2007 and 2008 Report

Department of Geomatics

The University of Melbourne
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EXECUTIVE SUMMARY

This is a report on the activities and the achievements of the Centre for Spatial Data Infrastructures and Land Administration in 2007-2008. The Centre is now moving to its 8th year of activities since it was established by the University of Melbourne in November 2001 and was launched by the Minister for Environment and Conservation the Hon. Sherryl Garbutt at the opening of the International Symposium on Spatial Data Infrastructures, hosted by the University, on 19 November 2001. The primary objective of the Centre is to undertake fundamental and applied research in the broad area of spatial data infrastructures and land administration. The Centre undertakes research into problems and issues at local, a state, national and multinational level.

The funding over the first five years has facilitated the activities of the centre and winning of further research funding from the Australian Research Council. The State Government of Victoria through the Department of Sustainability and Environment (DSE) and Department of Primary Industries (DPI) and the State Government of NSW through the Department of Lands, are the key sponsors of the Centre for 2008-2011.

The research undertaken in the Centre uses the State of Victoria, NSW and WA as working laboratories to obtain research data, and tests solutions and outcomes. International linkages through European and North American universities as well as through the UN supported Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP) and Global SDI Association (GSDI) give the Centre a strong international platform from which to build upon.

The Centre has been at the forefront in the development of SDI and land administration systems that facilitate decision making within the context of sustainable development objectives at local, state, national and multinational levels. An important role of the Centre is the ability to undertake research within a dynamic ICT and emerging technology environment and the development of SDIs that are now playing a much broader role in a modern society in support of the spatial enablement of society. The strong work undertaken within the Centre since its inception and the linkages created with both national and international organisations and universities has helped to position the Centre at the forefront of SDI and LA research internationally.

The end of 2007 saw the retirement from full-time employment by Professor Williamson, however he has been appointed to a part-time position focussing on research and professional activities in support of the Centre’s objectives. The Centre hosted a successful seminar to acknowledge his contributions and published a book dedicated to Professor Williamson titled “Towards a spatially enabled society”.

During 2007-8 a major commitment of the Centre has been the completing a book for ESRI Press in the USA titled “Land administration for sustainable development”. The book is authored by Professor Williamson, Professor Stig Enemark, Ms Jude Wallace and Associate Professor Abbas Rajabifard.

2007-2008 were successful years for the Centre as summarised below:

- Over 57 Publications in 2007-2008 (books, book chapters, journal and conference papers and technical reports),
- Publication of two books
- Successful completion of three PhD theses
- Winning two research grants
- Successful completion of three research projects
- Submission of two ARC Linkage applications
- President-Elect of GSDI by Associate Professor Rajabifard
- Contribution to professional and scientific associations and societies
- Successful organisation and running of three national and international seminars, workshops and training courses

There were 16 personnel (former and current members) directly involved with the research in the Centre in 2007-2008. The Centre also draws on the expertise and joint supervision of other academic staff in the Department of Geomatics.
The Visiting Program has been a successful component of the Centre. In 2007-2008 through the support from the University of Melbourne and support from the Department of Education, Science and Training (DEST), the Centre hosted seven visits from international researchers and scholars in which these visits were mutually beneficial to the research of the Centre and to research partners. As always, the success of the Centre is fully dependent on personnel involved in it. As such I want to acknowledge all the efforts of the graduate students and researchers and in particular Professor Ian Williamson, Ms Jude Wallace, Senior Research Fellow, Dr Mohsen Kalantari, Research Fellow, Mr Andrew Binns, Research Fellow and Ms Sadia Faisal and Ms Pauline Woolcock the group’s Assistants. It must be remembered that without the support and commitment of the Victorian Government through DSE (SII and Land Victoria) and DPI and the NSW Government, Department of Lands, the Centre would not be able to achieve what it has over the past two years. This support and trust is gratefully acknowledged.

Associate Professor Abbas Rajabifard
Director
INTRODUCTION TO THE CENTRE
HISTORY AND BACKGROUND

The Department of Geomatics has been undertaking research in Land Administration, and Spatial Data Infrastructures (SDIs), for over a decade. However, the last couple of decades have seen a dramatic increase of interest in spatial data and land administration infrastructures at State and Federal levels in Australia and internationally. This resulted in the establishment of the Spatial Data Infrastructures and Land Administration Research Group in the Department of Geomatics several in the mid 1990s.

As a result of the activities and outcomes of this Research Group and the increasing importance of spatial data in society, The University of Melbourne established a Centre for Spatial Data Infrastructures and Land Administrative within its Department of Geomatics in November 2001. This Centre was built on an already successful research group involving 15 researchers and the strong linkages that the Group had with the State governments of Victoria and New South Wales, the Federal Government, the United Nations, The World Bank and several universities and foreign governments.

The Centre provides a focus for research in Spatial Data Infrastructures and Land Administration by building on ongoing research relationships and creating new links through extended collaboration both nationally and internationally. After establishment of this Centre, The University of Melbourne received $1.3 million in November 2001 in State Government funding to build on a global vision by creating virtual information infrastructures that integrate and make accessible the spatial data necessary to solve many of the problems of modern society. Driving this vision is the evolving concept of SDI.

The activities of the Centre is based on a three pillared approach through the development of a Research Program, focused Postgraduate Training Program, and facilitated knowledge transfer including a Visiting Program.

![Diagram](ResearchProgram.png)

OBJECTIVES OF THE RESEARCH PROGRAM

- To establish a leading group of world class scholars in Spatial Data Infrastructures and Land Administration.
- To encourage collaborative research projects with State and Federal governments in Australia, the private sector and leading overseas universities, particularly Universitas 21 institutions.
- To secure national competitive grants through the development of team-based research expertise.
- To secure State, Federal and international research grants building on existing well-established collaboration.
- To disseminate research findings through academic publications, seminars and conferences.

Overall in its research program, the centre focuses on the following areas:
RESEARCH FOCUS

- Spatially enabling government and society
- Designing and developing SDIs
- Building land administration system to support land management
- Building the next generation of property data systems
- Managing the integration of land and marine administration
- Advancing metadata documentation

OBJECTIVES OF THE TRAINING PROGRAM

- To be a focus for postgraduates wishing to study in the Spatial Data Infrastructures and Land Administration area.
- To provide specialized supervisory expertise in Spatial Data Infrastructures and Land Administration.
- To develop and enhance the knowledge base and research capabilities in Spatial Data Infrastructures and Land Administration through research training and specific initiatives such as workshops, symposia and conferences.
- To conduct short training programs in the fields of Land administration and SDI for government agencies, private sectors and interested groups.

OBJECTIVES OF THE VISITING PROGRAM

- To facilitate research and teaching interchanges among Australian and overseas scholars who work in Spatial Data Infrastructures and Land Administration through a Visitors and Seminar program.
- To increase opportunities to involve international visitors in specific initiatives such as workshops and conferences.
- To facilitate collaborative links between visitors regarding research and postgraduate training.
CENTRE MANAGEMENT

Research in the Centre is conducted by staff members of the University of Melbourne, research fellows and students associated with the Centre, and academic visitors and collaborators around the world.

Associate Professor Abbas Rajabifard directs the research centre. Also Professor Ian Williamson on a part-time basis contributes to research and professional activities in support of the Centre’s objectives.

**Associate Professor Abbas Rajabifard**

**Director**

**Research Area:**
Planning, Management and Implementation of SDIs, SDI and Spatially Enabled Government concept, SDI Enabling Platform and Concepts of Virtual Australia.

**Professor Ian Williamson AM, FTSE**

**Professor of Surveying and Land Information**

**Research Area:**
Cadastral, Land and Geographic Information Systems, Land Administration and SDI.
ADVISORY BOARD

The Centre Advisory Board comprises distinguished Australian and overseas leaders in spatial science and technologies from academia and industry. Meetings, reports and information dissemination ensure that the Advisory Board members are informed of the research achievements and directions. Advisory Board members also encourage the promotion of networking linkages and research opportunities between the Centre researchers and their own institutions and contact networks.

Mr Peter Holland (Chair) Former PCGIAP President, Former General Manager, Mapping Science Division, Geoscience Australia

Mr Bruce Thompson Director, Spatial Information Infrastructure, DSE

Mr Greg Scott Group Leader, National Mapping and Information Group, Geoscience Australia and PCGIAP President

Mr Ollie Hedberg Chair Victorian Spatial Council and Chair Public Sector Mapping Agency (PSMA), Australia

Mr Paul Harcombe Chief Surveyor, Land & Property Information New South Wales

Mr John Tulloch Surveyor General Victoria, Land Victoria, DSE

Mr Jan Wandek Managing Director, AusSoft Solutions, Pty Ltd.

Professor Harlan Onsrud Department of Spatial Information Science and Engineering, University of Maine, Executive Director of GSDI Association

Professor Stig Enemark FIG President, Professor in Land Management- Aalborg University, Denmark

Professor David Coleman Dean, Faculty of Engineering, University of New Brunswick, Canada

Representative from the Centre

Associate Professor Abbas Rajabifard

Professor Ian Williamson
**RESEARCH TEAM**

The centre currently has 16 active members including research fellows, PhD and Master students as well administrative officers:

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<th>Name</th>
<th>Position</th>
<th>Research Area</th>
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<tbody>
<tr>
<td>Ms Jude Wallace</td>
<td>Senior Research Fellow</td>
<td>Land Policy, Land Markets and Infrastructure for Land Management, Spatially Enabled Government concept</td>
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<tr>
<td>Dr. Mohsen Kalantari</td>
<td>Research Fellow</td>
<td>Metadata Automation, eLand Administration, Cadastral Data Modelling, and Survey Accurate DCDB</td>
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<tr>
<td>Dr. Payam Ghadirian</td>
<td>Research Associate</td>
<td>Spatially Enabling Health in Regional Victoria</td>
</tr>
<tr>
<td>Dr. Malcolm Park</td>
<td>Research Associate</td>
<td>Editor, GSDI Asia-Pacific Newsletter</td>
</tr>
<tr>
<td>Dr. Serryn Eagleson</td>
<td>Research Associate</td>
<td>Spatially Enabling Health and Editor-GSDI Asia-Pacific Newsletter</td>
</tr>
<tr>
<td>Mr. Andrew Binns</td>
<td>Research Fellow 2007 and Honorary Fellow 2008</td>
<td>Virtual Jurisdiction, Concepts and Principles of Virtual Australia, Marine Administration, SDI Enabling Platform</td>
</tr>
<tr>
<td>Name</td>
<td>Position</td>
<td>Research Area</td>
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<tr>
<td>Dr. Rohan Bennet</td>
<td>Research Associate</td>
<td>Property Rights, Restrictions and Responsibilities in Land Administration and Spatial Data Infrastructure</td>
</tr>
<tr>
<td>Mr. Hossein Mohammadi</td>
<td>PhD Candidate</td>
<td>Integration of Built and Natural Environment Datasets as part of National SDI initiatives</td>
</tr>
<tr>
<td>Ms. Sheelan Vaez</td>
<td>PhD Candidate</td>
<td>Seamless SDI Model to Facilitate Spatially Enabling Land Sea Interface</td>
</tr>
<tr>
<td>Mr. Faisal Masood Qureshi</td>
<td>PhD Candidate</td>
<td>Facilitating Urban Planning &amp; Management Through Local SDI Design &amp; Development</td>
</tr>
<tr>
<td>Mr. Heri Suntata</td>
<td>PhD Candidate</td>
<td>Spatial Planning Support System for Local Planning and Disaster Management</td>
</tr>
<tr>
<td>Mr. Paul Box</td>
<td>MSc student</td>
<td>SDI Governance of multi-domain, and cross-jurisdictional SDIs built using Service Oriented Architecture (SOA) Approaches</td>
</tr>
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Ms Pauline Woolcock
Administrative Officer

Ms Sadia Faisal
Web site Administrator
Completed projects

- Designing Land Administration Systems to Support Modern Land Markets
- A new framework for managing property rights, restrictions and responsibilities
- Cadastral Data Modelling
- e-Land Administration
- Development of a Metadata Entry Tool
- Integration of Built and Natural Environmental Datasets within National SDI Initiatives
- Developments and Impact assessments of National SDI
- Spatially Enabling Health

Projects in progress

- Spatially Enabling Government
- Seamless SDI Model to Include Land and Marine Environments
- Spatial Data Infrastructure to Facilitate Urban Planning at Local Level
- Automating and integrating spatial data and metadata process

Submitted projects

- ARC Linkage on Spatial Enabled Health
- ARC Linkage on National infrastructure to manage land information

RESEARCH PROGRAM
DESIGNING LAND ADMINISTRATION SYSTEMS TO SUPPORT MODERN LAND MARKETS

Staff: Jude Wallace, Andrew Binns and Ian Williamson
Students: Rohan Bennett
Sponsor: ARC Discovery
Status: Completed

Current land administration systems (LAS) were developed since the middle 19th century to define simple land commodities and to support simple trading patterns, particularly by providing a remarkable secure parcel titling system, an easy and relatively cheap conveyancing system, and reliable parcel definition through attainable surveying standards.

Arguably Australia used to lead the world in adapting its LAS to support land parcel marketing. However, because of the pace of change, the capacity of LAS to meet market needs has waned. The land market of, say, 1940 is unrecognisable in today’s modern market. The controls and restrictions over land have become multi-purpose and replication of land related systems in resource and water contexts is demanding new flexibilities in our approaches to administration. The combination of new management styles, computerisation of activities, creation of databanks containing a wealth of land information, and improved interoperability of valuation, planning, address, spatial and registration information allow much more flexibility. However, Australia LAS remain creatures of their history of state and territory formation. They do not service national level trading and are especially inept in servicing trading in new commodities, as described in.

This project is describing the evolution of land markets in the context of their supporting LAS infrastructure to identify an infrastructure capable of servicing all levels of trading activity, including trading in complex commodities. It aims to show how land is converted into sets of abstract rights which become distinct and separate commodities, and how the technical support systems can be reengineered to better support processes of wealth acceleration.

PUBLICATIONS
The drive for sustainable development has led governments to create new interests over land. The role of cadastral and registration systems in the mapping and management of these new interests is unclear. Whilst these systems have always played an important role in the administration of land parcels and ownership, the new land interests are increasingly being mapped and managed elsewhere. As a result administrative inefficiencies and transaction complexities are growing. Existing cadastral and registration systems have the capacity to improve the situation; however, a guiding framework for their inclusion is needed.

This project attempts to articulate the components of this new framework. A key aim is to articulate the roles of cadastres and registration systems in the management of new land interests. The framework must be holistic and reflect other components essential to good land administration. These include the roles of land policy, legislation, flexible tenures, institutions, spatial data infrastructures and capacity building. The principles will systematize the management of land interests across different jurisdictions and help to ensure sustainable development.

**PUBLICATIONS**


CADASTRAL DATA MODELLING

Staff: Abbas Rajabifard, Jude Wallace and Ian Williamson
Students: Mohsen Kalantari
Sponsor: ARC Linkage
Status: Completed

Governments are increasingly concerned about how to best preserve, develop, allocate and use land, incorporating all interests in land. Modern land administration systems need to deliver much broader information about interests in land in order to achieve sustainable development.

Interests in land have historically been organised through land parcels as the basic building block of land administration systems. As a result, governments are trying to manage new commodities and interests in land through this traditional basic building block.

However, land parcels are not sufficiently flexible to accommodate or support the growing number of complex commodities (e.g. water, biota, mining rights, and carbon credits) and other interests (e.g. environmental, heritage, use restriction) in land. Therefore, an efficient technical solution for organization of the growing number of interests in a land information system is needed.

This research addresses the issue of poor organization of interests in a land information system by shifting the basic building block of land administration from land parcels to legal property objects. The legal property object is open-ended and can include complex commodities and all interests in land. The legal property object allows creating virtual information layers from intangible interests and commodities upon the Earth’s surface.

PUBLICATIONS


Cadastral Data Modelling- A Tool for e-Land Administration by Dr. Saeid Mohsen Kalantari Soltanieh, PhD, 2008
E- LAND ADMINISTRATION

Staff: Abbas Rajabifard, Jude Wallace and Ian Williamson
Students: Mohsen Kalantari
Sponsor: ARC Linkage
Status: Completed

Information and Communication Technology (ICT) is being heavily utilized by land administration subsystems and enablement of land administration with ICT is heading toward the concept of e-land administration: the transformation of land administration through the use of ICT.

Although ICT provides opportunities for better service delivery and customer satisfaction and reduction in operating costs, establishment of e-land administration has to date not been fully realized and is often problematic. Thus far, implementation of ICT initiatives in land administration subsystems is isolated in specific subsystems with a limited reference to the broader land administration system and its core policy function of supporting sustainable development.

This problem rises from the lack of flexibility and incompatibility of subsystems’ services. Problems encountered include, data coming from different sources, highly dispersed data, and failure of data to conform to a standard. The difficulties expand when the data is coupled with complicated technologies and bureaucratic management.

One solution to isolation is to develop effective communication among the different land administration subsystems by harmonising data and functionalities through interoperability. Interoperability is one idea offered to overcome these problems. This research describes an interoperability toolkit for e-land administration.

PUBLICATIONS
Cadastral Data Modelling- A Tool for e-Land Administration by Dr. Saeid Mohsen Kalantari Soltanieh, PhD, 2008
DEVELOPMENT OF A METADATA ENTRY TOOL

Staff: Abbas Rajabifard and Andrew Binns
Students: Mohsen Kalantari and Rohan Bennett
Sponsor: Spatial Information Infrastructure/DSE and Cooperative Research Centre for Spatial Information
Status: Completed

Access to up-to-date metadata is an important aspect in delivering high quality spatial information services to vast areas of Australia. It enables both professional and non-professional spatial users to find the most appropriate, applicable and accessible datasets for use. However, current metadata models/standards are complex and very difficult to handle. The creation and maintenance of spatial metadata is also seen as an expensive overhead by Australian government and the spatial information industry.

A new national metadata profile, the ANZLIC Metadata Profile (an Australian / New Zealand Profile of AS/NZS ISO 19115:2005, Geographic information - Metadata) has been developed. As part of this, there is now a need to create a metadata entry tool to support the entry and editing of metadata that complies with the ANZLIC Profile.

A range of different organisations in different parts of Australia and overseas have been working to develop entry tools that can be used to create and validate metadata records that comply with ISO 19115 or profiles of that standard. So far, these efforts have met with only limited success. The entry tools that have been produced satisfy some but not all of the requirements of users. Despite their recognised deficiencies, the existing tools do have the potential of being adapted for use in the short-term to satisfy a significant proportion of the user requirements of ANZLIC. This project will identify and develop a metadata entry tool that can be used by ANZLIC and agencies Australia wide.

PUBLICATIONS

ARC Linkage on “Automating and Integrating Spatial Data and Metadata Process “
INTEGRATION OF BUILT AND NATURAL ENVIRONMENTAL DATASETS WITHIN NATIONAL SDI INITIATIVES

Staff: Abbas Rajabifard, Ian Williamson and Andrew Binns

Student: Hossein Mohammadi

Sponsor: ARC Linkage

Status: Completed

Sustainable development and meeting “the triple bottom line” (economic, social and environmental objectives) requires an understanding of the natural and built landscape in order to observe and monitor change and to create realistic simulations of the evolving environment. This requires access to both built and natural environmental datasets. However, the integration of spatial data from different sources is a problematic process, as different data custodians maintain data in different ways. This causes heterogeneity among multi-source data sets, especially natural and built environmental data sets.

This research project aims to better understand and describe the technical, jurisdictional, institutional, legal and land policy perspective surrounding the two forms of data in a National Spatial Data Infrastructure (SDI). SDI is a platform comprising the technical components of standards, policy framework, access tools and governance to facilitate the interaction of spatial data stakeholders with spatial data. One of the major aims of SDI is to facilitate effective data integration.

The research has investigated the justification for integrating these two forms of spatial data in support of sustainable development and is developing an integration model and framework capable of being used in diverse jurisdictions. Findings of Australian and international case studies has led to the design of a number of technical tools for integration including an integratability web-service, data model and integration guidelines which address the issues associated with data integration.

PUBLICATIONS


DEVELOPMENTS AND IMPACT ASSESSMENTS OF NATIONAL SDI

Joint Project with Wageningen University, the Netherlands, 2005-2008
Staff: Abbas Rajabifard and Ian Williamson
Sponsor: Space for Geo-information (RGI), The Netherlands
Status: Completed

Over the last three decades, governments and the private sector in the industrial world have invested tens of billions of dollars in the development of spatial information systems designed largely to serve specific communities (forestry, agriculture, urban/rural planning, land records management, business geographics, etc.) within local, national, and even international framework. Now the focus is increasingly shifted to the challenges associated with integrating these systems, building what has come to be called spatial data infrastructure. Such infrastructures have been partly described as information highways, linking environmental, socio-economic and institutional databases, and providing for the flow of information from local to national levels and eventually to the global community. Many countries throughout the world have spent considerable resources over the past few years debating optimal spatial data infrastructures. At the moment, only a few well-operating SDI exist.

The known success stories are mainly from private sector, such as the oil and gas industries. It is difficult to implement SDI in governments partly caused by the shifts in bureaucratic power that will be associated with it. Because area (region) is unique in legal, economic, technological, cultural and institutional sense the gained benefits and expected bottlenecks for implementation will be different, so the best strategies for implementing spatial data infrastructures and will be different. However, main critical factors for success or failure should be made to support these best strategies. These factors can be external (society)-based for instance legal, economic, technological, cultural, demographical, and institutional characteristics of an area (region), or SDI-based for instance network architecture, standards and funding stability. From practical point of view, only the critical factors of SDI-components should be determined. As stated before, during last years many national spatial data infrastructures have been implemented around the world. It is important to assess the worldwide status and developments of these clearinghouses and to determine the critical factors for success, because derived information can support future SDI implementations and management. Nevertheless, at this moment, no study exists about these developments of SDI at a global scale (using a systematic periodical approach). This project attempts to fill this gap.

Based on this, the intention of this project was to improve the development, worldwide application and evaluation of the multi-view framework in order to assess National Spatial Data Infrastructures (NSDI). Since NSDIs can be defined as complex systems, the assessment should be flexible and based on a multi-view approach. The project considers approaches such as generational, system/program evaluation, performance based management, and organizational. In order to get a more comprehensive assessment, approaches such as: SDI-readiness, INSPIRE State Of Play, and performance measurement in the context of budgetary processes should be involved in the framework as well. All these approaches have been assessed.

PUBLICATIONS
SPATIALLY ENABLING HEALTH

Staff: Abbas Rajabifard, Serryn Eagleson and Payam Ghadirian
Collaborator: Centre for Spatial Data Infrastructures and Land Administration
Sponsor: Lower Hume Primary Care Partnership
Status: Completed

This project aims to spatially enable health data in the Mitchell and Murrindindi shires to support evidence based planning and decision making for the providers of health services in the area. The focus of this project is on developing a spatial data infrastructure (SDI) platform for analysing health services. To achieve this, a number of datasets have been collected and formatted ready for use within a GIS.

The project involves a multidisciplinary team from both the Centre for Spatial Data Infrastructures and Land Administration at the University of Melbourne and the Lower Hume Primary Care Partnership (LHPCP) and support from a reference group (formed to guide the project development) with members from the LHPCP, Seymour Hospital, Kilmore Hospital, Mitchell Community Health Services, Department of Health Services, Department of Rural Health, Mitchell and Murrindindi shires.

To demonstrate the use of spatially enabled health in the area, as part of this project two pilot projects have been identified for development. Both projects involve integrating demographic data with health data so gaps and overlaps of services in the region can be identified.

OUTCOMES
ARC Linkage application on Spatial Enabled Health submitted
The popular use of spatial technologies involves showing images and tracking assets and inventory in an increasing array of instruments, the most common being the ubiquitous mobile phone. Remarkable as the applications are, spatial technologies can be used in even more dynamic ways. Transformational use of spatial technologies occurs when they are used to improve business processes of government, and assist delivery of policies for equitable taxation, conservation of natural resources and planning for rational growth. Use of this transformational capacity of spatial technologies in government creates a spatially enabled government (SEG).

SEG is achieved when location and spatial information are available to citizens and businesses to encourage creativity, and governments use place as a means of organising their activities in addition to information. The problem is that this transformational capacity is used little or not at all in government, limiting Australia's international competitiveness. Transforming Australian governments to capitalise on spatial enablement is the basis of this project.

These transformational uses involve organization of social, economic or environmental data in relation to reliable and authoritative coordinate identification of significant places. Authoritative coordinate identification systems facilitate the integration, not merely the presentation, of information throughout government. These new uses apply the benefits of spatial technologies to business processes of traditional users of land information, including emergency management, resource and water management, land management, and marine management. More importantly, the use of a Spatially Enabled Cadastre supports identification of where non-spatial data sets apply and potentially allows seamless interrogation on information, even by agencies that do not traditionally use spatial or land information.

The aim of this project is to develop a whole of government path to use transformational spatial technologies, particularly land information, by Australian governments to manage their processes and activities, provide services and deliver information.

**PUBLICATIONS**

Rajabifard, A. (Eds), 2007, Toward a Spatial Enabled Society, The Centre for Spatial Data Infrastructures and Land Administration, Department of Geomatics, The university of Melbourne, pp 400


Centre for SDI and Land Administration
Department of Geomatics, The University of Melbourne

SEAMLESS SDI MODEL TO INCLUDE LAND AND MARINE ENVIRONMENTS

Staff: Abbas Rajabifard and Ian Williamson
Student: Sheelan Vaez
Sponsor: ARC- Linkage
Status: In progress

Current Spatial Data Infrastructure (SDI) design is focused mainly on access to and use of land related datasets or marine related datasets, with most SDI initiatives stopping at the land-ward or marine-ward boundary of the coastline, institutionally and/or spatially. Consequently, there is a lack of harmonised and universal access to seamless datasets from marine, coastal and land-based spatial data providers. This leads to the creation of inconsistencies in spatial information policies, data creation, data access, and data integration across the coastal zone.

The extension of a National SDI covering the land and marine environments on a seamless platform would facilitate greater access to more interoperable spatial data and information across the land-marine interface enabling a more integrated and holistic approach to management of the coastal zone.

This project is investigating current land and marine SDI initiatives and concepts at both national and international levels in order to develop seamless information across the coastal zone. This will lead to the determination of characteristics and components for the design of a seamless SDI model. The ultimate aim of this research is to design, develop and test a seamless SDI model that covers land, marine and coastal based spatial information, using a case study approach.

PUBLICATIONS


The twentieth century witnessed the rapid urbanization of the world’s population. The global proportion of urban population has almost quadrupled in last one century. Most cities have very limited resources to provide for the growing demand for services that comes with rapid urbanisation. To meet this challenge, cities have to be organised and managed as efficiently as possible. Public bodies at a local level are responsible for land use / urban planning and development control.

Urban planning process begins with the investigation of prevailing problems by analysing available information. Better information means better problem identification leading to informed decisions and improved urban environment. Urban planning being a multidisciplinary field relies heavily on information regarding land-use, demography, socio-economic and build environment etc. Most of the information needed by urban planner is available with other local departments, but either its contents are different or it is in such a format that it can not be used easily. It means either decisions are made in dark or information is collected and analysed again. All local departments are facing same problem of information crisis. The question arises that why resources are wasted to collect same information again and again when some one has already collected it? It causes not only financial wastage but also time delay. Even certain information like weather can not be collected at later stages when it is required for analysing issues like global warming.

Cities especially in developing countries are faced by two opposite extremes, on one side they possess limited resources and on the other hand these resources are wasted for collecting same information again and again. Spatial Data Infrastructure (SDI) is such an enabling platform which aims to facilitate and coordinate exchange and sharing of spatial information between stakeholders. SDI is a new emerging field and much of research done in field is focused on the role of SDI at national level. This research aims to explore how SDI can facilitate data sharing between different stakeholders at local level especially from urban planning perspectives. It is expected that such a platform will not only reduce data duplication, but will also helpful in information sharing and greater public participation and ultimately informed decision making.

**Publications**


AUTOMATING AND INTEGRATING SPATIAL DATA AND METADATA PROCESS

Staff: Abbas Rajabifard, Ian Williamson, Mohsen Kalantari
Student: Hamed Olfat
Sponsor: ARC Linkage
Status: In progress

The ability to find and access the appropriate information relies on having up-to-date metadata. However, current metadata models and standards are complex and very difficult to handle, often with missing or incomplete metadata. It is also viewed as an overhead and extra cost by organisations. The ability to automatically generate metadata relating to spatial information, and make it available through the Australian SDI will have important benefits not only at an organisational level (with each organisation saving time and money in generating their metadata), but at a national level because it will assist delivery of high quality spatial information and services to vast areas of Australia. This project investigates the importance of having an integrated system for both spatial data and metadata information in which that metadata and spatial data can be integrated within the one spatial dataset, so that when spatial data is updated, metadata related to that data is also automatically updated.

OUTCOME
SDI, Metadata and Updating Tool paper authored by Spatial Metadata Researchers; A/Prof Rajabifard, Dr. Mohsen Kalantari and Mr. Andrew Binns has been accepted for inclusion in the refereed volume to be produced prior to and distributed at the GSDI-11 conference.
**SUBMITTED ARC LINKAGE APPLICATIONS, R2- 2008**

- **ARC Linkage on Spatial Enabled Health**

  This project will develop a new platform for managing health resources spatially. Health professionals will be able to harness the power of spatial technologies for their planning, research and management of health resources. A demonstration system will be developed, integrating the position of health services, population demographics and transport infrastructure. The project will assist in refining the cost effective allocation of health resources and it will aid the development of spatially enabled government more generally. The project will also showcase achievements of the project partners internationally, and facilitate the development of spatially enabled government across Australia.

- **ARC Linkage on National Infrastructure to Manage Land Information**

  In Australia, the range of property interests has exploded. New commodities (water titles, carbon credits, ecoTenders, mortgage based securities and market based instruments) are already being designed and used. Restrictions and regulation of land uses and transactions are piecemeal and lack transparency. Community, government and private sectors increasingly need coherent, timely and NATIONAL land information. Australia’s Torrens registers are strained by these changes. They were designed 150 years ago, before the arrival of spatial technologies. A new, national administration infrastructure using these technologies will update these institutions, while maintaining core processes that support successful land markets.

  The project will translate popular spatial technologies into national business tools to better manage land information for the government, community and private sectors.
Completed PhD Thesis
- Property rights, restrictions and responsibilities: their nature, design and management
- Cadastral Data Modeling - A Tool for e-Land Administration

Seminar, workshops and training programs
- International Seminar on Land Administration Trends and Issues in the Asia and Pacific Region-Malaysia 2008
- SDI governance workshop 2008
- Developing SDI-Training program for national Coordination Agency for Surveys and Mapping (Bakosurtanal), Indonesia 2007
- Modern land administration – Training program for deeds and registration organization of Iran 2007

TRAINING PROGRAM
**COMPLETED PHD THESIS:**

**Property Rights, Restrictions and Responsibilities: their Nature, Design and Management**

**Student:** Rohan Bennet  
**Supervisors:** Ian Williamson, Jude Wallace

This thesis develops the RRR Toolbox and Property Object concept. The RRR Toolbox includes eight components: policy, legal, tenure, institutional, cadastral and registration, spatial and technology, capacity and emerging tools. If a jurisdiction wishes to coherently manage its land rights, restrictions and responsibilities, then each of the eight components needs to be addressed and acted upon. The Property Object is defined as an advanced descriptive framework of the key attributes (objective, action, spatial extent, people impacted, duration) that make up an individual property interest. The property object permits holistic treatment of most current property interests, from ownership down to simple access powers, and also enables meaningful contrast between different interests. Together, the RRR Toolbox and Property Object provide new and innovative perspectives on the research aim. The results of the case studies reveal the hypothesis to be substantially not disproved. Together the concepts help to deliver sustainability objectives. However, this thesis does not claim to fully solve the problem: more work on each of the toolbox components and their implementation in different jurisdictions identified is required.

**Cadastral Data Modelling - A Tool for e-Land Administration**

**Student:** Mohsen Kalantari  
**Supervisors:** Abbas Rajabifard, Ian Williamson, Jude Wallace

Current cadastral data models are, firstly, not sufficiently flexible to incorporate the increasing number of interests and new commodities in land and, secondly, do not facilitate interoperability between different types of cadastral data in order to meet end users' needs. This research proposed that the data model based on the physical land parcel be replaced by a spatially-referenced data model based on the legal property object. The proposed data model is more comprehensive, capable of organizing a wider range of interests, and should facilitate wider exchange of information. The legal property object is open-ended and can include complex commodities and all kinds of rights, restrictions and responsibilities. Spatially referencing these objects facilitates interoperability in land administration system. The proposed data model was successfully developed and implemented with reference to the requirements of the international specifications in spatial domain and global statements in land administration. The model then was assessed against future land administration and effectively responded to its requirements.
INTERNATIONAL SEMINAR ON LAND ADMINISTRATION TRENDS AND ISSUES IN THE ASIA AND PACIFIC REGION

19-20 August 2008 - Kuala Lumpur, Malaysia

As part of the PCGIAP-Working Group 3 Activities

The UN sponsored Permanent Committee on GIS Infrastructure (PCGIAP) together with the Food and Agriculture Organization of the United Nations (FAO), the Malaysian Government, the International Federation of Surveyors (FIG), the Global Spatial Data Infrastructure Association (GSDI) and the Centre for SDIs and Land Administration, University of Melbourne, were organized a two day seminar from 19-20 August 2008 as part of 14th annual meeting of PCGIAP in Kuala Lumpur to discuss land administration issues and possibility of establishing an annual forum under the UN in the Asia and Pacific region. The Seminar was Chaired by Prof Ian Williamson and co-chaired by Associate Professor Abbas Rajabifard.

Over 150 people from 30 countries and 5 international organisations attended the seminar. The objectives of the seminar were:

To share land administration experiences in the Asia and Pacific region with a focus on access to land and security of tenure, the role of land administration in supporting sustainable development, the promotion of effective land markets, poverty reduction, protection of vulnerable groups, e-land administration, land registration, cadastral surveying and mapping.

To discuss the objectives and focus proposed by the Mongolian Round Table with a view to preparing a firm proposal to go to the appropriate UN agencies as well as the PCGIAP. It is planned to have a firm proposal and resolution to be put before the UN Cartographic Conference for Asia and the Pacific in Bangkok in 2009.

The seminar was the result of a desire by many countries in the Asia and the Pacific region to have a forum to discuss and share land administration issues, best practice and experiences in a similar manner to the Working Party on Land Administration (WPLA) for European countries organized by the UN Economic Commission for Europe (UNECE).

The focus of the seminar was developed both by the PCGIAP and a successful international workshop organized by the Mongolian Government titled “Good land administration – its role in economic development” (www.la-east.west.mn), that was also supported by UNDP, UNECE (WPLA), GSDI Association, the International Federation of Surveyors, the Asian Development Bank, German Technical Assistance (GTZ), Eurogeographics and the National Land Survey of Sweden. A Round Table meeting was also held in Mongolia with the above agencies and a number of countries in the region to develop a draft proposal for a regular meeting on Land Administration in the Asia and Pacific region.

As part of the seminar program, there were more than 20 presentations including invited presentations from FAO - Land Tenure Service and UNECE – WPLA and also selected countries from Asia-Pacific that presented. The seminar was conducted in six sessions including an opening session, three invited speaker sessions and a special session on data integration. Each session and presentation followed with a panel discussion. The countries presented were Australia, Cambodia, Fiji, Iran, Laos, Malaysia, Mongolia, New Zealand, Philippines, South Korea, Thailand and Vietnam.

The speakers have been selected based on their understanding of the issues and trends relating to Land Administration in their jurisdiction and they have been asked to address the key challenges or issues facing the development of their cadastre or land administration system.

Seminar Outcomes

The final session of the seminar and a follow-up meeting were used to discuss and finalise seminar outcomes, resolutions and the report to the PCGIAP. In summary, the following items are feedback from the Seminar:

Centre for SDI and Land Administration

Department of Geomatics, The University of Melbourne
Mongolia, Iran, Cambodia, Fiji (on behalf of Pacific Island nations), Australia, Philippines and India expressed strong support from senior land administration officials for the concept of an annual land administration forum.

Iran has offered to host the next land administration forum in 2009 in May (prior to 18th UNRCC-AP Conference in Bangkok in October 2009).

Australia speaking for FIG 2010 has offered to host a Pacific forum and an Asia and Pacific land administration forum.

Australia through Western Australia offered to co-host a WALIS Forum with PCGIAP or host a land administration forum.

Land Administration meetings or forums must be demand driven (provides value and helps solve problems), must pursue cost sharing, focus on specific problems or be thematic.

Be committed to long term. Building a community takes time. Must be sustainable.

Be opportunistic and look for individual funding opportunities.

Collaboration not competition.

A forum must be linked to the UN in some way.

From the issues and challenges presented by speakers and feedback from the Seminar to support the establishment of an annual forum in Asia-Pacific region, the seminar discussed and agreed on the following three resolutions and further agreed to forward this to the PCGIAP meeting for consideration. Following are the resolutions as modified and agreed during the PCGIAP plenary on the 22nd August, 2008.

**Resolutions**

Rename WG3 “Land Administration” with a mandate to consider land administration (land policy, land registration, cadastre, land markets) issues, spatially enabling government and their joint role in supporting sustainable development in the context of SDI.

PCGIAP supports an annual land administration forum and related activities focusing on land administration issues, challenges and implementation in the Asia and Pacific region.

WG3 will facilitate the annual land administration forum and any other related activities and will liaise with the respective agencies in the Asia and Pacific region through WG3 in the pursuit of this objective.

Further information about the Seminar (background document, aims and objectives, seminar outcomes, etc.) and other related materials can be found at the dedicated seminar website [http://www.geom.unimelb.edu.au/research/SDI_research/Integrated/](http://www.geom.unimelb.edu.au/research/SDI_research/Integrated/) or through the PCGIAP-WG3 web page ([www.pcgiap.org](http://www.pcgiap.org)).
**SDI Governance Workshop**

1st August 2008

The aim of the workshop was to elicit from participants the scope, activities current and future challenges of SDI governance that will inform the development of the governance model.

In addition to the research oriented outcomes of the workshop, participants, their agencies and the SDI initiatives as a whole benefited from a clearer understanding of the perceptions and realities of SDI governance together key issues and gaps that may be identified in the workshop reports.

SDIs are based around agreements articulating common approaches to configuring, and sharing geospatial data to meet common goals. Governance comprises the processes, mechanisms and institutions that enable collaborative decision-making, leading to the creation of agreements such as strategies, policies, and standards, underpinning an SDI. Governance is therefore a critical SDI enabler. As SDIs increasingly adopt service oriented architecture (SOA) approaches to sharing data, and as demand for interoperability between SDI initiatives increases, governance will become a more critical and problematic aspect of SDI enablement.

Currently, there is no common understanding of the scope, activities and challenges of SDI governance. In addition, the relationship between SDI governance and the management of SDI capabilities is often unclear. Dependencies on external governance processes such as domain, international or national standards processes are not well understood. This leads to ad hoc governance responses that are incompatible with each other and limit the potential re-use and leveraging of governance agreements and resources.

The objectives of the workshop were to work with participants to:

- To determine the characteristics, scope and nature of the SDI
- To map SDI governance (from participants perspective) covering:
  - the scope (WHAT) of the technical dimension of governance
  - the institutional architecture (WHO) developed to respond to the governance challenges
  - processes mechanisms and tools that are used to implement governance functions (HOW)
  - Key current and future anticipated governance challenges and issues
DEVELOPING SPATIAL DATA INFRASTRUCTURES – TRAINING PROGRAM FOR NATIONAL COORDINATION AGENCY FOR SURVEYS AND MAPPING OF INDONESIA (BAKOSURTANAL) 19-30 Nov 2007

A Spatial Data Infrastructure (SDI) training course was successfully conducted for participants from the National Coordination Agency for Surveys and Mapping of Indonesia from the 19th-30th November 2007 at the University of Melbourne, Australia.

13 participants from Indonesia attended the course, with 14 SDI experts from the Department of Geomatics, industry and government agencies presenting and sharing their knowledge as part of the course. The final course structure and program is attached. Participants were provided with a range of materials relating to the course program, including relevant books associated with the course, papers, session overviews and lab exercises.

The course introduced the concepts, principles, policies, organisational models, design strategies and technology requirements for the development of SDIs. The course discussed technologies and disciplines to facilitate the development of SDIs as an enabling platform, exploring cross-jurisdictional relationships as part of SDIs and related disciplines such as land and marine administration for those participating in and managing SDI implementation. Technical areas including interoperability, web-mapping and web-delivery, metadata issues as well as best practice were also features of the features.

The focus of the course was on problem-solving to increase management capacity for the spatial industry in the context of SDI development. Case studies, lab work and group exercises formed a major part of the course, as well as field trips to organizations within Victoria that are developing SDIs.

At the end of the course, participants gained an understanding of SDI principles and issues; institutional arrangements supporting SDI initiatives; the need for effective and efficient design and development of SDIs; were able to review a variety of technologies for developing and maintaining SDIs; understand and analyse a range of international approaches to SDI development in both developed and developing countries; and modeling, designing and evaluating SDI and other related spatial data initiatives.

A particular feature of the course was the involvement by participants in the development of an SDI Blueprint for Indonesia’s SDI. The major focus of this was on group work to development an SDI Road Map to guide the development of Indonesia’s SDI over the next decade. This Blueprint will be continually worked on and developed by all participants over the coming months in line with Indonesia’s Presidential SDI directive.

The course was successfully completed with the presentation of certificates to participants in order to recognize their achievement over the two weeks of the course.
This course discussed the development of modern land administration systems and the need for an effective and efficient cadastre. This included a review of a variety of concepts, theories and technologies for developing and maintaining such systems, and to understand and analyse a range of approaches to land administration in both developed and developing countries. The concept of land administration and humankind to land relationship, the land administration toolbox, the development of land markets, the cadastral concept and e-land administration were important concepts and principles studied. The focus of the course was on problem-solving and case studies to increase management capacity within Iran’s Deeds and Land Registration Organisation.

110 participants attended and successfully completed the course.
VISITING PROGRAM
**Visiting Program**

The Visiting Program was a successful component of the Centre for the last two years. Through the support from the University of Melbourne, the Centre hosted the visits of the following researchers and scholars in which these visits were mutually beneficial to the research of the Centre and to research partners.

### Visiting Fellows

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Peter Holland</td>
<td>Former President of PCGIAP</td>
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<tr>
<td>Professor Milan Konecny</td>
<td>Former President of ICA, Masaryk University, Czech Republic</td>
</tr>
<tr>
<td>Associate Professor Abdul Rashid Mohamed Shariff</td>
<td>Institute of Advanced Technology, University Putra Malaysia, Malaysia</td>
</tr>
<tr>
<td>Ms Frederika Mella Donker</td>
<td>Delft University of Technology, The Netherlands.</td>
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<tr>
<td>Dr Dozi Ezibalike</td>
<td>Information officer and land information expert, United Nations, Addis Ababa, Ethiopia</td>
</tr>
<tr>
<td>Mr. Lukasz Grus</td>
<td>PhD Student from Wageningen University, The Netherlands.</td>
</tr>
<tr>
<td>Mr. Hamed Olfat</td>
<td>MSc student from Science &amp; Technology University, Iran.</td>
</tr>
</tbody>
</table>
**Contribution to seminars, conferences and meetings**

As part of visiting program, members of the Centre have also contributed to seminars and conferences by participating and presenting centre’s research program achievements.

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Place</th>
<th>Contribution</th>
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<tbody>
<tr>
<td>2nd International Conference on Advances in Space Technologies</td>
<td>29-30 Nov 2008</td>
<td>Islamabad, Pakistan</td>
<td>Presentation</td>
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<tr>
<td>Conference of Canadian Land Registrars</td>
<td>29 Sep to 3 Oct 2008</td>
<td>Quebec, Canada</td>
<td>keynote paper</td>
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<tr>
<td>Seventh International Conference on ASIA GIS</td>
<td>26-27 Sep 2008</td>
<td>Busan, Korea.</td>
<td>Presentation</td>
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<td>14th PCGIAP Meeting (International Seminar on Land Management Trends and Issues in Asia and The Pacific Region), and Map Asia 2008</td>
<td>18-20 Aug 2008</td>
<td>Kuala Lumpur, Malaysia</td>
<td>Vision Paper Presentation Keynote Speaker</td>
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<tr>
<td>INSPIRE Conference 2008, Implementation and Beyond</td>
<td>23-25 Jun 2008</td>
<td>Maribor, Slovenia</td>
<td>Keynote Speaker</td>
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<tr>
<td>11th AGILE Conference on GI Science</td>
<td>5-8 May 2008</td>
<td>Girona, Spain</td>
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<tr>
<td>WALIS International Forum</td>
<td>12-14 Mar 2008</td>
<td>Perth, Australia</td>
<td>Presentation</td>
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<tr>
<td>International Congress on Geomatics and Surveying Engineering, Academy of Culture</td>
<td>18-21 Feb 2008</td>
<td>Valencia, Spain</td>
<td>Presentation</td>
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<td>ISPRS workshop on Geoinformation and Decision Support Systems and 4th GIS Conference</td>
<td>6-7 Jan 2008</td>
<td>Tehran, Iran.</td>
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<td>Hydro2007-Focus on Asia</td>
<td>21-24 Nov 2007</td>
<td>Cairns, Australia</td>
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<td>Coast GIS07</td>
<td>8-10 Oct 2007</td>
<td>Santander, Spain</td>
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<td>International Workshop on Good Land Administration - Its Role in Economic Development,</td>
<td>27-29 Jun 2007</td>
<td>Ulaanbaatar, Mongolia</td>
<td>Keynote Speaker</td>
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<td>International Workshop on &quot;Spatial Enablement of Government and NSDI - Policy Implications</td>
<td>12 Jun 2007</td>
<td>Seoul, Korea</td>
<td>Keynote Speaker</td>
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<td>The national biennial Conference of the Spatial Sciences Institute</td>
<td>14-18 May 2007</td>
<td>Hobart, Australia</td>
<td>Presentation</td>
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Centre for SDI and Land Administration

Department of Geomatics, The University of Melbourne
CONTRIBUTION TO PROFESSIONAL AND SCIENTIFIC ASSOCIATIONS AND SOCIETIES
**CONTRIBUTION TO PROFESSIONAL AND SCIENTIFIC ASSOCIATIONS AND SOCIETIES**

In the last two years the centre has extensively contributed to professional and scientific association both national and internationally.

- President-Elect of GSDI by Associate Professor Rajabifard
- Chair and Vice-Chair of Working Group on Spatial Enabled Government - Permanent Committee on GIS in Asia Pacific (PCGIAP)
- Member - Spatial Data Standards Commission-International Cartography Association-
- Member - Victorian Spatial Council
- Member - Marin SDI Technical Committee- International Hydrography organisation
- Member Editorial Board, Spatial Science Journal
- Editor - GSDI- Asia-Pacific Newsletter
- Scientific Member, GSDI Conferences
- Advisory Member Coordinates Professional magazine
PUBLICATIONS 2007-2008

In between 2007 and 2008 the centre has published 57 publications as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Book</th>
<th>Book Chapter</th>
<th>Journal Paper</th>
<th>Conference Paper</th>
<th>Professional Magazine</th>
<th>Total</th>
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<td>12</td>
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<tr>
<td>2008</td>
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<td>3</td>
<td>8</td>
<td>8</td>
<td>2</td>
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<td>1</td>
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<td>20</td>
<td>3</td>
<td>57</td>
<td>2</td>
</tr>
</tbody>
</table>

(Most Publications are Available Online)


Book

Rajabifard, A. (Eds), 2007, Toward a Spatial Enabled Society, The Centre for Spatial Data Infrastructures and Land Administration, Department of Geomatics, The university of Melbourne, pp 400

A society or a government can be regarded as spatially enabled where location and spatial information are regarded as common goods made available to citizens and businesses to encourage creativity and product development. Spatial enablement uses the concept of place and location to organise information and processes and is now a ubiquitous part of eGovernment and broader government ICT strategies. It is also defined as an innovator and enabler across all society and promoter of eDemocracy and it is rapidly offering new opportunities to government and wider society.

With this background, this book aims to contribute to the understanding of, and address the issues, challenges and requirements in achieving a spatially enabled society. The book has been dedicated to Professor Ian Williamson therefore the book also aims to showcase the work, contribution and dedication in teaching and research of Prof Williamson in the related fields of land administration and SDI, which formed some of the foundation to the concept of spatial enablement. The contributions to this book have come from leaders and researchers who have an interest in spatial enablement and who have worked with Prof Williamson over the past three decades.

This book aims to promote a better understanding of SDI-assessment by providing the concepts, demands and implications of SDI-assessments, a compilation of existing approaches to assess SDIs, and examples in practices in order to assist practitioners to develop more comprehensive and better evaluations that fit the assessment demands. The book is designed to be a professional resource to help build information resource management capacity in the context of SDI-assessment. The contributions to this book have come from leaders and researchers who have an interest in SDI design and assessment.

Book Chapter


Journal Articles


Conference Papers


Vaez, S., Rajabifard, A., Binns, A. & Williamson, I. (2007), Developing a Seamless SDI Model across the Land-Sea Interface, Coast GIS07, 8-10 October Santander, Spain


Centre for SDI and Land Administration

Department of Geomatics, The University of Melbourne


Professional Magazines


Thesis
Cadastral Data Modelling- A Tool for e-Land Administration by Dr. Saeid Mohsen Kalantari Soltanieh, PhD, 2008

Property rights, Restrictions and Responsibilities: their Nature, Design and Management by Dr. Rohan Bennett, PhD, 2008
CENTRE WEBSITE AND BROCHURE
**WEBSITE**

The centre has recently upgraded its website including a new design inline with University of Melbourne policies and search engine for publications. The website presents information about people, skill development program, publications, research project, news and events. The website can be accessed through [http://www.csdila.unimelb.edu.au/](http://www.csdila.unimelb.edu.au/).
**Brochure**

For publishing the centre and promoting new directions within the centre, a new brochure has published. The brochure includes an introduction to centre, its core policy and research, training and visiting programs.