Review of the 3D Modelling Algorithms and Crowdsourcing Techniques. An Assessment of their Potential for 3D Cadastre.

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SUMMARY

Smart Cities are mapped in detail at various levels today, while at the same time a modern cadastre is broadly considered to be the tool in support of good governance of urban areas. As cities expand vertically, safeguarding of tenure requires a clear 3D picture in terms of property rights, restrictions and responsibilities. Some of the current research trends in this field include integration of the 3rd dimension to the traditional form of 2D cadastre; the adoption of automation and low-cost but reliable procedures for cadastral surveys and data processing; the usage of modern IT tools and m-services for cadastral data acquisition; as well as the integration of the "time" factor in the cadastre. Much experience has already been accumulated on how a 3D Cadastre should be best developed. However, the Land Administration Model (LADM ISO 19152) provides only an international generic framework for cadastres and there are still several aspects that need to be investigated and improved.

In recent literature, the currently explored sources for 3D data acquisition include Lidar data, aerial, terrestrial or spaceborne optical data, topographical data, terrestrial laser surveys, and data derived from volunteered geographic information (VGI). Several photogrammetric and digital image processing approaches already exist and have been used in 3D modelling. This study presents an evaluation of the current state of the art of algorithms and techniques used for 3D modelling and investigates the potential of their usage for 3D cadastre. The main objective of this paper is to review the experience gained from the use of crowdsourced data in 3D building reconstruction and investigate the potential for using this experience in order to design low-cost 3D cadastral surveys in urban and suburban areas. An assessment of the current techniques, tools and algorithms, is presented. The main conclusions refer to the usability, the perspectives and the reliability of crowdsourced data in designing an affordable and functional procedure for the compilation of 3D cadastral surveys.

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