Workshop on Visualization, Distribution and Delivery of 3D Parcels

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Synthesis 2014

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Proposed format

- ➢ Day 1
  - Introduction with a questionnaire
  - Discussion about the literature review, and where we currently are standing about Visualization, Distribution and Delivery of 3D Parcels
- ➢ Day 2
  - Draw a list of "must" go
    - Main issues/problems
    - Further research and development activities
  - Identify actions to continue those discussion, and make researchers and practician collaborate and share results

Who we are?

➢ How many people ?
- Day 1: 7
- Day 2 : 6 (we lost 2 and get 1 new people)

➢ 4 academics, 1 PhD student, 2 people from the Azerbaijani government who are thinking about 3D cadastre for 2-3 years from now, 1 from industry
- Professor, Claire Ellul
- Professor Abbas Rajabifard
  - University of Melbourne, Head of the Dept. of Infrastructure Engineering, Director of the Centre for SDIs and Land Administration,
- Roni Rochsar from sivandesign.com, Israel, (3DGIS software designer)
- Kim Sangmin, Ph.D. student from South Korea
- Nazim Ismayilov and Adalat Salmanov, State Committe of Land and Cartography, Azerbaijan,
- Thomas Becker, Department of Geodesy and Geoinformation Science, Technical University of Berlin

Who we are?

- Main job responsibility related to cadastral data?
    - 1 Decision making, politician, president (at a strategic level)
    - 1 Manager/administrator (could be project manager or technology manager)
    - 1 Domain Specialist, Professional or Assistant (at an operational level, regardless of the speciality)
    - 1 Technician (Regardless of the speciality)
    - 1 Sales representative, marketing, consultant
    - 3 Trainer, professor, researcher

- Background (academic program)?
    - 1 Administration and business
    - •Agriculture
    - •Archaeology
    - •Architecture
    - 2 Computer sciences/informatics
    - 1 Civil Engineering, transport and routing
    - •Mechanical eng., industrial design
    - 1 Environment
    - •Forestry
    - •Geology/Hydrogeology
    - •Geography
    - 2 Geomatics
    - •Health
    - 2 Land surveying
    - •Law
    - •Mathematics and statistics
    - •Social science and humanities
    - 2 Urban planning

Who we are?

- Frequency of use of cadastral data?
  - 2   Regularly (at least once a week)
  - 1   Occasionally (at least once a month)
  - 2   Infrequent / irregular use (some time a year)
  - 2   Never

- Frequency of use of 3D visualization tools?
  - 5   Regularly (at least once a week)
  - •Occasionally (at least once a month)
  - •Infrequent / irregular use (few time a year)
  - 2   Never

- 3D tools used?
  - 3   Autocad suite
  - 1   Bentley suite
  - 5   ESRI suite (CityEngine, Arcscene)
  - 1   Cloud point modelling tools (such as Realwork)
  - 2   Adobe PDF 3D
  - 1 All the previous
  - Other: 3DGis SivanDesign

- 3D activities involved in?
  - 2   Cadastral Data acquisition
  - 3   Cadastral Data modeling (create 3D models)
  - 7   Cadastral Data visualisation
  - 2   Cadastral Data analysis
  - •Cadastral Data distribution (publish/sale 3D models)
  - •Cadastral Data/model usage (any kind of uses other than data acquisition, modeling or publishing)
  - 2   Software tools development/sales
  - •Sensor/hardware development/sales
  - •Consulting
  - 1   Training

What we expected?

- Discuss and share experiences
- Being informed (training)
- To get in touch with people working in the same area of me

➢ Our aims of the workshop

- To identify directions for the future that we can take further
- To sketch out something that others can join at a later date, as we are a small group

Day 1

- ➤ Discussion about the literature review, and where we are currently standing about Visualization, Distribution and Delivery of 3D Parcels

- ➤ Conclusion from 2011 (we still agree)

- ➤ Outcomes from 2011 as a basis for discussion

Outcomes from 2011 as a basis for discussion

- ➢ 3D Parcels
  - • What is about? Use the term with a larger sense
    - • 3D spatial units
    $2011 \rightarrow$ • 3D legal units
    - • 3D legal space
    - • 3D register object
    - • 3D administrative units
    - • 3D property
    - • 3D property units

Remind the main workflow to be addressed

- ➢ 3 main steps (we will not focus on Modeling)
  - Modelling
  - Symbolization (or graphic design)
  - Visualization
    - With or without Interaction
- ➢ All depend on the intended purposes and limitations
- ➢ Possible focus for research and development
  - Focus on data modeling (and storing)
  - Focus on data representation (symbolization)
  - Focus on visualisation
  - Focus on interfaces
  - Focus on data interaction
  - Focus on usability/cognitive issues

Current stand and challenges (1/2)

➢ Important to understand why we visualise, the limitations and user skills

➢ General consensus within the group: users are not taken into account very much at the moment for data visualisation (but more than 2011) – the focus has been on visualisation as a general service

- End users should include the general public not only the specialists

➢ Different expectations of the different user groups – notaries may be happy with 3D PDF or more basic interaction, but engineers want CAD-like functionality

➢ Visualise legal objects (or space), not only the physical objects

- A clear tendency in 3D (maybe not in 2D)

- It is the representation of the geometry, not often the RRR

➢ Importance of distinguishing between privately owned and commonly owned parts, and the ability to model spatial relationships

- Currently very few works

➢ Do we need Solid objects (compare to 3D surface) - this is still not clear

➢ Few work on labelling and linking to documents

Current stand and challenges (2/2)

➢ The importance of training of end users,

- 'they cannot ask for what they don't know about' – eg. the opportunity to slice through a building and produce a transverse section.
- Need more interaction with the end-users
- It is getting better, but still need to be improved

➢ Several work on Web services

➢ Technology as to be of the equation, but not focus on as that changes relatively quickly, but on the end users and the user interaction

➢ Still need to demonstrate the importance of a 3D model for interaction and as a potential for 'indexing' the many cadastral and technical documents relating to a building – i.e. linking the documents to the 3D model

➢ Talking to people in their own language, and of interdisciplinary teams to approach this 3D challenge, to keep the end users engaged, rather than having them wait 3 years for a final result.

➢ Relevance of crowd sourcing – 'mapmyright', VGI (Portugal experiment)

➢ Currently few existing work on 3D printing and augmented reality

Day 2

➢ Draw a list of "must" go

- Main issues/problems
- Further research and development activities

➢ Identify actions to continue those discussion, and make researchers and practician collaborate and share results

➢ It started with a demo from Sivan design

- of particular interest the ability to extrude a parcel below ground and perform an intersection between the 3D parcel and underground structures such as tunnels, pipes. Functionality also includes 3D select, distance measurement, buffering, line of sight, select individual apartments within a block

➢ For the followings, we assume having digitize data (even scanned images)

Recommendations (or wish list!) 1/4

1. We should promote 3D visualisation, and 3D models (compared to 2D)
   - Even though 2D or 2.5 may be suitable and enough in many cases
   - more effort on promoting technology transfer of research prototypes
     - Ex. Web sites: a series of 3D Cadastre SHOWS !
2. The importance of other fields of research in 3D visualisation
   - Information visualisation, vision, cognitive aspects, game engine (we learn from Xbox, minecraft, and also from 3D mice, gaming mice)
   - Do not reinvent the wheel, lot of knowledge and foundations,
   - We have to integrate their network of specialists, let them know that we are doing innovative R&D (application is not only application)

Recommendations (or wish list!) 2/4

3. Taking advantages of new visualising tools such as :

   - Dashboard, SOLAP system, new rendering techniques for thematic color mapping; Immersive and interactive 3D visual display; Multimedia, augmented reality and mobile technology; Schematized maps; Ringmap to display a time series, ETC

   - promote 3D printing and AR as an additional means for people to engage with cadastre

4. R&D on user interface and interaction

   - level of interaction have to be matched with user profile

5. Take into consideration users and usages (from a visualisation point of view)

   - Capturing of user requirements for on-demand mapping and dealing with different communities of users;

   - Indirectly:
     - Meet the end-users, be part of their day-to-day activities
     - Need more conceptual data modeling depending on the usages
     - The importance of integrating with users beyond the standard surveyors or land registry staff or notaries

Recommendations (or wish list!) 3/4

6. Having a clear view of What to visualise/deliver in 3D
   - Cadastral Data and information, auxiliary document (title/deed), contextual data such as road, infrastructure, ETC
   - BUT more about to visualise spatial relationships with neighbours - e.g. this lot is bounded to the north by the land owned by Mr Smith, to the west by Mr Jones and so forth. How can this type of definition be visualised?
     - Ex. legal objects crossing other multiple legal objects (or parcel) or unbounded legal object
   - Should go beyond the 3D building, and more integrated system and visualise objects that are not visible !
   - Suitability for multipurpose 3D cadastre and multi-users database design
   - Not only visualise RRR, but O (Opportunity, ex. Simulation)
7. The integration of time (history of changes),
   - Need to be addressed not only from the point of view of registration but multiuser point of view, and tools to track the temporal aspects
   - How about xD map (3D + transaction time + time validity + scale + cost +?
   - and tools to view these multidimensional aspects

Recommendations (or wish list!) 4/4

8. What to call the 3D product – and importance of familiarity for end users e.g. 'matrice 3D' or "3D Certificate of localisation"

9. The question of precision or level of detail must be addressed (not clear what is exactly, depends on the usages)

- Cadastral LoD - may be useful to promote 3D cadastre in a very understandable manner
- promote tools for viewing quality of the models or fuzzy boundaries

10. New data acquisition techniques like LiDAR, Georadar, or even crowdsourcing data pushing, it will impact the data visualization and distribution schema

11. Generalization of higher dimensional data (3D and temporal data) like automated, on-the-fly, and contextual generalization

12. GeoBIM data (combining above ground and subsurface application)

A question for you

- From a visualization point of view3D, what are the differences between City Models, 3D Building Models and 3D Cadastre Models?

What is next?

➢ We have to step on this event and keep on working together!

➢ Possible actions

- Open Web sites to show and share our prototypes, all the resources
    - a list of the many trial projects and link to their source if possible, as well as to sample datasets
- Having an inventory upon literature on 3D visualisation
    - Good work from Peter, we have to contribute

➢ Create a position paper on 'best practice' for 3D cadastral visualisation

- To be published in Journal

➢ Cadastral questionnaire answers may not be representative of a whole country situation

- Possibility of repeating Jacynthe's questionnaire around other countries

Swiss experience – Public law restrictions

How to enable the citizen!