INDOOR TARGETLESS TERRESTRIAL LASER SCANNING

J. Chow[*a] W. Teskey[a] B. Teskey[a]

[a] University of Calgary, Geomatics Engineering, 2500 University Drive NW , T2N 1N4, Calgary, Canada

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ABSTRACT:

Terrestrial laser scanning (TLS) is one of many 3D imaging modalities currently out on the market. Many modern TLS systems like the Trimble GX captures radiometric information for every point in additional to the positional information. Over the years there have been huge demands from the TLS system users' community for scanning and point cloud registration without the need for signalized targets. Two mainstream approaches could be identified in recent years and can be broadly classified as GPS/INS navigated approach and overlapping approach. The former uses GPS/INS to directly georeference every point captured by a scanner with time-tagged observations (e.g. Riegl VZ400); many companies such as Geo-3D and Topcon have adopted this methodology. However this system requires expensive instrumentation and is not applicable for indoor environments where there is no clear view of the sky. The latter approach either uses ICP or extracts features such as planes, spheres, and cylinders from the scene and best match the features. The major draw back of this approach is that it requires reasonable overlap between scans to perform registration and the features matching is environment dependent and may not be applicable in some cites. In this project, an indoor targetless scanning routine that does not require any signalized targets or overlapping scans is developed. Through the aid of solely an IMU it will be demonstrated that even a TLS system with no time-tagged observations, in this case the Trimble GS200, can register each individual point cloud to a common reference coordinate system.

TOPIC: Lidar and laser scanning
ALTERNATIVE TOPIC: Data fusion and data assimilation