



Basic Post Processing in Geomagic Design X

This guide explain how to post process 3D scans in Geomagic Design X

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Source: <http://www.geniusinstruments.co.th/Industrial%20equipment-PortableMeasuringArms.2>

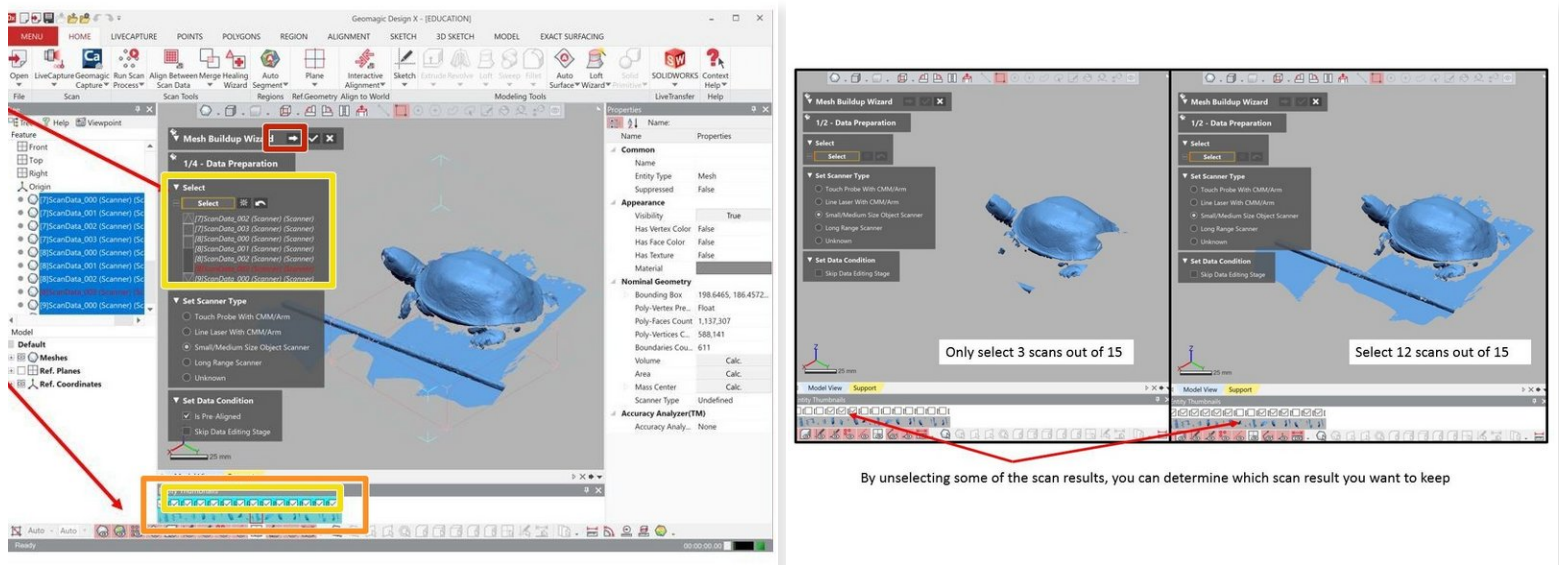
Introduction

Creating a clean and manifold mesh with 3D scanning requires not only capturing scans, but post processing them. Typically, the workflow of a simple 3D scan involves:

- Scanning the target object from multiple angles
- Clean each scan by removing captured surfaces not part of the target object
- Align the scans from different angles together
- Merge the aligned scans into a single mesh

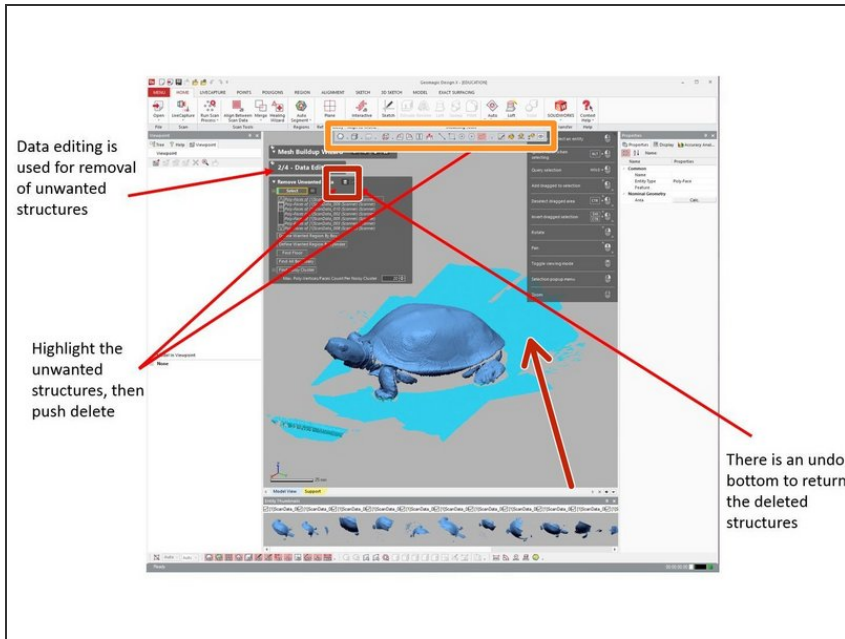
This guide introduces the fundamentals of post processing 3D scans with Geomagic Design X.

Step 1 — Selecting Data to Post Process



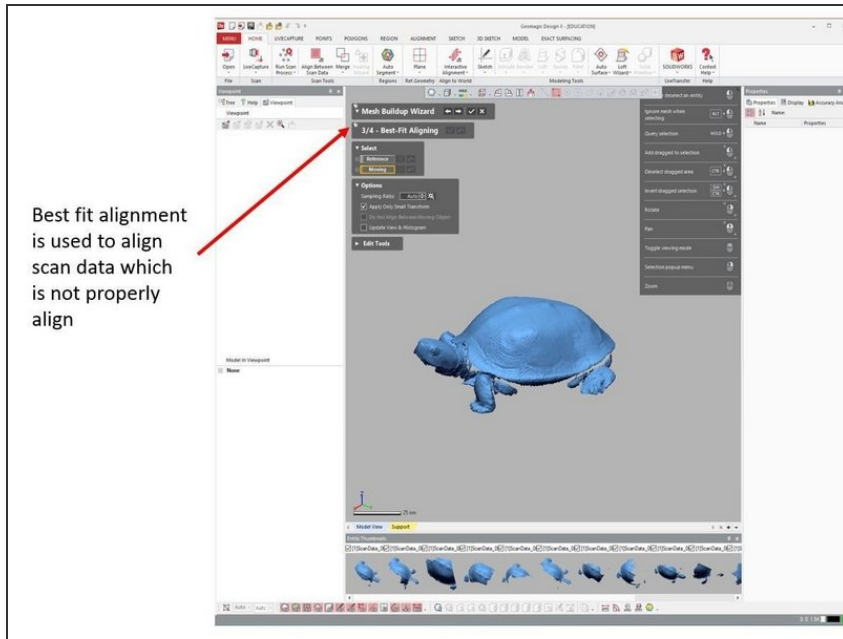
- After finishing a scan at one orientation, a window appears with options on how to proceed with the recently collected data. Select **Mesh Buildup Wizard**.
- ① The mesh buildup wizard includes a step-by-step guide to converting scan data in point-cloud format into a mesh.
 - Toggle through the steps in the mesh buildup wizard with the arrows on the top of the window.
- In the first step, select the scan data to process.
- ① Note that each time a scan is started then stopped, it creates a new point cloud.
 - The bar on the bottom displays each individual point cloud.
 - Select scan data to process either with the menu in the mesh buildup window or with the check marks on the bottom bar.
 - Select all point clouds from a single orientation then hit the arrow to move on to the next step.

Step 2 — Data Editing



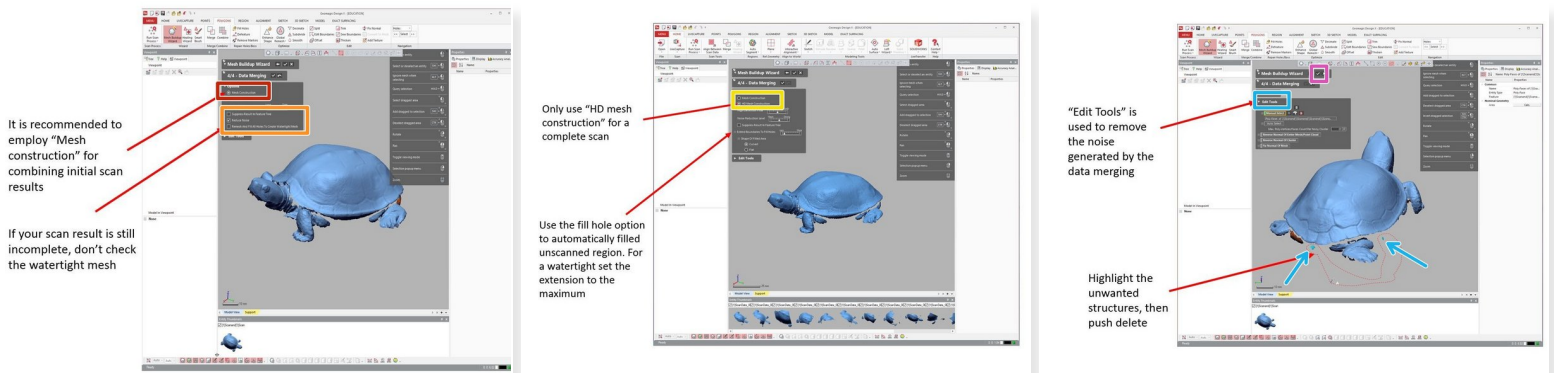
- The second part of the Mesh Buildup Wizard is **Data editing**.
- **i** This step is to remove unwanted data captured when scanning, e.g. the table beneath the target object.
- Highlight the unwanted data then push delete.
- Choose the selection tool - lasso, circle, rectangle, etc - from the small toolbar at the top of the screen.
- There is an undo button to return the deleted data.

Step 3 — Best Fit Aligning



- i Best fit aligning takes point clouds oriented to different coordinate systems and reorients them to properly represent the target object.
- Since the Romer Arm automatically aligns each scan to a global coordinate system, as long as the object remained in the same orientation, this step is unnecessary.
- When merging scans from alternate orientations, this step is necessary.
- Step 7, Alignment, will describe the alignment process once we add a scan from a different orientation

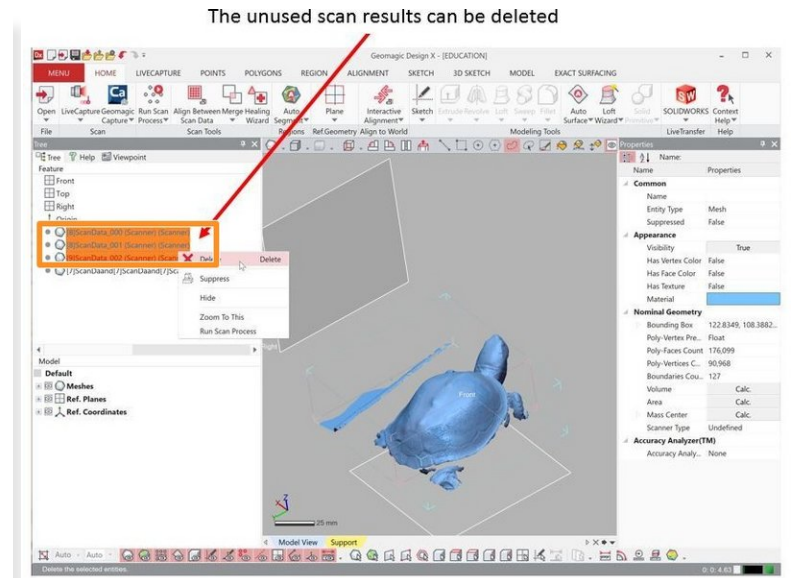
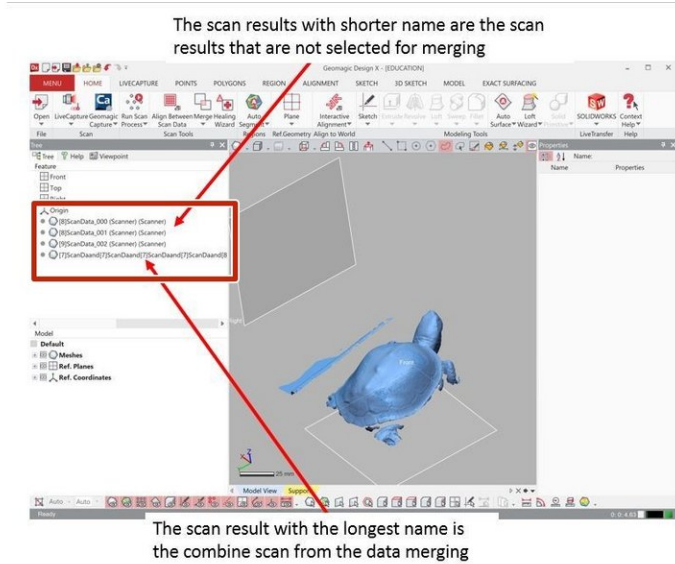
Step 4 — Data Merging



Data Merging is used to combine the all the scans into a single point cloud.

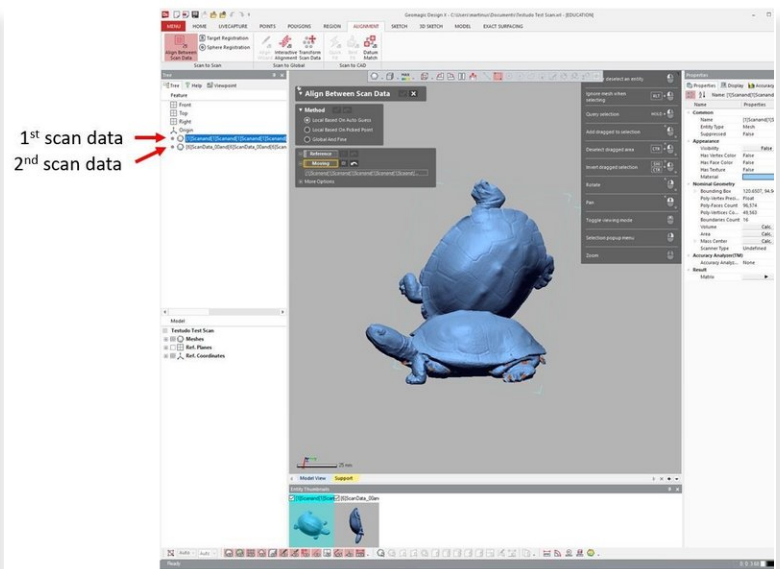
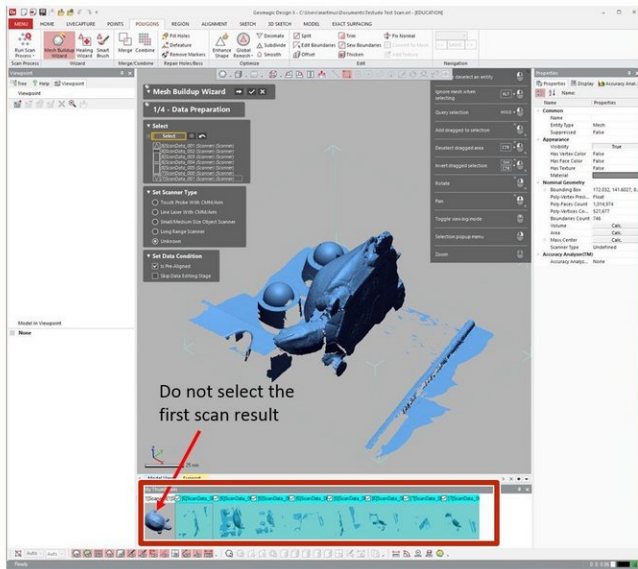
- It is recommended to use **Mesh construction** for combining initial scan results (See the first figure).
- If the scan is still incomplete, don't check the watertight mesh. This prompts Design X to automatically fill in any gaps to create a solid shape.
- Only use **HD mesh construction** for a complete scan. Step 8 uses this option to combine scans from multiple orientations and create the final mesh.
- **Edit Tools** enables the removal of noise generated by the data merging algorithm.
- When finish, hit the check button under **Mesh Buildup Wizard** to complete the mesh buildup wizard.

Step 5 — Analyzing the Merging Result



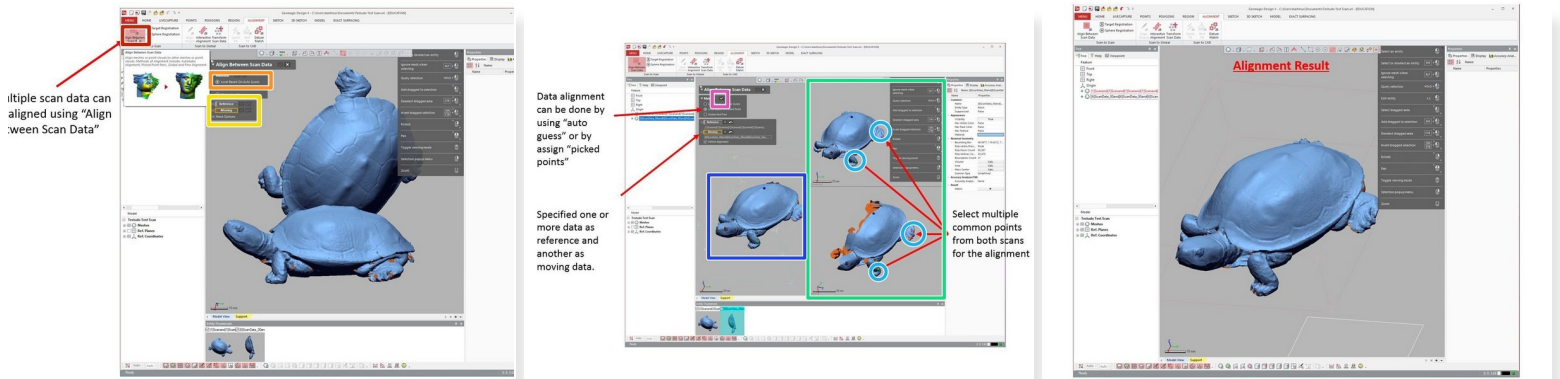
- The data merging will generate a **combine scan result** on the left window (See the first figure).
- The scan data with **the longest name** is the combine scan from the data merging.
- The scan results with **shorter name** are the scan results that are not selected for merging.
- The unused scan results can be deleted by right click on them and select delete (See the second figure).

Step 6 — Scanning from Different Angle



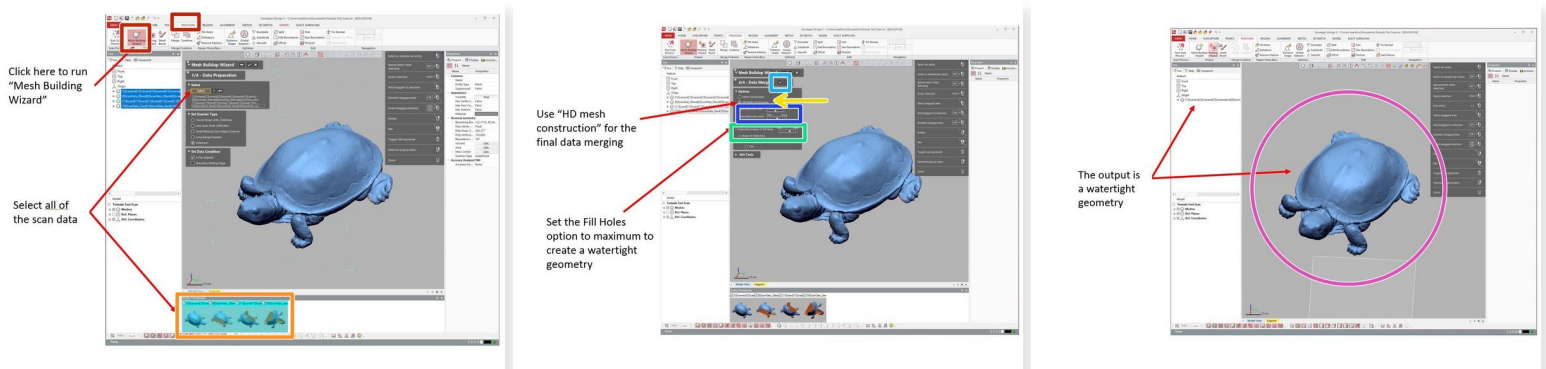
- After processing the data from a scan at one orientation, change the orientation of the object and re-scan to capture any missed surfaces
- Open the Mesh Buildup Wizard for the second scan.
- In the Data Preparation step, deselect the point cloud from any earlier scans.
- Follow the same process as described in steps 1 to 5 to process the scans from alternate orientations.

Step 7 — Alignment of Scan Data



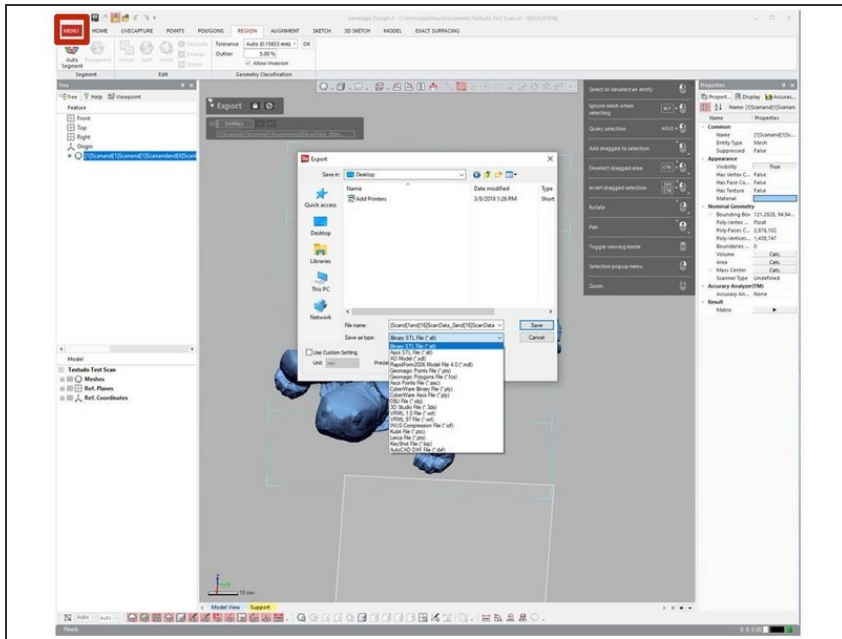
- Multiple scan data can be aligned using **Align Between Scan Data** command in the home toolbar.
- The Align Between Scan Data window has multiple approaches for alignment. The manual option, **local based on picked points**, leads to the most reliably successful alignment.
 - Select a static reference scan, and a moving scan that translates to align with the reference.
 - After selecting a reference and moving scan, two inset windows appear where each point cloud is controlled independently.
 - Select at least three common points between the reference and moving scan. Click on the scans in the inset windows to drop a point.
 - The view on the left of the screen previews the alignment.
 - Accept the alignment with the check mark on the Method window.

Step 8 — Final Data Merging



- Ensure that the scans capture all surfaces of the target object, then proceed to final data merging. For final data merging, re-run the mesh buildup wizard (Under Polygon > Mesh Buildup Wizard).
- Under **Data Preparation** sequence, make sure to select all of the scan data
- Since the data is already cleaned and aligned, skip steps two and three of the mesh buildup wizard
- Use "HD mesh construction" for the final data merging.
- Set the Fill Holes option to maximum to create a watertight geometry
- When finish, hit the check button next to **Data Merging** to complete the mesh buildup wizard
 - This runs the data merging algorithm but does not complete the mesh buildup wizard. If the resulting mesh does not look correct, hit Ctrl+z and adjust the noise and detail filters.
- You should end up with one watertight result as shown in the third figure

Step 9 — Exporting the file



- To export the file, go to Menu > Export
- Select the mesh you want to export
- Select the type of output file such as stl, asc, obj, etc.

This guide to post-processing in Geomagic Design X enables the construction of meshes from scans of objects that capture all surfaces. Post-processing is best learned by practice completing scans on a wide range of objects.