Terrestrial Laser Scanning User Guide - using Leica C5 TLS

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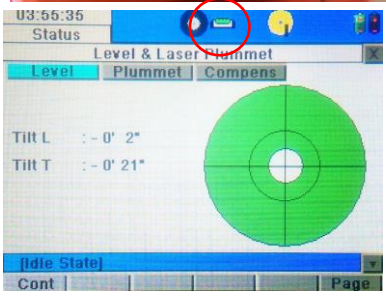
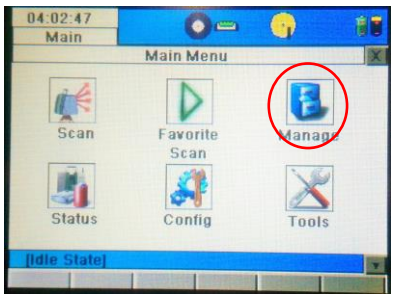
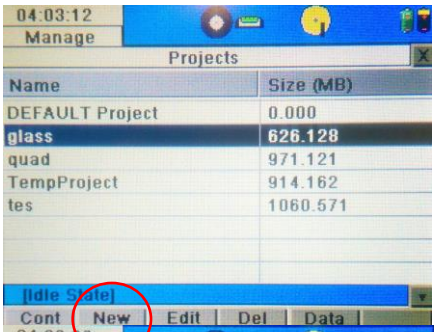
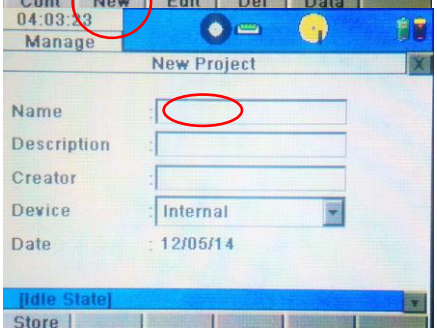
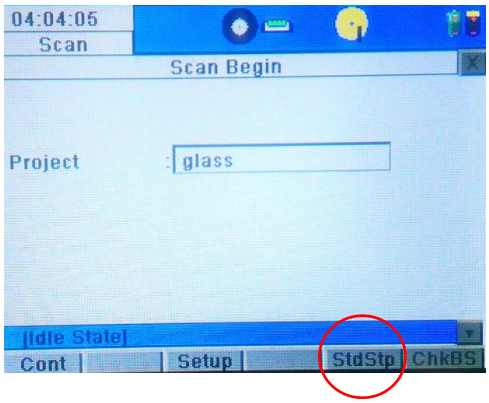
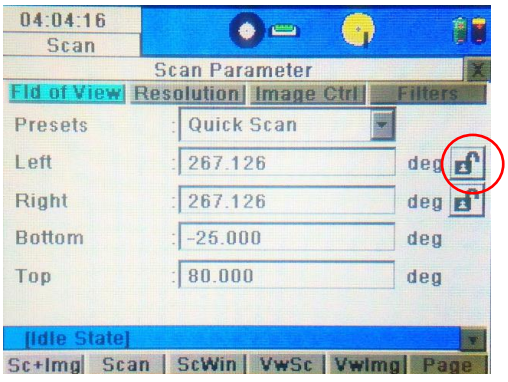
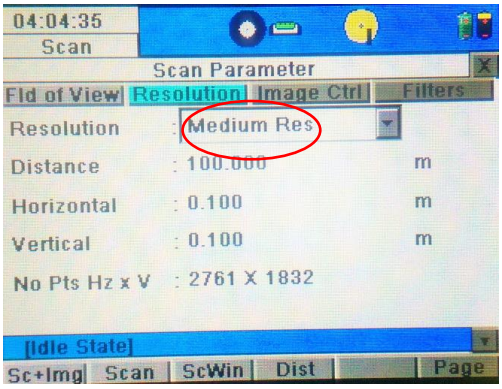
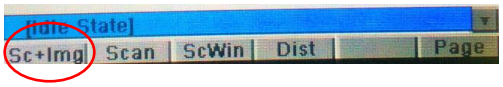
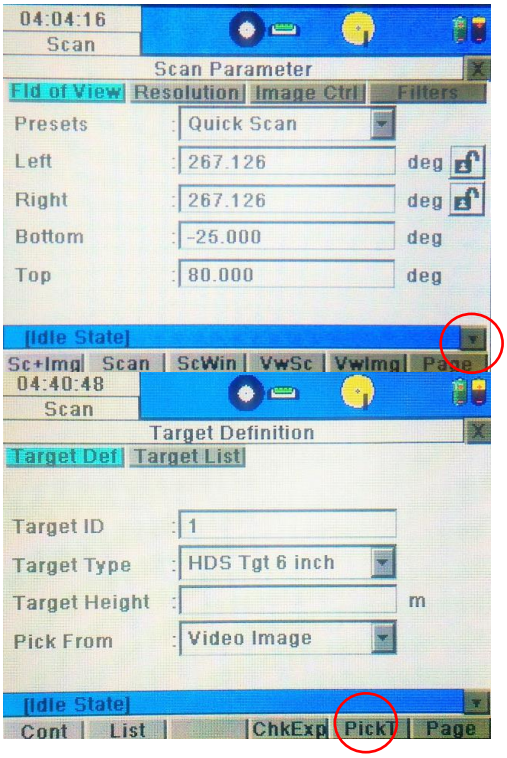
Step	Action	Detail	Picture
1	Set up Scanner on tripod	Set up Scanner on a stable tripod. Note the scanner weighs 14 kg so please be careful of your back when you lift it. **Never** let go of the handle until it has been screwed onto the tripod. **Level the bubble before powering on!** Check both batteries are inserted.	
2	Power on	Press and hold power button on scanner for 3 seconds. Wait about 3 minutes for the software to boot up. During that time a Windows screen will appear, wait until the Cyclone scanning software opens automatically.	
3	Adjust Level	Use Stylus to click on bubble menu Use 3 footscrews to adjust bubble so it is aligned at centre (green color) Go back to Main Menu using X at top right corner	 

4	Create new project	From Main Menu Manage > Projects > New (See pictures on next page) Name the project (click in the box and keyboard appears) Enter Store Go back to Main Menu (use X) These first 4 steps take about 10 mins.	  
5	Set up angle to Scan	From Main Menu Scan > Standard set up > Field of view Presets > Quick Scan Rotate the Scanner to face left side of the object area you want to scan (To know which way the instrument is facing stand behind it and point it at LHS of object, antenna should be on top RHS of scanner and screen on the RHS. You can see a spot bubble under the laser lens.) then press lock icon on screen Rotate again to the right side of object and press lock Adjust the depression angle(Bottom) and elevation angle (Top) by typing in the boxes. E.g. -25° means slope angle below horizontal +80° is angle above horizon [+90° is zenith and is not usually needed to scan sky outdoors!]	 

Note: This quick guide is for teaching and student practices in School of Civil and Environmental Engineering

6	Set up Resolution	Tap Resolution For beginners, start with Medium Res	
7	Scan	Press Sc+Img for coloured point cloud i.e. with camera images (the files take longer to download than scan only data) OR Press Scan for point cloud i.e. scan only. [This takes about 5 mins for ¼ FoV]	
8	Select Target (if applicable, target types in table below)	On bottom of the screen, click the down arrow to get next menu Target > New Name Target ID e.g. 1 for the first or its campus point number - Enter Target type select e.g. HDS Tgt 3 inch Pick from: Video Image Click on PickT Put Cross-hair on screen at the centre of target. Turn the scanner in the direction of the target, use zoom (+) and pan (red button below (-) then click on part of image and that part moves to centre of screen), then point / click near the centre of the target. Doesn't have to be exactly at centre. Enter> Cont The scanner should automatically do a fine scan of the target - Store Repeat the process to Register the next target e.g. 2	

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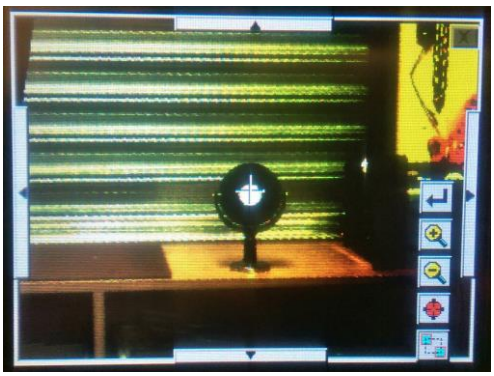
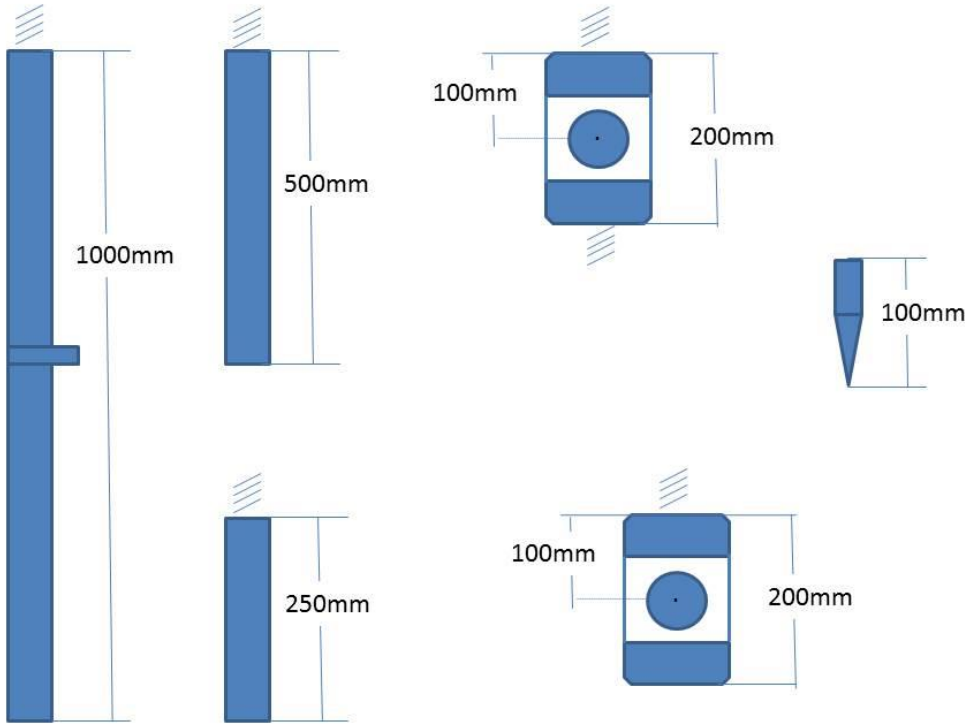
		Repeat all parts of step 8 for all targets [Selecting 2 targets and fine scanning them takes about 25 mins for beginners.]	
9	Download (this step can be done later e.g. in the office)	Press window close X until main menu appears. Plug USB stick into slot below on button. Tools Transfer Project Continue This will automatically open a directory on your USB called Scanner-Projects and place your project in this directory	Most (~95%) of the download time is for the images. A small quick scan survey at two set ups with narrow FoV can take 30 mins to copy to a good USB and e.g. 850Mb of files.
10	Shut down	Use X to return to Main Menu, and X again. It asks if you want to power down. Yes. Wait until screen goes blank and motor stops. That takes about 1 min. If finished for the day, remove batteries and charge them.	

Target Type:

Type	Description
HDS Tgt 6 inch	HDS 6" circular planar target
HDS Tgt 3 inch	HDS 3" x 3"square planar target
HDS Sphere Tgt	HDS 6" spherical target
HDS B/W Tgt	HDS 6" Black&White planar target
Twin Tgt Top	Top target of Twin Target Pole without extension. Target height automatically changes to **1.900 m**.
Twin Tgt Btm	Bottom target of Twin Target Pole without extension. Target height automatically changes to **0.200 m**.

Type	Description
Twin Top/Ext	Top target of Twin Target Pole with extension. Target height automatically changes to **2.150 m**.
Twin Btm/Ext	Bottom target of Twin Target Pole with extension. Target height automatically changes to **0.450 m**.

Note: The separate pieces of the twin target can be seen in the figure below.



Note: If you intend to setup the laser scanner over a known control point and use the Easting, Northing and AHD height, you will need to measure the height of the laser scanner over the point. You must use the plastic attachment in the laser scanner box and the specified tape measure. The plastic attachment must clip in place over one of the footscrews. The zero end of the tape is placed in the plastic attachment and the tape extended to the mark on a slant angle. A small plastic extension on the tape measure is opened out and touches the mark. The tape is specially calibrated to give the corrected vertical height to the centre point of the instrument – so simply read and record. (Check it with a standard 1:1 scale tape measure).