Session 4c: Technology

Charlie Frye presented the paper "Intelligent Multi Scale Cartographic Data and Their Databases"
(mention any developments which have occurred since the paper was written, or key observations/ comments not in the paper)

Even with digital data, making a map still takes a comparatively long time.

Advances in technology, especially the ability to store geographic information in databases offers the opportunity to automate the cartographic process to a greater extent than before.

The ESRI approach is based on using data that has not only been geographically modelled, but cartographically modelled.

The model needs to be very well defined for each map dataset so that the appropriate map products can be generated from it.

The basis of creating a cartographic model depends on drawing together classifications, attribution, symbology, rules of representation and page layouts.

Its success depends on defining what is to be included,.e.g a north arrow,what is its relationship to everything else (it needs to be in the top right hand corner and overlays any map features)and what are the rules that govern its relationship (its this size, this colour, uses this stored image). It will also need to be able to pick up any changes to the geographic data that result in changes to how it is to be displayed on the map.

Once these elements have been defined and modelled, they can be stored along with the geographic data that will be used to create the maps, in a Geodatabase.

The maps production process can therefore take of the flexibility for accessing elements (whether the data itself or the cartographic elements) that the database environment provides.

The following questions of clarification were asked:
(name, question) for important questions
Peter Woodend asked if the technology supported multi scale map production.
Yes the model can deal with the necessity of producing different scales of mapping from the same base data – it relies on the users explicit definition of the rules of symbology to be applied to certain types of features and the scale of display could be one of the parameters of those rules.

Melanie Hacker presented the paper "Efficient Map production by Re-Engineering and Generalising your Data Assets"
(mention any developments which have occurred since the paper was written, or key observations/ comments not in the paper)

Many NMA's are under increasing pressure to cut costs and improve efficiencies.

Value can be added to data collected to produce a base map at a certain scale by deriving more products from the same source – capture once, use many times

Generalisation tools exist to enable that process to take place.

The very latest tools provide the ability to generalised features based on their geographic context, not just in isolation or as part of a set of the same objects.

The AGENT project is an example of one such tool and the approach used to not to itemised every possible resolution of a conflict between features but to describe the final required result and let the software make the decisions based on context.

Before you can optimise the generalisation process it may be desirable/essential to re-engineer the base data to an object based data set, e.g. OSGBs OS MasterMap data set.

Reengineering should consider:

- Seamlessness
- Geometric Cleaning
- Coding Consistency
- Meaningfulness of objects – mirror the real world by moving from lines to polygons
- Unique referencing
- Topology and structure
- Maintenance
- Lifecycles of features and referencing

Although spatial RDBMS are very useful for storing such re-engineered data they are not necessarily optimised for generalising it - a good flowline is to store the data in one but extract it into a specialised generalisation sub system for the generalisation to take place.

Further examples of work were given from KMS Denmark and the MAGNET project.

The following questions of clarification were asked:
Steve Booth (GB) asked if the algorithm in the Agent software was applied in a linear fashion or was triggered at different scales ?
Agent is made up of several components including a map specification that determines scale dependent on the object i.e. a building would have different generalisations at different scales.
Louis Hecht (USA) asked how many object were tested under the MAGNET project ?
Denmark is covered by 109 sheets of which 10 were included in the project. The generalisation was applied primarily to the buildings sub class of data.

Louis Hecht presented the paper "An Interoperability Report, a Forecast and a Call to Action"
(mention any developments which have occurred since the paper was written, or key observations/ comments not in the paper)

Interoperability is a key challenge for NMA's

OGC works to identify and fill gaps in achieving interoperability

Three main areas for OGC's work are
Rapid Interface Development

Session 4c: Technology

Standards Setting
Testing

A key enabler has been the web, especially Web Services – OGC has adopted specifications for a family of such services for mapping.

Interoperability and open systems are key to achieving Spatial Data Infrastructure objectives.

NMA's are urged to keep up to date with latest technologies for ensuring optimised processes.

There is an ever growing amount of resources available for establishing interoperable systems.

New developments and challenges for interoperability include
Sensor Web enablement
Web pricing and payment
Security
Licensing and IPR
Certification of data – building trust
Location Services

When thinking about IT architecture in an NMA , OGC suggests 7 goals to aim for;

- Costs
- Accuracy and Currency
- Access
- Seamlessness
- Multi Use
- Availability
- Security

The following questions of clarification were asked:
Chris Parker (UK) asked if all the information given in the presentation was also available on the OGC website ?
The presentation could be made available through the Conference website, hosted by OSGB.

Carlos Lopez presented the paper "Evaluation tests performed over a proposed anti-piracy system for digital vector datasets"

Few NMA's have the luxury of secure or even generous funding

As we move to the production of primarily digital map data NMA's are increasingly likely to suffer from copyright piracy as it is far easier to duplicate digital data than it ever was to copy paper mapping.

Ways must be found to enforce copyright and reduce pirate copying if revenue is to be protected.

Main issue for SGM is proving ownership of the copied data

Session 4c: Technology

Current technology has certain limitations – namely the ability to let the original purchaser of the data use the data but not enable them to share that data onwards – i.e. there is no protection once the data is in the purchasers system

SGM in Uruguay have researched new technology for protected digital datasets.

The approach they have followed is to use Steganography

The basis of the approach is that the data is tagged or watermarked so that the original purchaser can always be identified regardless of what modifications or transformations have been performed on the data.

The watermarks needs to be:

- Unnoticeable
- Eraseable- but only by causing severe damage to the data
- Immune to legitimate copying or transformation e.g. splitting of the data set
- Easy to detect
- Should not affect the ability to use the data or to receive updates
- Unique to the customer
- Needs to be provided by a 3rd party – not the author or the customer for neutrality

It works by embedding the identification within the data itself, rather than in metadata or associated files.

The watermarking was tested by taking one from five identical sets of both urban and rural data and manipulating the data in various ways – re formatting, editing and transforming.

Despite these operations on the data, the watermark was not removed and the data set could always be traced back to its original source.

This puts the onus on the purchaser to police the copyright themselves as any illegal copy can be traced back to them. A suitable contract with the customer needs to be in place.

More information at www.thedigitalmap.com

General discussion

Delegate from Norway asked if copyright infringement was a big problem and surely it would be better to make the data so cheap that there would be no need to copy it ?
It is a significant problem, not only in Uruguay, but also wherever government policy dictates that NMA's must survive on revenue generated by the sales of their products.
Dr Pande (India) made the comment that there are copyright issues that also centre around the fact that while the maps themselves are copyright, the locations of features they describe are not.
Doug Nebert (USA) asked if they had looked at the issue of data authentication – the tracking of data that had been modified (possibly quite legitimately, but to such an extent that it could be considered as fundamentally different from the original dataset and therefore might need some "use with caution" labelling.

Session 4c: Technology

Digital signatures or authentication had not been looked at although there was no reason why one could not be incorporated alongside the watermark.
Peter Jakobsen (Denmark) asked if any work had been done on individualising datasets so that even if it was a copy it would have its own unique tag ?
Again, no specific work has been done but the technology certainly exists to do this.