

THE CONCEPTS OF INCREMENTAL UPDATING AND VERSIONING

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1. BACKGROUND TO THE PROBLEM OF INCREMENTAL UPDATING AND VERSIONING

As well as a number of Commissions, the International Cartographic Association (ICA) had one Working Group, on Incremental Updating and Versioning, and this presentation describes some of the work undertaken recently by the Working Group (WG). The WG was voted for a Commission by the General Assembly held at the 21st ICC in Durban, South Africa.

The basic problem being addressed by the Commission is that a user compiles their data base using core data sets from various sources, integrating them together for their particular needs and building their own, value-added data and topology on top. The user's primary concern is their value-added data, maintaining their integrity, quality and spatial referencing; however, the core data sets provide the crucial spatial framework for the value-added data. Unfortunately, geographical data are dynamic and most suppliers maintain and update their core data sets. Such updates could be: continuous (eg: telemetry), periodic (eg: daily, monthly or annually), part of a planned update cycle (eg: for a national mapping series), when the amount of change or number of errors crosses a threshold, or by special request (eg: to prepare for a census or election).

Historically, updates have been provided in bulk, with the new data set replacing the old one. User could: ignore update (if it is not significant enough), manually (and selectively) update their data base, or accept the whole update *in toto* – and then have to re-integrate the update with the other core data sets used and rebuild their value-added data and topology on top. Any changes, aggregations, sub-divisions, additions or deletions to the core data might affect the geocoding of the value-added data, such as through the loss or change of an unique identifier. Hence, the user needs to track all the different versions they have received and used, to ensure: they implement the updates in the correct order, they do not re-implement updates and they do not miss updates. Unlike software, a user might need to: keep several different versions of the same data set and even use them together simultaneously, such as for time series analyses.

Because attempts at resolving this issue of incrementally updating and versioning core data sets have failed in the past, the work of the Commission could be considered to be a futile exercise. However, with the ever increasing availability of data sets, the more rapid update cycles and the user community growing ever larger and more diverse, there is an urgent need for these issues to be addressed, if not actually solved.

2. THE ICA COMMISSION ON INCREMENTAL UPDATING AND VERSIONING

The ICA's Commission on Incremental Updating and Versioning was established (as an Executive Committee Work Group) during the 19th International Cartographic Conference (ICC) in Ottawa in August 1999, with its terms of reference being to:

- Be the focal point for research and solutions for incremental updating & versioning;
- Conduct a literature study and overview of state of the art;
- Organise seminars and/or workshops;
- Develop models of the concepts;
- Publish a reference manual (cookbook);
- Compile definitions, further research goals and best practices for the field; and
- Define algorithms for modular and/or application-oriented incremental updating and versioning.

The commission has been cooperating closely with the International Society for Photogrammetry and Remote Sensing (ISPRS) and other organisations, arranging annual joint workshops in Amsterdam in July 2000 (at the ISPRS Congress), in Beijing in August 2001 (20th ICC), in Frankfurt in October 2002 (in collaboration with the Eurogeographics Research & Development Forum) and in Durban July 2003 (in the week preceding the 21st ICC). As this is a new field for research and there is little clarity on the issues at this stage, the focus of these workshops has been on sharing experiences and ideas, and on trying to assemble a definitive list of the concepts of incremental updating and versioning – the focus of this presentation. The Commission is also in the process of compiling a book based on the presentations and discussions at these workshops.

3. INCREMENTAL UPDATING AND VERSIONING

There is a continuum of types of updates, from the once-off base data set that is not maintained (ie: for which there are no updates), through to automatic, continuous and transparent updates (the nirvana towards which we are aiming).

For versioning, one needs to deal with both the real and imaginary worlds, as they were, are or might be. Tracking versions of spatial data is different from software versioning, because the users need to keep multiple versions, such as for time series analysis (when multiple versions might be used simultaneously), for legal requirements (eg: to prove ownership of property) and for historical research.

4. THE CONCEPTS OF INCREMENTAL UPDATING AND VERSIONING

The concepts of incremental updating and versioning have been grouped provisionally under the following headings:

- Dating issues
- Versioning issues
- Standards issues
- Economics issues
- System maintenance issues
- Administrative organisation issues
- Quality control issues
- Modelling issues

These were refined further during the 4th Joint Workshop on Incremental Updating and Versioning, held in Durban, South Africa, from Friday 8 to Sunday 10 August 2003. The concepts and issues related to IU&V are presented at our web site <http://geo.haifa.ac.il>. All Commission members and WS participants are invited to join the E-discussion in order to expedite our progress.

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6. REFERENCES

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