Scanning Methods

At a high level, there are two methods you can use in order to capture scans: the single scan method and the batch scanning method. Both methods feature a number of adjustable parameters to suit your preferred way of scanning an object.

The Single Scan Method

The single scan method allows you to capture scans one at a time. This method allows you to take as much time as you need to reposition the sensor and/or scanning object.

To use the single scan method:

1. Be sure that the Enable Batch Scanning checkbox in the Scanning panel is NOT checked.

2. Set an initial time delay in the Delay (in seconds) field, if desired.
3. Point the sensor at the object, and make sure the object is visible in the live video feed(s).
4. Press the SCAN button.
Depending on the settings you've selected in the Meshing panel, KScan3D will generate a mesh or a point cloud. An image of the mesh or point cloud will appear in the Thumbnail panel, indicating that the scan was successful.

Also:

If Generate was set to "Mesh" or "Points"
   The mesh or point cloud will also appear in the 3D viewport.

If Generate was set to "Capture Only"
   The point cloud will be captured but the data will not be visible in the 3D viewport until the thumbnail checkbox is selected.

If Generate was set to "Mesh" and Alignment was set to "Mesh Geometry"
   KScan3D will attempt to align the mesh with previously generated and aligned meshes.

**The Batch Scanning Method**

The batch scanning method allows you to capture multiple scans.

To use the batch scanning method:

1. Select the Enable Batch Scanning checkbox in the Scanning panel.

2. Select the number of scans you would like to capture.
3. Set the time delay in seconds between scans.
4. Set an initial time delay, if desired.
5. Point the sensor at the object and make sure the object is visible in the live video feed(s).
6. Press the SCAN button.

KScan3D will begin capturing scans one at a time, pausing between each scan according to the specified time delay, until the total number of specified scans have been captured.
The settings in the Meshing and Point Cloud Meshing panels provide options that may influence how you choose to use the batch scanning method. Here are two common batch scanning workflows.

**Immediate Mesh Generation and Alignment**

One batch scanning workflow allows you to generate meshes and align them within a single process.

1. Set Generate to "Mesh" and Alignment to "Mesh Geometry" in the Meshing panel.

![Meshing Panel](image)

2. In the Scanning panel, enable batch scanning and set the number of scans and the delay between scans.

![Scanning Panel](image)

3. Set an initial time delay, if desired.
4. Press the SCAN button.

KScan3D will begin capturing scans, generating, and aligning meshes one at a time with the specified delay between each scan. Note that KScan3D will take additional time between scans (beyond the time delay set in the Scanning panel) to align the currently generated mesh with previously captured and aligned meshes.

Depending upon your computer's hardware, the density of the captured mesh, and the number of meshes that have already been generated and aligned, this process may take some time. However, the benefit is that KScan3D will capture scans, generate meshes, and attempt to align each mesh within a single process.

**Rapid Point Cloud Capture With Postponed Processing**
An alternative batch scanning workflow allows you to capture multiple scans as quickly as possible and postpones the mesh creation and alignment process for later.

1. Set Generate to "Capture Only" and Alignment to "None" in the Meshing panel.

![Meshing Panel](image)

2. In the Scanning panel, enable batch scanning, set a relatively high number of scans (such as 25 or 50), and set the delay to 0.

![Scanning Panel](image)

3. Set an initial time delay, if desired.
4. Press the SCAN button. The moment you press the SCAN button, KScan3D will rapidly begin capturing data point clouds.
5. Move the sensor around the object, or rotate the object in place, to capture data from various angles. As each point cloud is captured, a small image of the point cloud will appear in the Thumbnail panel.
6. Once the batch scanning process is complete, the Thumbnail panel will display images of all the point clouds that KScan3D has captured during the process.

At this time, note that the captured point clouds are all unloaded (i.e. not visible in the 3D viewport), unprocessed (i.e. they are still point clouds, not meshes), and unaligned. If you'd like, you can select the checkboxes beside the images in the Thumbnail panel to load and view the point clouds in the 3D viewport. The important next step, however, involves processing the point clouds into meshes.

To process the point clouds:

1. Select the Mesh Editor button in the Toolbar at the top-left of the screen.
2. Select the point clouds you would like to process by CTRL-left clicking the images in the Thumbnail panel (tip: to select all point clouds, scroll to the top of the Thumbnail panel, select the first image, scroll to the bottom of the panel, then hold SHIFT and select the last image).
3. In the Point Cloud Meshing panel on the left side of the screen, choose an Alignment option in the
drop-down list, adjust the Density slider to set the mesh density, and click the "Build" button.

One by one, KScan3D will load each point cloud, convert it to a mesh, and if "Mesh Geometry" was selected as an alignment setting, attempt to align the mesh to previously-aligned meshes.

Method / Workflow Selection

When deciding upon a scanning method / workflow, consider your environment and the object you wish to scan:

- If you need to carefully position the sensor and/or object before capturing a scan (for instance, to scan a difficult section of the object due to poor lighting conditions and/or occlusion), you may want to perform a single scan.

- If you plan to scan an object that requires you to move the sensor around the object and capture/processing speed isn't an issue, you may want to batch scan using the "Immediate Mesh Generation and Alignment" workflow.

- If you plan to scan a person who is holding a pose, it may be best to batch scan using the "Rapid Point Cloud Capture With Postponed Processing" workflow. This method is particularly well-suited for multi-sensor scanning with a motorized turntable. For a complete step-by-step process using this method, see Creating A Multi-Sensor Setup For Full Body Scanning.

In all cases, you are free to use any combination of scanning methods and workflows within any given project.

About Automatic Mesh Alignment

The ability for KScan3D to automatically align meshes during the capture/generation process is dependent upon several factors. Sometimes a mesh will not properly align during this process. Usually, this type of mesh can be aligned by manually repositioning the mesh first, then selecting the Align button to align the mesh with previously aligned meshes. For more information, see Aligning Data.
Scanning Tips

Scanning an object is as much an art as it is a science. Here are some tips for generating quality scan data.

Maintain a Close Scanning Distance
Although the sensors can capture data from approximately 40 centimeters to 4 meters (16 inches to 13 feet) away, it's important to note that scan data quality is reduced significantly as the distance from the sensor increases. To capture quality data, it's best to scan at fairly close range.

Use the X, Y, and Z Sliders
The Scanner panel on the right-side of the screen contains four sliders that affect the dimensions of the scanning volume. Adjust these sliders to separate the area you wish to scan from the remaining area that you don't need to capture and process.

Scan Overlapping Data
For the automatic alignment process to function properly, scans should contain sufficient overlapping data. There is no hard and fast rule regarding how much data should overlap, as this complex process depends upon the quantity and quality of scan data you capture. The process can also be affected by the shape and surface qualities of the object, environmental conditions, and other factors. Even if there appears to be sufficiently overlapping data, sometimes a mesh will not automatically align. For more information, see Aligning Data.

NEXT: Aligning Data