Association of Jersey Architects

3D LiDAR Point Clouds in Architecture

Thu 11th July 2019

Click the Accuracy Report to link to the Jersey Cod House YouTube demonstration video

Video is also on the Jersey Laser Scanning YouTube channel and also under CPD resources on the https://jerseylaserscanning.com website

Introduction

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- The Aim

- 3D LiDAR Scanning – The Facts

- Popular Misconceptions – The Truth

- The Outputs – What's Useful to you?

- Examples

The Aim

For you to know more about LiDAR scanning generally, its capabilities, limitations and its workflow from collection to output …

… you will also have access to a stack of data I have collected and uploaded to DropBox of the POSH Town Hall.

3D LiDAR Scanning - The Facts

- Traditional/Alternative methods
  DGPS, Theodolite, Total station, laser or tap measure, photogrammetry, Matterport

- What is LiDAR?
  Just like RADAR but with laser light, creates and records dots in 3D space and colours them

- How accurate is LiDAR?
  Relative and Absolute. Depends on the hardware 4-7mm range accuracy and 6-8mm 3D point accuracy @ 20m

- How does a LiDAR scanner make a point cloud?
  360,000 measurements/sec. Software needs an overlap between scans

- Why is LiDAR meant to be so good compared to traditional/alternative methods?
  Superior accuracy, impressive detail, panoramic and thermal imagery, huge number of measurements in a short period of time, unlikely a return to site will be required, modular approach, output that can be used to audit trail and validate a survey.

- Scanning workflow
  Collect data, register the scan, export into suitable formats for CAD software and other outputs, trace the cloud in 3D, change to client request format (poss flattened into 2D), prepare scale pdf … all in an accelerated time frame relative to traditional/alternative methods

Popular Misconceptions – The Truth

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- Is a LiDAR ground and wall penetrating?
  No. If you can't see something LiDAR can't measure it (most of the time)

- Have I used a drone to collect the scans?
  No. A point cloud can be viewed from any angle and distance creating an impression of being viewed from the air though

- LiDAR cannot be used if something doesn't exist yet
  Not true. The ground that something will be built on exists , water features, topography, cut and fill, purchase of materials to cover i.e. turf, gravel, other

- The CAD drawings are automatically created in the point cloud
  Not true, this is a manual process albeit one with a very accurate and detailed model to trace over

- LiDAR scanning is expensive
  The hardware and software is expensive and the expertise and understanding is hard fought for and always changing … but if there is a sufficient market for it prices can be kept down

- LiDAR is only useful for large, complex jobs and only in preparation for a project
  In my experience, the scanner has already been deployed on a huge spectrum of projects, examples later

The Outputs – What's Useful to you?

- The web based panoramic image viewer - TruView

  Panoramic images only, albeit sitting on a point cloud via secure cloud server for any browser and platform. Angle, distance and temperature measurements. Go to https://jerseylaserscanning.com click on 'CPD Resources' in the title bar to access a viewable public version.

- The local computer point cloud viewer - JetStream

  There is a free to install and use proprietary point cloud viewer produced by Leica. Only developed for Windows (not Mac). View panoramic imagery, simple distance and temperature measurements by downloading file to your computer. Extremely useful briefing tool and support when creating drawings/models. Installer and jsv file on the same CPD Resources web page as above via a DropBox link. Password is POSHCPD.

- The point cloud for use in CAD software

  An object to trace in 2D or 3D with your chosen CAD program. Can be geo-referenced. CAD programs take a variety of point cloud formats, my research listed below. All formats are available in the DropBox link on the CPD Resources page. Password is POSHCPD.

- The CAD file

  In dwg or dxf format in any version available. Will contain whatever was agreed from point cloud to contour polylines, 3D model and of course the 2D drawings. Can be flattened.

- Scale pdf drawings

	rcp	pts	e57
Autodesk	X		
Sketchup		X	
Vectorworks		X	X
ArchiCAD			X

Examples

- Plant room example

- Town house example

- Topography example

Summary

- Superior accuracy

- Billions of measurements

- Five times faster

- Greater data capture

- Client friendly format

- No extra cost