3D Reconstruction using Drones as a Tool for Energy Efficiency in Buildings - BIM to BEM

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Abstract

Building Information Modeling (BIM) is a digital tool to design, construct, and manage buildings. It has paved the way for the implementation of Building 4.0, which leverages technologies such as virtual reality and digital twins to improve building performance. Unmanned aircraft systems (UAS/drones) are becoming increasingly popular as a mean of gathering data from buildings. A methodology was developed for digitally integrate photogrammetric surveys of structures into BIM exclusively using these equipment. Nowadays, buildings account for 40% of all energy use in Europe; consequently, integrating BIM and BEM (Building Energy Modeling) is crucial to digitalize the construction industry and boost competitiveness through cost reduction. To show the value of drones for the energy-related optimization of solutions, this work describes a procedure for 3D reconstruction of a building using of one of the aforementioned aircrafts. Numerical simulations were conducted on the case study building and validated though comparison with experimental data.

Author Keywords. BIM, BEM, photogrammetric survey, sustainable construction, energy simulation, UAS, UAV, drones

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