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Comparison of high resolution terrestrial laser scanning and terrestrial photogrammetry for modeling applications

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3D documentation of cultural heritage and engineering projects is an important matter. These documentation applications, requires highest possible accuracy and detail to represent the actual surface correctly. Terrestrial photogrammetric method which is employed to produce 3D models to day, now can obtain dense point clouds thanks to advancements in computer technology. Terrestrial laser scanners gained popularity in the last decade because of their high capacity and today they are being widely used in many applications. However every application has its own requirements that depend on the type of application, modeling environment, accuracy and budget limitations. This means, for every application highest accuracy instruments are not always best, considering the facts that mentioned before.
In this study, laser scanner and terrestrial photogrammetric methods' spatial and model accuracies investigated under various conditions which include measuring targets at different instrument to object distances then investigating the accuracy of these measurements, modeling an irregular shaped surface to compare two surfaces volume and surface areas, at last comparing dimensions of known geometrical shaped small objects. Also terrestrial laser scanners and terrestrial photogrammetric methods most suitable application conditions investigated in terms of cost, time, mobility and accuracy. Terrestrial laser scanner has the ability to, measure distances under cm accuracy and directly measuring 3D world but there is also some drawbacks like sensitive, bulky and expensive equipment. When it comes to terrestrial photogrammetry, it has above cm accuracy, comparatively fast (considering the image acquisition stage), inexpensive but it can be affected by the coarse geometry, surface texture and the environmental lighting.

Key Words: Accuracy, Comparison, Model, Terrestrial Photogrammetry, Terrestrial Laser Scanning,.