GLS-2000 – On-board Laser Scanning Project

This Quick Guide details the steps for performing a 4 point laser scanning project. We will be utilizing the GLS-2000 for scanning from 4 known points in the field. You can either scan from known points in the field, or scan from points that you do not know the coordinates of and then register the data later in the office. In this example, we will be using the Occupy/Backsight routine rather than scanning multiple targets to register the data later in the office.

Our order of setups went as follows: Occupy 2, Backsight 1, Target Scan 3; Occupy 3, Backsight 2, Target Scan 4; Occupy 4, Backsight 3, Target Scan 1; Occupy 1, Backsight 4, Target Scan 2.

With our process, we will orient the instrument from our Occupy point to our Backsight point, and then take a Target Scan over our foresight point.

Step 1: Setting up Instrument; Power ON; Level Instrument over Point

Set up the GLS-2000 over a control point in the field. Put the tripod over the point, set the instrument on the tripod and then secure the instrument to the tripod with the screw in the bottom of the tripod top surface. Make sure that the point that you set up over has good coverage of the area that you want to scan. Once you have set the instrument on the tripod over the point, power the unit on. It will take a few minutes for the unit to start up. Once it is on the Main Menu screen, you will be able to level the instrument over the point. To do this, on the Main Menu press the Level button.

This brings you to the digital level screen. In this screen, you will click on the laser plummet button

This will turn on the laser plummet. You will see a red dot on the ground beneath the instrument. Now you will need to move the tangent screws on the instrument to position the laser over the point. After you have positioned the laser over the point you will adjust the legs of the tripod until you are close to level on the level screen. From this point you will fine tune the tangent screws of the instrument until it is level. If your laser point is not over the center of the point, you will need to adjust the instrument on the tripod to move it over the center of your point. You may need to go through the process of moving the instrument on the surface of the tripod and adjusting the tangent screws a few times to get the instrument level and over the center of the point.

Useful Tip: You will need to take good field notes along with the scan data in order to process the data correctly. Make sure that you write down your Occupy Location and Instrument Height, as well as your Backsight Location and your Rod Height for each setup of your scan project. To simplify note taking and to minimize errors in field notes, it is recommended to use the same heights for your backsight, as well as your target scans. Also, it is recommended to use either two scan targets or two prisms for your backsight and target scan, respectively.

**Step 2: Setting Up for First Scan Location**

At the Main Menu screen, tap the Station ID field to enter a station point name.
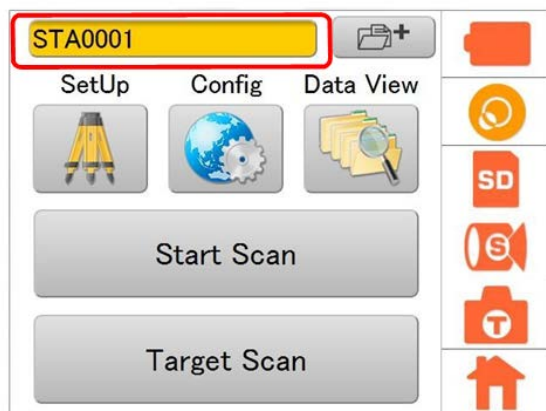
Not only for the first station SetUp, a new station point name should be entered each time the instrument is moved, or a new scan is started at the same station point. Each setup within this procedure is known as a Scan Session.
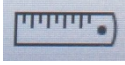
NOTE: After entering a new station point name, the instrument will always perform an internal system calibration taking approx. 1 min.- 45 seconds.

Tap the "SetUp" icon on the Main Menu. This will open up the SetUp window. In this window, we need to verify the station name, the occupy name, and the backsight name. You should use unique names for your points to eliminate confusion when processing the field data. In out example, we first occupied point 2, and first backsighted point 1 on STA 1.
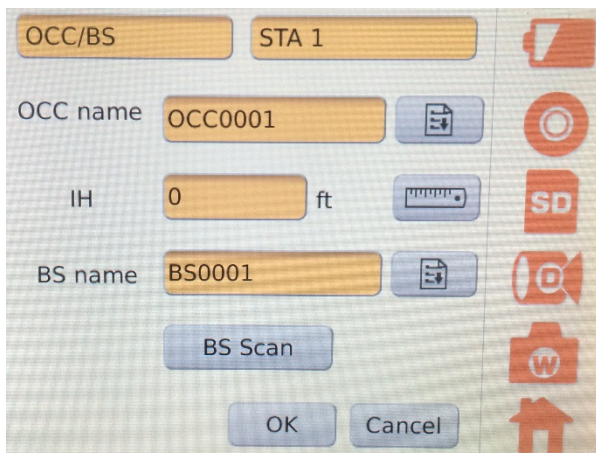
- Type "STA 1" for station name.

- Type in "2" for OCC name.

- Enter in height of instrument in IH field.

- Type "1" for BS name.

- Make sure that you write down all of the setup information for help in processing the data (Occupy name, occupy height, backsight name, backsight height, station name).

When measuring the instrument height, there are two ways to measure the height. You can use an engineering tape measure (a tape measure that is in feet and tenths of feet), or you can let the instrument measure the height by utilizing the laser to measure from the instrument down to the point. In order to

have the instrument measure the height, click on the ruler icon to the right of the IH field.

This process will take a few moments to complete. If you choose to manually measure the height, make sure that you measure from the top of the control point to the mark on the side of the instrument. This measurement is known as a slant height, since it is not exactly perpendicular to the ground. The slant height and the vertical height will differ by up to a few hundredths of a foot.

Once you have entered all of the information on this screen, you can tap the "OK" button at the bottom of the screen.

Step 3: Backsight & Target Scan

Tap the BS Scan button on the Main Menu. Click on the ⇔ icon in the upper left corner of the screen to switch to "Tele" mode of the camera. Tap the target in the screen and it will zoom the focus there. If you need to zoom in closer, use the zoom in/zoom out controls in the upper right corner of the window to zoom in/zoom out. Also, note in the upper right hand corner which icon you have shown. You have the option for a target or a

prism. If you are using a target for the backsight, make sure you select this icon . If you are using a

prism for the backsight, make sure you select this icon . If you need to change the icon, click on it and it will switch to the other option. Once you have the target selected and it is in the middle of the screen, click "Start" at the bottom of the screen. This will scan the target and show you onscreen what it looks like. Press OK on the screen, and you will be brought to the SetUp menu.
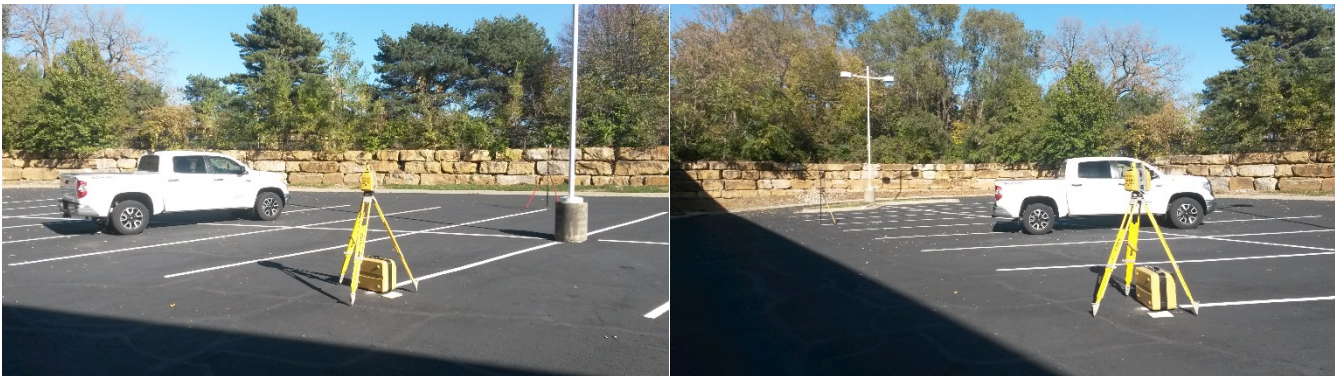

In this particular project, we have opted to set up a target or prism on the next point of our traverse. Turn the GLS-2000 scanner to the next point in your setup, then press the Target Scan button. You will use the ⇔ button to switch between tele lens and wide angle lens, and the zoom in/ zoom out buttons to zoom in & out on your screen.

Step 4: Select Scan Area

At the Main Menu screen, tap the Scan area button. This will take you to the Scan menu where you can choose either a scan area or a full dome scan. In this example, we are going to select a scan area. Tap on the area scan button. Your next screen will prompt you to select the top left corner of your scan area, then click "OK" at the bottom of the screen. Next, you will be prompted to select the bottom right corner of your scan area, then click "OK" at the bottom of the screen. This will take you back to the SetUp menu. Now that you have your parameters set to scan, click the "Start Scan" button in the middle of the screen to start your scan.
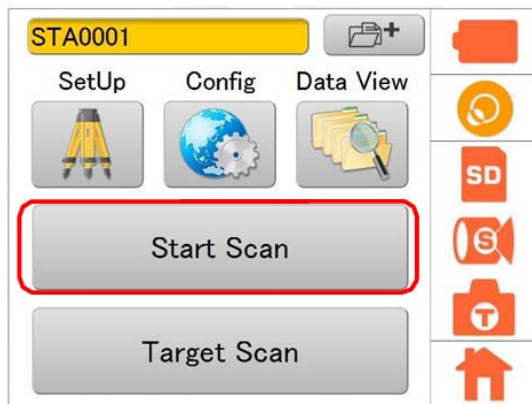
Once you select "Start Scan" the instrument will first take a series of pictures of the area to be scanned. This will take a few moments. After the pictures are taken, it will start the laser scan. You will want to step back and out of the way so that you are not captured in any of the pictures or scan data that is being collected. After the scan has finished, you will be given an image of the scan on the screen. At that time, press "OK" at the bottom of the screen. You have completed your first scan session.

After completing scan, move to the next station point and repeat sequence from Steps 1 through Step 4. Continue this process until you have occupied all four points and you have captured all four setups of scan data.

Note: When selecting a full dome scan, keep in mind that the laser scanner will take a 360° scan of the area, including above the instrument. If your scan is taking place outside, there may not be anything above the instrument. Even if there is nothing above the instrument it will attempt to send the laser out and it will not get a return from the laser, thereby increasing the amount of time the scan will take and also increasing the file size of the project.

If you would prefer to take a 360° scan, I would recommend that you use the area scan option. What you would want to do is to select the top left corner of the area you want to scan, then turn the instrument around to the right side of the left constraint, leaving a small gap between the left and right corners of the scan. This will enable you to get completely around the instrument without wasting time and file size by scanning the sky above you.