

LAB 3

3D SCANNING SURVEYING WORKFLOW: THE TRAVERSE APPROACH

In general, any 3D scanning data can be properly aligned with either two or three known points. If two points are known, the field operations usually require the leveling of the scanner. Leveling of the instrument is not necessary if three points are known in the point cloud. Here are some possible workflows in the field with PointScape:

1. The traditional traverse approach: the scanner is leveled and setup over a known point. An another known point (a backsight point) is also needed.
2. Three known points approach: the scanner is not leveled and not setup with a known point, but three targets or points with known coordinates are scanned in the field.
3. Resection approach: the scanner is leveled, but setup over an unknown point. In this case, the scanner location can be determined by scanning two backsight points (known points).

In this lab, we are going to use the traverse approach to properly align two stations and verify the results by comparing them with two independent stations. Here is a summary of the process:

1. Select two spots 5 to 20 m apart as Station 1 and 2.
2. Setup and level the scanner at Station 1. Perform an Object Scan by selecting part of the object area using the default coordinate system of the scanner and (0, 0, 0) as the instrument position. In the default coordinate system, the scanner window faces the scanner north. (To keep the scanner window pointing to the direction you want when it is turned on next time, make sure that the scanner returns to its north position before turning it off.)
3. Repeat Step 2 at Station 2 using the same PointScape file. When this is done, save it as No_Align.ppf. Make sure the scanned area has some overlap with the scan at Station 1.
4. At Station 2, start a new PointScape file by clicking on the program icon. Repeat Step 2, but this time setup a target at Station 1. Use the Survey Point Tool to measure the coordinates of Station 1 and name the point ST1 . Make sure to measure the instrument and target heights. For the instrument position, enter (0, 0, 0) as the Known Point and name it Point0.
5. Move the scanner to Station 1 and the target to Station 2, and keep the PointScape file open. Setup and level the scanner and target and measure their heights. For the scanner position, select ST1 as the Know Point. Select Point0 as a known backsight point and measure the backsight point (the target) with the Survey Point Tool. Perform an Object Scan and save the file as Aligned.ppf. Again make sure the two scans at the two stations have some overlap.

Lab 3 Report

Summarize the details of the field operations using the traverse workflow. Compare point clouds in the two files No_Align.ppf and Aligned.ppf. Can you tell the measurement accuracy in Aligned.ppf? If yes, how much is it?