

Research Report

For

The Land Surveying Division

The Hong Kong Institute of Surveyors

Land Boundary Survey System for the Title

Registration System of Hong Kong

1 October 2007 to 30 September 2008

By

Alice Cheng, Simon Kwok and Dr Conrad Tang

Cadastral Survey Systems in the Asia-Pacific

Introduction

In recent years there has been lots of debate and discussion about the re-engineering and implementing various aspects of the Hong Kong cadastral survey system. The study is to identify the characteristics of a proper cadastral survey system and to compare best practice as a basis for improvement. In this article, three distinctive cadastral survey systems in Australia (using Victoria as a good illustration), Singapore and New Zealand were primarily examined, based on a common template to discuss their similarities and differences in terms of national land policy, laws and regulations, institutional arrangements and spatial technology.

Institutional Framework

Government Organizations

To uphold and provide optimal land resources in support of economic and social development, **Singapore** Land Authority (SLA) and Land Information **New Zealand** (LINZ) are the statutory authorities and leading agencies responsible for administering up-to-date and complete land registers as well as an integrated geo-spatial information system, solely in cadastral records and geodetic networks, relating to land administration and conveyancing purposes. Both survey and title functions have been managed within one government agency.

According to Williamson [2003] and Bennet *et al* [2007], **Australia** maintains land administration offices without any prescribed organizational structure in every state. A range of government departments such as Sustainability and Environment, Planning, Information technology and Land administration shall share the duties of cadastre, land registration, business units for land information and resources and so on lacking an overarching land policy in all states. A consortium of all states and the Commonwealth, known as the Public Sector Mapping Agencies Ltd, prepares national cadastral map products.

In fact, most of the cadastral surveys among three regions are performed by the private sectors. In other words, all departments are heavily involved in confirming their submission qualities. As a result, they govern the rules, measures, guidelines and standards on any matter related to land survey and land registration.

Professional Management

Three organizations shall appoint some key personnel to handle the above issues. The Chief Surveyor, on behalf of either **SLA** chairman or Surveyor-General of Land in **LINZ**, or the Surveyor-General in every **Australian** jurisdiction, is a frontline executive who shall supervise the cadastral system and monitor the standards for the accurate identification of land boundaries undertaken by private surveyors.

The Registrar of Deeds and the Registrar of Titles in **Singapore**, and the Registrar of Titles in **Australia** preside over the registration systems. However, the Registrar General of Land in **New Zealand** is the tenure manager exercising identical duties after the disestablishment of the District Land Registrar and the Assistant Land Registrar in 1998. The daily registration functions are undertaken by other staff operating under delegation from the Registrar.

Legislative and other measures

In reviewing key legislation, the above governments have constantly reviewed legislative amendments to provide a cost-effective and reliable land survey system.

Legal sanction of boundary

In **Singapore**, the recent amendment of *Boundaries and Survey Maps Act (Cap. 25)* clearly states the cadastral survey requirements, so as to ascertain the boundaries and its rights of every land parcel. Subject to the section 4(1),

“4(1): A cadastral survey for any parcel of land shall not be taken to have been completed until –

- The boundaries of the land have been determined by straight lines;
- The physical boundaries of the land have been demarcated by boundary marks or defined by approved coordinates or, ... by reference to floors and walls ...;
- The area of the land has been determined;
- A lot number has been assigned to the land by the Chief Surveyor; and
- A survey plan, showing the location of the land and its boundaries ... has been approved by, and is filed in the office of, the Chief Surveyor [BSMA, 2008a].”

Sections 5(4) and 13(1c) of *Registration of Deeds Act (Cap. 269)* as well as the sections 16(1) and 54(2) of *Land Titles Act (Cap. 157)* also highlight the importance of cadastral survey conducted by every registered surveyor upon registration on any land.

“5(4): Upon the presentation for registration ... the instrument is so presented shall be deemed to have made ... for the land to be surveyed and demarcated under the direction of the Chief Surveyor, ... that person may either make application to the Chief Surveyor for the survey to be carried out by the Government Survey Department ... or directed that a registered surveyor be employed to carry out the survey, or that person may satisfy the Registrar by annexing an assurance plan to the instrument which has been approved by the Chief Surveyor...”

13(1c): No instrument or memorial shall be registered unless the boundaries of all lands affected thereby have been surveyed and demarcated to the satisfaction of the Chief Surveyor or unless ... original instrument presented for registration an assurance plan ... endorsed by the Chief Surveyor to indicate that is has been approved by him with the caution as to the inconclusiveness of its boundaries and dimensions [RDA, 2001].”

16(1): Where any land alienated ... is brought under the provisions of this Act and a folio has been created for the land, the Registrar shall –

- Where the boundaries and dimensions as shown in the plan filed with and approved by the Chief Surveyor are inconclusive, make an entry in the folio to show –
 - That the boundaries and dimensions are inconclusive; and
 - The reference number of the plan; or
- Where the Registrar has entered a caution on the folio created for the land ... when the boundaries and dimensions shown in the plan filed with the Chief Surveyor have been approved as conclusive by the Chief Surveyor.

54(2): ... require the allocation of a new survey lot number by the Chief Surveyor for that part of the land, the instrument lodged for registration shall be accompanied by a plan which will enable the land to be identified with certainty [LTA, 2004].”

Cadastral surveys must be carried out by reference to survey control marks within the coordinated cadastre, which is legally valid as set out under the section 7 of the *Boundaries and Survey Maps Act (Cap. 25)*. As described in section 11C, a private registered surveyor shall deposit a certified plan together with the survey documents to the SLA for inspection upon completion of every cadastral survey. This plan, its boundaries defined by approved coordinates, shall be prima facie proof. Once accepted by Chief Surveyor in section 13, the plan shall be conclusive evidence in all courts. The Chief Surveyor may inquire any submission in case of doubt [BSMA, 2008a].

On the other hand, the earlier *Land Transfer Act 1952* in **New Zealand** furnishes an unambiguous distinction between title boundary and occupation boundary, and indicates a rough plan standard. In accordance with the sections 14(1) and 14(3),

“14(1): Title boundary, in relation to the land, means the boundaries of the land as shown on the certificate of title or Crown grant relative to that land, or on the latest plan of survey approved by the Chief Surveyor of the land district ... Occupation boundary, in relation to the land, means any fence, wall ... or other artificial means, or any natural feature of the land ...

14(3): The boundaries on any such plan of survey shall be drawn as follows:

- where the title boundary of the land ... is the common boundary between that land ..., the plan shall to that extent be drawn in terms of that title boundary ...
- where the occupation boundary of the land ... is outside the title boundary of that land ..., the plan shall to that extent be drawn in terms of the title boundary ... [LTA, 1952]”

Besides, LINZ approves a survey plan with required standards of accuracy illustrated under the section 167(1) and the record itself becomes the prima facie evidence (Section 215A).

“167(1): ... the Registrar is of the opinion that a plan complying with the regulations is not warranted ... he may require ... to deposit as aforesaid such other plan as the Registrar, after consultation with the Chief Surveyor under the Survey Act for the land district in which the land is situated, considers is sufficient to define the land in relationship to existing surveys made ... [LTA, 1952]”

Despite that, the section 3 of the *Cadastral Survey Act 2002* identifies how to carry out cadastral surveys under the supervision of licensed cadastral surveyors. It also sets out the requirements and accuracies to be achieved, leaving it to the surveyor to decide the methodology to use. It foreshadows the provision of cadastral survey dataset in lieu of usual paper survey plans.

With reference to the section 6(1) of *Survey Co-ordination Act 1958*, every survey officer or licensed surveyor shall be responsible for any surveys tied to the same datum, which is subject to the satisfaction of the Surveyor-General in every **Australian** federated state.

“6(1): ... the Surveyor-General may be writing addressed to the proper officer of any department or public authority require to relation to any survey ... that –

- a. such survey shall be connected to an existing local or general survey or based upon a specified datum as to levels or otherwise;
- b. the surveyor carrying out such survey shall cause permanent marks ... as the Surveyor-General directs and also that such survey shall be connected with any permanent mark or marks already established [SCA, 1958].”

Every survey plan, after the approval of the Surveyor-General, shall be registered in the Central Plan Office pursuant to these sections 6(2), 8 and 12 of *Survey Co-ordination Act 1958*. Particularly in the sections 6 (1c and 3) of this Act and the

sections 15(2) and 95(2) of *Transfer of Land Act 1958*, they lay down standards of measurement and prescribed accuracy just like diagrams of permanent marks, date of survey, surveyor certification etc. in the light of the *Surveying Act 2004*.

“6(2): The proper officer ... shall cause the survey to be carried out and plans prepared and forwarded in accordance with any such requisition of the Surveyor-General and ... lodged in the Central Plan Office.

8(1): The Surveyor-General after due enquiry shall cause to be entered in a register in the Central Plan Office which shall be called the Central Plan Register and which shall in the prescribed form.

8(2): Where it appears to the Surveyor-General that any registered plan ... to be lodged in the Central Plan Office

12(5): ... plans of every standard or local traverse established ... shall be entered in the Central Plan Register and a copy ... shall be forwarded by the Surveyor-General to the Commonwealth survey authority immediately upon the completion ... [SCA, 1958].”

“6(1c): The original or a true copy of any plan ... showing the date of the survey and certified by the surveyor ... together with a separate sketch plan ... showing the position any permanent marks ... shall be forwarded to the Surveyor-General immediately after the completion of such plans [SCA, 1958].

15(2): An application (survey conversion scheme) must be in the prescribed form and the applicant must lodge with the application – a plan of survey of the land (with an abstract of field records) certified by a licensed surveyor or any other plan, diagram or document describing the land ...

95(2): All surveys required by the Registrar and ... all plans lodged under this Division shall be made and certified by a licensed surveyor and, subject to the requirements of the *Surveying Act 2004*, shall comply with any requirements of the Registrar [TLA, 1958].”

According to the sections 27D (1) and 41 of *Transfer of Land Act 1958*, every folio of the Register certified and signed by the Registrar is conclusive proof in any proceedings.

“41 Certificate to be conclusive evidence of title

Every folio of the Register shall be received in all courts as evidence ..., and shall be conclusive evidence ..., the land described in the folio is possessed of that estate or interest or has that power [TLA, 1958].”

Power of entry

A number of survey statutes similarly enacted among **three regions** have a limited right of entry for surveyors in the performance of surveying services. Under the section 11A of the *Boundary and Survey Maps Act (Cap. 25)*, the section 53 of the *Cadastral Survey Act 2002*, the section 58 of the *Surveying Act 2004* and the section 14 of the *Survey Co-ordination Act 1958*, every surveyor with his/her assistants, authorized by the Chief Surveyor or Surveyor-General, may enter upon and pass over any private lands at reasonable times. A sufficient prior notice together with the necessary identification document should be produced and presented to the occupier. A written consent signed by the occupier is necessary for entry to the premises. Certainly every occupier may share the social responsibility in doing so.

“11(A)(1): ... the Chief Surveyor may authorize, ... any registered surveyor who has in force a practicing certificate or any assistant employed by the registered surveyor –

- To enter and re-enter any land, seabed, foreshore or building at any reasonable time ... with such equipment as may be reasonably necessary to conduct the survey or to install the boundary mark or survey control mark.

11(A)(3): Any person exercising any power under subsection (1) shall produce evidence of his identity and authority to exercise those powers if practicable, on first

entering the land or premises; and whenever subsequently reasonably requested to do so [BSMA, 2008a].

53(1): A cadastral surveyor ... may for the purpose of conducting a cadastral survey or the installation of a survey mark,

- Enter and re-enter any land ... with or without any assistants ... that are reasonably necessary for the conduct of the cadastral survey or to install the survey marks; and
- On any land, do all things necessary or required of him or her for the proper conduct of the cadastral survey or the installation of the survey mark [CSA, 2008].

58(2): A licensed surveyor ... may, during ordinary working hours ... after giving reasonable notice to the occupier of the land, enter land and do on the land all acts, including the placing of survey pegs or survey marks ... for the purposes of a cadastral survey.

58(3): A licensed surveyor ... may not exercise ... if he or she fails to produce, on request, for inspection by the occupier of the land the identity card issued to the licensed surveyor or identification ...

58(4): A person may not enter a residence unless the occupier of the residence –

- has consented in writing to the entry; and
- is given a copy of the signed consent immediately.

58(5): If a written consent is not produced to the court, it must be presumed, until the contrary is proved, that the occupier of residence did not consent to the entry [SA, 2004].

14: Power to Surveyor-General to carry out surveys

The Surveyor General may at any time cause to be carried out any survey ... necessary or expedient ... and may establish upon the area surveyed such permanent marks ... necessary and a record of the plan every such survey shall be entered in the Central Plan Register [SCA, 1958a].”

Aside from that, it gives a circumstantial regime of trespass consent to exercise those powers in case of access denied. According to Cadastral Survey Circular No. 5/2005 in [Singapore](#), the surveyor should not force his way to the premises and take the subsequent actions.

- “(i) He should seek the help of the owner who engages him to conduct the cadastral survey to speak to the occupant/owner who has denied his entry;
- (ii) if the entry is again denied, the registered surveyor should ask the owner who engages him for the cadastral survey to request his solicitor to serve a notice to the occupant ... ;
- (iii) if the entry is still denied, he should tell the occupant to call the Manager in the Survey Services, SLA who is in charge of the zone to confirm the need ... ;
- (iv) if all the above efforts fail, the registered surveyor, ... should seek a Court Order ... [SLA, 2005].”

Professional Licensing

The [Singaporean Land Surveyor Act](#) (Cap. 156) is to set up the Land Surveyors Board for the registration of land surveyors, maintenance of annual registers for practitioners and licensees, and regulating the qualifications and practice of land surveyors for engaging survey services, particularly said in both sections 15 and 17. Specification and procedures are spelt out in the Directive on Survey Services under the *Land Surveyors (Conduct of Cadastral Surveys) Rules 2001*, such as general field practice, survey and demarcation, required precision, plan specification, and so on.

The independent Cadastral Surveyors Licensing Board in **New Zealand** is established for the issue and regular renewal of cadastral surveyor licences in reference to the section 11 of *Cadastral Survey Act 2002*. The Board may also require other evidence of competency, like participation in a CPD activity. *Surveyor General's Rules for Cadastral Survey 2002* are made pursuant to the sections 7 and 49(1) of the Act. These rules stipulate the conduct of cadastral surveys and the competency standards.

Victoria had insufficient professional surveyors to service needs for over a hundred years [Enemark *et al*, 2005]. The Surveyors Registration Board in every province is founded under the *Surveying Act 2004*. It keeps a reliable register for licensed surveyors in the sections 7 and 15, investigates the professional conduct of licensed surveyors, and fosters the continuing education and training of licensed surveyors in the section 18. *Surveying (Cadastral Surveys) Regulations 2005*, *Survey Co-ordination Regulations 2004* and Surveyor-General's Practice Directives come into operation for audit of diversified surveys in conjunction with the relevant legislation. In some cases, penalty will be given to those who fail to obligate the rules.

According to the *Mutual Recognition Act 1993*, surveyors registered by the Surveyor's Board in any States of Australia and New Zealand can apply for registration in any other states subject to a reciprocity agreement.

Registration and its searches

Generally speaking, the *Land Titles Act (Cap. 157)*, the *Land Titles (Strata) Act (Cap. 158)*, the *Registration of Deeds Act (Cap. 269)* cater the registration of all transactions relating to land and strata units in **Singapore**.

- “29(1): The Registrar shall create a folio for any land by making a record of –
- A description of the land and of the estate or interest ... ;
 - A description of the proprietor ... as the Registrar thinks fit; and
 - Such particulars ... of other estates or interests, if any, affecting the land; and other information, if any, that relates to the land or any estate or interest therein and is included in that record ... [LTA, 2004].
- 4: All instruments affecting land may be registered.
- ... all assurances executed or made, ... before or after 30th November 1998 by which any land within Singapore is affected and which have not been registered under any repealed enactment, may be registered ... and unless so registered shall not be admissible in any court as evidence of title to such land [RDA, 2001].”

Bennion *et al* [2005, p.38] reported the earlier deeds system in **New Zealand** was initiated by passing of the *Deeds Registration Ordinance 1841*, but it is still in force. The *Land Registry Act 1860* had failed to introduce the Torrens system. The later *1870 Act* was firmly enacted to initiate the titles that the majority of leased land should be subject to the Land Transfer system. Several consolidations have been made dating from the 1870s, and the provisions of the existing Act are the *Land Transfer Act 1952*, which has operated very effectively with little modification. As referred to the section 34,

- “34: Every grant and certificate of title shall be deemed and taken to be registered under the provisions and for the purposes of this Act so soon as the same have been

marked by the Registrar with the folium and volume as embodied in the register. Every memorandum of transfer or other instrument purporting to transfer or in any way to affect land under the provisions of this Act shall be deemed to be so registered so soon as a memorial thereof as hereinafter described has been entered in the register upon the folium constituted by the existing grant or certificate of title of the land [LTA, 1952].”

The *Transfer of Land Act 1958* in the Commonwealth of **Australia** is to simplify to the title to and the dealing with estates and land interests. Sections 26F and 27 illustrate a folio of land register and its requirement. A certificate of title will be issued under the section 27B.

“26F(1): Any person with or claiming an interest in land ... may lodge with the Registrar a notice in an appropriate approved form together with an instrument or document showing evidence of that person’s interest in that land.

26F(2): The Registrar may record on an identified folio for land –

- (a) an interest in that land for which evidence is given ... ; or
- (b) any matter, notice or document relating to that land in respect of which the Registrar is directed, ... to make a recording in or amendment to the Register

27(6): A folio of the Register ... contain the recordings that are required or authorized to be made in the Register ... and ... include a distinctive identifying reference ... and ... contain recordings ... that the Registrar thinks appropriate ... and ... describe any land by reference to a separate map or plan in the Office of Titles and so much of a separate map or plan as relates to the land in the folio is deemed to form part of the folio in which it is described.

27(7): The Registrar creates a folio of the Register by making a recording of a description of the land ... and except in the case of an identified folio, a description of the proprietor ... of the land ... any by allocating a distinctive identifying reference to those recordings [TLA, 1958b].”

In recent years, effects on the automation and modernization of registry practice have faced towards some significant reforms both in New Zealand and Australia, which were steadily implemented by the *Land Transfer (Automation) Amendment Act 1998*, the *Land Transfer (Computer Registers and Electronic Lodgement) Amendment Act 2002* and the *Transfer of Land Act 1958* correspondingly. These legislations enable the Registrar General of Land or Registrar of Titles to create computer registers for land held under the Act and such instruments are to be compiled and maintained in the electronic lodgement network. They lead to improve the efficiency of land title functions and procedures, and to provide the evidentiary effect of the registers.

Integration of Cadastral Survey System

Geodetic services

Three regions tended to revamp a complete coverage of geodetic control networks as a basis of land boundary support. They have renewed their former survey frameworks with advanced GPS technology quickly at a minimal cost.

As collaborated with the Nanyang Technological University, **SLA** has renovated a more complete and secure coordinated cadastre namely SVY21 survey system in August 2004, to supersede the old one. The ground control allows all lots to be geographically tied to each other and to the whole of Singapore. Two types of ground controls are available to support SVY21: the Integrated Survey Network (ISN) and

Precise Levelling Benchmarks (PLBM). The former is a horizontal control network of approximately 70 primary and 4,000 secondary control points, whereas the latter comprises 600 vertical marks along main roads.

LINZ has developed the national survey control system known as PositionNZ, which enables user to determine points about a few centimetres in relation to the New Zealand Geodetic Datum 2000 (NZGD2000). It is a high order GPS active control network to supplement 31 control marks horizontally and vertically over the majority of the country. Geodetic control marks are assigned orders from 0 to 5, while cadastral survey marks are assigned orders 6 or 7.

The **Victorian** GPS base stations were established in 1995 and a comprehensive geodetic strategy was implemented between 1998 and 2001. Where coordinate information is required in support of documentation to be lodged with either Land Registry or the Surveyor-General, it is in terms of GDA94 (AMG66) datum in cadastral surveys commenced after (before) July 2005. An online database of Survey Marks Enquiry Service is introduced, for which any user can search the current information of about 110,000 permanent survey marks (PM) and 34,000 primary cadastral marks (PCM).

Cadastral services

Singapore has more than 130,000 land parcels delineated in terms of coordinated cadastre method, instead of 'bearing-and-distance' measurement. In the past, cadastral records like First Series Sheets, Second Series Sheets, and Resurvey Sheets were internal office records kept and only used by the government. Today, SLA maintains three types of maps and plans in electronic media. They are Cadastral Maps, Registrar of Title Plans and Certified Plans respectively.

1. Cadastral Maps: a total of 1600 maps (600 x 900 m each) prepared covering the entire area, define legal boundaries of whole lot, subdivided lot or amalgamation of lots, under the provisions of the *Boundaries and Survey Map Act (Cap. 25)*;
2. Registrar of Title Plans: a survey plan shows provisional boundaries of subterranean lot, airspace lot, reclaimed land and foreshore structure, prepared by registered surveyor;
3. Certified Plans: a final survey plan depicts the accurate measurement of the boundaries of the land/property, area, lot number, boundary marks and the approved coordinates.

Apart from this, SLA also establishes the Land Data Hub which contributes the wealth of accurate and invaluable geo-spatial information exchange across government agency networks. The hub has three main components, namely Land Information Network Infrastructure (LandNet), Integrated Land Information Service (INLIS) and Land Base Information.

1. LandNet is a high-speed network efficiently connecting various agencies' geographical databases.
2. INLIS is an internet record search service particularly designed for the general public to obtain plans and/or its textual information conveniently. If the information is inaccessible online, a manual search is available at the Registry.
3. Land Base information is the storage of basic map base features.

It offers a crucial and invisible link for data dissemination from data originators to end-users, which is proven to be beneficial to the public and private sectors. SLA will continue to work closely with the survey industry to further utilize the above for other applications. For instance, State Property Information Online (SPIO) and LandQuery are extensively used by over a hundred government agencies.

LINZ governs the cadastre with its records mainly for the accurate identification of boundaries of freehold and leasehold, Maori land and Crown land. Until 2000 to improve the growing community demand for service delivery, a massive conversion project was virtually commenced to integrate and automate the title registration and cadastral survey approval functions into a single national register via the Landonline. Indeed, it is a well-designed and manageable infrastructure which provides the following electronic services such as e-search, e-survey and e-dealing, so as to fulfill the key components of a cadastre. In addition to this, it offers territorial authorities to any online survey plan certification.

1. e-search: an essential and common search service to the titles register, cadastral survey datasets and survey plans in imaged format and so on, without any spatial data support;
2. e-survey: other than all the functionality of e-search plus, a direct and interactive online service designed to assist private surveyor in the preparation of new surveys, serving for cadastral data retrieval, dataset creation, plan production, submission pre-validation and approval; and
3. e-dealing: a user-friendly process to register and lodge all instruments relating to conveyancing.

Comprising more than 10.2 million parcels in all **Australian** states and territories, the present seamless cadastral database (DCDB) named as 'Cadastral Lite' is designed to support legal land parcel identification of public and private rights. It is a parcel-oriented system which portrays all digitized parcels related to the registered titles with plan numbers and unique identifiers. Such land boundaries inside the cadastral maps are either fixed (90%) by legal measurements or general (10%) based on natural or man-made physical features [Williamson, 2003]. Nevertheless, these systems vary between each state and are graphically represented with slight differences.

Quoting Victoria as an example, Vicmap Property became the first comprehensive cadastral layer in the state, via the internet on the Land and Survey Spatial Information (LASSI). It was developed by hand digitized base maps at scales 1:2000 – 4000 in urban areas and 1:10000 – 50000 in rural areas, providing accessibility from the broader perspective of land and utilities management and spatial analysis. Both government agencies and private parties update cadastral content regularly.

On the other hand, the State and territory governments are involved in the development of the Australian Spatial Data Infrastructure (ASDI). The major collections of spatial information available across Australia can be easily accessed online via the Australian Spatial Data Directory (ASDD), under the auspices of the Spatial Information Council for Australia and New Zealand (ANZLIC). Williamson [2003] agreed that such pivotal coordination advocates various spatial data dissemination among a wide range of organizations in the public and private sectors.

No matter in **the above** countries, all are welcome to inspect, search the public records or apply any certified copies for court evidences shown in the land registers upon prescribed payment. For instance, LINZ offers title searching service in two regional processing centres. Those clients who have registered through licensing agreements can securely access the computer registers and relevant records over the internet.

Land Registration services

Three regions have mainly operated analogous systems to give security and certainty of title. They also tend to alter the existing paper records into an automatic strategy.

Starting from 1993, land registration has intended to gradually convert from deeds to titles in **Singapore**. Nowadays, there are two systems of land registration (Common law and Torrens) co-existing. These two registers are the Register of Deeds and the Land Titles Register respectively. As the conveyance of deeds land is in the form of huge volumes and labour intensive, the Land Titles Registry deals with the registration of property transactions into titles. Thereafter, the Registrar will either issue a certificate of title to land parcels or subsidiary strata certificates of title to strata units. With effect from 2006, all documents relating to the land interests have been mandatory submitted over the internet in an electronic land registration and public search system called as the Singapore Titles Automated Registration System (STARS). With the move to e-Lodgment, it leads to savings in cost and time for the preparation of legal documentation.

The Torrens system had been in operation in **LINZ** close to a century. Before the introduction of the Landonline, New Zealand is divided the whole territory into 12 Land Registration Districts. Millions of titles and the relevant details under this traditional burgeoning paper-based storage system were manually updated and this separate Land Transfer register could be searched from the designated branch office. With the advent of Landonline, it enables dealings to be captured in images and freely processed by any registry office staff for online registration.

Electronic conveyancing (EC) and registration services to the society are significant government reforms in **Australia**. To settle and lodge any land dealings, the current EC Release 3.1 brings the major functions of property transfer and related mortgage activities into the world of e-commerce, with enhancements of reporting, invoicing and caveats [Williamson, 2003].

1. e-Lodge: completion and signing of transaction instruments for lodgement, calculation and payment of duty and other fees for transactions; and
2. e-Settle: financial settlement of transactions and lodgement of instruments with the Registrar.

The corresponding ownership titles are securely recorded and daily updated in both computerized land register and the DCDB in each state or territory.

The following table gives some basic facts of these countries (Table 1).

		Singapore	New Zealand	Australia
1	Institution	Singapore Land Authority (SLA)	Land Information New Zealand (LINZ)	Sustainability & Environment, Planning, Information Technology, Land Administration Departments share the duties in

				all states
	Key Personnel	Survey: Chief Surveyor; Registration: Registrar of Deeds and Registrar of Titles	Survey: Chief Surveyor; Registration: Registrar General of Land	Survey: Surveyor General; Registration: Registrar of Titles
2	Land Registration	Deeds (<1%) and Titles (99%) system registered under STARS	Titles system registered under Landonline	99% legally registered and surveyed, other legally occupied but not registered or surveyed [Rajabifard <i>et al</i> , 2006]
	Its Legislation	Registration of Deeds Act (Cap. 269), Land Titles Act (Cap. 157), Land Titles (Strata) Act (Cap. 158)	Deeds Registration Ordinance 1841, Land Transfer Act 1952, Land Transfer (Automation) Amendment Act 1998, Land Transfer (Computer Registers and Electronic Lodgement) Amendment Act 2002	Transfer of Land Act 1958
3	Cadastral rules and regulations	Directive on Survey Services	Surveyor General's Rules for Cadastral Survey 2002	Survey Coordination Regulations 2004, Surveying (Cadastral Surveys) Regulations 2005, Surveyor-General's Practice Directives
	Its Legislation	Boundaries and Survey Maps Act (Cap. 25)	Cadastral Survey Act 2002	Survey Coordination Act 1958, Surveying Act 2004
4	Licensing	Land Surveyor Board under the provisions of Land Surveyors Act (Cap. 156)	Cadastral Surveyors Licensing Board under the provisions of Cadastral Survey Act 2002	Surveyors Registration Board under the provisions of Surveying Act 2004, Mutual Recognition Act 1993
5	Significant Improvement	Implementation of Coordinated Cadastre, Establishment of Land Data Hub, and other applications SPIO, LandQuery, etc.	Establishment of Landonline, including e-search, e-survey, and e-dealing	Establishment of Cadastral Lite, Australian Spatial Data Directory, and Electronic Conveyancing (e-Lodge & e-Settle)

Table 1 A summary of Cadastral Survey Systems in Australia, Singapore and New Zealand.

Impact of Technology

As mentioned earlier, both Australia and New Zealand have ubiquitously launched authoritative one-stop e-delivery platforms on a nationwide basis – Landonline and iLand Vision.

When data are the most expensive component of any DCDB, it is a parcel based cadastral hub agreed by Bevin and Haanen [2002], in relation to the spatial and observational data, and to the various interests, forms of ownership and attributes. Here are some advantages summarized as below [Bevin, 2002; Williamson, 2003; Williamson and Wallace, 2006]:

1. Accessibility: Users are easy to remote access the land records via Internet and Wireless Application Protocol (WAP) technologies. These converted records are highly readable. Therefore, extra time is no longer spent on result searching or deciphering such old and worn documents.
2. Security: To safeguard and securely protect the system, LINZ backups on a regular basis against threats to the integrity of the land information.
3. Diversity: To make more alternatives on clients' customization, some built-in functions are developing just like preservation of historical and updated title documents, etc.
4. Simplification: All instruments relating to land are directly processed and finally

current documents with live materials are only presented, so that users can simply obtain the latest information available.

Conclusion

With the enactment of the Land Titles Ordinance (LTO, Cap. 585) since 2004, Hong Kong gradually transits from the existing deeds system to titles. Section 94 of LTO empowers the Director of Lands to determine whole lot boundaries by owner's application; it only applies to new lots but not leased lands under the Land Registration Ordinance (LRO, Cap. 128). Comments and feedbacks are going to be sought from the concerned parties for the proposal of determination of land boundaries under the Land Survey Ordinance (LSO, Cap. 473), such as boundary re-establishment, lots with insufficient documentation, right of entry, etc.

To assist land transactions and provide protection to Hong Kong people's rights to land and boundaries, the above targeted systems give an insight on identifying best practice within nations of the same socio-economic standing. To boost the industry and the public through the development of advanced technology, an e-enabled comprehensive cadastral database connected to the land registration function becomes a key strategy to reduce the level of Government involvement and automate cadastral processing and approval. Surveyors will be able to more effectively uphold and demonstrate their professionalism and competence with quality surveys.

References:

1. BENNET, R., WALLACE, J., WILLIAMSON, I.P. (2007) "A Toolbox for mapping and managing new interests over land." <http://www.anzlic.org.au/> Accessed dated 14 October 2009.
2. BENNION, T., BROWN, D., THOMAS, R., TOOMEY, E. (2005). *New Zealand Land Law*, Brookers Ltd.: Wellington.
3. BEVIN, T. (2002). "e-Survey and Title in New Zealand – Landonline", *Proceedings of Joint AURISA and Institution of Surveyors Conference*, Adelaide, South Australia, 25-30 November 2002.
4. BEVIN, T., HAANEN, A. (2002). "Reforms in the Regulation of Surveying in New Zealand", *FIG XXII International Congress*, Washington D.C., USA, 19-26 April 2002.
5. BEVIN, T., HAANEN, A., SUTHERLAND, N. (2002). "e-Cadastre – Automation of the New Zealand Survey System", *FIG XXII International Congress*, Washington D.C., USA, 19-26 April 2002.
6. BINNS, A., RAJABIFARD, A., WILLIAMSON, I. (n.d.) "International Case Study Development and Data Integration Activities in Australia". <http://www.anzlic.org.au/> Access dated 14 October 2009.
7. ENEMARK, S., WILLIAMSON, I., WALLACE, J. [2005] "Building Modern Land Administration Systems in Developed Economies". <http://www.anzlic.org.au/> Access dated 14 October 2009.
8. MINISTRY OF LAW, SINGAPORE (2001). *Registration of Deeds Act (Cap. 269)*, Revised, Singapore Statues Online. <https://statues.agc.gov.sg/non-version/html/homepage.html>. Access dated 1 August 2009.
9. MINISTRY OF LAW, SINGAPORE (2004). *Land Titles Act (Cap. 157)*, Revised, Singapore Statues Online. <https://statues.agc.gov.sg/non-version/html/homepage.html>. Access dated 1 August 2009.
10. MINISTRY OF LAW, SINGAPORE (2006). *Singapore Land Authority Act (Cap.*

- 301), Revised, Singapore Statues Online. <https://statues.agc.gov.sg/non-version/html/homepage.html>. Access dated 1 August 2009.
11. MINISTRY OF LAW, SINGAPORE (2008a). *Boundaries and Survey Maps Act (Cap. 25)*, Revised, Singapore Statues Online. <https://statues.agc.gov.sg/non-version/html/homepage.html>. Access dated 1 August 2009.
 12. MINISTRY OF LAW, SINGAPORE (2008b). *Land Surveyors Act (Cap. 156)*, Revised, Singapore Statues Online. <https://statues.agc.gov.sg/non-version/html/homepage.html>. Access dated 1 August 2009.
 13. PARLIAMENTARY COUNSEL OFFICE, NEW ZEALAND (1952). *Land Transfer Act 1952*, New Zealand Legislation. <http://www.legislation.govt.nz/>. Access dated 19 August 2009.
 14. PARLIAMENTARY COUNSEL OFFICE, NEW ZEALAND (1963). *Land Transfer Amendment Act 1963*, New Zealand Legislation. <http://www.legislation.govt.nz/>. Access dated 19 August 2009.
 15. PARLIAMENTARY COUNSEL OFFICE, NEW ZEALAND (2002). *Cadastral Survey Act 2002*, New Zealand Legislation. <http://www.legislation.govt.nz/>. Access dated 19 August 2009.
 16. RAJABIFARD, A., BINNS, A., WILLIAMSON, I., STEUDLER, D. (2006) “A Template for Assessing Worldwide Cadastral Systems as Part of National SDI Initiatives”. <http://www.anzlic.org.au/>. Access dated 14 October 2009.
 17. SINGAPORE LAND AUTHORITY, (2005). *Cadastral Survey Circular No. 5/2005*, Singapore.
 18. SINGAPORE LAND AUTHORITY, (2008). *Singapore Land Authority Annual Report*, Singapore.
 19. TAN, S. Y. (2001). *Principles of Singapore Land Law*, 2nd edition, Butterworths Asia: Singapore, Malaysia, Hong Kong.
 20. THE OFFICE OF THE CHIEF PARLIAMENT COUNSEL, VICTORIA, AUSTRALIA, (1958a). *Survey Co-ordination Act 1958*, Revised, Victorian Legislation and Parliamentary Documents. <http://www.legislation.vic.gov.au>. Access dated 14 October 2009.
 21. THE OFFICE OF THE CHIEF PARLIAMENT COUNSEL, VICTORIA, AUSTRALIA, (1958b). *Transfer of Land Act 1958*, Revised, Victorian Legislation and Parliamentary Documents. <http://www.legislation.vic.gov.au>. Access dated 14 October 2009.
 22. THE OFFICE OF THE CHIEF PARLIAMENT COUNSEL, VICTORIA, AUSTRALIA, (1988). *Subdivision Act 1988*, Revised, Victorian Legislation and Parliamentary Documents. <http://www.legislation.vic.gov.au>. Access dated 14 October 2009.
 23. THE OFFICE OF THE CHIEF PARLIAMENT COUNSEL, VICTORIA, AUSTRALIA, (2004). *Surveying Act 2004*, Revised, Victorian Legislation and Parliamentary Documents. <http://www.legislation.vic.gov.au>. Access dated 14 October 2009.
 24. WILLIAMSON, I. P. (2003). *Country Report 2003 - Australia*, PCGIAP – Cadastral Template 2003, Australia.
 25. WILLIAMSON, I.P., WALLACE, J. (2006) “Spatially Enabling Governments: A new direction for land administration systems”, *FIG Congress XXIII – Shaping the Change Proceedings*, Munich, Germany, 8-13 October 2006.