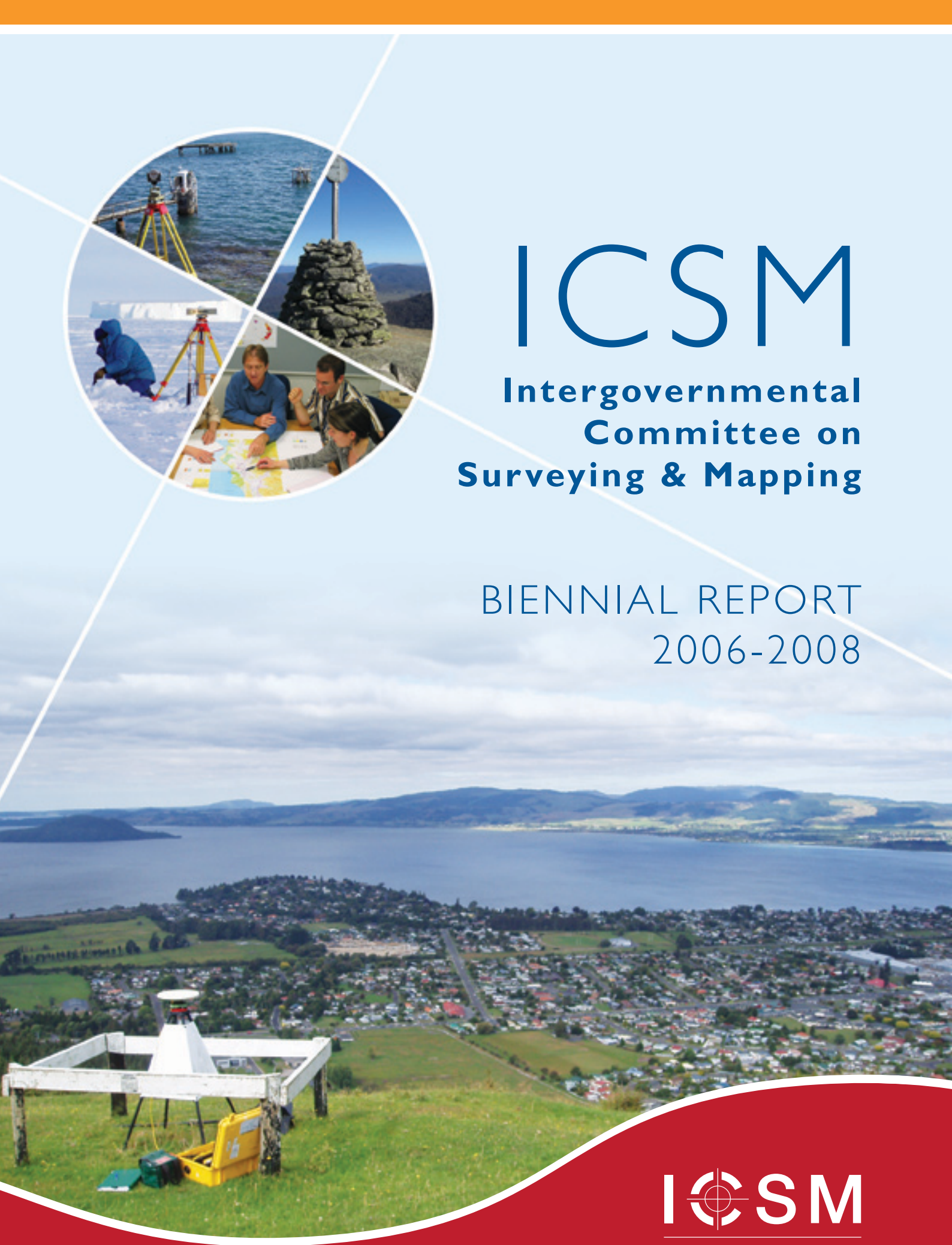
ICSM

Intergovernmental Committee on Surveying & Mapping

BIENNIAL REPORT 2006-2008



ICSM
INTERGOVERNMENTAL COMMITTEE ON
SURVEYING & MAPPING

ICSM

Intergovernmental Committee on Surveying & Mapping

BIENNIAL REPORT 2006-2008

FOREWORD

The Intergovernmental Committee on Surveying and Mapping (ICSM) has continued to provide leadership to the Australian and New Zealand spatial community for data standards, fundamental framework datasets and international relations over the reporting period from 1 July 2006 to 30 June 2008.

The strength of ICSM lays in its permanent committees and working groups, membership of which not only reflects the representative jurisdictions but also the wealth of diverse talent and dedication to excellence that exists across our spatial community and it is to these members that I reserve my deepest thanks.

This biennial report covers a wide range of significant activities and achievements, some of the more notable that reflect this diversity being:

- Reinvigoration of the vision for the Australian Spatial Data Infrastructure on behalf of ANZLIC _ the Spatial Information Council, confirming support for the concept of Spatially Enabling Australia and leading to ANZLIC developing a more dynamic and evolving framework for spatial information and service provision for the future.
- The publishing of the internationally compliant next-generation version of the harmonized data model, a collaboration between the Data Framework Technical Sub Committee and CSIRO.
- Completion of the Native Title national data model, dictionary and associated guidelines designed to contribute 'certainty' to the identification and exchange of information on native title rights and interests.
- Development of ePlan, a national cadastral data transfer standard for electronic lodgment of digital cadastral data, from data model to practical implementation.
- National and international involvement and recognition through the ongoing work of the Permanent Committee on Geographic Names of Australia, Permanent Committee on Tides and Mean Sea Level and support for the 2010 FIG Sydney Conference.
- Significant involvement in improving national geodetic infrastructure through ICSM and jurisdictional support of the AuScope initiative.
- Efficiencies and cost benefits under the National Topographic Information Coordination Initiative through ongoing collaboration between ICSM member jurisdictions.
- Formation of the Elevation Special Interest Group to provide technical support for the National Elevation Data Framework and publishing the ICSM Guidelines for Digital Elevation Data for elevation data capture and processing.
- Creation of the popular Fundamentals of Mapping web package.

I would like to thank all ICSM members who have ably contributed during my term and in particular to out going Chairman, Ian O'Donnell for his enthusiasm for initiatives in all things mapping and recognition for the part he played in the All-Hazards Symbology report that received the 2007 Victorian Spatial Excellence Award.

Thanks must also go to our untiring Executive Officer, Susie Salisbury, for her ability to support the committee and its working groups across an ever divergent range of technical issues. To the incoming Chairman, Russell Priebbenow, all the best for the future of ICSM as it continues to support the spatial enablement of Australia and New Zealand.

Garry West
Chairman
1 July 2006 – 30 June 2008

CONTENTS

ABOUT ICSM




OUR VISION

World best national land and sea bed spatial data infrastructure providing sustainable benefits for Australians and New Zealanders.

ICSM
INTERGOVERNMENTAL COMMITTEE ON SURVEYING & MAPPING

WHO ARE WE

ICSM was established by the Australian Prime Minister, State Premiers and the Chief Minister of the Northern Territory in 1988. A prior body, the National Mapping Council (NMC), coordinated Australian mapping programs from 1945 to 1988. New Zealand joined ICSM in 1997.

ICSM is made up of representatives from New Zealnad, Australia's Commonwealth, State and Territory surveying, mapping and hydrographic charting agencies. It is a key coordinating body in Australia and New Zealand for surveying and mapping issues.

ANZLIC
the Spatial Information Council

In 2003 ICSM was accepted as a Standing Committee of ANZLIC – the Spatial Information Council [for Australia and New Zealand].

ICSM provides a mechanism to establish protocols and technical standards for spatial databases and infrastructure on a national basis. It also provides a forum that enables the exchange of information and ideas, a means to benchmark and identify best practice and influence the implementation of modern approaches to surveying, mapping and charting.

The Committee is made up of representatives from eleven different Jurisdictions:

National

- Australia – civilian
- Australia – military (terrestrial and marine)
- New Zealand

Australian State/Territory

- Australian Capital Territory
- New South Wales
- Northern Territory
- Queensland
- South Australia
- Tasmania
- Victoria
- Western Australia

The Committee meets twice a year. A Chairman is appointed from the Committee every two years.

The Executive Officer (EO) of ICSM delivers (1) secretariat support to the Committee, (2) project support to the committees and working groups and (3) maintains the ICSM website. During this reporting period, the Secretariat was provided by the Geoscience Australia's National Mapping and Information Group.

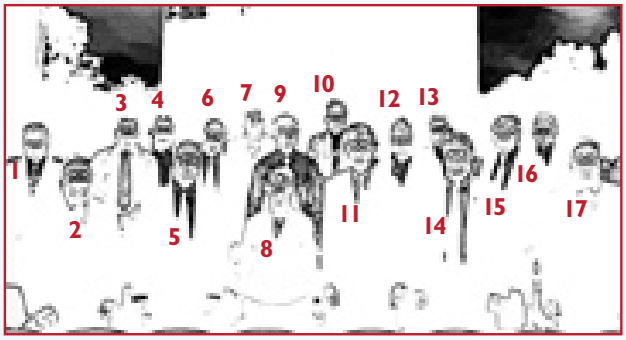
ICSM committees and working groups provide expert advice, carry out research, as well as develop and conduct ICSM projects.

OUR ROLE

ICSM's role is to provide leadership, coordination and standards for surveying, mapping/charting, and assembling and maintaining national data sets, including:

- cadastral
- geodetic
- geographical names
- street addressing
- tides and sea level
- topographic

ICSM's coverage includes both land and sea.



Delegates to the ICSM meeting in Adelaide, 2008

1. Chris Body (Aust.), 2. Garry West (NT), 3. Greg Scott (Aust.), 4. Gary Johnston (Aust.), 5. Russell Priebbenow (Qld), 6. John Tulloch (Vic.), 7. Jasbir Randhawa (Aust.), 8. Susie Salisbury (ICSM), 9. Bill Hirst (ACT), 10. Dave Mole (NZ), 11. Peter Murphy (Tas.), 12. Don Grant (NZ), 13. John Gallagher (Vic.), 14. Barry Cribb (WA), 15. Peter Kentish (SA), 16. David Boyle (Vic.), 17. Paul Harcombe (NSW)

See ICSM Members Section for information about individual ICSM members and their agencies.

ICSM WILL

- Continue to provide a sponsorship role within the context of the Australian Spatial Data Infrastructure (ASDI) initiative with respect to geodesy, cadastral surveying, topography, hydrography and place names.
- Develop strategic direction for the provision and integration of spatial data of national significance.
- Develop and publish best practice guidelines, national technical policies, standards, specifications and data models particularly for geodesy, cadastral surveying, topography, hydrography, place names, street addresses and native title.
- Share knowledge, experiences and expertise.
- Communicate and develop relationships with key stakeholders in Government, industry and the user community.
- Foster a cooperation and coordination ethos on inter-jurisdictional projects.
- Encourage a consistent approach to jurisdictional policies, standards, programs and priorities.
- Promote data integration.
- Provide technical advice and support to other coordinating bodies.
- Encourage and sponsor research.
- Facilitate the involvement of industry in ICSM activities.
- Maintain international liaison.

ICSM maintains a 5-year Strategic Plan which is reviewed biennially with the appointment of each new Chairman. The current plan can be viewed at **http://www.icsm.gov.au/icsm/about/strategic.html**.

OUR WORK 2006-2008

ICSM uses a sub-committee system to undertake the majority of its work. Membership of these Working Groups is usually, but not essentially, drawn from the same Jurisdictions as the ICSM Committee members. A key component of our work is expanding the communication and increasing understanding of different agencies work practices and capabilities.

In June 2008 there were eleven Committees / Working Groups with a total membership of approximately 150 different people.

Permanent Committees

These are Working Groups that have been formed to undertake long-term coordination, development, maintenance and communication of important spatially related issues.

In June 2008 these were:

- Cadastral Reform (PCCR)
- Data Framework (DFTSC)
- Geodesy (GTSC)
- Geographic Place Names (CGNA)
- Tides & Mean Sea Level (PCTMSL)
- Topographic Information (PCTI)

In 2007, in recognition of the importance and on-going significance of the DFTSC's work relating to data harmonisation, ICSM agreed that it should become a Permanent Committee. Previously it had been regarded as a Temporary Working Group and therefore likely to be disbanded in the foreseeable future.

Temporary Working Groups

These are Working Groups which are formed to undertake nationally focused short term projects that can take several years to complete.

In June 2008 these were:

- Australian Spatial Data Infrastructure (ASDI)
- eLodgement of Survey Plans (ePlan)

Disbanded during 2006-2008 were:

- Native Title (NTWG)
- Tidal Interface (TIWG)

Special Interest Working Groups

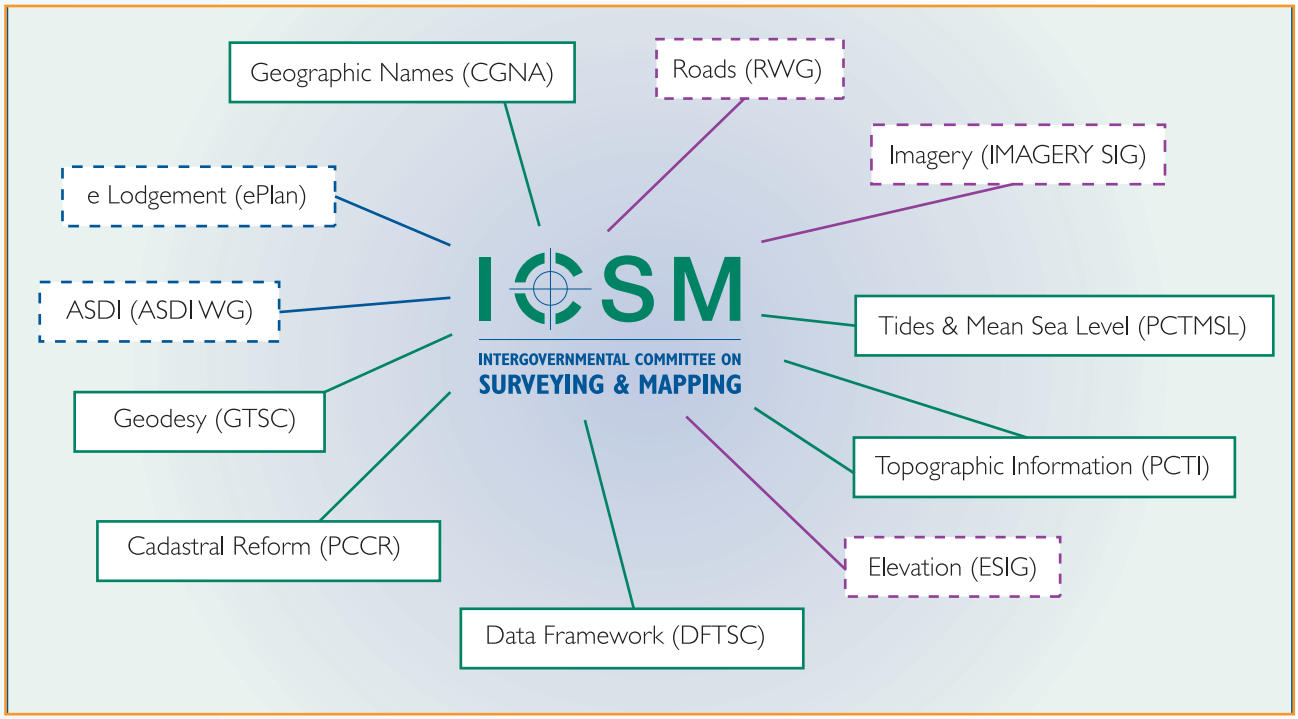
These Groups are usually short duration, with a very precise Terms of Reference and time frames. They are usually formed under the auspices of a Permanent Committee. In the case of the three Special Interest Groups that existed in June 2008 the sponsoring committee is the Permanent Committee on Topographic Information (PCTI).

In June 2008 these were:

- Elevation (ESIG)
- Imagery (IMAGERY SIG)
- Roads (RWG)

Disbanded during 2006-2008 was:

- All-Hazards Symbology (AHS)



ICSM Working Groups, June 2008

ICSM Special Projects

During 2006-08 ICSM was heavily committed to supporting the XXIV FIG (the International Federation of Surveyors) International Congress which is to be held in Sydney, 11-15 April, 2010: (**http://www.fig2010.com/**).

Being awarded this Congress is a major achievement by the Institution of Surveyors Australia.

This Congress will be the largest international surveying event in the region in 2010 and will attract around 2000 surveyors from over 100 countries. The theme of the Congress is *"Facing the Challenges; Building the Capacity"* and will be the highlight of the four year term of office of the current FIG Council and Commissions.

The four plenary sessions will focus on the hot issues of the global agenda and of the broad survey profession: namely the big challenges – climate change, disaster risk management and good land governance; spatially enabled society; and different aspects of the technological futures.

The Congress will have a full professional programme consisting of more than 80 technical and poster sessions, several workshops, pre-congress seminars, and special forums.

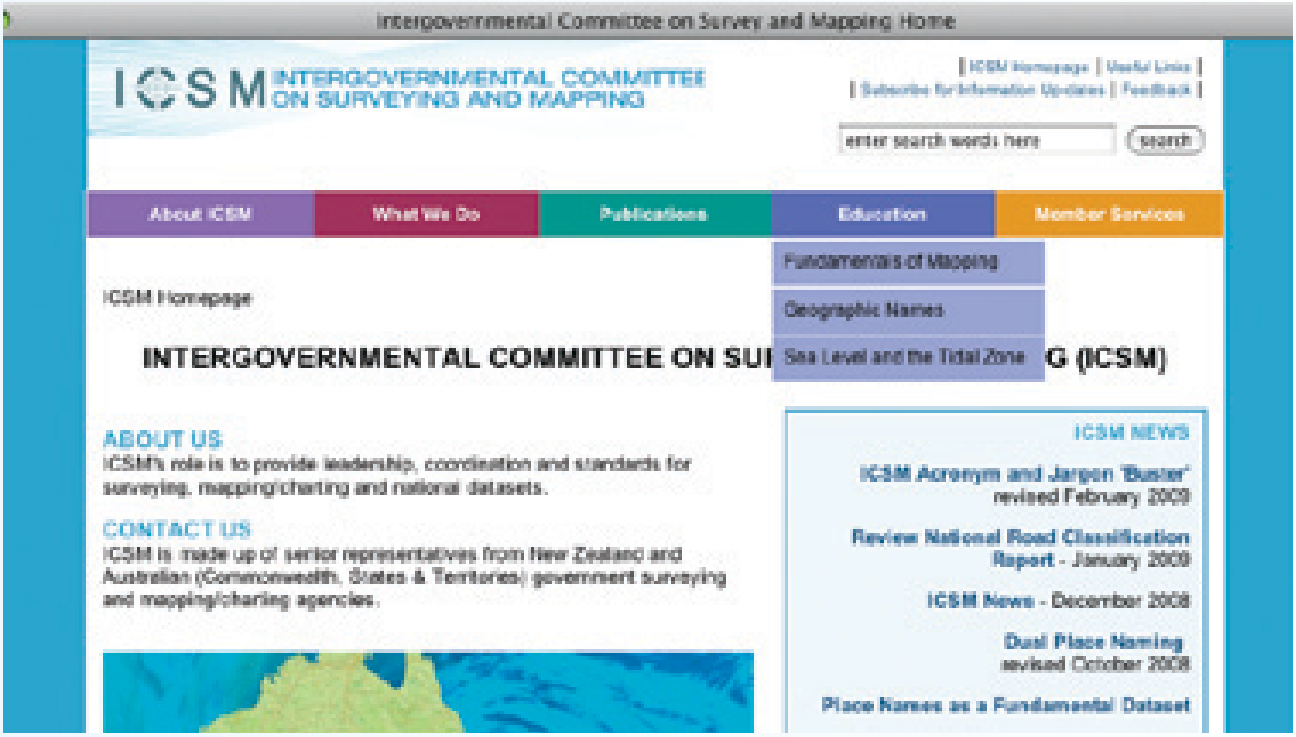
As part of a concerted effort to promote the FIG 2010 Congress a group of Australian spatial industry companies and associations, together with government agencies agreed to sponsor a promotional stand which was badged as *Australia – Team Spatial to INTERGEO in Munich, 2006*. INTERGEO is the largest geo-information trade exhibit in Europe, attracting over 20,000 participants.

ICSM and ANZLIC participated in the stand which showcased Australian expertise, products and services. ICSM also sponsored a number of Young Ambassadors to attend Congresses in Munich (2006) and Stockholm (2008). Their enthusiasm was a feature of the Australian presence at both Congresses.

Australia – Team Spatial stand at Munich

centre, Paul Harcombe (FIG Sydney 2010 Director) and, left to right, Young Ambassadors: Venessa O'Connell (ISNSW), Chris McAlister (ISAQ), Lauren Mills (PSMA) and Barbara Howlett (SCVB)

OUR WEBSITE



The primary tool that ICSM uses to publicise its work; and to promote growth and understanding in the spatial industry is its website: **http://www.icsm.gov.au/**

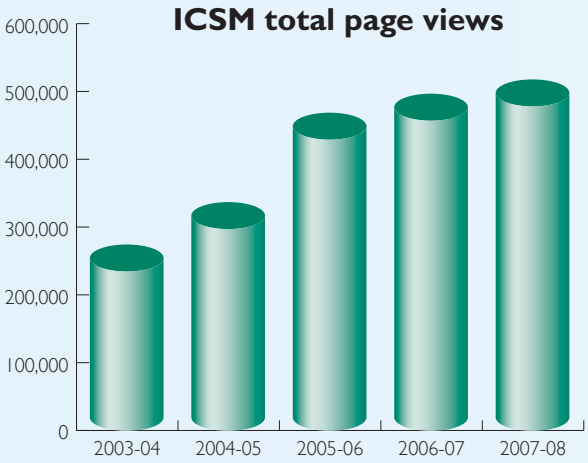
Significant developments during 2006-2008 include:

- **new resources:**
  - Fundamentals of Mapping package
  - All-Hazards Symbology Gap Analyses Report
  - Report on Active GPS and Survey Marks
  - Report on the Accuracy of Tidal Predictions
  - Report Assessing the Feasibility of a National Road Classification System
  - Spatially Enabling Australia – two Reports
  - Committee on Geographical Names in Australasia Place Names Brochure
  - ICSM Acronyms and Jargon Buster
- **up-dating of existing resources:**
  - Topographic Map Index
  - Gazetteer of Australia
  - Standards and Practices for Control Surveys – ICSM Special Publication 1
  - Australian Tides Manual – ICSM Special Publication 9
  - Geocentric Datum of Australia, Technical Manual
  - Geographical Names of Australia teaching package
  - Harmonised Data Model
- **totally redesigning** the website to make discovery of material easier
- **additions hyperlinks** to externally hosted gazetteers:
  - Gazetteer of Australia
  - Maritime Gazetteer of Australia
  - Australian Antarctic Gazetteer

A Five Year Record of Growth

Since its' creation in 2002 the ICSM website has continued to grow.

The site has seen massive increases in content and this is reflected in the growth in the usage rates shown in these graphs.



Information in Different Locations

ICSM has material on three separate websites and the usage pattern between them is markedly different.

ICSM: http://www.icsm.gov.au/

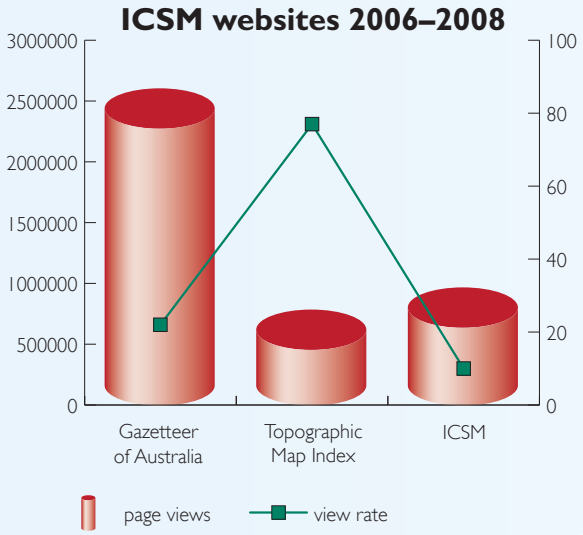
Our home website has over 400 . html pages and over 500 . pdf documents. In 2006-2008 it had over one hundred thousand unique visitors who on average viewed eleven pages.

The Gazetteer of Australia: http://www.ga.gov.au/map/names/

This gazetteer was created from CGNA State/ Territory geographic names databases. As a result it is a summary of geographic names for the whole of names databases. It is a summary of geographic names for the whole of Australia and it is hosted on the Geoscience Australia website. It the two years 2006-08 it had a similar number of unique visitors as the ICSM site, but they had twice as many page views.

Topographic Map Index http://mapconnect.ga.gov.au/ICSM/imf.jsp?site=ICSM

This index was created from PCTI State/ Territory topographic map indexes. It is a consolidated reference for Australian topographic maps greater than or equal to 1:25,000 scale. Because of this it has a more technical clientele who each viewed a staggering 80 pages over the two year period. This is hosted as part of MapConnect on the Geoscience Australia website.



ICSM's 2006-08 Most Popular Pages

***GDA Technical Manual*, http://www.icsm.gov.au/icsm/gda/gdatm/gdav2.3.pdf**

The document is designed to explain all facets of the new Geocentric Datum of Australia (GDA). It provides complete formulae and worked examples.

***Standards and Practice for Control Surveys*, http://www.icsm.gov.au/icsm/publications/sp1/sp1v1-7.pdf**

The document provides clear standards of accuracy for control surveys and outlines some techniques that can be employed to attain the required accuracy standards.

***All Hazards Symbology*, http://www.icsm.gov.au/icsm/all-hazards/index.html**

A series of documents which make-up a gap analysis of symbols used by Australian and New Zealand emergency services agencies – a first step in establishing an Australasian All-Hazards Symbol library.

***Australian Tides Manual*, http://www.icsm.gov.au/icsm/tides/SP9/index.html**

A web enabled package which provides operating procedures to be followed at tide gauges on the Australian National Network – ie those gauges that provide data for tide predictions at ports.

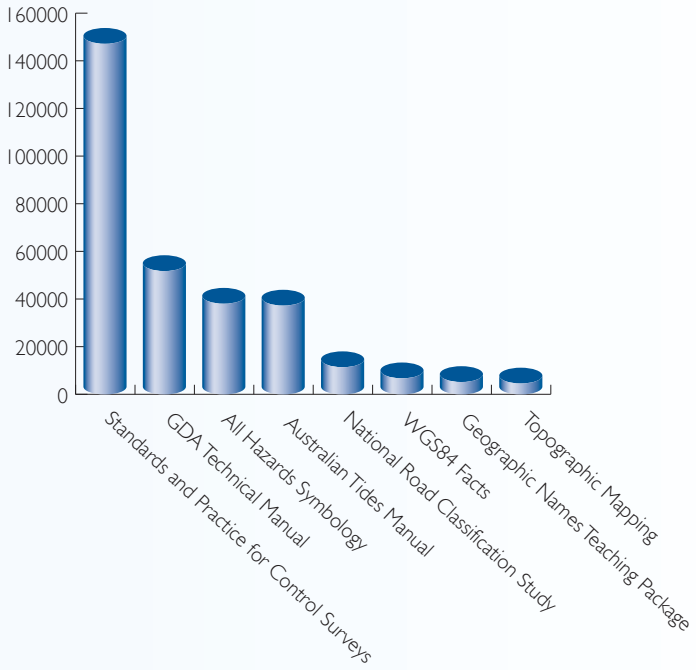
***National Road Classification Study*, http://www.icsm.gov.au/icsm/roads/index.html**

The document which assesses the issues associated with developing a nationally consistent road classification and attribution scheme.

***WGS84 Facts*, http://www.icsm.gov.au/icsm/gda/wgs84fact.pdf**

A document which explains the difference between the World Geodetic System 1984 (WGS84 or WGS) and the Geocentric Datum of Australia 1994 (GDA94 or GDA) and is designed as an information guide for spatial information specialists.

ICSM's most popular pages



***Geographic Names Teaching Package*, http://www.icsm.gov.au/icsm/cgna/lesson/index.html**

A web enabled package which provides educational material relating to Geographic Names.

***Topographic Mapping*, http://www.icsm.gov.au/icsm/topo/index.html**

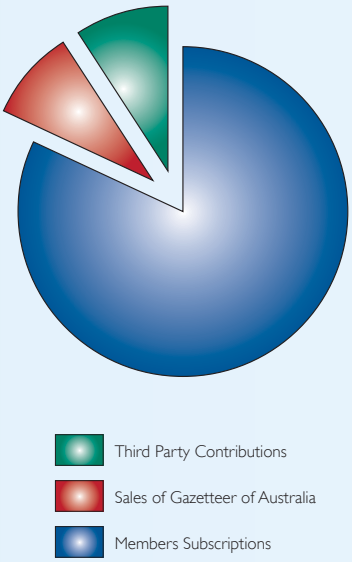
A series of documents relating to topographic mapping – including symbol libraries and data dictionaries.

Members Services

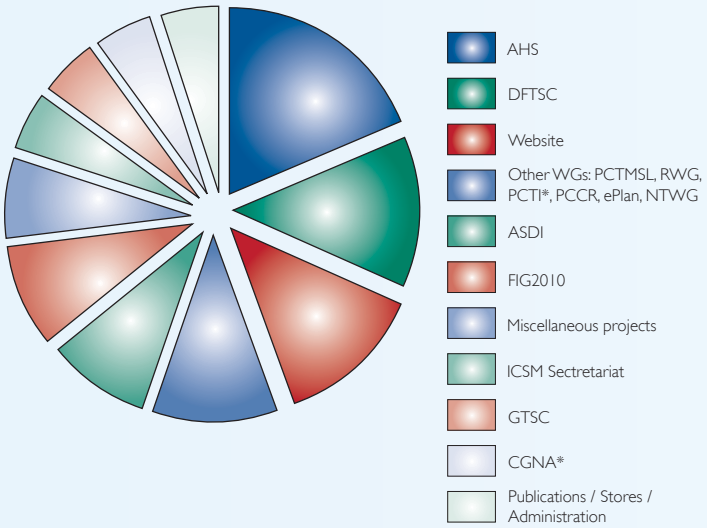
Finally, and not listed in these statistics is the ICSM Members Service section of the ICSM website. Each Working Group has a private website that they use to exchange documents and share 'discussions'. This is a vitally important tool for ICSM's work.

FINANCING OUR WORK – 2006-2008

Income ($246,220 ex-GST)



Expenditure ($316,181 ex-GST)



* excludes funding for CGNA and PCTI web based packages which are accounted for as part of Website development.

ICSM WORKING GROUP REPORTS




Permanent Committees

Temporary Working Groups

Special Interest Groups

PERMANENT COMMITTEE ON CADASTRAL REFORM (PCCR)

http://www.icsm.gov.au/icsm/cadastral/index.html

Chairman

Peter Murphy
Director Geospatial Information
Surveyor-General
Department of Primary Industries and Water
HOBART TASMANIA

About PCCR

The Permanent Committee on Cadastral Reform (PCCR) was established in 1999 to provide a leadership role in advising ICSM on cadastral reform matters, raise awareness of the cadastre and the benefits of cadastral reform to the spatial industry and the community. Its role is to develop a coordinated approach to cadastral reform that incorporates the participation of all stakeholders, including other peak government and industry groups.

Terms of Reference

1. To recommend leadership initiatives to ICSM relevant to future cadastral reform
2. To advise on initiatives to raise the awareness of industry & the community of the benefits of the cadastre & cadastral reform initiatives
3. To develop preferred models for the coordination of cadastral reform that incorporate the participation of all stakeholders, including other peak government & industry groups
4. To identify / develop 'best practice' standards & guidelines for cadastral activities that are relevant to ICSM

Activities during 2006-2008

The current focus for PCCR is to facilitate the development of concepts for incorporating Rights, Restrictions and Responsibilities in complex situations – including marine and three-dimensional (3D) cadastres.

The concepts for 3D cadastres will make particular reference to strata titles.

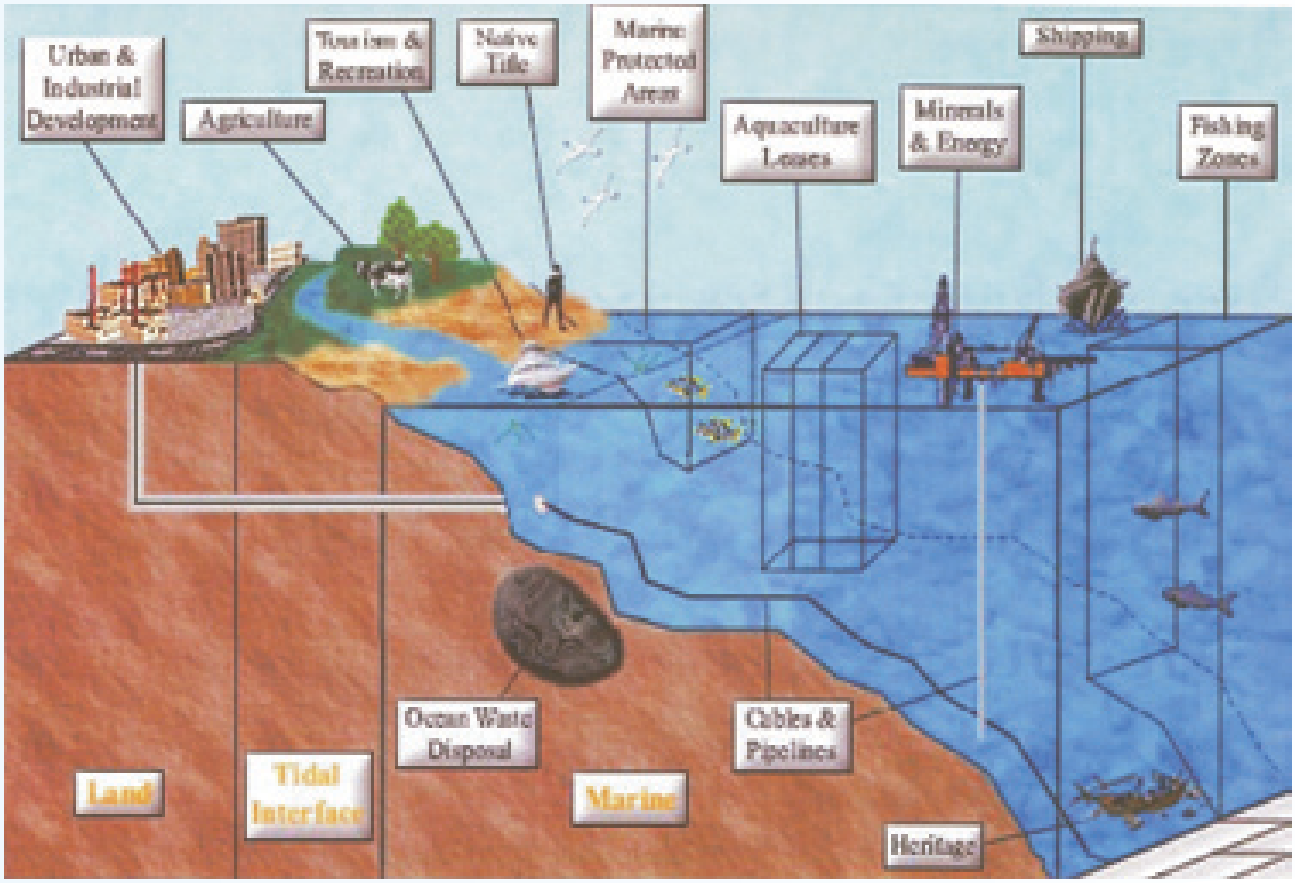
To gauge current thinking and mechanisms for 3D cadastres a survey of PCCR jurisdictions was conducted in mid-2006. A paper was subsequently developed to summarise the general themes and issues at that time. In early 2008 PCCR also held a two day work-shop to review existing cadastral systems. The report from this, titled *Strengths and Weaknesses of Cadastral Systems* is published on the ICSM website at **http://www.icsm.gov.au/icsm/publications/cadastral/cadastral_systems_review.pdf**.

This workshop confirmed the common issues in the definition of Rights, Restrictions and Responsibilities and the increasing importance and need for a 3D spatial cadastre. It proposed:

1. Establishing a working group to deal with 3D cadastral matters including strata titles, and
2. Considering the implications of differentiation between a 'Spatial Cadastre' and the DCDB.

As a result of this PCCR is developing a brief for a consultancy to provide a more detailed overview of the concepts, principles and philosophy appropriate to Australia/New Zealand for the development of 3D spatial cadastres. This should ultimately support:

- Best practice guidelines and standards for the technical aspects of a 3D cadastre including surveying standards; and
- An extension/enhancement to the ICSM HDM cadastral theme incorporating the 3D component and a reference implementation framework.



DATA FRAMEWORK TECHNICAL SUB-COMMITTEE (DFTSC)

http://www.icsm.gov.au/icsm/harmonised_data_model/index.html

Chairman

Chris Body
Geoscience Australia
SYMONSTON ACT

About DFTSC

The Data Framework Technical Sub-Committee was established in November 2001 following the disbanding of the Harmonisation Working Group. Its role is to manage the maintenance, implementation and further development of the Harmonised Data Model (HDM).

In 2007, in recognition of the importance and on-going significance of the DFTSC's work, ICSM agreed that the DFTSC should become a Permanent Committee.

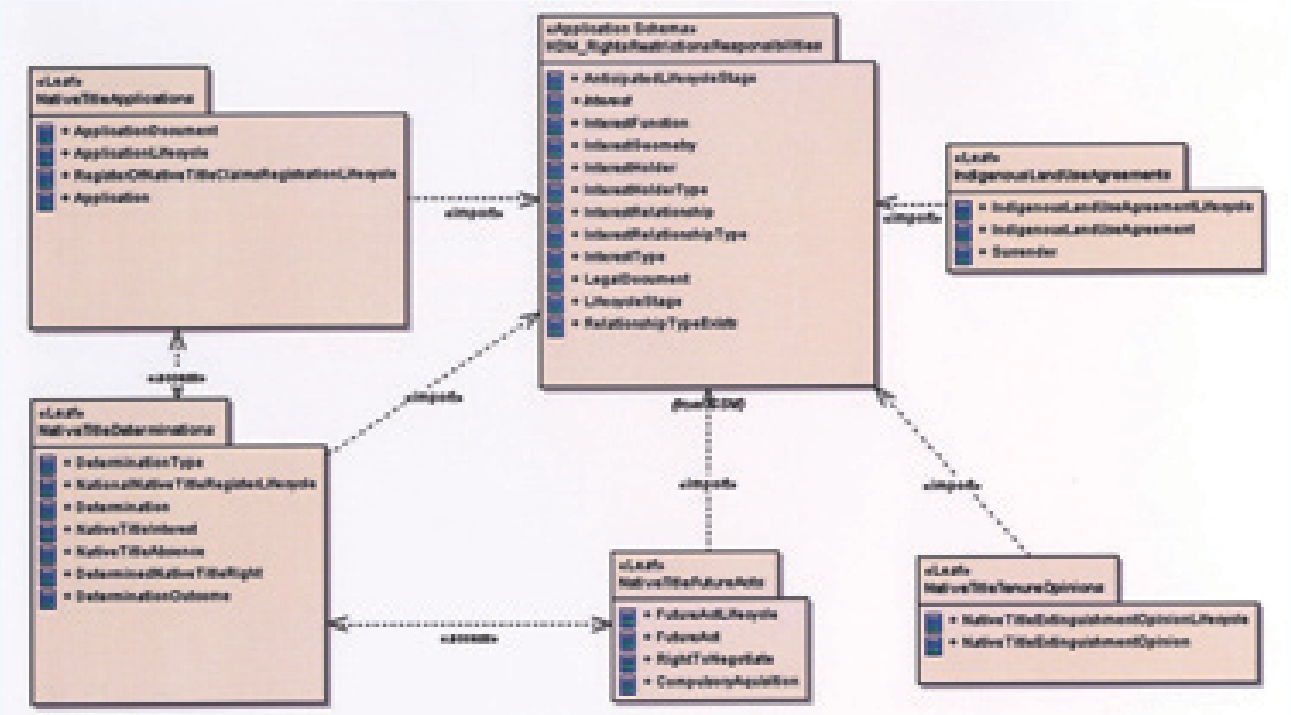
Terms of Reference

1. Maintain the components of the ICSM Harmonised Data Model (HDM)
2. Participate on other ICSM Working Groups that are developing data models to ensure integration with the HDM
3. Monitor developments in national and international standards and recommend revisions to the HDM as necessary
4. Supplement the HDM to explicitly include the geodetic reference framework
5. Monitor the extent to which jurisdictional data sets comply with the HDM
6. Promote the availability of the HDM to the wider geospatial community

Activities during 2006-2008

In early 2006 DFTSC initiated a total review of the HDM with a view to create a next-generation version of the model – one which compiles with international standards and is designed to increase harmonisation within the spatial data community. By early 2008 this had occurred.

The CSIRO Solid Earth and Environmental Grid (SEEGrid) website was chosen as the preferred host for the new model as it provided a stable and accessible environment; which also hosts other similar



initiatives that are developing various data models. The new model (referred to as Version 2 of the ICSM HDM) consists of two parts:

- An UML (Unified Modelling Language) model
- An XML (Extensible Markup Language) schema which was derived from the UML model

These can be accessed at: **https://www.seegrid.csiro.au/subversion/xmml/ANZLIC_ICSM/HarmonisedDataModel/trunk/**

This Version 2 model is a conceptual model. As such it is the basis for the development of operational models (including logical, implementation and physical models). The Version 2 model was used by ICSM's Native Title Working Group (NTWG) to create their data model. Also, PSMA Australia intends to utilise the Version 2 model when creating their LYNX2 network. LYNX2 is designed to facilitate real time data updates and the sharing of web services across Australia.

The next challenges for the DFTSC will be to develop a governance framework to maintain the integrity of the new model and to promote the up-take of the HDM – including the development of additional modules.

GEODESY TECHNICAL SUB-COMMITTEE (GTSC)

http://www.icsm.gov.au/icsm/geodesy/index.html
and
http://www.icsm.gov.au/icsm/gda/index.html

Chairman

Gary Johnston
Geoscience Australia
SYMONSTON ACT 2609

About GTSC

Geodesy provides the positional framework for all surveying, mapping and geographic information applications in Australia. The ICSM Geodesy Technical Subcommittee is responsible for providing advice on geodetic issues. Therefore the main role of this subcommittee is to maintain a compatible geodetic infrastructure across Australia and New Zealand.

Terms of Reference (summary)

1. Identify issues and propose possible solutions for consideration by ICSM
2. Coordination, development and maintenance of geodetic infrastructures
3. Coordination, preparation and update of technical publications
4. Coordination of efficient dissemination of geodetic information

Activities during 2006-2008

Geodetic Infrastructure Developments

This period has seen the commencement of a significant geodetic infrastructure improvement program under the AuScope initiative. AuScope has been funded by the National Collaborative Research Infrastructure Strategy (NCRIS) to oversee the development of research infrastructure. This is a joint Commonwealth and State/Territory initiative which will construct major new facilities/capabilities, including three Very Long Baseline Interferometry (VLBI) antennae, upgrades to the Mt Stromlo Satellite Laser Ranging (SLR) system, the procurement of Absolute and Earth Tide Gravimeters and the

construction of approximately 100 Global Navigation Satellite System (GNSS) Continually Operating Reference Stations (CORS). This program is well underway with construction progressively occurring across the country.

Positional Uncertainty

The Dynamic Network Adjustment software (DynaNet) which was developed by the University of Melbourne using ICSM funding, has now had all operational bugs removed and is fully functional. This software allows positional uncertainty values to be calculated as part of the primary network adjustment. In parallel, the development of a software utility to transform legacy NEWGAN datasets has been completed as well. This is the culmination of a long and complex development process and opens the way for the full propagation of positional uncertainty as well as a seamless readjustment of large geodetic data sets.

Standards and Practices for Control Surveys (SP1)

GTSC is responsible for maintaining ICSM Special Publication #1 – Standards and Practices for Control Surveys (SP1). This document serves a number of purposes:

- It sets clear standards of accuracy for control surveys which are independent of technique; and
- Provides a selection of guidelines for survey and reduction practices.

The latest version of SP1, Version 1.7, September 2007, can be viewed at **http://www.icsm.gov.au/publications/sp1/sp1v1-7.pdf**

SP1 is currently undergoing a review process to examine if the content is still valid and complete, and to determine if the content can be presented in a way that makes reading the document more efficient.

Legal Traceability of Position for GPS Surveys

GTSC is continually reviewing the legal issues associated with GPS and in mid-2008 it released an updated report on Active GPS and Survey Marks, 2008. This can be viewed at **http://www.icsm.gov.au/icsm/publications/gtsc/ActiveGPSAndSurveyMarks.pdf**

Height Modernisation

The Height modernisation project continues to gather momentum. In 2009 a new gravimetric geoid will be released. It will be based on EGM2008 with optimisation for the Australian circumstances using techniques developed by Curtin University. The gravimetric geoid will also be supplemented by a geometric correction surface between the geoid and AHD71. The result will be a model that allows users to derive AHD71 heights directly from GPS ellipsoidal heights.

Geodesy and Sea Level Monitoring

The GTSC continues to undertake monitoring surveys at the Australian Baseline Sea Level Monitoring Array tide gauges using precision levelling techniques. This work is in support of the sea level monitoring program. These surveys will soon be expanded to include a connection to neighbouring CORS sites installed as part of the AuScope initiative.

PERMANENT COMMITTEE ON GEOGRAPHIC NAMES OF AUSTRALASIA (CGNA)

http://www.icsm.gov.au/icsm/cgna/index.html

Chairman

Bill Watt
Department of Transport, Energy and Infrastructure
ADELAIDE SA 5001

About CGNA

The Permanent Committee for Geographical Names in Australasia (CGNA) was established to provide a coordinating role in Australasian place naming activities.

Terms of Reference

1. Promote a greater community awareness of geographical names
2. Develop and promote National guidelines for geographical names
3. Promote the use of correct names by map, chart and electronic application producers
4. Support the maintenance and development of jurisdictional and national gazetteers
5. Support initiatives for the appropriate use and preservation of geographical names, and for the recognition of their heritage and cultural importance
6. Support the maintenance and development of jurisdictional, national gazetteers and SCAR, CGA & SCUFN

Activities during 2006-2008

Dual Naming in Australasia

CGNA up-dated it's *Report on the Storage and Depiction of Dual Names in Australia and New Zealand*. This recognised that a dual naming system needs to be in place for recording traditional indigenous names alongside introduced European names – across the whole of Australia and New Zealand. This can be viewed at **http://www.icsm.gov.au/icsm/cgna/DualNameDepictionStorage08.pdf**

United Nations Group of Experts on Geographic Names (UNGEGN)

CGNA is a committed supporter of United Nations place naming activities. As part of this the CGNA Chairman, Bill Watt, has been appointed the United Nations Rapporteur for geographic names. This is an important, prestigious position that CGNA and ICSM are proud to support.

CGNA is progressing well with its work on creating a gazetteer and up-dating a related map of the UNGEGN region which stretches from South-East Asia to New Zealand. CGNA was instrumental in creating the previous editions of this map that have been published by Land Information New Zealand (LINZ).

CGNA Information Brochure

This was released in late-2007 and it outlines the history, vision, work and achievements of CGNA in ensuring the integrity of geographic names. The brochure can be viewed at: **http://www.icsm.gov.au/icsm/cgna/CGNA_Brochure.pdf**

Geographic Names Educational Kit

Since its creation in 2005 CGNA's *What's In A Name – Australia's Geographic Names* teaching package has been progressively up-graded by CGNA. By June 2008 it was averaging 50 page views per day and 250 unique visitors.

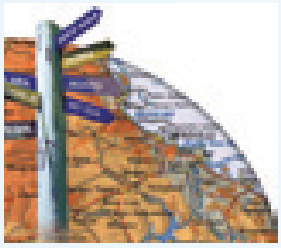
This resource is a valuable tool for CGNA to achieve its objective of promoting greater community awareness of the importance of the correct use of geographical names. This package can be viewed at: **http://www.icsm.gov.au/cgna/lesson/index.html**

Community Geographical Domain Name System – auDA and auCD

CGNA continues to be actively involved in the on-going development and support of community based use of Australian geographic names as internet domain names.

CGNA is working closely with auDA (Australian Domain Administration Limited) and auCD (Australian Community Domain Names Trust) to ensure that communities within Australia are encouraged to take advantage of the non-commercial internet space created, with funding from sales of commercial names.

Gazetteer of Australia



A new edition of the Gazetteer of Australia was released in mid-2007. It was fully up-dated and now provides information on the location and spelling of 322,328 geographical names in Australia. Features recorded include mountains, rivers, cities, towns and homesteads. Plus it records both official (gazetted) and unofficial geographic names.

This very popular product is created from individual State and Territory gazetteers which CGNA members maintain. Not only is this a valuable resource for the general public, but it is an authoritative source of official place names – for example it is used to define geographic names which are eligible for grants from the Australian Community Domain Names Trust (auCD).

It can be viewed interactively at **http://www.ga.gov.au/map/names/** or a complete copy of the data can be obtained from Geoscience Australia **http://www.ga.gov.au/news/**.

Australasian Standards for Place Names and Addressing

CGNA is committed to an ongoing development of Australasian standards for the naming of places. Given that there is significant differences in both legislation and resource availability in each of the state, territory and New Zealand jurisdictions, this can be at times a challenging exercise. Standards will continually be reviewed and updated as required, or new standards developed to assist with emerging issues.

Following advice from Standards Australia that *AS/NZS 4819 – Rural and Urban Addressing* was scheduled for review, ICSM requested CGNA to form an Addressing Special Interest Group tasked with undertaking the review in early 2009.

PERMANENT COMMITTEE ON TIDES & MEAN SEA LEVEL (PCTMSL)

http://www.icsm.gov.au/icsm/tides/index.html

Chairman

Rod Nairn
Hydrographer of Australia
Australian Hydrographic Service, RAN
WOLLONGONG NSW

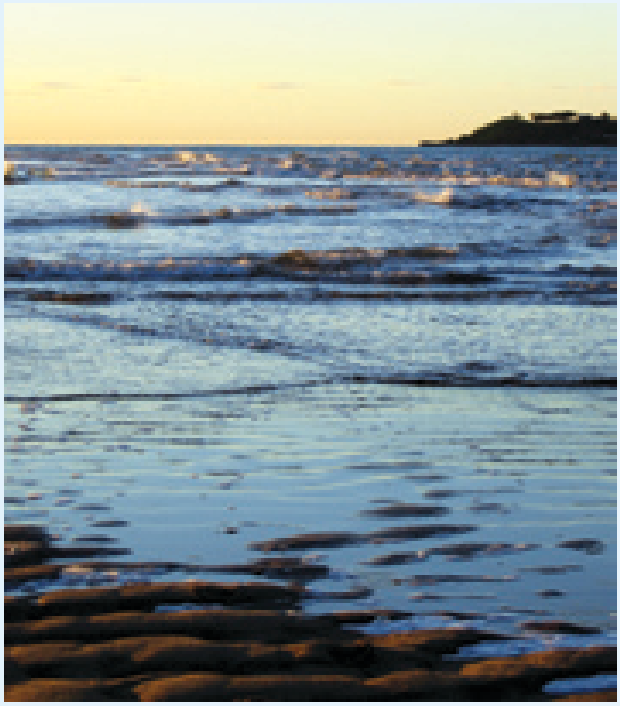
PCTMSL
PERMANENT COMMITTEE ON TIDES AND MEAN SEA LEVEL

About PCTMSL

The main role of the Permanent Committee for Tides and Mean Sea Level is to coordinate a national database of tidal records as well as develop national standards and best practice guidelines for tidal related matters. PCTSML also acts as a focal point for national inquiries relating to tides and mean sea level and identifies long-term tide and sea level management requirements for Australia and New Zealand.

Terms of Reference

1. Ensuring the adequacy of the tide gauge network for scientific, economic and public interest applications
2. Development and maintenance of national standards and best practice guidelines related to the data collection, processing and distribution of tidal and mean sea level information
3. Investigating the current and future clients, uses and technical developments, including investigating and making recommendations on areas where improvements are required in tide gauging in terms of emerging technologies, commercial usage and scientific research
4. Development of appropriate material for the promotion of tidal and mean sea level issues within Australia and New Zealand and their areas of interest
5. Represent ICSM, as appropriate, on appropriate international associations
6. Cooperation with other ICSM working groups in areas of common interest eg. sea level, cadastre, earth tides, tidal loading
7. Cooperation with other appropriate groups including the International Hydrographic Organisation (IHO) Tidal Committee, the Intergovernmental Oceanographic Commission (IOC) and the IHO/IAG Advisory Board on the Law of the Sea (ABLOS)
8. Encouraging research into tidal observations, analysis, and mean sea level



Activities during 2006-2008

Australasian Tides Workshops

PCTMSL co-sponsored two Australasian Tides Workshops for people involved in tidal analysis and prediction. A third workshop is also being planned for late-2008. The Bureau of Meteorology's National Tidal Centre (NTC) in Adelaide was/will be the venue for all three workshops.

The workshops include hands-on, practical sessions as well as formal presentations on analysis and quality control of sea level data. Topics covered include:

- tidal theory
- storm surges and extreme events
- instrumentation
- real-time systems with meteorological sensors
- benchmark levelling and datums
- data analysis and quality control
- archiving and quality assurance

Australian Tides Manual (Special Publication #9 or SP9)

A full update of SP9 (2004 edition) was carried out during 2007. The layout was also redesigned to make it much more 'web user friendly'. SP9 can be viewed in .pdf and .html format at: **http://www.icsm.gov.au/tides/SP9/index.html**. With over 50,000 page views of the two formats in 2006-08, this has proven to be a very popular document.

Link between Tidal Reference Levels and the Australian Height Datum (AHD)

The PCTMSL embarked on this task mainly due to problems faced by councils and coastal authorities determining tidal reference levels to manage inundations along coastal areas where there were no tide gauges. It requires interpolating/calculating the tidal reference levels (Chart Datum, High Water Springs, etc) in relation to a fixed elevation, the Australian Height Datum (AHD). The Geodesy Technical Sub-Committee (GTSC) is carrying out work in respect of the link between AHD and the ellipsoid (ITRF/GDA94) as part of the 'Height Modernisation' project.

The task involves linking all tide gauges through their bench marks to the ellipsoid and also establishing the reference surfaces (Highest Astronomical Tide (HAT), Lowest Astronomical Tide (LAT), Chart Datum (CD), etc) in relation to each tide gauge. In order to achieve this, the PCTMSL decided to seek information from various State and federal organisations about their tide gauge bench marks relationship to the ellipsoid and AHD. To date all the height information – ellipsoid height, AHD and Tidal Levels – had been achieved for 43% of the total stations (58 of 132).

PERMANENT COMMITTEE ON TOPOGRAPHIC INFORMATION (PCTI)

http://www.icsm.gov.au/icsm/topo/index.html

Chairman

Greg Scott
National Mapping and Information Group
Geoscience Australia
CANBERRA ACT 2601

About PCTI

The aim of the Permanent Committee for Topographic Information (PCTI) is to enhance the coordination of topographic mapping and associated activities undertaken by the jurisdictional mapping agencies and the private sector.

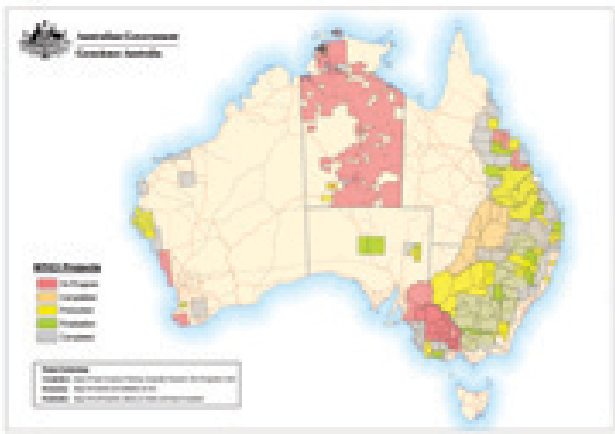
Terms of Reference

1. Recommend initiatives to ICSM that are relevant to the future of topographic mapping carried out in Australia, Australian Territories, and New Zealand
2. Provide a framework for enhanced cooperation
3. Liaise with key government bodies and industry stakeholder groups on matters of prioritisation and national coordination of topographic mapping and data projects
4. Advise on initiatives that aim to raise the awareness of industry and the community to the benefits of topographic mapping
5. Identify, develop, and promote 'best practice' standards and guidelines for topographic mapping and data generation, maintenance, and dissemination that are within the ambit of ICSM

Activities during 2006-2008

National Topographic Information Coordination Initiative (NTICI)

NTICI is a national collaborative agreement between the Commonwealth, State/Territory and local agencies in areas of topographic data collection, data management/access and mapping. Created by ICSM in 2005, PCTI's governing principle is to *'map once, use many''*. By June 2008 major projects had been undertaken in all State/Territory, except Tasmania.



NTICI projects in late-2008

A cost-benefit survey on the NTICI process was conducted by Geoscience Australia in 2007-08 on behalf of PCTI. This survey was aimed at seeking empirical evidence to establish how much collaboration among the jurisdictions is occurring, and the value of this collaboration. The survey clearly demonstrated that the benefits of collaboration – and large amounts of current data and new products available across jurisdictions - far outweighed the costs associated with data integration.

Fundamentals of Mapping Web Package

In 2006 ICSM and PCTI identified a need for a comprehensive web-based package which explained terminology and issues associated with topographic mapping.

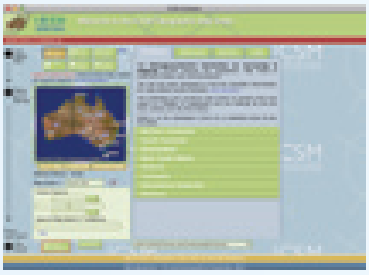
Over the ensuing months PCTI came to the realisation that there are a large number of web sites which supply high level and/or introductory information about topographic mapping and mapping in general. However, this is highly fragmented and can be difficult to find. As a result PCTI refined the original vision into one web-based package which supplied introductory information about mapping in general. In doing so it would:

- unashamedly have an Australian / New Zealand focus
- have numerous hyperlinks to more complex sites
- have a design concept that included an attractive layout (eg the use of numerous images/graphics etc)
- use non-technical language wherever possible

The package went live in mid-2008 and can be viewed at: **http://www.icsm.gov.au/mapping/index.html**

Topographic Map Index

This highly popular package was fully up-dated and redesigned in 2007. It now uses Landsat imagery, topographic information and map sheet extents to allow users to search interactively. When finding the results, they can preview the location of the map sheet with a click. The package can be viewed at: http://mapconnect.ga. gov. au/ICSM/imf. jsp?site=ICSM



Australian Spatial Data Accuracy Standard

PCTI is conducting a full review of the current Australian Standard for defining the locational accuracy of topographic information. This work is being undertaken in the realisation that the current standard is based on very dated (1930's) expectations/technology, and is applied to well-defined points only. In the modern digital era it was recognised that a more versatile standard is needed.

A proposed new standard has been drafted and is being circulated for comment. It is anticipated that it will be formally released in 2009.

Topographic Mapping Workshops

In conjunction with its annual face-to-face meeting PCTI is now regularly participating in a topographic mapping workshop. This is a uniquely valuable forum for the many technical people who daily face the issues associated with topographic map production, and is designed to keep participants abreast of technology and operational changes.

AUSTRALIAN SPATIAL DATA INFRASTRUCTURE WORKING GROUP (ASDI)

http://www.icsm.gov.au/icsm/asdi/index.html

Chairman

Peter Murphy
Director Geospatial Information
Surveyor-General
Department of Primary Industries and Water
HOBART TASMANIA

About ASDI

The current vision and structure for the Australian Spatial Data Infrastructure had been developed over the last 10 years and required a review in order to accommodate changes for our spatially enabled society.

This Working Group was established in October 2007, but it had previously existed for a number of years as an informal working group. It was formed with the express role of reviewing the current status of the Australian Spatial Data Infrastructure (ASDI) and framing a vision for its on-going development – with particular emphasis on identifying any actions ICSM needed to undertake.

When established in 2007 it was agreed that a reinvigorated ASDI was about Spatially Enabling Australia. There was general agreement that ICSM had a role in such areas as:

- building support for the national vision
- reviewing data access issues in relation to government
- review of education and skills capability

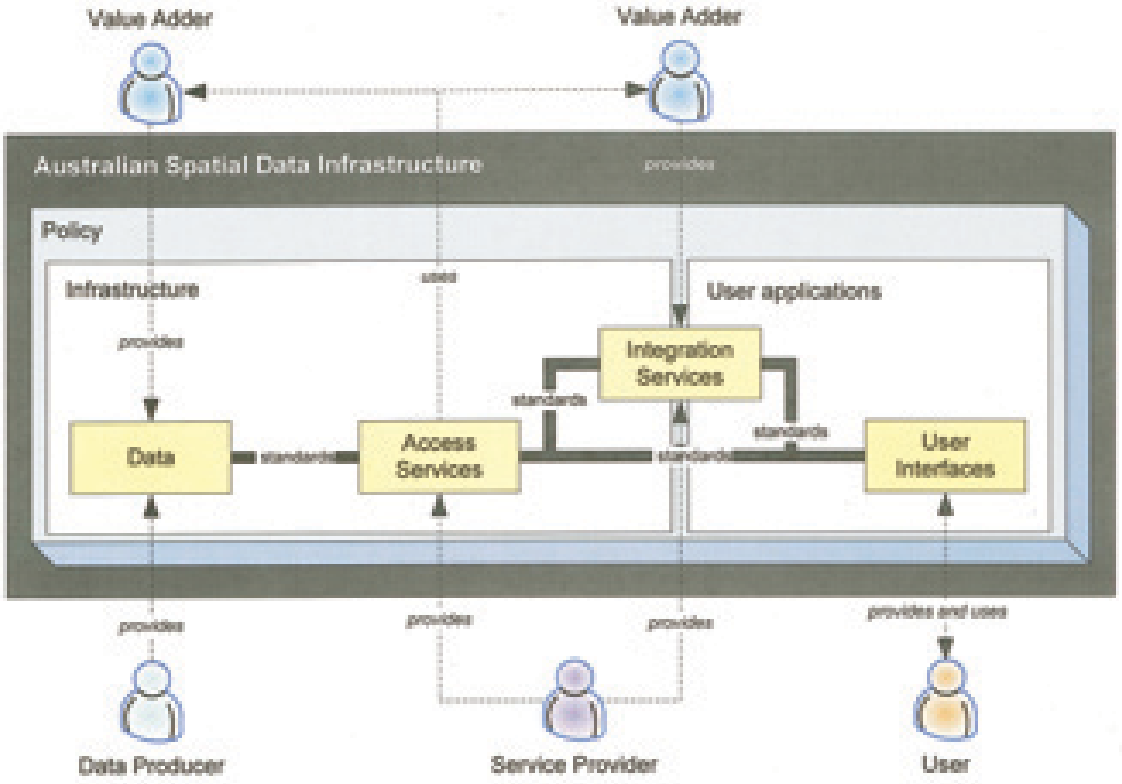
Terms of Reference

1. Rebirth of ASDI proposal – fundamental data sets audited
2. Review and report on:
   - The original ASDI goals
   - Virtual Australia
3. In conjunction with ANZLIC, build support for the national vision "Spatially Enabling Australia"
4. Review current data and systems
5. Prepare recommendations for governance

Activities during 2006-2008

Work was solely focused on a full review of the ASDI. Geomatic Technologies was engaged to undertake the review and in January 2008 ICSM released its report titled *Spatially Enabling Australia – Recommendations*. This contained a significant number of Recommendations (31) and associated Actions (36). See: **http://www.icsm.gov.au/icsm/asdi/ASDI-Spatially_Enabling_Australia-V2.pdf**

Over the next few months the ASDI Working Group assessed these recommendations and actions, and in June 2008 a Review Report was released. This summarised ICSM actions arising from the original consultants report. See: **http://www.icsm.gov.au/icsm/asdi/ASDI-Spatially_Enabling_Australia-V2-Review_Report.pdf**



eLODGEMENT OF SURVEY PLANS WORKING GROUP (ePlan)

http://www.icsm.gov.au/icsm/ePlan/index.html

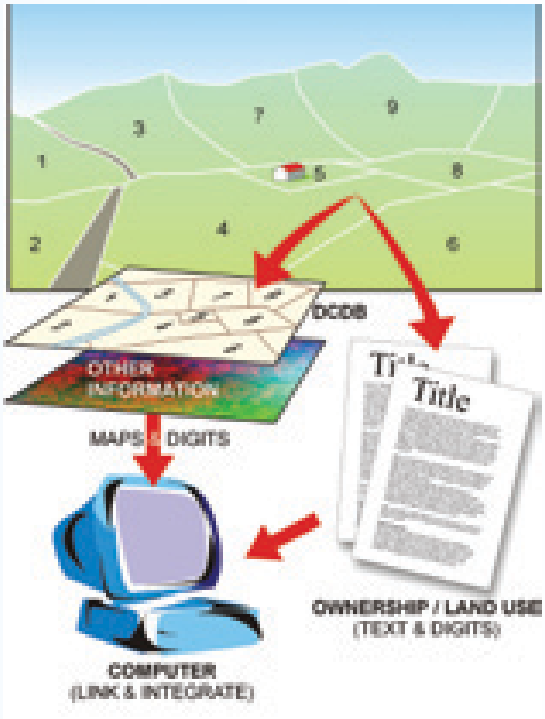
Chairman

Nevil Cumerford
Department of Natural Resources and Water
WOOLLOONGABBA Qld

About ePlan

This committee was established in November 2003 when it was recognised that a national cadastral data transfer standard was needed to capitalise on the inherent efficiencies that electronic lodgement and processing of digital cadastral data can bring.

The ePlan Working Group is composed of representatives from industry and government to review and progress this change. The aim is to establish an electronic framework which will allow for easy recording and transfer of survey plan information. This will enable the seamless flow of data from capture in the field to dissemination and display through data bases and mapping products



Terms of Reference

1. Implement communication strategy involving industry stakeholders
2. Establish ICSM Web site for ePlan Reference Implementation media
3. Legally operational implementation in at least two jurisdictions
4. Develop 3D capabilities of the ePlan Model
5. Align ePlan Model with ICSM Harmonised Data Model
6. Make recommendations for implementation, review and management of ePlan standards
7. Provide advice to ICSM on other areas of electronic survey data transfer
8. Make regular reports to ICSM on progress

Activities during 2006-2008

Over the 2 year period significant progress has been made in making the electronic capture and lodgement of survey plans a reality. The focus of the group has changed from development to implementation and the Terms of Reference adjusted accordingly.

By mid-2006 the ePlan group has successfully created (1) a Unified Modelling Language (UML) logical model of a cadastral survey (ePlan Model), (2) a protocol for representing the ePlan Model in LandXML to enable encoding by Software packages and (3) data capture, visualisation and validation tools to prove the viability of the system. Throughout the remainder of the period these were tested and refined against Jurisdictional requirements.

The system relies on the participation of both government and private agencies. It also recognises the importance role that survey software developers play in the up-take of the technology.

Implementation is now well advanced in Queensland and New South Wales; with most other States/ Territories starting to implement the system.

NATIVE TITLE WORKING GROUP (NTWG)

http://www.icsm.gov.au/icsm/ntitle/index.html

Chairman

Russell Priebbenow
Director of Surveys
Survey Policy & Infrastructure
Department of Natural Resources and Water
WOOLLOONGABBA Qld

About NTWG

The Native Title Working Group was established May 2001 in order to contribute to increased 'certainty' with respect to identifying native title rights and interests, by promoting the adoption of appropriate methods for defining native title interests; and recording and exchanging relevant information about native title interests.

May 2008 NTWG was disbanded having completed its Terms of Reference.

Terms of Reference

1. The Working Group is to consult with, and where appropriate gain the support of the National Native Title Tribunal (NNTT), jurisdictional lead agencies for native title, and other relevant stakeholders in undertaking their work.
2. To develop national guidelines for the description, and where appropriate, realisation of claimed and determined native title interests.
3. In line with ANZLIC's Australian Spatial Data Infrastructure (ASDI), to develop a National Data Model, associated Data Dictionary, Metadata and associated guidelines for the recording and accessing of relevant information about Native Title Interests. The Data Model should include, but not be limited to, the recording of relevant attribute information about:
   a. Native title claimant applications and what is claimed within them
   b. Indigenous Land Use Agreements (ILUAs)
   c. Native title determinations
   d. Non-claimant applications and section 24FA of the Native Title Act 1993 (Cth) protection
   e. Land to which the non-extinguishment principle applies
   f. Compulsory acquisition of Native Title
   g. Surrender of native title
   h. Opinions concerning land on which NT has been validly extinguished
   i. Right to negotiate process
   j. Compensation applications
   k. The Data Model should include spatial components as appropriate.

4. To identify issues to be addressed for jurisdictions to be able to populate and maintain in an up to date form (including incremental update) the above Data Model.
5. To provide advice to ICSM of any other issues/areas where ICSM may be able to provide national leadership in the identification or presentation of the spatial component of native title interests.
6. To provide reports to each ICSM meeting on the progress of each element in these Terms of Reference.

Activities during 2006-2008

During 2006 the NTWG had finalised its Unified Modelling Language (UML) data model for native title information. Work then began on incorporating it into the ICSM Harmonised Data Model (HDM) Version 2 (with particular reference to its existing Cadastral component) and developing an Extensible Markup Language (XML) reference implementation. This was completed in 2007.

In early-2008 representatives from the National Native Title Tribunal (NNTT) assisted with the review of the native title information component of the Harmonised Data Model. Following this meeting, a number of minor issues with the native title information component were submitted to ICSM's Data Framework Technical Subcommittee (DFTSC) and the Working Group was disbanded. Further refinement of this component of the HDM can be undertaken by the DFTSC, with input from relevant experts.

ALL-HAZARDS SYMBOLOGY SPECIAL INTEREST GROUP (AHS)

http://www.icsm.gov.au/icsm/all-hazards/index.html

Chairman

Ian O'Donnell
Group Leader (now retired)
National Mapping and Information Group
Geoscience Australia
SYMONSTON ACT

About AHS

This Special Interest Group was established in May 2006 to review the existing Emergency Management symbols with a view to creating a core set of All-Hazards Symbols for use by emergency service agencies in Australia and New Zealand. The symbols were envisaged as comprising a symbol description, symbol definitions, and codes for their use.

This Working Group grew out of a forum convened by ANZLIC in December 2005 that comprised representatives from Emergency Management agencies – including Emergency Management Australia (EMA) and Emergency Management Spatial Information Network Australia (EMSINA). ICSM project managed this phase of the development.

Two years later, in May 2008, the AHS was disbanded having successfully completed the review.

Terms of Reference

1. Provide the Australian /New Zealand point of contact for delivery of a harmonised approach for an all-hazards symbology set.
2. Maintain a comprehensive listing of availability and likely application of all hazards symbol sets.
3. Develop an annual work program to define and ensure an incremental roll-out of a national core set of symbols.
4. Develop a nationally consistent outreach and promotions program and ensure education and promotional materials are embedded within the appropriate training courses occurring nationally (eg.EMA Mt Macedon and Police Colleges).
5. Build and communicate the supporting hierarchical & scalable classifications and ensure close synergies with existing EM, CT and CIP taxonomies, topographic data models (eg AusDIN Portal, NSW EM Data Model).
6. Ensure all symbol sets are:
   a. Technology and vendor independent;
   b Fit-for-Purpose and scalable (dependent upon the user requirement(s);
   c. Harmonised (where possible); and
   d. Catalogued online for open discovery and access.

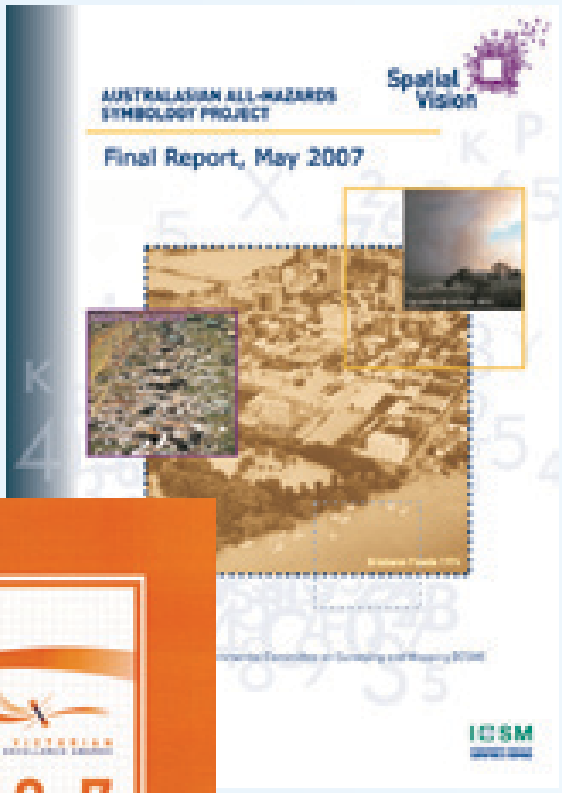
Activities during 2006-2008

With the scope of work being very well defined at its inception the AHS was able to immediately engage Spatial Vision (a Victorian based GIS company) to consult widely within the Australian and New Zealand emergency services community and to:

- conducted an audit of existing symbols used by emergency agencies
- recommend a catalogue of symbols for emergency Incident Management Systems
- an initial set of symbols to largely satisfy Emergency Management requirements

The draft report was considered by AHS and EMSINA with feedback has been incorporated into the final report. This can be viewed at the AHS page on the ICSM website: **http://www.icsm.gov.au/icsm/all-hazards/index.html**. It is made up of a number of separate files:

- The body of the report;
- Six separate Appendices which address different topics – including a summary of existing symbols; and
- A feedback from people/organisations which had reviewed the report



The final report was released in May 2007 and in late-2007 the work received a 2007 Victorian Spatial Excellence Award.

The National Spatial and Information Management Working Group (NSIM) is now building upon this intial work with an audit and gap analysis of counter terrorism (CT) symbols and symbology. This will feed into the developement of a national set of symbols for the CT sector.

ELEVATION SPECIAL INTEREST GROUP (ESIG)

http://www.icsm.gov.au/icsm/elevation/index.html

Chairman

Phil Tickle
National Mapping and Information Group
Geoscience Australia
SYMONSTON ACT

About ESIG

The ESIG was created in November 2007 to provide technical assistance to the National Elevation Data Framework (NEDF) project – most notably the development of best practice guidelines for the capture and processing of elevation data.

NEDF is an ANZLIC sponsored project – with the support of the Department of Climate Change, Geoscience Australia (GA) and the Cooperative Research Centre for Spatial Information (CRCSI). The purpose of the project is to develop a collaborative framework that can be used to increase the quality of elevation data and derived products such as digital elevation models describing Australia's landform and seabed.

Terms of Reference

1. Develop technical guidelines and standards for the acquisition, processing and quality assurance of elevation data.
2. Develop generic best practice 'Statements of Work' that may be used by agencies in developing project deliverables.
3. Liaise with ICSM committees and other appropriate bodies to optimise alignment of activities.
4. Facilitate national awareness of guidelines, best practice and standards.

Activities during 2006-2008

In the six month to June 2008 ESIGs work was focused on developing *ICSM Guidelines for Digital Elevation Data*: **http://www.icsm.gov.au/icsm/elevation/ICSM-GuidelinesDigitalElevationDataV1.pdf**. This has proven to be a very popular resource.

IMAGERY SPECIAL INTEREST GROUP (IMAGERY SIG)

http://www.icsm.gov.au/icsm/imagery/index.html

Chairman

Paul Duncan
Landgate
MIDLAND WA

Members of IMAGEY SIG inspecting the NSW Lands Department digital aerial camera (ADS40) and aircraft. Bathurst September 2007.

About Imagery SIG

This Special Interest Group was created in March 2006 to review technical issues associated with the emergence of new technologies – with particular emphasis being placed on filling Australia wide knowledge gaps in relation to digital aerial imagery and aerial cameras.

Terms of Reference

1. Develop and promote a national awareness of airborne imagery and its uses
2. Develop and promote a network for national coordination and airborne image data interchange
3. Develop and promote a network for the discovery and access to imagery holdings – bigger consideration
4. Develop a mechanism for assessment to advise on emerging trends and technologies
5. Explore and enhance the use and application of imagery
6. Develop and promote a set of guidelines and formats for image capture, dissemination, and storage.

Activities during 2006-2008

A significant number of teleconferences were held in 2006-2008 to exchange ideas and understanding of digital airborne imagery. These culminated in a highly successful technical work shop being held at the NSW Department of Lands office in Bathurst. Discussions and presentations focused on image matters – mainly on the Department of Lands/LPI Digital Image Acquisition System Leica Airborne Digital Sensor 40 platform and subsequent work flows.

As a result of their work in 2006-2008 much of the technical detail around the aerial sensors is now known and the IMAGERY SIG's focus is now more targeted to understanding systems, and applications; and developing guidelines is imagery acquisition, metadata, dissemination and storage.

ROADS SPECIAL INTEREST GROUP (RWG)

http://www.icsm.gov.au/icsm/roads/index.html

Chairman

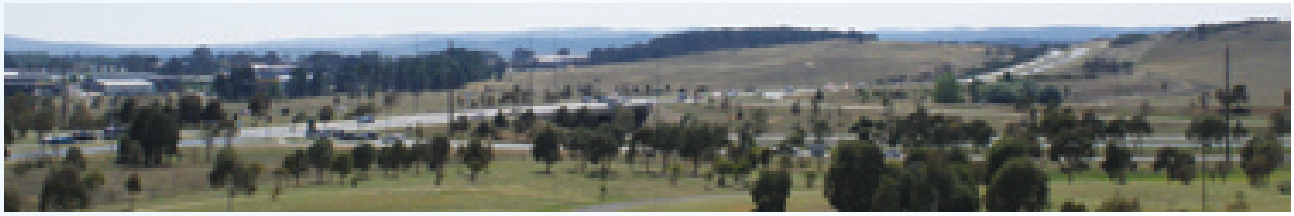
Simon Costello
National Mapping and Information Group
Geoscience Australia
SYMONSTON ACT 2609

About RWG

The RWG was established in May 2005 to resolve national issues associated with the consistency of capture and ease of dissemination of digital information about roads.

Terms of Reference

1. Develop and promote a nationally consistent classification and attribution scheme for the representation of roads and associated infrastructure
2. Develop and promote a nationally consistent approach to the naming of roads and roads related features in spatial databases
3. Work closely with the ICSM Data Framework Technical Subcommittee to ensure that there is alignment between the work of the ICSM Harmonised Data Manual (HDM) on standards developed spatial data management of roads
4. Liaise with key government bodies and industry stakeholder groups on a nationally consistent classification and attribution scheme for the representation of roads and associated infrastructure



Activities during 2006-2008

Report on Road Classification

In October 2006, the RWG released a report titled 'Assessing the Feasibility of a National Road Classification – Report to ICSM on National Road Classification Developments'. This represented a significant body of consultation with national data providers and users having indicated that it was urgently need.

The report has proven to be a very popular document with over 20,000 page views in the reporting period – interestingly, over 50% of the unique visitors are from outside Australia, with 20% being from the United States of America.

In summary, the report notes that the current PSMA classification is sound for most national purposes, but some further improvements to the classification and the decision-making process behind determining road classification will be investigated further.

By June 2008 the RWG had addressed three of the seven recommendations in the report, namely:

- Review of the usefulness of traffic volume, design speed, travel distance, route numbering, population measures and structural considerations for additional determinants of road classification;
- Practicality of differentiating between local and state roads through liaison with relevant government agencies;
- The need for additional classification and attribution of vehicle tracks and other lower order roads for emergency, resource- and land-management applications.

The remaining recommendations will be addressed by 2009.

Consistent Representation of road features, names and other identifiers

ICSM endorsed the following recommendations made by the RWG:

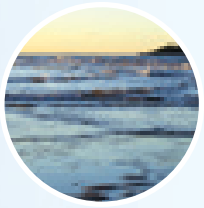
- Dual carriageways will be any roads with the same name and functional class, with opposing traffic flows, separated by any barrier that prevents vehicles from easily turning from one carriageway to another.
- An entry/exit ramp is defined as an access ramp to or from one road to another to allow smooth integration of traffic, associated with a freeway or motorway. They are a road sub-type, always sealed, have a single lane and travel flow is in one direction only.Jurisdictions and the PSMA can continue to apply their own business requirements for ramp classification. A numbering system for exit ramps will also be developed to assist with navigation, particularly in emergency management and dispatch applications.
- All roundabouts regardless of size will be included in roads datasets to meet emergency management requirements. Roundabouts of a diameter greater than 15m (later revised up to 20m) will be shown as linework as well as a point. Connector features will be captured and attributed accordingly.

Stakeholder Considerations

The RWG has been liaising with road data users to identify which issues need addressing on a national level. A number of issues have been identified – such as emergency services' need for easily identifying entry/exit ramps and which particular road attributes are best maintained by government. Many of these users are outside the mandate of ICSM Jurisdictions and to this end the RWG has engaged with agencies involved in the creation and use of roads related data.

- National associations:
  - Association of Australian and New Zealand Road Transport and Traffic Authorities (Austroads)
  - Emergency Management Spatial Information Network of Australasia (EMSINA)
  - Transport Authorities Survey and Mapping Group (TASAM)
  - PSMA Australia
- Australian Government Department:
  - Transport & Regional Services (DOTARS)
  - Australian Local Government Association (ALGA)
  - Australian Bureau of Statistics (ABS)
  - Commonwealth Grants Commission
- State/Territory Departments:
  - Main Roads Departments
  - Emergency Services Agencies
- Local Government
  - Australian Local Government Association
  - Various councils
- Private Sector

ICSM MEMBERSHIP




AUSTRALIA

Australian Government

Geoscience Australia

GPO Box 378
CANBERRA ACT 2601

http://www.ga.gov.au

Within the Commonwealth portfolio of Industry, Tourism and Resources, Geoscience Australia takes a lead role in producing national geoscientific information and knowledge. Key areas of activity include data acquisition, analysis and dissemination, research and advice associated with:

- topographic mapping and data
- pre-competitive petroleum exploration
- pre-competitive onshore mineral exploration
- coastal zone and sea-bed mapping, including Australian Marine Spatial Information System (AMSIS)
- risk analysis and modelling to support national initiatives for Disaster Mitigation Australia, counter terrorism and critical infrastructure protection
- seismic and geodetic monitoring
- Australian National Tsunami Warning System (ATWS)
- advice on carbon capture and storage to mitigate greenhouse gas emissions

Greg Scott

Group Leader
National Mapping and
Information Group
Geoscience Australia

Tel: +61 2 6249 9132 or (02) 6249 9132

Email: **greg.scott@ga.gov.au**

Greg is Group Leader, National Mapping and Information Group in the Geospatial and Earth Monitoring Division (GEMD) in Geoscience Australia, and is now largely responsible for shaping the future direction of topographic mapping and spatial information management in the organisation. Prior to this role, Greg spent six years leading the development of the Australian Government's spatial analysis and decision support modelling for national security and critical infrastructure protection programs.

With over 30 years experience in geoscientific, topographic, hazard and risk analysis mapping, Greg possesses formal qualifications in cartography and survey mapping, has a Graduate Diploma in Science (Geography) from the ANU, and has a strong spatial analysis background.

Greg is the chair of the ICSM Permanent Committee for Topographic Information, a member of the Spatial Sciences Institute, and Australian representative for, and chair of, the Permanent Committee for GIS Infrastructure in Asia and the Pacific (PCGIAP).

Gary Johnston

Geospatial and Earth
Monitoring Division
Geoscience Australia

Tel: +61 2 6249 9049 or (02) 6249 9049

Email: **gary.johnston@ga.gov.au**

Gary Johnston is the Project Leader of the National Geospatial Reference Systems project within Geoscience Australia's Geospatial and Earth Monitoring Division. Gary has a bachelors Degree in Surveying and a Masters in Information Technologies and Sciences from the University of Canberra. He became registered as a licensed surveyor in 1993 in the Northern Territory.

Gary is the Chair of the ICSM Geodesy technical sub-committee, Chair of the International Earth Rotation and Reference Systems Service Working Group 2 on Site Survey and Local Ties, and a Steering committee member of the Global Geodetic Observing System.

In his current role Gary is responsible for reshaping the strategic direction of geodetic activities within GA and the associated activities within ICSM. He has led the current initiative to significantly enhance Australia's geodetic infrastructure.

AUSTRALIA

Defence Imagery and Geospatial Organisation

PO Box 2793
BENDIGO VIC 3554

http://www.defence.gov.au/digo/

The Defence Imagery and Geospatial Organisation (DIGO) is the lead geospatial and imagery intelligence organisation in the Department of Defence. Its functions, as described in the Intelligence Services Act 2001, include meeting the operational, targeting, training and exercise requirements of the Australian Defence Force; supporting Commonwealth and State authorities in carrying out national security functions and to provide Commonwealth and State authorities and bodies imagery and other geospatial products in support for carrying out their emergency response functions.

In reaching these goals DIGO relies extensively on the services of Geoscience Australia for a combined effort in the production of geospatial products over Australia. The partnership with Geoscience Australia has grown over the past years and continues to prosper with the effective use of Australian Industry.

DIGO continues to produce mapping over many training areas in Australia and its production program also includes assisting it's neighbouring SE Asian nations with their mapping programs. This currently sees DIGO mapping Vanuatu, Solomons and in the near future PNG. These programs provide these countries with up to date mapping coverage in both hardcopy and digital format, included with this is the delivery of systems and training to ensure each nation has the ability to continue their mapping program.

Stephen (Steve) Unwin

Director Geospatial Analysis Centre

Tel: +61 3 5449 0297 or (03) 5449 0297

Email: **stephen.unwin@defence.gov.au**

Steve Unwin served as an engineer in the Royal Australian Air Force from 1977 to 1999.

In 2000 Steve joined the Defence Imagery and Geospatial Organisation (DIGO) as a Project Manager and a Steering Committee member responsible for the implementation of numerous Defence geospatial-related capability initiatives.

He returned to Australia in January 2003, and has worked as the Director of Capability and Plans, Director of Customer Relations and Dissemination. In late 2006 Steve was transferred to Bendigo to run DIGO's Geospatial Analysis Centre.

AUSTRALIA

Australian Hydrographic Service
Royal Australian Navy

Australian Hydrographic Office
Locked Bag 8801
Wollongong NSW 2500

http://www.hydro.gov.au

Australia has ratified the United Nations Convention on Safety of Life at Sea (SOLAS) under which it is obliged to survey and chart its Exclusive Economic Zone (EEZ) waters to enable safe navigation of all vessels in Australia's charting area. By Cabinet Decision in 1946 and since reaffirmed, Navy is the Department responsible for this activity. Shipping in Australia is governed by the Navigation Act 1912 (as amended). The Australian Hydrographic Service (AHS) is a component of the Royal Australian Navy Hydrographic Meteorological and Oceanographic Force Element Group, and is charged with these responsibilities. This role requires the coordination and determination of policy and standards which cover both hydrographic surveying and charting, as well as contributing to the coordination, exchange and standards related to geospatial data in general.

The AHS is also responsible for providing direct support to the Australian Defence Force for the provision of hydrographic, charting, oceanographic and meteorology services.

Rod Nairn

Hydrographer of Australia

Tel: +61 2 4221 8683 or (02) 4223 6687

Email: **rod.nairn@defence.gov.au**

B. Surv (Hons), Grad Cert Mgmt, MA (Strategic Studies), Cert. Prof. Hydrographic Surveyor Level 1, SSI

Commodore Nairn joined the Royal Australian Navy in 1975 as a Seaman Officer and specialising in hydrography. His seagoing experience spans 25 years and encompasses hydrographic surveying around Australia, New Zealand, the South West Pacific, the English Channel and the Norwegian Sea.

Highlights of his career include four sea Commands, the operational introduction of the worlds first Laser Airborne depth sounder, commissioning of HMA Ships Melville and Leeuwin and the successful introduction of multi-crewing to the Royal Australian Navy. He first served ashore as quality control officer at the Australian Hydrographic Office in 1984, later returning for terms as Manager, Hydrographic Development, Head of Survey Operations, and Director of Hydrographic Operations and Charting.

Commodore Nairn was appointed as Hydrographer of Australia and Commander Hydrographic Meteorological and Oceanographic Force Element Group in December 2004. He is currently Chairman of the Australasian Hydrographic Surveyors Certification Panel, the Permanent Committee on Tides and Mean Sea Level, the Ports Australia Hydrographic Surveyors Working Group and Vice Chair of the International Hydrographic Organization Hydrographic Commission on Antarctica.

NEW ZEALAND

Land Information New Zealand

PO Box 5501
WELLINGTON NEW ZEALAND

http://www.linz.govt.nz

Land Information New Zealand (LINZ) is responsible for providing New Zealand's authoritative land and seabed information. This covers responsibility for the geodetic reference system, the cadastral survey system, topographic mapping, hydrographic charting, geographic names, the land title system, Crown property, the valuation rating system, electoral boundaries and continental shelf boundaries.

Don Grant

Surveyor-General

Tel: +64 4 498 3507

Email: **dgrant@linz.govt.nz**

Don Grant holds a BSc Honours in Physics from Canterbury University, a Diploma in Surveying from Otago University and a PhD in Surveying from the University of New South Wales. He registered as a surveyor in 1979 and is a licensed cadastral surveyor.

Between 1991 and 1994, he served as Chief Geodesist for the United Nations Iraq Kuwait Boundary Demarcation Commission. Don was appointed Deputy Surveyor-General of New Zealand in 1996 and worked on the Landonline programme for automation of the survey and title systems. Since 2004, Don has been Surveyor-General. As such, he is responsible for the geodetic and cadastral survey systems, and has responsibilities for electoral boundaries and geographic names.

Dave Mole

Manager, Topography/ Hydrography

Tel: +64 04 460 0583

Email: **dmole@linz.govt.nz**

Currently working in an acting capacity, Dave has a regulatory role for New Zealand's national topographic and hydrographic information with responsibilities for national standards and compliance with them.

He represents Land Information New Zealand at a number of international forums dealing with the standardisation of government topographic and hydrographic data. His background is in cartography, and has over 30 years experience in the geospatial industry

AUSTRALIAN CAPITAL TERRITORY

ACT Planning & Land Authority

GPO Box 1908
CANBERRA ACT 2601

http://www.actpla.act.gov.au/actlic/surveying/index.htm

The Chief Surveyor for the ACT is a statutory appointment under the Surveyors Act (2007). The Chief Surveyor maintains the ACT's secure system of land ownership and tenure by ensuring that land boundaries are unambiguously defined and accurately recorded. The Chief Surveyor's responsibilities include standards for surveying and the regulation and licensing of surveyors in the Territory.

The Chief Surveyor manages the Surveying and Spatial Data Office within the ACT Planning and Land Authority. The Authority is responsible for Territory planning, management of development activity, land information and regulation and licensing of the building industry. Through the Surveying and Spatial Data Office, the Authority produces, updates and maintains and distributes a range of land information including a most comprehensive and accurate cadastral database. It also checks survey plans, opens and closes roads, provides and maintains an extensive survey control network and manages a unique place and road naming infrastructure.

Bill Hirst

Chief Surveyor for the ACT

Tel: +61 2 6207 1965 or (02) 6207 1965

Email: **bill.hirst@act.gov.au**

Bill Hirst worked with the NSW Roads and Traffic Authority (RTA) (then the Department of Main Roads) for approximately 20 years, primarily involved in cadastral, engineering and geodetic control surveying. In 1990 he managed a graphics database section and later worked with a small group formulating information policy.

In 1994 Bill moved to Canberra to take up employment with the Australian Surveying and Land Information Group (AUSLIG) which merged with Geoscience Australia (GA) in 2002. In AUSLIG he was initially IT manager and research and development manager. He was also involved in product development prior to accepting the role of managing Australia's maritime boundaries, a position he held until taking up the position of ACT Chief Surveyor. He was also a member of AUSLIG's Executive Board.

While with AUSLIG Bill accepted the additional responsibilities of the duties traditionally associated with the role of Commonwealth Surveyor-General. This included providing Surveyor-General services for Norfolk Island and participation on the Aboriginal and Torres Strait Islander Commission (ATSIC) electoral review panel.

He commenced work with the ACT Government as Chief Surveyor in May 2007.

Qualifications:

- Bachelor of Surveying, Uni of New South Wales in 1975
- Registered as a surveyor 1976
- Masters of Surveying Science from Uni of NSW in 1992
- Graduate diploma in Management from Uni of Western Sydney 1996

NEW SOUTH WALES

Department of Lands

Paul Harcombe

Chief Surveyor of NSW

PO Box 15
SYDNEY NSW 2001

http://www.lands.nsw.gov.au

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Email: **paul.harcombe@lands.nsw.gov.au**

The Department of Lands (Lands) provides a variety of land administration and land management products and services. These include land ownership information, surveying and mapping, land valuation services, stewardship and development of Crown lands and soil, water and environment conservation works and consultancy services.

Our products and services underpin the economic well being of the State of New South Wales by providing sound, accurate land information, which assists in generating economic growth and investment in New South Wales, and in informing planning, policy development and decision making across the public sector.

Paul Harcombe is the Chief Surveyor, Land and Property Information NSW (LPINSW) within the Department of Lands. His primary responsibilities include management of the State Survey System, and related statutory functions. He holds a Bachelor in Surveying from the University of New South Wales and also a Master of Geomatics from the University of Melbourne. He has a broad background in surveying and land information.

Paul is a member of the NSW Board of Surveying and Spatial Information which regulates land and mining surveying activities and advises Government on Spatial Information matters. He is also Deputy Chair of the Geographical Names Board of NSW and Director of the Common Spatial Information Initiative- the NSW whole of government strategy for Spatial Information.

Other positions held include membership of the University of NSW Dean of Engineering Advisory Committee, several Survey industry committees, as well as being on academic advisory boards for surveying and spatial information schools at Melbourne and New South Wales Universities.

Paul is an inaugural Director of auCD – a not for profit company established to manage the allocation of geographical names for use by Australian communities as Second level Internet Domain Names - a World first initiative for Australia.

Most recently Paul was appointed by the Institution of Surveyors, Australia as the Congress Director for the FIG XXIV World Congress which will be held in Sydney, Australia in 2010.

NORTHERN TERRITORY

Department of Planning & Infrastructure

Northern Territory Government

GPO Box 1680
DARWIN NT 0801

http://www.ipe.nt.gov.au/howdoi/index.html

The Department of Planning and Infrastructure is the lead agency for land administration and spatial information in the Northern Territory Government. Spatial information is largely delivered through the business units of the Land Information Division as follows:

- Survey – provides the statutory functions of the Surveyor-General, geodetic and cadastral (or land boundaries) infrastructure and supports the Place Names Committee and Surveyors Board for the Northern Territory
- Land Information - provides whole of government aerial photography, satellite imagery and topographic information programs, generates products and services from integrating spatial data and delivers services through Land Information Centres
- Valuation – provides the statutory functions of the Valuer--General for both commercial land and property valuations for the Northern Territory and local governments
- NT Land Information Systems – provides integrated spatial information systems and services to the Department and other government agencies and coordinates land information initiatives across Northern Territory, local and Australian governments.

Garry West (ICSM Chairman 2006-2008)

Surveyor-General

Tel: +61 8 8999 6062 or (08) 8999 6062

Email: **garry.west@nt.gov.au**

Sydney Technical College, Surveying Certificate (Hons) University New South Wales, Batchelor of Surveying (Hons 1) Northern Territory University, Graduate Diploma Administration Flinders University, Graduate Certificate Public Sector Management

Current Position: Surveyor-General, Land Information, Department of Planning and Infrastructure, Northern Territory.

Activities in home and International Relations: member NT Place Names Comittee; member NT Electoral Commission; member Institution of Surveyors Australia; Regional NT Committee Member Spatial Sciences Institute Australia; Chairman Council of Reciprocating Surveyors Boards for Australia and New Zealand; Chairman Intergovernmental Committee on Surveying Mapping for Australia and New Zealand.

QUEENSLAND

Department of Natural Resources and Water

Dr Russell Priebbenow

Director of Surveys

Tel: +61 7 3896 3192 or (07) 3896 3192

Email: **russell.priebbenow@nrw.qld.gov.au**

GPO Box 2454
BRISBANE QLD 4001

http://www.nrw.qld.gov.au

The Department of Natural Resources and Water (NRW) works with industry, the community, landholders and other government agencies to ensure that the management of Queensland's natural resources is innovative, responsible and balances the needs of today and tomorrow.

NRW's responsibilities are many and cover issues such as vegetation and land management, securing water supplies, native title and protecting Aboriginal and Torres Strait Islander cultural heritage. The responsible use of Queensland's natural resources will support economic growth and ensure future generations are able to share the benefits.

Russell is Director, Survey Policy & Infrastructure with the Queensland Department of Natural Resources & Water. In this position he is responsible for the legislative and policy framework for surveying and mapping, and for the provision of the geodetic and positioning infrastructure.

Russell is a registered cadastral surveyor. He has been involved with surveying and mapping policy and business direction in the Queensland government for 17 years. Prior to this, he carried out research into the mapping applications of imagery from the SPOT satellite, and attained a PhD from the University of Queensland for this research. Russell also holds a Bachelor of Surveying with Honours from the University of Queensland.

Russell is a member of the Surveyors Board of Queensland. He is also a member of the Faculty Advisory Committee for the Faculty of Engineering and Surveying at the University of Southern Queensland.

SOUTH AUSTRALIA

Department for Transport, Energy and Infrastructure

Government of South Australia
Department for Transport, Energy and Infrastructure

GPO Box 1354
ADELAIDE SA 5001

http://www.landservices.sa.gov.au

Land Services Division is a business unit within the Department for Transport, Energy and Infrastructure and has a lead role for land administration within South Australia through the provision of:

- a survey infrastructure
- a guaranteed system of land titling
- an impartial property valuation service
- land and property information

The Group includes the statutory offices of the Registrar-General, Surveyor-General, and Valuer-General and provides a range of land administration products and services to government and the community.

Peter Kentish

Surveyor-General, Manager
Land Boundaries Branch

Tel: +61 8 8226 4036 or (08) 8226 4036

Email: **kentish.peter@saugov.sa.gov.au**

BTech (Survey), Grad Dip Project Management, FIS, FSSI, LS

Peter graduated from the South Australian Institute of Technology in 1972 and commenced his professional career in the private sector in South Australia. He was licensed as a surveyor in 1978 and joined the South Australian Public Service as a senior surveyor in 1983.

Here he moved from field surveying to policy development and in the mid 1980's oversaw the development of the Survey Act 1992 which resulted in the transfer of the responsibility for licensing and registering surveyors from the Government to the profession.

Peter was appointed Surveyor-General of South Australia in 1994. In this role he has statutory and operational responsibility for the State's cadastral and geodetic survey systems and South Australia's nomenclature. He is also a member of State Electoral Districts Boundaries Commission and Federal Redistribution Committee for South Australia.

TASMANIA

Department of Primary Industries & Water

Peter Murphy

Director Geospatial Information, Surveyor-General

GPO Box 44
HOBART TAS 7001

http://www.dpiw.tas.gov.au

The Department of Primary Industries and Water (DPIW) drives sustainable development of Tasmania's natural resources by playing a central role in industry development, natural resource management, land information services and the conservation of our natural environment.

Our broad range of services include: agriculture; fisheries and aquaculture; land and water resource management; nature conservation; Crown land management; quarantine; Service Tasmania shop management; and land title, valuation and mapping services.

The Information and Land Services Division provides services that maintain the security of land tenure, including the collection and maintenance of core land datasets and the State's cadastral mapping system. The Division also provides access to land-related information through the Land Information System Tasmania (LIST) web interface.

Tel: +61 3 6233 3238 or (03) 6233 3238

Email: **peter.murphy@dpiw.tas.gov.au**

B. Ap. Sci (Surv), Grad. Dip. Computing, Cert. Prof. SSI

Peter Murphy has had wide-ranging survey experience and extensive involvement in public sector management. His interest in surveying started during National Service training in 1971-1972 and grew through work with a private surveying practice. He obtained his degree in 1977.

After four years in private practice, Peter worked as a mining surveyor for a further four years.

He was subsequently appointed to various positions within the Tasmanian Government and developed systems and practices for digital data collection and 3D terrain modelling, as well as implementing innovative survey methods for major road works.

Peter was responsible for implementing quality systems in the former Department of Transport and Works and was a member of the executive management team for developing and implementing the State roads program. He later worked in asset management until he was asked to create an information service for Tasmania's infrastructure and resources (IRIS Tasmania) in 2000.

Peter was appointed Surveyor-General in 2003 and has since implemented the Surveyors Act 2002 and associated Survey Directions. He is Chairman of the Nomenclature Board of Tasmania, and as Director Geospatial Information he is also responsible for policies associated with the Land Information System Tasmania (LIST).

VICTORIA

Department of Sustainability & Environment

PO Box 500
EAST MELBOURNE VIC 3002

http://www.dse.vic.gov.au

The Department of Sustainability and Environment leads the Victorian Government's efforts to sustainably manage:

- water resources and catchments
- climate change
- bushfires
- parks and other public land
- forests
- biodiversity and ecosystem conservation.

The department employs approximately 2,700 staff, working in and around 90 different cities and towns across Victoria.

Included in the Department's broad range of outcomes are:

- Confidence in the integrity of the property system underpins the Victorian economy and is fundamental to our prosperity.
- Comprehensive and accessible spatial information that supports the effective operation of a number of public and private sector institutions.

John Tulloch

Surveyor-General

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John Tulloch is the Surveyor-General of Victoria, located in the Land Victoria division of the Department of Sustainability and Environment, and is the primary government authority on surveying and cadastral boundaries.

His major responsibilities involve regulation of cadastral surveying practices and monitoring compliance with relevant legislation and practice directives.

As Chair of the Surveyors Registration Board of Victoria, John oversees the regulation of the surveying profession covering training, licensing and disciplinary matters, and the provision of high level advice to the Minister.

John is also Registrar of Geographic Names with responsibility for administering place names legislation. Other positions include membership of the Electoral Boundaries Commission, University of Melbourne Faculty of Engineering and the Geomatics Course Advisory Committee.

John was appointed Surveyor-General in 2003 after accumulating 30 years experience in a variety of surveying roles in both the government and private sectors.

John Gallagher

Manager Data Acquisition and Development

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Email: **john.gallagher@dse.vic.gov.au**

John Gallagher is the Manager Data Acquisition and Management located in the Spatial Information Infrastructure Division (SII) of the Department of Sustainability and Environment (DSE). SII has a whole of State responsibility for spatial policy and the creation, maintenance and distribution of framework spatial data as well as provision of spatial services to DSE.

John's role is in the creation and maintenance of the 9 framework data products including the management of key custodians and development of the data products. The role also extends to the provision of positioning services through the establishment and operation of the State's GNSS network and the cooperative acquisition of image data.

John is a Registered Surveyor and has been in his current role for approximately 12 months following on from a 10 year program establishing and maintaining custodial relationships with Local Government and other key stakeholders. He has been involved in the spatial sciences for more than 35 years, the majority of which has been in the water utility businesses of Melbourne.

WESTERN AUSTRALIA

Landgate

Gary Fenner

Executive Director Information Services and Valuer General

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B Bus (Val), Dip Agric., Certified Practising Valuer

The Landgate provides:

- land and property information
- a secure land titles system and
- land valuation services

Landgate is the Statutory Authority responsible for Western Australia's land and property information. Landgate's transition from the Department of Land Information came into effect on 1 January 2007.

As a Statutory Authority Landgate maintains the State's official register of land ownership and survey information and is responsible for valuing the State's land and property for government interest.

Our core business is land and property information. Geospatial data is gathered from ground surveys, aerial photographs and satellite imagery. This information is used to produce a wide range of digital and hard copy products and services.

Landgate is in the process of developing a common platform to provide increased access to government land and property information and is investigating ways to partner with sections of industry and government to provide better quality and more accessible land and property information.

Gary is currently the Executive Director of Information Services and the Valuer General at the Department of Land Information. He has previously held both the Chief Valuer, Metropolitan and Chief Valuer, Country positions.

Gary has a Bachelor of Business from WAIT (now Curtin University), Diploma in Agriculture and he is also a Licensed Valuer. He is a Board member for the Australian Property Institute; member of the Curtin Education Committee Commerce (Property) Course Review sub-committee; member of the Property Education Foundation and Chairman of the Legislative Review Committee (API).

ICSM SECRETARIAT

Susie Salisbury

ICSM Executive Officer
Geoscience Australia

Tel: +61 2 6249 9677 or (02) 6249 9677

Email: **icsm@ga.gov.au**

A geographer by training and with a love of mapping, Susie has worked as a cartographer for almost 30 years. She joined National Mapping in 1980 and for a significant part of that time she was the Chief Geographer of Australia. In recent years she was in charge of a team of geographic researchers, tasked with gathering the revision information for Geoscience Australia's 100K and 250K topographic mapping and data products.

In 2004 she joined ICSM as its ICSM Executive Officer.

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PO BOX 457 MAWSON ACT 2607
Tel 02 6232 6400

Photographs and Diagrams

cover	Photograph by Matt Amos from Land Information New Zealand view from Ngongotaha looking over the suburbs of Rotorua to Lake Rotorua, New Zealand
main index page	Photograph by Josh Leyshon and Ryan Mathews, Geoscience Australia Natures Window, Kalbarri National Park, WA
page 2	Photograph by Don Brice Photography 245 Sturt Street ADELAIDE SA 5000
page 13	Andrew Binns, Abbas Rajabifard, Phil Collier & Ian Williamson Issues in Defining the Concept of Marine Cadastre For Australia, (2004)
page 27	International Federation of Surveyors (FIG), Commission 7, 1994

David Campbell, Michael Holzapfel and Anastasia Christodoulu,
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Survey Tide Gauge, Tasmania
Trig Station, Mount Gudgenby, ACT

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ICSM
INTERGOVERNMENTAL COMMITTEE ON
SURVEYING & MAPPING