



# **Understanding and Specifying Laser Scanning Services**

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**A Quantapoint White Paper**

**by**

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**ABSTRACT**Meeting Project Objectives Through Laser Scanning

Increasingly, project managers are called upon to employ laser scanning technology. However, little information is available to aid with its specification. This white paper discusses the basics of laser scanning and the parameters that should be including when specifying these services.

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Document Version: 1.4

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**QUANTAPOINT WHITEPAPERS**

As the acknowledged industry leader in laser scanning technology, Quantapoint has published several papers, some of which are listed below. These are available in the Resources section of [www.quantapoint.com](http://www.quantapoint.com).

- Understanding and Specifying Laser Scanning Services
- Seven Things Every Project Manager Should Know About Laser Scanning
- Contract Terms & Conditions for Laser Scanning Services
- Combining 3D CADD with Laser Scanning
- Uncovering the Value of As-Built Laser Documentation for Engineering Firms
- Uncovering the Value of As-Built Laser Documentation for the Power Industry
- Uncovering the Value of As-Built Laser Documentation for the Processing Industries

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## Introducing Laser Scanning

Laser scanning is rapidly becoming a standard technique for process, power and offshore engineering and design projects. Laser scanning has been shown to reduce costs, improve schedules, increase quality and enhance safety – resulting in up to an 80% reduction in project rework – makes it an attractive alternative to manual data collection or other techniques. This white paper focuses on volumetric laser scanning of structures and buildings, and not laser total stations or other traditional survey equipment or techniques.

The goal of this white paper is to help project managers gain a better understanding of the basics of laser scanning and to learn what specifications are important – without getting bogged down in hype or confusing and sometimes contradictory hardware and software performance claims. It is possible, with basic knowledge and early preparation, to create specifications for laser scanning services that are both practical and which result in positive project results each and every time.

The paper is organized into four sections. The first covers laser scanning terminology, the second covers the fundamentals of laser measurement, the third lists important specifications for a laser scanning service (including a summary checklist) and the fourth is an overview of the tangible benefits offered by laser scanning.

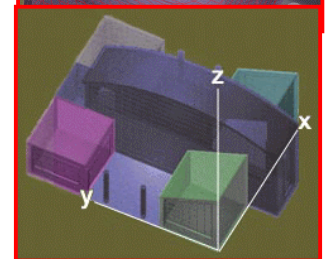
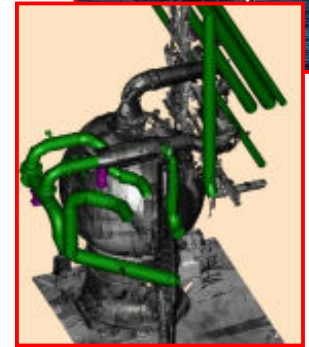
## Laser Scanning Terminology

A **laser scanner** is a device that generates spatial information for a spherical volume using a laser measurement device and a steering device. It differs from traditional survey equipment in that it is specifically designed for high data rates and works in complex, unstructured environments. The terms laser scanner, 3D laser scanner, laser camera, 3D laser camera, and light detection and ranging (LIDAR) are generally considered to be equivalent.

A **laser scan** (or **point cloud**) is a single data set collected by a laser scanner for an area. A laser scan from a laser scanner is roughly analogous a digital picture for a digital camera. A laser scan is sometimes referred to as a point cloud or a cloud of points. This originates from the point-like appearance of low-density laser scans.

**Reference points** are placed in an area to identify a specific known location in the laser scans. These are used to integrate or **register** the laser scan data.

**Registration** is the process of integrating multiple laser scans from multiple laser scanner placements into a single central coordinate system. The result is a registered network of laser scans (or simply a registered network). This process is also referred to as stitching or merging.



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