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The Concept and Application of Real-Time 6DOF Tracking

AUTHORS
Juergen Dold · Raimund Loser

ORGANIZATION
Leica Geosystems AG

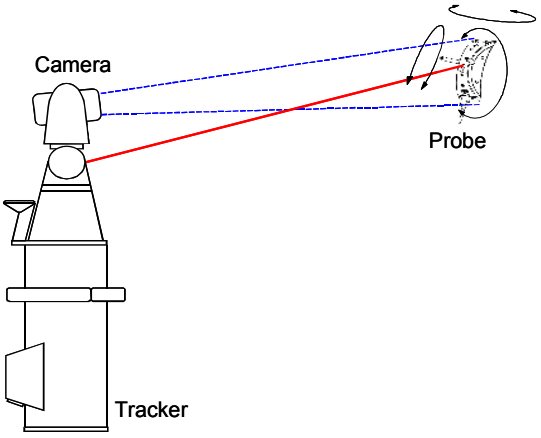
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The Concept and Application of Real-Time 6DOF Tracking

By
Juergen Dold, Loser Raimund
Leica Geosystems AG

Laser Trackers are known as mobile polar measurement systems for real-time measurement of point position. These systems are frequently used in assembly or inspection processes of jigs and parts.

The unique combination of the tracker technology with photogrammetry will allow real-time “6 Degree of Freedom” (6DOF) tracking. That means not only real-time measurement of point position but also orientation of any object in space will be possible. To achieve this the laser tracker will be equipped with a high-speed digital camera. On a target device such as a hand probe or hand scanner for measuring other objects, a single reflector with surrounding diode target cluster will be attached. While the laser tracker measures the precise position of the reflector, the high-speed camera simultaneously images the diodes. By combining position and image measurement, real time 6 degrees of freedom (6DOF = position and orientation) of any object in space can be calculated at least 100 times per second.



This paper will describe the measurement principle of 6DOF tracking which was realized by merging the Laser Tracker technology with Photogrammetry. Besides some accuracy considerations this paper will also describe how the 6DOF tracking technology can be applied to applications such as inspection with a hand probe and reverse engineering with a hand scanner.