Perceptron Scanner Plugin

for Geomagic Studio 6 service release **4**, Geomagic Qualify 6 service release **2**, and Geomagic Qualify 7.

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Plugins > Perceptron is the interface in Geomagic Studio and Geomagic Qualify to a Perceptron Contour Probe. Perceptron's ScanWorks must be running in the background.

The purpose of this (or any) scanner plugin is to eliminate the need to import scan data into Geomagic Studio or Qualify. With the plugin, scanned data exists in the application's Model Manager immediately after the data capture process.

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Activating the Perceptron Plugin

The main point of this procedure is that the ScanWorks software must be running before the Geomagic application is started.

1.   Turn on the Perceptron interface box by pressing the power button. Allow up to 90 seconds for startup.
2.   Turn on the arm to which the scanner is mounted.
3.   Turn on the scanner by pressing the Sensor Power rocker switch on the interface box.
4.   Start **ScanWorks**, typically with a desktop icon.
5.   In response to the "arm joint" dialog, exercise joints on the arm until all all bars are solid blue. When you hear a long tone, the arm is ready.
6.   On the ScanWorks interface, at **Setup > User Options**, verify that the "Output Data to TCP/IP" option is checked. This causes scan data to be captured by ScanWorks but rerouted to the Geomagic application.
7.   Verify that a ScanWorks is in the online state.

8. If **Geomagic Studio** or **Geomagic Qualify** is not already running, start it now.

9. To activate the scanner control dialog, click the Perceptron icon on the toolbar, or select **PlugIns > Perceptron Scan**.

   (This menu item in Geomagic products is an optional, separately licensed feature. If Perceptron does not already appear on the Plugins menu, download the software from support.geomagic.com/downloads, install it according to instructions on the web site, and re-start this procedure.)

Controls on the Plugin Dialog

This section details the controls and indicators on the user interface of the FARO Scanning plug-in.

- **Start Capture** icon button - Enables the three control buttons near the end of the arm (but does not start data collection). When scanning is complete, press the Stop button on the arm.
- **Object Name** field and **Reset** button - indicates the name of the object that will be stored in the Geomagic model manager. The first scan is named Scan1. Subsequent scans (during one invocation of the Geomagigic software product) are numbered incrementally. **Reset** restores the Object Name to Scan1.
- **Units -** specifies the units of measure on the object that will be scanned, such as inches or millimeters.
- **Scanning Options** - control the operation of the scanner and the display of data.
  - **Shade Points** checkbox - By the time a scan is stored in the model manager, the plugin will have calculated individual point normals based on the scanner direction at time of acquisition. This checkbox specifies whether to perform these calculations during pauses (in which case you must wait for a calculation to complete before resuming a scan) or after you press **OK** to terminate the plugin (in which case you might have to wait for a relatively long time).
  - **Virtual Camera** checkbox - toggles the Virtual Camera functionality of the laser scanner.
  - **Highlight Scan Pass** checkbox - activates display of the most recent scan pass in red. Otherwise the incoming scan data appears in the viewing area in the same light green of previously collected scan points.
  - **Display Polygons** checkbox - toggles the display between Polygons and Points. Acts on all scan passes in the current plugin instance.

- **Edge Ratio** slider (five settings from Low to High) - specifies the propensity of the software to leave gaps between scan lines in the scan image if you are scanning too fast. [A triangle with *high edge ratio* is one that has two relatively long sides caused by rapid scanning, and a relatively short side which is influenced by **Setup > Scan Density** on the ScanWorks interface.]
  - If density of scan is more important, such as in a reverse engineering scenario, use a lower Edge Ratio. If you scan too fast, gaps appear on the scan image. In that case, slow down or make a second pass.
  - If density of scan is less important, such as some inspection scenarios, use a higher Edge Ratio. If you scan relatively fast and scan lines are far apart, software will triangulate the space between scan lines and thereby suggest that the scan is "good". If you are still scanning too fast and gaps appear, slow down or make a second pass.
- **Data Options** - affect the scan data.
  - **Merge Scan Passes** checkbox - specifies whether to perform a point merge on all individual scan passes created during the current session of the plugin. Each scan pass is named Scan *N*, with a unique value of *N*. The result will be one point object in the model manager named Merged *N*. (Merging occurs when you click OK to close the plugin.)
  - **Sampling** checkbox - specifies whether to perform uniform sampling (a reduction of point density) on the resulting point cloud at the end of a scan pass. (Sampling occurs during pauses between scan passes.)
    - **Spacing** - specifies the spacing parameter used by the Uniform Sample operation.
  - **Smoothing** slider (None, Min, Med, and Max) - specifies whether to perform a smoothing operation on each scan line. The intent is to smooth noisy data in real-time for better wrapping results. (Smoothing occurs during scanning.)
  - **Filter Angle** field (0 to 90 degrees) - offers the ability to ignore points collected by the scanner beyond the specified angle. This results in much cleaner data. The filter angle can be adjusted between 0.0 and 90.0 degrees. This value, like smoothing, applies per scan line. (Filtering occurs during pauses beween scan passes).
- **OK** button - Stops the capture process, stores the created object(s) in the model manager, and closes the **Perceptron Scan** plugin.
- **Cancel** button - Stops the capture process, discards the created object(s), and closes the **Perceptron Scan** plugin.

Controls on the Arm

After you press the **Start Capture** button in the dialog, the arm buttons are enabled and the scanner is in the Paused state. Looking from the elbow toward the laser scanner, the three buttons on the arm are:

- Left Button - **STOP** - returns control to the plugin dialog.

- Center Button - **Unpause** and **Pause -** Press once to activate the laser and scan the physical object. Press again to pause the scanner. During the pauses, the application performs shading and sampling (if configured in the plugin dialog) on the data that was just collected. Each cycle of Unpause/Pause generates a uniquely numbered "Scan N" object in the Geomagic model manager. When a sufficient number of Scans are complete, press the Left button to **Stop** scanning and return control to the plugin dialog.
- Right Button - no function.

Step-by-Step Procedure

Use this procedure to perform a scan with Geomagic Studio or Geomagic Qualify.

1. Select **Plugins > Perceptron Scan** on the Geomagic Studio or Geomagic Qualify toolbar.
2. Set the values in the ScanWorks dialog appropriately.

3. Press the **Start Capture** button in the dialog. If the arm is in the upright/stored position, it issues a continuous tone until you extend it.
4. Notice the laser cursor shining from the scanner head. Hold the scanner above the target object so that the range finder in the Geomagic window indicates a suitable scanning distance. When the blue bar is short, the scanner is too close to the object. When the blue bar fills the range finder, the scanner is too far away.
5. To begin a pass (un-pause the scanner), press and release the middle button on the scanner arm.
6. To complete the pass (pause the scanner), press and release the middle button on the arm again. During the pause, two things happen:
   - Scan data is automatically scaled to fill the Viewing Area.
   - If configured, Sampling and Shading occur on the object(s).
7. To perform additional passes on the same object, go back to Step **5**.
8. Press the Left (Stop) button on the arm to stop the capture process and return control to the plugin dialog.
9. On the plugin dialog, press:
   - **OK** to close the **Perceptron Scan** plugin.
     - *If* **Merge Objects** was checked, **OK** also merges multiple objects into one object, named Merge *N* in the model manager. Closing the plugin is the only way to cause the Scan N objects to be merged into one Merge N object in the model manager.
   - **Cancel** to close the **Perceptron Scan** plugin without saving any scan data to the model manager.
   - **Start Scan** again to create additional Scan *N* objects. Go to step **3**.