EDITORIAL

Current Issues in Spatial Data Infrastructures and System Design

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This edition of the Spatial Sciences Journal includes a special feature of four research papers describing current research in spatial data infrastructures and system design. While the four papers are only a snapshot of a much wider range of current research in Australia and internationally, the four papers do show the depth and breadth of research in the area.

Trigger for this special feature was the first anniversary of research in the Program 3, Spatial Information System Design and Spatial Data Infrastructures, of the Cooperative Research Centre for Spatial Information (CRCSI). Responses to a call for papers came from research projects in this program and another research project at the Centre for Spatial Data Infrastructures and Land Administration, Department of Geomatics, University of Melbourne. The latter project is funded by the Department of Education, Science and Training from the International Science Linkages program established under the Australian Government's innovation statement, *Backing Australia's Ability*. All these papers underwent a rigid international, anonymous peer review, with three reviews per paper.

The first paper, by Abbas Rajabifard, Andrew Binns and Ian Williamson, describes a six month project in the CRCSI to review existing spatial information and spatial data infrastructure (SDI) practices in four jurisdictions in Australia (Victoria, NSW, WA and the Australian Government) as well as leading international initiatives (Europe, USA and Canada) as a first step in developing a better understanding of the concept of Virtual Australia, a central vision for the CRCSI (Thompson and Chan 2005). The project benefited from ongoing research in related areas in the Centre for SDIs and Land Administration. The paper focuses on improving opportunities for the spatial information industry by developing a better understanding of the need for an enabling platform to support the sharing of spatially related services across participating organizations. The paper concludes with recommendations for future initiatives to move towards the Virtual Australia vision and includes technical and institutional principles to aid in facilitating an improved understanding of the need for an enabling platform.

The second paper, by Jude Wallace, Ian Williamson, Abas Rajabifard and Rohan Bennett, explores the issues of using Australia's land administration systems to spatially enable government. The paper proposes the adoption of a new concept called *iLand* where all major government information systems are spatially enabled, and where location and spatial information are regarded as common goods made available to citizens and businesses to encourage creativity and product development. The paper reviews developments in land administration and spatial information, looks at the dramatic changes in the land information needs of modern governments ranging from taxation to environmental management, and proposes the new concept of *iLand*.

The other two papers come out of the CRCSI project on making spatial data more accessible. Accordingly, the third paper, by Martin Tomko and Stephan Winter, addresses the problem of finding *appropriate* information for consumers of spatial information, or in this case, of navigation information. The addressed problem is adapting to different levels previous

knowledge of consumers. In particular, the paper develops criteria to select spatial references that help people to orient in their daily or professional life, i.e., in *familiar* environments. This problem is quite in contrast to current designs of location-based services, which all assume consumers with no previous knowledge of their environment. So, if the consumers have everyday knowledge and look only for specific details, what is then an effective answer to a question such as *"Where is ..."*? The authors collect models from cognitive science and linguistics about referencing to objects, and apply them successfully to spatial referencing in urban environments. They claim that their problem relates to a bigger market for spatial information than traditional location-based services, and a sustainable market.

The fourth paper, by Alexander Klippel, Christian Freksa and Stephan Winter, profited from a collaboration with Christian Freksa, Head of Cognitive Systems at the University of Bremen, during his sabbatical at the CRCSI. The paper looks at design criteria for emergency plans, such as the 'you-are-here' displays in public buildings. The research question is related to the one of the third paper, but in a completely different domain: which information is *appropriate* in the case of an emergency, i.e., in which ways should spatial information be designed to communicate in situations where the consumer is stressed or panicked? All we know is that current designs frequently fail to deliver (Levine 1982). Hence, what we need are clear principles, founded in cognitive theory, to communicate in a cognitive efficient manner. The relevance of this work for static displays of emergency plans is already obvious, but a more advanced goal is the design of digital emergency plans, such as on mobile devices or on immersive devices. After reading this paper we propose you do an experiment: apply the described design rules to the emergency plan at your office door, and then imagine a stressed or panicked user reading this plan looking for instructions how to act.

Hopefully this feature will give an insight to practitioners on the depth and breadth of current research in spatial data infrastructures and system design. All these projects report "work in progress" and show that even after a limited time useful results can result. The papers show that spatial information problems that require research range from global (Google Earth) to very local issues (emergency evacuation in buildings). The papers also highlight that spatial information research ranges from a theoretical and technical level (recursive construction of granular route directions) to a policy and institutional level (spatial enablement of government), with all levels required to deliver appropriate spatial information systems. Also the four papers show that spatial information initiatives require appropriate enabling platforms that are inherent in the spatial data infrastructure (SDI) concept – such enabling platforms promote and improve opportunities for the spatial information community to access and share spatial information.

This special section would not have been possible without the help of many people. Most prominently, twelve international leading experts in the field were willing to review papers for this section, and give valuable comments to the authors. Since this special section collects papers on work we have supervised and been involved, the review process was overseen by the editor of this journal, Graeme Wright. Our thanks go to all these persons.

References

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Thompson, B.; Chan, T.O., 2005: Know, Think, Communicate — Key Elements of Virtual Australia. Discussion Paper, Cooperative Research Centre for Spatial Information, Melbourne, Australia.