

Spatially Enabled Societies: Asia and the Pacific

Abbas Rajabifard¹, Ian Williamson² and Sheelan Vaez³

¹abbas.r@unimelb.edu.au

²ianpw@unimelb.edu.au

³s.sheikheslamivaez@pgrad.unimelb.edu.au

Centre for SDIs and Land Administration, the University of Melbourne, Australia

1. INTRODUCTION

Spatial enablement is where data, information and related business services with spatial content become ubiquitous in the daily conduct of government agency business in the efficient and effective delivery of services and also in wider society activities. A spatially enabled government (SEG) is one that has ready access to the spatial or geographic or location based information and associated technologies that it requires and is applying these productively to government decision making and service delivery, including developing policy and supporting its own business processes. To do so also requires data and resources to be accessible and accurate, well-maintained and sufficiently reliable for use by the majority of society who are not spatially aware (Rajabifard, 2007).

According to the outcomes of the International Workshop on Spatial Enablement of Government and NSDI, Policy Implications conducted by Permanent Committee for GIS Infrastructure for Asia and the Pacific –Working Group 3 (2007), Seoul, Republic of Korea, Spatial enablement leads to:

- improved decision making;
- reduction of administrative costs;
- whole of government outcomes; and
- enhanced industry development opportunities.

In particular spatial enablement is usually used by a wide cross section of society in a ubiquitous and transparent manner. As a result spatial enablement demands a “whole-of-government” approach. Popular uses of spatial technology involve displaying imagery, and tracking assets and inventory through an increasing array of devices, the most common being the ubiquitous mobile phone. Remarkable as these applications are, spatial technology can be used in even more dynamic ways. Transformational use of spatial technology occurs when it is used to improve business processes of government and the private sector, including equitable taxation, allocation of services, conservation of natural resources, and planning for rational growth (Steudler, 2010). An SDI provides a foundation on which spatial enablement for both government and society can occur.

The Asia and Pacific region is the largest region in the world with a vast area of land and water containing some 60 per cent of the world’s population, and including 56 countries according to the United Nations. The countries span a wide part of the globe from Iran and

Armenia in the West to French Polynesia in the East, from the Russian Federation and Japan in the North to New Zealand in the South.

This region is one of the first regions in the world that started to develop a Spatial Data Infrastructure (SDI) at its regional level. It has a complex social and political environment, typified by competing and often conflicting priorities and motivations. Every case in this region is unique because of its national context, language and characteristics (such as size, population, political systems, social and economic priorities, and varied infrastructures and skills), the national traditional and cultural attitudes, and the people who participate, develop and use SDIs.

With this development and strategy, spatially enable government and society is now part of Asia Pacific plans and intentions. These trends are coupled with institutional and structural reforms in the use of Spatial Information (SI) and SDI as an enabling platform. While SEG increasingly operates in a virtual world, we still have a long way to go.

The development of SEG was a key outcome of the 17th United Nations Cartographic Conference for Asia and the Pacific (UNRCC-AP) and 12th meeting of the UN supported Permanent Committee for GIS Infrastructure for Asia and the Pacific (PCGIAP) in September 2006 in Bangkok, Thailand. This prompted Working Group 3 (formerly Cadastre) of the PCGIAP to refocus its activities on Spatially Enabled Government as part of developing National Spatial Data Infrastructures (NSDI). In conjunction with the GSDI Association, WG3 (Spatially Enabled Government) of the PCGIAP held a dedicated workshop, “Spatial enablement of government and NSDI – policy implications” during the 13th PCGIAP meeting in Seoul, Korea on 12th June 2007.

The development of a SEG has also been highlighted in Australia, with the Australian Government conducting a conference on SEG in August 2007. This chapter presents and summarizes the outcomes of two major events which have been conducted in the Asia-Pacific region regarding spatially enablement and, also the activities of a working group on SEG through WG3 of the PCGIAP. Finally, the chapter outlines the opportunities, issues and challenges involved in the design and development of a SEG.

2. ASIA AND PACIFIC– SPATIALLY ENABLED GOVERNMENT WORKING GROUP

The Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP) is a committee established in 1995 by a United Nations Resolution. Working Group 3 (WG3) of this committee was originally the ‘Cadastre’ working group and was established in 2000 based on a Resolution from the 15th United Nations Regional Cartographic Conference (UNRCC-AP) in Malaysia. As a result of the needs of societies and technological development, the importance and role that large scale spatial information now plays in SDI, and in order to align with this development and to leverage off the achievements of WG3 over the six years period between 2000-2006, WG3 re-named in 2006 “Spatially enabled government” and focused on the development of spatially enabled government. This was a key outcome of the 17th United Nations Cartographic Conference for Asia and the Pacific (UNRCC-AP) and the 12th meeting of the UN supported Permanent Committee for GIS Infrastructure for Asia and the Pacific (PCGIAP) in September 2006 in Bangkok, Thailand. These movements prompted Working Group 3 to refocus its activities on SEG as part of developing national SDI. A new vision and objectives for its future direction and its activities was undertaken, which focused on the concept of spatially enabling government. The work

plan for 2007-2009, included a Spatially Enabling Governments Project to develop a strategy and work plan to assist SEG implementation.

This includes work on:

- Concepts and principles of SEG;
- Design requirements for SEG;
- Issues associated in the development of SEG including: institutional; technical; political and socio-economic dimensions;
- relationship between SDI and land administration (and particularly cadastre) to support SEG;
- Capacity building for SEG.

Furthermore, the 18th UNRCC-AP Resolutions in October 2009 emphasized disaster management as a tangible driver for SEG in the Asia and Pacific region (Scott 2010). The resolution recommended that PCGIAP undertake a study to understand, compare and determine the state of SEG and society, including levels of maturity and governance of SDI, in the region.

3. INTERNATIONAL WORKSHOP ON SPATIALLY ENABLED GOVERNMENT, SEOUL, SOUTH KOREA

As part of the PCGIAP Working Group 3 work plan for 2007-09, an international workshop was conducted on the 12 June 2007 on the 'Spatial Enablement of Government and National SDI-Policy Implications'. The workshop was conducted in Seoul, Republic of Korea as part of the 13th PCGIAP Annual Meeting and in collaboration with the GSDI Association. The workshop was actively supported by the Centre for Spatial Data Infrastructures and Land Administration, the University of Melbourne. Over 120 people from 13 countries and 2 international organisations (GSDI and FIG) attended the workshop.

The objectives of the workshop were:

- To commence dialogue at PCGIAP and better understand and describe spatial enablement of government;
- To gather preliminary data and refine the understanding of data requirements for the PCGIAP WG3 task of facilitating spatial enablement of government; and
- To better understand and describe the legal and economic issues in the development and implementation of SDIs as enabling platforms.

3.1 WORKSHOP OUTCOMES

The workshop addressed the development of SDIs, including legal and economic issues at both a global and regional level to facilitate spatially enabled government and society. Countries including Australia, the Republic of Korea, Malaysia, Singapore and Japan shared their experiences and knowledge of spatial enablement at the Workshop, with consensus on the need to develop a path to spatial enablement of government and society.

The workshop endorsed the concept of SEG as an important tool for governments to improve effectiveness, efficiency, better decision making, business processes, and policy implementation at national, regional and global levels. It highlighted that SEG builds on traditional uses of spatial information in mapping, positioning, asset management, visualization, web enablement, and GIS in supporting economic development and environmental management. Furthermore, it extends it across the whole of government into non-traditional areas such as taxation, health, human services, census, education,

immigration, sustainability accounting, security and emergency response, in a transparent and ubiquitous manner (PCGIAP- WG3, 2007)

SEG can be built at different levels of government (such as local and state/provincial) to support thenational level, all playing an important and integral role in the development of an enabling platform. This includes all institutional, legal, governance, and political arrangements that facilitate the integration of built and natural environmental data together with all related non-spatial data such as demographic and census data to support sustainable development. In simple terms, SEG is about using SDIs to improve the operation and processes of government, and deliver better policy implementation and decision making by extending the use of spatial information to the whole of government and society.

The workshop also recognised SEG as an important part of countries' ICT, e-government and information sharing strategies, and a key activity that fosters innovation. SEG is an evolving concept that requires ongoing research and development by PCGIAP, the GSDI Association and member countries, in order to clarify and expand the principles and applications associated with a concept that involves policy, social, institutional, legal and technical dimensions, and to make the most from the concept. Most importantly however, SEG requires cooperation at all levels of government, from national to lower levels such as states, provinces, counties, municipalities (PCGIAP- WG3, 2007). The implementation of SEG requires:

- an enabling platform comprising institutional, collaborative framework, governance, legal and technical tools for data sharing as part of ICT, e-government and information sharing strategies;building on NSDI and related initiatives;
- using geocodes and “place” related information, such as national geocoded street address files;
- facilitating the use of legal land parcels and legal property objects to better manage all rights, restrictions and responsibilities relating to land;
- development of more holistic data models to integrate separate land administration data silos where they exist;
- maintenance of complete and optimally, continually updated national cadastral maps of legal parcels, properties and legal objects, as part of the NSDI;often re-engineering the institutions of government;legal frameworks to facilitate integration and management;activities on spatial data standards, interoperability and integratability;development of authoritative registers of key spatial information;research and development;growth in capacity at society, institutional and individual levels.

The workshop proposed several recommendations to PCGIAP in regards to the development of SEG. These recommendations were endorsed by PCGIAP in Korea. Due to the importance of the recommendations they were put to the next UNRCC-AP conference in 2009 as follows:

- PCGIAP and the GSDI Association re-endorse Resolution 4 of the 17th UNRCC-AP, Bangkok 2006 with regard to encouraging countries to explore the principles of spatially enabling government as they support the four dimensions of sustainable development: economic, environmental, social and governance.

- PCGIAP endorses the outcomes of the PCGIAP Workshop on “Spatial Enablement of Government and NSDI-Policy Implications” conducted jointly by the Working Group 3 and GSDI Association on the 12 June 2007 as part of the 13th PCGIAP meeting, in Seoul, Korea.
- PCGIAP and the GSDI Association encourage closer collaboration between national mapping/GI organizations and large scale land administration/cadastral/land parcel organizations, as a key aspect in promoting the spatial enablement of government.

WG3 continues to be active in SEG with the details of these activities and work plan found at the PCGIAP website (www.pcgiap.org).

4. SPATIALLY ENABLED GOVERNMENT CONFERENCE, CANBERRA, AUSTRALIA

After the International workshop held in Korea in June 2007, and due to the increased international and national importance being placed on Spatial Enablement, the Australian Government conducted a dedicated conference with more than 200 practitioners and attendees on SEG in Canberra in August 2007. As part of the activities of PCGIAP-WG3 and in line with the objectives of WG3 on SEG, this conference was supported by the Centre for SDIs and Land Administration, the University of Melbourne and chaired by Ian Williamson, the Chair of WG3 (SEG) of PCGIAP.

The Australian Government released its e-Government strategy, “Responsive Government: A New Service Agenda”, in March 2006. In announcing its release, the Special Minister of State, the Hon. Gary Nairn MP, stated that a spatially enabled government was likely to be an important contributor to the e-Government strategic outcome. The purpose of the conference was to highlight the importance of spatial information and promote spatial strategies and information as a vital tool for policy development and public sector decision making. The combination of strategies in the spatial enablement of government and mainstream e-Government are now an emerging trend in Australia and many other parts of the world. Further, the key message from the Conference was that SEG is here to stay and is rapidly offering new opportunities to government and wider society.

As now practiced in Australia, SEG is governed by a whole of government approach at the national and state levels and is increasingly operating in a virtual world. However, there is still a long way to go. Most uses of spatial information still focus on coloured maps, and do not use the full potential of spatial information to re-engineer the activities of government, though SEG is starting to be used to improve business processes in some non-traditional areas. In the next few years it is anticipated Australia will have to re-purpose spatial information to unlock knowledge.

In the context of the conference, spatial enablement uses the concept of place and location to organize information and processes and is now a ubiquitous part of e-Government and broader government ICT strategies. The Conference made it clear that the “where” is precious, and that “place” is a “magic joiner” – a boon in the past, now and in the future. It recognized that SEG promotes innovation. The importance of SEG in Australia is recognized by two initiatives as part of a wider strategy of the On-line and Communications Ministerial Council reporting to the Committee of Australian Governments (COAG) – the National Address Management Framework (NAMF) and the National Information Sharing Strategy (NISS) where the spatial information industry will be used as a test bed.

The public are now used to spatial information being available on-line and on-demand, a need satisfied by the large, private systems such as Google Earth and Maps, Microsoft Virtual Earth and other applications. On the local scene, the key to SEG lies in the Geocoded National Address File (GNAF) produced by Public Sector Mapping Agency (PSMA) Australia. GNAF is a key component of the Australian Spatial Data Infrastructure (ASDI). A good example of the pervasive use of GNAF is that some GPS car navigation systems in Australia can include an accurate and up-to-date cadastral map with accurate property boundaries for all land parcels in Australia (over 10 million parcels) all linked to GNAF, for as little as USD50! As the results of the International workshop in Korea show, spatial enablement needs to build on the development and implementation of spatial data infrastructures, with Australia a world leader in the development and implementation of SDIs.

4.1 ISSUES AND CHALLENGES

The conference discussed the issues and challenges in creating a spatially enabled government and society. Major challenges and issues identified included (Rajabifard, 2007):

- **Broader appeal.** The Spatial Information (SI) community needs to reach a much broader audience;
- **Institutional processes.** Significant inter-jurisdictional issues limiting spatial enablement in Australia with a key risk for implementation being institutional failure;
- **Bandwidth.** Australian limitations on bandwidth;
- **Information policy.** A key challenge lies in capturing historical hard copy spatial data and making it available in digital systems through the Internet;
- **Research and education.** SEG is rapidly evolving and needs strong research and education/training support. For example Korea expends between 25-30% of its USD1.4 billion SEG strategy on research and training;
- **Access issues.** The idea of providing information free or at low cost is now articulated in many countries, particularly the USA and more recently the United Kingdom - the contribution to the economy at large is considered far in excess of the retail price of the information. Moreover, the value of information in spatial systems is now being identified so that its significance as a major institutional asset is more fully recognized. The trend is to move from “on-line” to “on-demand”;
- **Standards.** These are a key enabler and facilitator of partnerships in SEG. Australia’s capacity to develop standards is clear in the work of Australia and New Zealand Land Information Council (ANZLIC) and other organizations. However the issue of metadata remains since it is often not systematically addressed. Most assume that metadata is available, useful and appropriate – this is not necessarily the case;
- **Seamless platform.** There is a growing need to create a seamless SDI model to bridge the gap between the terrestrial and marine environments. The resulting spatially enabled land-marine interface will promote sharing of marine and coastal data and communication between organisations. The improved decisions will be more effective in implementing sustainable development objectives;

- **Licensing.** Issues of licensing and the use of the Creative Commons are part solutions to issues of sharing data. Without these, complexity of current access arrangements to government SI will continue to restrict innovation and SEG;
- **Risk management.** SI is one of the tools to combat tax and welfare fraud because of the ability to organize information in ways that are easily interpreted. On the positive side, spatial systems can help organizations manage their primary risk. The subordinate question of the risks inherent in the information itself, which is far from well managed in Australia, remains. These issues of liability are primarily handled through disclaimers and licence conditions, but need more effective strategies. There are also potential liability issues if SI is available and has not been used to prevent a disaster;

The drivers for spatial enablement were also discussed, with the focus of spatial information needing to be on users, with all strategic decisions in the use of spatial information being user driven with a business focus. While Australia leads in some aspects of spatial enablement, such as use of high integrity geocoded street addresses, it is behind leading international trends in creating an appropriate infrastructure for spatial enablement, and especially in promoting a single authoritative repository for each data set. Information policy, interoperability, access, licensing, standards, capacity and risk management all have unanswered themes.

In line with this, the federal government in Australia through its office of spatial data management (OSDM) has established a new conference known as spatial@gov to address the rapidly increasing demand for information on how spatial capabilities can enhance the ability of governments at all levels to develop policies, deliver services and streamline business processes. The inaugural spatial@gov conference was first initiated in 2009 in Canberra. The conference recognised that efficiencies in government operations and more effective service delivery can be achieved simply by connecting to the 'place' component of government information. This conference is now an annual conference which attracts government and non government spatial data practitioners and stakeholders.

5. CONCLUSION AND FUTURE DIRECTIONS

Spatially enabling government is now part of the objectives of countries in the Asia Pacific region. The key message from the International Workshop, Conference and different initiatives on SEG in the Asia Pacific region is that spatial enablement is here to stay and is rapidly offering new opportunities for government and wider society in the use and development of spatial information. The ability to implement spatial enablement, particularly in relation to Australia, requires a range of activities and processes to be created across all jurisdictional levels. These include:

- an enabling platform comprising institutional, collaborative framework, governance, legal and technical tools for data sharing as part of ICT, e-government and information sharing strategies;
- building on NSDI and related initiatives;
- using geocodes and “place” related information, such as national geocoded street address files;

- facilitating the use of legal land parcels and legal property objects to better manage all rights, restrictions and responsibilities relating to land;
- developing more holistic data models to integrate separate land administration data silos where they exist;
- maintaining complete and continually updated national cadastral maps of legal parcels, properties and legal objects, as part of the NSDI;
- developing improved legal frameworks to facilitate integration and management;
- activities on spatial data standards, interoperability and integratability;
- development of authoritative registers of key spatial information;
- research and development – essential but often over-looked by government in the SEG;
- growth in capacity at societal, institutional and individual levels.

The development of a spatially enabled government and society is ongoing and multi-disciplinary; achieving it will draw on a wide range of experiences and disciplines from surveying and mapping, land administration, GIS, information and communications technology, computer science, legal and public administration and many more disciplines. Jurisdictions will need to work together over the long-term if the vision of a spatially enabled society is to become reality.

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Author/s:

Williamson, IPW; SHEIKHESLAMI VAEZ, A; Rajabifard, AR

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