Investigating an Interoperability Platform for Sustainable Land Management

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1. Need for Sustainable Land Management (SLM)
2. BIM and Cadastre as useful tools for SLM
3. Interoperability platform for SLM
4. Application on a pilot building
5. Conclusions and future work
1. Need for Sustainable Land Management (SLM)
2/1 Are Cadastre and BIM Models useful tools for SLM?

I. BIM

'A Building Information Model serves as a shared knowledge resource for information about a facility forming a reliable basis for decisions during its lifecycle from inception onward'

BulidingSMART Alliance
II. Cadastre

...is at the core of any land administration system

...ensure identification of land parcels and proper management of RRRs

The real world development is in 3D, so the 3D Cadastre is the tool in a land administration system
The benefits of using BIM models in the geospatial domain have been demonstrated for different applications:

A. Require indoor and outdoor spatial information
   • Evacuation (*El-Mekawy, 2012*)
   • Fire response management (*Isikdag, 2008*)

B. 3D RRR data management
   1. via IFC models (*Clemen & Grundig, 2006*)
   2. via Unified Building Models (UBM) (*El-Mekawy & Ostman, 2015*)
   3. via IFC Models (*Atazadeh, 2016*)
3. Interoperability platform for SLM

BIM is a dynamic model that contains a range of information regarding:
- geometry, materials, thermal and energy performance characteristics, costs etc.

A secure interoperability and interchange of data without introducing error and loss of information is the purpose of having open data formats:
- IFC, Industrial Foundation Classes
- BCF, Building Collaboration Format
- BIMSie, BIM Service interface interchange
Interoperability character of BIMs

Scheduling open standards in interoperability platform is of paramount importance due to:

- increased number of involved stakeholders in the construction process
- BIM is defined as a dynamic model
- many different BIM tools used
This application aims at accomplishing the goal of an interoperability platform for SLM. The following means were used:

- BIM Software
- 3D Cadastral information
- Federated model
- Interoperability platform

4/1 Application on a pilot building

The diagram shows a 3D model and a 2D plan view of a building, indicating the application of BIM software (Revit) and 3D cadastral information in IFC open standard formats.
4/2 Application on a pilot building
4/3 Application on a pilot building

Interoperability platform
5. Conclusion and future work

Conclusions

Revit BIM models can be enriched with cadastral information being the basis for an operational interoperability platform for SLM:
✓ Visualization of 3D properties
✓ Invaluable tools for managing 3D properties
✓ Prevention of data issues and inconsistencies
✓ Mitigation of interoperability issues

Future work

- Evaluation of the interoperability platform in three aspects namely, efficiency, usability and reliability
- Automatic algorithms for extracting appropriate building elements from the BIM models
- Further research on IFC format due to specific limitations
Thank you for your attention!!!
Questions?
Comments?