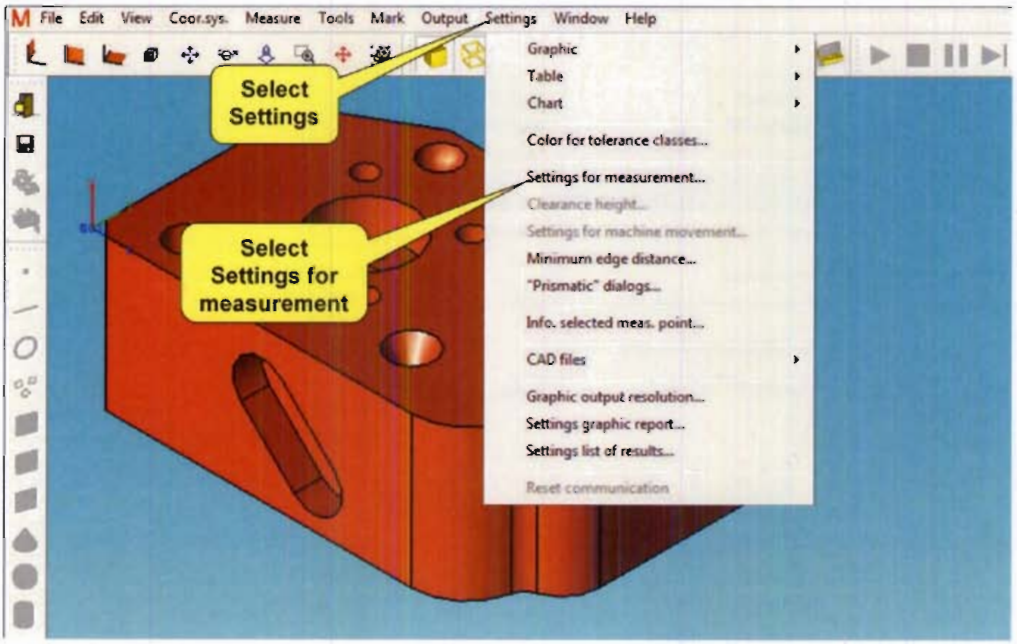

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23

- Select Settings.
- Select Settings for measurement.
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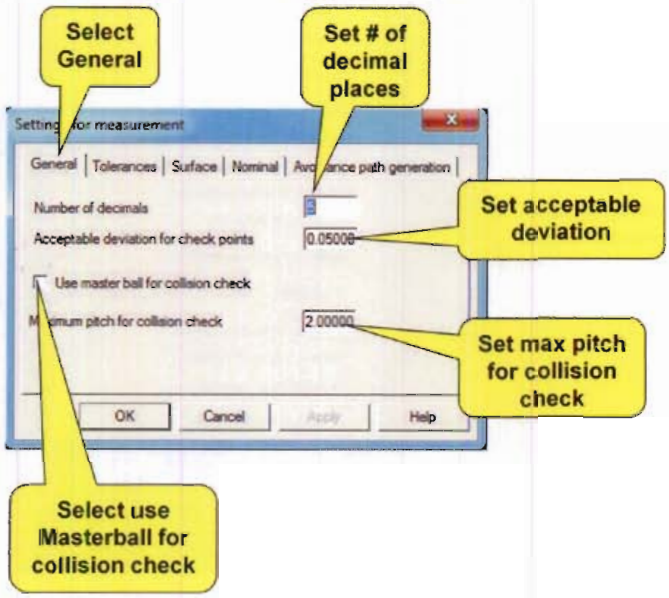
Cat 1000P/S Settings



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- Select General settings.
- Set the number of decimal places, a number grater than or equal to it's counter part in Geopak is recommended.
- Set an acceptable deviation.
- Select use master ball for collision check this will use all visible machine components for collision check.
- Set max pitch for collision check. The collision check will check for collision along the probe path in the increment defined, when collision avoidance is activated.
- Note To activate collision avoidance you must have a clearance height off.
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Cat 1000P/S Settings

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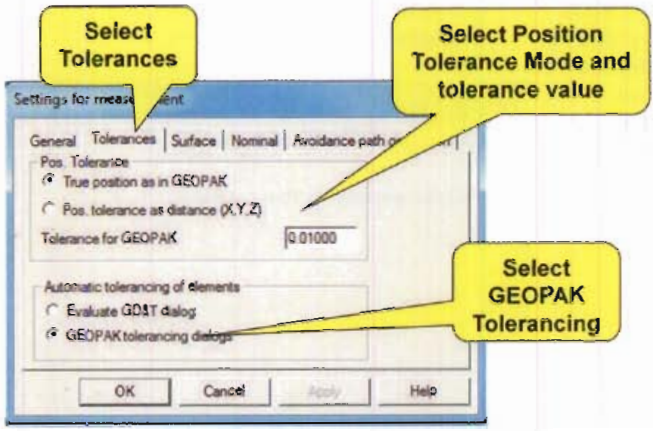

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- Select Tolerance
- Set position mode and tolerance.
- Select evaluation location GD&T dialog or in GEOPAK.
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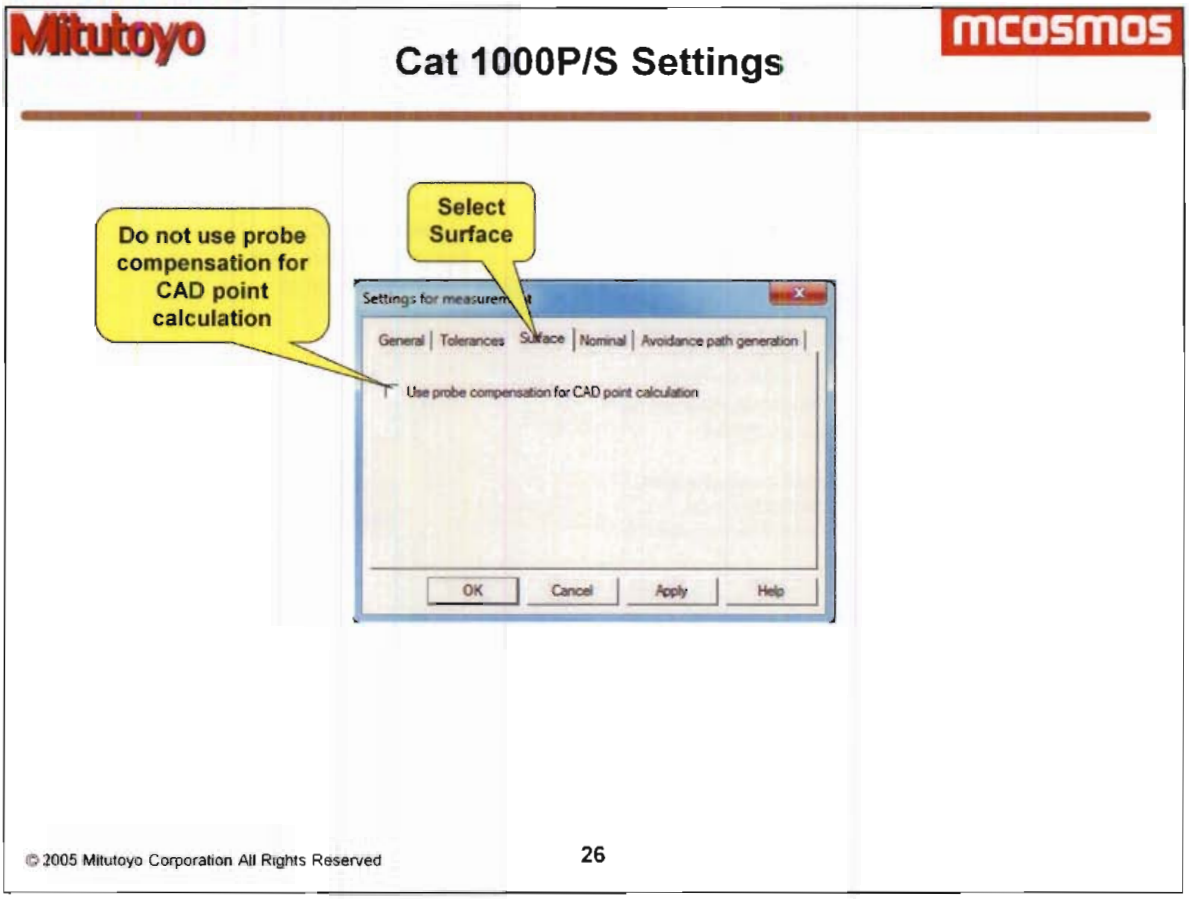

- Select Surface.
- Do not use probe compensation for cad point. Cad will find the model point closest to the center of the probe and compensate in that direction.
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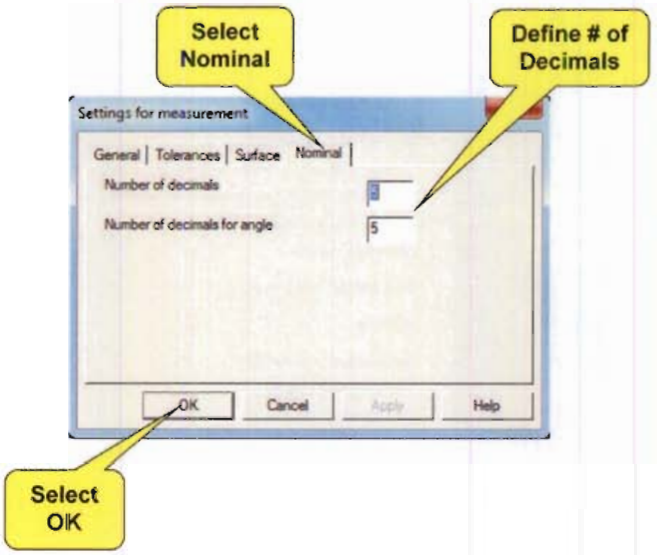

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27

- Select Nominal
- Set the number of decimal places, a number grater than or equal to it's counter part in Geopack is recommended
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Cat 1000P/S Settings

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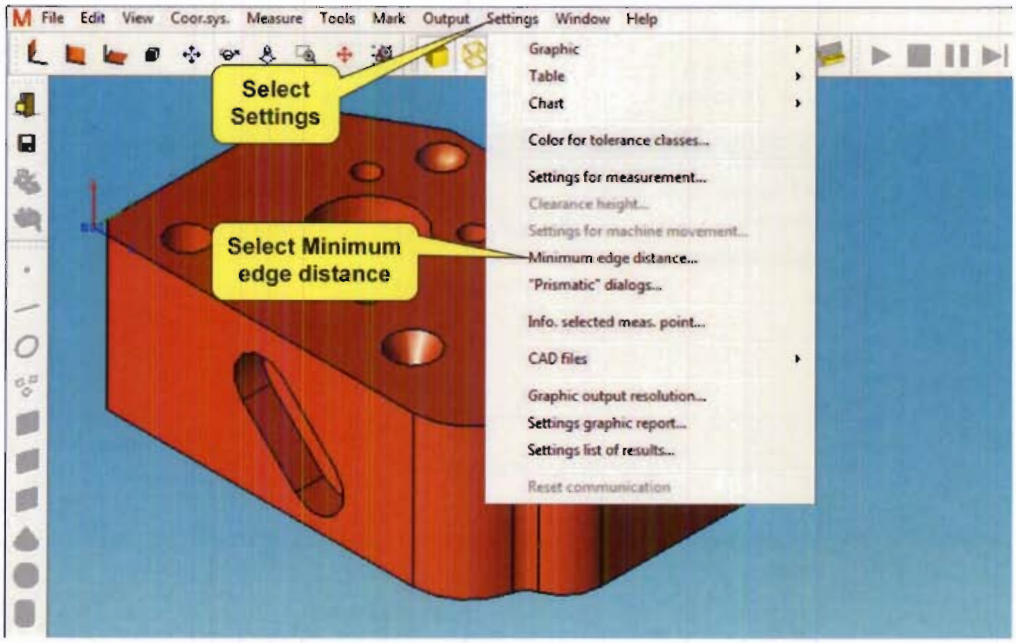

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- Select Settings.
- Select Minimum edge distance.
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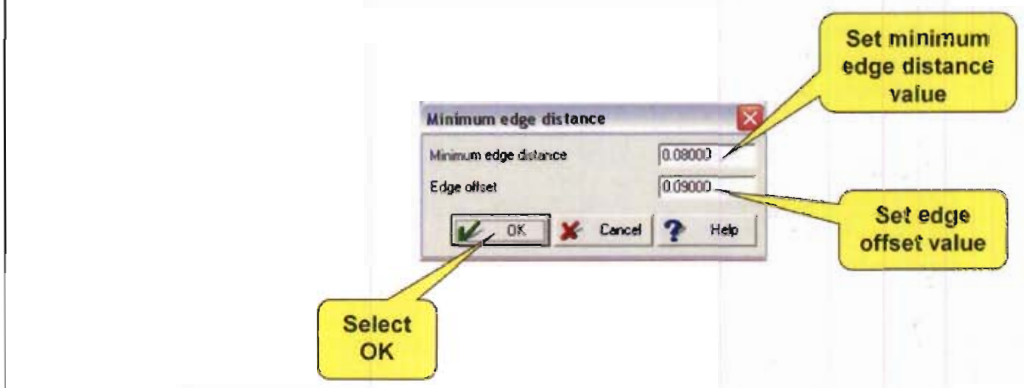
Cat 1000P Settings



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- Minimum edge distance defines the minimum distance from the closest edge that probing points will be accepted when check points is turned on.
- Edge offset will place points the edge offset distance away from certain edges when creating a probing path.
- Note: The Edge offset must be grater then or equal to the Minimum edge distance
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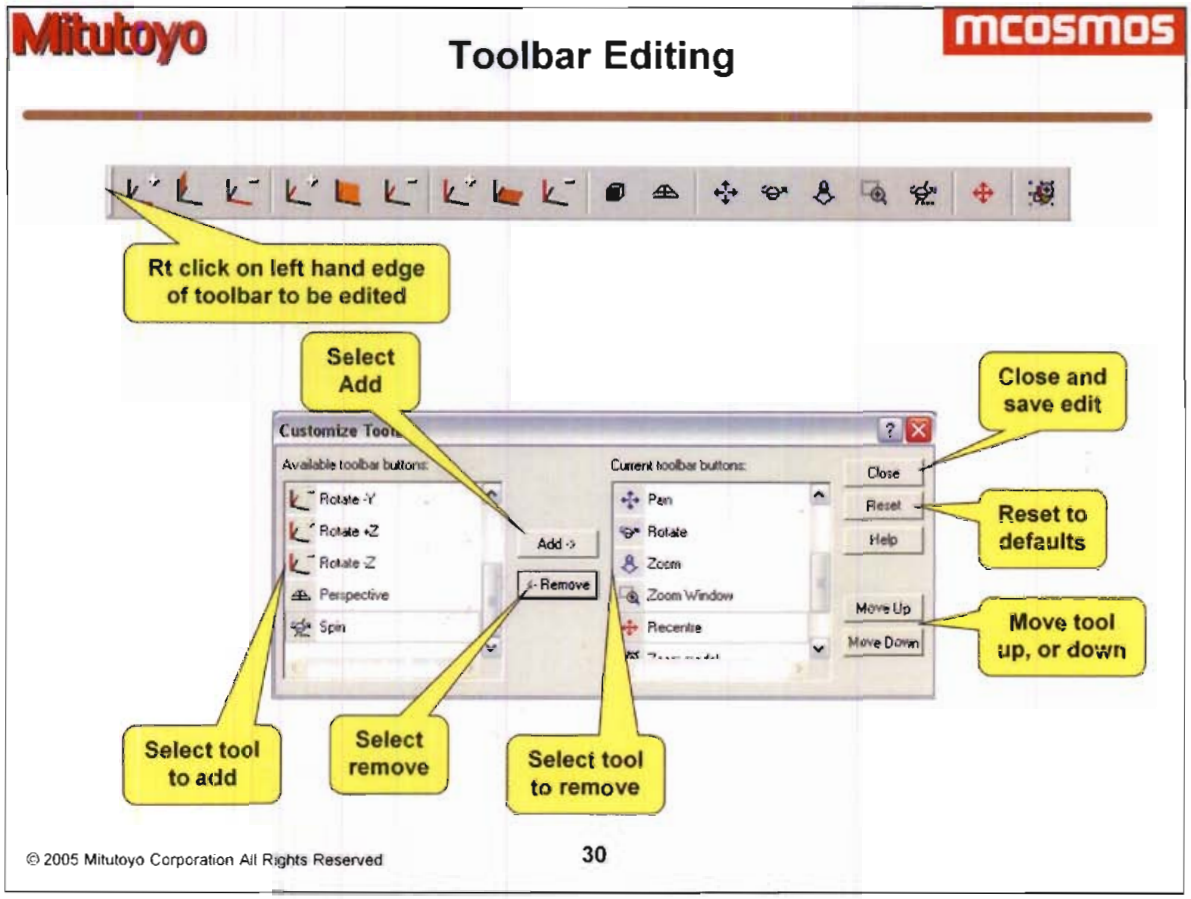

- To edit a toolbar Rt click on the bar at the left side of the toolbar to be edited.
- The Customize toolbar dialog will appear.
- Select tools from the available side to add.
- Select tools from the current tool side to remove.
- Select tool to move, select move up, or down to position tool.
- Reset will reset the toolbar to the Default.
- Close will apply the selected changes.
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Add Remove Toolbars

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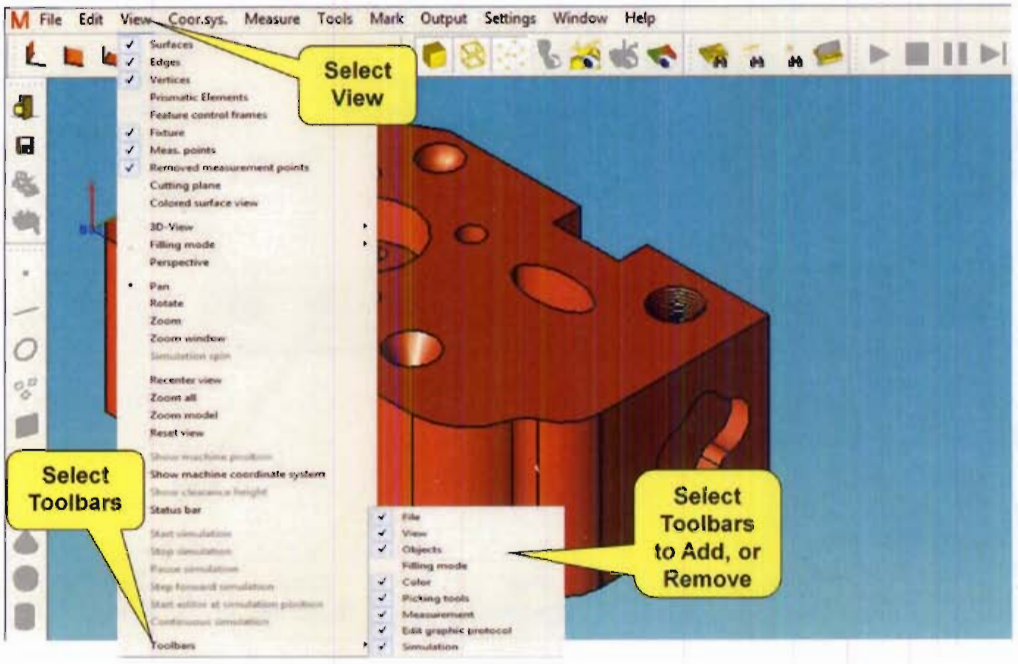

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- To add, or remove a Toolbar Select View.
- Select Toolbars.
- Select a Toolbar to add, or remove. A check mark will indicate the presents of the toolbar.
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View Toolbar

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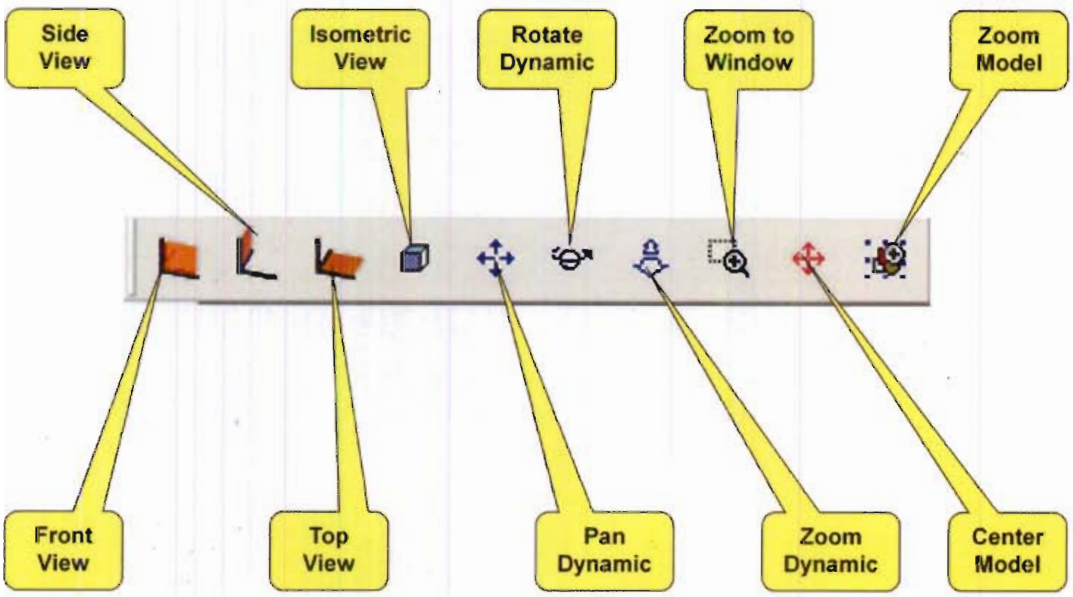

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- The above tools will manipulate your model View.
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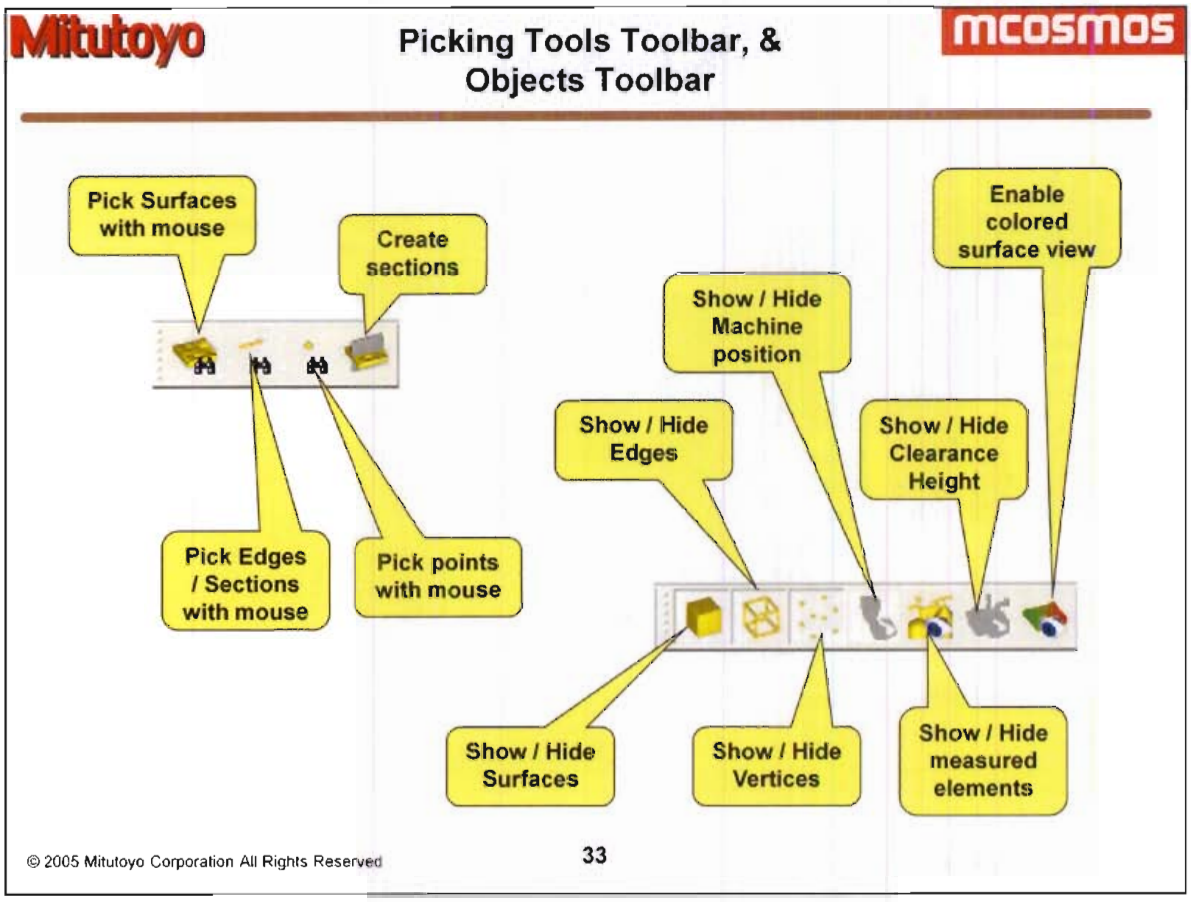

- Picking tools to select various model components.
- Objects toolbar allows you to turn on or off various model /machine components. Note: Surfaces must be visible to create a path.
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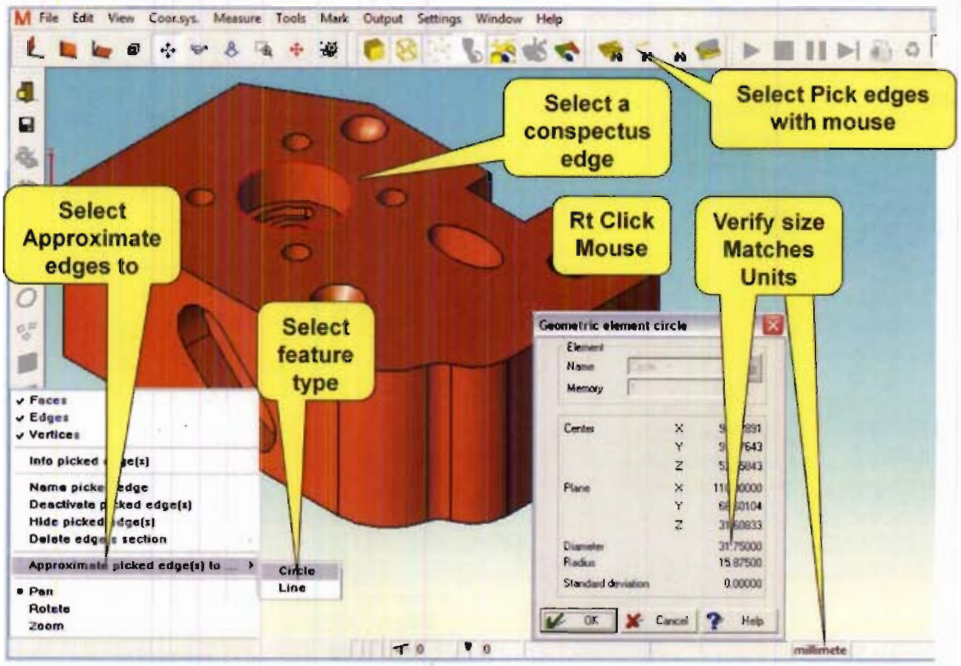
Verify the Model



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- After Loading the model, it is always a good idea to verify your Model.
- Select pick edges with mouse.
- Pick a conspicuous feature, left click on an edge of the feature selecting that edge. You have picked an edge when it changes color.
- Right click in the field to open the dialog and select Approximate edges to.
- This will open an extension. Pick the feature type in this example Circle.
- A dialog will open displaying the location, vector, and size of the selected feature.
- Verify this information to be sure that model was imported correctly.
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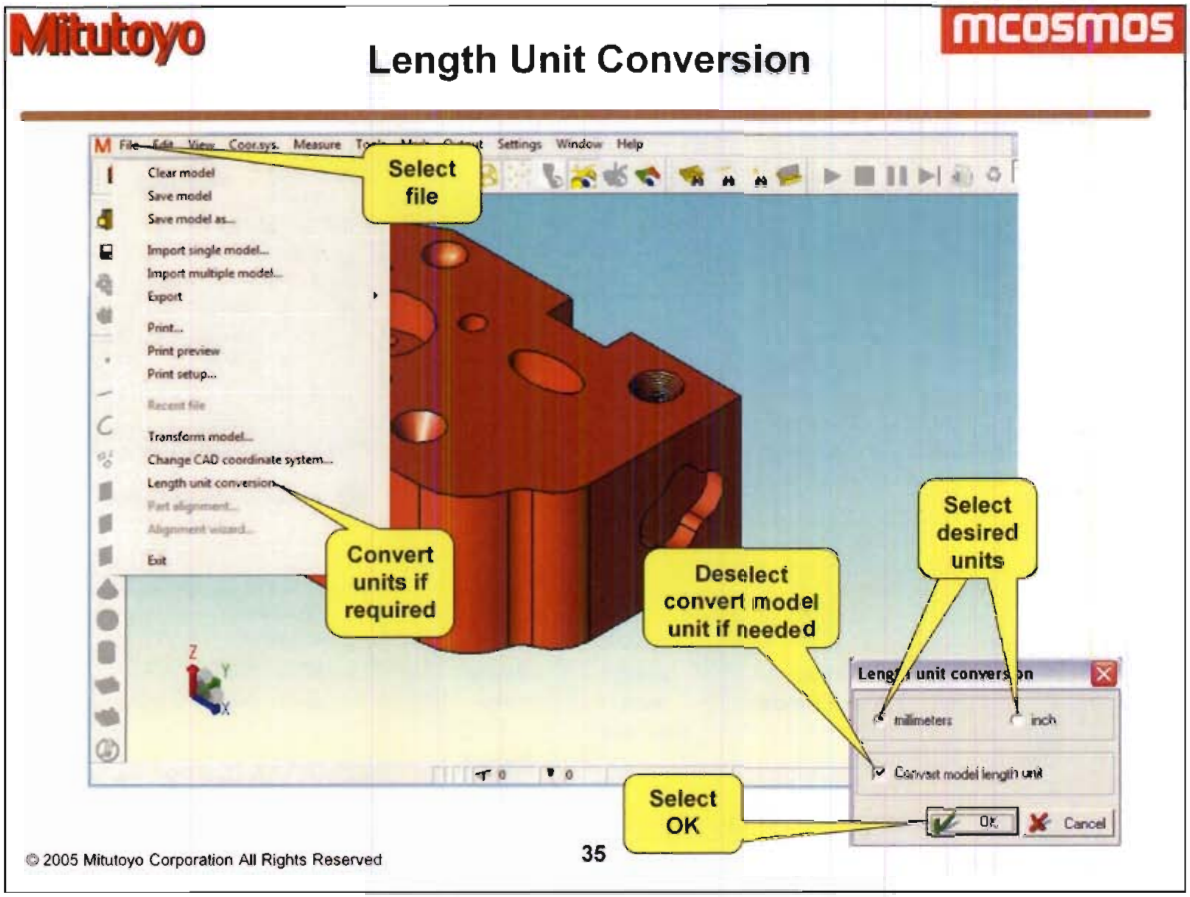

- If the model units require adjustment select file.
- Select Length unit conversion to correct units (inch / MM)
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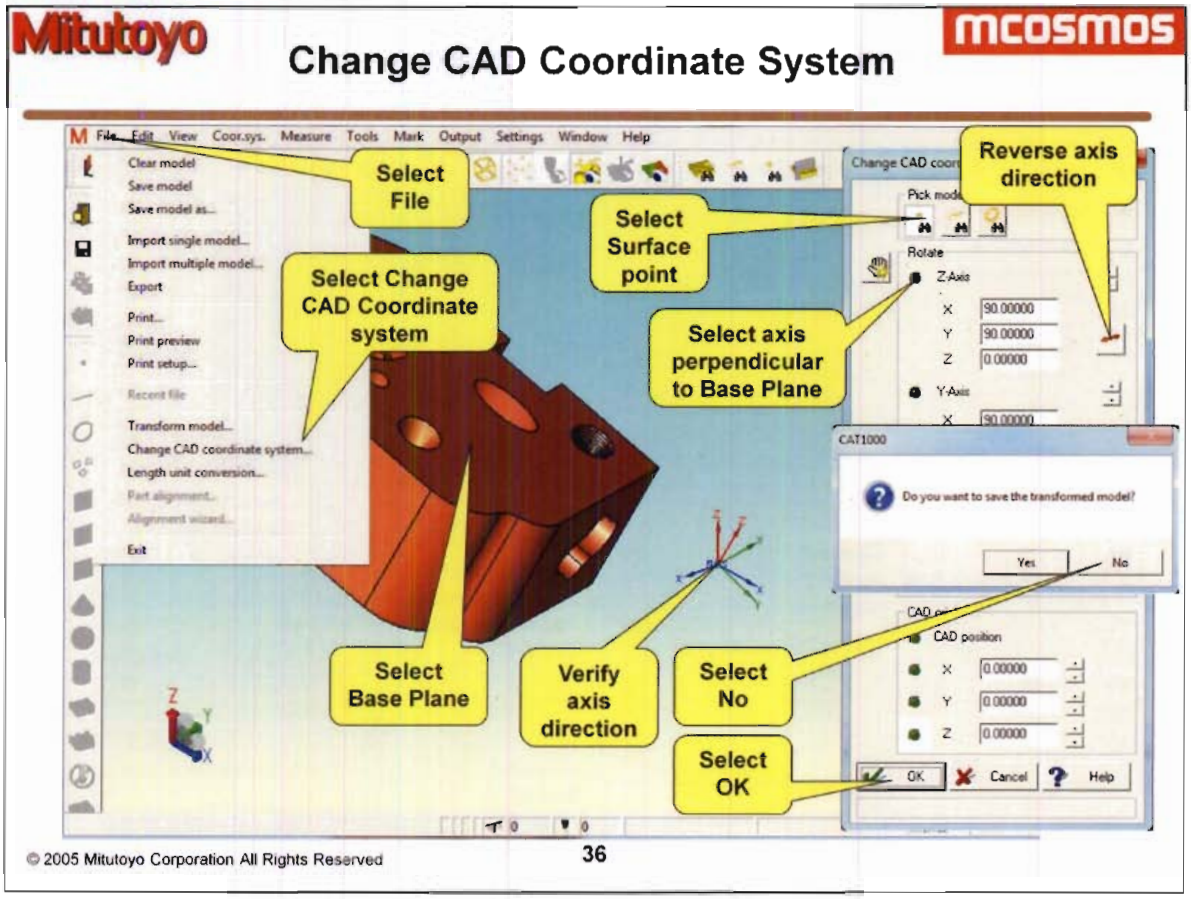

- To create a local coordinate system select File.
- Select Change CAD Coordinate System.
- The Change CAD Coordinate System dialog will open.
- The following 3 steps may be done repeatedly as you prefer.
- Select Surface point.
- Select the axis you want to be perpendicular to the surface to be selected.
- Select the surface to align plane to.
- Verify Axis icon direction Reverse as necessary.
- Select OK to complete step 1.
- Select NO when asked to save the transformed model.
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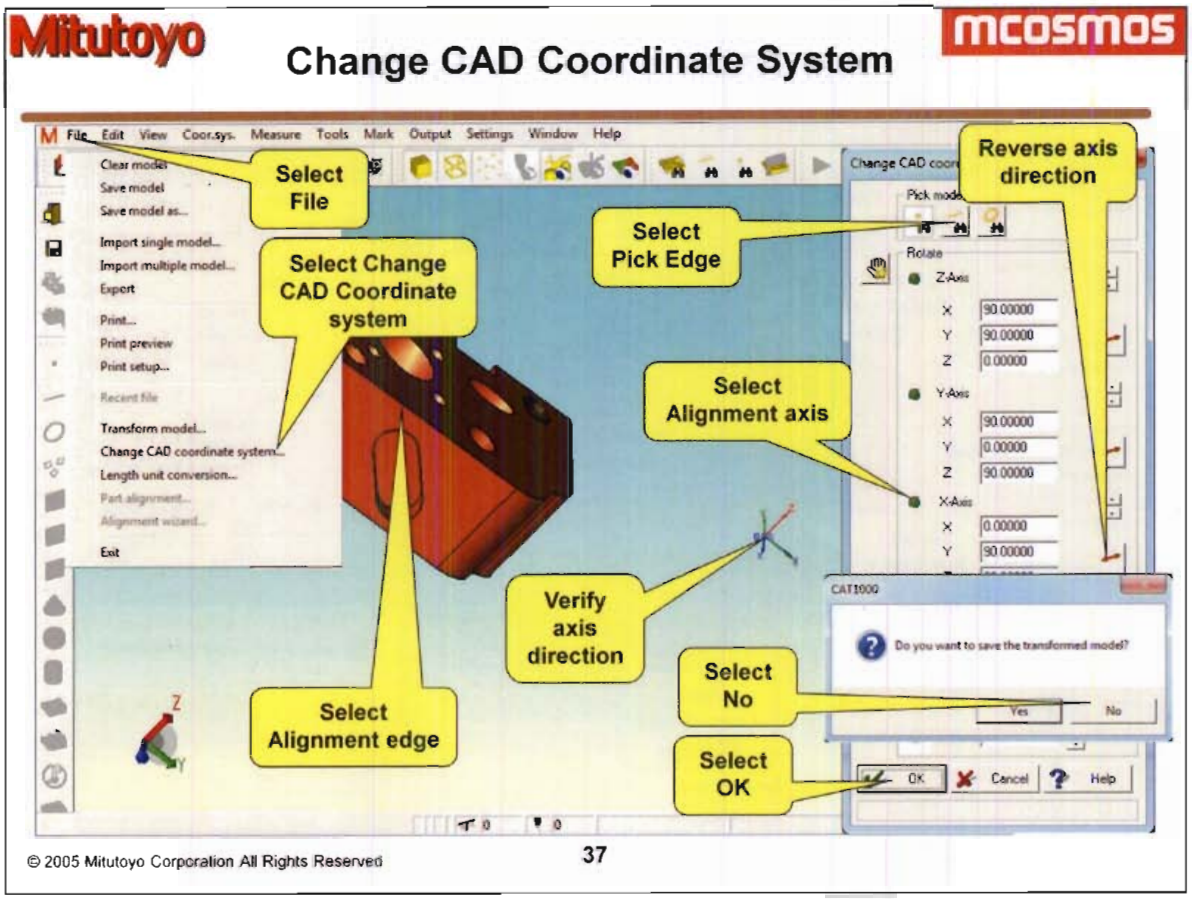

- Select File.
- Select Change CAD Coordinate System.
- The Change CAD Coordinate System dialog will open.
- Select Pick Edge.
- Select the axis you want to Align to.
- Select the surface to align axis to.
- Verify Axis icon direction Reverse as necessary.
- Select OK to complete step 2.
- Select NO when asked to save the transformed model.
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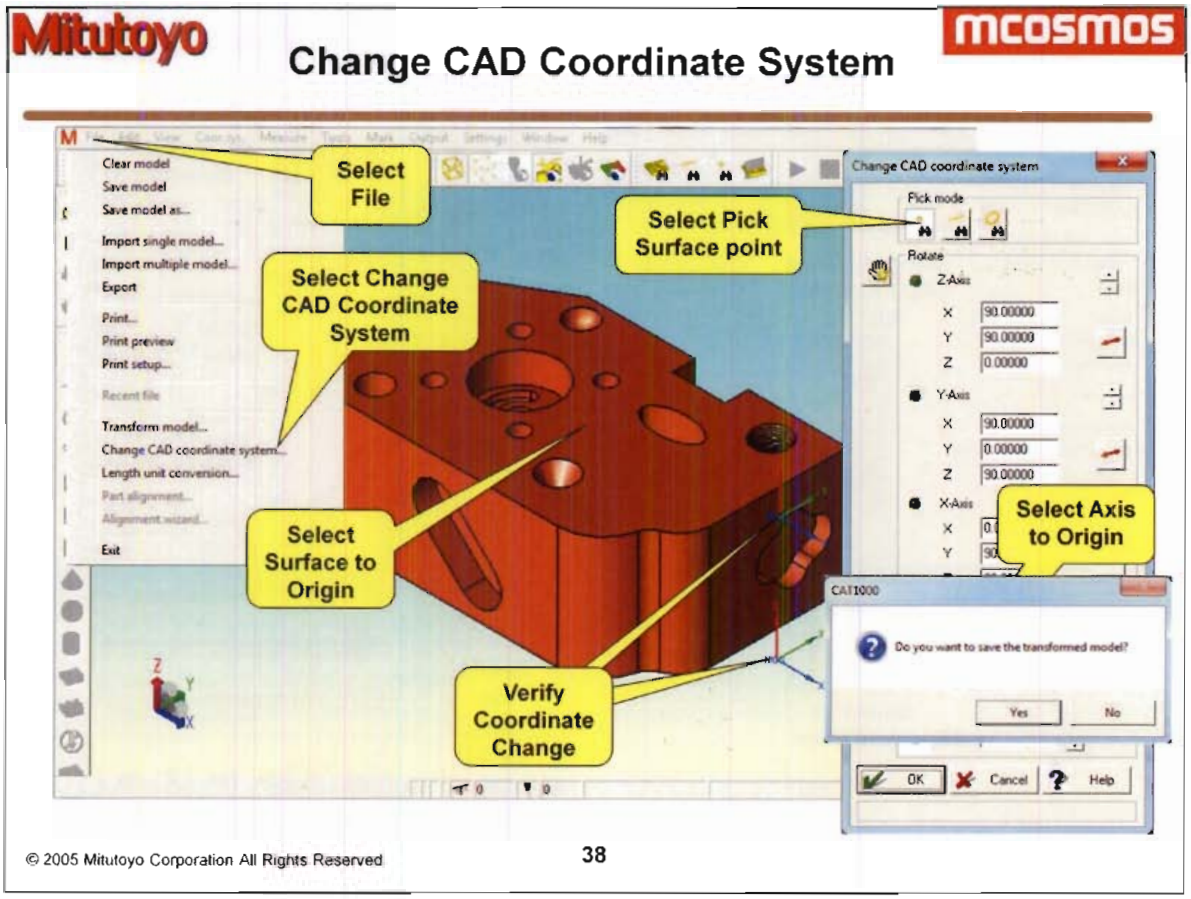

- Select File.
- Select Change CAD Coordinate System.
- The Change CAD Coordinate System dialog will open.
- Select a feature type you would like to use to adjust an axis origin.
- Select an axis you want to create an origin on for the selected feature type.
- Select the feature to origin the selected axis on.
- Verify Axis icon location in the selected axis.
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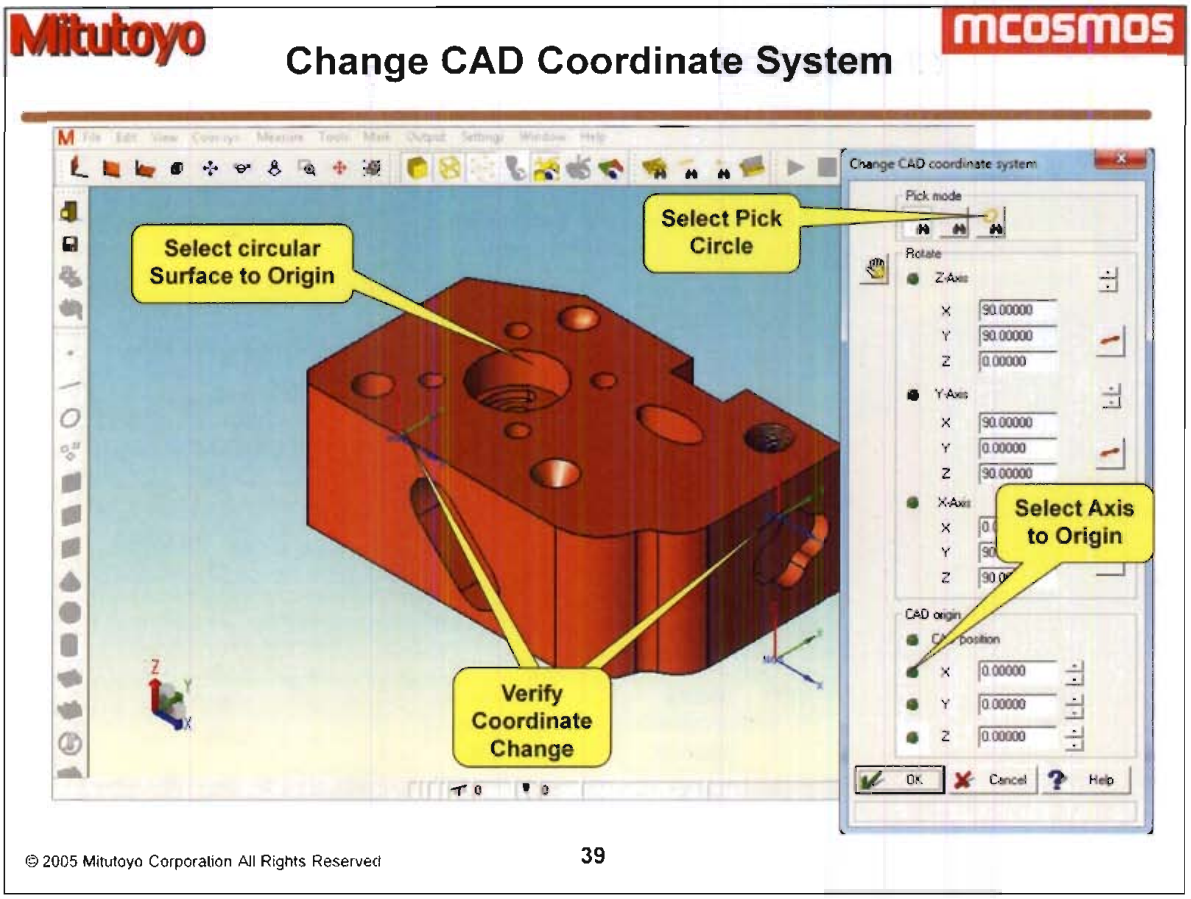

- Select a feature type you would like to use to adjust an axis origin.
- Select an axis you want to create an origin on for the selected feature type.
- Select the feature to origin the selected axis on.
- Verify Axis icon location in the selected axis.
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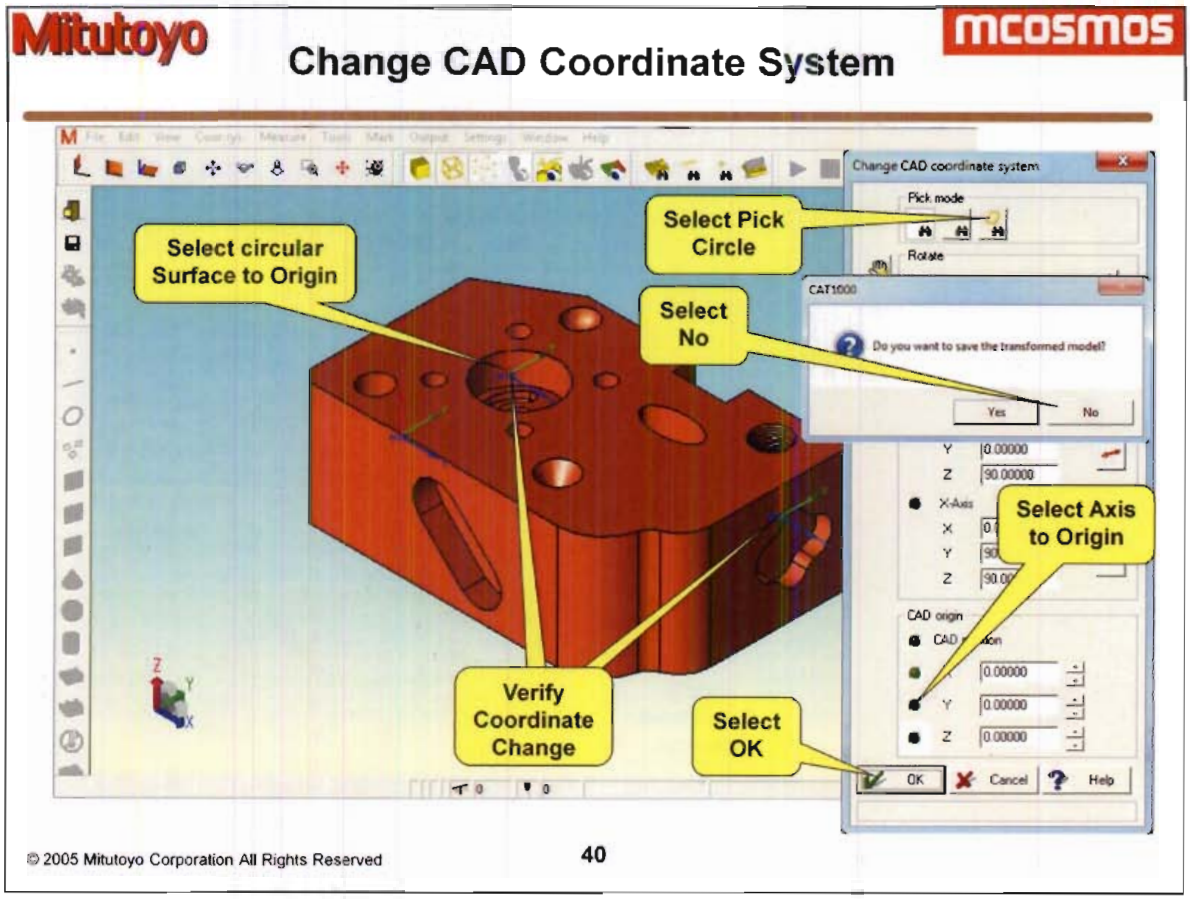
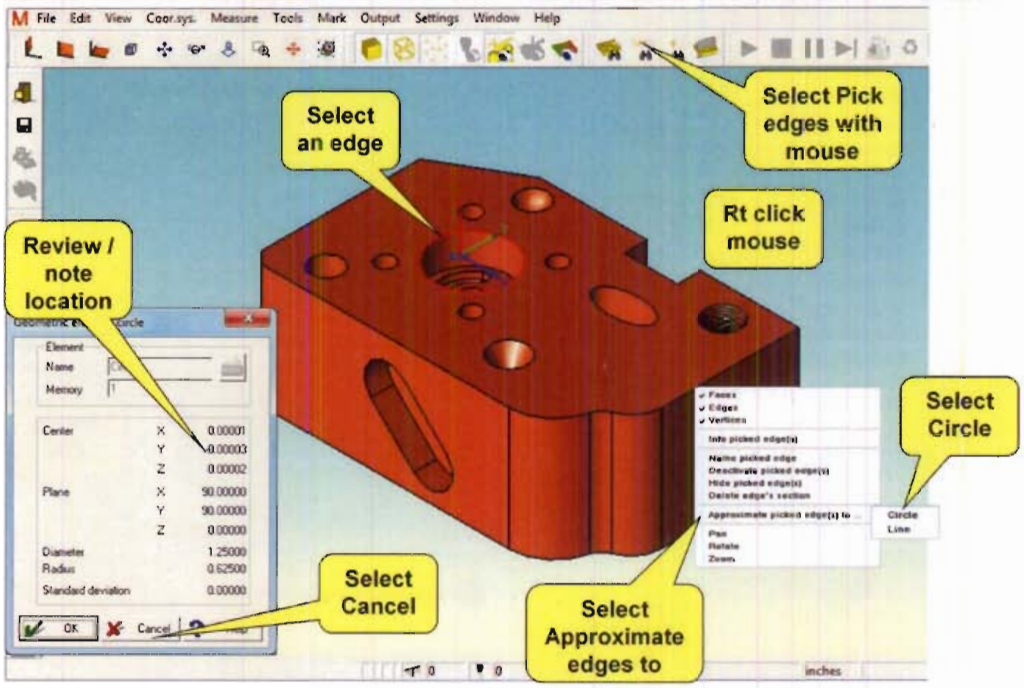


- Select a feature type you would like to use to adjust an axis origin.
- Select an axis you want to create an origin on for the selected feature type.
- Select the feature to origin the selected axis on.
- Verify Axis icon location in the selected axis.
- This completes step 3. If the model origin is too far from the model you may complete step 3 first then repeat step 3 after step 1 and 2.

Verify CAD Coordinate System



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- After changing cad coordinate system, it is always a good idea to verify your Model.
- Select pick edges with mouse.
- Pick a conspicuous feature, left click on an edge of the feature selecting that edge. You have picked an edge when it changes color.
- Right click in the field to open the dialog and select Approximate edges to.
- This will open an extension. Pick the feature type in this example Circle.
- A dialog will open displaying the location, vector, and size of the selected feature.
- Verify this information to be sure that model adjustments were done correctly.
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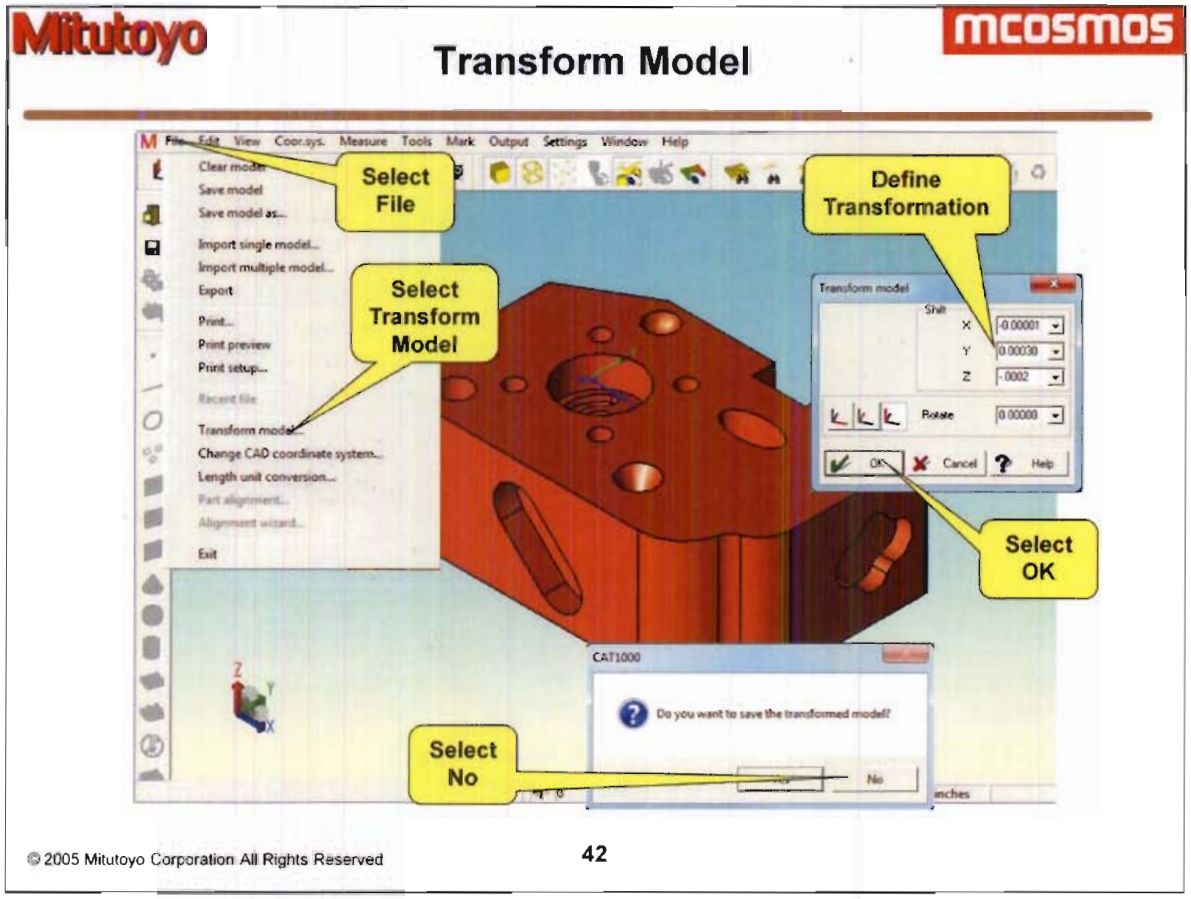

- If necessary Transform the model to correct for minor picking errors.
- To Transform the model select file.
- Select Transform model.
- Input model transformation values. Note: We are moving the model not the origin. The values are the opposite of those used to move the origin
- Upon completion select OK.
- Select NO when ask to save the transformed model.
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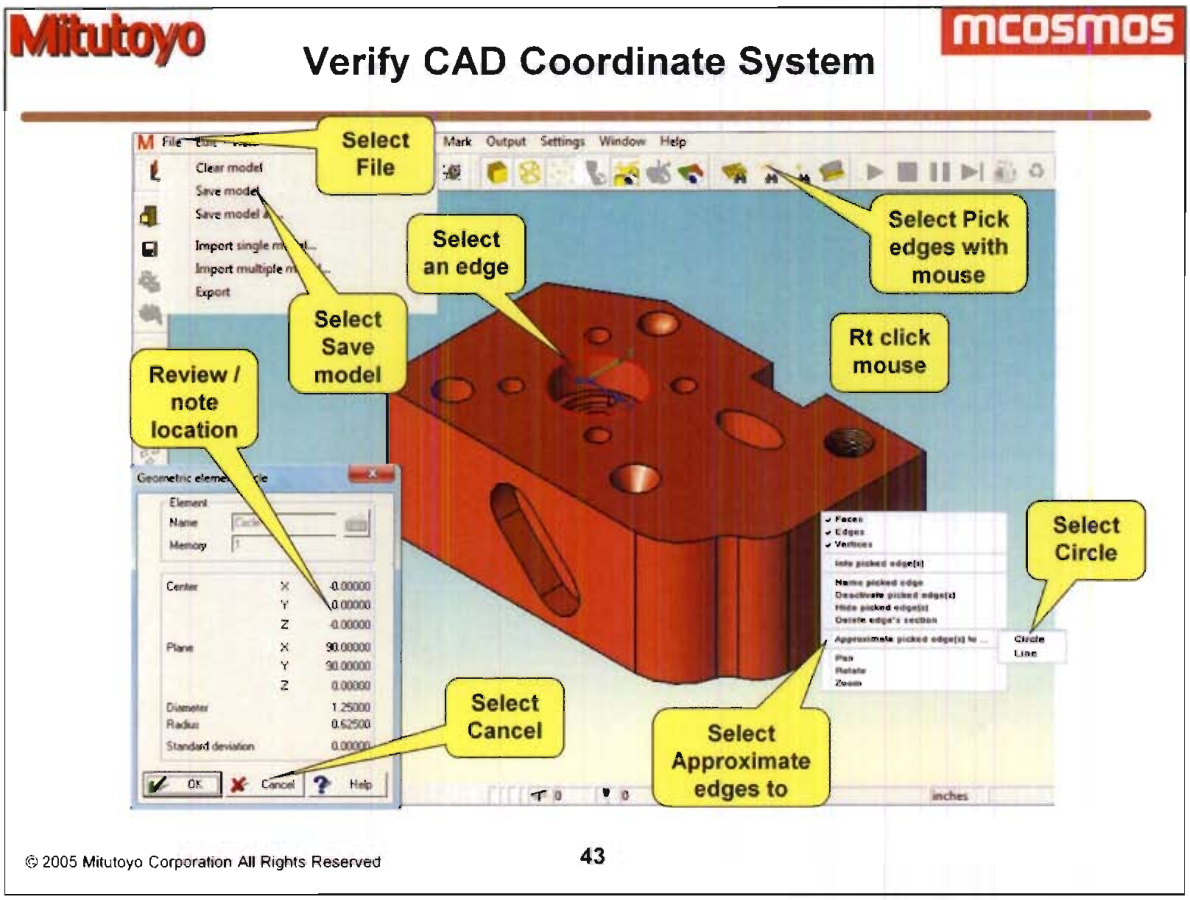

- After adjusting the model, it is always a good idea to verify your Model.
- Select pick edges with mouse.
- Pick a conspicuous feature, left click on an edge of the feature selecting that edge. You have picked an edge when it changes color.
- Right click in the field to open the dialog and select Approximate edges to.
- This will open an extension. Pick the feature type in this example Circle.
- A dialog will open displaying the location, vector, and size of the selected feature.
- Verify this information to be sure that model adjustments were done correctly.
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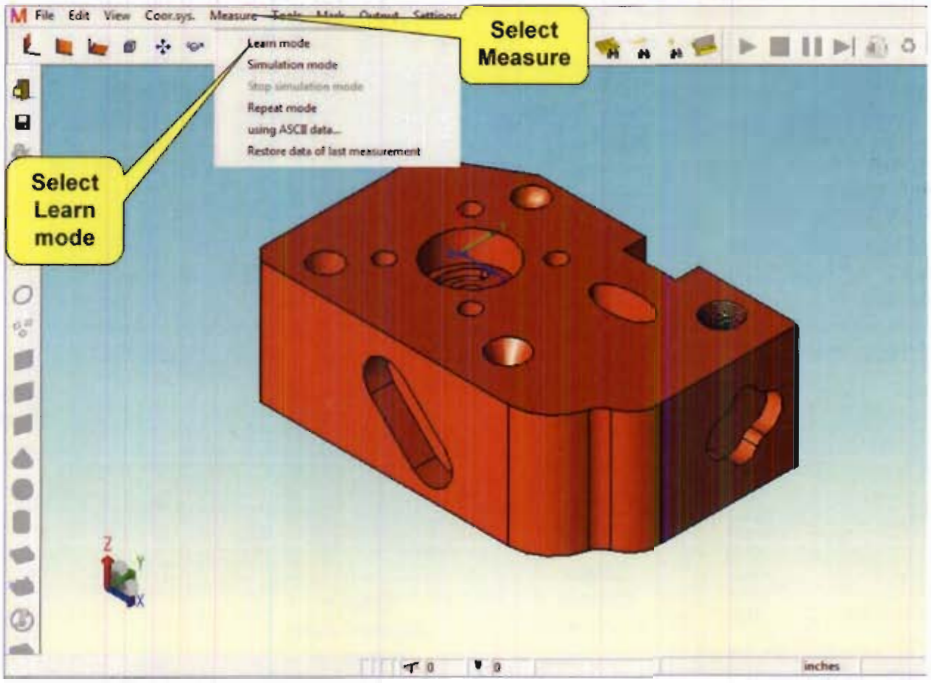
Learn mode



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- Once all settings have been reviewed enter into the learn mode.
- Select measure.
- Select learn mode.
- The learn mode may also be entered from the program manager.
- Most settings may be adjusted any time thought out the programming process.
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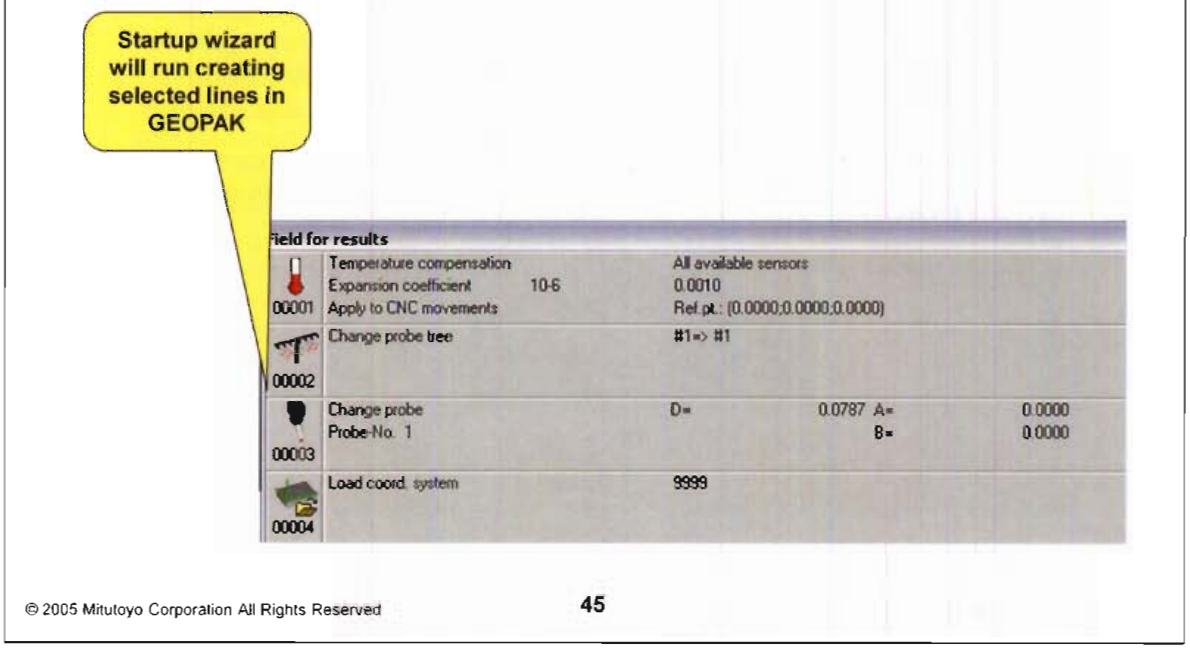
Learn mode



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- The learn mode will start and the startup wizard will run.
- In GEOPACK create a coordinate system to match the Cad coordinate system.
- This can be done manually, or by using a fixture coordinate system and a translation.
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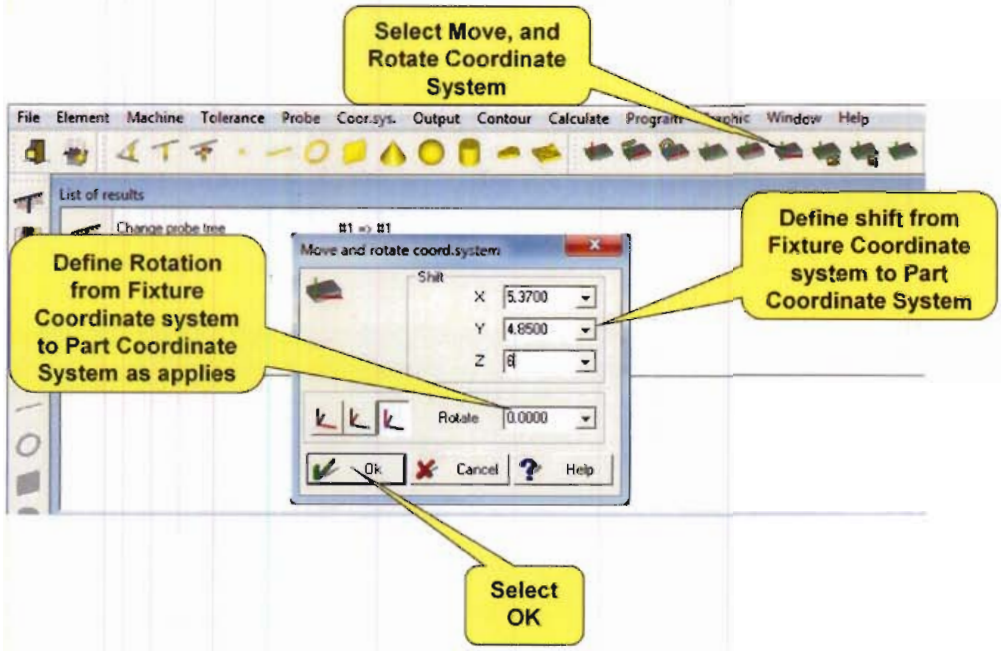
Coordinate Part to Model



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- Place part in fixture coordinate system.
- Collect data from part for translation, document the values, delete measurements.
- Select Move, and Rotate Coordinate System.
- Define shift and rotation, as applicable from collected data.
- Select OK to apply translation.
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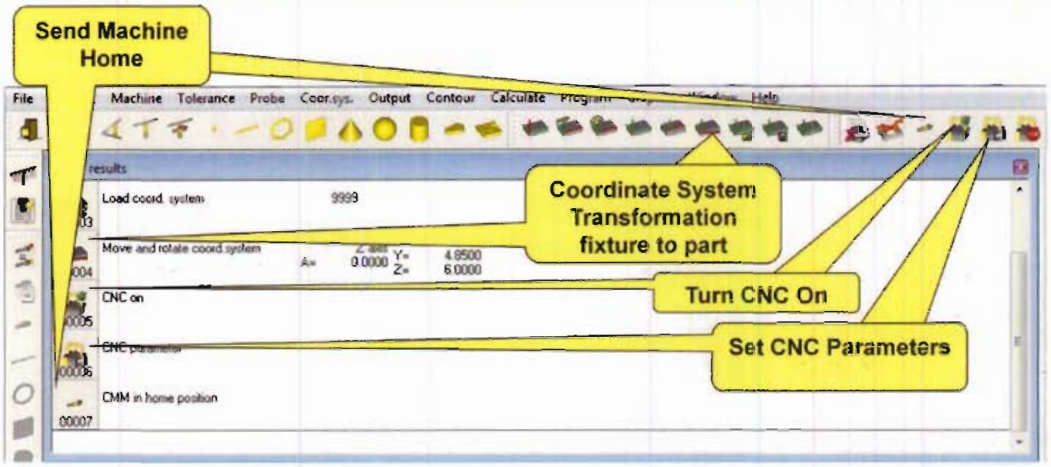
Setup in Geo Pak



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- Turn CNC motion on.
- Set CNC Parameters as defined in level 1 training Ref page 214.
- Move machine to home position.
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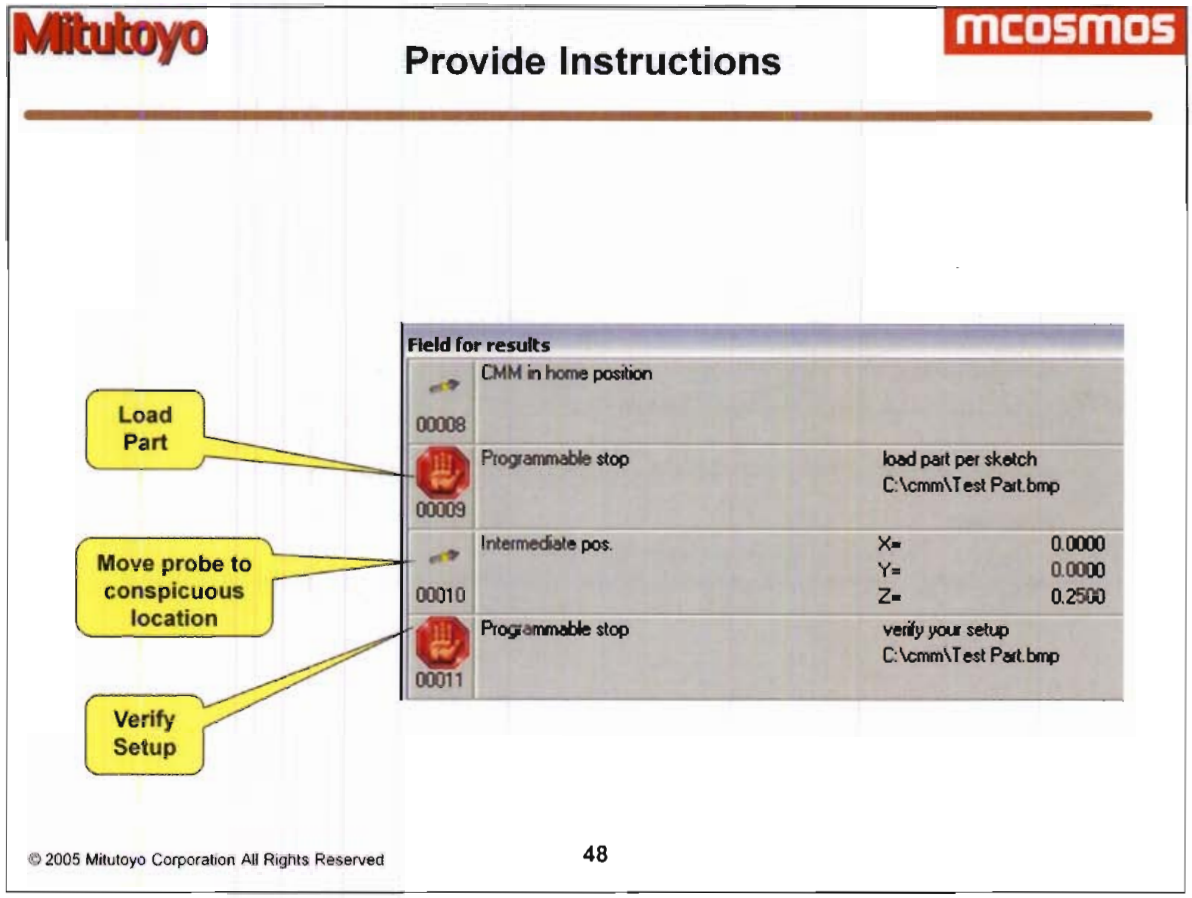

- Use programmable stop to provide instructions, pictures, and sound files for loading part as applicable.
- Move machine to a conspicuous location on part.
- Use programmable stop to provide instructions, pictures and sound files for verifying setup of part as applicable.
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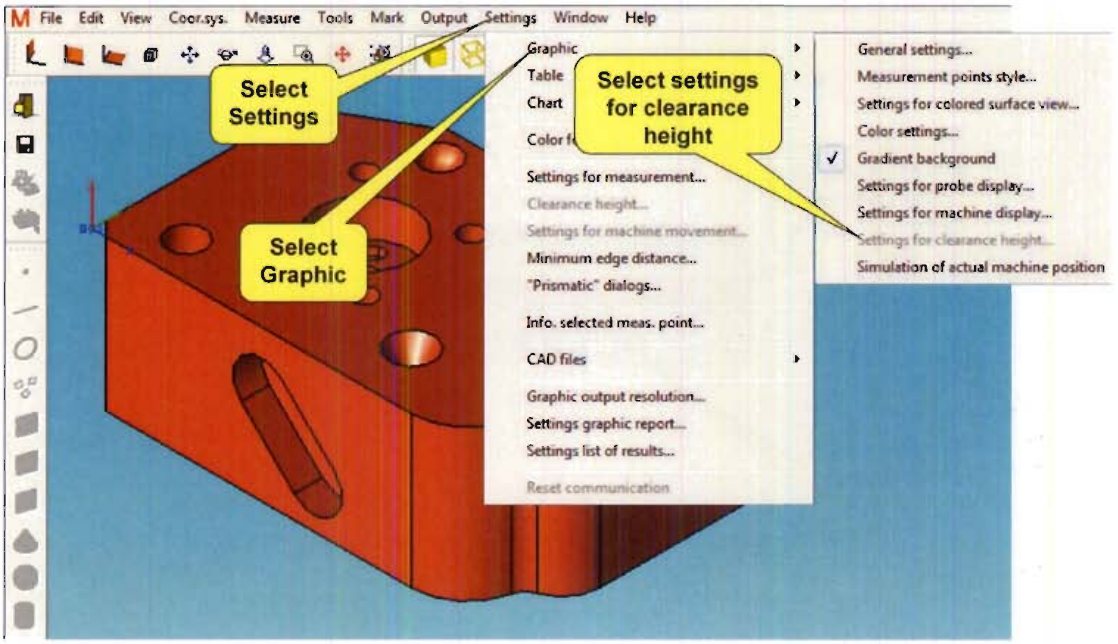
Cat 1000P Settings



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49

- Select Settings.
- Select Graphic.
- Select Settings for clearance height.
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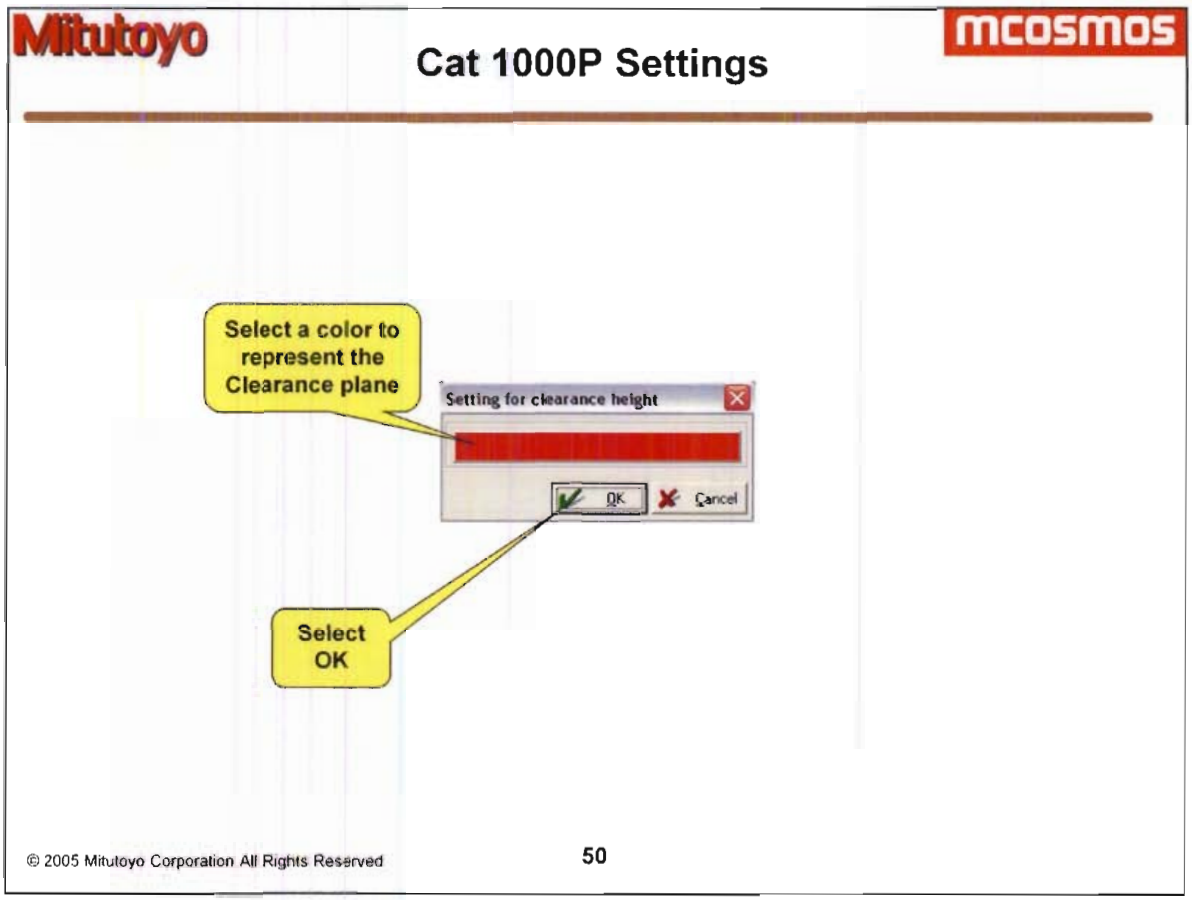

- Select a color to represent the Clearance plane. Same procedure as in model colors. Note: Clearance plane and it's representation may be turned on or off at any time.
- Upon completion select OK.
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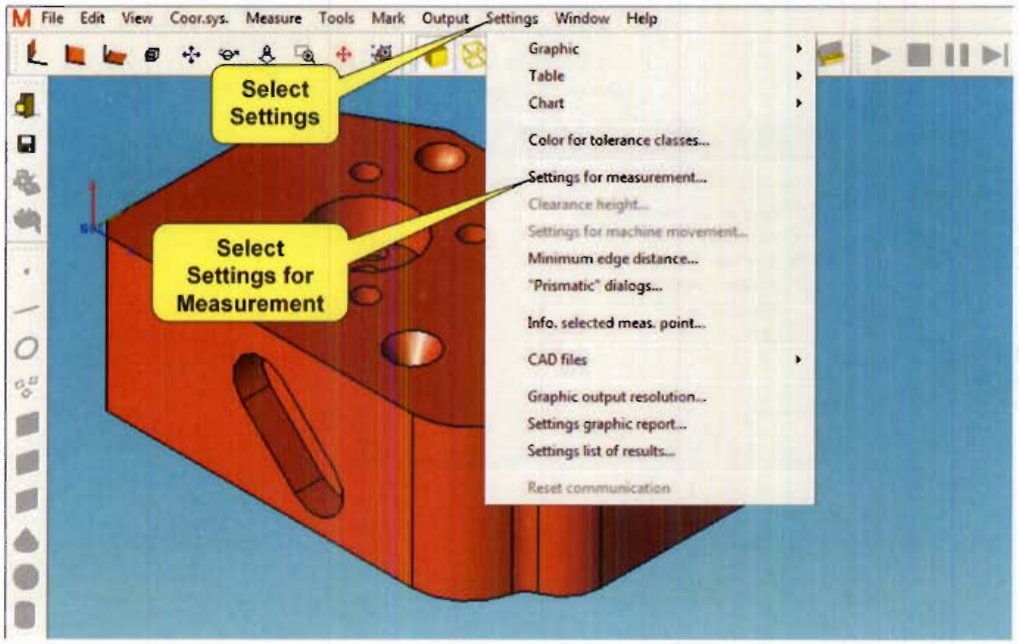
Cat 1000P Settings



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51

- Select Settings.
- Select settings for measurement.
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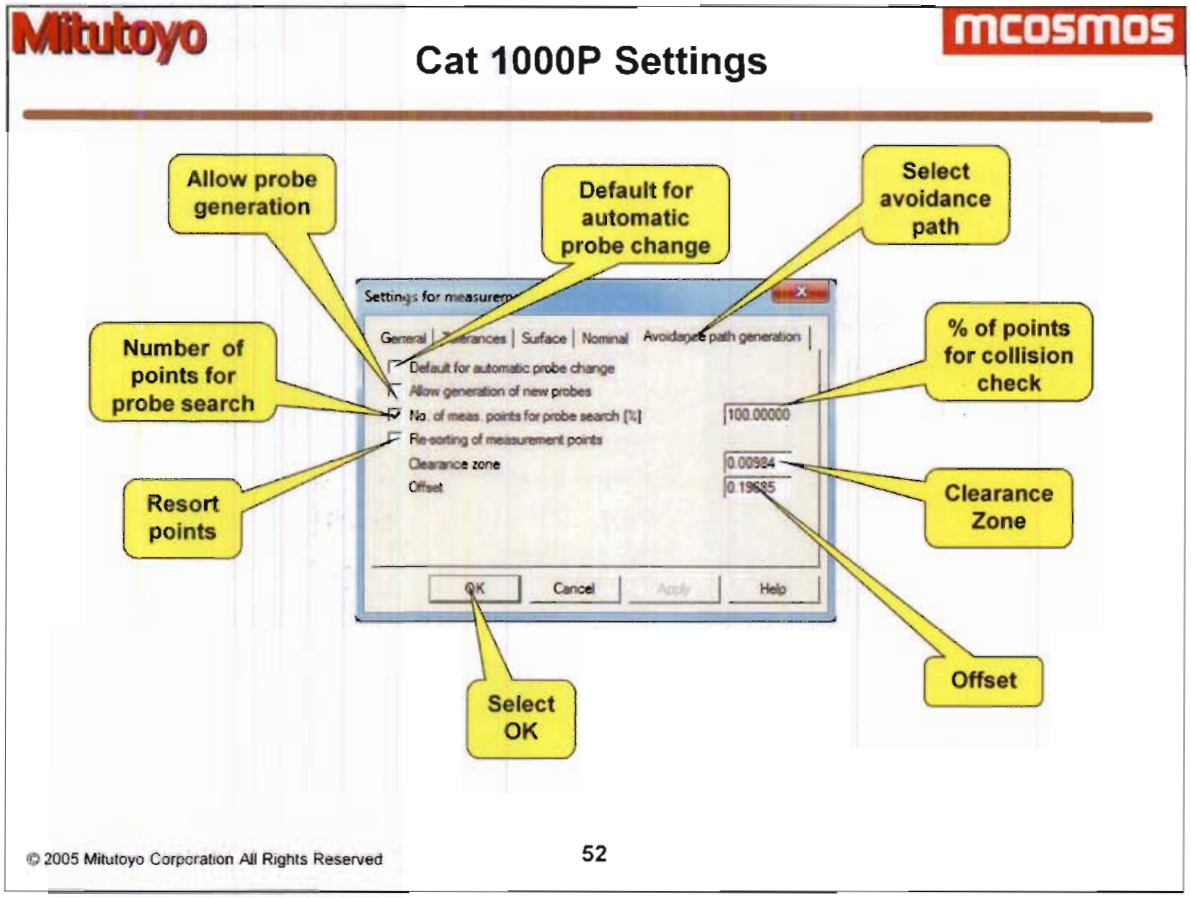

- Select Avoidance path.
- If you want the machine to change probes, when the program path warrants it, select Default for automatic probe change.
- Allow probe generation, will allow the machine to add needed probes for a program and will allow for their use. If this option is selected upon completion the added probes should be calibrated and the part re-inspected.
- Number of points for probe search, indicates the percent of probing points to be checked for collision if violated.
- Resorting of measurement points will resort the points to optimize probe path.
- Clearance zone is a zone around the probe (safety distance max) that will register a collision.
- Offset, if a collision avoidance path is necessary, offset defines the distance to an intermediate point normal and away from the detected collision point.
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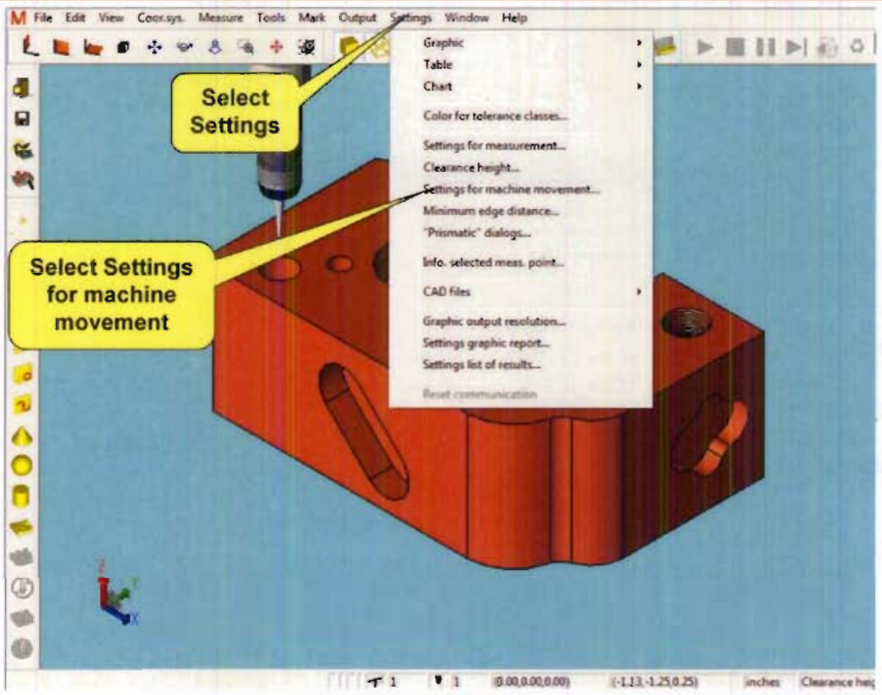
mcosmos

Cat 1000P/S Settings



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53

- Select Settings.
- Select Settings for machine movement.
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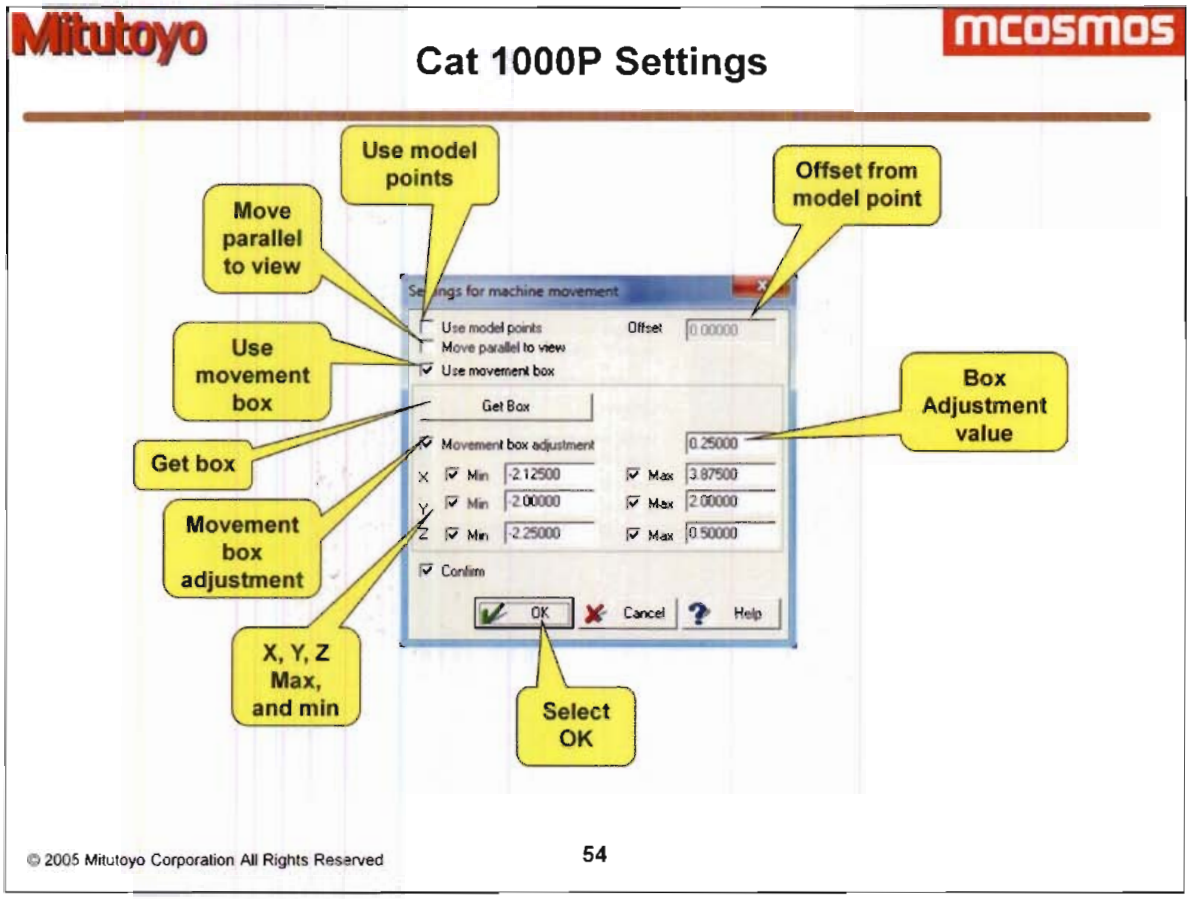
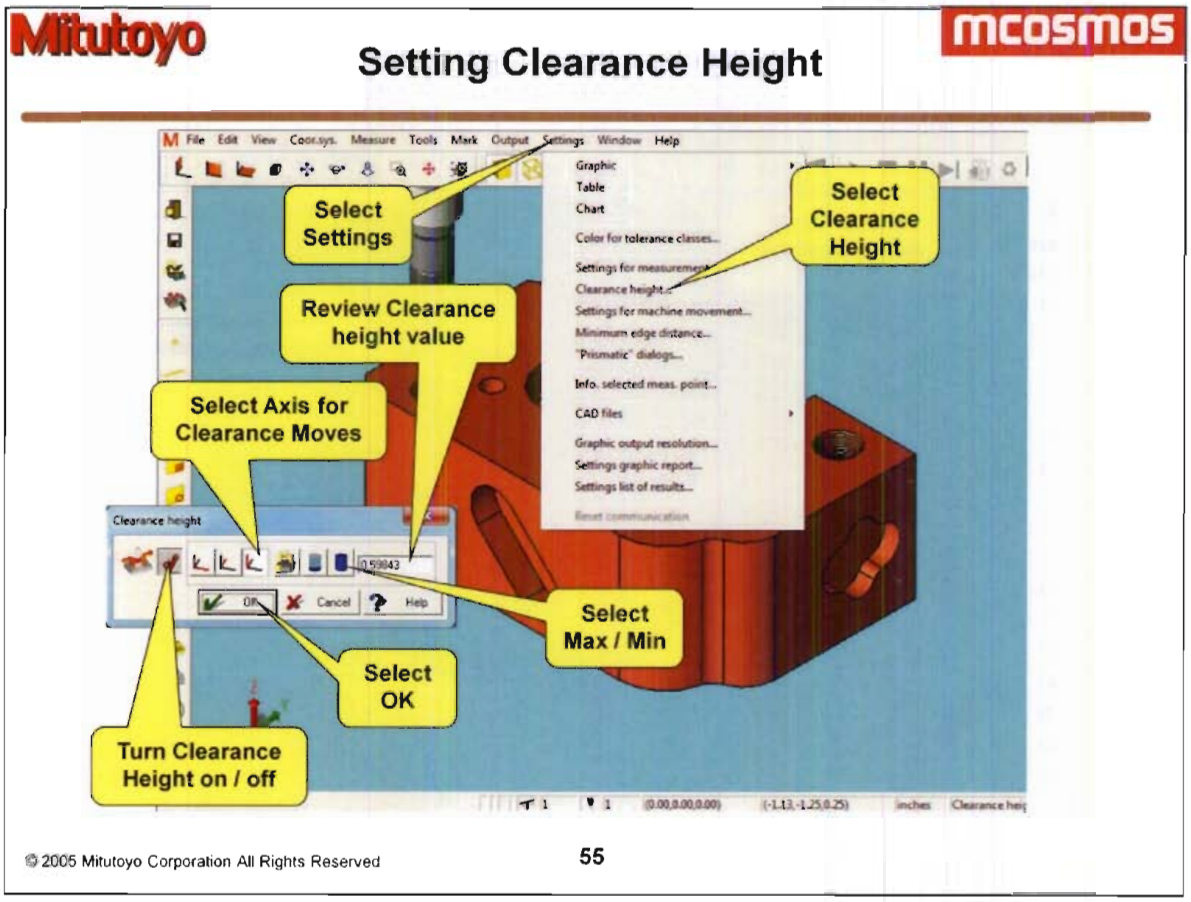
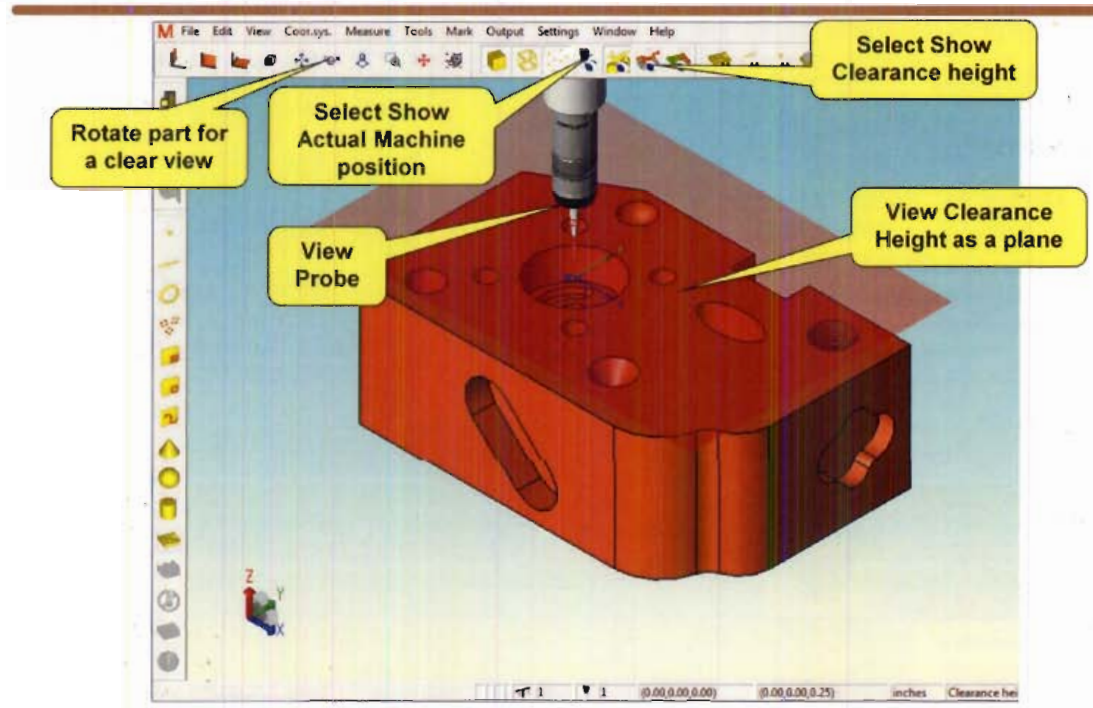


- Choose the method of defining a move:
  - Use model points, creates a move point the offset value away from the selected model point normal to the part. Set the offset value.
  - Move parallel to view, moves to the selected point parallel to the current view.
  - Use movement box moves to a selected point on the movement box.
- Accept or adjust Max, and Min in X, Y, and Z .
- Movement box adjustment. assigning adjustment value will enlarge the movement box on all selected sides by the adjustment value.
- Get box, will enter the selected Max, and Min values from the model.
- These settings are used for movement, collision avoidance, setting clearance height, and automatic probe changes.
- Select OK upon completion. These settings may be adjusted throughout the part program as required.



- Select Settings.
- Select Clearance height.
- Turn on, select axis, select min / max, or define clearance value. Note: if min / max is not available create movement box in settings for machine motion.

Setting Clearance Height



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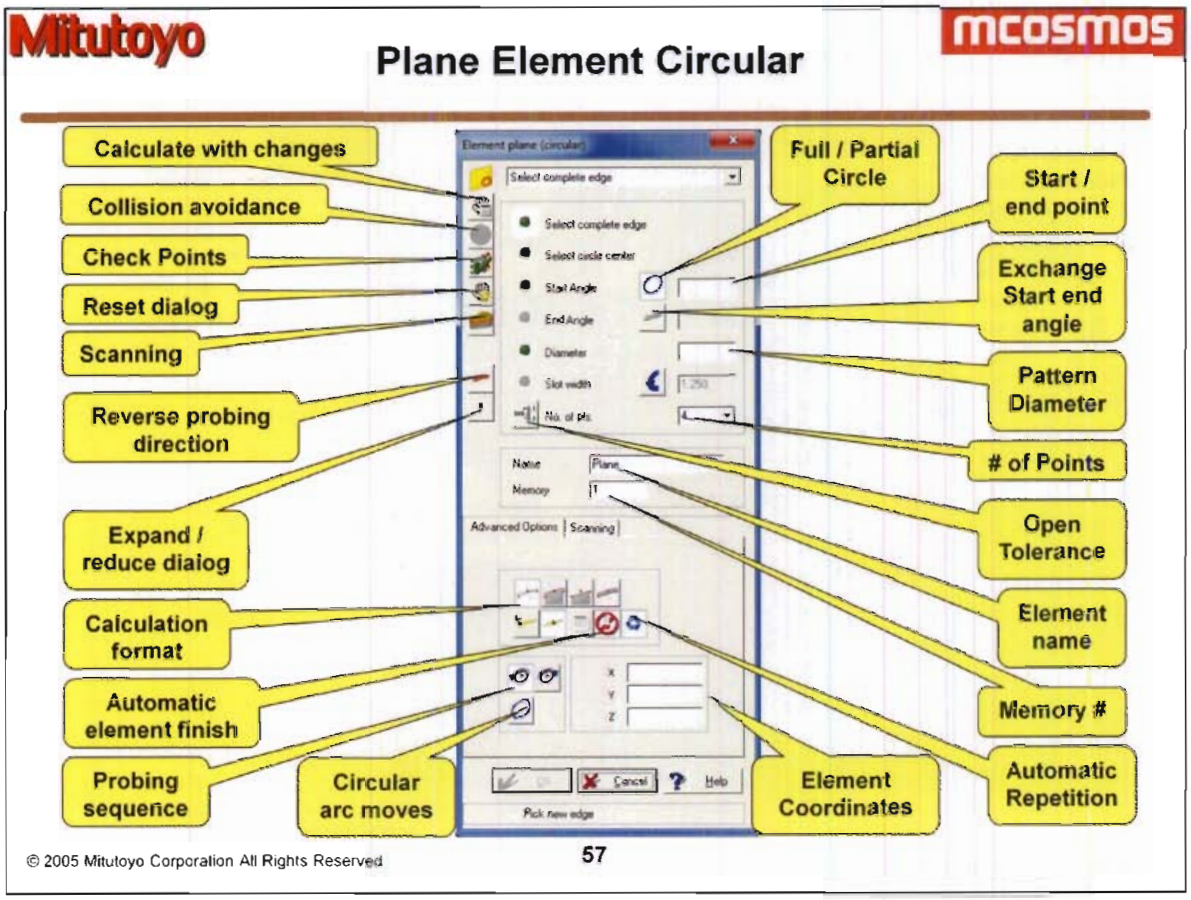
- Select Show actual machine position to view probe .
- Select the clearance height icon to view the clearance plane.
- Rotate part to verify clearance plane location Adjust as necessary.
- Verify that probe representation is in the same relative location in the model as on the machine.



- Select the Icon for plane element circular.
- Place curser over each icon to provide an icon explanation.
- Note: once a plane element is started if automatic element finish is off you may use multiple tools multiple times to collect required points on the element. You may start the element from Geopak.

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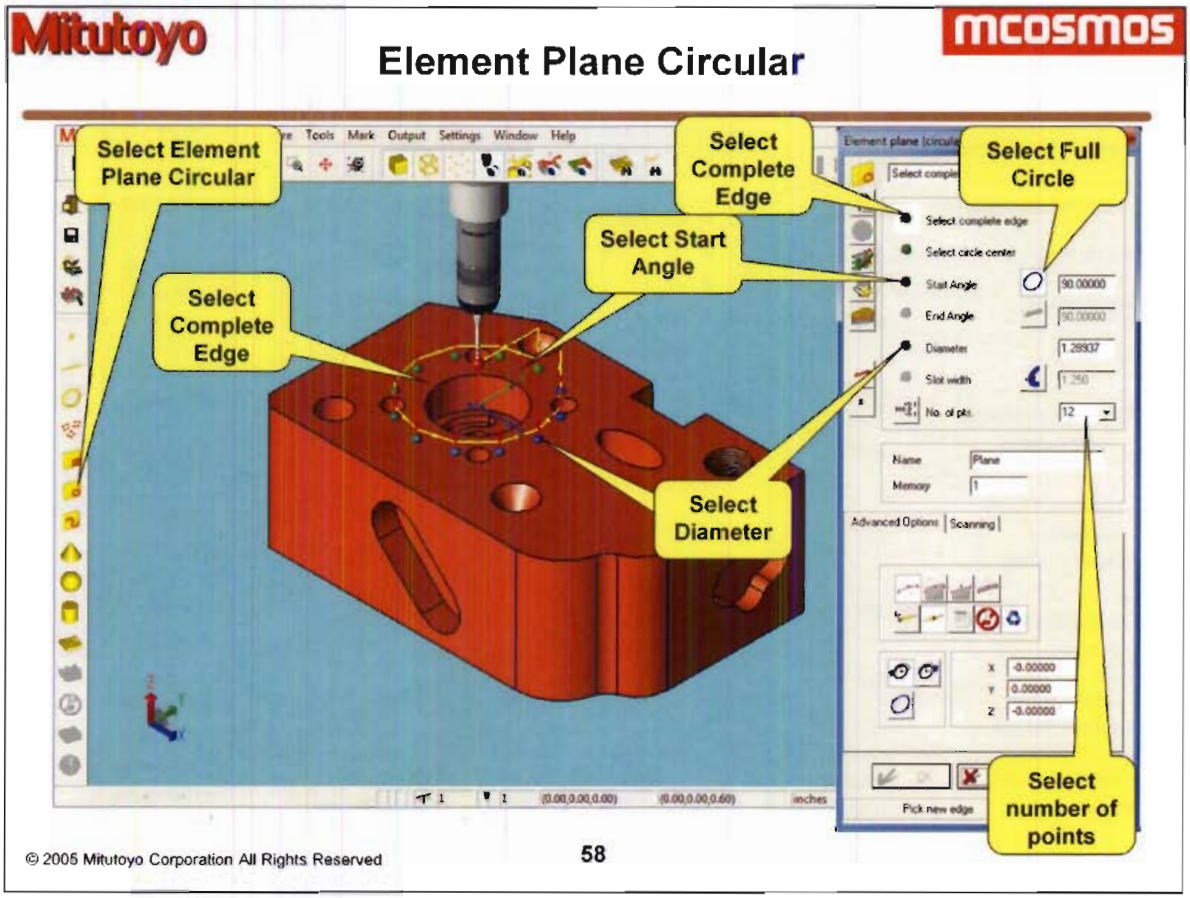

- Select the Element Plane Circular Icon, the Element Plane Circular dialog will open.
- The green light next to Select complete edge indicates to select a circular edge on the surface desired. Points will be placed around the edge.
- The green light next to Start Angle indicates to select a start angle.
- The green light next to Diameter indicates to select the diameter.
- Note: With each mouse click the path updates.
- To correct start angle or diameter be sure to select the corresponding green light which will light when selected.
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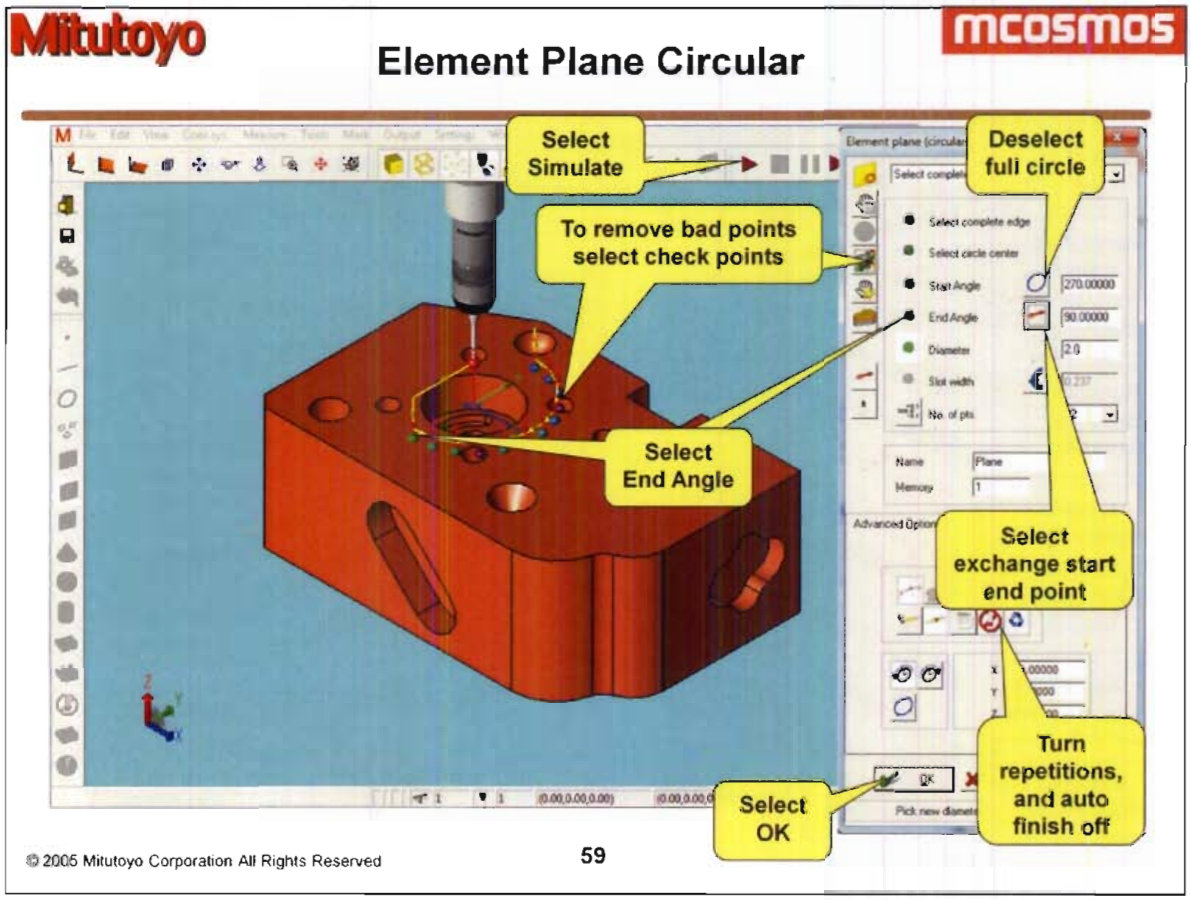

- To check points on a portion of a circle deselect full Circle.
- Select the light at End Angle to adjust the portion of points to be checked.
- Select the end point on the model, the path will adjust.
- To place points on the opposite portion of the circle, select Exchange start end point Icon.
- To remove points too close to an edge, or not on the selected surface select Check points Icon.
- Select Simulate to view simulation to verify the path.
- If you are happy with the simulation select OK to collect the points.
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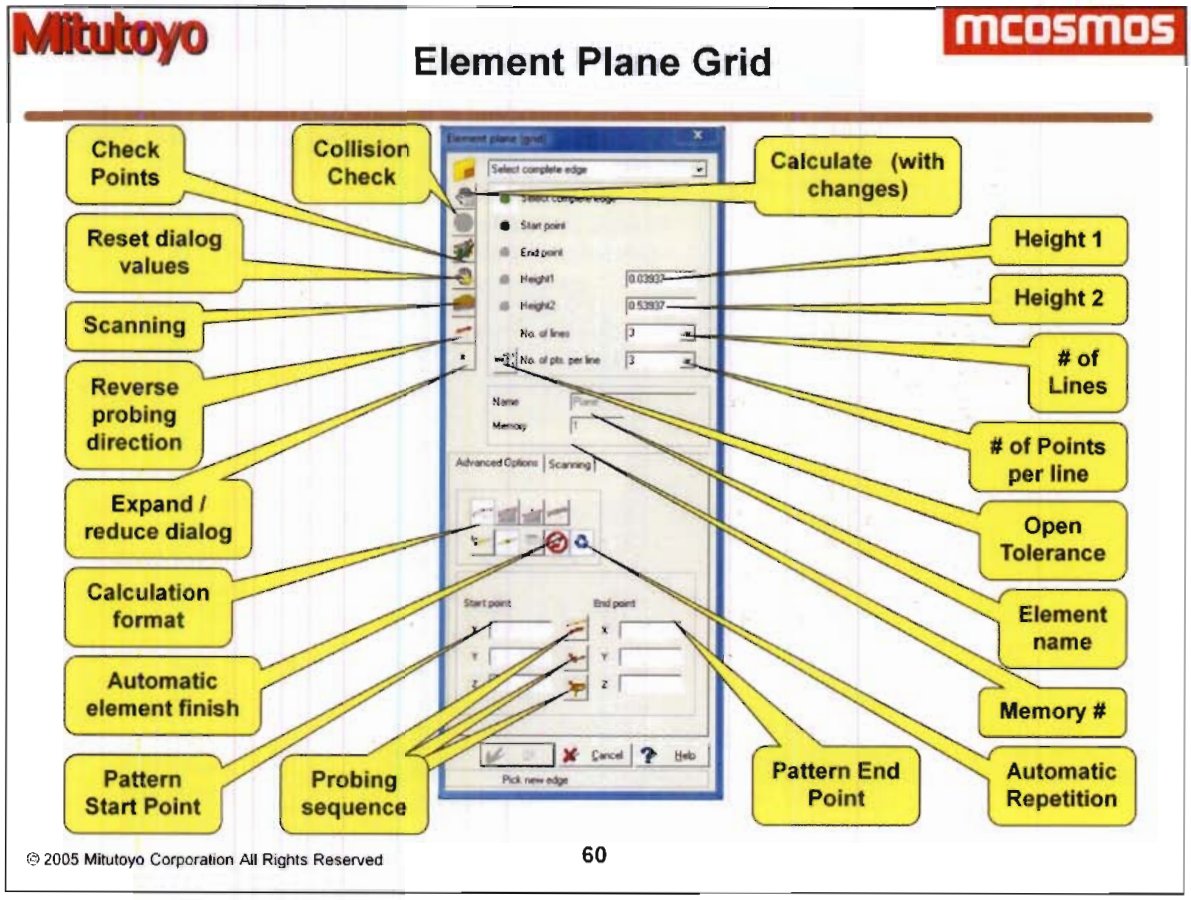
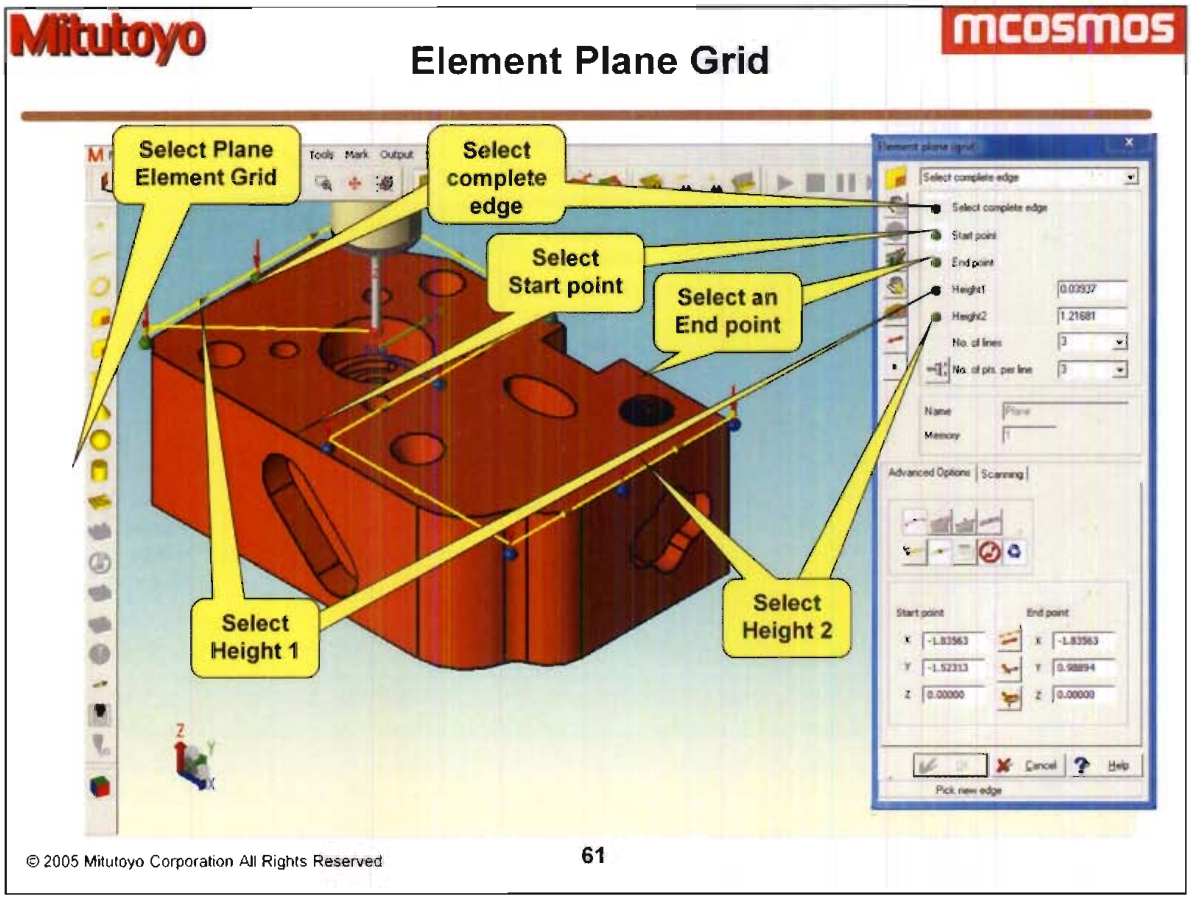


- Select the Icon for plane element grid.
- Place curser over each icon to provide an icon explanation
- Note: Once a plane element is started if automatic element finish is off you may use multiple tools multiple times to collect required points on the element. You may start the element from Geopak.



- Select Element plane Grid
- The light at select complete edge is lit. Select a complete edge (the longest continues straight edge at a point were a perpendicular line would find the opposite edge of the surface as the first edge).
- If this is not possible adjust the Start point (the first point in the path in the direction of the first to the second point).
- Adjust the End point (the opposite end in the same direction)
- Adjust Height 1 (the location of the first point in the opposite direction)
- Adjust Height 2 (the last point in the same direction as height 1)
- Note: Be sure the light next to the desired selection is lit, if not select the light corresponding to the desired function.
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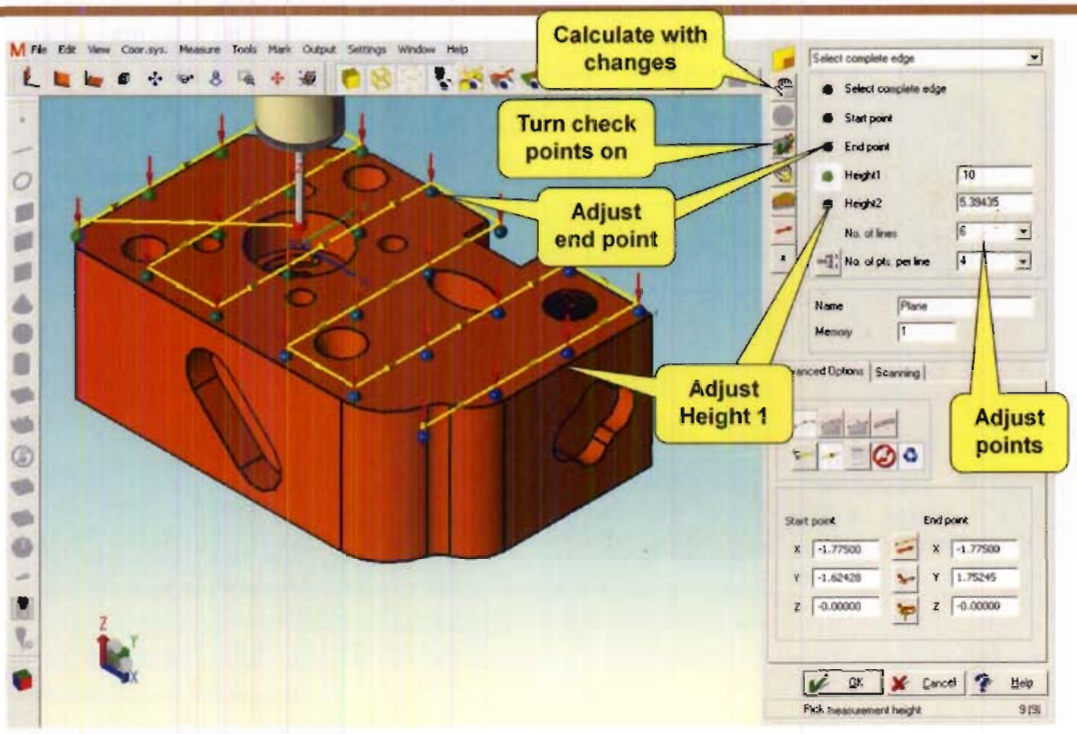
Check points

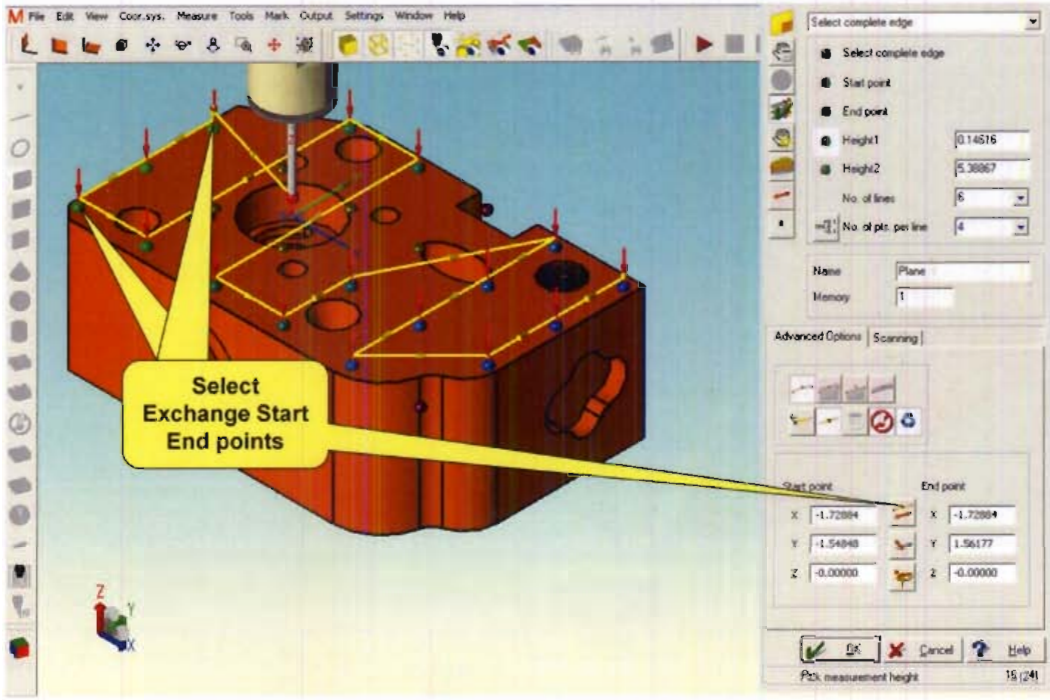
mcosmos



Mitutoyo

Element Plane Grid

mcosmos



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- To remove points not on the selected surface, or to close to an edge. as defined by minimum edge distance select Check Points.
- Select Exchange Start End points to exchange Start End points.
- Select Flip Begin End points to exchange Begin End Points.
- Adjust the number of lines and number of points per line to collect the desired grid of points.
- Start point, End point Height 1, and Height 2 may be adjusted at any time.
- Select Simulate to verify the path.
- If you are happy with the simulation select OK to collect the points.
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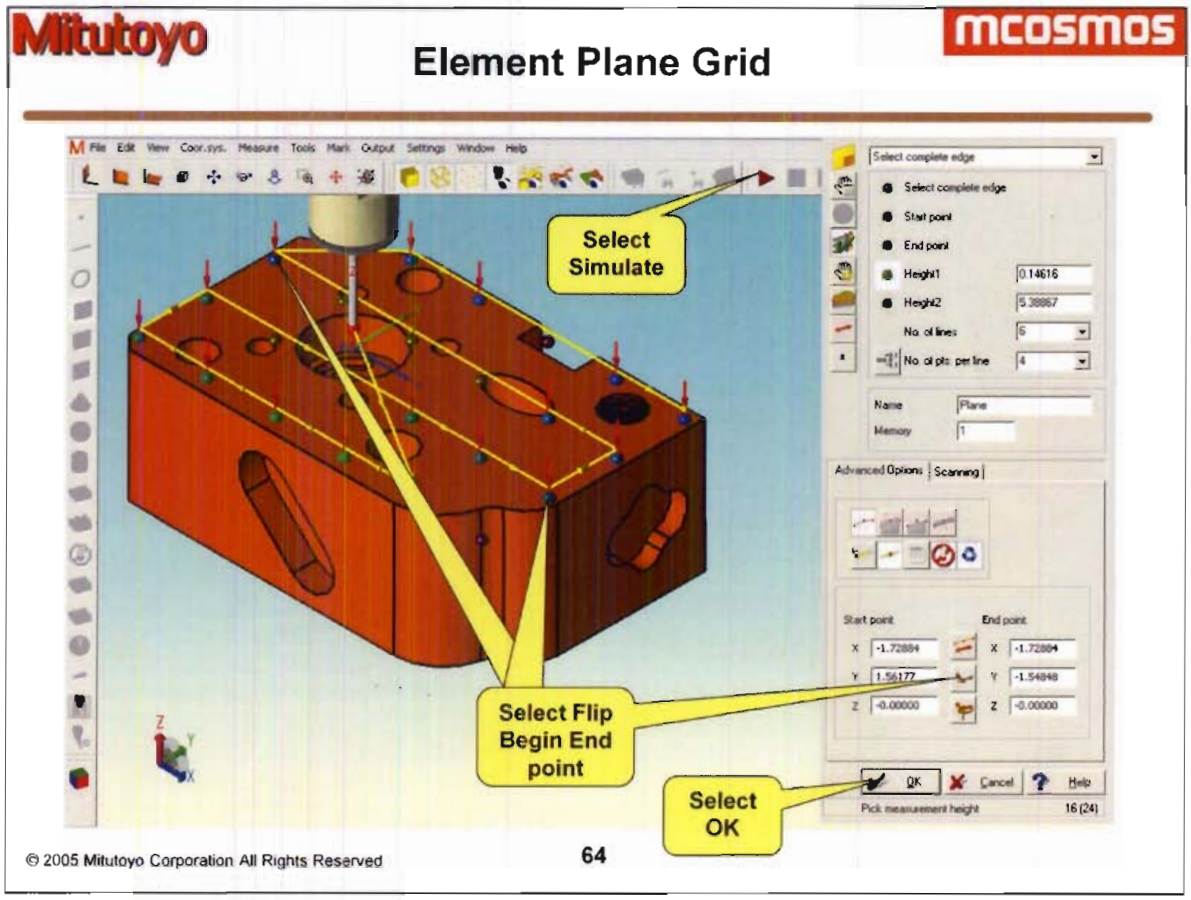

- To remove points not on the selected surface, or to close to an edge. as defined by minimum edge distance select Check Points.
- Select Exchange Start End points to exchange Start End points.
- Select Flip Begin End points to exchange Begin End Points.
- Adjust the number of lines and number of points per line to collect the desired grid of points.
- Start point, End point Height 1, and Height 2 may be adjusted at any time.
- Select Simulate to verify the path.
- If you are happy with the simulation select OK to collect the points.
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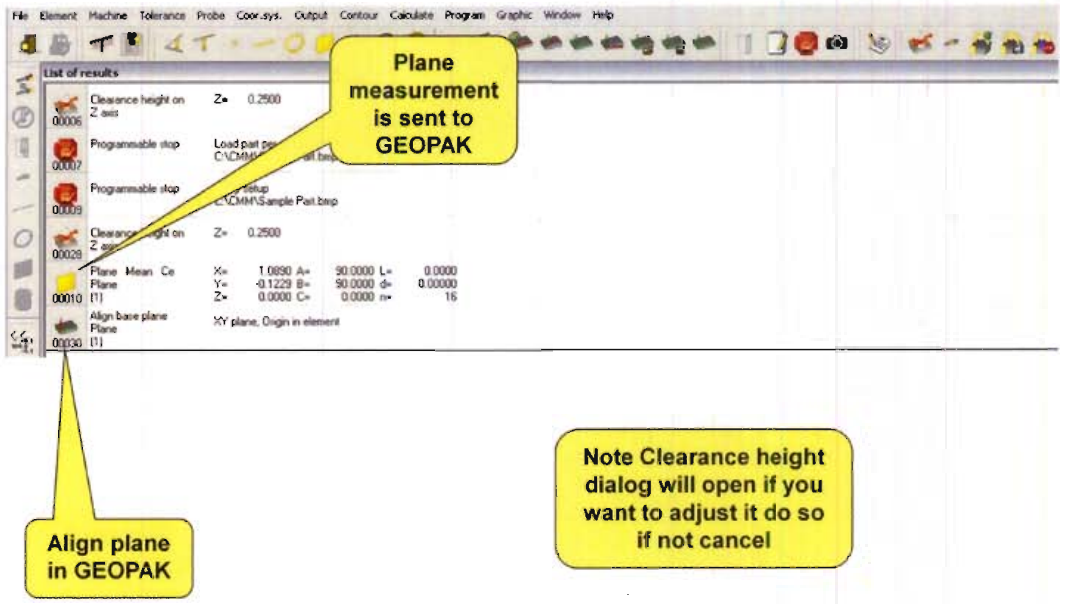
Align Plane



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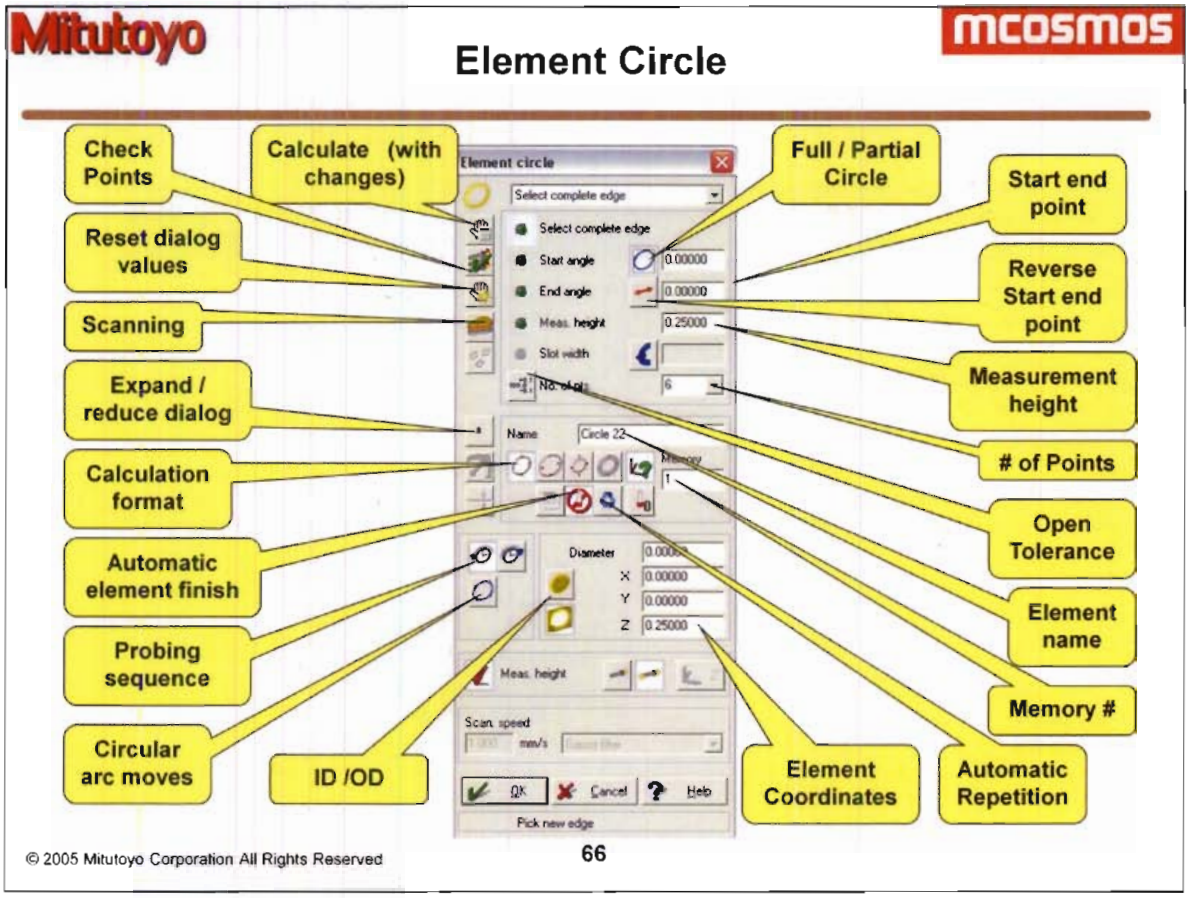
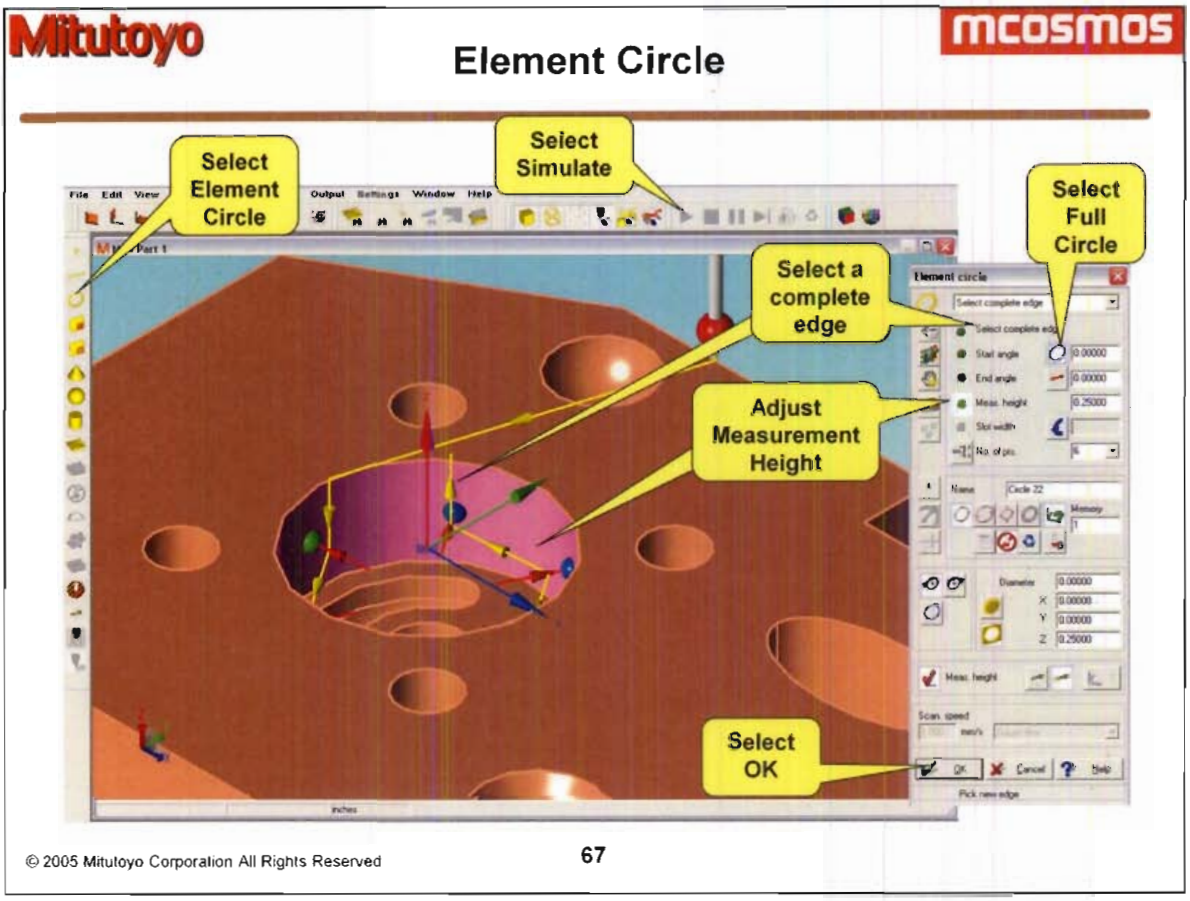
- Cat 1000 will create the part program in GEOPAK.
- Cat 1000 only generates motion and nominals, you must apply alignments
- After modifying the coordinate system, GEOPAK will open the clearance height dialog for adjustment. If you want to adjust the clearance height do so, if not cancel the dialog.



- Select the Icon for Element Circle.
- Place curser over each icon to provide an icon explanation.
- Note: Once an Element Circle is started if automatic element finish is off you may use multiple tools multiple times to collect required points on the element. You may start the element from Geopak.



- Select Element Circle to open the Element Circle dialog.
- Select Full Circle (we will be measuring a complete circle).
- Select a complete edge (a point on the cylindrical surface containing the circle near entry).
- To adjust the Measurement Height select Meas. Height click at the desired Height for measurement, or type in the desired height, and select Calculate.
- Adjust desired parameters i.e. Number of points, Start Angle.
- Select Simulate to verify the path.
- If you are happy with the simulation select OK to collect the points.
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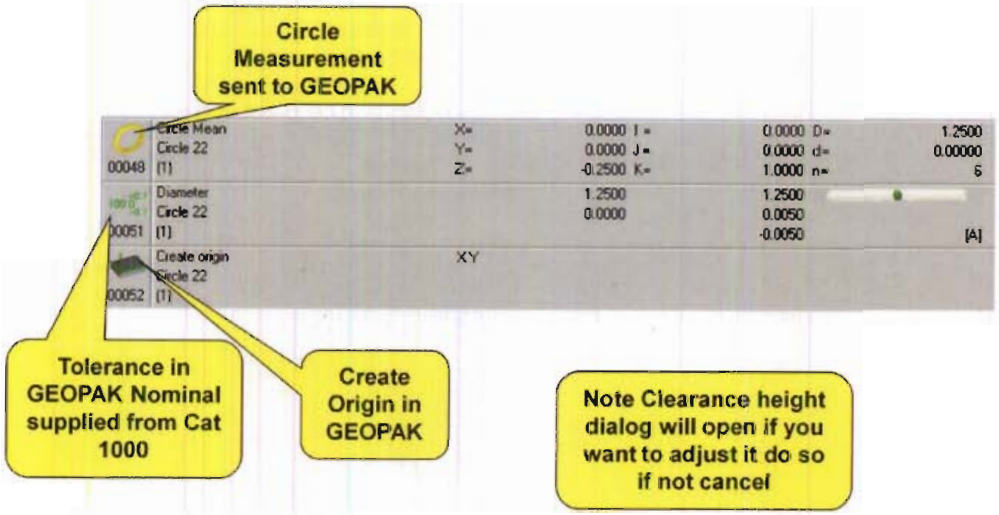
Tolerance, and Create Origin



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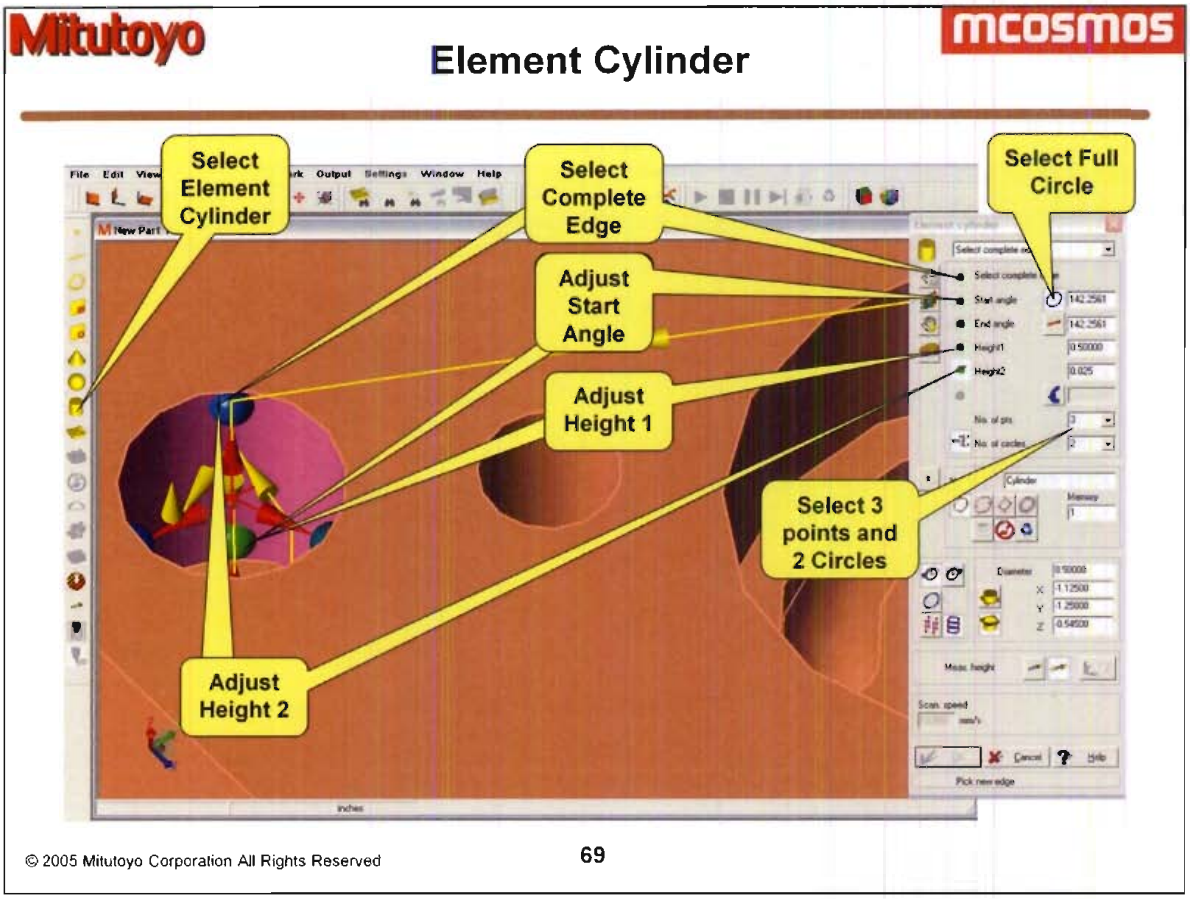
68

- Cat 1000 will create the part program in GEOPAK.
- Cat 1000 only generates motion, and nominals you must apply Tolerances, and create origin.
- After modifying the coordinate system, GEOPAK will open the clearance height dialog for adjustment. If you want to adjust the clearance height do so, if not cancel the dialog.



- Select Element Cylinder to open the Element Cylinder dialog.
- Select Full Circle as we will be measuring a complete cylinder.
- Adjust to 3 points on 2 circles to reduce clutter in hole simplifying selections.
- Select a complete edge (a point on the cylindrical surface near entry).
- Select a point at the far side of the Cylinder as your start point.
- Adjust Height 1 (start point depth) with mouse or input value and Calculate.
- Adjust height 2 (end point depth) with mouse or input value and Calculate.
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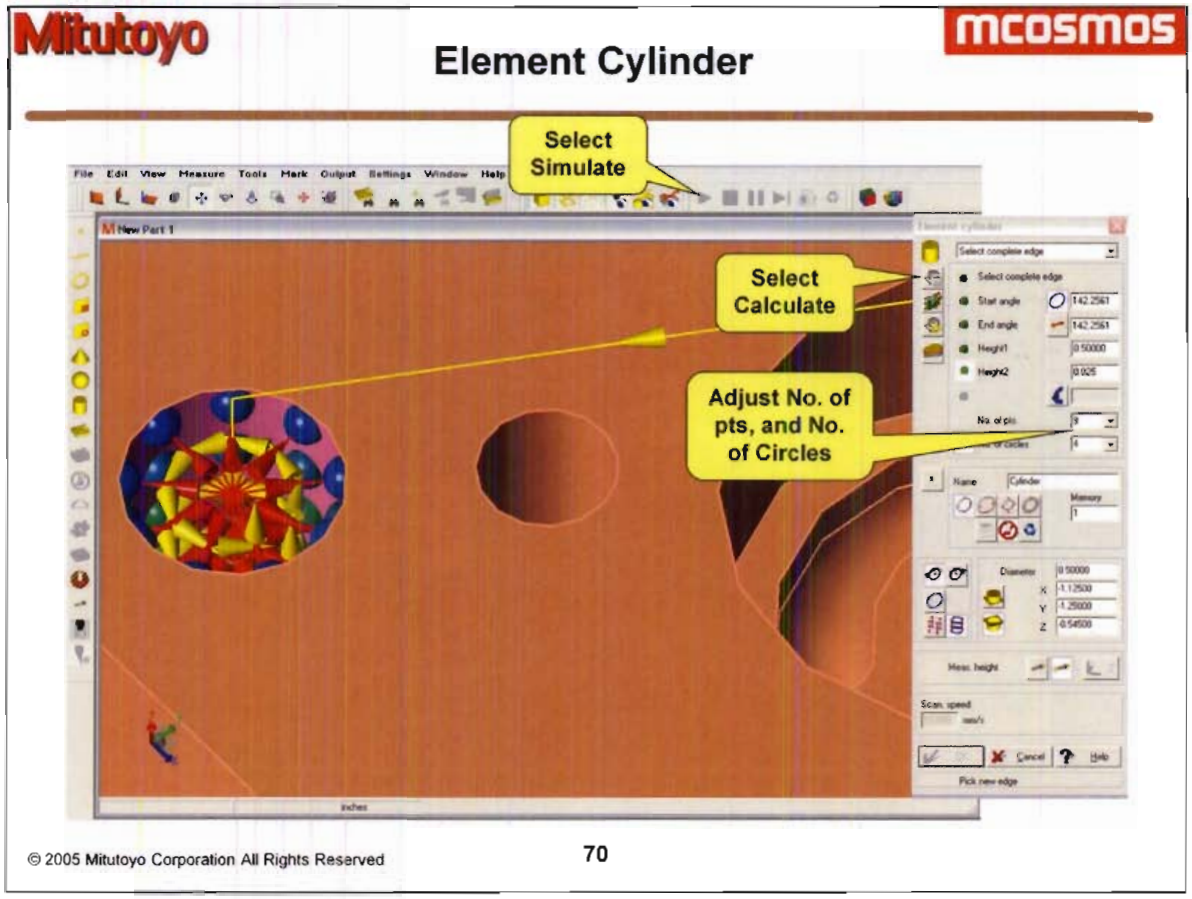

- Adjust number of points, and circles based on tolerance and feature size.
- Select Calculate to apply your adjustments
- Note: The clutter in the hole this makes it difficult to see height adjustments.
- Select Simulate to verify the path .
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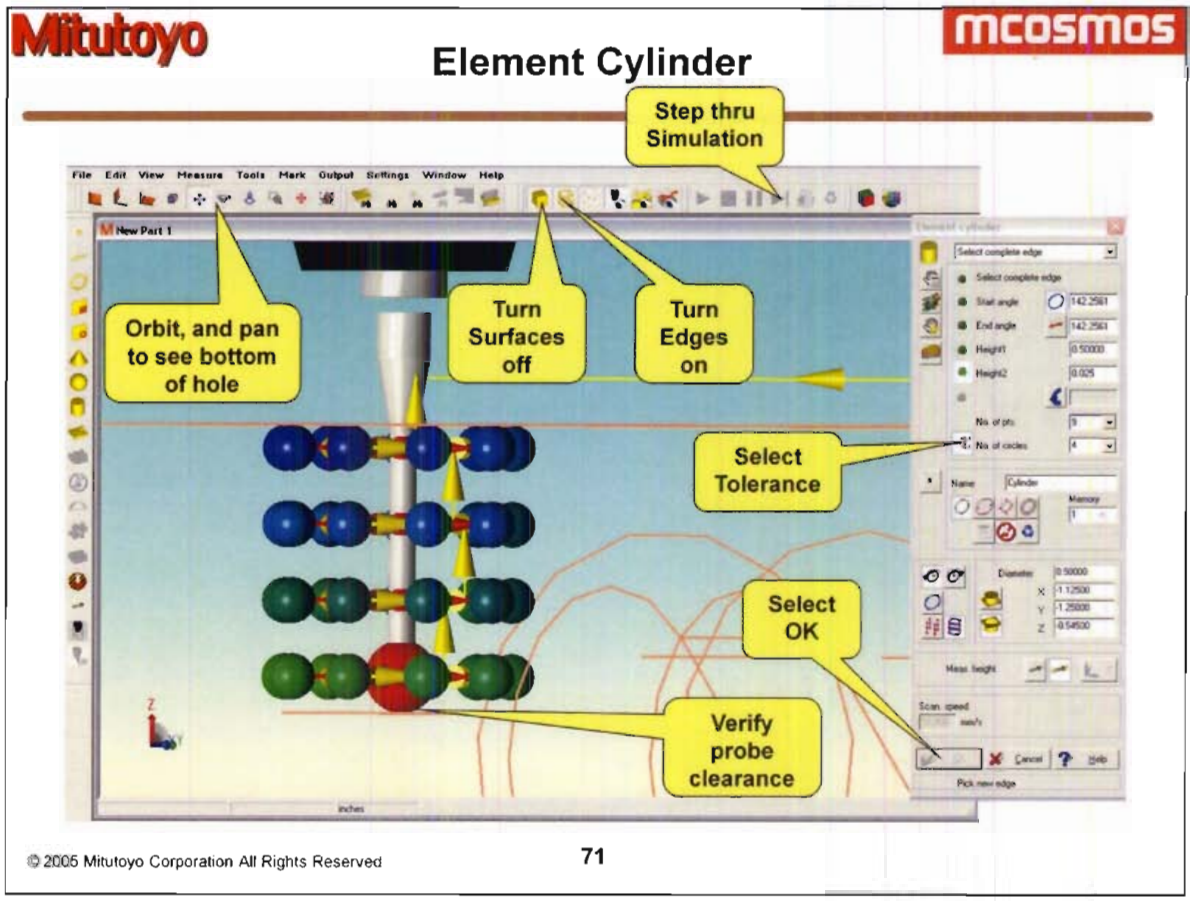

- To verify probe clearance at the bottom of the hole Turn Edges on.
- Turn surfaces off.
- Rotate, and pan to see bottom of hole.
- Step thru Simulation to verify probe clearance and the path.
- Note: Clearance should allow fore tolerance, and a safety factor.
- If you are happy with the simulation select OK to collect the points.
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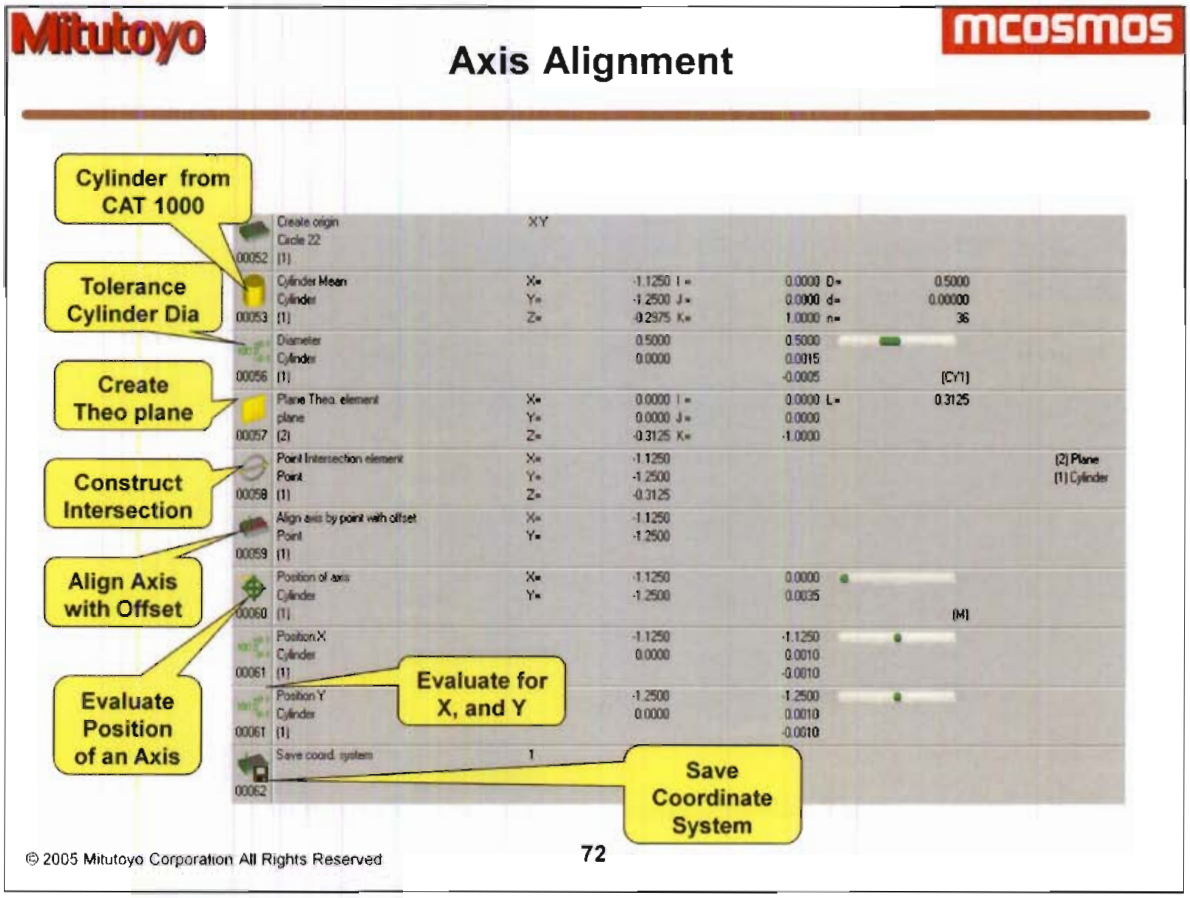

- Cat 1000 will create the part program in GEOPAK.
- Cat 1000 only generates motion and nominals, you must apply Tolerances, and make constructions for the axis alignment.
- After modifying the coordinate system, GEOPAK will open the clearance height dialog for adjustment. If you want to adjust the clearance height do so, if not cancel the dialog.
- Once the Coordinate system is complete we can tolerance the Cylinder for location.
- We should also save the complete coordinate system for future recalling.
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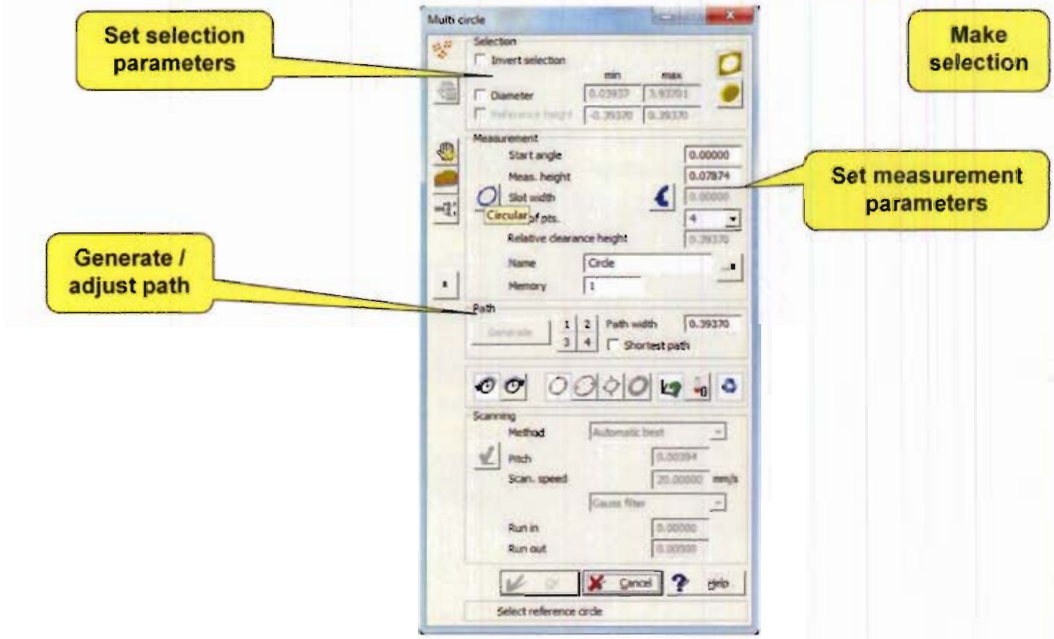
Mitutoyo

Element Circle

mcosmos



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- There is also a multi circle function.
- In multi circle you can specify your selection limitations, and type.
- Selections can be made individually or with a box
- You can adjust your measurement parameters.
- You can adjust the path
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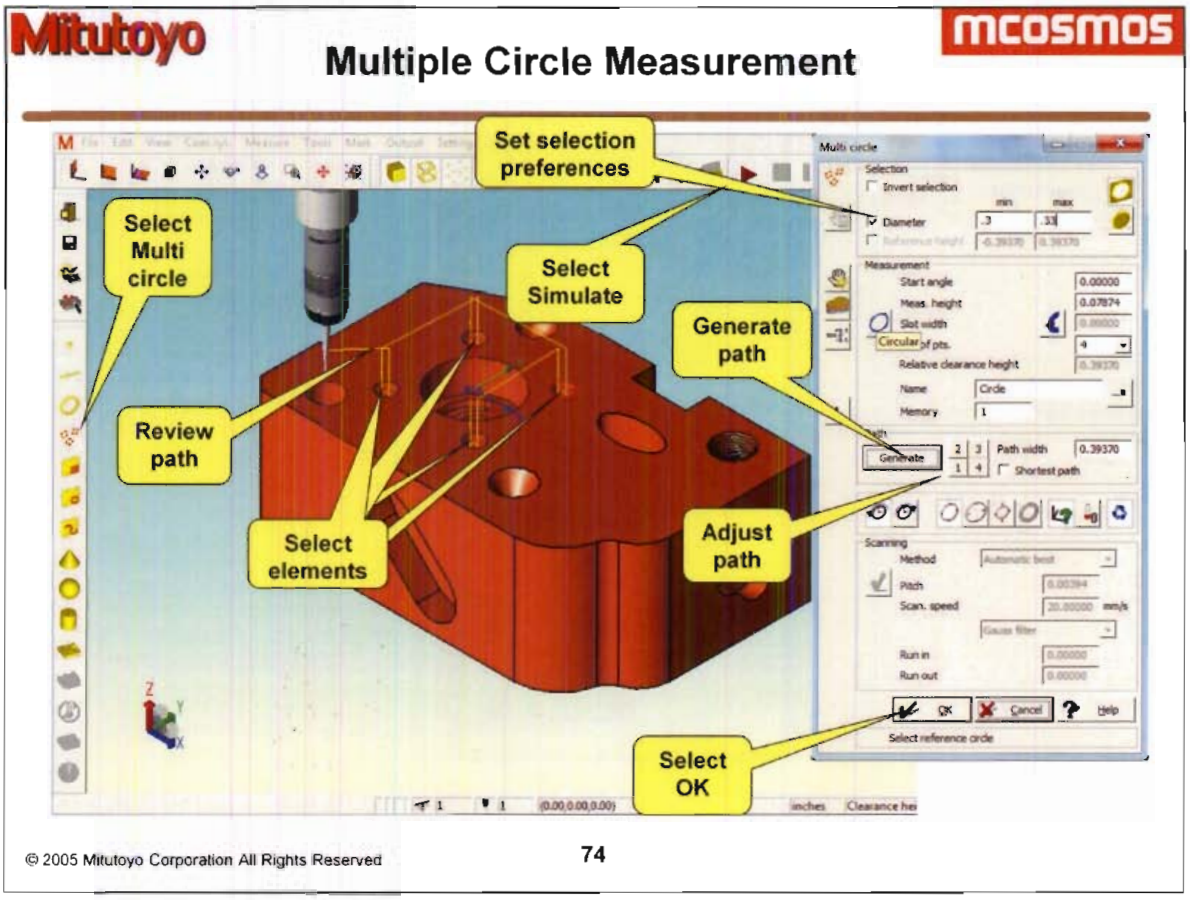

- To measure multiple circles select Multi circle.
- Set the selection parameters size and ID / OD.
- Select the circles either individually or with a box.
- Generate the path, verify the path, adjust the path if descried.
- Simulate to verify path Note collision avoidance doesn't work with multi circles.
- If circles on multiple coplanar planes are to be checked select Surface / Plane.
- Select OK to measure the circles.
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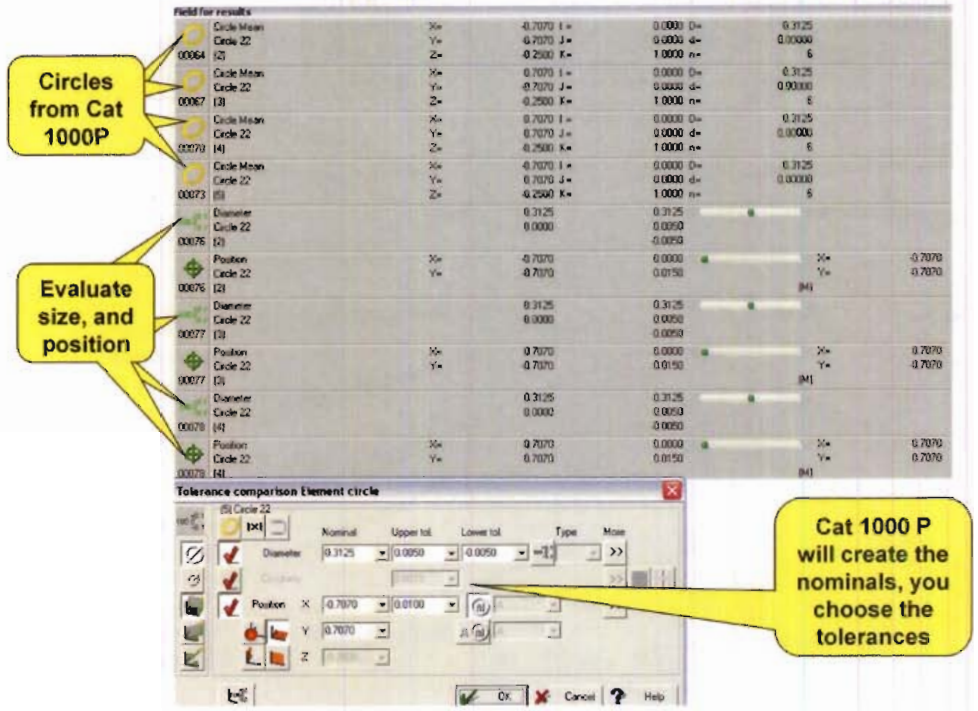
Tolerance Circles



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75

- Cat 1000 will create the part program in GEOPAK.
- Cat 1000 only generates motion and nominals, you must apply Tolerances,
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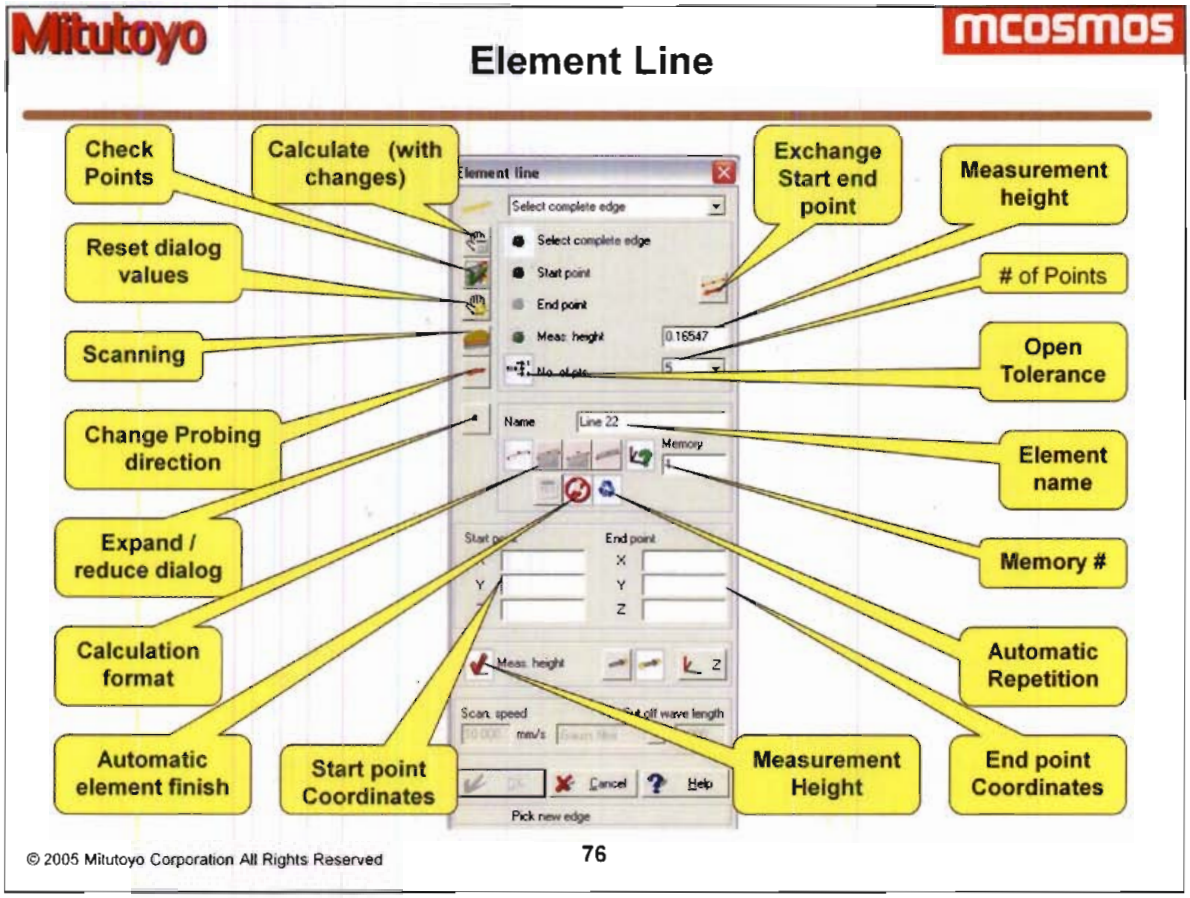
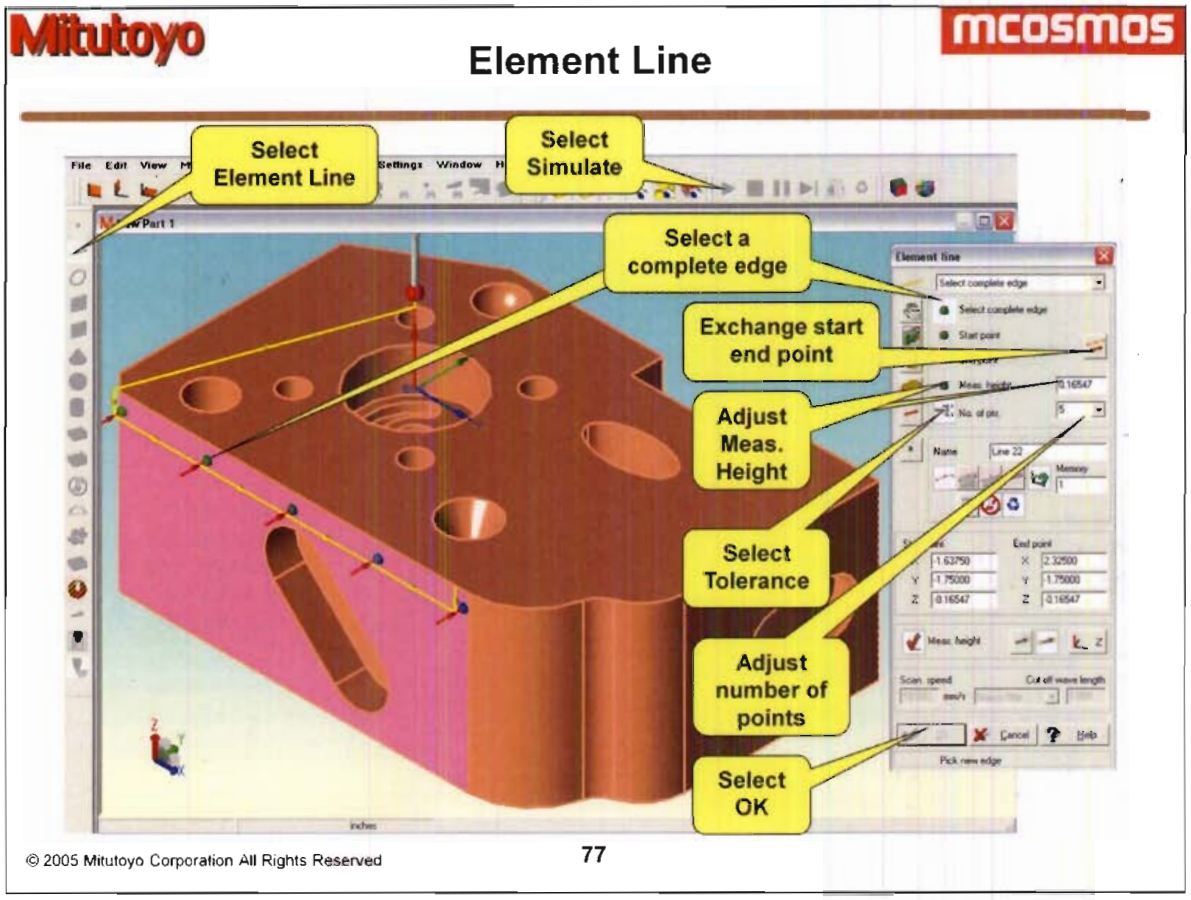


- Select the Icon for Element Line.
- Place curser over each icon to provide an icon explanation.
- Note: Once an Element Line is started if automatic element finish is off you may use multiple tools multiple times to collect required points on the element. You may start the element from Geopak.



- Select Element Line to open the Element Line dialog.
- Select a complete edge (a point on the surface containing the line near an edge parallel to the line to be measured).
- To adjust the Measurement Height select Meas. Height. Click at the desired Height for measurement, or type in the desired height, and select Calculate.
- To reverse the measurement direction select Exchange Start End points.
- Adjust desired parameters i.e. Number of points, Exchange start end point.
- Select Simulate to verify the path.
- If you are happy with the simulation select OK to collect the points.
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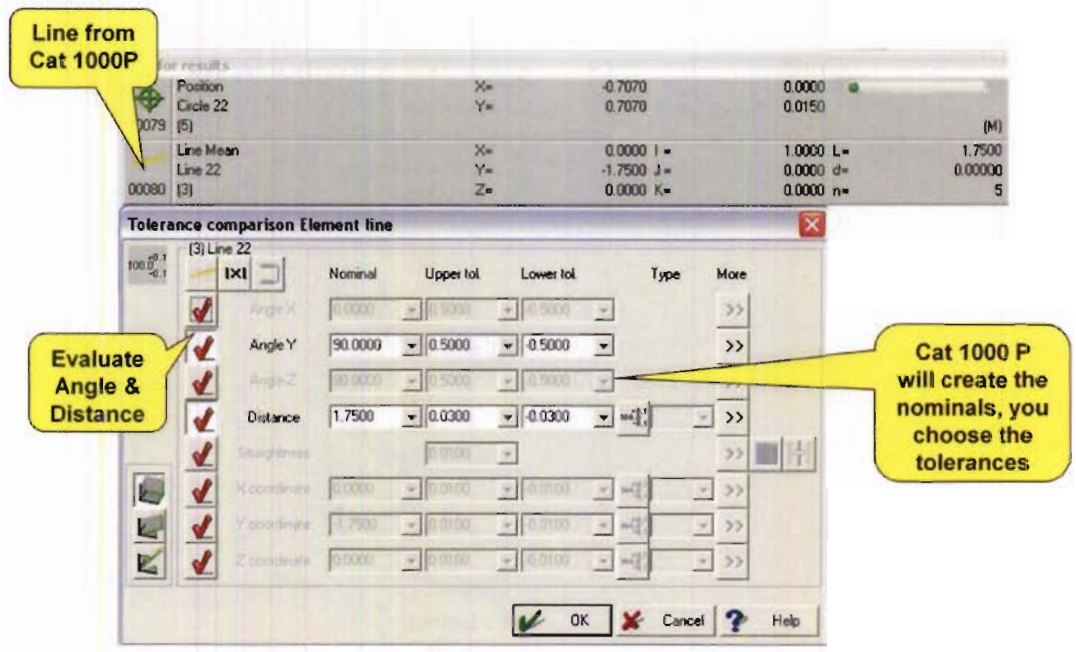
Tolerance Line



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78

- Cat 1000 will create the part program in GEOPAK.
- Cat 1000 only generates motion and nominals, you must apply Tolerances.
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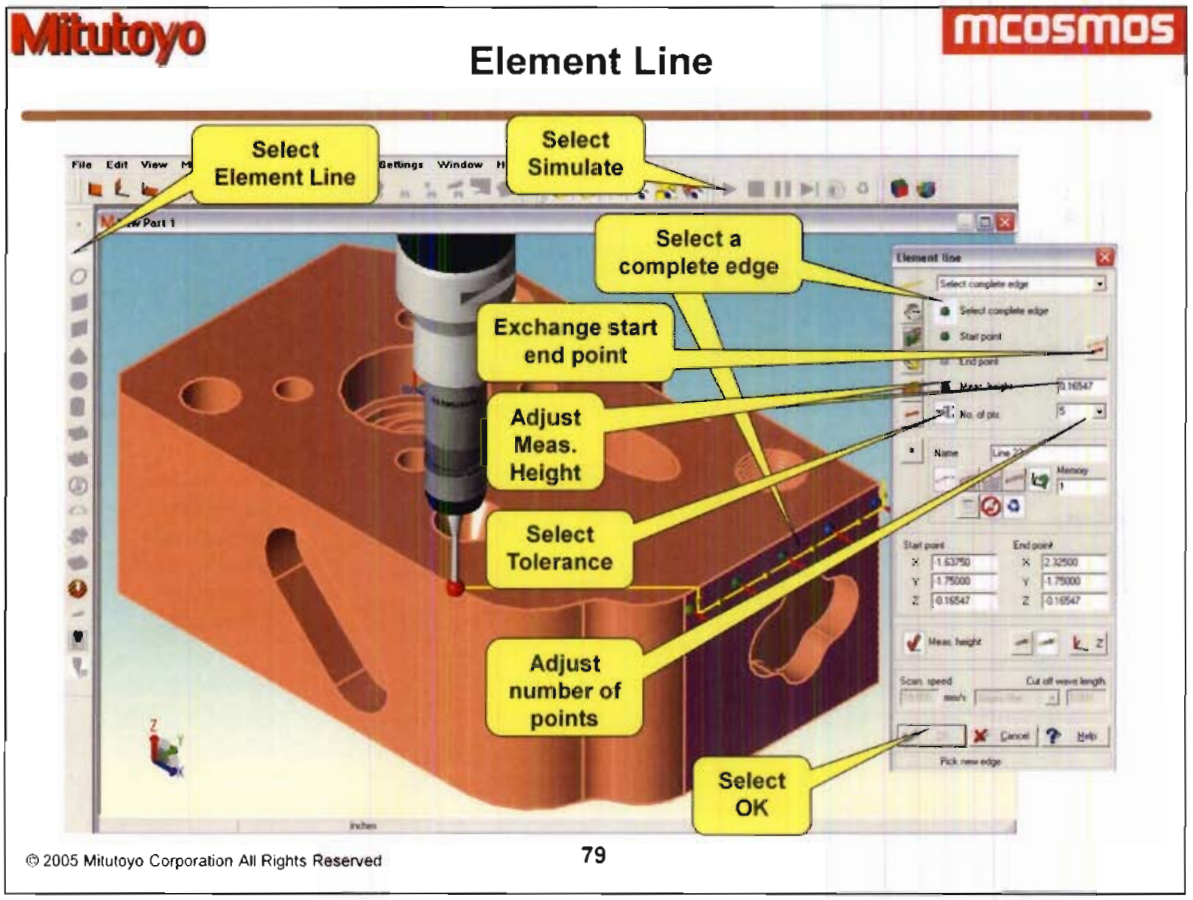

- Select Element Line to open the Element Line dialog.
- Select a complete edge (a point on the surface containing the line near an edge parallel to the line to be measured).
- To adjust the Measurement Height select Meas. Height. Click at the desired Height for measurement, or type in the desired height, and select Calculate.
- To reverse the measurement direction select Exchange Start End points.
- Adjust desired parameters i.e. Number of points, Exchange start end point.
- Select Simulate to verify the path.
- If you are happy with the simulation select OK to collect the points.
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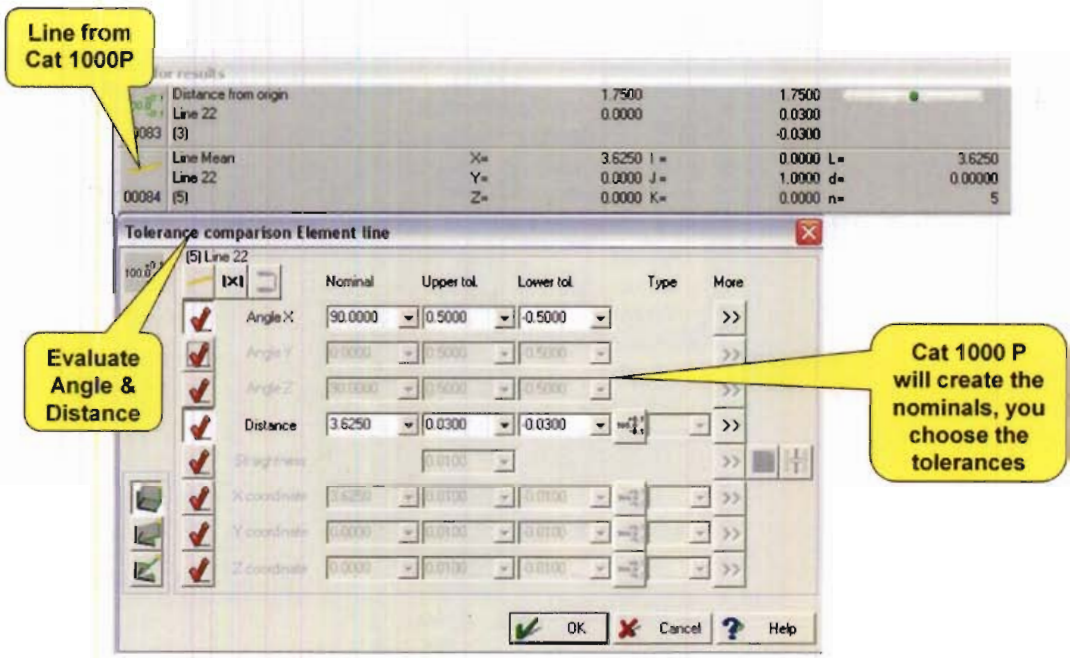
Tolerance Line



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80

- Cat 1000 will create the part program in GEOPAK.
- Cat 1000 only generates motion and nominals, you must apply Tolerances.
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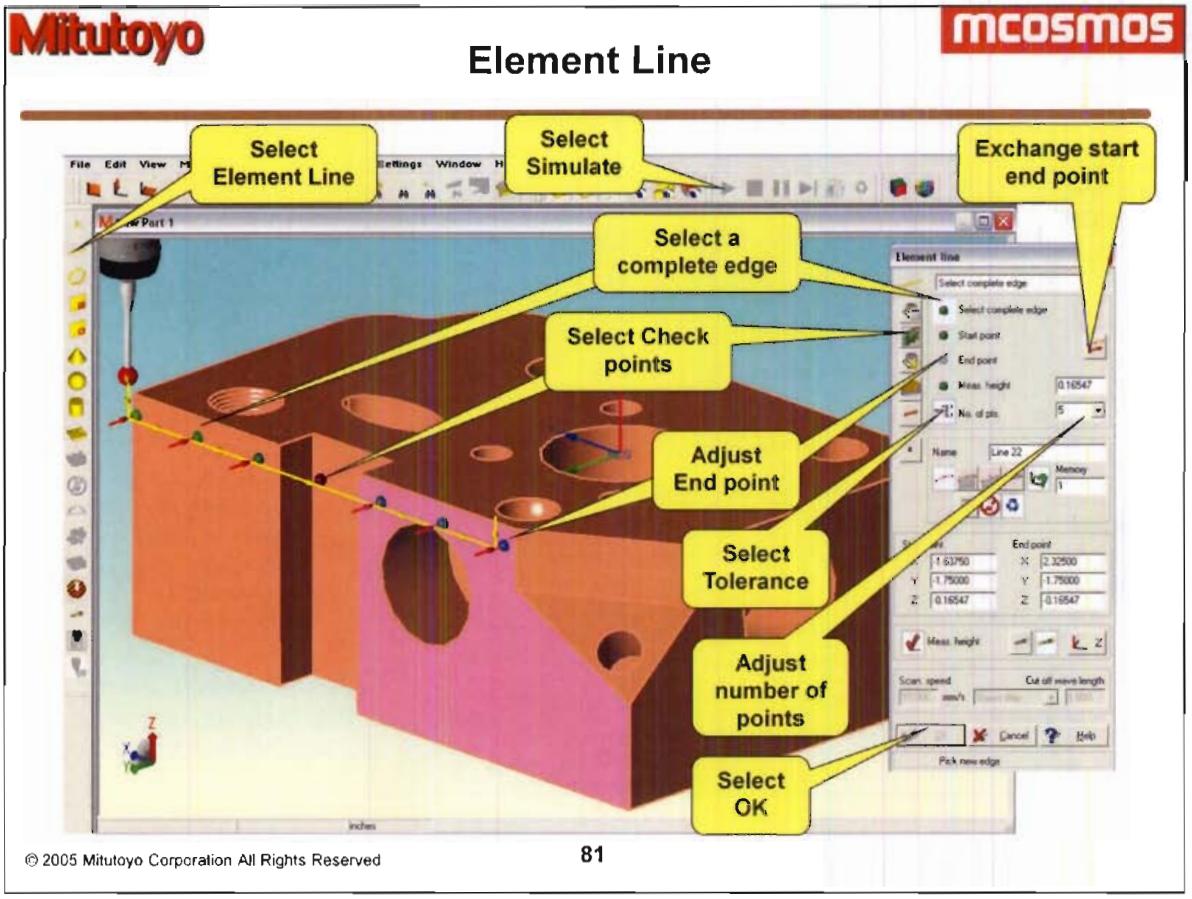

- Select Element Line to open the Element Line dialog.
- Select a complete edge (a point on the surface containing the line near an edge parallel to the line to be measured).
- To reverse the measurement direction select Exchange Start End points
- Adjust end point to inspect both line segments.
- Select Check points to remove point not on selected surface.
- Adjust desired parameters i.e. Number of points, Exchange start end point.
- Select Simulate to verify the path.
- If you are happy with the simulation select OK to collect the points.
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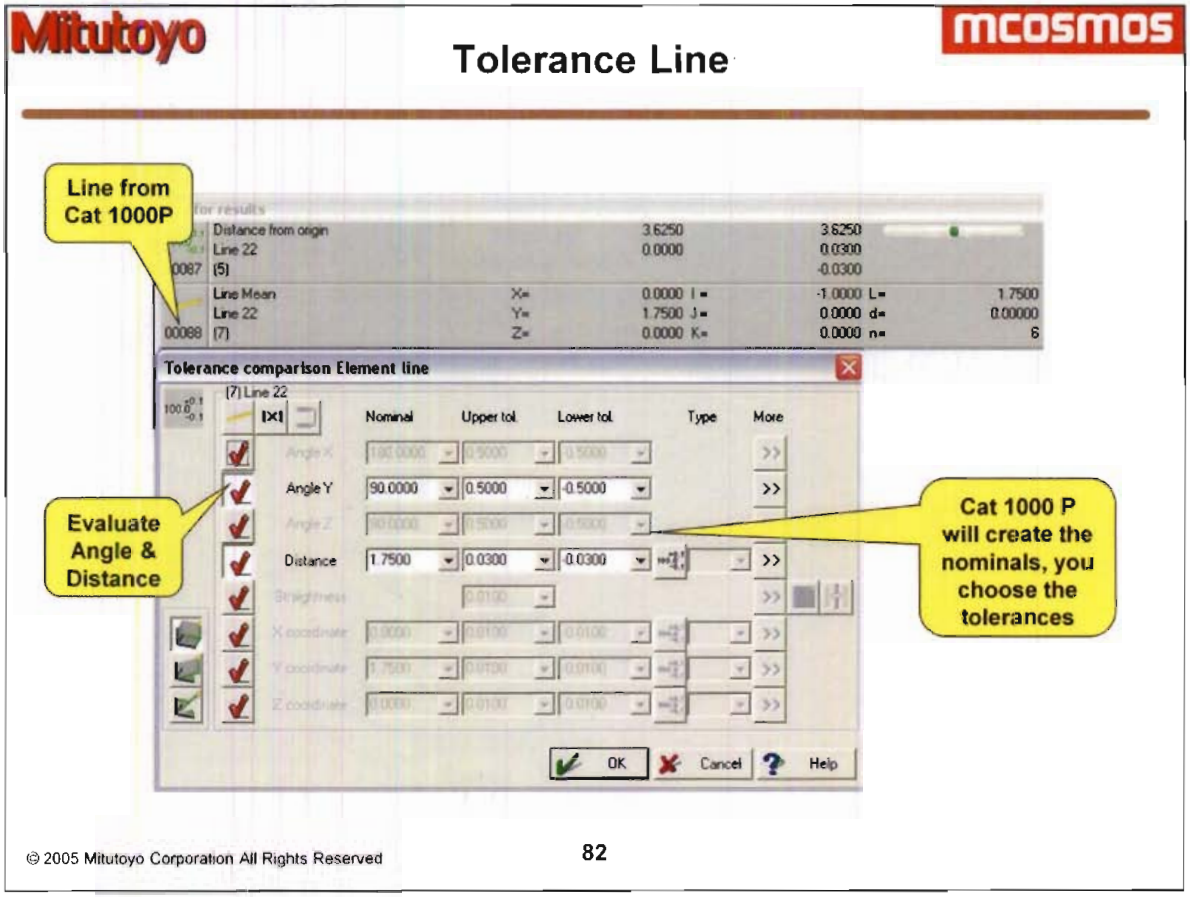
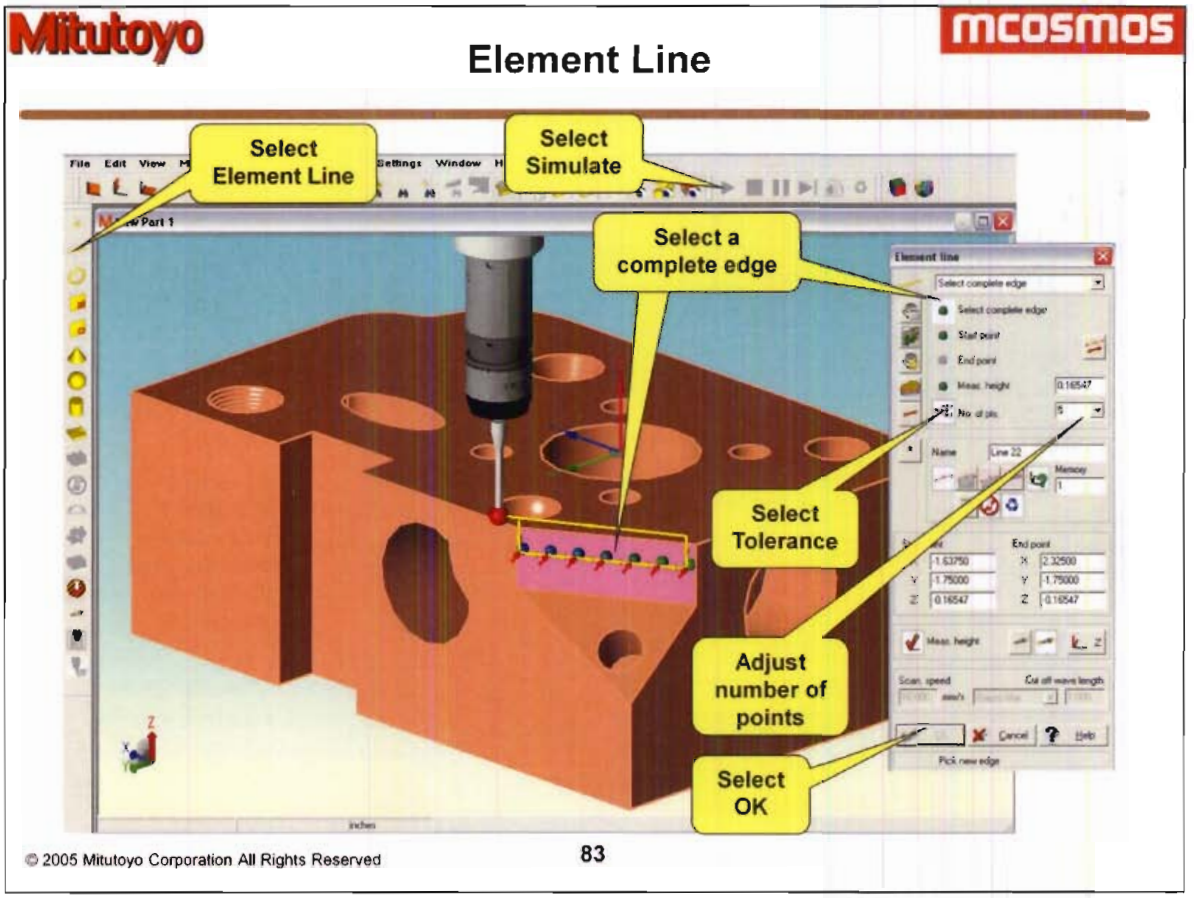


- Cat 1000 will create the part program in GEOPAK.
- Cat 1000 only generates motion and nominals, you must apply Tolerances.



- Select Element Line to open the Element Line dialog.
- Select a complete edge (a point on the surface containing the line near an edge parallel to the line to be measured).
- Adjust desired parameters i.e. Number of points, Exchange start end point.
- Select Simulate to verify the path.
- If you are happy with the simulation select OK to collect the points.
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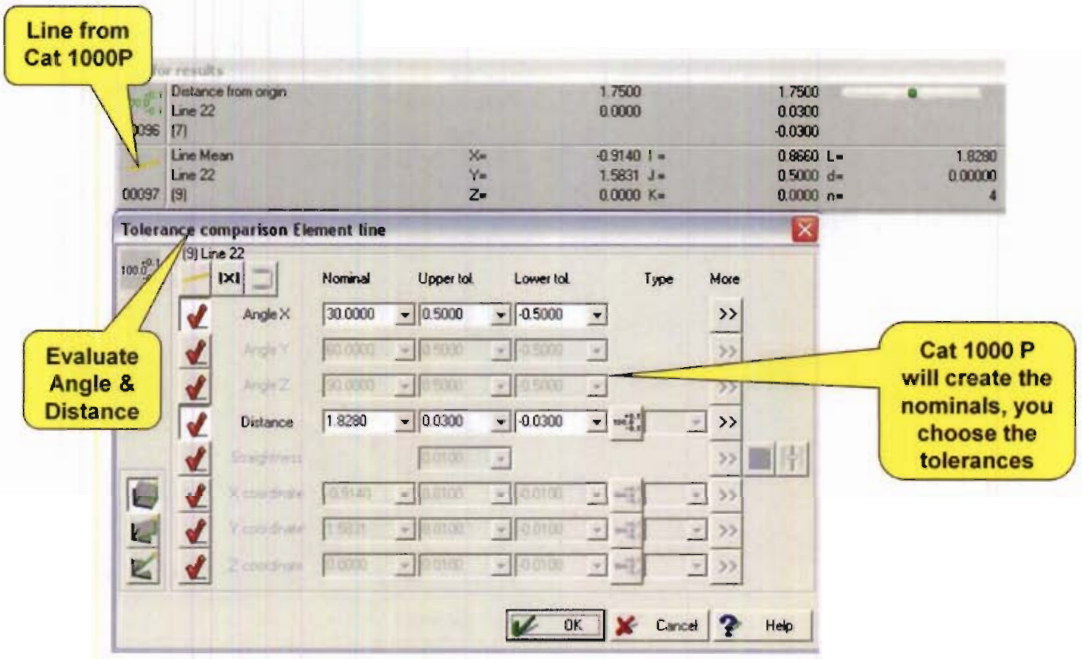
Tolerance Line



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84

- Cat 1000 will create the part program in GEOPAK.
- Cat 1000 only generates motion and nominals, you must apply Tolerances.
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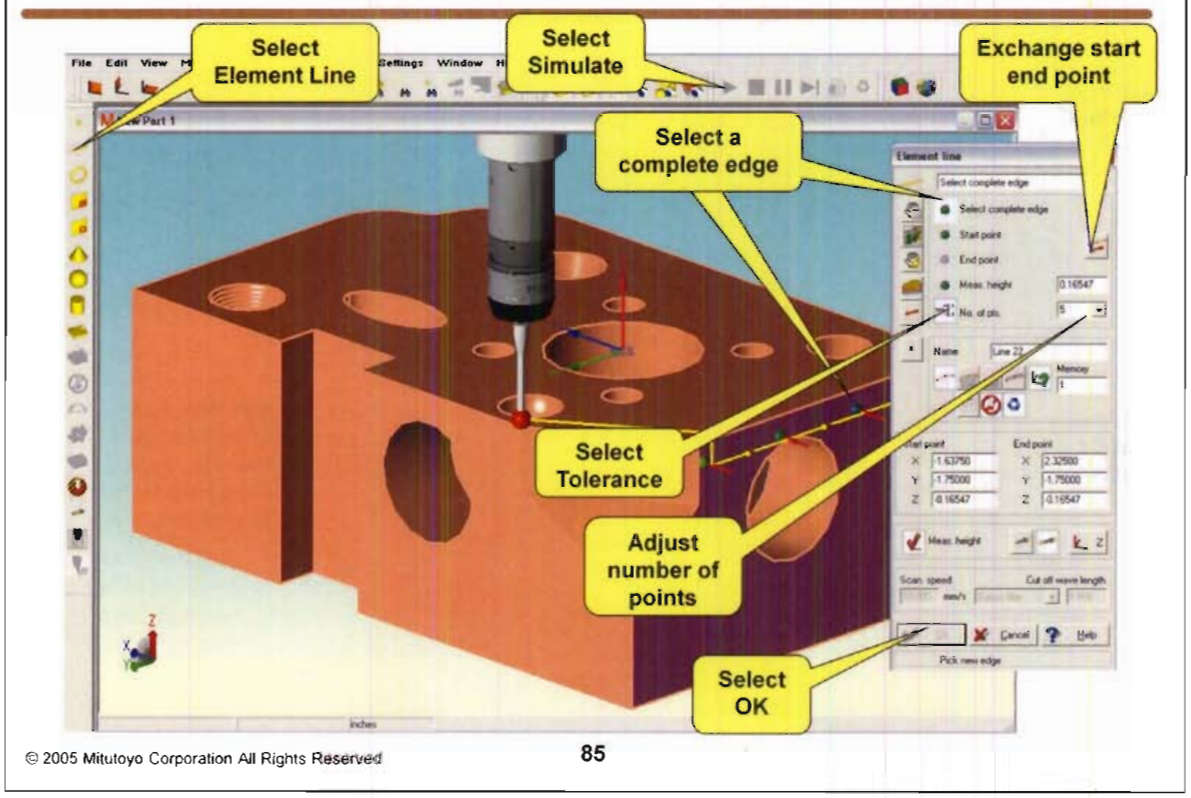
Element Line



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- Select Element Line to open the Element Line dialog.
- Select a complete edge (a point on the surface containing the line near an edge parallel to the line to be measured).
- Adjust desired parameters i.e. Number of points, Exchange start end point.
- Select Simulate to verify the path.
- If you are happy with the simulation select OK to collect the points.
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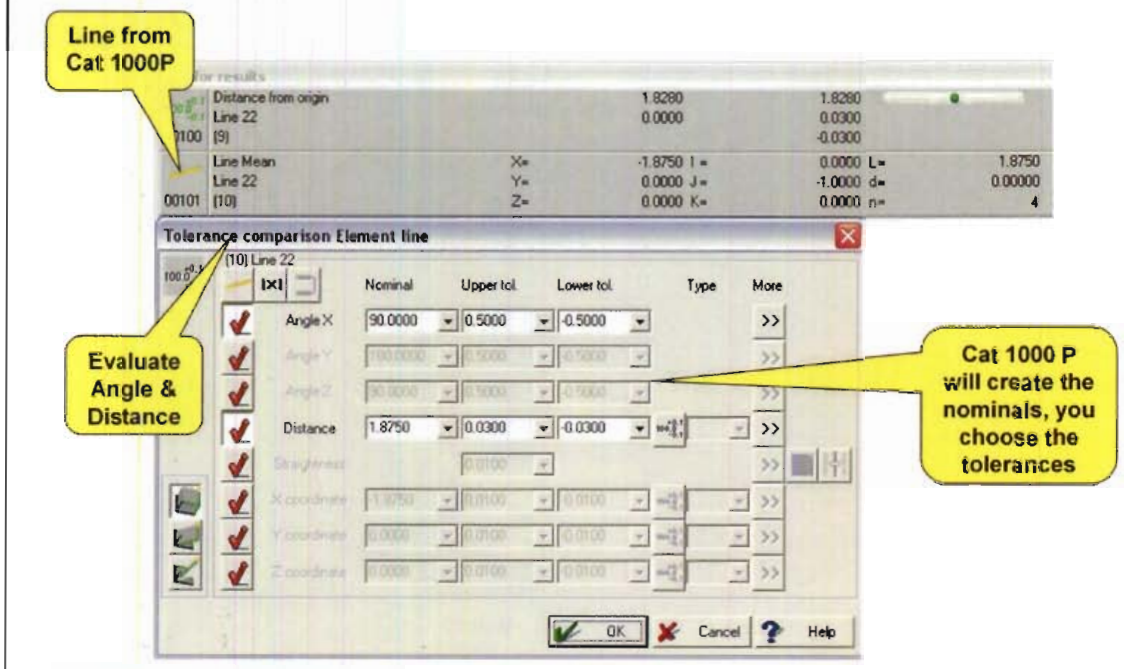
Tolerance Line



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- Cat 1000 will create the part program in GEOPAK.
- Cat 1000 only generates motion and nominals, you must apply Tolerances.
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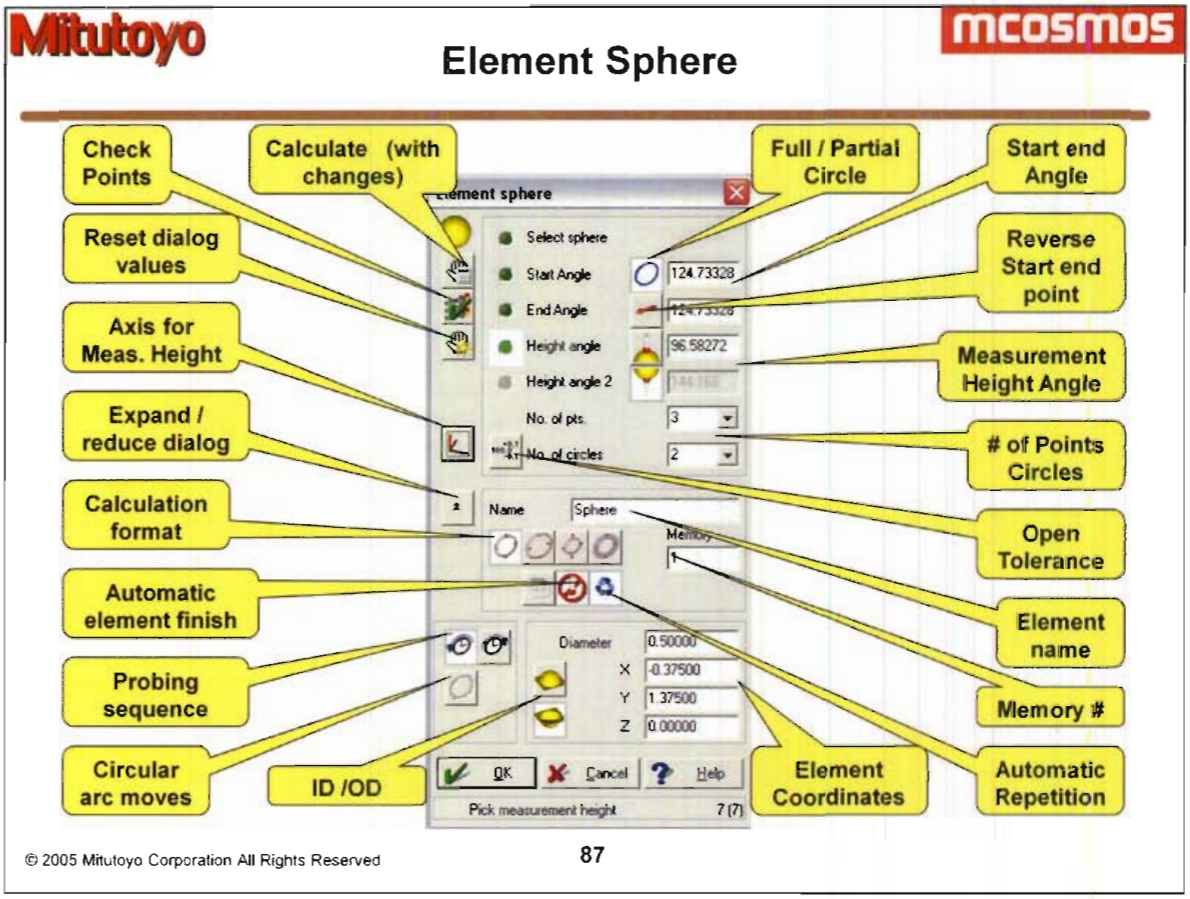
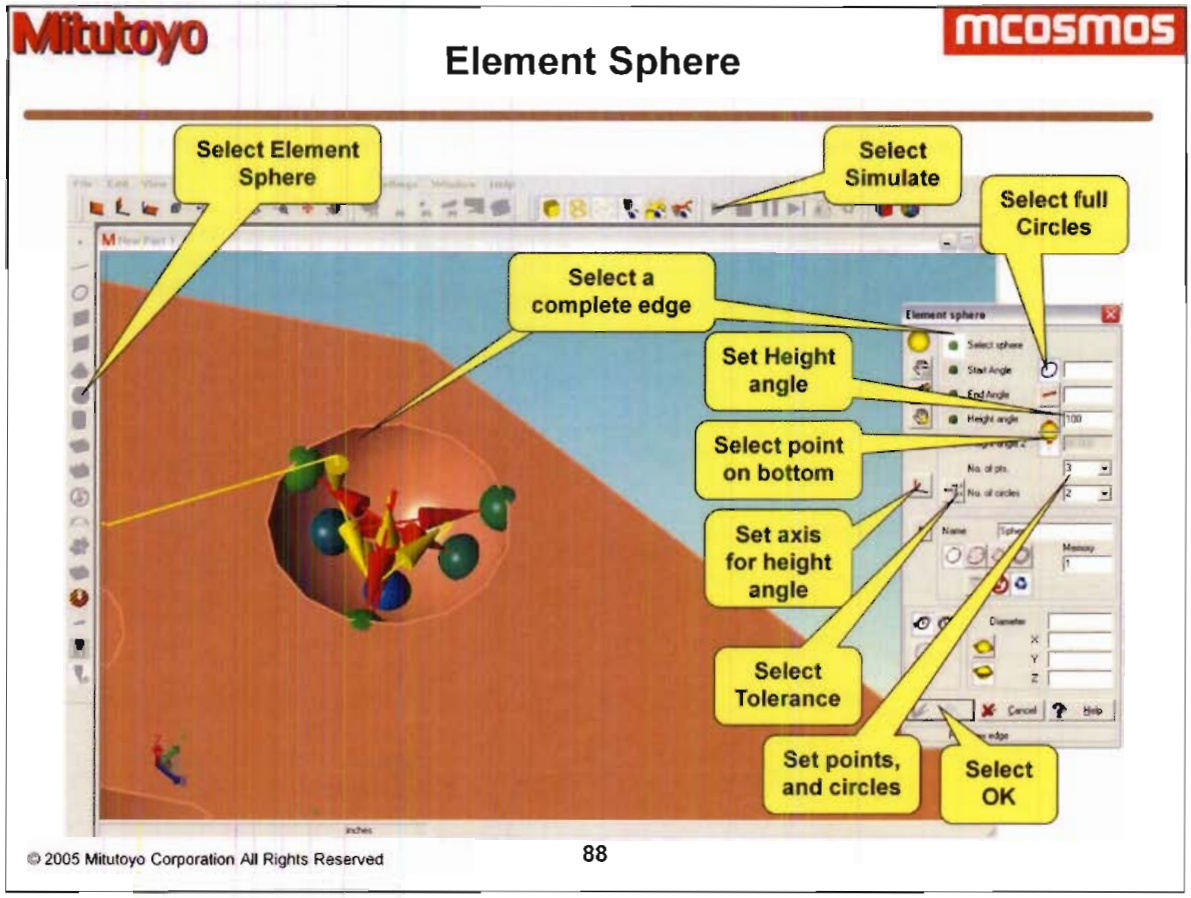


- Select the Icon for Element Sphere.
- Place curser over each icon to provide an icon explanation.
- Note: Once an Element Sphere is started if automatic element finish is off you may use multiple tools multiple times to collect required points on the element. You may start the element from Geopak.



- Select Element Sphere to open the Element Sphere dialog.
- Select Full Circle as we will be measuring a complete circle.
- Set Height angle, and point on bottom.
- Select an axis along which to define the Measurement Height.
- Set the number of points per circle (3), and the number of circles (2).
- Select a complete edge (a point on the Spherical surface near entry).
- Select point on (bottom for this case) otherwise set height angle 2.
- Adjust desired parameters i.e. Number of points, Start angle.
- Select Simulate to verify the path.
- If you are happy with the simulation select OK to collect the points.
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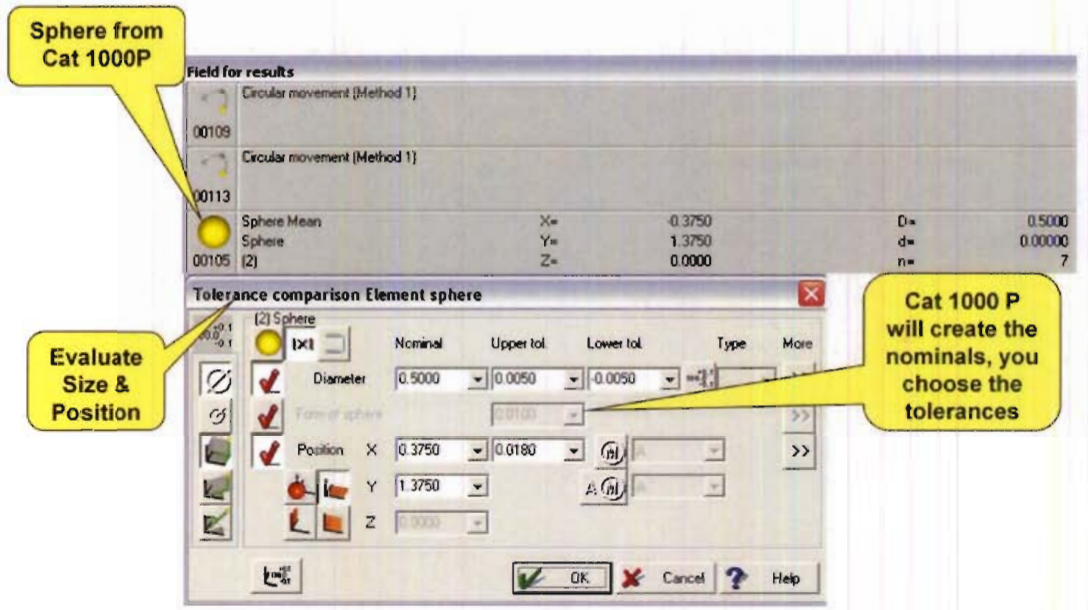
Tolerance Sphere



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89

- Cat 1000 will create the part program in GEOPAK.
- Cat 1000 only generates motion and nominals, you must apply Tolerances.
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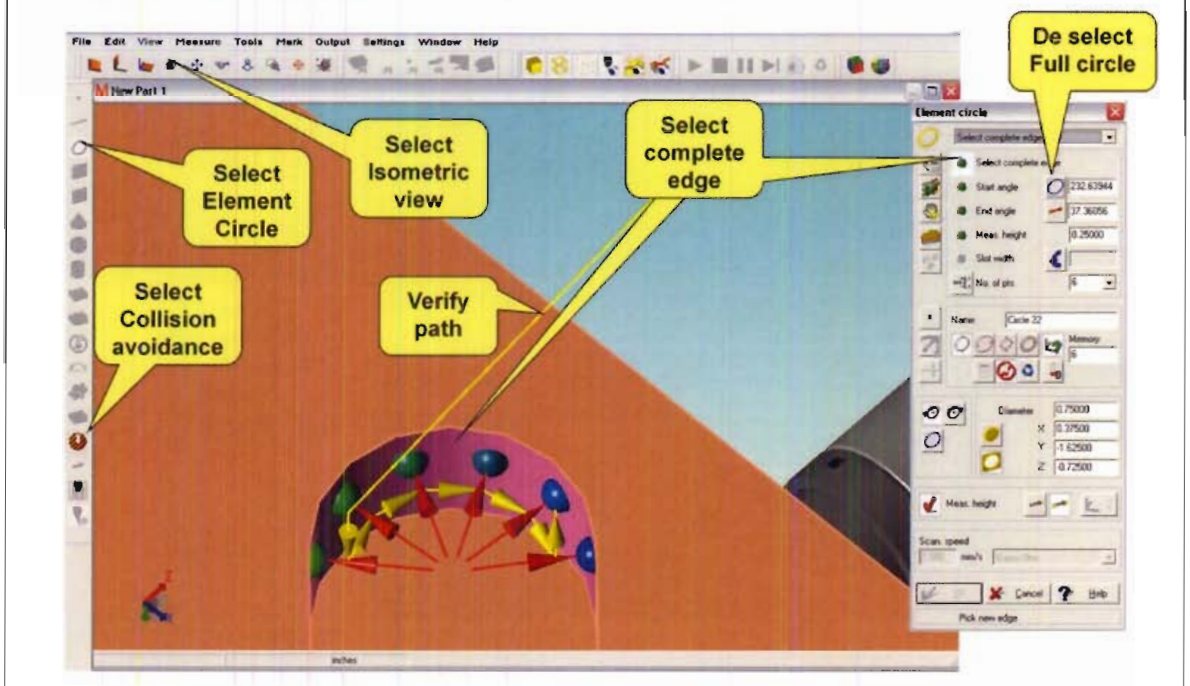
Element Circle (partial)



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- Select Element Circle to open the Element Circle dialog.
- Deselect Full Circle as we will be measuring a partial circle.
- Select a complete edge (a point on the Cylindrical surface containing the circle, near entry, and close to the center of the edge / surface).
- Select Simulate, to verify the path note the probe travels thru the part.
- Select collision avoidance to recalculate the path avoiding the collision.
- Note: Collision avoidance takes time depending on the path, the size of the model, and your settings. Collision avoidance is not a guarantee that your machine will not crash.
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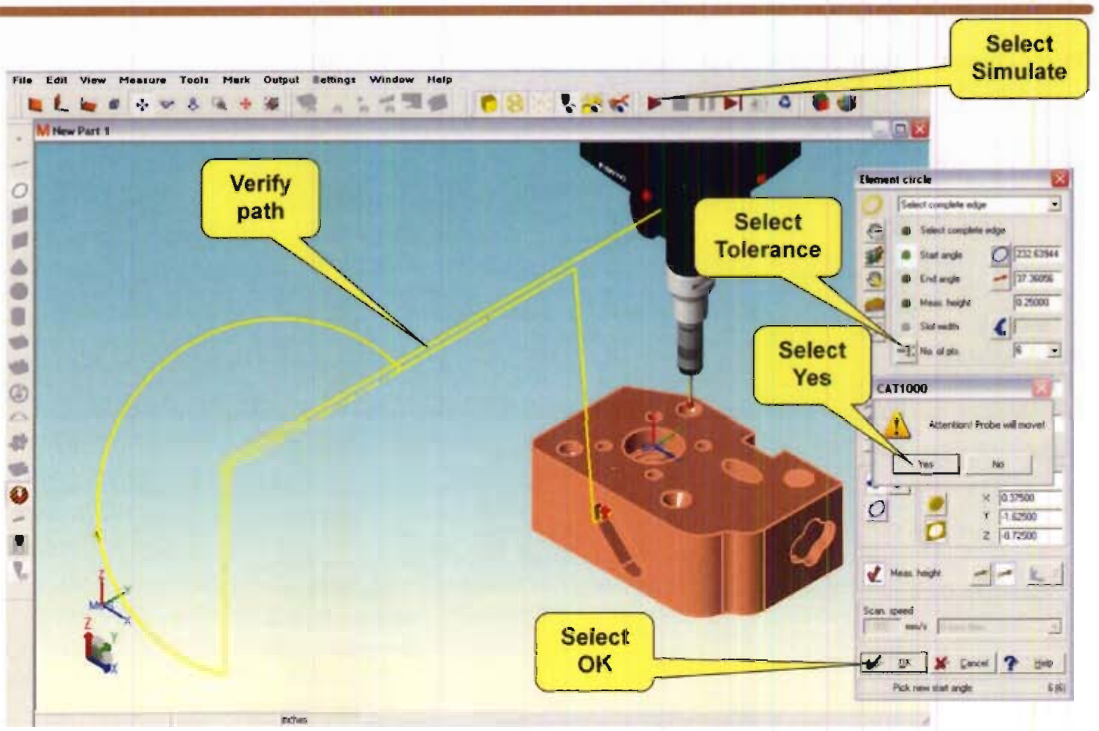
Element Circle (partial)



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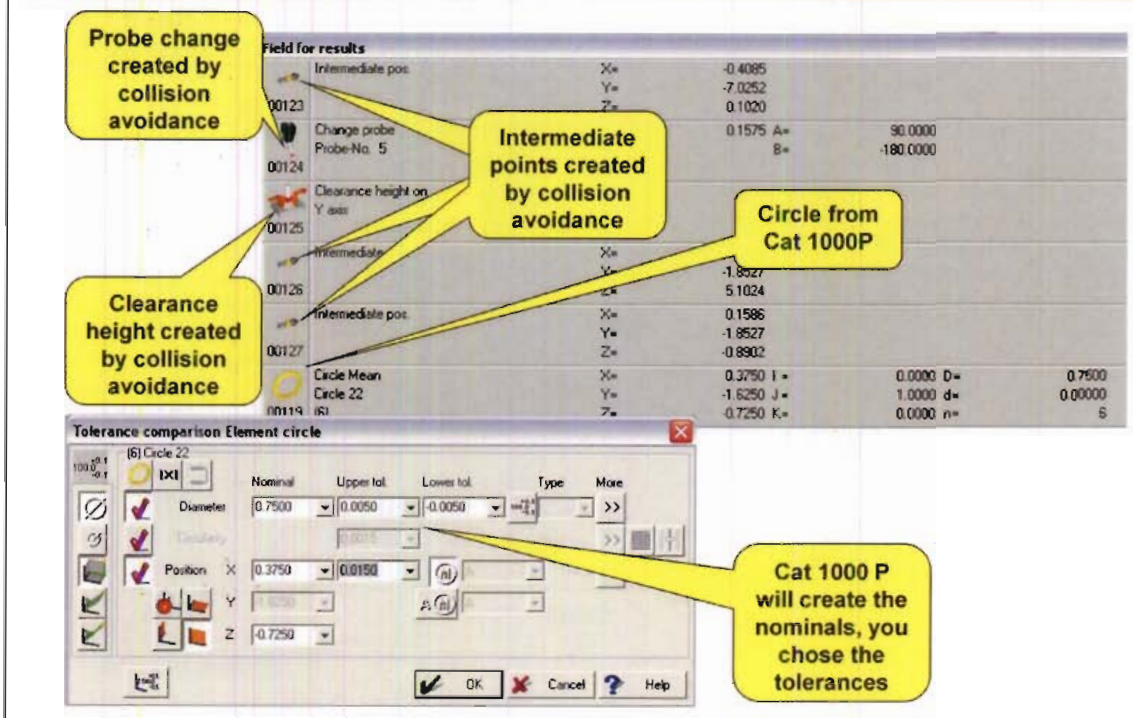
- Select Simulate to verify the path.
- Note: Any adjustment as well as selecting OK will initiate the recalculation of the path for collision avoidance.
- If you are happy with the simulation select OK to collect the points.
- Select Yes to allow probe to rotate.
- You may choose to turn Collision avoidance off to reduce programming time. If so be sure to verify the path thru other means.

Tolerance Circle



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- Cat 1000 will create the part program in GEOPAK.
- With Collision avoidance the necessary Intermediate moves, Probe changes, and Clearance height adjustments will be made.
- Cat 1000 only generates motion and nominals, you must apply Tolerances.
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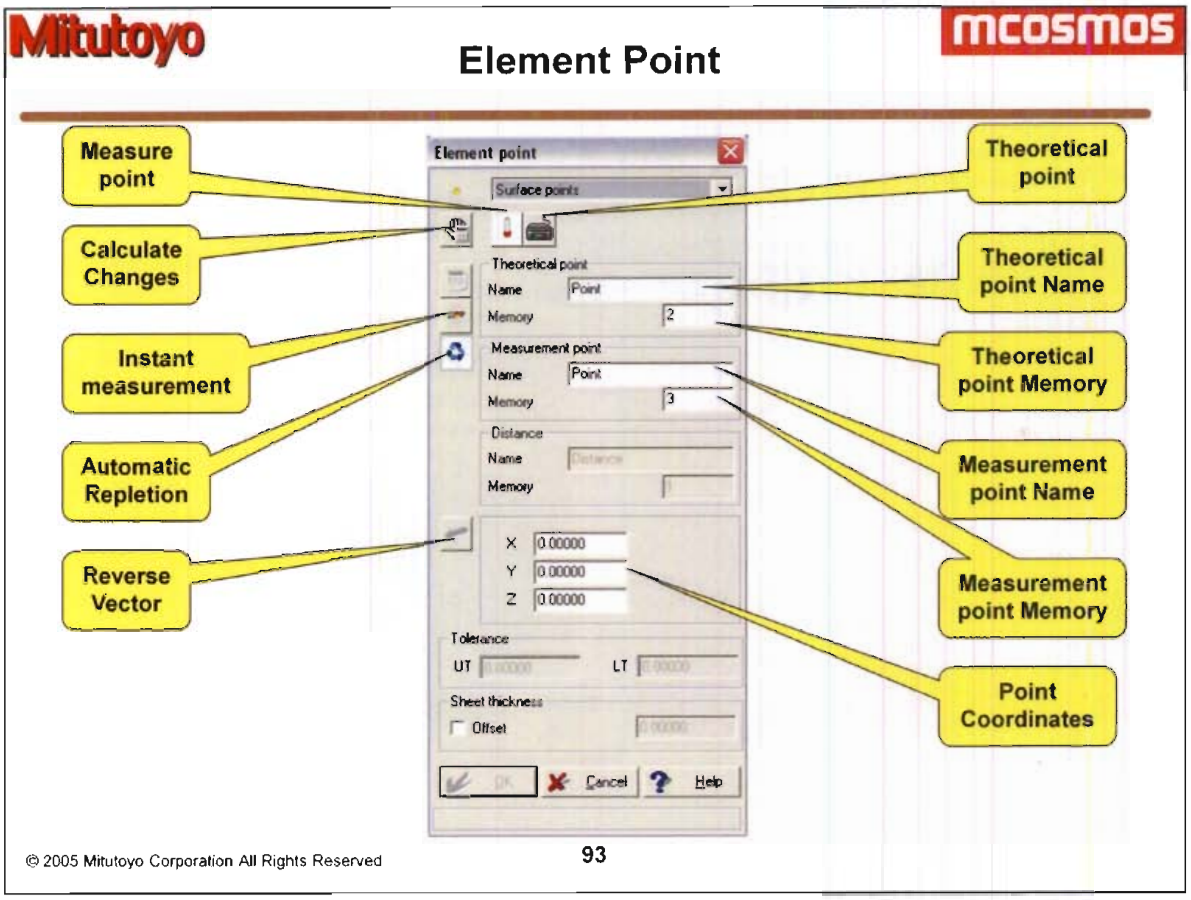

- Select the Icon for Element Point.
- Place curser over each icon to provide an icon explanation.
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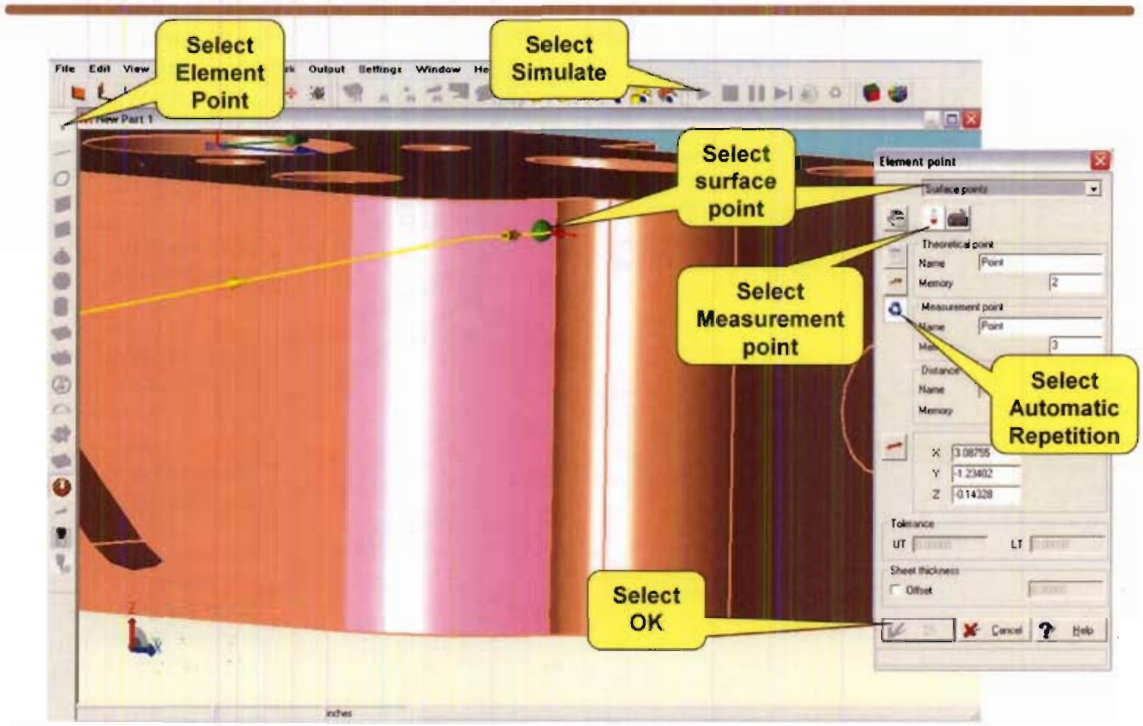
Mitutoyo mcosmos

Element Point



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- Select Element Point to open the Element Point Dialog.
- Select Measurement Point.
- Select Automatic repetition.
- Select the intended surface measurement point.
- Select Simulate to verify your path.
- If you are happy with the simulation select OK to collect the point.
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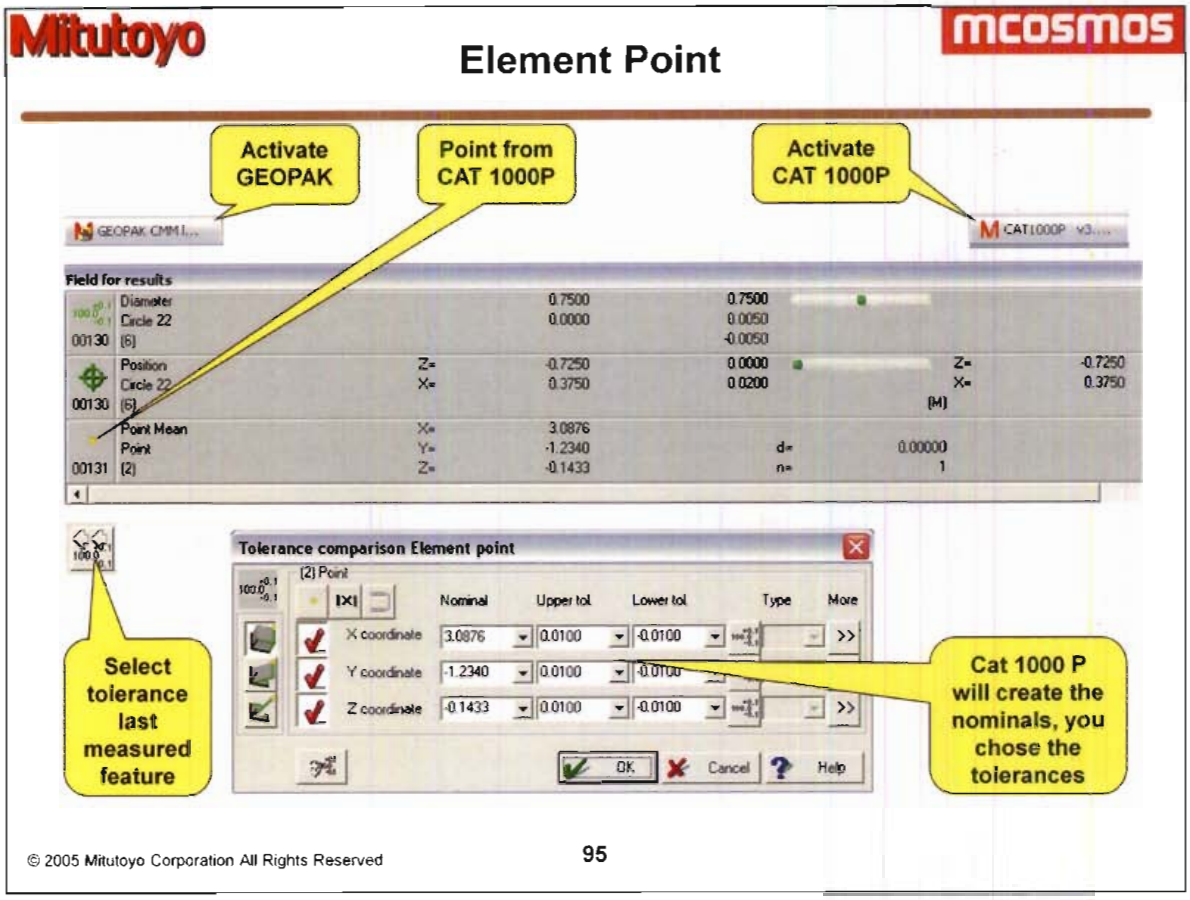

- To apply an axial or positional tolerance to this point activate GEOPAK.
- Cat 1000 will create the part program in GEOPAK.
- Select Tolerance last measured feature.
- Cat 1000P will create the nominal values you must select components to apply tolerance to and tolerances.
- Activate CAT 1000 to return to CAT 1000.
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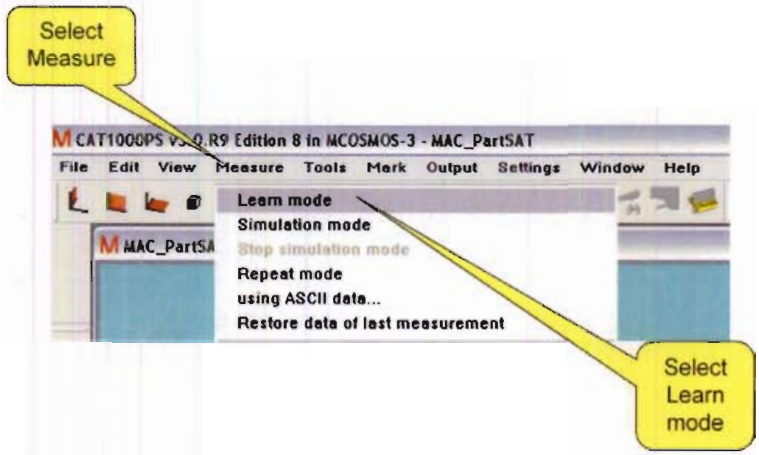
Learn mode



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- Once all settings have been reviewed enter into the learn mode
- Select measure
- Select learn mode
- The learn mode may also be entered from the program manager
- Most settings may be adjust any time thought out the programming process
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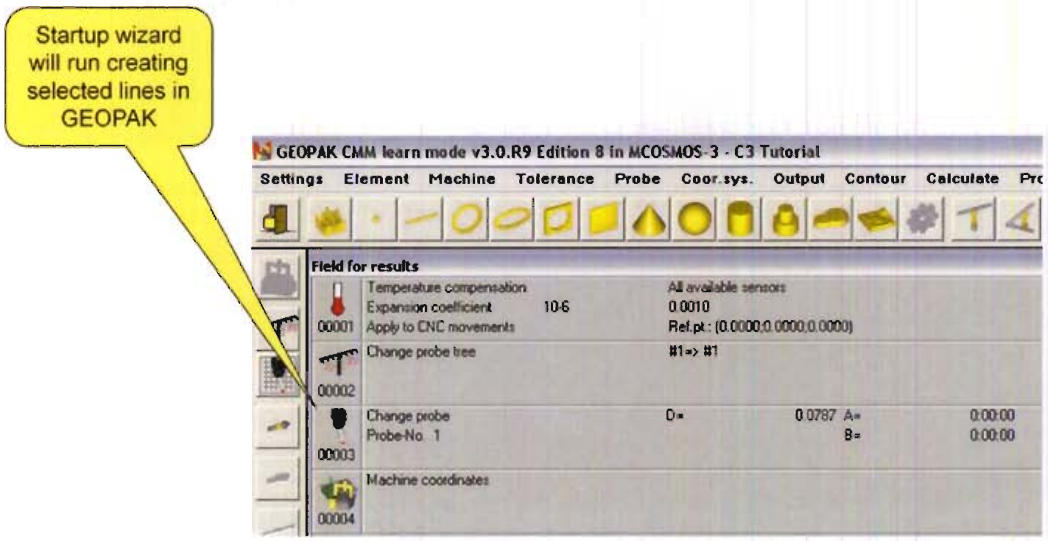
Learn mode



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- The learn mode will start and the startup wizard will run
- In GEOPACK create a coordinate system to match the Cad coordinate system
- This can be done manually, or by using a fixture coordinate system and a translation
- We will do an RPS alignment on prismatic features to define an approximate Coordinate System to collect points on curved or sloped surfaces to complete the actual Coordinate System that will be used
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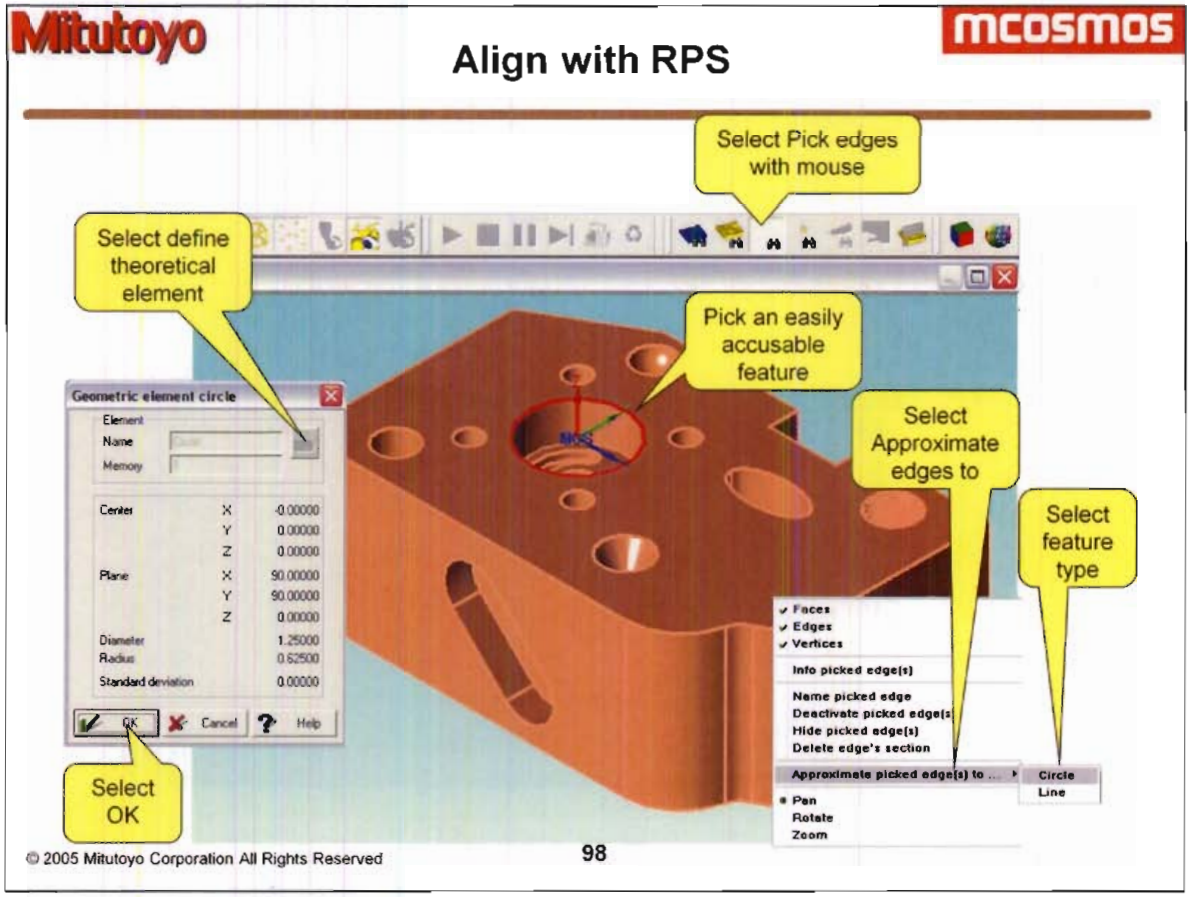

- We will define nominal features from the Cad Model
- Select pick edges with mouse.
- If all datum targets are on a surface parallel to the part Coordinate system then select the datum targets see page 43. If not select easily accusable 3 Dimensional defined features such as holes
- Right click in the field to open the dialog and select Approximate edges to.
- This will open an extension. Pick the feature type in this case Circle.
- A dialog will open displaying the location, vector, and size of the selected feature.
- Select define theoretical element. Repeat for a total of 3 features. Note: features should be collected in a clockwise direction
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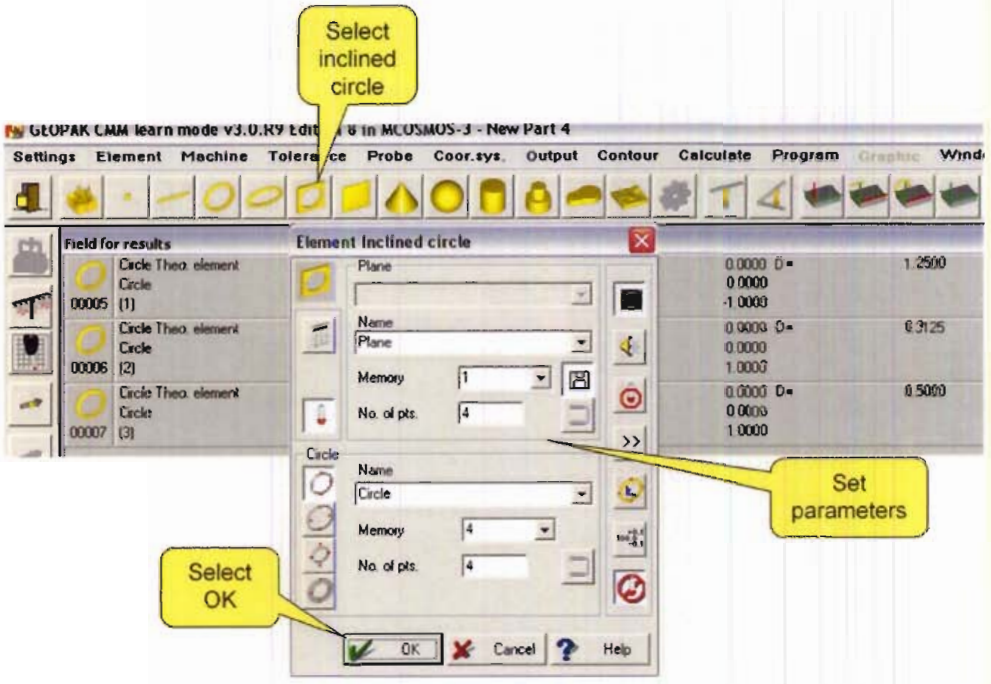
Align with RPS



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- Now we will measure corresponding features on the part
- Measure corresponding features on the part as inclined circles
- If all circles are on the same surface then you may recall rather then measure the plane for the 2nd, and 3rd circle
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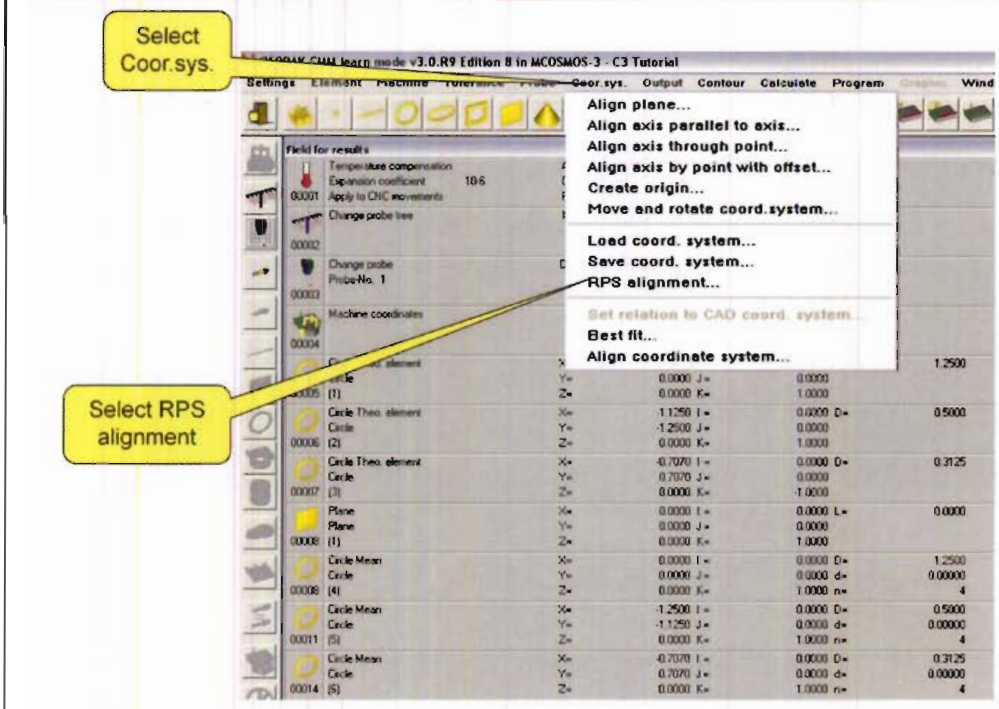
Align with RPS



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- Once all data is collected select Cooor. sys.
- Select RPS Alignment RPS stands for Reference Point System
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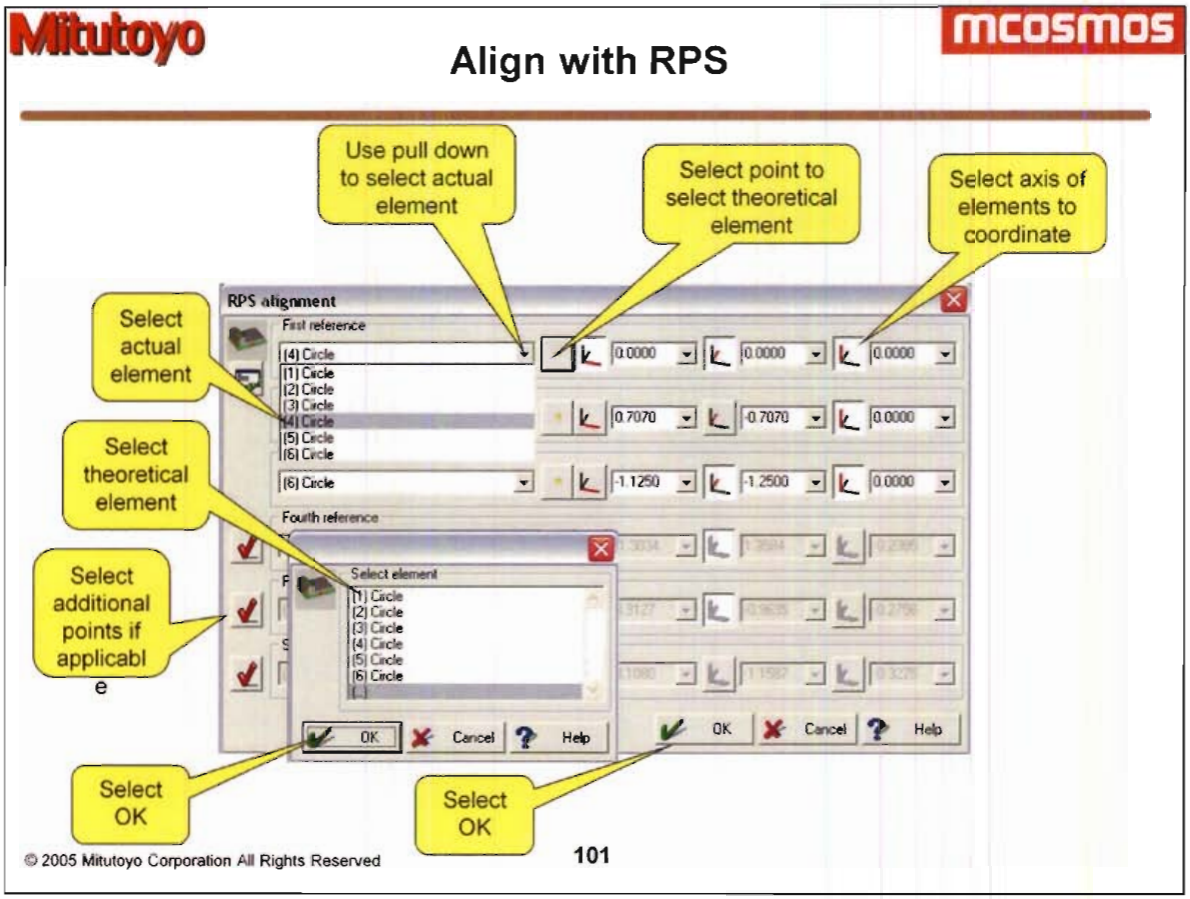
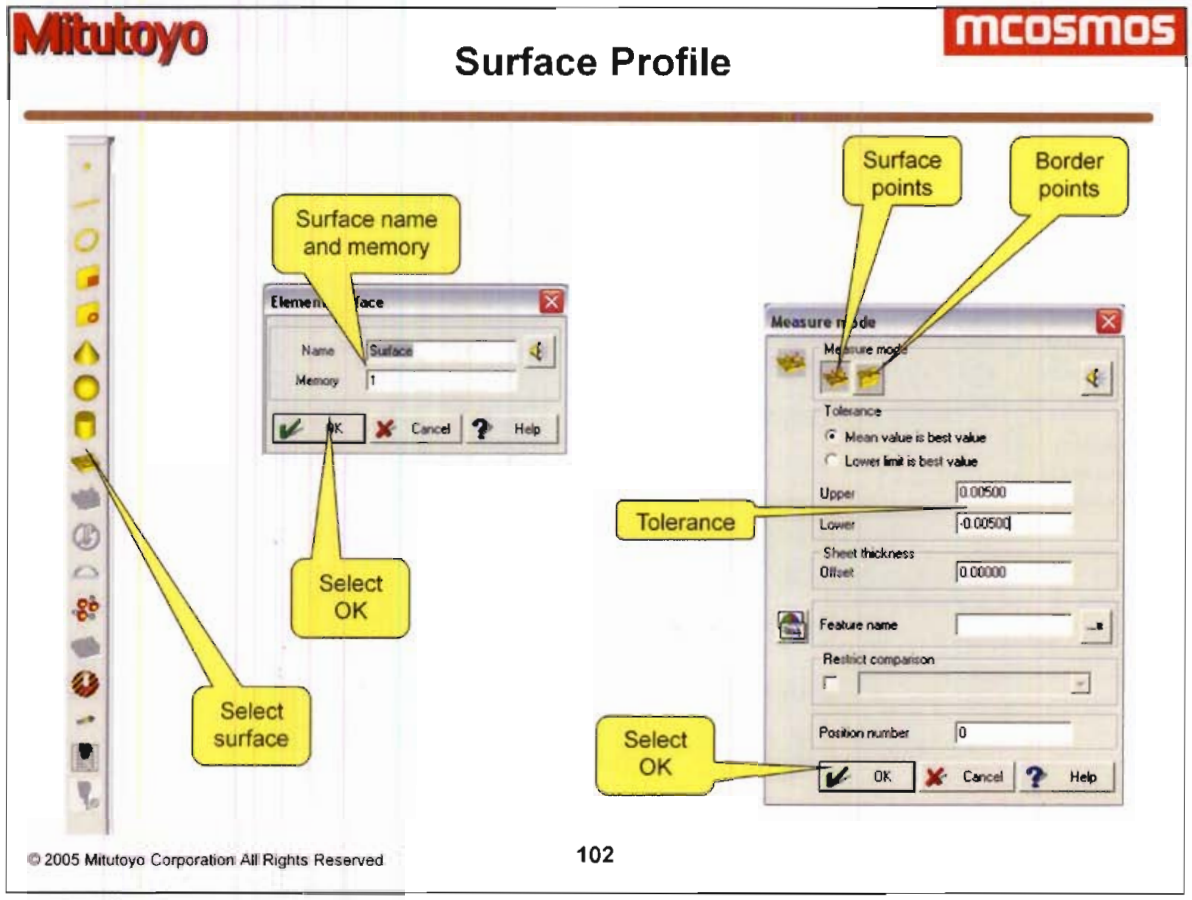
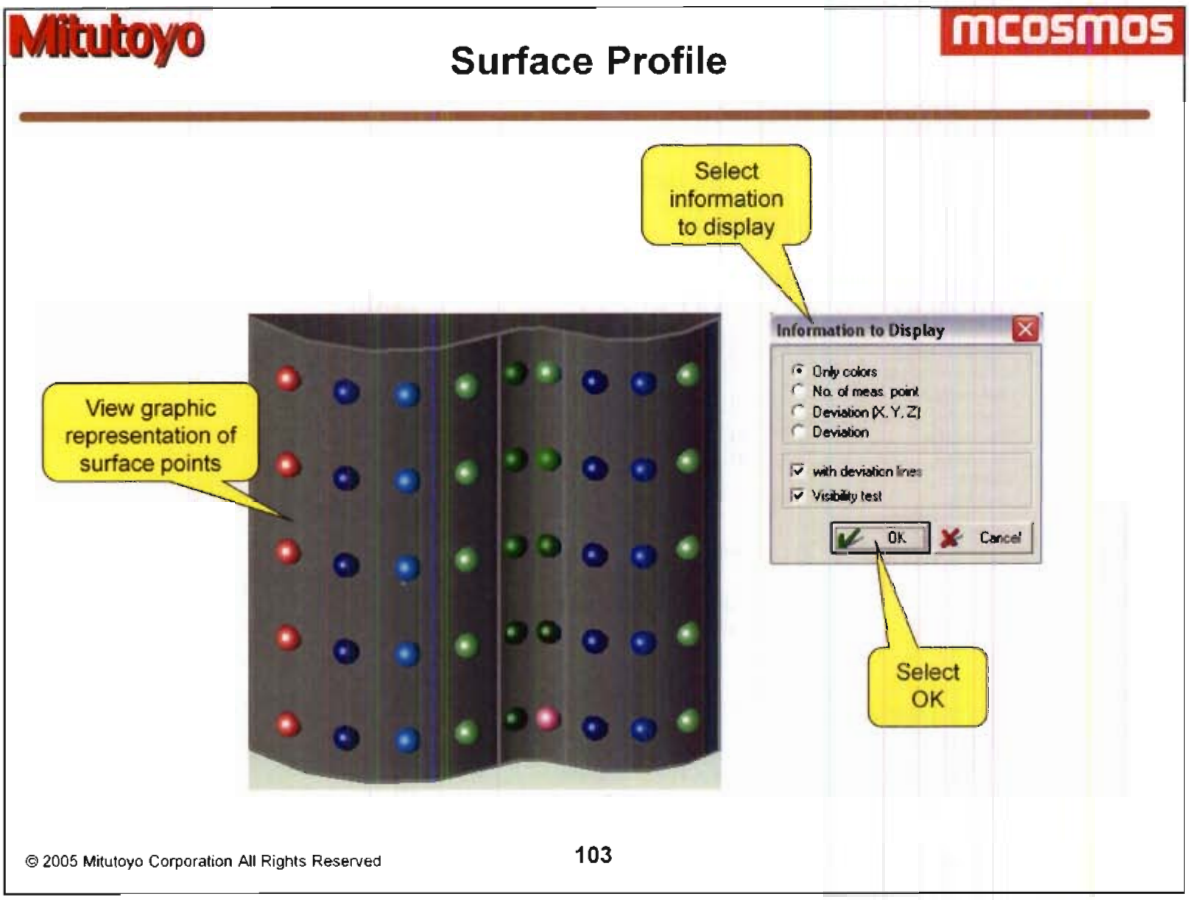


- In the RPS alignment dialog select additional points if applicable
- Select the pull down for each actual element to select the appropriate element for each reference
- Select the actual element from the list
- Select the point to select the corresponding theoretical element
- Select the theoretical element from the list this will populate the X,Y,and,Z values Note nominal values may be defined from a part blue print
- Select OK in the select element dialog
- Select the axis of the elements to coordinate 6 axis buttons must be selected
- Select OK
- The above process would be used to create an RPS from prismatic elements, or to create an approximate alignment to check targets on curved, or sloped surfaces



- To inspect a surface for profile a 2nd method is to inspect it as a surface
- To inspect a surface select the surface icon
- An element surface dialog will appear
- Define the surface name and memory #
- Select OK
- The measurement mode dialog will appear
- Select surface points, or border points as is applicable Surface points in this case
- Define a tolerance zone note this zone is for the graphic report only
  In addition points deviating in excess of 10 X the noted tolerance zone will not be displayed
- Manually collect points on your part surfaces corresponding to this tolerance zone or feature repeat as required
- _____



- View the measured points the color will be as defined based on the tolerance, and the color for tolerance classes see settings
- The information will be defined in Settings:, Graphic:, Graphic info to display see settings page 11
- Select to apply the adjusted information to display
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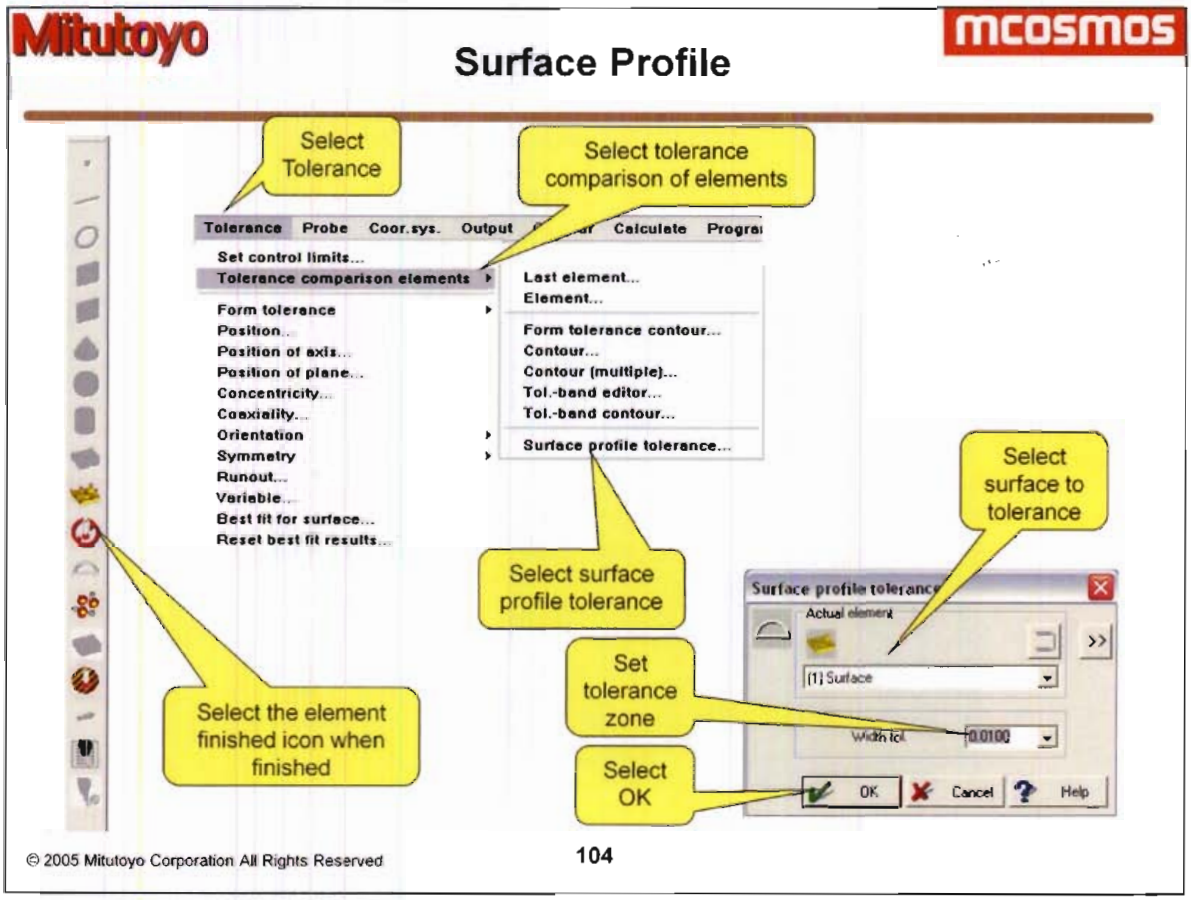

- Select the element finished when you have collected all desired points
- You may run multiple grids on multiple surfaces as desired
- You may pick points with mouse on multiple surfaces as desired
- It is important that the same tolerance zone apply to the entire surface as it is toleranced as a surface not individual points
- To apply a tolerance in GEOPAK select the Tolerance menu
- Select Tolerance comparison elements
- Select surface profile tolerance
- Select surface name and memory number
- Set tolerance zone
- Select OK to apply your tolerance Note this tolerance should be applied prior to tolerancing the surface with a graphic report
- _____
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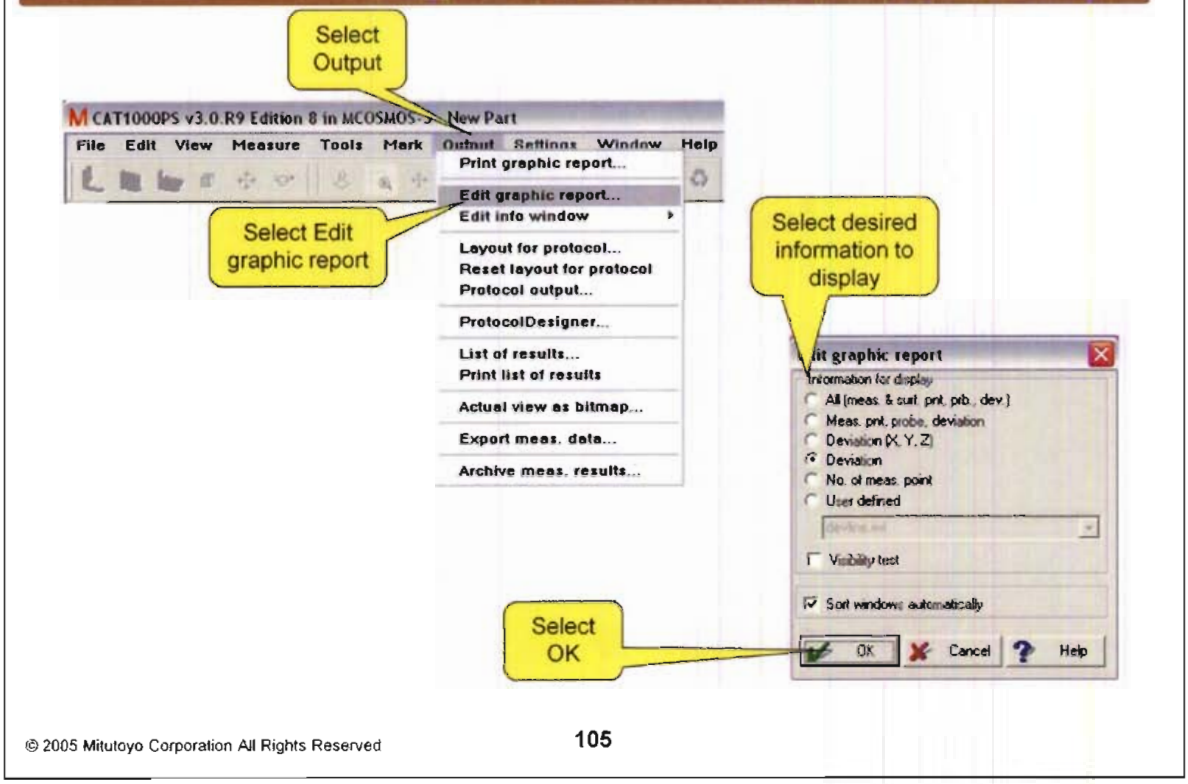
Surface Profile



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- Select Output to create a Graphic report
- Select Edit Graphic report to populate the measured points with information labels
- From the Edit graphic report select the desired information
- Select OK upon completion
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Surface Profile

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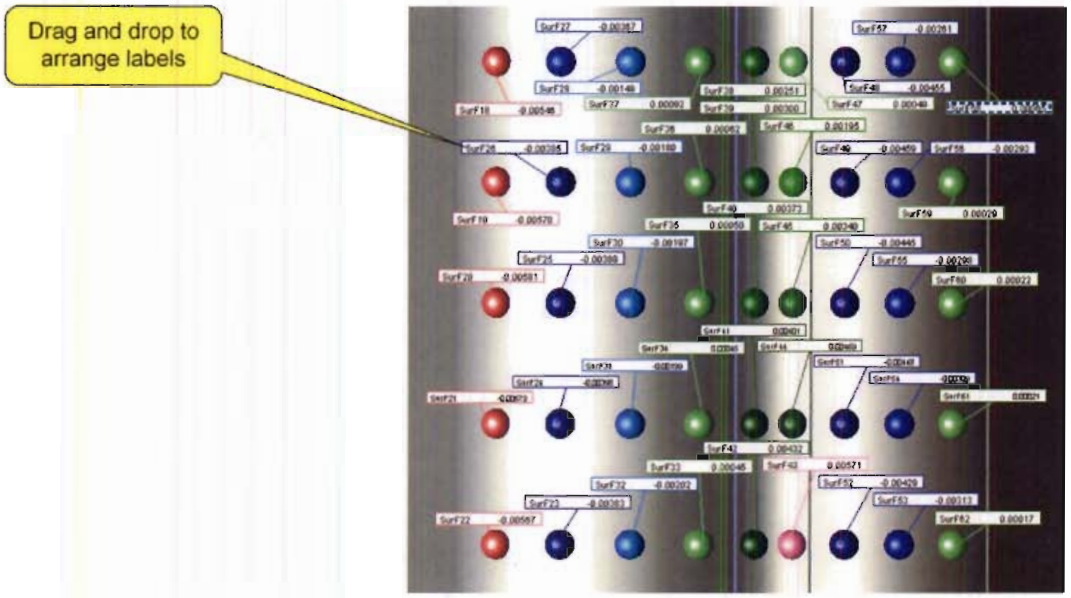

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- The requested labels will populate the Cad model points
- Adjust the model using Pan, Orbit, and Zoom to the best size and orientation for your report
- Drag and drop to arrange the labels in an orderly fashion
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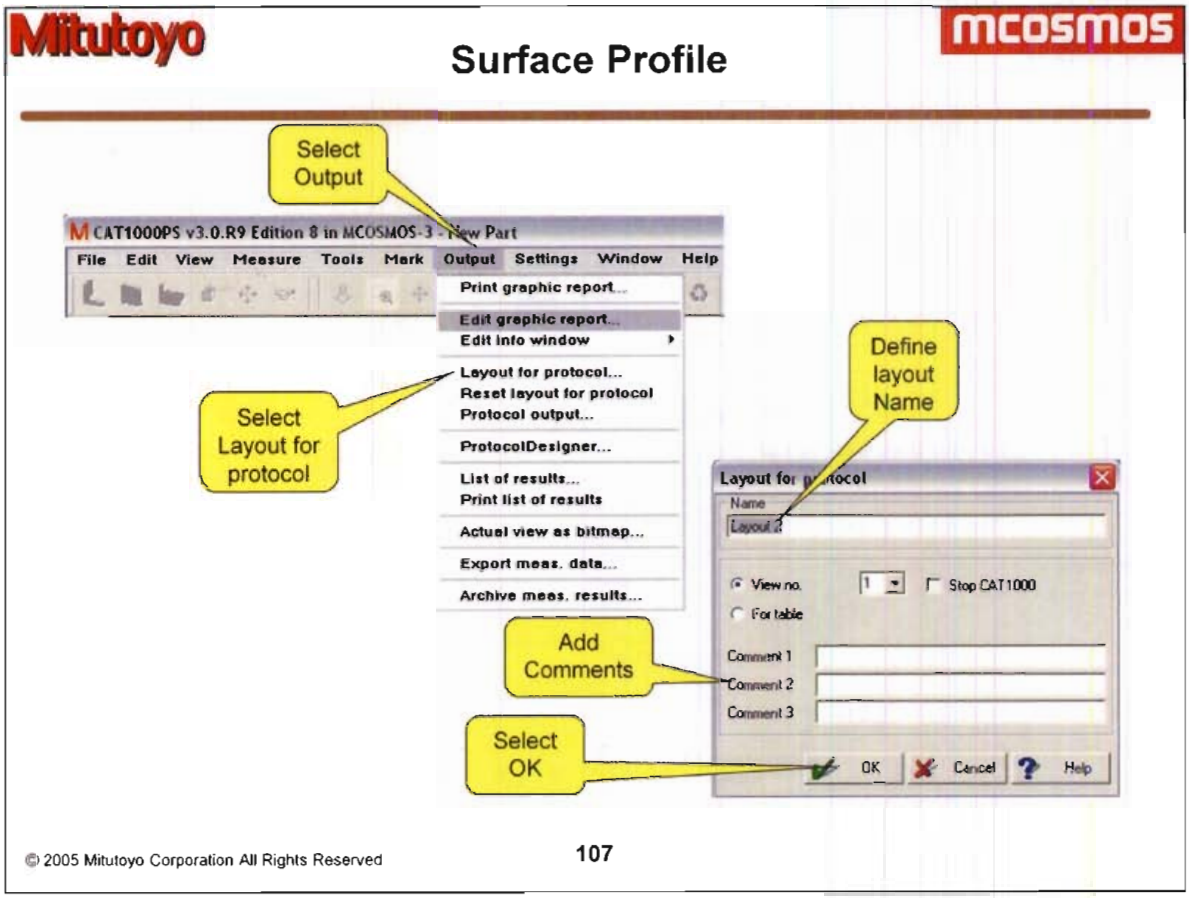

- Select Output to further define your report graphic
- Select Layout for protocol to save your graphic as a layout
- In the Layout for protocol define the layout name
- Add Comments as preferred Note the system will remember your comments
- Upon completion select OK
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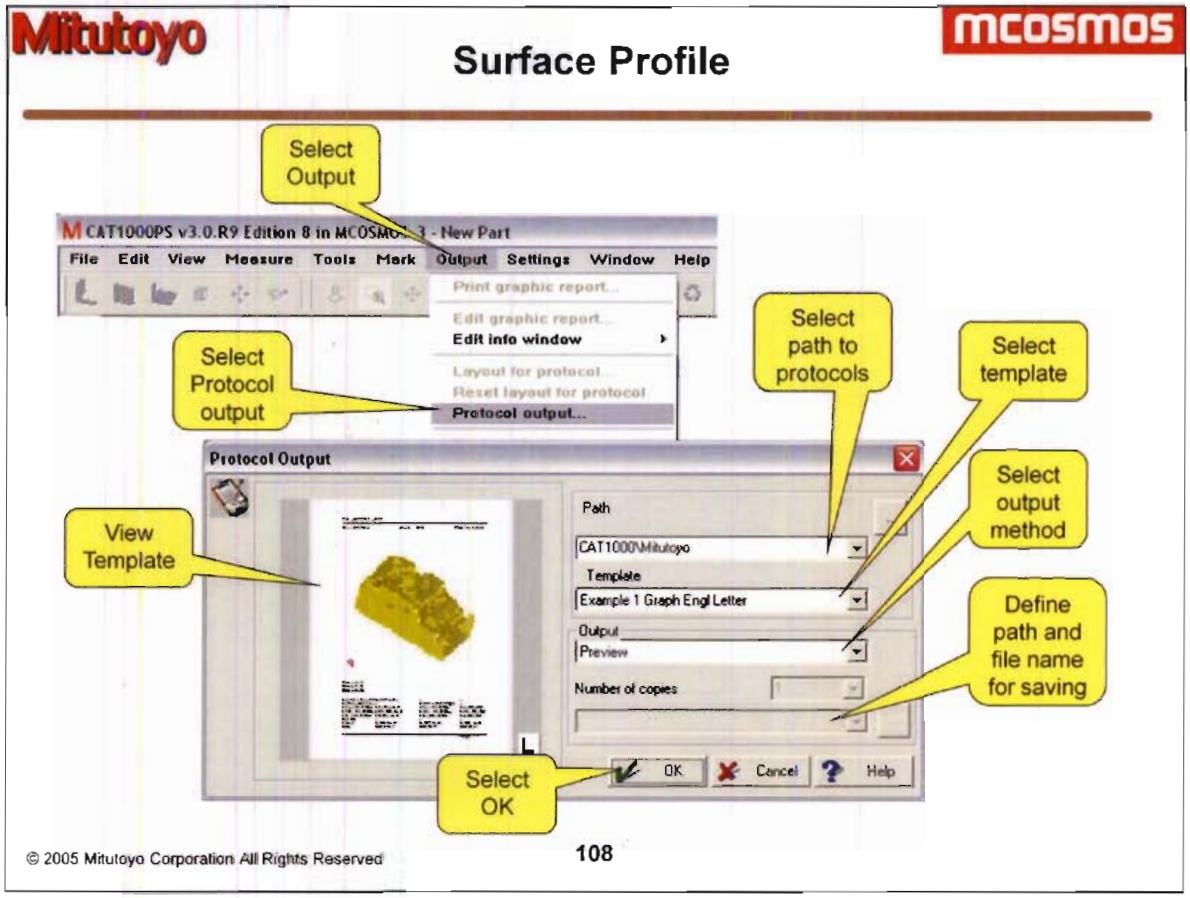

- Select Output
- Select Protocol output to create a report
- In the Protocol Output dialog select the path to the desired Template
- Select the desired Template
- Select the desired output format
- Define the path and file name for a saved file format . Note you may browse for this path, and name
- Select OK
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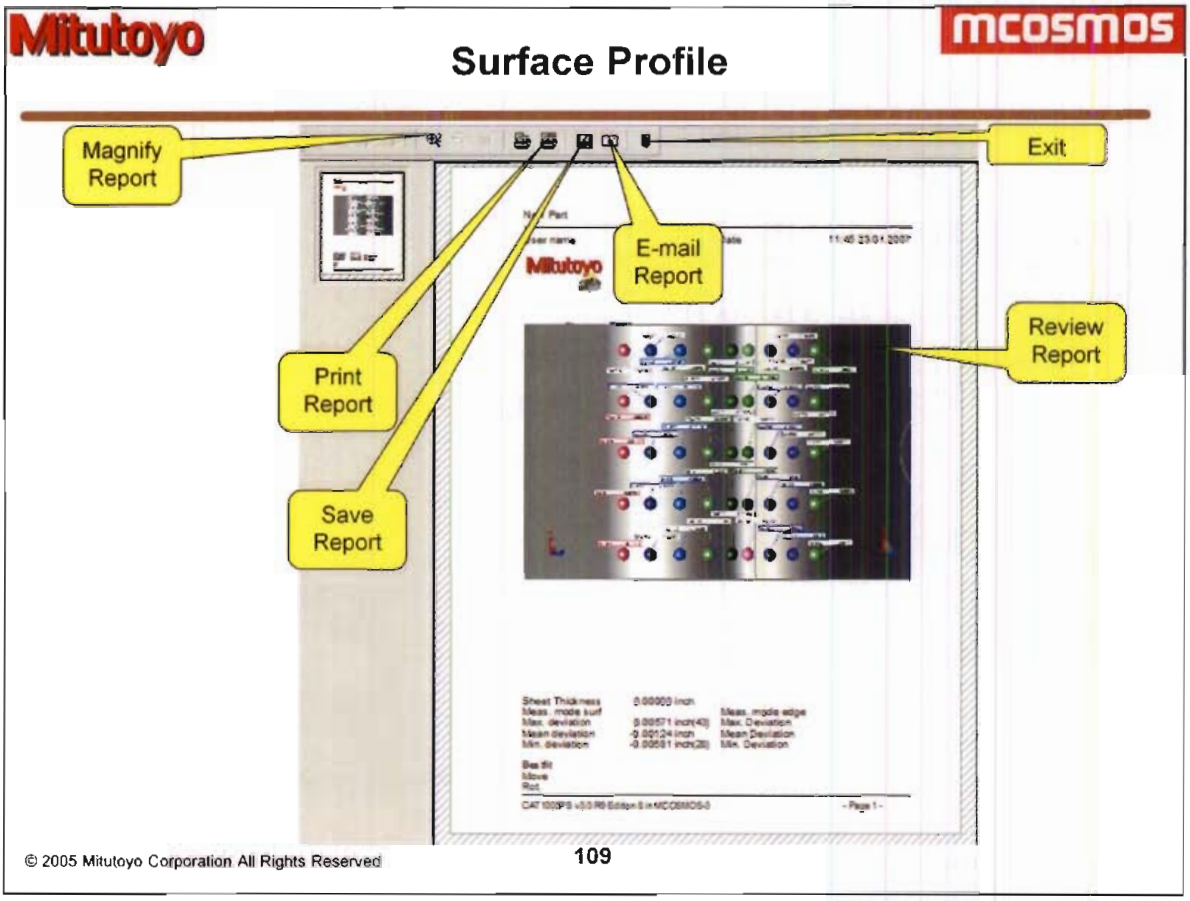

- With the Preview option you can
  - Review the report prior to printing
  - Magnify the report for closer examination
  - Print the report
  - Save the report
  - E-mail the report
  - Exit
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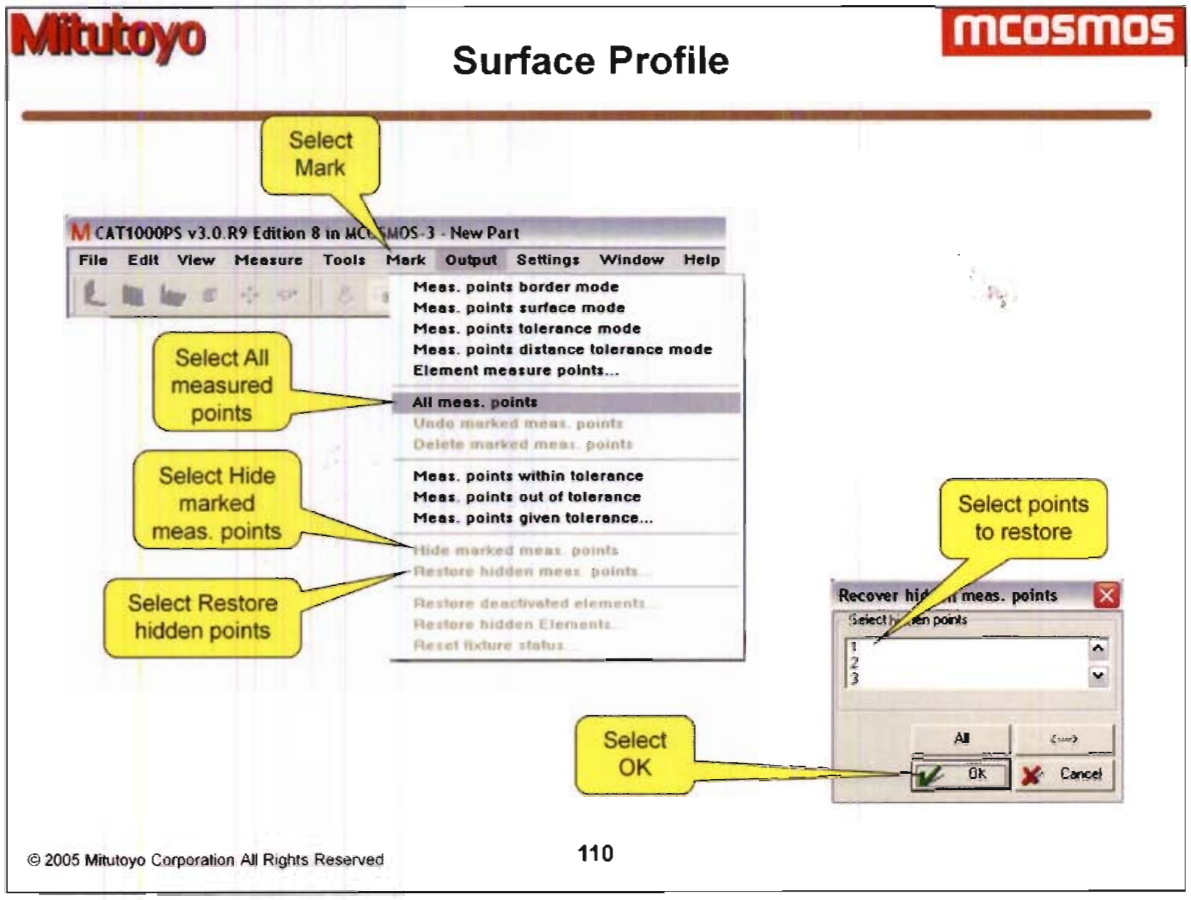

- Once you are through with this portion of the inspection you may want to hide these points
- Select Mark to hide measured points
- Select All Measured points
- Select Mark to reopen the dialog
- Select Hide Marked measured points
- Select Mark to reopen the dialog
- Select Restore hidden points
- In the Restore hidden points dialog select points to restore, or all
- Select OK to restore selected points
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Knowledge Base 1

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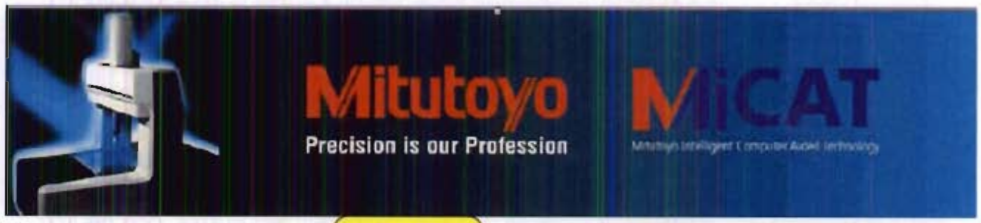
Knowledge Base 2



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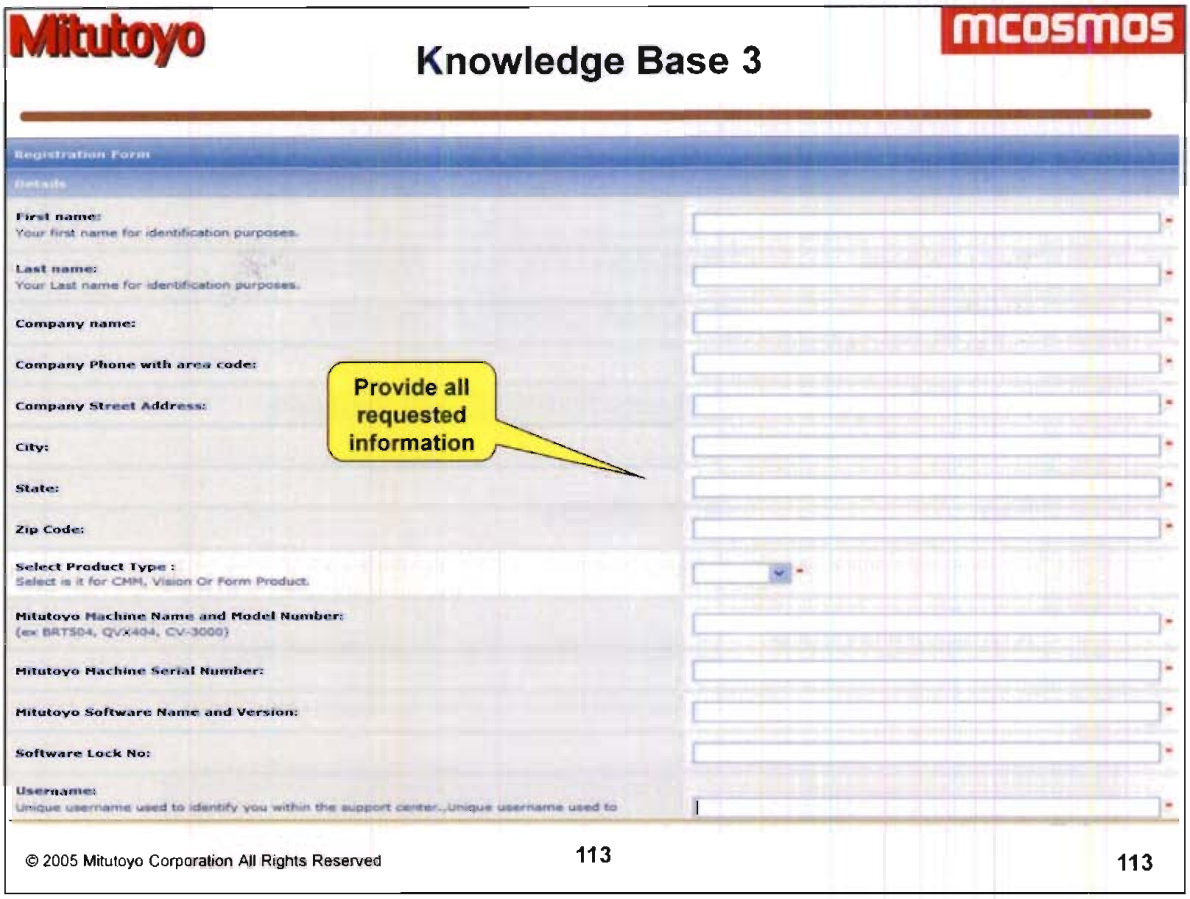
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Knowledge Base 3
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Registration Form
Details
First name:
Your first name for identification purposes.
Last name:
Your Last name for identification purposes.
Company name:
Company Phone with area code:
Company Street Address:
City:
State:
Zip Code:
Select Product Type :
Select is it for CMM, Vision Or Form Product.
Mitutoyo Machine Name and Model Number:
(ex BRTS04, QVX404, CV-3000)
Mitutoyo Machine Serial Number:
Mitutoyo Software Name and Version:
Software Lock No:
Username:
Unique username used to identify you within the support center.,Unique username used to
Provide all requested information
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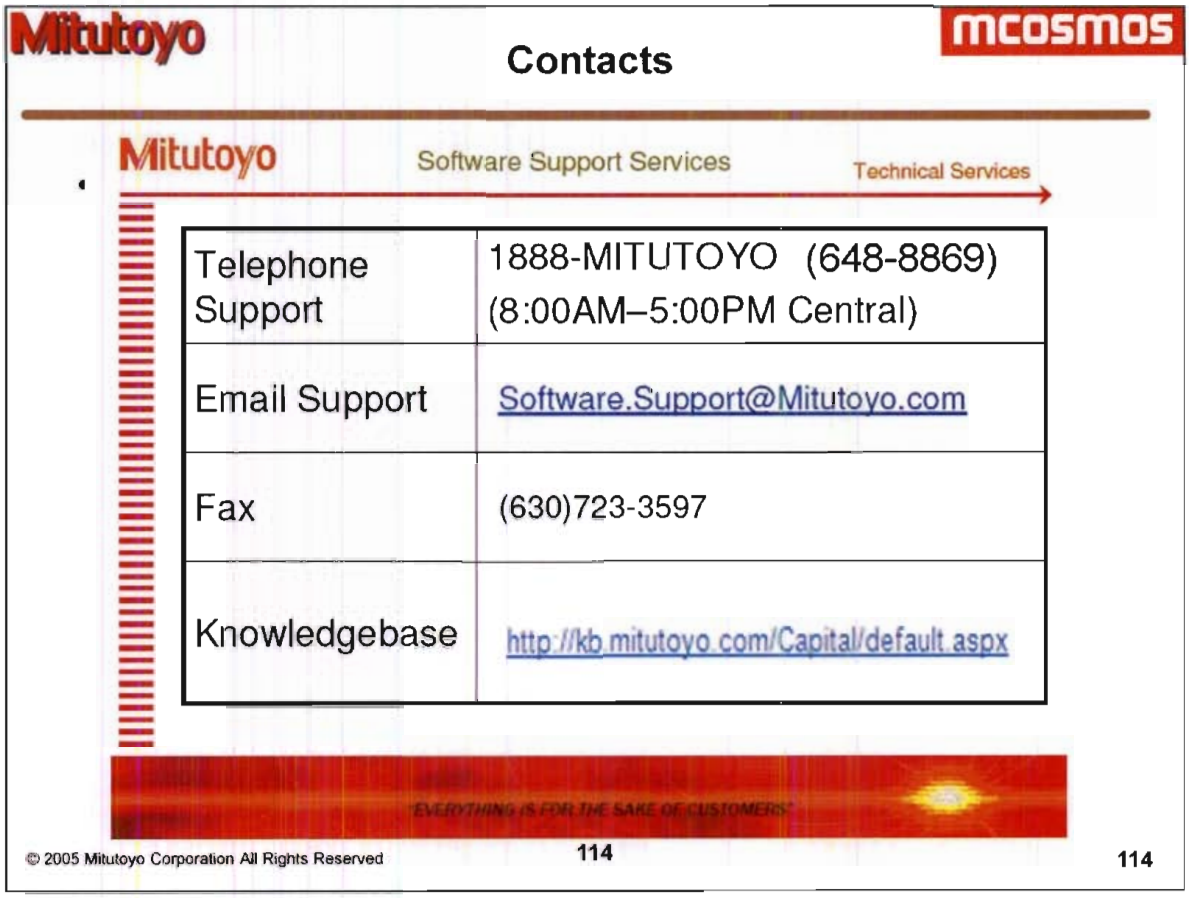

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