A 3D LADM PROTOTYPE IMPLEMENTATION IN INTERLIS

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Abstract The massive developments and uses of high-rise buildings indicated that the demand for use of space above and below the ground surface is rapidly increasing in re-cent years also in Greece. The existing cadastral model does not cover the need for 3D and does not conform to international standards. In this paper, the proposed model is considered as an effort for overcoming previous shortcomings, introducing a model based on international standards, including the wide range of different types of spatial units, organized in levels according to the LA_Level structure of ISO19152 LADM. It is a proposal for a comprehensive 3D multipurpose LAS supporting 2D and 3D cadastral registration in Greece.A prototype system was developed to discover the possibilities and limitations of the conceptual model, as well as to investigate the efficiency of technological tools. Experience from the prototype will be used to further improve the conceptual model. The steps that were followed was the description of the prototype in UML diagrams, the use of INTERLIS, Swiss standard for geo-information exchange, convert and/or create sample data into model, decide the technical model/format to implement and visualize the result in 3D environment. In this paper it is explored how INTERLIS and LADM complement each other in actual implementation of land administration system based on LADM. During the development of the prototype many design decision have been taken and analyzed below, together with technical problems and challenges posed for future work.

Keywords: LADM, INTERLIS, constraints, 3D cadastre, technical model

A DATA MODEL FOR THE INTERACTIVE CONSTRUCTION AND CORRECTION OF 3D BUILDING GEOMETRY BASED ON PLANAR HALF-SPACES

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Abstract 3D city models of large areas can only be efficiently (re-)constructed using automatic approaches. But since there is always a certain number of buildings where the automation fails, there is a need for interactive construction and correction tools. These tools should ideally use the reconstruction results as input, so that the amount of manual labor is minimized. However, automatic 3D building reconstruction approaches make use of different solid modeling techniques that are not all suitable for interactive modeling purposes. One such representation is half-space modeling that exhibits several advantages for the automatic (re-)construction of 3D building models (from segmented point clouds). Because planar half-spaces are infinite entities that are usually represented as mathematical inequality equations, it is difficult to design an interactive modeling system that allows their direct manipulation. In this paper, we propose an interactive modeling concept specifically for 3D building geometry based on a half-space kernel. Following from it, a special-purpose object-oriented data model is developed that hides the kernel under a layer of parameterized primitives and boundary representation (B-rep) that are better comprehensible to human users. Its hierarchical class structure reflects the interactive steps of the modeling concept and gives meaning to its modeling elements.

Keywords: 3D Modeling, Buildings, Data Model, Interactive