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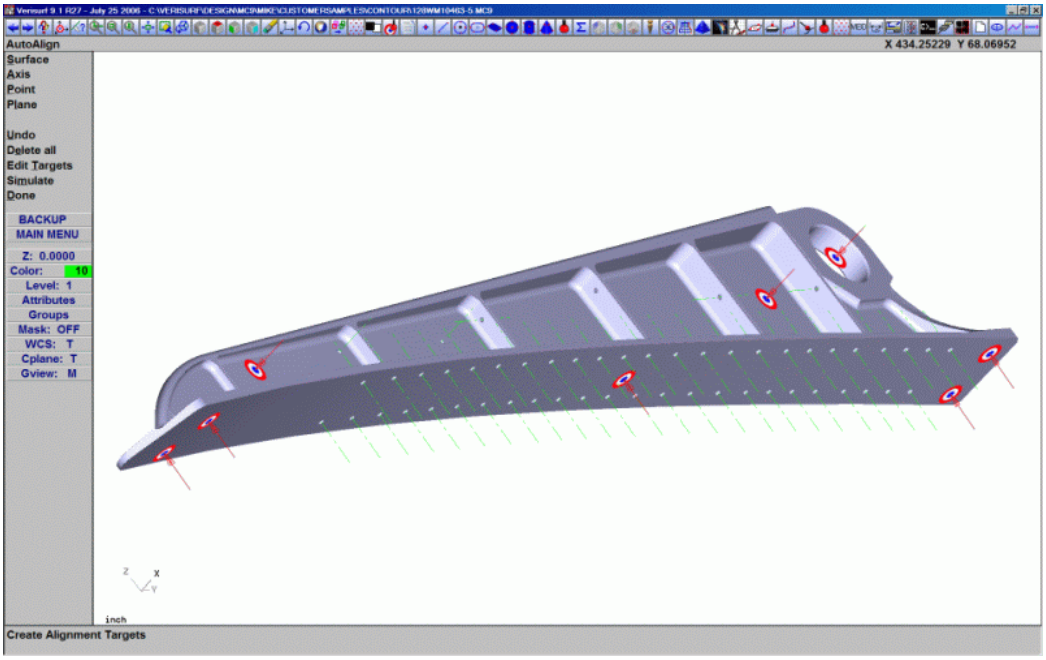
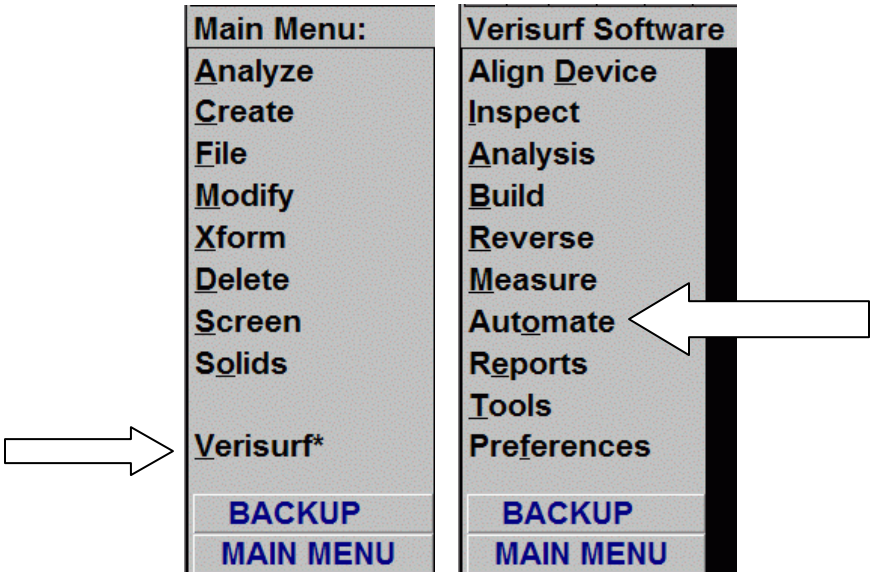
Introduction of Auto-Align

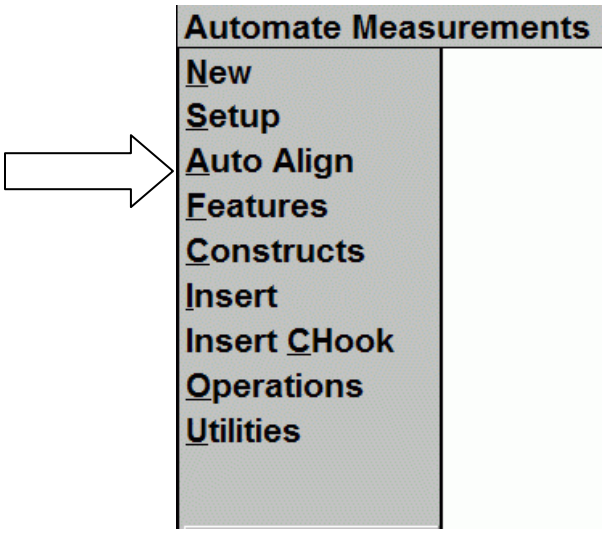
AutoAlign is an ‘on line’ model based tool that provides for the alignment of your device to the 3D model based on measurements taken from the actual product or tool being analyzed.



Accessing AutoAlign

- Through from Main Menu by selecting Verisurf / Automate.





- Or by selecting the icon on the upper toolbar 

Model Based Alignments

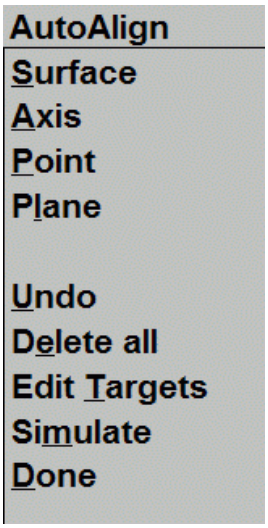
Before any process can be started in Autoalign it is necessary to 'Get' the 3D model of the product.

- From the Main Menu select File / Get for MC9 files or File / Converters as required to bring in your particular project file. For more information on obtaining files and the various interface tools see the Verisurf Cad System Basics included in the Verisurf Manuals folder.

- Now that we have the appropriate model on screen we can start the Autoalign process, no re-orientation of the cad model location is required we will only change views.

Creating an Auto Alignment

- From the Main Menu Select Verisurf / Automate / Auto Align. You will be presented with various methods of creating targets for aligning the measuring device to the cad model.



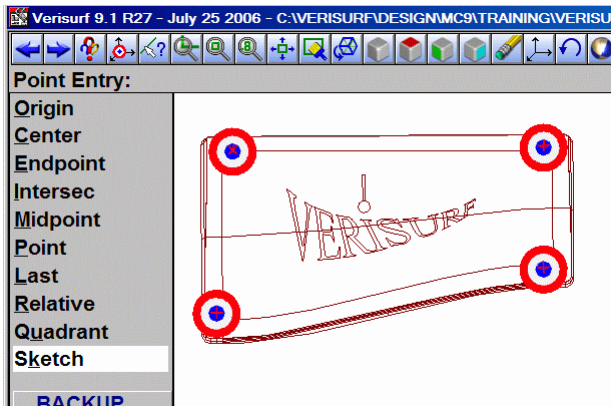
- The following will give details on the use of these methods and options

Target Selection

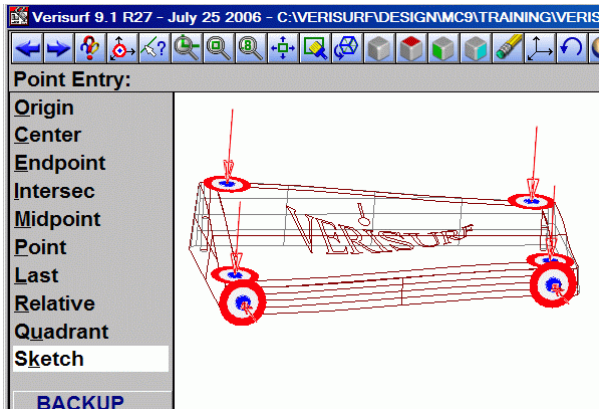
- Selecting **Surface** will bring up several methods of creating target points on model surfaces. The most popular and easiest method is **Sketch**. Using this option we can create the target points on the Datum surfaces or any surface to lock the alignment to the desired control surfaces.

- Now get the desired view by using the Gview button or hold down the Alt key and use the arrow keys to rotate the view pane to the proper orientation for targeting. Note that when executed the saved program will rotate to this view. This process can be done with the model shaded or not, you may find it easier in the shaded mode.

- Simply move the cursor to the desired location and click the mouse button. A target will appear as shown below.

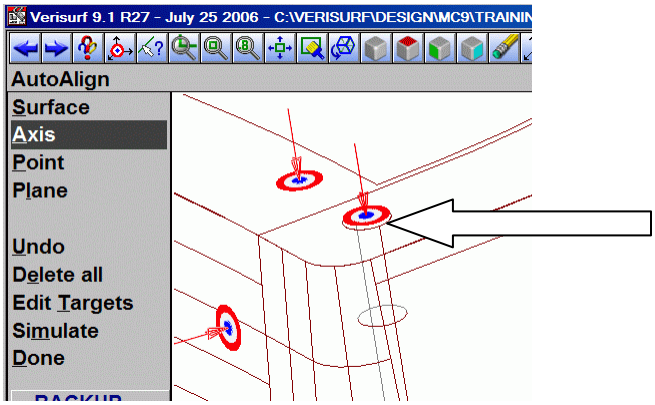


Rotate to the next view and repeat



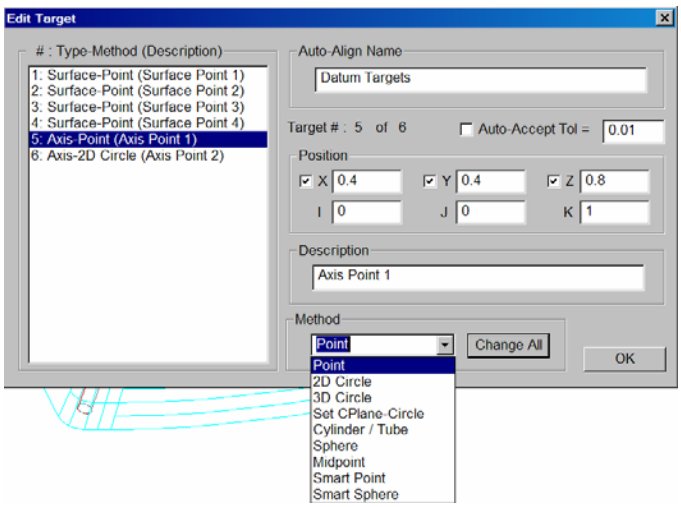
Note; when selecting surfaces be aware of the direction of the arrow as this indicates the surface ‘normal’. Surface normal should be as shown here. To modify go to Main Menu / Modify / Normal.

- Another option of Autoalign is **Axis**. This method is used to select holes and cylindrical features. To create these targets select the cylindrical feature or the arc on the model.



Edit Targets

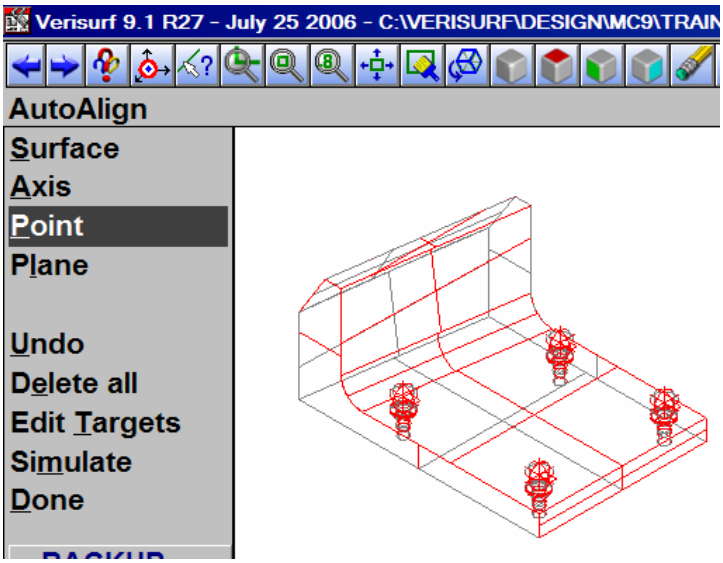
- When using the Axis method the system defaults to measure a four point circle this can be modified to a single point for use when the probe diameter is larger than the hole. Select Edit Targets and change method from Axis 2D circle to Axis-point as shown here.



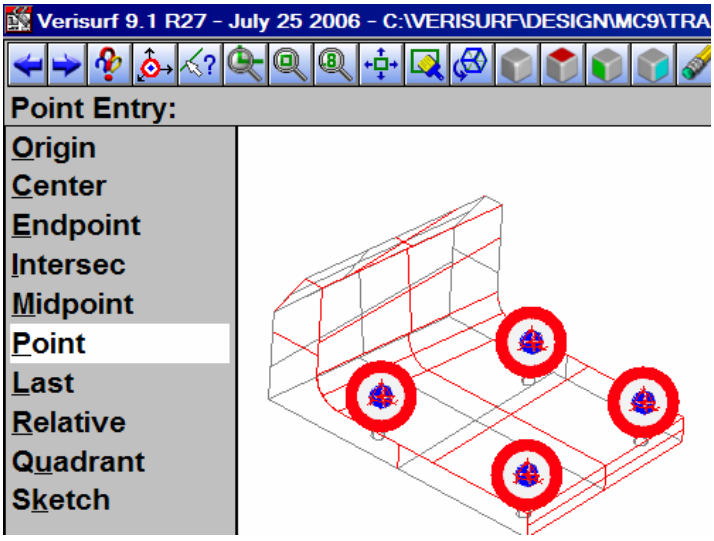
- The Edit Target dialog box also presents the opportunity to rename the alignment, the point descriptors and set the auto accept threshold if using this feature.

- When the required target is a specific 3D object such as a tooling ball the following steps could be taken.
- If the target points are already in the data base we can proceed to the next step. If not the points need to be created. From the Main Menu select Create / Point / Position. Make sure the construction plane is 3D and you have selected an appropriate level when keying in these points.

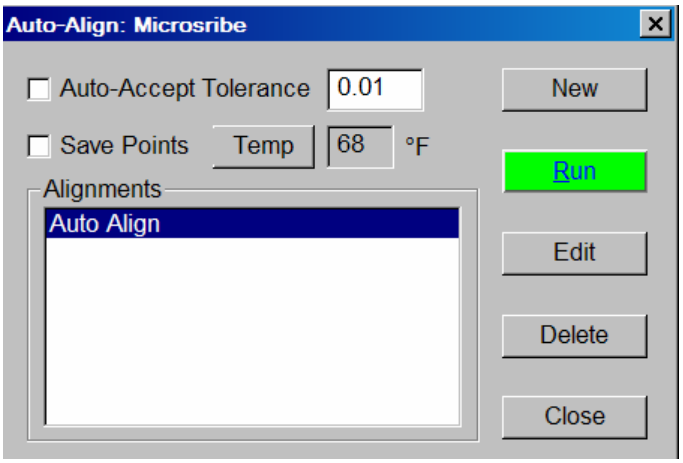
- Return to the Auto Align Menu and Select Point



- Select the points

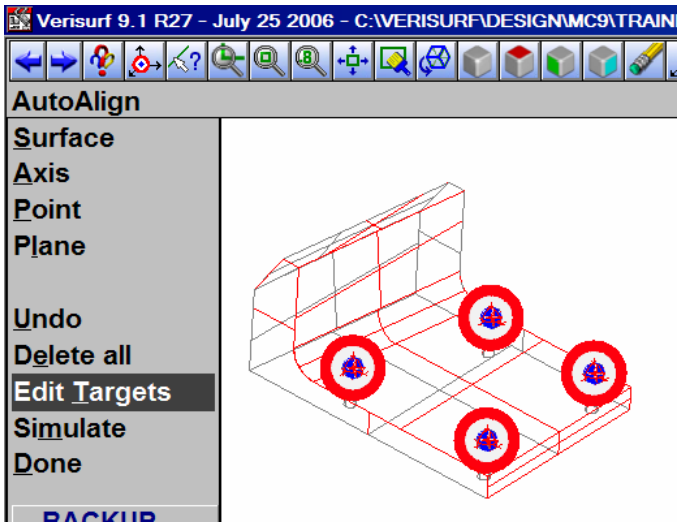


- Once the points have been selected click on Backup / Done. From the Automate Measurements Menu select Auto Align. The Auto Align Run dialog box will open.

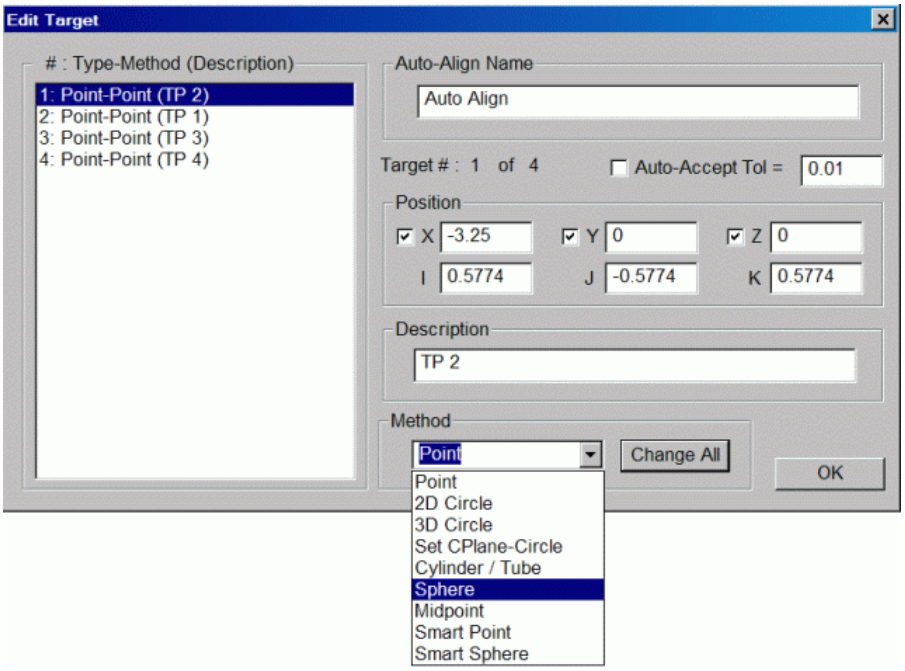


- Select Edit. (This dialog box also presents the opportunity to save the actual points collected and set the auto accept threshold. Note that the points will save to the current construction level if Save Point was selected.)

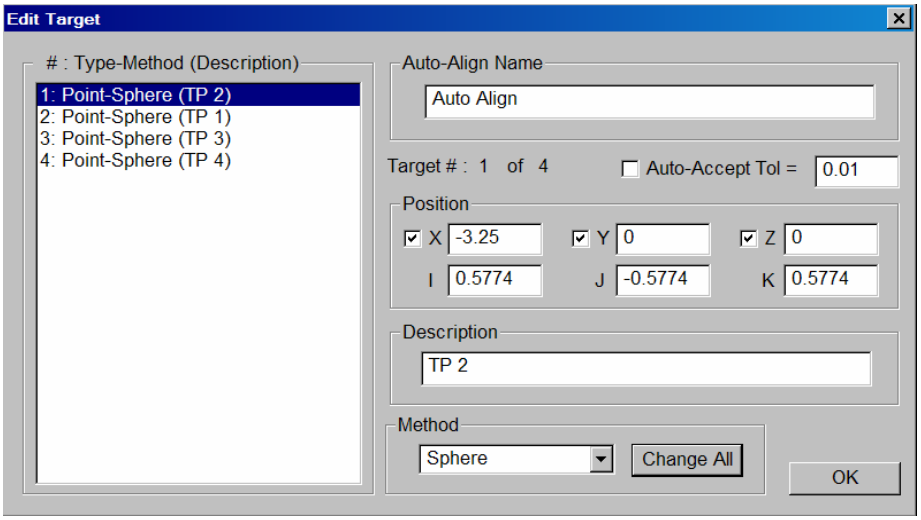
- This will return us to the Autoalign menu, Select Edit Targets.



- Open the Drop down menu at Method and select Sphere.



- Select Change All to change all the targets to Sphere. Select OK.



- When this menu closes you will return to the Autoalign main menu, select Done to return to the Automate Measurements menu. You can select Auto Align and run the alignment by following the screen prompts.

Saving the AutoAlign

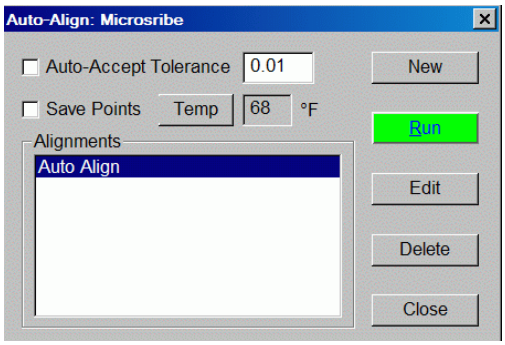
- At this point it is recommended to save the file as this will also save the auto align parameters for recall at a later time.
- Return to the Main Menu and select File / Save.

Running Autoalign

- With the file / model on screen go to the Main Menu and select Verisurf / Automate / Auto Align. Or select the Icon on the upper tool bar.

Auto Align Icon

- This will present one of two menus. If an Auto Align routine is detected the window shown here will be displayed. To execute the plan select Run.



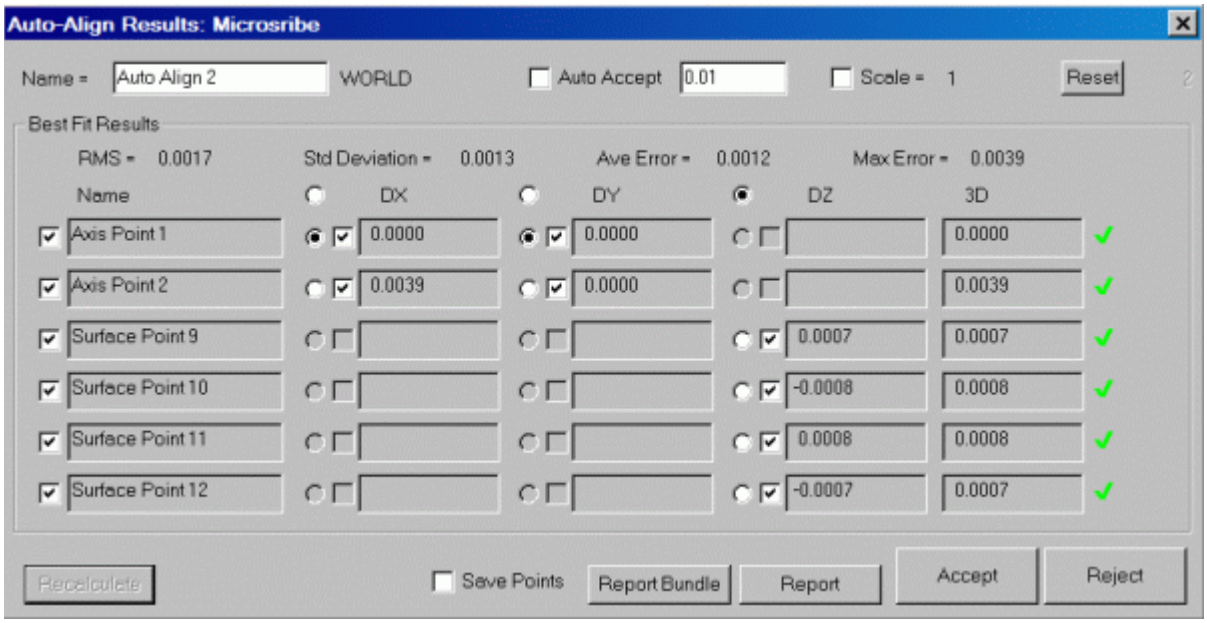
- If the file / model does not contain an automated alignment the Auto Align target selection menu will open. See the previous chapter on creating an auto alignment.

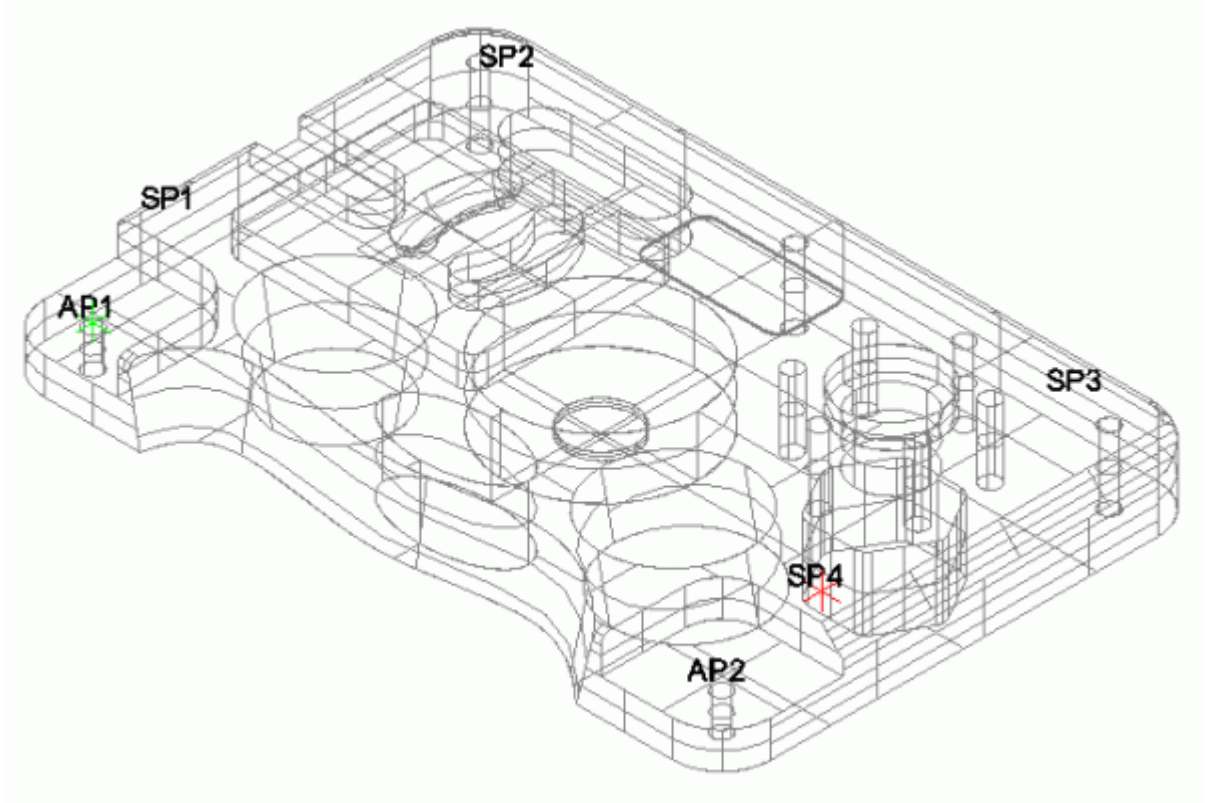
- Selecting Run on the above dialog box will execute the saved Auto Alignment and prompt the operator through each step until the alignment is completed.

- After completing the Autoalign process the Auto Align Results dialog will open in order to review results and make adjustments to the alignment.

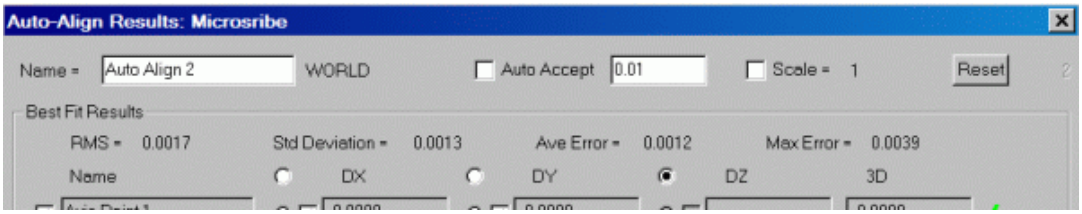
- If the Auto Accept box is checked the Results screen (shown next) will not display if the alignment is solved within the noted tolerance.

AutoAlign Results





- In this example AP1 to AP2 represent a line in the secondary axis with AP1 as origin or tertiary axis, SP1 thru SP4 are representative of the primary axis or plane.
- Name reflects the name of the alignment executed



- Auto Accept if checked in the Auto Align / Run dialog box will not display this Auto Align Results dialog when the alignment results fall within this setting.

- Scale will indicate the current scale factor imposed on the measurements as set in the temperature compensation settings in the VDI.

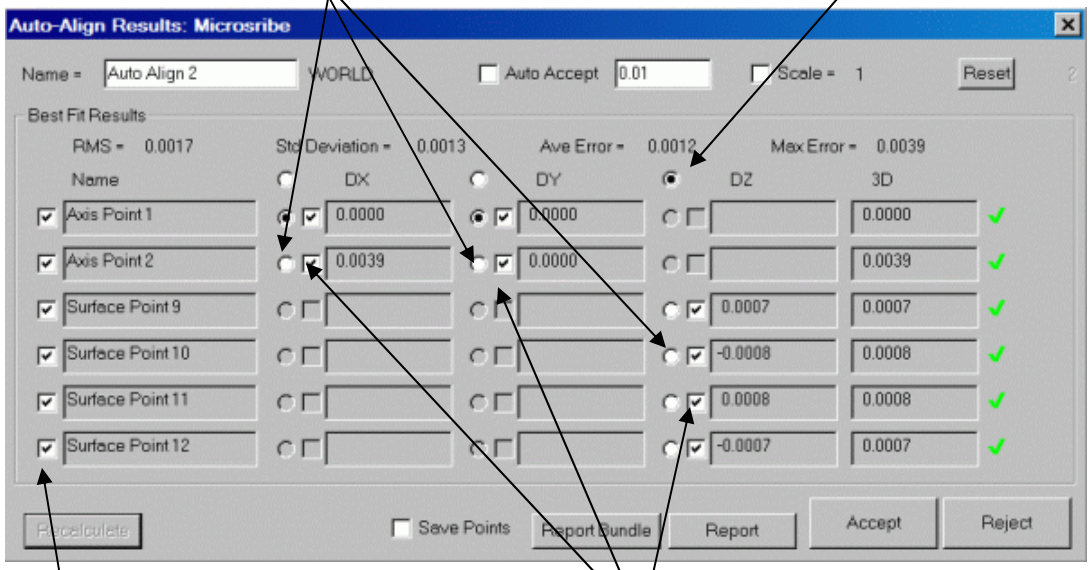
- Best Fit Results RMS – STD DEVIATION – AVG ERROR – MAX ERROR indicate departure from nominal as a grouped bundle.

- The following check boxes can be selected to refine the default alignment results; selecting Recalculate will revise the results to reflect the new settings. Reset will return the settings to the original results.

Editing Alignment Results

The round buttons here when checked specify the feature used to lock location such as a datum surface or hole axis.

The round buttons across the top here allow the features in this direction to be averaged as shown here in the Z direction.



Check boxes here indicate features used in the alignment. One or more may be unchecked removing it from the solution.

The square check boxes here specify the features used to align / orient the primary and secondary axis

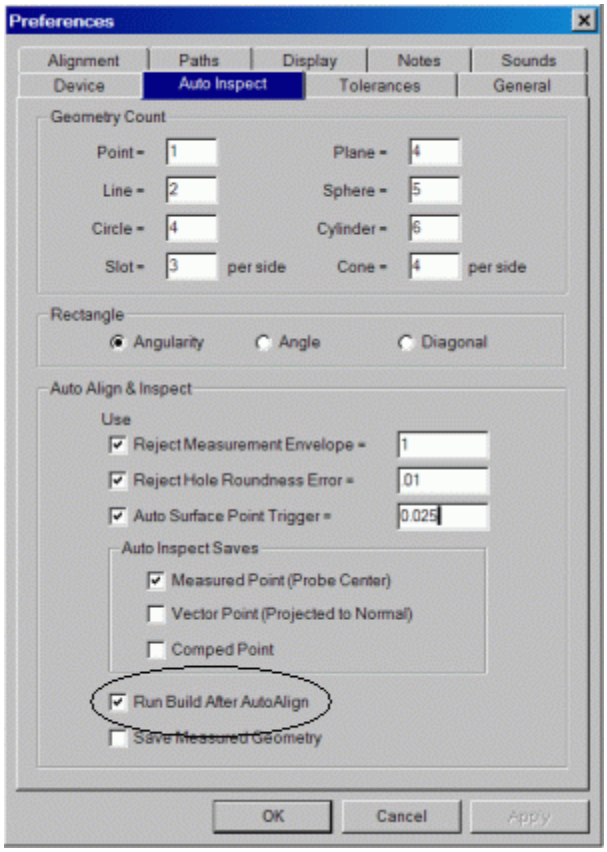
- Recalculate is on the lower left corner of the dialog box.

- After the alignment settings have been set and the operator is satisfied it is possible save the alignment data as geometry or create a report of the results.

- Selecting Save Points will save the alignment data as points on the current construction level
- Report Bundle will create an Excel format with nominal point locations, Vector data and deviations.
- Report creates a similar report in the HTML format.
- Selecting Accept will align the device to the measured object and the 3D model.

AutoAlign and Build

- For many users or in some circumstances the need is to go directly into an analysis mode after alignment rather than running a more in depth automated inspection plan.
- **Build** provides real time 3D comparison of a manufactured object to its Cad representation with immediate results and data collection tools that record findings for further analysis.
- To access **Build** after Alignment the operator can execute the module by way of the Main Menu then Verisurf / Build, or auto start by selection in the **Preferences** dialog box
- To start Build automatically after Autoalign go to Main Menu / Verisurf / Preferences and select the Auto Inspect tab.



- Check the box for ‘Run Build after Autoalign’.
- See the Build Documentation for detailed instructions on using Build.

AutoAlign and Automate

- Automate provides the tools to create a programmed procedure for inspecting the manufactured object against the 3D model. For more information on these procedures see the Verisurf Automate Manual.