

## **Terrestrial Lidar Scanner Data Quality: Considerations for Collection and Analysis**

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Terrestrial Lidar Scanners (TLS) enable the collection of dense point-data sets that may be difficult or impossible to acquire by other means. As with any measurement technique, however, it is important to understand the limitations and error sources associated with data collection and processing. Regardless of the application, a good understanding of the measurement process is vital for designing effective TLS campaigns that lead to reliable results. Therefore, the goal of this paper is to provide practical guidance on data-quality issues associated with TLS.

Errors associated with TLS measurements can be divided into four general groups: Instrumental, Georeferencing, Object, and Environmental. Instrumental errors are largely a function of specific hardware designs and, given the proprietary nature of commercial scanners, somewhat difficult to accurately quantify. Errors associated with georeferencing are also specific to the system being used, however, they are generally similar to errors encountered in traditional surveying and are therefore relatively well understood. Object and Environmental errors, related to target properties and scanning conditions respectively, effect the quality of TLS data collected by all systems in similar ways. Unfortunately, these are often the most difficult to quantify on an operational basis. Nonetheless, a good understanding of the general impacts of target properties and scanning conditions on data quality is vital if the best possible data is to be collected in a given set of circumstances.