

Capability Mapping of the New Zealand Geospatial Sector (2007)
Final Report



Report on: **Capability mapping of the New Zealand Geospatial Technology Sector – Final Report**

Prepared by: David Park, Tom Botterill, Dave Allen, Adam Cooper

Version: FINAL

Date: 31st January 2008

Copyright 2008 Geospatial Research Centre NZ Ltd

All rights reserved. No part of this document may be disclosed to any third party, translated, reproduced, copied or disseminated in any form or by any means, except as defined in the contract, without the permission of Geospatial Research Centre NZ Ltd.

Geospatial Research Centre NZ Ltd
Private Bag 4800
Christchurch 8140
New Zealand
Tel: +64 (0) 3 364 3830
Fax: +64 (0) 3 364 3880

Table of Contents

Executive Summary.....	3
Study Objectives.....	5
Scope.....	6
Methodology	7
Survey Summary	8
International Geospatial Sector Review	18
New Zealand's Competitive & Comparative Advantages.....	20
Constraints & Barriers to Growth.....	22
Critical Factors & Drivers of Change	26
Conclusions & Next Steps	30
Appendix A - List of Respondents	32
Appendix B - Database.....	34

Executive Summary

This report provides a high-level assessment of the current New Zealand Geospatial Sector based largely on the response to an online survey by forty of New Zealand's leading Geospatial companies, universities, government organisations and research institutes.

The survey captured information on a range of issues including: geospatial activities (current and planned); key numerical indicators (including revenue, staff numbers, expenditure on equipment hardware and service), and details of current partners and clients.

Details are presented on the typical size, activity and market focus of New Zealand's geospatial sector.

A number of competitive and comparative advantages have been identified for geospatial players operating in New Zealand including:

- World Class Pastoral Industries
- Market Trial Convenience
- Typical Kiwi Attitudes
- Quality Land Data
- Lower Cost Structure
- New Zealand Value Added Service Focus
- NZ Lifestyle

A number of (potential) constraints and barriers to growth have been identified for geospatial players operating in New Zealand including:

- Staff Issues
- Widespread Lack of Geospatial Understanding
- Data Standards Issues
- Difficulties starting / developing a business in NZ and then moving offshore
- Problems Accessing NZ Data
- IT Issues (Internet / Communications)
- Lack of access to funds for growth
- Government Issues

The majority of benefits and constraints raised by the survey participants are aligned with constraints and barriers to growth identified in other NZ sectors / spheres of interest.

The survey data, in conjunction with a brief desktop review, has also identified a number of critical factors and key drivers of change which are expected to impact significantly on the New Zealand Geospatial Industry in the immediate future including:

Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

- Skilled Workforce
- International Networks
- Application of Data Standards
- Infrastructure
- New Zealand Geospatial Forum
- Capital
- Environmental and Climate Change Focus
- Information and Communications Technology Trends
- Tax Structure / Incentives
- Government Sectoral Planning
- Productivity

The report concludes by identifying a number of further activities and key questions that could usefully be addressed in order to further capture the significant issues and opportunities ahead for the New Zealand Geospatial Sector.

Study Objectives

The primary objective of the study is to provide an assessment of the current state of the New Zealand Geospatial Sector. The purpose of doing so is to build on NZTE's current knowledge of the sector to optimise the value of the interventions it makes through:

- maintaining a close focus on New Zealand's global competitive advantages
- promoting industry-wide responses to industry needs and constraints
- introducing appropriate investors and partners to New Zealand geospatial businesses
- other steps it takes to facilitate and promote the growth and development of the New Zealand Geospatial Sector

It is also hoped that the act of initiating and completing this study will not only provide the geospatial community within New Zealand with a useful source of information but act as catalyst for change in terms of inter-sector communication and external engagement.

Scope

This study is an initial, high-level assessment of the geospatial industry in New Zealand across all industries and applications, whether large or small scale, selling domestically or offshore, manufacturing or providing services. The study seeks to identify and describe:

- the breadth and capabilities of New Zealand's geospatial industry
- the key New Zealand based geospatial organisations and their capabilities – those that are leaders in their field and high growth potential companies
- the core strengths of New Zealand's geospatial industry
- constraints, capability gaps, or any other barriers to the growth and success of New Zealand geospatial organisations and industry

A project team comprising the Geospatial Research Centre (NZ) Ltd (GRC), the New Zealand Geospatial Office (NZGO) and Vantage Consulting (Vantage) was established to conduct this first assessment of the New Zealand Geospatial Sector.

Key outputs include details of key NZ-based geospatial sector organisations; their current and future interests and linkages (within NZ and overseas) and identification of core NZ strengths and gaps within the sector.

In addition to this report the key deliverables are a database of geospatial organisations operating in New Zealand and an internet based 'capability map' of geospatial organisations operating in New Zealand, outlining their areas of operation and capability, linkages, relative size, etc. This is available for viewing on line via geoforum.grcnz.com.

Methodology

An online survey was developed and a target list of organisations involved in the New Zealand Geospatial Sector was approached to respond.

Between the launch of the survey (9th October 2007) and the 15th December a total of 43 people representing 40 companies, universities, government organisations and research institutes responded out of 56 organisations who were asked to participate.

The survey asked for details regarding:

- Respondent details
- Current Geospatial Activities
- Geospatial hardware
- Geospatial software
- Geospatial services
- Geospatial data sources
- Employees
- International presence
- External linkages
- Other organizations to contact
- Perspectives on New Zealand's geospatial industry

Some questions asked for specific information but many asked respondents to write free text on various issues affecting the sector. A considerable amount of useful feedback was received.

This provided a first-pass assessment of the New Zealand Geospatial Sector which resulted in the identification of a number of issues, trends and factors which were discussed both in workshops in Auckland and Wellington, and directly with a number of individual respondents.

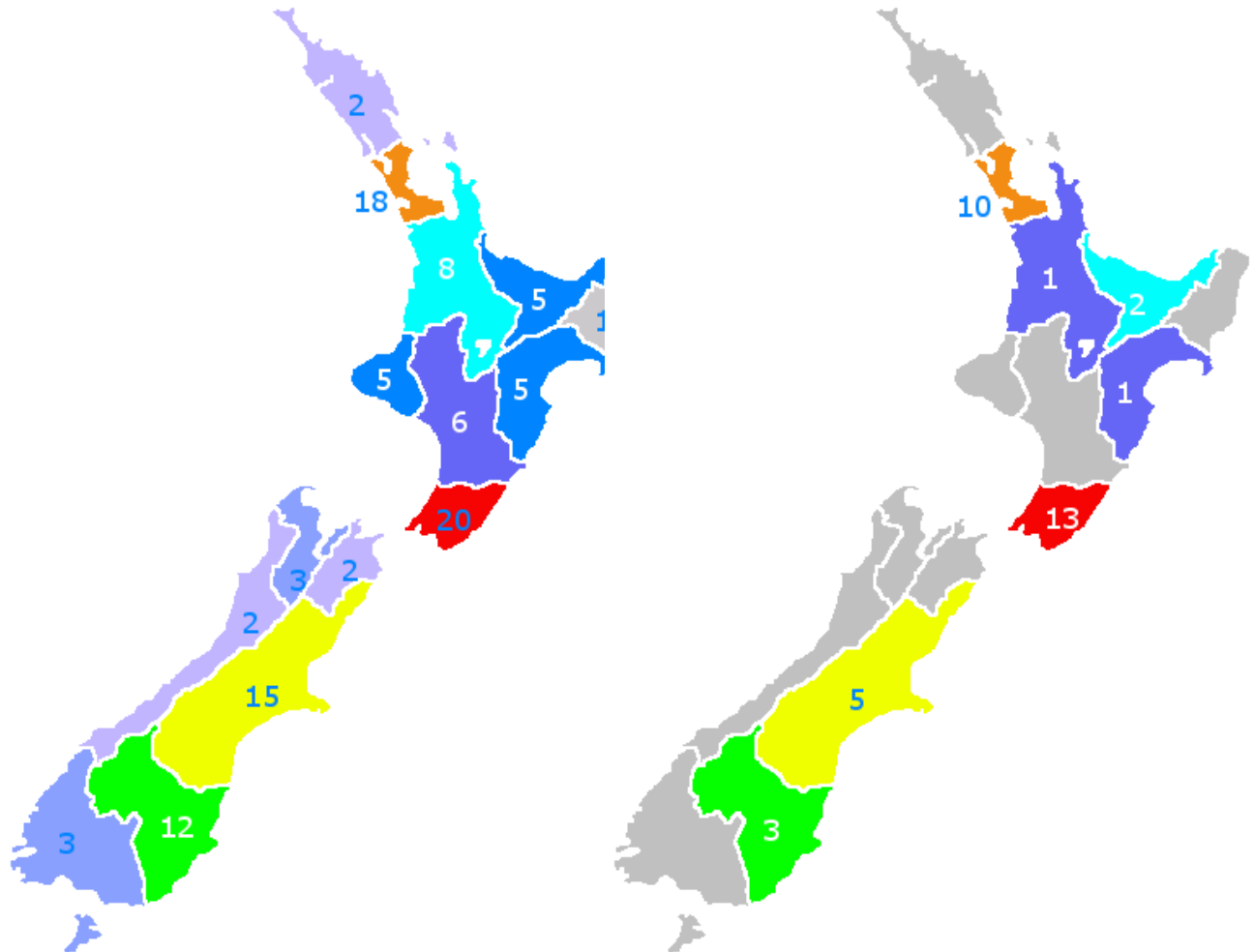
Key findings of the survey were subsequently reviewed with key New Zealand Geospatial Sector participants at meetings in Wellington and Auckland to further test the analysis.

Survey Summary

Geographic distribution of NZ Geospatial Companies

Areas where survey respondents operate

Areas where survey respondents are based



Region	Geospatial companies operating here	Geospatial companies based here
Wellington	22	15
Auckland	20	12
Canterbury	15	4
Otago	13	3
Waikato	9	1
Manawatu-Wanganui	6	1
Hawke's Bay	5	1
Bay of Plenty	5	2
Taranaki	5	

Capability Mapping of the New Zealand Geospatial Sector (2007)

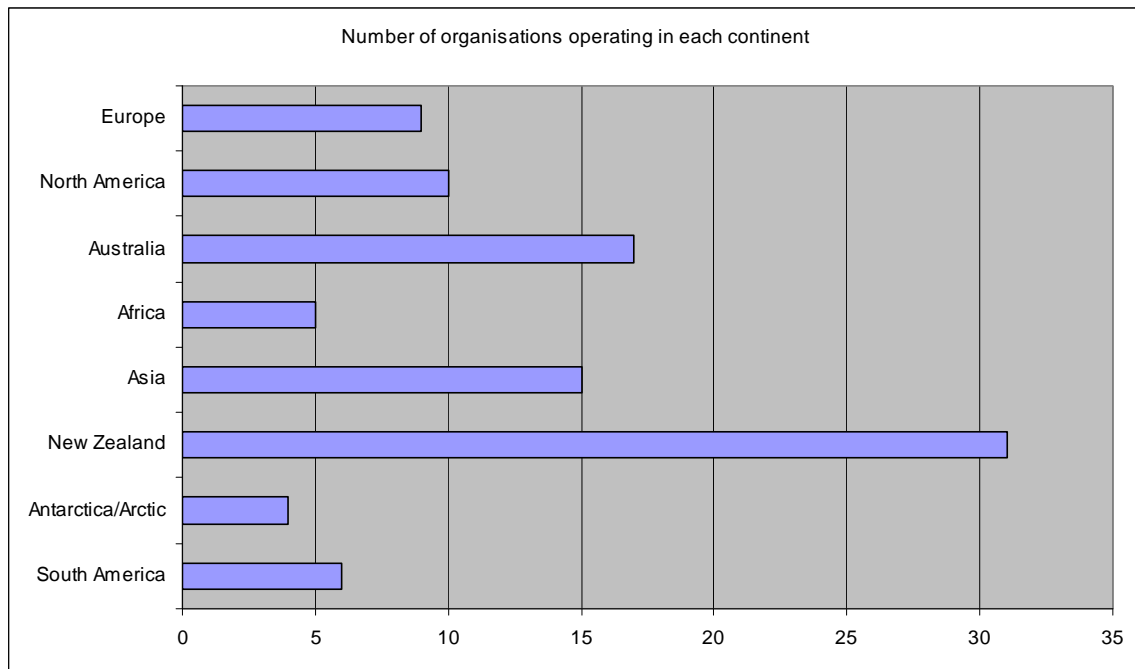
Final Report

Southland	3
Nelson	3
Northland	2
Marlborough	2
West Coast	2
Tasman	1
East Cape	1

Unsurprisingly Geospatial organisations are based mainly in the larger population centres around the country, and in many regions this sector is represented only by the responses from NZ Fire Service and Quotable Value Ltd.

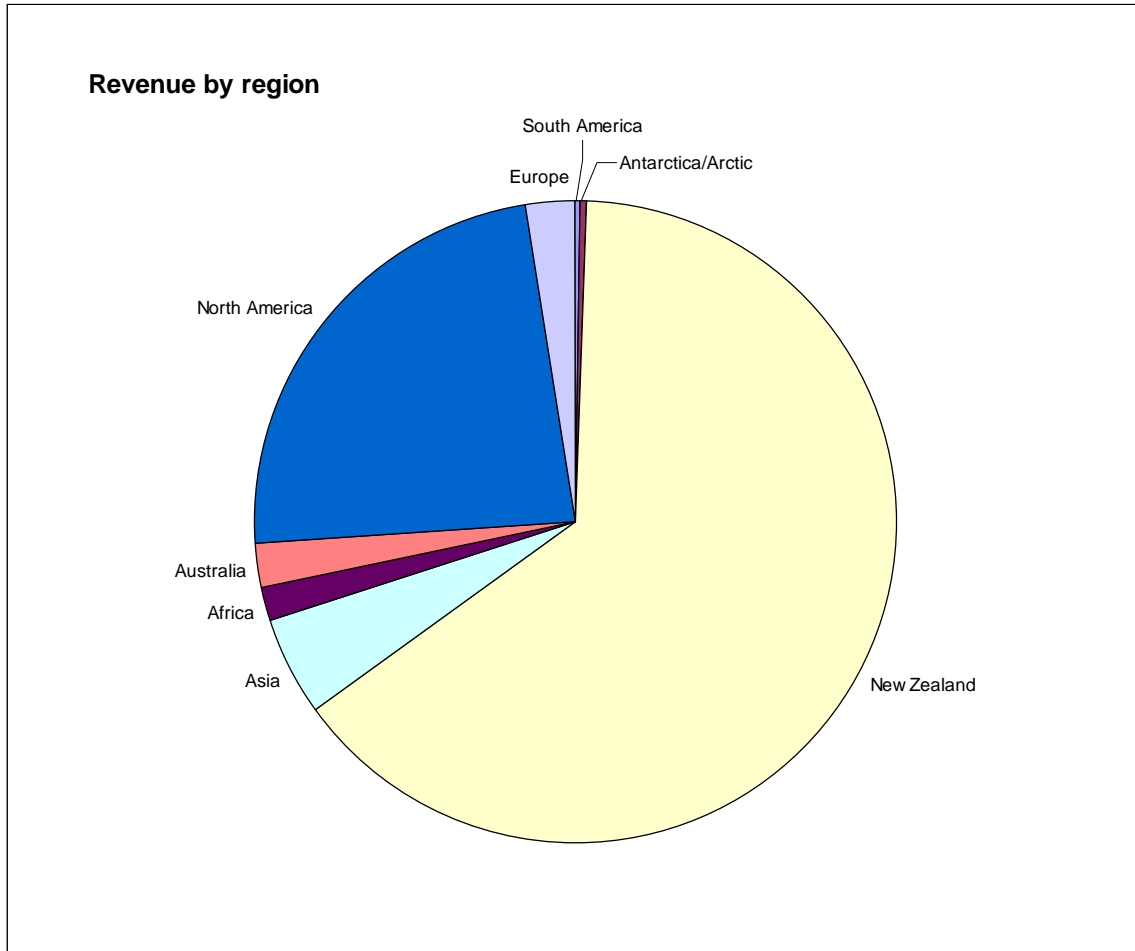
International Presence

Respondents were asked what countries they operated in and what proportion of their revenue came from each.



Capability Mapping of the New Zealand Geospatial Sector (2007)

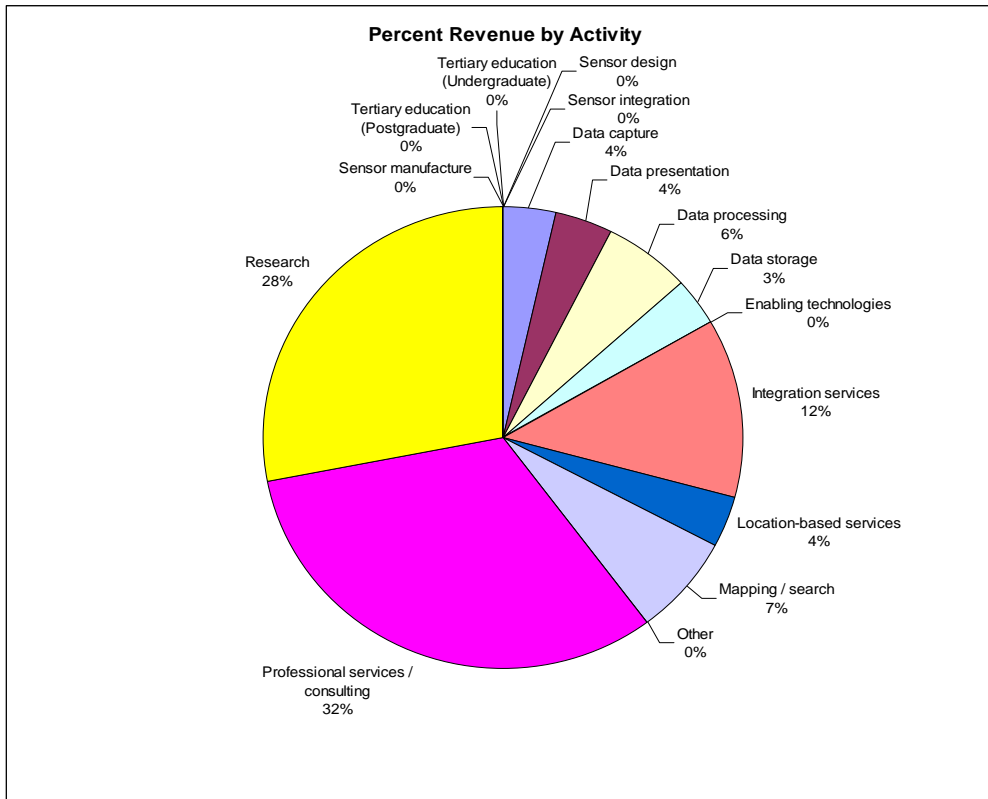
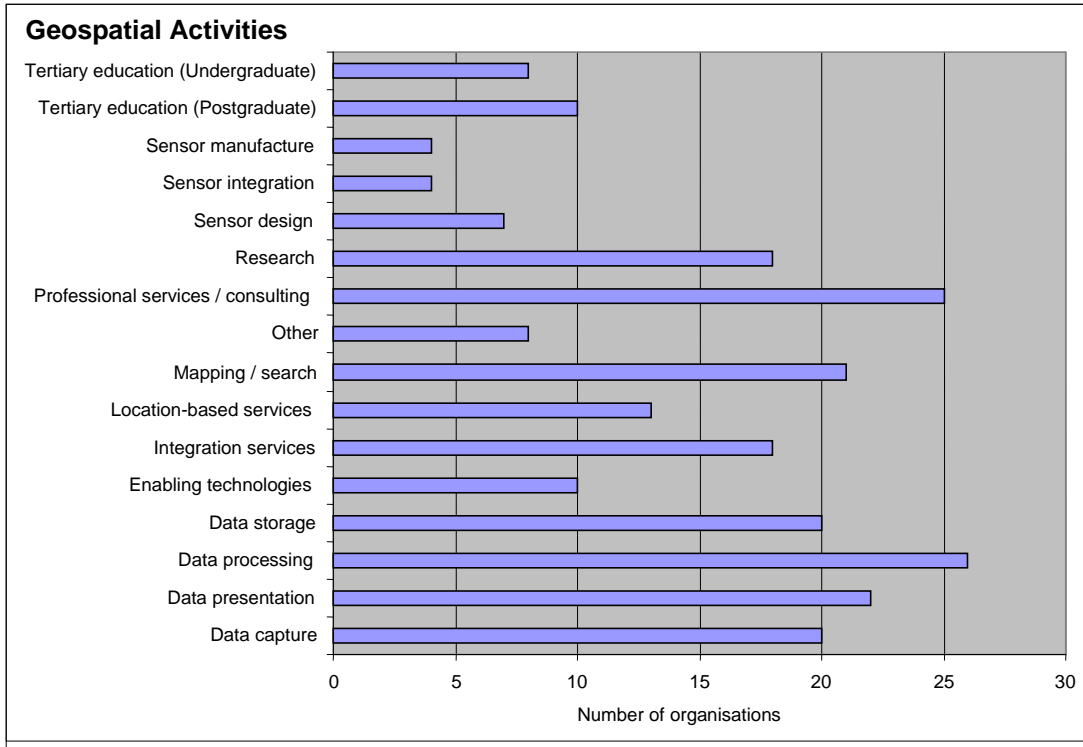
Final Report



All companies and most other organisations that responded had some overseas activity, although a surprisingly large proportion of revenue currently derives from within New Zealand. North America accounts for a surprisingly large proportion of revenue when compared to Australia and Europe.

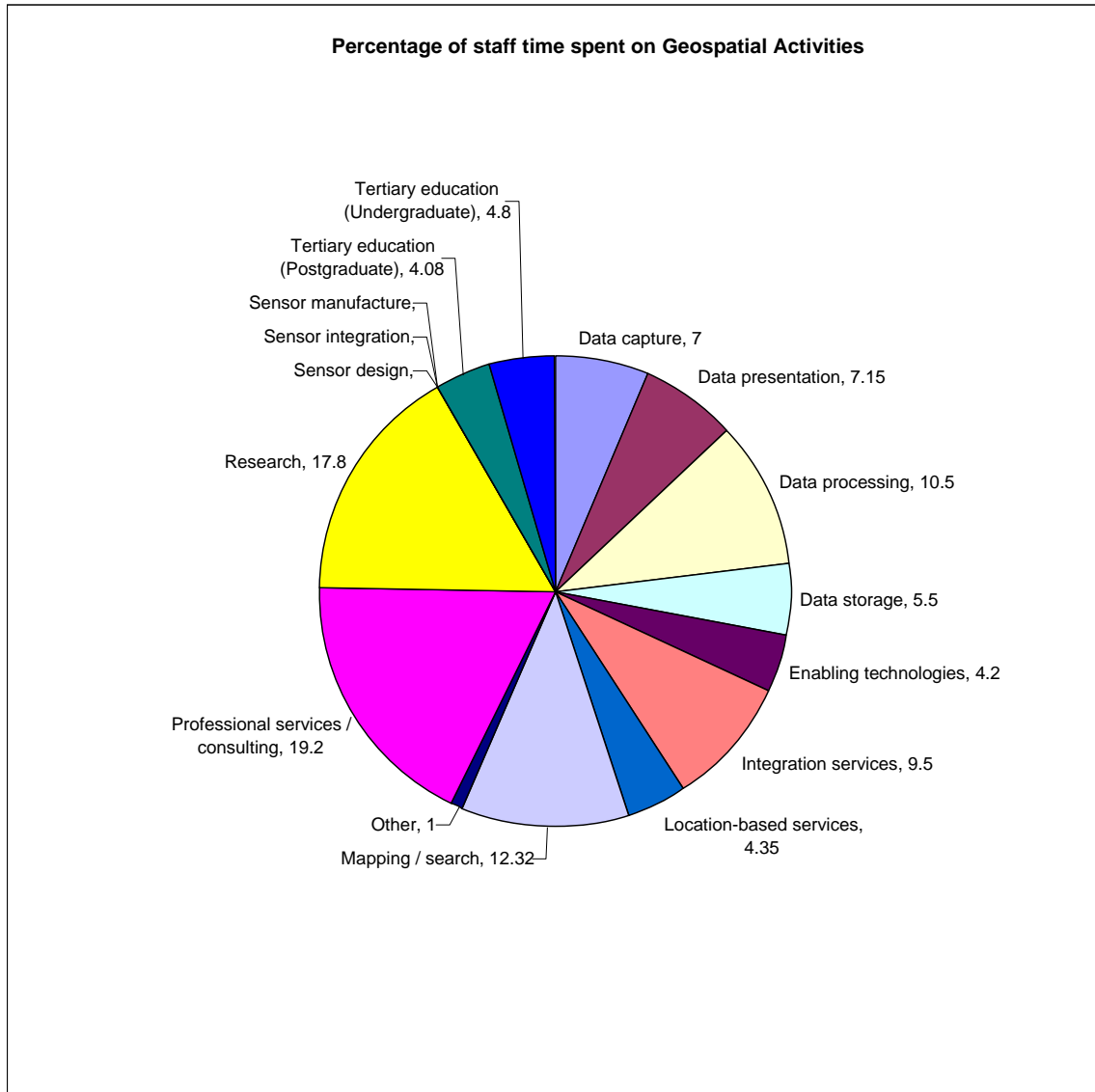
Almost all respondents predicted their international operations to grow with many highlighting Australia and Asia as key growth areas / targets.

Geospatial Activities



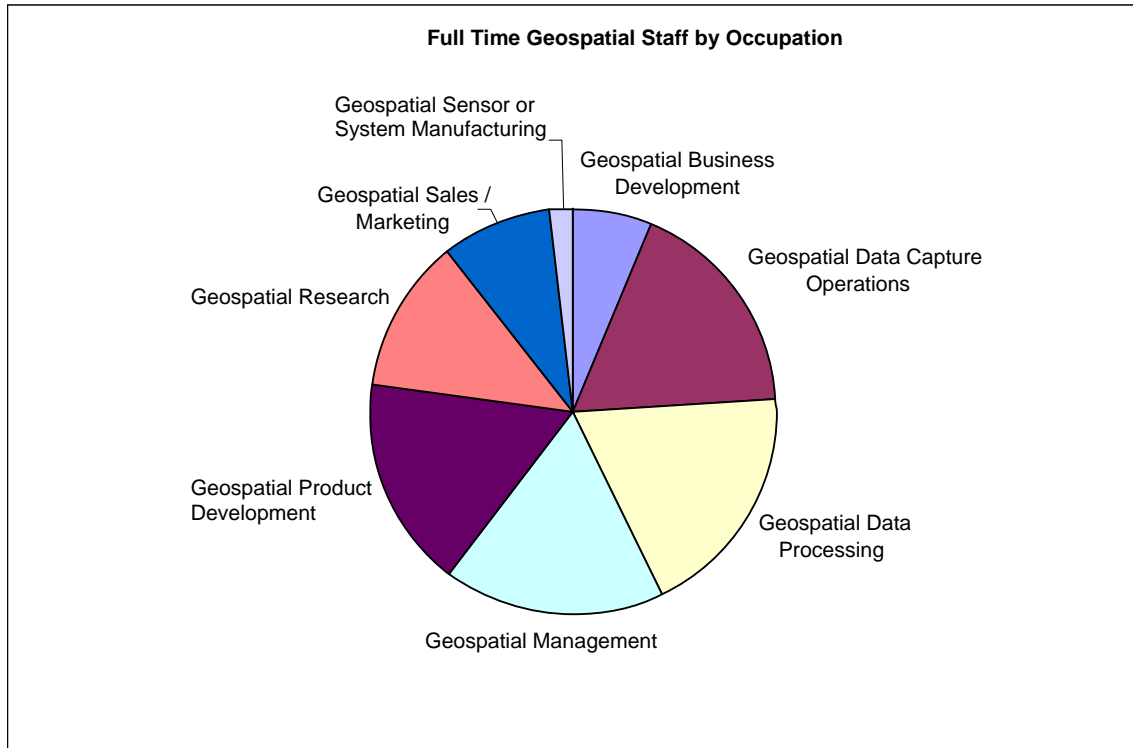
Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

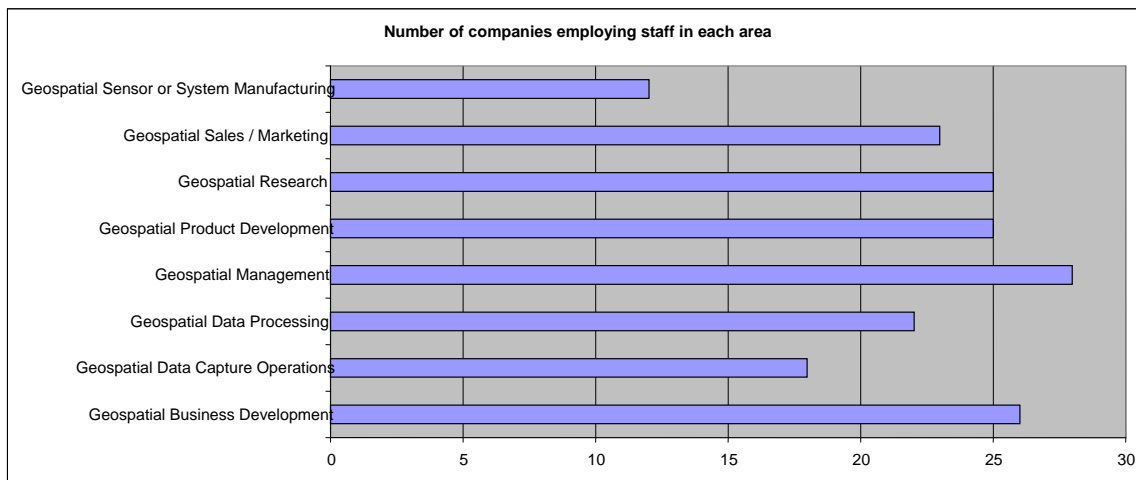


NZ Geospatial Organisations engage in a variety of activities but the majority of revenue comes from research and consultancy.

Capability Mapping of the New Zealand Geospatial Sector (2007)
Final Report



Around a third of Geospatial staff are employed in R&D, but data processing is the single biggest category from those listed. Manufacturing is much less common.

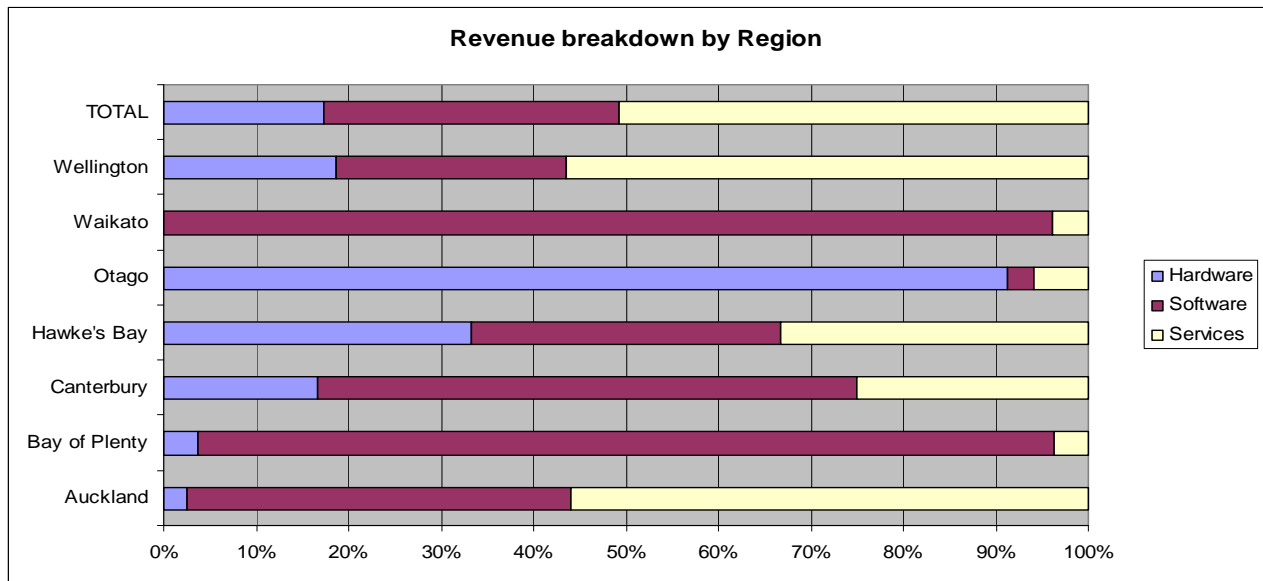
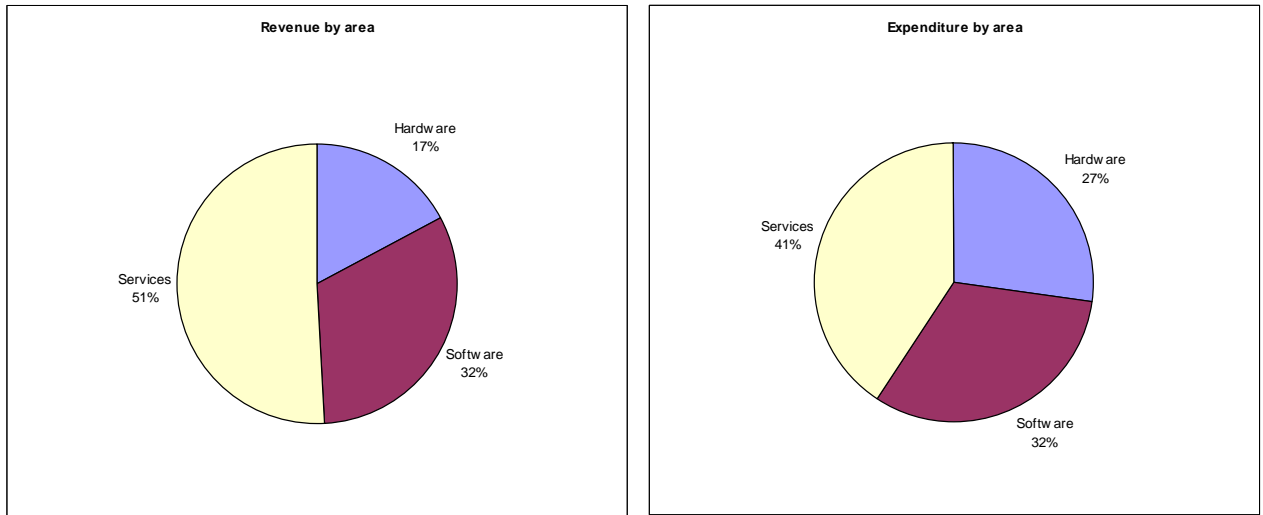


The available data suggests that most companies have 5-20 staff engaged in Geospatial Activities. Note that many organisations are not involved in data capture themselves.

Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

Revenue size



The proportions of revenue per area are not exact but some trends are evident: services are the main source of revenue for the majority of organisations (particularly around Auckland and Wellington), although revenue from software is dominant in Waikato and Bay of Plenty, while revenue from hardware is considerably higher in companies from Otago.

The average company has an annual reported income of around \$500,000 while that of almost all the public sector organisations is considerably larger. Overall the sector seems to have an almost equal balance between revenue and expenditure of around 100 million dollars each. However, there is great disparity within the figures with Universities and some other public sector organisations

Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

reporting very low revenue from and relatively high expenditure on Geospatial products, whilst large companies and some small companies have considerably higher revenue than expenditure. Some of the smallest companies are currently just breaking even, or recording a small loss.¹

Most predicted a growth in revenue and expenditure in all areas, but several predicted increasing use of free open-source software.

Data sources

Most companies purchase most of the data they use, however many mentioned that the amount of government data that is available for free has increased, and predicted further increases in the availability of free data, particularly that available online. Many listed government departments or councils as their data sources.

The following list is a sample of the diverse range of data suppliers noted by the survey respondents from within NZ and overseas:

¹ Please note that these figures are only estimates extrapolated from the ranges of values available from the survey data. Several of the smaller companies did not provide an answer to the questions on annual income and expenditure.

Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

ACRES	Ministry of Education
Aerial mapping companies	Ministry of Health
Aerial Surveys	Ministry of Social Development
AgriQuality	NASA
Civil Aviation	National Rural Fire Authority
CRS	Natural Gas Corp
Critchlow	NAVTEQ
Department of Conservation	NIWA
Department of Statistics	NZ MasterMap Road & Rail
DigitalGlobe	NZAM
Eagle Technology	NZDF
ECANZ	NZPost
Ensis	Ollivier and Associates Topographic
ESRI	OnTrack
European Space Agency.	Other Government organisations
Forest companies	Points of Interest
Geographx Aerial photography	Quotable Values
Geolmage	Regional and District Councils
Geological Surveys	Rural Fire Authorities
Geoscience Australia	Satellite Imagery
GPS satellites	Scion
HCNZ	SKM
Landcare	Telecom
LINZ	Terralink
Lower Hutt CC	Territorial Authorities
Manukau City Council	Transit NZ
MED	Transpower
Mineral and Oil Exploration companies	Universities
Ministry for the Environment	USGS

Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

Key markets, clients and partners

Most companies target their products or services at other business, however both local and central government were identified as major consumers. Surprisingly only two companies explicitly mentioned agriculture at all. Three companies sell directly to consumers.

The following list of just some of the clients and partners mentioned by the survey respondents highlights the breadth of potential opportunities for geospatial organisations:

Accord Mining	Meridian Energy
Agresearch	Mighty River Power
Alpstein GmbH	Navico
Arrow International	Nga Puhi
AsureQuality	Ngai Tahu.
Auzex Resources	NIWA
Balance	New Zealand Post
Beca	NOAA
Brimstone Clarity Minerals	Nui Pacific
C&F	NZ Mines
Contact Energy	NZML Oriental
CSIRO	Ontrack
Defence Technology Agency	Overland Resources
Eagle Technology	PFN Prosperity Resources
EDAC	Quinphos
EQC	Quotable Values
ESRI	Ravensdown
GNS	Right Hemisphere
Genesis Energy	Selwyn Plantation Board Ltd
Geoscience Australia	Sonardyne
Google	Solid Energy
Government of Brunei	Super Computing Centre
Green Energy	Techtonics
Holcim New Zealand	Toll New Zealand
HORT	Torrens Energy
International Telematics	Transpower and Vector
L&M Mining	Trutest
Landcare	Tuawhenua Trust
Landcorp	University of Keil
LIC	USGS
LINZ	VUW
Massey University	Widespread Energy
Meat and Wool NZ	Xtract Energy

International Geospatial Sector Review

In support of the initial NZ GeoSector Review detailed in this report, the project team also prepared a short report (available online in full via geoforum.grcnz.com) introducing a selection of 18 initiatives, organizations and associations around the world which are attempting to bring together geospatial sector players from government, industry and academia. The scope for these organizations ranged from regional (e.g. Queensland, Bavaria) to National (e.g. Canada, US, UK) to Continental (e.g. pan-Europe, global).

Whilst the 'International Review' does *not* attempt to provide an exhaustive survey of all geospatial organizations around the world it *does* provide an accessible introduction / overview to the range and type of initiatives already underway globally by providing:

1. A single page overview of a selection of existing geospatial 'umbrella' organizations, including contact details and website(s) where available, as a quick guide to interested parties
2. Enabling the interested reader to rapidly grasp and understand the main activities / missions / objectives of umbrella organizations in the global geospatial sector

The 18 organizations described in the International Review include:

- Network of European Regions Using Space (NEREUS)
- Open Geospatial Consortium (OGC)
- Global Spatial Data Infrastructure Association (GSDI)
- Geospatial Information and Technology Association (GITA)
- European Umbrella Organisation for Geographic Information (EUROGI)
- Location and Timing Knowledge Transfer Network (L&T KTN)
- Australia's Spatial Industry Portal
- Association for Geographic Information (AGI)
- GI Gateway
- GeoConnections
- National States Geographic Information Council (NSGIC)
- University Consortium for Geographic Information Science (UCGIS)
- National Geospatial Program Office (NGPO)
- Management Association for Private Photogrammetric Surveyors (MAPPS)
- GIS Colorado
- Co-operative Research Center for Spatial Information (CRC-SI)
- Queensland Spatial Information Council (QSIC)
- Bavarian Satellite Navigation Cluster

Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

The report concludes by drawing out a number of drivers / missions that almost every one of these organizations is attempting to encompass (whether at local, regional, national or international levels) including:

- Facilitating Communication amongst the membership (usually including industry, academia and government) and developing effective working relationships between all sectors
- Promoting and marketing spatial information / systems / partners
- Collaborating with other organizations and initiatives
- Undertaking / playing an active lead in relevant market and economic industry research
- Collaborating with training / tertiary educational and industry bodies to develop and promote the application of spatial information, and skills development
- Promoting inter-agency coordinated data capture programs, the harmonization of metadata repositories, the capture of metadata to internationally recognized standards and the development of facilities for on-line/real time access and delivery of government spatial data resources
- Providing a single point of contact for strategic / policy feedback and leadership
- Keeping abreast of emerging strategic and policy issues, evaluating their relevance to the sector and disseminating this information as widely as possible

It is clear that there already exist a number of organizations that appear to have common aims and objectives. In the New Zealand context, this fact leads to a number of key questions that need to be raised, and answered, including:

- Which trans-sector organizations are NZ players already engaged with?
- Which, if any, organizations in the above list or elsewhere should New Zealand players be involved with that they aren't at present?
- Which of the above roles / objectives are already being met in New Zealand by (for example) LINZ, the Geospatial Office, the Geospatial Executives Group or Geospatial Advisory Committee?
- Is there any benefit in trying to implement a geospatial sector 'umbrella organization' within New Zealand or is it possible to realize all the benefits identified in the previous list from existing (overseas) organizations and in-country governance structures?

New Zealand's Competitive & Comparative Advantages

World Class Pastoral Industries

Although it was only explicitly noted by two respondents, the global scale and market leadership of New Zealand's pastoral industries sector provides a significant opportunity and comparative advantage to the New Zealand Geospatial Industry. This provides global opportunities although they can be hard to realise. This view is supported by the Digital Strategy (May 2005) which notes that ICT generally is an enabler across the whole economy and that 20 years from now New Zealand is likely to still be a commodity producer on a global scale. This provides opportunities for the New Zealand Geospatial Industry to play a role in the continued success of New Zealand's primary industries through innovation and the application of geospatial technology.

Market Trial Convenience

Several respondents noted that, as a small developed market, New Zealand is well suited to initial (national) trials / developments. Respondents noted that because New Zealand is a geographically contained country, with varied terrain and climates and a small population, it is well suited to the testing of many different spatial applications.

Typical Kiwi Attitudes

These include:

- 'Early Adopter'
- 'Can Do'
- 'Solutions Driven'

Such attitudes appear to be facilitated (if not encouraged) by New Zealand's relatively small physical size, population and industry base. In terms of the global economy the New Zealand Geospatial Industry (like a number of other New Zealand industries) is relatively small in both in terms of the number and scale of participants and the level of activity in the markets it services. There appears to be less specialisation among industry participants and it is relatively easy to contact all the relevant parties across industry and within government. Respondents also suggested that the New Zealand Geospatial Industry constitutes a small enough group that can work together to solve one of the fundamental issues, that of data management and data compatibility, but large enough to have a critical mass on the global market.

A number of survey responses noted that smallness can be an advantage as it enabled New Zealand participants to react more quickly to changes in the

Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

environment and it is believed that smaller businesses can be more innovative, and move more quickly than international multinationals.

Quality Land Data

A number of respondents noted the high quality of New Zealand land data which arises from a 'trustworthy land registration system' and 'quality national datasets based on a robust land titling'. It was suggested that core public geospatial datasets are a mature offering now - meaning they are data rich and complete with good data quality – and that decades of having geospatial information available has enabled New Zealand to become world leading in the understanding and integration of such geospatial data and delivery (via applications) to all sectors. It was further suggested that the quality of the land registration system can be used to help establish NZ consultant's credibility.

Lower Cost Structure

While only two respondents explicitly noted that staff costs (relevant to the geospatial sector) were lower in New Zealand than offshore this appears to be true in relation to a large number of other countries and also applies to other components of business cost structure. However there are some countries where costs, particularly key costs such as data processing, are significantly cheaper than New Zealand and this was widely recognized across the sector.

New Zealand Value Added Service Focus

New Zealand potentially has a comparative advantage in that the development of its Geospatial Industry has been focused on value added services rather than on the development of infrastructure as in other countries. New Zealand can therefore use its greater experience in value added services to help other countries design and build such systems.

NZ Lifestyle

None of the respondents commented on the attraction of the lifestyle available in New Zealand however it is known to be a factor in the recruitment and retention of a number of staff in this field. Given that respondents have noted one of the key barriers to doing business in New Zealand is recruiting highly skilled staff this is potentially an important factor. Anecdotal evidence suggests that potentially large numbers of skilled staff *are* actually already in the country and the issue is one of providing the "right" environment to attract the right staff.

Constraints & Barriers to Growth

The survey responses are remarkably consistent across all sectors in detailing a number of (perceived) constraints and barriers to growth which have been grouped under the following high-level headings (selected *after* the survey results were compiled for ease of assessment and presentation):

Staff Issues

- Finding senior management with the expertise to understand the geospatial sector / business
- Finding, recruiting and retaining more junior / technical personnel with the necessary skills (possibly driven by a lack of suitable graduate courses)
- Finding experienced staff who can both sell geospatial solutions and deliver the resulting projects / contracts
- Competing with companies overseas (e.g. India and China) who can process data at a much more competitive rate due to their far lower staff costs.

Widespread Lack of Geospatial Understanding

- Limited (at best) understanding within the sector, councils, government, users, clients and the market in general of the value of geospatial needs and information flows
- Minimal resources available to raise or promote Geospatial awareness
- Perception of too much focus on Geographical Information Systems at the expense of broader geospatial IT / data issues
- reluctance to adopt new technologies / systems / processes either because of a lack of familiarity or because "we have always done business this way"
- Geographic and geospatial literacy in IT workforce and community at large. Lack of 'geospatial culture'
- General unwillingness to recognize that various elements in the geospatial chain actually have a value (including raw data, web-enabled LBS services) leading to difficulties attracting sustainable funding / payment

Standards Issues

- A lack of knowledge within the sector about the importance and availability of relevant standards for both system design and operation, and data storage and processing.
- A lack of "good", consistent metadata available on the majority of current products (related to an identified issue regarding the lack of requests from those paying for data capture or processing for finished products to meet certain standards)
- Limited access to or knowledge of standard compliant data processing / discovery tools
- Various issues around the provision of data in non-standard (custom) formats

Difficulties starting / developing a business in NZ and then moving offshore

- Small internal (NZ) market leads to increased business development focus overseas (with associated increase in costs / risks / difficulties)
- The inability of small New Zealand companies to achieve global market penetration in the (temporally small) window when they are ahead of the competition even though New Zealand is a great place to develop a prototype
- Perception that physical distance from target markets is a barrier
- Difficulties competing overseas where foreign governments and companies back the local provider before looking at an outsider (meaning NZ companies need to be overly competitive on pricing)
- Lack of "Buy NZ" loyalty within New Zealand procurement

Problems Accessing NZ Data

- Data / IP is "locked up" by government, local councils and CRIs and there are very few free and usable crown datasets
- Very few national datasets are being compiled and the majority of datasets are encumbered by intellectual property issues
- Commercial opportunities to exploit a data monopoly tend to prevent the wider release of that data.
- Various issues around the provision of data via "offline" delivery methods when it would be more use online

IT Issues

- Limited national / regional investment in enabling cyber infrastructure (e.g. roll out of high speed networks on which to build geospatial services)
- Low bandwidth available for transferring (raw / processed / intermediate) data intra-NZ and offshore
- High cost of broadband

Lack of access to funds for growth

- Lack of access to significant private venture capital within New Zealand.
- Problems securing sufficient cash flow to fund (rapid) growth
- Inadequate research funding opportunities, including problematic recognition of GIS in grant application evaluation structures

Government Issues

- Lack of Government initiatives and incentives to support the Geospatial Sector or raise awareness (e.g. standards)

Which Issues Dominate?

Based purely on the number of comments assigned from ALL respondents to each of the post-survey headings, the following indicative priority order for issues can be proposed (“biggest” issue first – i.e. most discrete comments recorded):

1. Lack of geospatial understanding
2. Problems accessing NZ data
3. Staffing issues
4. Difficulties starting / developing a business in NZ and then moving offshore
5. Access to funding
6. IT issues
7. Limited awareness / use of (internationally aligned) standards, metadata and protocols
8. Government issues

Alignment with non-Geospatial Sector “Issues”?

It is worth considering whether the concerns and issues identified in the survey are unique to the geospatial sector or are, at least in part, consistent with problems identified elsewhere within New Zealand society, government and business.

In summary, it would appear that apart from the sector specific issues of geospatial standards and geospatial awareness the majority of the issues and concerns raised by the survey *are* aligned with constraints and barriers to growth identified in other NZ sectors / spheres of interest.

The recent Cabinet paper on Advancing Economic Transformation² recognises many of the difficulties reported by the Geospatial survey respondents including the need to “attract high quality capital and labour” and the requirement for “a world-class communications and transport infrastructure to link with the rest of the world”.

The paper makes an explicit suggestion that New Zealand needs to be an attractive location for those parts of international value chains that focus on high-value products and activities or which compete in the weightless areas of business, such as design, marketing, and research and development.

However, although the provision of well priced, good performance broadband infrastructure is specifically identified as a key enabler for organisations providing high-value, weightless products such as research and design, the lack of high-speed broadband (caused in part by limited competition and underinvestment in telecommunications infrastructure relative to OECD benchmarks) is explicitly

² <http://www.med.govt.nz/upload/52910/cab-paper.pdf> (Q3 2007)

Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

noted as a factor that is currently limiting the growth of New Zealand firms³. There is no immediate short term solution and despite a raft of regulatory reforms, it is unlikely that it will be commercially viable for traditional telecommunications service providers, such as Telecom, to make investments in key infrastructure bottlenecks in areas outside major urban centres in the next three years.

So are the government's efforts to address these common constraints and barriers to growth in conflict with the needs of the Geospatial sector? The short answer is no *if* the geospatial sector is centrally recognised as one of the country's priority technology areas.

The Government has a priority target to develop and support Globally Competitive Firms by "Focusing government investment in areas that reflect and extend New Zealand's strengths, tackling fragmentation and better aligning government spend across education and training, RS&T, business and market". This drive from central government hopes to enable New Zealand to be recognised as a world leader in a small number of priority technology areas through the development of clusters of world class firms, research institutions, tertiary education organisations, and private businesses that collaborate to drive innovation.

It is hoped that the targeting of (limited) resources into more productive industrial and technology areas will lead to greater overall productivity via a flow-on or 'pull' effect from these activities to the wider economy. It is also widely accepted that building critical mass in a specific business / research area will help to attract additional, globally competitive talent, R&D and businesses.

³ NZ's level of ICT investment as a percentage of Gross Capital Formation has increased from 10.8% in 1995 to 13.6% in 2003 but still places NZ 17th out of 21 OECD countries –upcoming 2007 Economic Indicators

Critical Factors & Drivers of Change

The survey data, in conjunction with a brief desktop review, has identified a number of critical factors and key drivers of change which are expected to impact significantly on the New Zealand Geospatial Industry in the immediate future:

Skilled Workforce

As noted by a number of respondents in the survey a key barrier to operating successfully in New Zealand is the difficulty in recruiting and retaining people with the requisite skillsets. This is expected to continue to impact on the New Zealand Geospatial Industry and requires an effective education system, the ability to raise the skill levels within the existing workforce and the provision of attractive packages to staff.

International Networks

Strong international connections are essential for the New Zealand Geospatial Industry to access cutting edge knowledge and technology, as well as to capitalise on New Zealand innovations.

Application of Data Standards

A number of respondents suggested that data management and data compatibility is a fundamental issue to the New Zealand Geospatial Industry. The establishment, application and (possibly) the enforcement of data standards will need to be dealt with in conjunction with international bodies to fit existing international protocols.

Infrastructure

The New Zealand Geospatial Industry deals with significant volumes of data and requires access to fast, reliable, high capacity broadband services to effectively interact with offshore data processors, collaborators and clients. The provision of such services is a key focus of the Digital Strategy however a substantial number of respondents considered current broadband service levels to be a barrier to doing business in New Zealand.

New Zealand Geospatial Forum

As a direct result of initiating this survey the New Zealand Geospatial Users Forum has been established. This is expected to contribute significantly to increased cooperation within the Geospatial Industry through knowledge-sharing, collaborative research, co-bidding, joint ventures etc. This step aligns well with the government approach of fostering a co-ordinated NZ Inc approach between

Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

research, industry and government offshore to ensure access to global networks, ideas, markets and technologies.

Capital

Access to capital has been identified by a large number of respondents as a barrier to operating from a New Zealand base. The government has taken steps intended to deepen and enlarge capital markets through changes in the savings and investment environment. These include enhancements to KiwiSaver, increased funding for and development of venture capital investment; and reducing taxation on widely-held savings vehicles.

Environmental and Climate Change Focus

As noted in the Draft Research Science & Technology Agenda Consultation Document⁴ New Zealand, as a small trading nation with an economy heavily dependent on the primary industries, is vulnerable to the shift in consumer attitudes in key overseas markets, where sustainable production systems, climate change and other environmental issues are increasingly under the spotlight.

However this focus on sustainability provides an opportunity as well as a challenge. As noted in the Draft Agenda the existing globally-recognised strengths in biological and natural-resource-based activities give New Zealand the potential to become a world leader in the delivery of innovative and technology-driven responses to environmental and climate change issues. An opportunity exists for New Zealand's Geospatial Industry to perform a key role in a multi-disciplinary approach to improving environmental sensing networks for measuring, monitoring and managing the environment including land, water and coastal management; hazard management and biosecurity. In its survey response AgResearch noted the increased emphasis on environmental and climate change will drive a huge increase in the emphasis on spatial information. However it is relevant to note this factor was not noted by other respondents.

Information and Communications Technology Trends

As noted in the Draft Research Science & Technology Agenda Consultation Document⁵ New Zealand's research, science and technology system is only a small component of a vast global network marked by increasing

⁴ Draft Consultation Document October 2007 - <http://www.morst.govt.nz/Documents/consultations/NZRA-discussion-document.pdf>

⁵ Draft Research Science & Technology Agenda Consultation Document October 2007 - <http://www.morst.govt.nz/Documents/consultations/NZRA-discussion-document.pdf>

Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

interconnectedness. New Zealand's share of global research and development investment (0.2%) and science output (0.58% of the world's annual output of science and engineering papers) is small, and New Zealand is therefore very dependent on accessing the global pool of new knowledge and technologies.

Multinational corporations are now more willing (partly as a result of improved ICT capacity and capabilities) to externally source technology and innovations to complement their in-house R&D strengths and take advantage of specialised pockets of excellence around the world. As noted in the Draft Agenda to exploit this opportunity requires that New Zealand is globally engaged and can make good decisions about the knowledge it develops locally and the way it adopts and applies the ideas and knowledge of others⁶.

Tax Structure / Incentives

The government has recently made a number of changes which are likely to benefit the New Zealand Geospatial Industry. An R&D tax credit of 15% will apply from 1 April 2008 with the intention of driving up levels of R&D across a broad base of New Zealand enterprises. Other changes include a 3% cut in the company tax rate to 30% from the 2008/09 tax year onwards and the removal of tax on the foreign active income of NZ companies operating offshore.

Government Sectoral Planning

The government has taken a number of steps in sectoral planning which are likely to impact on the New Zealand Geospatial Industry. The government has identified six Transformational RS&T Opportunities. These will receive the greatest focus and allocation of resources through a closer matching of strategic RS&T investments to economic development priorities for New Zealand. The two most relevant Transformational RS&T Opportunities to the New Zealand Geospatial Industry are:

- High-tech platforms: targeted development of a sustainable pipeline of high technology platforms, such as sensors, intelligent materials and virtual reality. Each platform is expected to have the ability to support a range of applications and products that can help establish and sustain firms at the forefront of industry sectors, such as high-tech manufacturing, engineering or services

⁶ Draft Research Science & Technology Agenda Consultation Document October 2007 - <http://www.morst.govt.nz/Documents/consultations/NZRA-discussion-document.pdf>

Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

- Environmental sensing for real-time resource management: A target has been set of sustainably and competitively managing the environment in real-time. Realtime data gathering and resource management is expected to lift resource efficiency and environmental outcomes while creating new business opportunities. These opportunities range from 'on the farm' to regional and national decision making in areas such as irrigation and fertiliser application, hazard preparedness, biodiversity, waste management etc.

In terms of the survey several respondents noted they would like to see greater leadership and a faster pace from government on geospatial matters whilst others noted the tight retention of IP (particularly by CRI's) as a barrier to doing business.

Productivity

As noted in the submission to the Cabinet Policy Committee entitled Advancing Economic Transformation⁷ New Zealand's level of aggregate labour productivity and GDP per capita is currently at the lower end of the OECD range (22nd out of 30 using 2005 figures). To maintain or improve New Zealand's position will require growth which will need to come from improvements in productivity. The government focus on investment in RS&T and in workplace skill development is likely to have a positive impact on the Geospatial Industry.

⁷ Paper to Cabinet Policy Committee re Advancing Economic Transformation
<http://www.med.govt.nz/upload/52910/cab-paper.pdf>

Conclusions & Next Steps

Steps are already in place to address some of the issues identified with the survey that are potential constraints / barriers to growth both in New Zealand and overseas:

- the various initiatives to increase the roll out of reliable, high speed internet access
- the active efforts to make centrally funded geospatial data freely available via the web
- the initiation of the GeoForumNZ initiative⁸.

However, a number of further activities and key questions have been identified that could usefully be addressed in order to further capture the significant issues and opportunities ahead for the New Zealand Geospatial Sector including:

- Are there staff skill shortages at all levels or are there particular shortages in specific fields / roles?
- Should funding be available to support the activities of a pan New Zealand geospatial forum and / or raise the awareness of “geospatial”?
- What are the specific funding barriers that are rather generally mentioned by many respondents? Is it funding for development or marketing? Operational costs or capital items? etc
- In order to better understand the potentially key environmental and climate change opportunity it would be helpful to complete a further assessment of:
 - o what specific range of technologies, applications, processes, software/hardware/data integration are currently contemplated
 - o what are the value propositions for each
 - o what are the potential markets for each, including whether it has potential applications offshore
 - o what is the scalability of each application
 - o what inputs, other disciplines, governmental support, capital etc. are likely to be required in order to pursue these opportunities?
- What are the measurable impacts of the identified barriers / constraints to growth?
- What options are available to get around these constraints (move offshore, manufacture offshore, etc)?
- What makes pastoral industry opportunities so hard to realise?

⁸ www.grcnz.com/geoforum

Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

- What is the extent and quantifiable value of the benefits arising from having high quality land registration data?
- How do staff costs and other categories of operating cost in New Zealand actually compare to other countries?
- What are the difference between potentially competing countries in terms of comparative cost structures, tax regimes, cost of debt and equity funding, etc?

To conclude, this first Geospatial Survey has captured a wealth of information about the sector from many of the key players. This information will be made available via a range of internet-based resources including a Geospatial Sector Wiki and online visualisation tool.

It is suggested that specific benefits that are already being realised as a result of this initiative include the intra-sector interest generated by the act of completing this review, the provision of the resulting information via the nascent Geoforum Wiki along with the renewed interest within the sector itself to focus on closer engagement and sector growth in the immediate future.

There are clearly potential global opportunities for New Zealand's current geospatial sector thanks to both the existence of NZ-specific competitive and comparative advantages and the likely impact of key (international) drivers of change.

Potentially insurmountable barriers and constraints to growth do exist and could stymie this vision. However, the close alignment between the majority of geospatial-sector specific issues with the wider situation in New Zealand offers a ray of hope. Could a focussed effort by key players across the sector (including government) to tackle two or three key geospatial sector specific issues work in combination with existing and planned attempts to address New Zealand wide issues (improving broadband access, increased access to funds for growth, etc) to ensure the global opportunities and potential are realised?

The overwhelmingly positive industry response to the survey initiative together with New Zealand's collective technical and entrepreneurial skills and competitive advantages suggests that, with concerted effort and focus by industry and government, we should be optimistic that the NZ Geospatial Sector can both successfully participate in the burgeoning global geospatial growth and provide a strong contribution to the New Zealand economy as an enabler technology.

Appendix A - List of Respondents

Representatives of the following organisations had responded to the survey by the cut off date of 15th December 2007⁹:

Crown Research Institutes

AgResearch
GNS
Industrial Research
Landcare Research
NIWA
Scion

Universities

Auckland (Spatial Analysis Facility)
AUT (Geospatial Research Group)
Canterbury (various)
Lincoln (various)
Massey (Centre for Precision Agriculture)
Otago (Surveying, Spatial Information Research Centre)

Companies

Critchlow
Deviceware
e-Spatial
EGL (Explorer Graphics Ltd)
Geosmart
Geographx Ltd.
Geospatial Research Centre (NZ) Ltd.
GeoVector NZ
Holliday Group
iVistra
Kenex Knowledge Systems
MiTAC
Navico
NZ Aerial Mapping
Ollivier and Company
Project-X

⁹ Although the survey site and database are still 'live' and new users / interested parties are actively encouraged to enter their views and details which will be reflected in the online visualization tool

Capability Mapping of the New Zealand Geospatial Sector (2007)

Final Report

R & D Technology Solutionz Ltd.
Rakon
Surveylab
Terralink
TGR Helecorp
Trimble
Unlimited Realities

Other

Animal Health Board
NZDF
NZ Fire Service

Appendix B - Database

Respondents could mark a checkbox on each page to specify whether their answers on that page could be made public. Two Excel spreadsheets are included with this report to New Zealand Trade & Enterprise:

- Private Full survey results.xls contains all responses, including those that were marked as private.
- Public Full survey results.xls is similar except that answers that were marked as Private have been removed. This file is also available online at http://www.grcnz.com/survey/Geospatial_survey_results.xls