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Application of Terrestrial Laser Scanner in Particle Accelerator and Reverse Engineering Solutions

Terrestrial Laser Scanners can collect a million points per second and it is a technology widely used in fields such as: topography, forensics, building, mining, as-built surveying, architecture, archaeology, monitoring, civil engineering and urban modeling. In this paper a novel application for particle accelerators is presented. The Leica ScanStation P20 has been used to collect point cloud data and HDR images of the inner wall of the Advanced Light Source particle accelerator main storage ring tunnel; sub-millimeter accuracy registration of multiple setups was performed on sphere shaped targets using an existing monument network previously surveyed by laser tracker. Data was exported in a web-based point cloud with HDR images. Direct surface reconstructions in Autodesk Inventor 3D CAD provide a parametric solid model of all significant features such as wireways, pipelines, air ducts and electrical boxes. A validation analysis was conducted comparing the constructed model to the actual tunnel wall by laser tracker.

Summary

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