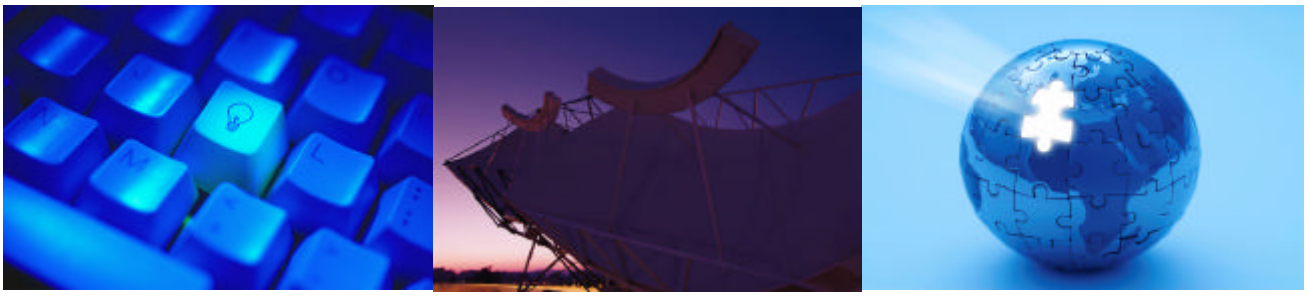
The Spatial Information Industry in Australia

.....profile, education & training and skill demand

A snapshot



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Summary of a report prepared

for

Spatial Education Advisory Committee

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The Spatial Information Industry

The Spatial Information industry is new, emerging, growing and it is a major player in the development of the nation's economy.

The Spatial Information industry brings sophisticated skills and technology to major challenges facing the nation such as the management of water systems, the exploration of new mining operations and the effective management of land resources.

> The Spatial Information Industry is new, growing, large and important – it enriches the nation and enables the better management of natural resources, facilitates new mining ventures and the more efficient operation of businesses dependent on spatial information

It is the recognition of the strategic importance of the industry that is driving governments around the world to invest in the skilling of the workforce and the development of policy that will ensure the viability and growth of the industry.

The industry is working to define its place in the community and economy. The industry's reach, breadth and impact is captured in the following definition:

> **The spatial information industry acquires, integrates, manages, analyses, maps, distributes and uses geographic, temporal and spatial information and knowledge. The industry includes basic and applied research, technology development, education and applications to address the planning, decision-making and operational needs of people and organisations of all types.**

(drawn from the US Department of Labor's Employment and Training Administration project to define the geospatial industry : *Defining and communicating geospatial industry workforce demand Phase 1 Report*.)

The industry is also emblematic of 21st century enterprise – global in its reach, cross sectoral in its impact and underpinned by the latest technologies including satellites and computer information systems.

The Workforce

Spatial Information has its roots in a number of traditional professions including surveying and cartography but, through the introduction of new technologies and the expansion of the work performed, the contemporary spatial information professional may well be working in land management, water management and hydrography, town planning, engineering and mining surveying, remote sensing and photogrammetry.

The Spatial Information industry is large and diverse with the central or core workforce numbering more than 92,000 workers.

Given that there are additional workers in the IT and other industries who regularly use spatial information as part of their work, and who are not identified or counted in this report due to a lack of detailed data, it is likely that **the broader spatial information workforce numbers approximately 250,000**.

The employment breakdown is shown in two categories:

Tier 1 – which represents the core Spatial Information Industry professionals who strongly identify with the industry and use high level skills in the creation, management and use of spatial information

Tier 2 - which represents related professionals who are reliant on spatial information to perform effectively in their workplaces and who require strong spatial information skills.

OCCUPATIONS	Males Total	Females Total	Total Male & Female
TIER 1			
Cartographer	1145	395	1540
Surveyor	5913	285	6198
Surveying and Cartographic Associate	1235	316	1551
Survey Hand	1647	149	1796
Urban and Regional Planner	3458	1972	5430
Environmental and Agricultural Science Professionals, nec	3031	1759	4790
Environmental Research Scientist	1413	864	2277
Forester	1667	267	1934
Geologist	3384	688	4072
Geophysicist	856	127	983
Meteorologist	467	122	589
Soil Scientist	168	62	230
	24,384	7,006	31,390

from: Australian Bureau of Statistics, 2001 Census of Population and Housing

OCCUPATIONS	Males Total	Females Total	Total Male & Female
TIER 2			
Agricultural Adviser	1961	624	2585
Agricultural Engineer	176	3	179
Agricultural Scientist	2257	660	2917
Agricultural Technical Officer	1878	1194	3072
Architect	9008	2294	11302
Botanist	487	376	863
Civil Engineer	14356	972	15328
Civil Engineering Associate	3642	404	4046
Civil Engineering Technologist	30	-	30
Earth Science Technical Officer	1767	440	2207
Environment, Parks and Land Care Manager	1819	518	2337
Extractive Metallurgist	152	33	185
Intelligence Officer	742	431	1173
Land Economist	3911	832	4743
Landscape Architect	1029	728	1757
Marine Biologist	499	211	710
Mining Engineer (excluding Petroleum)	1763	129	1892
Park Ranger	1248	338	1586
Valuer	3632	515	4147
	50,357	10,702	61,059

from: Australian Bureau of Statistics, 2001 Census of Population and Housing

The industry is facing considerable challenges with more than a quarter of the workforce being over the age of 50 (in 2001) and few women being attracted to forge careers in spatial information.

Tier 1	**% males**	**% females**
Under 50	77.62	91.78
Over 50	22.38	8.21
Tier 2	**% males**	**% females**
Under 50	72.02	88.70
Over 50	27.98	11.30

from: Australian Bureau of Statistics, 2001 Census of Population and Housing

Skill Shortages

The Spatial Information industry is experiencing the dual pressures of an aging workforce and an explosive demand for new skills across a broad base of the Australian workforce. There is, and there will continue to be, demand for skilled professionals working across the field of spatial information.

The Department of Education, Science and Training conducted a study between July 2005 and February 2006 of 33 spatial information enterprises and found that:

- 70% had current vacancies in spatial science related occupations
- 69% of the survey participants indicated that they had vacancies in spatial science related occupations and that these were 'difficult' to fill
- participants also noted that there is potential for current recruitment and retention problems to be aggravated by the anticipated growth in the spatial information industry unless the supply of qualified staff increases.
- approximately 36% of participant organisations listed conceptual/technical skills as the key attribute sought after in spatial science employees.

(*Industry Study Report – Spatial Information Skills*, draft, undated)

> "Currently, we are in the midst of a geospatial labor market shortage that shows every sign of growing more acute in the years to come. The explosive growth in the utilization of geospatial tools and data in nearly every sector of the global economy has been driven by dramatic increases in the capabilities of our tools and in the increased availability of better spatial data. This growth has created a substantial demand for additional, highly qualified personnel in all areas of the geospatial industry…"
>
> Dr. Duane F. Marble, Castlereagh Enterprises, Inc.

The spatial science industry provides significant underpinning to the Australian economy. The importance and growth of the industry is also driving skill shortages as the industry works to retain, attract and upskill workers.

This new and evolving industry requires a workforce with a broad range of skills and knowledge. In order to meet these diverse skill needs education and training opportunities are required across all qualification levels and within both the vocational and higher education sectors.

The Solutions

While there is support for the skill development of the workforce through the VTE system and universities much still remains to be done.

There is also a need to build understanding of the nature, size and needs of this complex, sophisticated and diverse industry. The report recommends that consideration be given to:

- conducting national primary research to profile and size the industry and address the gaps in information resulting from the inability of traditional ANZSCO and ANZSIC classifications to truly reflect the industry and its diverse workforce
- conducting national primary research to explore further the skill shortages and skill gaps being experienced within the industry
- conducting further work to clarify the skill development needs, currently and emerging, of the diverse workforce including the 'core' spatial science workforce and those who require spatial skills but who are attached to other industries
- conducting further work to explore the content of higher education courses and map possible career pathways and the associated articulation pathways for new entrants and experiences workers