

Towards an Implementable Data Scheme for 4D/5D Cadastre Including Bi-Temporal Support

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SUMMARY

Cadastral databases have unique requirements not shared by other spatial databases.

The third spatial dimension must be included, but visualisation using 2D software must also be accommodated. The majority of users of the Cadastre will always use 2D software, and should be provided an “instant in time” plan view of the boundaries (with any 3D parcels “flattened”). Some users will have access to and need for fully functioned 3D software, and some to tools with “time sliders” but access to the Cadastre cannot be restricted to such users

A history of the Cadastre must be maintained. It is important that patterns of subdivision and land use can be tracked through the past, and it is highly desirable that planned future activity is included. In addition, a record of the state of knowledge of the database is needed (in case past decisions must be reviewed). That is to say, both the “valid time” and “transaction time” forms of time stamping needs to be accommodated.

The accuracy of the data is constantly being improved (each time a new survey is done), and this action must be reflected within the database as it becomes available. Other parties traditionally use the Cadastral database as a “base map”, and accuracy improvements need to be promulgated to these parties.

This paper builds on previous research and development – mixing 2D and 3D cadastre has already been demonstrated, as has Cadastre with transaction time history. This paper considers what is needed to complete the schema. Specifically:

The storage of real-world (valid time)

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history.

The storage of “tentative time” temporal data for proposed developments.

The improvement of accuracy of Cadastral corners, both in 2D and 3D spatial units, and in the definition of historic spatial units.

2D and 3D views of the data, and 2D and 3D update of the data.

Making the data available via scalable services, including access to historic items, and update history.

The novelty of this research is the combination of the full 4D functionality in a single schema that can be implemented in a practical multi-user database.

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