What is LiDAR 3D Mapping?

The following LiDAR overview is provided by Mike Willis an Architectural Technologist with Digital Blueprint and Jeff Godfrey from Accessibuild..

LiDAR, A word becoming more prominent in today's technology industries, leaves many of us wondering: "What is it?" How does it work?"

The word itself is an acronym which stands for 'Light Detection and Ranging'. It's a remote sensing method that uses light in the form of pulsing lasers to measure physical entities with high accuracy, precision, and flexibility. This terrestrial data collection method is commonly referred to as laser scanning.

Similar in sound to RADAR, the two methods of measuring are quite different.

• Radar (Radio Detection and Ranging) uses pulsing radio waves to detect the presence, direction, distance and speed of objects like aircrafts, ships, vehicles, etc. applications are for instances where detection of distance is more important than the exact size of the object (ie. Military operations, airspace coordination, police speed traps).

•LiDAR uses light waves (lasers) which travel from the source to the intended object, reflects off the object, and returns to the source. The lasers may travel back and forth numerous times. Since light waves have a shorter wavelength than radio waves, Lidar is more accurate than Radar. Lidar is used in applications where the detection of exact shape and size of the object is necessary. For example, buildings and infrastructure, large plots of land, etc.

LiDAR instruments consist of a laser, a scanner, and a specialized GPS receiver that will provide the exact x,y,z coordinates of any given point of an object that is being measured. These units can be installed on airplanes and helicopters to map broad areas or placed on a tripod to measure building exteriors and interiors.

The data collected from site is processed on server computers and converted into accurate, scaled, 3D models reflecting all physical entities/conditions. Any physical, visible object on site is recreated and included within the model (walls, doors, windows, stairs, furniture, etc.). The model created is referred to as a Point Cloud. Point clouds are a collection of millions of tiny points placed in a 3D virtual space. Each point is taken from the external surface of an object on site, given an X, Y, Z, coordinate and its own unique RGB colour. When the millions of tiny points are placed in their exact location, the 3D model is created. Within this space, the user can measure and quantify any set of points in the model with ease, and more importantly, accuracy.

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