

# **Closer Than You Think: The Pioneering Relationship between PSMA Australia and EuroGeographics**

**Dan PAULL, Australia**  
**Dave LOVELL, Great Britain**

**Key words:** International, Collaboration, EuroGeographics, INSPIRE, PSMA Australia, Spatial Data Infrastructure, Spatial Data Integration.

## **SUMMARY**

PSMA Australia is an unlisted public company that is owned by the governments of Australia. It was established as a company in 2001 to coordinate the assembly of, and facilitate access to, fundamental national spatial and spatially related datasets.

EuroGeographics is a body that was established in 2000 to represent Europe's National Mapping and Cadastral Agencies. It was established to facilitate collaboration between participating countries of Europe, and to develop pan-European datasets.

This paper will discuss the similarities between PSMA Australia and EuroGeographics, and how the domestic and international spatial communities will benefit from the establishment of their strategic relationship.

This paper will explore the connection between PSMA Australia and EuroGeographics by:

- Exploring the similarities between business models and governance structures;
- Discussing the process required for the development of Continental datasets involving multiple governments;
- Discussing how both organisations are involved in global initiatives to further spatial data activities;
- Exploring the delivery of 'spatial Marketplaces' to both the Australian and European spatial communities; and
- Exploring the development of an international collaboration for further development in the areas of data standardisation and integration.

The relationship between PSMA Australia and EuroGeographics is strategic and previously unseen within the global spatial community. It provides a linkage, between two organisations, to the government agencies responsible for spatial data across two continents. The benefits to both organisations will be significant in that both the Australian and European spatial communities will be positively influenced by this relationship. Such initiatives as INSPIRE, ANZsi, LYNX, ESDIN as well as data contributors and data consumers from both continents will benefit from the shared knowledge, experience, exposure and resources that will be available from this collaboration.

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## **1. INTRODUCTION**

PSMA Australia and EuroGeographics are essentially mapping agencies with responsibilities for the assembly of spatial datasets across an entire continent. PSMA Australia acts as the national spatial data aggregator on behalf of the governments of Australia and EuroGeographics is effectively the mapping agency for the European Union. Both companies, whilst world's apart geographically, share similar business attributes, values, challenges and strategies to deliver continental datasets.

This paper will explore these similarities and highlight how, through collaboration, much is being achieved to benefit the Australian and European spatial communities.

## **2. COMPANY BACKGROUND**

PSMA Australia and EuroGeographics are continental mapping agencies, both striving to achieve the development of continental spatial datasets. Although similarities are shared between the companies, their path to fruition is quite different. While the organisations share many similarities today, the paths that led them to this point are markedly different.

### **2.1 PSMA Australia<sup>1</sup>**

The concept to form PSMA Australia first came about in 1992, from a meeting of Surveyors-General who discussed the possible creation of a 'national dataset including the Digital Cadastral Database and selected topographic data' (Holmes, 2009), to support the national Census of population and housing conducted by the Australian Bureau of Statistics. Since 1992, considerable work was undertaken to form a mechanism to deliver these national datasets. This work included overcoming the issues of:

- Jurisdictional sovereignty;
- Costs/ Price for data;
- Jurisdiction agreement content (nine Crown Solicitors had to agree);
- Standards;
- Definitions;
- Revenue sharing; and
- Scope of operations.

In 1997, following the delivery of national data for the 1996 Census, PSMA Australia signed its first Value Added Reseller agreement which commenced the development of the PSMA Australia distribution network and the establishment of a commercially focus organisation.

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<sup>1</sup> Largely taken from Paull (2009) and Holmes (2009)

This culminated in June 2001 with the formation of PSMA Australia Limited, became an incorporated company.

PSMA Australia is an unlisted public company limited by shares. It was established under Australia's corporations' law and is wholly owned by each of the State and Territory Governments and the Australian Government. Each government holds an equal share despite their disparity in population and economic capacity. In line with the requirements of Australia's national corporations' law, the directors are required to act in the best interest of all shareholders, which in the instance of PSMA Australia means the overall focus of the company is on the benefits to Australia as a whole.

The means by which PSMA Australia achieves the long-term outcomes sought by its shareholders is by forming and managing a crucial data network between creators of fundamental spatial information and users of this information through aggregating, standardising, integrating, distributing and assisting with the utilisation of national spatial datasets.

Data is valuable, and spatial data has always been more difficult to handle and more difficult to put a value on. Nevertheless, it inherently contains great value. Consequently, PSMA Australia shareholders measure their return not by the size of the dividend returned to them but by the value received by all Australians via access to, and utilisation of, these continental datasets.

PSMA Australia provides a mechanism for sovereign states to work collaboratively and yet is able to act independently within broad boundaries established by its owners – the Governments of Australia. PSMA Australia is a self-funded entity, thereby contributing to its independence and a strong focus on the consumer and the provision of social, environmental and economic benefits through the delivery of continental spatial data. Competition, and the threat of competition, drives increases in efficiency and innovation, ultimately delivering to customers greater levels of value from spatial information which can be extracted with greater ease.

As the Australian population continues to grow, so does the quantity of data requiring management. This is further sustained by the recognition of the importance of spatial data by all sectors of the community. PSMA Australia is a dynamic company, and has, historically, been innovative in the development of continental datasets. PSMA Australia sees its role as an industry leader continuing into the future as it continues to innovate to provide new continental datasets to the wider community.

The governments of Australia established PSMA Australia Limited to ensure that the substantial value inherently held within national spatial datasets could be readily accessed so as to deliver economic, social and environmental benefits to Australia. This is captured in the

Company’s mission statement, which has changed little since it was first crafted over a decade ago. It relates to the strong and consistent focus of the organisation on this task.

*“The return of social, environmental and economic benefits through the provision of authoritative national location information, knowledge and services.”*

Like the mission, the vision has remained reasonably consistent and still accurately describes what it is that PSMA Australia is striving to achieve.

*“To be recognised as instrumental in the provision of the authoritative foundations for enabling and shaping location based business solutions across all aspects of life.”*

**2.1.1 How PSMA Australia Adds Value through a Sustainable Value Proposition**

Significant financial and institutional barriers exist in an environment where the requirements of consumers can only be satisfied through an aggregation of multiple data custodians. These barriers discourage many from even contemplating the task. Each of those that attempt the process carries a significant burden that consumes precious resources that might otherwise be employed in the creation of products and services. It should be noted that the burden does not rest entirely on consumers but also on data contributors.

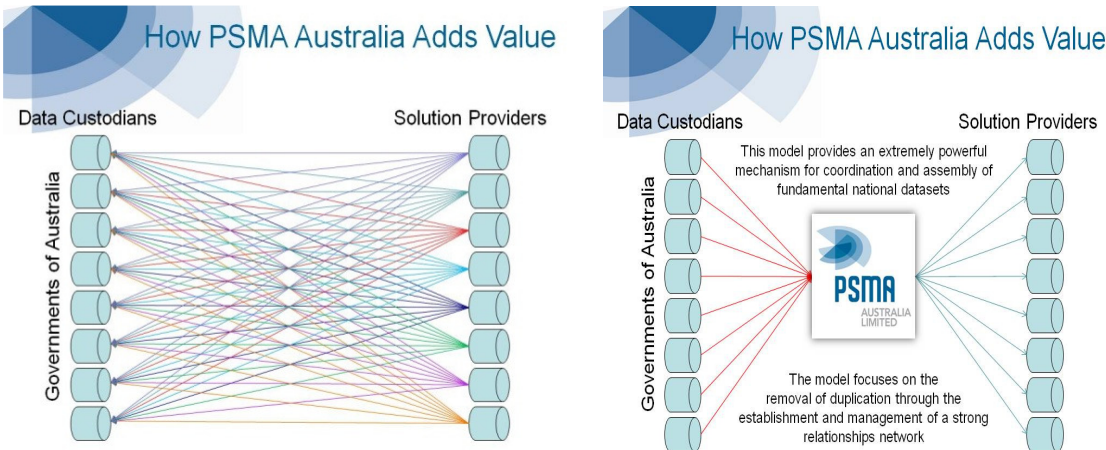


Figure 1: How PSMA Australia Adds Value

The introduction of PSMA Australia into this environment greatly simplifies the arrangements under which standardised and aggregated data can be accessed. The removal of duplication frees up resources that can then be focused on core business and innovation. The ability to share the costs of data conflation across all users enables a higher quality of data at a lower cost per consumer. Finally, there is greater consumer confidence and certainty as there is a single authoritative source for fundamental spatial reference data.

### 2.1.2 Datasets

PSMA Australia has developed six continental datasets that are distributed domestically and internationally. These datasets are released to Value Added Resellers for product and service development on a quarterly basis.

#### **Administrative Boundaries**

The Administrative Boundaries dataset comprises five themes:

- Australian Bureau of Statistics (ABS) boundaries;
- Electoral boundaries;
- Local government areas;
- Suburbs/localities; and
- State boundaries.

The ABS boundaries theme includes three layers—collector districts, statistical local areas and urban centre localities. The electoral boundaries theme has two layers—Commonwealth electoral boundaries and state/territory electoral boundaries.

#### **CadLite®**

The CadLite® dataset depicts polygon representations of the 10.8 million registered land parcels in Australia. It incorporates the legal parcel identifier for each parcel as well as the names of suburbs and local government areas across Australia. This dataset is a graphical index of digital cadastral boundaries, excluding easements and road drainage easements.

CadLite® can be used to reference other geographic and land administrative data available from respective jurisdictions via the legal identifier. CadLite® does not contain any road information, addresses and property details, or contextual information (such as coast, rivers or cultural features) unless they form a cadastral boundary.

#### **G-NAF®**

G-NAF® (Geocoded National Address File) is Australia's authoritative geocoded address index for the whole country, listing all physical addresses in Australia. It contains approximately 12.6 million addresses, each linked to a geocode (that is, the specific latitude and longitude of the address). Data used to build G-NAF® comes from contributors that include the Australian Electoral Commission, Australia Post, State, Territory and Australian Government mapping agencies and land registries.

G-NAF® is the single, national authoritative source for:

- Validating customer-provided addresses (assisting in fraud prevention)
- Identifying the geocode for spatial analysis (creating maps to plot and analyse services and customer locations), and
- Assembling and maintaining large address files (reducing duplication and costs, increasing efficiency and improving mail delivery).

## Points of Interest

The Points of Interest dataset contains more than 130,000 points of interest each with a feature code and name attribution to facilitate selection by categories such as:

Accommodation	Community Services	Cultural
Defence	Education and Training	Emergency
Facilities	Finance	Jails
Government	Grounds	Homesteads
Locality/ Suburb	Medical	Water
Mountains and Hills	Places of Worship	Post Offices
Public Assembly	Relief Feature Names	Utilities
Transport		

## Postcode Boundaries

Each Australian State or Territory has locality boundaries. Australia Post has aligned, where possible, their postcode boundaries to these localities. This alignment was undertaken with the assistance of PSMA Australia, through the use of the organisations mapping capabilities. As a result of this collaboration, PSMA Australia has developed a Postcode Boundaries Dataset that has been endorsed by Australia Post.

The national Postcode Boundaries Dataset reflects delivery area post codes and has a very high degree of alignment with localities. It has two data layers:

- Postcode boundaries - polygon data, and
- Postcode centroids - point data.

The Postcode Boundaries dataset includes approximately 2,600 postcodes.

## Transport and Topography

The Transport and Topography dataset is underpinned by a road centreline layer representing over two million kilometres of road network, together with more than 30 feature types within Transport, Hydrology and Greenspace themes.

The Transport component of this dataset encompasses the roads, rail, rail stations and airport infrastructure networks across the whole country. The rail and rail station layers depict the national rail network, including tram lines. The airports layer also includes landing grounds.

The Topography component of this dataset has two themes-Hydrology and Greenspace. There are two layers of Hydrology, comprising water bodies, major rivers, minor waters and oceans. The two Greenspace layers are urban parks plus national parks and other reserves.

### 2.1.3 LYNX

The best way to describe LYNX is a series of linked initiatives focussed on improving the efficiency and effectiveness of PSMA Australia's end-to-end data supply chain processes.

LYNX is without doubt the most ambitious project that PSMA Australia has attempted. It involves practically every stakeholder associated with PSMA Australia and the re-engineering of the entire data management and delivery processes within the organisation. It is a complex

task in an intricate and dynamic environment. It involves new technology to deliver a world-leading information management and distribution environment. It is bold and ambitious but a natural evolution from the achievements of the past. Its success will come not from the combinations of technology that will be implemented to achieve this outcome, but on the strength of the relationships that have been developed over the last 17 years and the certainty and security for stakeholders in the governance arrangements and business model underpinning PSMA Australia.

LYNX was originally launched in 2006, and was developed to provide a storage environment for PSMA Data. This environment also enabled the establishment of a secure web portal for the provision of data reports and product information, data manager deliverable acceptance and VAR data requests that could be fulfilled by automated DVD burning and mailing, email or FTP delivery.

During 2009, PSMA Australia commenced a new project to redevelop and enhance the existing LYNX infrastructure. The project was named the LYNX Redevelopment and Enhancement Programme. The LYNX Redevelopment Programme is a critical component of the PSMA Australia Data Network. LYNX, through this redevelopment and enhancement programme, will streamline PSMA Australia's end-to-end data supply chain, with its core functions being:

- Assisting Data Contributors, through providing a gateway to efficiently and as far as possible, automatically supply PSMA Australia with data;
- Allowing external technologies to process contributor data and then to store the conflated data through a single point of access;
- Assisting with the provision of services that Contributors and End Consumers can use to enhance their data use experience. This includes services to certify NAMF (National Address Management Framework) compliance; and
- Providing a mechanism for feedback to be registered and passed to Data Contributors. This enables the source data to be updated and improve the quality of data retained by the Governments and Agencies of Australia.

The redeveloped LYNX infrastructure will provide much value to the PSMA Australia supply chain through the following benefits:

- Data and services can move in any direction within the network with ease. This enables the consideration of user feedback to data contributors and the ability to consider data capture through crowd-sourcing;
- Web services required by multiple shareholders can be shared, therefore reducing the cost of development and hosting. Furthermore, this capability promotes consistency and, importantly, delivers a core-business benefit to Data Contributors; and
- New opportunities arise for industry in the delivery of products and services through LYNX, and the building of new products and services to enable LYNX. In the long term, LYNX will become a vibrant marketplace for spatial resources.

The key benefits provided with LYNX will assist in supporting the valuable relationships PSMA Australia has developed, and the core business of data maintenance and management. LYNX is a programme that will support PSMA Australia into the future. It is needed, due to the changes in technology and market conditions, to support the continuous growth being experienced within the spatial industry.

## **2.2 EuroGeographics**

EuroGeographics is an Association established under the French law of Associations of 1901. It is a not-for-profit membership association formed in 2000 by the merger of two former organizations, CERCO (Comité Européen des Responsables de la Cartographie Officielle) and MEGRIN (Multi-purpose European Ground Related Information Network).

CERCO was founded more than 20 years ago to represent the Heads of Europe's National Mapping Agencies (NMAs). By 2000, membership had increased to 37 countries and the organization provided a useful forum at which experiences were shared and common problems resolved.

In 1993 CERCO established its 'daughter' organization MEGRIN to manage pan-European projects. These have included the creation of harmonised geographic databases and the development of web-based metadata services.

EuroGeographics currently has 53 members, covering national mapping and cadastral agencies from 43 countries in geographical Europe. The Association is under the day-to-day management of an Executive Director and a team of seven staff, based just outside Paris but with individuals working in Belfast, Southampton, Bratislava and Brussels all connected using modern ICT tools including VOIP communication and web services for remote access to computer files.

EuroGeographics members invest around €1.5 billion in the development of geographical information each year and use cutting-edge technology to create, manage, maintain and make available authoritative national databases. EuroGeographics experts are developing an infrastructure that integrates their members' national data – including topographic and land information – to deliver the definitive pan-European location framework for a wide range of users and uses.

EuroGeographics' vision is:

*To achieve 'interoperability' of the Members' national land and geographic information assets in order to provide Europe with an information asset that will support its goal to become the most competitive and sustainable economy in the world.*

The Articles of Association define the Mission:

*To further the development of the European Spatial Data Infrastructure through collaboration in the area of geographical information, including topographic information, cadastre and land information.*



Achieving the vision and fulfilling the mission, EuroGeographics is built upon:

- Engagement – to build a strong association of motivated members based on effective internal communication and to represent the members to provide a ‘unified voice’ to external stakeholders;
- Exchange of best practice – to provide a platform for the exchange of information amongst its members, including the implementation of joint ‘development’ and ‘best practice’ projects;
- Delivering the (interoperable) infrastructure that will facilitate creation of pan-European datasets and services built on the members’ national information assets.

### 2.2.1 How EuroGeographics adds value at national and European level.

Put simply, the wheel only needs to be invented once. Once invented and manufactured, it needs to be rolled out far and fast.

Implementing these principles and coordinating the various activities is achieved through a well-organised and structured Programme Management regime. This is based upon strong leadership, clear responsibilities and a resources network of members’ expertise. This is described in the following diagram.

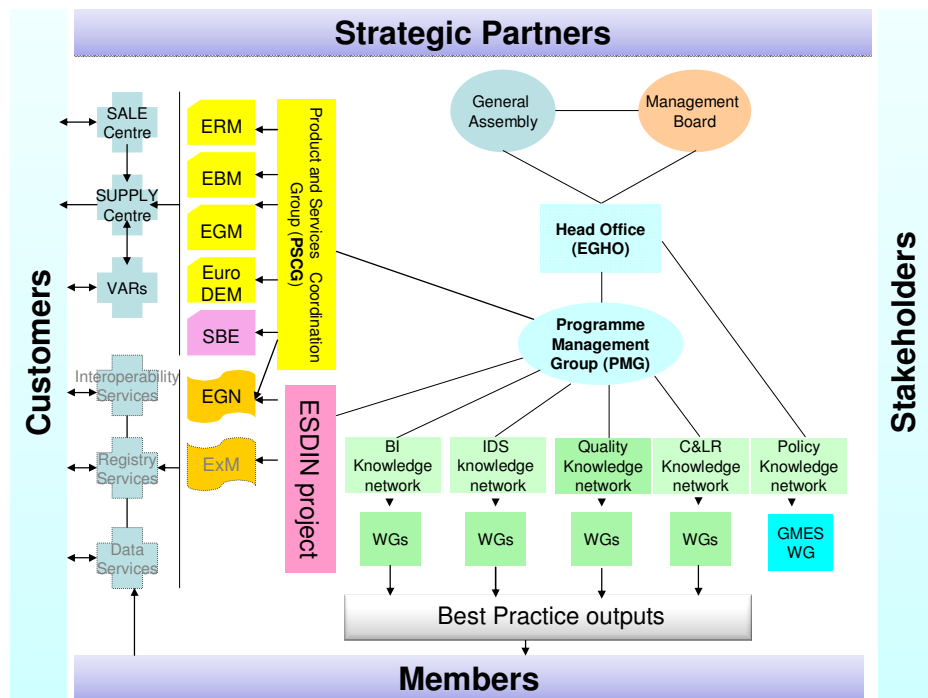


Figure 2: How EuroGeographics manages value delivery.

Within this structure each product, project and knowledge exchange network is managed by EuroGeographics Head Office or an expert from one of the member organisations.

As the number and complexity of issues affecting the provision of spatial data at national and continental level has grown so has the need for greater short term agility within a longer term

planning horizon. As a result regular scenario modelling and mid- and long-term planning has been introduced.

### 2.2.2 Datasets

EuroGeographics pan-European datasets and services have been created through the active contribution of its members, using national data, the knowledge and experience from members' experts and in cooperation with both private business and academic resources.

The products continue to be improved in content, coverage and quality based upon direct feedback from organisations such as the European Environment Agency and the European Commission via Eurostat.

#### **Administrative Boundaries**

EuroBoundaryMap is a seamless database at the scale 1:100 000. It is EuroGeographics' oldest product, was launched in 1992, and today covers 39 countries. It contains the geometry, names and codes of administrative and statistical units continuously updated by the national mapping and cadastral agencies (NMCAs) of Europe. EuroBoundaryMap is an example of how EuroGeographics has developed its product over the years based on pan-European user requirements. Today's product is widely used in the European Commission and it is an integral part of their GISCO reference database.

#### **Transport and other Topographic Data Themes**

EuroRegionalMap is a multi-functional topographic reference dataset at the scale 1:250 000 covering 35 countries. It is seamless and harmonised data that is produced in cooperation with the NMCAs, using the official national databases and is designed to provide the basis for all EuroGeographics pan-European products.

EuroRegionalMap is designed for professional use and facilitates comprehensive spatial analysis, e.g. transport and water networks have full connectivity, administrative boundaries are topologically consistent. The product is extensively used by the European Commission and other bodies to analyse and report on environmental, transport, health and many other policy and service topics.

EuroGlobalMap is a topographic dataset at the scale 1:1 Million and it covers 32 countries. It is seamless and harmonised data and is produced in cooperation with the National Mapping and Cadastral Agencies of Europe, using official national databases.

#### **Height**

EuroDEM is a mosaic of EuroGeographics members' national elevation data. It provides a digital representation of the ground surface topography of 38 countries, making it ideal for environmental change research, hydrologic modelling, resource monitoring, mapping and visualisation.

## **Gazetteers**

EuroGeoNames provides the infrastructure through which the gazetteers of official names maintained by the National Mapping and Cadastral Agencies across Europe are made available to users. Currently the service is undergoing user testing before wider commercial release.

### **2.2.3 ESDIN**

ESDIN - Underpinning the European Spatial Data Infrastructure with a Best Practice Network Background is a project part funded by the European Commission's eContentplus programme.

The project was conceived and defined within the context of the European Commission's ambition to build a European Spatial Data Infrastructure (ESDI) for which INSPIRE is the legal instrument. Whilst this mandates that the ESDI will be based on the National Spatial Data Infrastructures in Member States, many practical implementation issues have yet to be resolved.

The ESDIN project is helping Member States, candidate countries and EFTA States achieve interoperability of their geographical information, between data themes, across borders, for different applications and at different resolutions.

The project is dedicated to overcoming the technical and business obstacles which currently make it difficult for users to: find, assess, harmonise across national borders, download and use public sector geographical information in a reliable and cost effective manner. The project will develop a sustainable best practice network, improve aggregated information for a number of INSPIRE data themes, provide interoperability services and support the ongoing development and testing of INSPIRE implementing rules and data specifications.

It will address the challenge of 'business interoperability' by harmonising the pricing and licensing policies for National Mapping and Cadastral information which exist across Europe. It will facilitate effective management of intellectual property rights whilst providing access to data through simple data licensing in a digital geo-Rights management environment to provide fast and easy user access to data. Quality of data is also a prime concern of users and this will be addressed by establishing a standard approach to reporting data quality for a range of data in a manner understood by users (Jakobsson et. al., 2009).

ESDIN is led by EuroGeographics and brings together the National Mapping and Cadastral Agencies of Europe, a number of academic institutes and commercial companies. Through blogs and electronic discussion forums, it draws upon the ideas, expertise and experiences of people from across the globe.

The project will deliver aggregated (interoperable) data for six of the 34 data themes in INSPIRE through a distributed technical architecture and a number of interoperability components including:

- Content transformations, containing functionalities for schema-based data and query transformation;
- Coordinate Reference System (CRS) transformation;
- ‘On the fly’ edge-matching and map generalisation;
- Specifications and guidelines for sustainable maintenance of pan-European data using stable Unique Identifiers;
- Geo Rights Management services (GeoRM);
- A data quality evaluation service composed of a quality model and guidelines based upon ISO standards; and
- A pricing and licensing policy aimed at maximising use and re-use of pan-European geographic information,

The project builds upon work carried out in previous European Commission funded projects including GMoDig, RISE, MOTIIVE, EuroRoadS and EuroGeoNames.

### **3. SHARED ATTRIBUTES**

#### **3.1 Governance Structure**

Both PSMA Australia and EuroGeographics are firmly established under national laws relevant to their ambition and activities. PSMA Australia is a commercial company whilst EuroGeographics is an association which is permitted in law to carry out commercial, and other, activities.

Both organisations have Management Boards who scrutinise the performance of the executive and provide management control and direction.

The role of the ‘shareholder’ is formally recognised as such in PSMA Australia. In EuroGeographics no formal shareholders exist.

In both cases the shareholder interest is separated from the Board’s functions and documented as such in Corporate Governance charters and Codes of Practice.

#### **3.2 Business Model**

PSMA Australia has a unique business model. All profits that are obtained during the financial year are reinvested for the further development of products and services to fulfil its vision to enable the Australian Spatial Industry. The reinvested profits contribute to the further development of datasets, spatial services, and provide government and industry support.

To further understand the business of PSMA Australia, it is important to realise that PSMA Australia does not obtain government data at a nil cost. PSMA Australia pays licensing fees, equal to or greater than market rates, to access data provided by the States, Territories and agencies of the Australian Government.

EuroGeographics is a ‘not for profit’ organisation. Its income comes from members’ subscriptions, licensed sales and European Commission funding for projects. The latter being available typically annually but only after winning a competitive process.

Profits, which are subject to corporate taxes in France, are avoided with any surplus after taxation used to fund subsequent projects or exceptional operating cost.

While the mechanism used to achieve the business intent of each organisation is different, the underlying rationale is very similar. It is evident that both PSMA Australia and EuroGeographics are driven to provide returns that benefit the wider spatial and non-spatial communities. This is demonstrated not only in their mission statements, but also in Business Models. It can be said that both Business Models are unique and are focused towards developing new spatial initiatives and technologies to discover new ways for spatial data to be used to benefit their ‘audiences’.

### **3.3 Supporting Spatial Community Development**

Through the ESDIN and LYNX projects, significant effort is being made to assist European and Australian communities in the development of Spatial Data Infrastructures (SDI).

The European SDI is being developed in accordance with the INSPIRE directive (European law). Once completed, it will provide accessibility to European Union Member States’ spatial data and spatial services that has previously been unseen for such a large area anywhere in the world. Whilst the investments in this SDI at national level are huge the benefits for society far outstrip them. In the Netherlands, where the economic value of the geo-information sector is estimated to be € 1,4 billion, or 0.25% of the national GDP, it is estimated that investments in INSPIRE will be between € 93 and € 138 million per year for 10 years with the associated benefits potentially running from € 770 to € 1150 million per year.

In fact, in all cases known to the authors, the cost benefit analysis carried out at national level has shown significant positive benefits.

Of course, whilst INSPIRE is a huge step forward, its timescales are of necessity very long. As yet not all European Union Member States have taken the necessary step of incorporating it into their national law. Notwithstanding this, the members of EuroGeographics have already invested perhaps one million hours in developing the European implementing rules, data specifications and in implementing their national infrastructures which, together with other components, make up the SDI. In fact the practical implementation of INSPIRE, with the exception of a geoportal being developed by the European Commission, will be done by the member states.

At present, in parallel with the enormous efforts at national level the ESDIN project, lead by EuroGeographics, brings together the national mapping, land registry and cadastral agencies of Europe with academic and commercial partners, such as 1Spatial, to develop services for the benefit of the European community. In addition to developing new INPSIRE compliant

specifications, the services being developed will test whether the principle of distributed databases aggregated on the fly, embodied in INSPIRE, is a practical reality.

Until the INSPIRE European Spatial Data Infrastructure is completed, the location reference component of the ESDI will continue to be met by EuroGeographics' pan-European products. These will be implemented within a technical infrastructure managed by the European Statistical Agency, on behalf of the European Commission.

From an Australian perspective, a report prepared by ACIL Tasman (2008) found that spatial information activity contributed to a cumulative gain of between A\$6.43 billion and A\$12.57 billion in Gross Domestic Product (GDP) – equivalent to 0.6% and 1.2% of GDP respectively. However, than the activities of PSMA Australia, Australia does not yet have a national SDI, but discussions are occurring to commence the delivery of, not just an infrastructure across Australia but New Zealand as well. ANZsi (Australian and New Zealand Spatial Infrastructure) will be all-encompassing, through the inclusion of State and Territory spatial infrastructures, with PSMA Australia's LYNX infrastructure being at the forefront of the SDI. The timeline for the development of the Australian SDI is still to be determined, but momentum is rapidly growing.

To further support the broad use of spatial information and the SDI initiative of ANZsi, the industry has been successful in establishing a Cooperative Research Centre for Spatial Information (CRC-SI) with a major research theme dedicated to ANZsi and jointly lead by PSMA Australia. The CRCSI brings together A\$100 million in cash and in-kind from its partners to identify the question of Australia's future spatial information needs and to seek innovative solutions to these needs. The CRCSI uses the collective wisdom of a broad base of participants to accelerate the industry wide growth; generate intellectual property; seek efficiency gains for government; inform environmental management; and best position the research and education programs of universities and other institutions.

The major involvement of both PSMA Australia and EuroGeographics within the continental SDI development projects is testament to how both organisations are striving to enable their wider spatial communities. It is evident that significant commitment is required from both PSMA Australia and EuroGeographics to provide the guidance that these SDIs require.

## **4. DEVELOPING CONTINENTAL DATASETS**

### **4.1 PSMA Australia's Experience**

PSMA Australia has had significant experience in developing continental datasets, dating back to 1993, with the delivery of the first digital multi-resolution map base for the 1996 Australian Census. From this early stage, PSMA Australia recognised that success in the development and maintenance of continental datasets was predicated on two factors:

- the quality and breadth of relationships and the management of this network; and
- the efficiency with which data from disparate sources could be integrated, harmonised and delivered to meet a wide range of user requirements

PSMA Australia manages a complex network of relationships to achieve the development and distribution of its continental datasets that essentially consist of three key roles; data contributors, data distributors and supporting partners.

Data Contributor relationships are established with organisations that are custodians of the data required by PSMA Australia to build national datasets. The major contributors are the States, Territories and Australian Government agencies but there are also a small but growing number of private data contributors. These relationships are critical to enable the quarterly supply of data for the development of all six PSMA Australia datasets.

Data Distribution relationships are vital for the exposure and delivery of PSMA Data through targeted products and services. These relationships are with a select network of Value Added Resellers who utilise PSMA Data to develop and enhance their own spatial products. A dedicated team in a wholly owned PSMA Australia subsidiary (PSMA Distribution) work closely with this distribution channel to maximise both its effectiveness and the utilisation of the data products produced by PSMA Australia.

PSMA Australia is a relatively small organisation that relies on numerous relationships with other domain experts. These relationships allow the organisation to attempt initiatives well beyond its own internal expertise and have contributed to the agility that PSMA Australia enjoys.

Without effective relationship management across the whole of this network and the skills to coordinate and manage these interactions, PSMA Australia would not have delivered some of the significant achievements that it can now proudly lay claim to.

While Europe has the challenge of language, Australia has a different challenge – that of population density. Australia is the least populated continent in the world and at 2.6<sup>2</sup> people per square kilometre it ranks 235 out of 239 in the world! (See also the work done by researchers at the European Commission's Joint Research Centre in Ispra, Italy, and the World Bank on global remoteness as described by Williams 2009).

The implications for mapping are significant. There is not point mapping the Simpson Desert at 1:25,000 or even 1: 100,000 as there are simply so few features of interest. But in the CBD of Sydney or Melbourne, a mapping scale of 1:2500 is easily justified. In this context, it is the best available data for a location that is included in the national datasets. Add to this the challenge of up to 12 data structures and formats and the thought of delivering quarterly updates to a multi-resolution nationally harmonised digital dataset and it can be quickly seen that the ability to deliver a quality product efficiently and consistently becomes both a challenge and a critical success factor.

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<sup>2</sup> The European Union, consisting of 27 countries, has a population density of approximately 114.  
[http://en.wikipedia.org/wiki/List\\_of\\_countries\\_and\\_dependencies\\_by\\_population\\_density](http://en.wikipedia.org/wiki/List_of_countries_and_dependencies_by_population_density) access 20 Jan 2009.

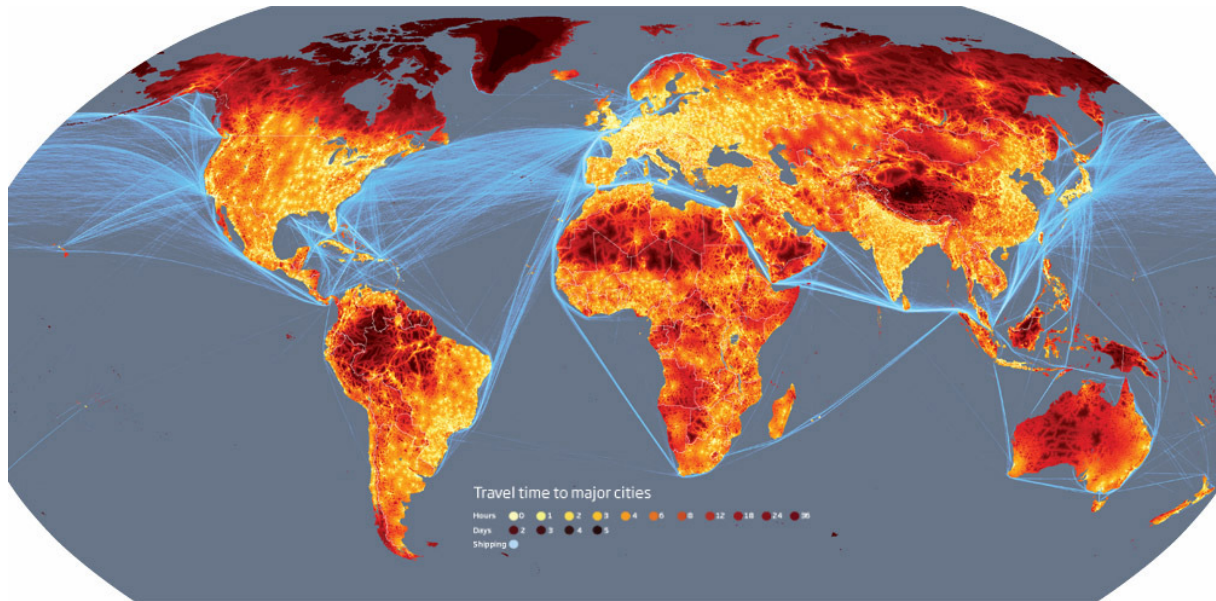


Figure 3: The remotest places on Earth (Williams 2009)

Through the recognition of these strengths, which has been refined through years of experience, PSMA Australia has been able to expand its product base, data quality, update frequency and distribution network whilst also undertaking new and innovative initiatives supporting the continuing improvement to these processes.

#### 4.2 Eurogeographics' Experience

EuroGeographics' experience of providing harmonised and interoperable data over the European territory started in 1992 when CERCO published its first version of the administrative boundary dataset. Since then EuroGeographics has provided mostly generalised map datasets including EuroBoundaryMap, EuroRegionalMap EuroGlobalMap and EuroDEM.

More recent projects, including the State Boundaries of Europe, aim to provide the highest resolution of data available. EuroGeoNames, a web service providing geographical names, is scale independent.

Relationship management, as we have seen in the PSMA Australia case, is fundamental to success, be they relationships on the demand or supply side.

Understanding user requirements is a fundamental pre-requisite for satisfying customer expectations and needs. This is a major challenge for EuroGeographics in trying to provide solutions which meet European user needs and not just because it is a continent with more than 23 official languages!



Identifying the end users and then managing their changing requirements is highly challenging. There are many factors influencing user requirements, of course. EuroGeographics' experience suggests that perhaps the greatest challenge for suppliers - a result of successful industry marketing - is the very diverse uses to which spatial information is being put since it was liberated from the paper map. This has led to continuous and frequent changes to EuroGeographics' specifications.

EuroGeographics current production approach is based on the national mapping and cadastral agencies providing their national data to a central production centre which then compiles the pan-European products. Modern technology however now facilitates the use of a distributed production environment. Accordingly, and because of the many advantages it provides, EuroGeographics is working to introduce this approach in their production environment. The EDSIN project is therefore introducing web services, including edge matching, generalisation and quality evaluation, to supersede some of the functions previously carried out in the production centre.

EuroGeographics' method for producing its European datasets has also utilised existing generalised datasets based on national specifications and harmonising these data to meet a common specification. The main reason for selecting this approach has been a practical one - it was simply not possible to change the specifications of each country in Europe in order to produce European datasets. INSPIRE on the other hand requires an approach based upon common specifications and interoperability at a semantic and technical level.

The INSPIRE legislation has also introduced the principle of reference datasets as the basis for a European SDI. In EuroGeographics' view this means that the reference data should, in every case possible, be sourced from definitive and authoritative official data sources, this is an important principle which EuroGeographics endeavours to implement.

It must also be remembered that at the outset the goal for EuroGeographics was the production of map datasets. This has been a satisfactory solution whilst the use of data was mainly visual. However, the users' needs have changed and now most users require topologically structured data for proximity, network and other spatial analysis. This is driving a fundamental change to the whole production paradigm. In future, the production of generalised datasets has to be based on common generalisation rules.

Driving cost out of production is another important consideration driving change. Currently because each production 'flow-line' is independent of others and each product is updated annually, significant resources are used by EuroGeographics members. EuroGeographics experience has led them to conclude therefore that in future they should concentrate production activity in member organisations at the largest scale and to produce generalised products through centrally provided web services.

Whilst the most cost-effective and efficient approach would be to implement a European specification at national level, the history, which has given each country their own specification and national market resistance to changing it, may result in insufficient progress until INSPIRE is implemented.

Quality is, and will remain, a major challenge for producers of any product. That is why EuroGeographics has had a permanent and very active working group on quality since 1997. Process management will be a key methodology which EuroGeographics will introduce in order to achieve an acceptable level of quality. This is why EuroGeographics is now active in the standardisation arena in order to produce a technical specification on the quality assurance of data supply processes (ISO 19158).

Semantic consistency is not of itself achieved through the implementation of common specifications. Take, for example, the roads or rivers of Europe. Classification of roads is, and is likely to remain, a national domain. What constitutes a main road in one country is not necessarily classified as one in another. The same issue manifests itself in water networks, and other features, as we see reflected in Figure 4.

Whilst user requirements, technology, specifications and relationship management may present challenges, as well as great opportunity of course, commercial or business harmonisation provides perhaps the greatest challenge of all. With nearly as many business models, and certainly pricing and licensing models as there are countries in Europe, it is certainly in this area where EuroGeographics experience shows the greatest difficulty to be. Although EuroGeographics has been successful in agreeing pricing and licensing models, licensing terms and product prices, the increasing diversity of users, uses and channels to market continue to stimulate great discussion in the community it represents. It is perhaps appropriate that the group within EuroGeographics which manages this is known informally as the Business Interoperability Group or BIG for short!

EuroGeographics experience also shows that sustainable funding for the collection, management, maintenance and supply of spatial information, whilst vital in ensuring continuity of benefit to society, is little understood. This too, of course, varies between national jurisdictions and at continental level. The degree to which governments see the importance, contribution and value of spatial information varies considerably in Europe. This influences the level of funding provided from taxation resulting, in some cases, in inadequate levels for even basic modern location infrastructure such as GNSS networks. This is particularly noticeable in some countries still going through the slow process of regime change.

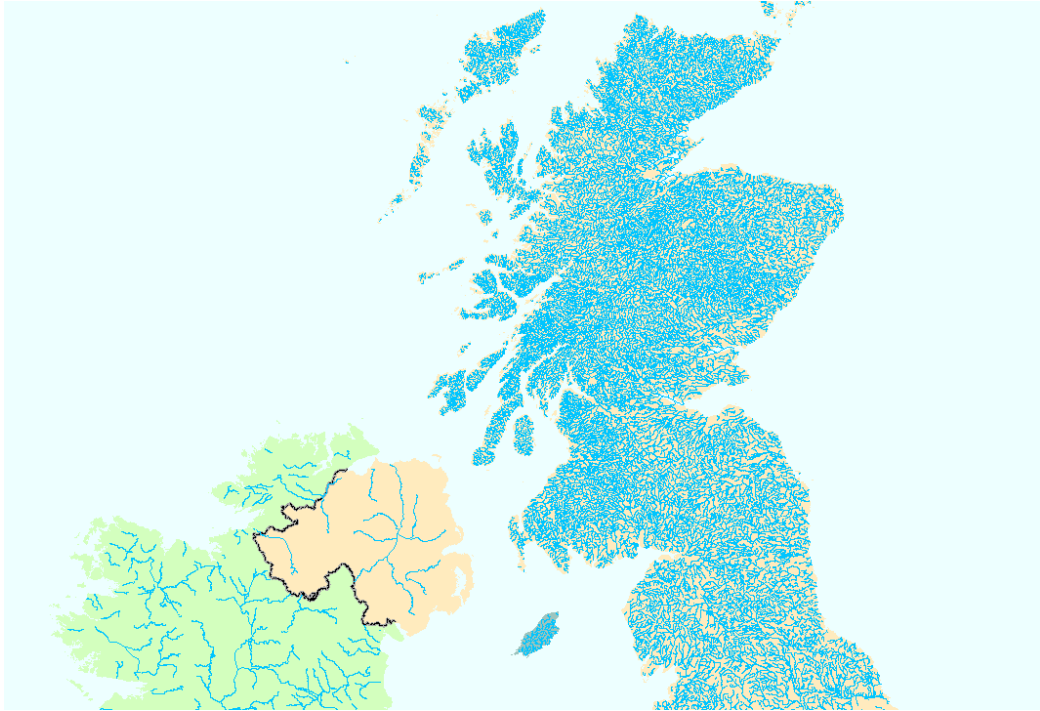


Figure 4: The Water Networks of ‘Cross-Border’ Areas.

EuroGeographics’ conclusions, based upon current experience, are that continental reference datasets must be based upon:

- A clear understanding of users’ constantly evolving requirements;
- A common set of specifications;
- Data aggregated from official national component parts;
- A strong quality management production process;
- Semantic interoperability;
- Data at large, medium and small scale provided by automatic generalisation in a distributed services architecture for capture, aggregation and supply;
- Being quick to market and quick to respond to market changes.

PSMA Australia’s and EuroGeographics’ current developments and working relationship aims to implement these in the LYNX Redevelopment and ESDIN projects.

## 5. THE IMPORTANCE OF COLLABORATION

In the context of the FIG Congress, it may seem trite to say that ‘Bonnie’ needed ‘Clyde’ and ‘Laurel’ needed ‘Hardy’. In Australia perhaps it is more relevant to say that ‘Ned’ needed ‘Dan’ (Kelly).

Whilst history shows that great accomplishments have come from fierce rivalry and competition, much too has been achieved through strong cooperation and collaboration. Since

PSMA Australia and EuroGeographics have no ambition beyond their territorial (continental) territories, collaboration for them is a natural relationship.

In establishing SDIs, be they national, continental or global, a willingness to work together is essential. The dangers of competition, particularly in the provision of spatial reference data have long been recognised. In INSPIRE, through ANZLIC<sup>3</sup>, and elsewhere, this is recognised in the principle of ‘create once use many times’.

In all organisations, particularly those with limited resources, it is important to recognise and play to your strengths, to acknowledge and address your weaknesses, where possible, by drawing on the strengths of others. EuroGeographics has for a number of years encapsulated this in the recognition of strategic partners and utilisation of their strengths through Memoranda of Understandings which provide the framework for planning and delivery of activities across organisational boundaries. To date with the exception of a relationship with EuroSDR (European Spatial Data Research) these relationships have been in the field of policy engagement and professional capacity.

The collaboration between EuroGeographics and PSMA Australia breaks new and important ground for both organisations. Whilst it is at a very early stage it is clear that the relationship has huge potential to deliver in areas such as organisational development and in research into, and development of, technical infrastructures. These will not only deliver benefits to each organisation and the communities they serve but also, and equally importantly, enormous personal development for the dedicated employees in both.

Collaboration, within and across continents, can undoubtedly deliver many benefits and great value.

Although outside the scope of our ambition for a strong collaboration between PSMA Australia and EuroGeographics, the time may well be right to improve effectiveness and efficiency in the representation of national and continental spatial interest. Many members of EuroGeographics for example are also active in PCC, Eurogi, Eulis, ELRA and EuroSDR. In the interest of improved cost effectiveness we must at least answer some questions: Do we need a multitude of secretariats, Presidents, Boards and Chairmen, yes and Executive Directors too? Can more be achieved, particularly within Europe, through a degree of consolidation of spatial representation? If yes, what is the vehicle and mechanism through which this could be done?

Or, in a global economy and a global environment should the continents combine under the UN, or GSDI banner, to deliver local, regional, national and continental solutions to help solve societal challenges? Surely this is a logical consistent vision for such organisations to have?

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<sup>3</sup> The Spatial Information Council of Australia and New Zealand. This body provides an environment to discuss and align spatial policy across and within the two countries.

It is just possible that now is the time for all governments, organisations, professions and people to work together for a sustainable planet with societies living in harmony with each other and the earth they occupy.

## **6. THE FUTURE OF THE RELATIONSHIP**

### **6.1 An Integrated Approach to Research, Technology Development and Innovation**

PSMA Australia and EuroGeographics are now looking to the future to identify how this unique relationship can be further utilised. Significant focus in the future will be on undertaking an integrated approach to research, technology development and innovation. This will be occurring through collaboration on the LYNX and ESDIN projects, provision of guidance in the development of new continental datasets and the identification of new business opportunities.

The year 2010 will be an important year for both PSMA Australia and EuroGeographics, as both organisations seek to work closely together. Steps are already in place to gain a better understanding of each other's business models and practices and to identify areas that can benefit from shared resources and technology. Potentially there is at least the scope to develop a global body of organisations, like that of PSMA Australia and EuroGeographics, to drive the development of national and continental datasets.

The relationship between PSMA Australia and EuroGeographics will continue to be at the forefront of their strategic activities as it becomes increasingly important for business operations.

### **6.2 Benefits to Australia and European Spatial Communities**

In the preceding sections, the similarities between the two organisations have been identified and many opportunities for joint working have been explored. The benefits of this relationship are significant and will enhance and enrich the spatial data communities in Europe and Australia in many ways.

Most importantly there is a great opportunity to reduce duplication of effort and to combine resources to make substantial cost savings; for example, through the sharing of knowledge and lessons learnt in the LYNX and ESDIN projects. Joint investment in innovation and research for product and process development, and in the development and creation of both regional and global SDIs, will be considered.

EuroGeographics is currently looking at how it might be structured as an organisation in the future. PSMA Australia has already completed a structural transition into an incorporated company and will be able to advise and support EuroGeographics through organisational change, suggesting what pitfalls can be avoided and which successful processes can be implemented.

Collective influence is of great benefit when lobbying governments and global institutions to the importance and relevance of Geographic information. To be able to speak and engage authoritatively with the backing of two continental organisations representing 12.3% of the

world's population holds great weight. The use of international case studies acts as powerful examples when demonstrating the efficiency saving and benefits to the citizen that harmonised continental datasets can deliver.

Members of both the PSMA Australia and EuroGeographics teams will also have the opportunity for personal development, allowing them to expand their knowledge and horizons, taking a global view of issues. The ability for members of each team to speak openly about issues and ideas provides an external sounding board - challenges can often be overcome by looking outwards instead of inwards.

Working together and breaking down barriers, learning, sharing, developing, creating and delivering in partnership will lead to changes being implemented more quickly and greater global recognition of the importance of the community we work in. Together we are stronger.

## **7. CONCLUSIONS**

The demand for high quality spatial information meeting the needs of diverse users when and where they need it, on terms and conditions and at a price they find acceptable, has never been greater. Demand will continue to grow.

Satisfying this demand in a timely, cost effective and sustainable manner has never been more challenging. It will continue to challenge us all. The benefits to users from all walks of life in all professions, of the ubiquitous availability of spatial information which meets their current and future needs, is unquantifiable.

Spatial information has a major contribution to make in overcoming the many challenges faced by today's society.

PSMA Australia and EuroGeographics have recognised that by working together they can go further and faster in satisfying the need at a continental level than either can by working apart.

The future of society, and therefore spatial information, is in less competition and more collaboration, in less conflict and more cooperation.

Whilst PSMA Australia and EuroGeographics may each be on opposite sides of the globe they are closer together than you might think!

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## **BIOGRAPHICAL NOTES**

### **7.1.1 Dan Paull**

Dan Paull is the Chief Executive Officer of PSMA Australia Limited, an unlisted public company limited by shares and owned by the State, Territory and Australian governments.

During his 10 years with the company, Dan has contributed to the development of all its national datasets including the G-NAF – Australia’s authoritative reference for physical address and geocoded and LYNX which has won two international awards. In more recent times, his focus has been on strengthening and streamlining the supply chain and strategic relationships that deliver PSMA Australia spatial data products.

He has recently completed an Executive MBA from the Australian Graduate School of Management (2009), is a Fellow of the Australian Institute of Company Directors, Director of PSMA Distribution Pty Limited and a founding member of the Surveying and Spatial Sciences Institute.

### **7.1.2 Dave Lovell**

Dave Lovell is the Executive Director of EuroGeographics a not for profit association established under the French Law of Associations of July 1901. Currently it has 53 members in 43 countries in Europe, each being responsible for their national mapping, land registry and /or cadastral activities.

Dave Lovell is also a Non-Executive Director of the British Geological Survey, a Fellow of the Royal Geographical Society and a Chartered geographer. He is a Board member of the Global Spatial data Infrastructure organisation. Previously he has been a Director of the UK’s Association for Geographic Information and worked for Ordnance Survey for nearly 40 years, ending his career there as Head of Public Affairs.

In his current role as Executive Director of EuroGeographics; he is focused on organisational development, strengthening the focus on effective engagement with legislators, product and services development whilst delivering increased benefits to members and value to European society.

## **CONTACTS**

**Dan PAULL EMBA, BSurv**  
PSMA Australia Limited  
Level 1, 115 Canberra Avenue  
GRIFFITH  
ACT 2603  
AUSTRALIA  
T. +612 6295 7033  
E. [dan.paull@psma.com.au](mailto:dan.paull@psma.com.au)  
Web: [www.psm.com.au](http://www.psm.com.au)  
**Affiliations:** FAICD, MSSSI, MGITA

**Dave LOVELL OBE FRGS CGeog**  
EuroGeographics  
6-8 avenue Blaise Pascal  
Champs-sur-Marne  
FRANCE  
T. +33 164 153 265  
E. [dave.lovell@eurogeographics.org](mailto:dave.lovell@eurogeographics.org)  
Web: [www.eurogeographics.org](http://www.eurogeographics.org)  
**Affiliations:** BGS, GSDI