

3D Digital Landscape Models - a second workshop
First breakout session
Monday 29th November 2011

3D Point cloud management

Chair: Wolfgang Stössel

Report: Kevin Mooney



3D Point cloud Management



- NMAs:
 - NMAs see the potential for 3D point cloud related products but if there is no market demand, it is difficult to get budget approval.
 - However, there is a case for managing the point cloud and allow market demand to develop.
 - Most NMAs build topographic databases and do not have products that need the point cloud.
 - The current practise is to create the DSM/DTM but not to use the point cloud.

3D Point cloud Management



- NMAs continued
 - Currency of data implies a two to three time period during which data should be readily available after which it is usually archived.
 - Storage is a challenge - particularly in the case of image-matched point clouds which generate large data sets.
 - Infra red represents an example of data that may not always be used by NMAs but which may be useful to a third party who could generate a product from it. Similarly for the DSM.

3D Point cloud Management



- NMAs continued
 - Maintenance of the raw data provides more potential for intermediate but less-refined products.
 - Updating point clouds or LiDAR data can become an issue as a later point cloud will not necessarily have the same distribution or penetration as the first, where vegetation has developed.

3D Point cloud Management



- Industry:
 - Industry has not yet seen a real demand from NMAs for data models for point clouds as the NMAs still work with raster and vector data.
 - However, technology is ready for NMAs to identify their needs in this area.

3D Point cloud Management



- Applications pull:
 - There are many applications that would benefit from the point cloud - forestry and city modelling being two examples.
 - Cities need centimetre accuracy so there is a case for a variable strategy to be followed by NMAs in acquiring data for 3D landscape models - tailor the data acquisition for different specifications for urban/rural or even within rural areas.

3D Point cloud Management



- EuroSDR:
 - EuroSDR should look to designing project activities to help the NMAs develop the business case for maintaining and managing the point cloud.

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Chair: Dieter Fritsch
Report: Andy McGill



3D Point cloud Management



- Q: Data Storage, should we maintain a 3D Point cloud as a dataset in NMAs:
 - Point cloud is the original data, but lovely idea to store it.
 - The issue is how to manage it rather than to store it.
 - Most NMAs have a legal requirement to store and archive original data – regulatory requirements will vary from country to country.
 - Storing original binary files would require you to also store the SW to handle it.

3D Point cloud Management



- Q continued
 - Currently a lack of standards, storing the point cloud would require a data structure.
- Conclusions:
 - (1) All original data should be archived.
 - (2) Difficulties with standardisation
 - (3) Point cloud is a product not original data, but NMAs may also store point clouds
 - (4) NMAs must think at a national level
 - (5) Need to decide between LOD for different areas (urban, suburban, rural)
 - (6) Funding required perhaps for further investigations

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Second breakout session
Monday 29th November 2011

3D Visualisation of National Landscape Models

Chair: William O'Sullivan
Report: Kevin Mooney



3D Visualisation of National Landscape Models



- 3D Visualisation is necessary - participants pointed to examples presented by 3D Reality Maps.
 - We live in a 3D world and 3D visualisation is the same as traditional cartography and should be seen as a product. It puts the user in context. Users use visualisations to help them make decisions and more dimensions make better decisions.

3D Visualisation of National Landscape Models



- A pyramid of users is identified in relation to 3D visualisation
 - At the base we have the public who have very high expectations of 3D visualisation and expect high definition. At the narrow top we see specialist users who want to do analytical analysis with topological relationships to help them and who do not, necessarily require high definition.

3D Visualisation of National Landscape Models



- Are NMAs trapped in a scenario where they feel it necessary to visualise their 3D data? However a 3D Landscape model is not the same as a 3D model of the landscape.
- NMAs should concentrate on delivering rich data in standards-based object-oriented 3D with identifiers. Third party resellers and value adders can develop applications as appropriate.

3D Visualisation of National Landscape Models



- It is always possible to generate good visualisations from good data but not necessarily the other way round. NMA data models should not be designed just for visualisation. Many applications can be developed where 3D visualisation is useful, e.g. forestry, tourism, training, ...
- 3D Visualisation should be seen from a business perspective to enable decisions in planning, development and governance. We do not need to consider visualisation just from a gaming or tourism perspective.

3D Visualisation of National Landscape Models



- There is a market for 3D visualisation but Microsoft and Google have 100% of the mass market.
- It depends on the focus of the NMAs. This is usually on the need to produce data and not on the need for high definition. However, there are examples where high definition visualisations can be used in the engineering sector to secure 'buy-in' from budget holders and decision makers in major projects.

3D Visualisation of National Landscape Models



- A number of new initiatives may impact on NMAs.
 - Examples cited were in the need to support personal navigation services, which may create the need to model smaller objects such as steps, ramps etc. The need to visualise indoor spaces was also identified as a possible future requirement for NMAs.

3D Digital Landscape Models - a second workshop
Third breakout session
Tuesday 30th November 2011

Future 3D Data Management

Chair: Dieter Fritsch

Report: Michael Peter



Future 3D Data Management



- Q: Is there any 3D Data Management at all in NMAs:
 - No, but all data is available in 2.5D (reference surface and vector data, what means data is carrying x,y,z)
 - 3D Rotterdam is a starting point, there are other activities in The Netherlands (with data not only from cadastre).
 - Using ESRI's 3D capabilities is easy to use, no big changes in storage necessary.
 - All NMAs are using DBMS for storing and maintaining their geographical data. It seems that Oracle is often used (not yet Oracle Spatial 11g).

Future 3D Data Management



- For processing, a combination of ESRI and Oracle is used (it seems to be easier to use ESRI SW for data manipulation)
- What about deriving 2D maps from ESRI 3D (multipatch approach)?
- Participants were surprised by the new MS Vexcel approach (data collection from scratch, 3D view by oblique imagery)
- All NMAs have huge datasets in stock, they have to be updated and used in a spatio-temporal approach maintaining their geographical data. **Change detection** is a hot issue!

Future 3D Data Management



- Municipalities are creating their own 3D City models. Quite often proprietary models are used which do not match the data models of NMAs.
- More pilot models like 3D Rotterdam are needed (use cases, **best practice** etc).
- So far only geometric problems have been discussed, semantic problems were missing.

Future 3D Data Management



- Conclusions:
 - (1) All original data should be archived.
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Future 3D data management in NMAs

Chair: Ian Dowman

Report: Kevin Mooney



Constraints



- NMAs feel they are playing ‘catch-up’ where the demand for 3D is already created
- There is a lack of knowledge as to what moving to 3D will mean to the organisation
- There is no clear idea yet as to the Human Resource implications – does expertise at 2D translate to 3D

Constraints



- Software is not a constraint but there is a need to define the rules of data capture and management in using 3D software
- 2D is easy but 3D requires more careful thought at a detailed level such as, for example, the number and location of vertices on a road in order to ensure sensible local relationships – water flowing downhill for example

Constraints



- Where comprehensive 2D frameworks exist, there is an argument for managing 2D and 3D in parallel but possibly sharing identifiers
 - Do we constrain 2D to fit the 3D or constrain the 3D to fit the 2D?
- Extrusion of 2D geometry to 3D can create anomalies where property boundaries don't fit well with LOD2 roof geometry for example.
 - Should we restart from scratch and, if so, when is the best time to do this?

Constraints



- It is proposed that NMAs should take a staged approach by making 3D data available for use-case testing to allow required uses to emerge together with requirements.
 - Netherlands pilot towards national 3D model is a good example
- Software systems are developing at a fast rate and it is a challenge to keep track and to decide when to ‘make the jump’ to a system

Constraints



- NMAs need to decide what to capture in 3D
 - An example might be to capture in 3D those objects that change the model or protrude from it and other objects in 2D
- Need to decide what to do with existing DTM where conflict exists between new 3D vector data and the DTM

Skills and Training issues



- There is a need for new skills in 3D
- Stereo measurement is more exacting than just viewing and few have skills in precise 3D measurement
- Underlying processes, such as aerial triangulation, must also deliver better accuracies when needed to support 3D data measurement.
- The personnel now find their task becoming more editing in nature than data generation

Skills and Training issues



- Retraining is needed and this can be a long and slow process
- Field surveyors have, in the past, discarded the third dimension but can no longer do so.
 - May need retraining for very different task of collecting 3D field data either on the ground or on buildings

Quality Assurance



- There is a need for thorough quality tests based on rules (can be 500+ rules) that check 3D relations within and between themes
- It is not yet seen as practical to constrain the data collection by such rules
 - Better to batch test the data following collection