PROJECT TO MEASURE VICTORIA'S DEFENCE INDUSTRY ACTIVITY

FINAL REPORT

June 2006

20 June 2006

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Dear Mr. Edney

PROJECT TO MEASURE VICTORIA'S DEFENCE INDUSTRY ACTIVITY

In March 2006, AADI was engaged to conduct a review of the Defence Industry in Victoria and from the results report on specific trends and discrete areas of local strength.

In accordance with these arrangements, AADI is pleased to submit the following final report.

Yours sincerely

Dr Mark Hodge
Chief Executive Officer

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Glossary

AADI	Australian Aerospace and Defence Innovations Ltd.
ADF	Australian Defence Force
AEW&C	Airborne Early Warning & Control
AIDN	Australian Industry and Defence Network
AiG	Australian Industry Group
ASLAV	Australian Light Armoured Vehicle
AWD	Air Warfare Destroyer
BERD	Business Expenditure on R&D
CEO	Chief Executive Officer
COTS	Commercial, Off-The-Shelf
CTD	Capability Technology Demonstrator (Department of Defence R&D program)
DIIRD	Victorian Department of Innovation, Industry & Regional Development
ESSM	Evolved Sea Sparrow Missile
DMO	Defence Materiel Organisation
GM	General Manager
FFG	Guided Missile Frigate
ICIP	Industry Cooperative Innovation Program
IP	Intellectual Property
JDAM	Joint Direct Attack Munition
JSF	Joint Strike Fighter
Kiowa	Armed Reconnaissance Helicopters
M113	Abrahams Tank Designation
MD	Managing Director
NCW	Network Centric Warfare
OEM	Original Equipment Manufacturer
P3C	Orion Maritime Patrol Aircraft
Prime	Large company with the capacity to bid for and manage large Defence procurement projects
R&D	Research and Development
RAAF	Royal Australian Air Force
SME	Small to Medium Enterprise
Tier 1	Large company with the capability to lead a supply chain. Often a principal subcontractor to a Prime.

1.0 Executive Summary

In March 2006, DIIRD contracted AADI to conduct a survey to assemble a detailed picture of the Victorian defence industry, its activities and capabilities.

The survey was limited in both time and resources, however 19 primes and Tier 1 contractors as well as 98 SMEs were interviewed. 119 completed questionnaires were collected in face to face interviews. Some companies refused to be involved in the survey.

The list of companies surveyed was generated by extensive cross-referencing of existing defence databases, and based on this AADI believes that the companies interviewed cover the vast majority – in excess of 90% - of Victorian companies that currently work for defence or have worked recently on defence projects. Victoria has a substantial defence industry with significant presence of all four primes and an extensive array of SMEs, a high proportion of which work in the advanced technology, high value added part of the defence sector. Many large defence industry establishments are located in regional Victoria

Major findings of the study were:

- Defence enabled companies operating in Victoria employ 10,200 Victorians
- Defence enabled companies operating in Victoria had an estimated turnover throughout Australia (defence and non defence work) in excess of $4,640 million.
- Defence enabled companies operating in Victoria had a turnover in excess of $1,060 million on defence projects last year. This represents an increase of more than 20% over the previous year and is 0.5% of GSP of $220,000 million.
- Victorian defence-enabled companies accounts for approximately 25% of defence activity in Australia annually.
- The major sources of defence industry activity in Victoria are:
    - Naval Shipbuilding & Repair, estimated revenue $400 million;
    - Land Vehicles, estimated revenue $85 million;
    - Weapons & Ordnance, estimated revenue $200 million (including Thales/ADI Mulwala, which is in NSW, but draws it workforce and supplies almost exclusively from Victoria);
    - Aerospace – Electronics, estimated revenue $140 million;
    - Non-aerospace Electronics, estimated revenue $80 million;
    - Aerospace - Structural Design & Manufacture, estimated revenue $240 million (includes Boeing 787 program value), and;
    - Aerospace – Maintenance & Overhaul, estimated revenue $75 million.
- The activities listed here are mainly addressing the DMO's Capital acquisition program; Victoria has few major Military bases and consequently fewer opportunities to supply maintenance and overhaul services to Defence.

- 74% of Primes and Tier one companies operating in Victoria acquired new technology, spending $105 million or 4.3% of their turnover to obtain it.
- 58 % of the SMEs operating in Victoria acquired new technology, spending $69 million or 7% of their turnover to obtain it.
- There was a minimal uptake of government R&D or technical support grants. Anecdotally, these grant programs are seen as administratively onerous and not of sufficient size to be of significant value.
- 67% of defence enabled companies operating in Victoria are actively exporting (defence and non defence goods) and services to a total value of $1,040 million last year. This compares with total exports from the State of Victoria for 04/05 0f $18,000 million.
- A significant majority (83%) of Victorian defence enabled companies have staff training and upskilling programs, however the sector-wide average spend on training was only 0.3% of turnover, or a total of $12 million for the entire sector.
- At interview many companies said that they would welcome a greater government interest and involvement in the sector.
- A manipulatable, web-enabled database that can be utilised to support further analysis, presentations, or to break the data down into smaller categories, such as defence industry sub-sector activity and output has been developed and populated with the data gathered so far. To be of continuing use this database will have to be continually maintained, upgraded and expanded.

The study concludes that Victoria has a vibrant, extensive and large if somewhat disconnected defence industry base that is growing, exporting, working in the high-tech high value-added end of the market and has large establishments in regional Victoria. There is general agreement across the sector that Government support in various areas – particularly in export assistance - has been important, but the sector was critical of the level of assistance in new technology acquisition, training and upskilling and promotion of defence industry in general.

2.0 Introduction

2.1 Background to the Study

In March 2006, DIIRD sought the services of AADI to assemble a detailed picture of the Victorian defence industry and its activities and capabilities. AADI was engaged to deliver the following outputs:

1. A comprehensive data set on the Victorian defence industry that includes output, R&D, exports and employment, reflecting the current and past two financial years.
2. A manipulatable database that can be utilised to support further analysis, presentations, or to break the data down into smaller categories, such as defence industry sub-sector activity and output.
3. A written report summarising the findings of the data collection to be used to publicly disseminate information about Victoria's defence industry.

In response to DIIRD's request, AADI proposed a comprehensive data-gathering program of face-to-face interviews with senior officers of Victorian defence and defence-enabled sector participants. Given the commercial focus of the study, and the limited time frame for reporting, the definition of defence sector participants was limited to SMEs and Prime organisations, rather than industry associations and research institutions.

AADI identified a list of 146 Victorian companies to approach for participation in the study. This list of companies was compiled from a range of sources, including:

- AADI's internal database, having been generated from AADI's ongoing business contacts and correspondence since the company's establishment;
- the Australian Defence Industry Network (AIDN);
- Defence Materiel Organisation's "Team Australia" Industry Capability Team membership list;
- The Australian Industry Group Defence Council, and;
- Australian Defence Information and Electronic Systems Association (ADIESA).

2.2 The Study – Approach

Companies were interviewed on the basis of having defence sector capabilities, as demonstrated through sales to Defence, prior participation in Australian military supply chains or military export supply chains, or through a predominance of opinion that the company was defence-enabled, i.e. had capabilities of strong relevance to the defence and/or security sector. Likewise, a small number of 'start-up' companies were interviewed despite not having a current turnover or past sales, as these companies have invested in defence-related technology development and are currently marketing their capabilities in the sector. AADI considers that the list of companies included in the study is comprehensive, but recognises that a small number of Victorian organisations with defence sector capabilities may have been overlooked if the companies themselves have not promoted their defence capabilities through marketing

activities or the joining of relevant defence associations and networks. AADI believes there are some further defence enabled companies that are yet to be identified in contiguous industries, e.g. clothing, software computer games industry

In order to maximise response rate, a letter of introduction from the Deputy Secretary – Business Development within DIIRD, was sent to each of the companies initially identified. The letter provided an official introduction to the study and notified potential respondents of the study's aims and objectives.

Of the initially identified Victorian defence companies, AADI was able to hold face-to-face interviews with upper management level personnel of 113 companies. An additional 3 companies were identified during the progress of the study, and were subsequently interviewed. AADI received written responses to questionnaires from 3 companies, whose contact personnel were unable to be interviewed in person. 12 of the companies on the original list were deemed inappropriate for inclusion in the survey, either by reason of ceasing operations in the defence sector or by ceasing to exist. 6 companies were unable to be contacted during the reporting period, while 11 companies declined to participate in the study. Interviews took place in the two months between March 31, 2006, and the final interview on June 2, 2006. Of the 148 companies/divisions initially contacted, survey responses were received from 119, for an overall response rate of 81%. (Appendix 1 presents a full summary of company participation in the survey).

In general, access to the target organisations was excellent, and the majority of the interviews were held with CEO, MD and/or GM level company representatives. A smaller number of interviews were held with Business Development Managers or similarly positioned personnel with a thorough knowledge of the commercial activities of the organisation. To ensure that information provided to AADI was as comprehensive and accurate as possible, AADI encouraged interviewees to speak freely by providing each of the interviewed companies with a written statement of confidentiality. The statement asserted, in part, that:

> *…no identifiable or attributable information regarding your organisation will be included in the report or made available to individuals or organisations searching the database, unless you specifically agree.*

2.3 The Study - Structure

The data collection and interview process was structured around a questionnaire that had been designed in response to desired outputs indicated by DIIRD at commencement of the study. Outputs identified by DIIRD in the initial request for proposal included:

- Turnover and defence sector outputs;
- Employment and employee training;
- Exports;
- R&D;
- Supplier and subcontract activities;
- Defence activities in Victoria that are billed to other States;
- Non-defence capabilities that are complementary to defence sector work;
- Defence sub-sector data.

During a progress meeting on May 16, 2006, a list of additional desired outputs for the data collection was presented, which in the main could be extracted from the questionnaire responses and are addressed in this report.

The questionnaire devised by AADI was structured in 6 parts:

1. *Company Overview:* A general overview of financial and numerical data of the organisation, including type of organisation (Prime, SME etc), ownership structure, defence sector(s) of operation, primary activity of the organisation, operations in Victoria, turnover, percentage of defence-based work, earnings from defence work in Victoria from the past three financial years, employment and employee training data.
2. *Defence Work:* This section provides the opportunity to examine the location and spread of defence work in Victoria through case studies of each organisations' defence work. Where possible, companies were asked to identify their involvement in specific Defence projects, including the activities undertaken on each project, the contact value of the work, and the number of employees involved in the project. Where companies were unable to identify the exact project or supply chain, they were asked to describe defence-related activities in as much detail as possible, even if that allowed only a general overview, such as "supply of components to Defence."
3. *Exports:* Examination of each organisations' export activities, including exports as a percentage of recent sales, export destinations, values of recent export contracts, future export plans and targeted export countries.
4. *Technology Development:* The levels of innovation in Victoria's defence sector, as reflected through percentage of turnover invested in innovation and new technology, methods of obtaining new technology, access to R&D grants, and collaboration on technology development.
5. *Non-Defence Capability:* An investigation into the broader capabilities of the organisation, and how these may complement the needs of defence. Companies that had worked on specific non-defence projects which provide an example of capabilities that could readily be applied to the defence sector were given the opportunity to detail case studies of these non-defence projects.
6. *Miscellaneous:* In polling participants in Victoria's defence industry, AADI was exposed to information about the sector that was appropriate to capture for the report. A miscellaneous section therefore allowed free text, focusing on future defence projects being targeted by companies, any structural or capability changes planned by the companies, unique capital assets existing within Victoria's industry, and any additional comments or messages industry participants would like conveyed to the Victorian Government.

The resulting set of data has been compiled in a searchable, web-enabled database, and is summarised in this report. AADI's report has been generally structured to follow the general format of the ACIL Tasman report, "*A profile of the Australian Defence Industry, November 2004*" as requested by DIIRD.

3.0 The Structure & Performance of the Victorian Defence & Defence Enabled Industry

This section provides an overview of the structure and performance of the Defence Industry in Victoria, in terms of:

- Scale;
- Function;
- Location, and;
- The business environment.

There are inherent judgements and assumptions that must be made in quantifying the size, scale or scope of such a fluid market segment, particularly as some of the companies surveyed (most notably the Primes and Tier 1 companies) have significant operational segments or headquarters outside Victoria. Estimates of the size, scale and scope of the Victorian defence industry are therefore based predominantly on responses to surveys and interviews, with follow-up discussions used to clarify any areas of uncertainty that arose from time to time in the analysis of the sector data.

3.1 The Scale of the Defence Industry in Victoria

The defence industry in Victoria consists of a stable core of Prime and/or Tier 1 contractors who are easily identified as primarily or significantly defence companies. This core is supported by a large number of SMEs, some of which enter or leave the defence sector on a contract by contract basis, and a few who have not participated significantly in defence contracts but are positioning their businesses to do so.

The Victorian defence and defence-enabled industries employs over 10,200 people, with approximately 6,000 employed by the Prime/Tier 1 companies and 4,000 employed by SMEs. Details of sector turnover and defence-specific turnover are provided in Table 3.1.

Attention is drawn to limitations in the survey data brought about by calculations being taken from earnings range midpoints. AADI estimates that calculations will err on the conservative side, as the data ranges are largest at the higher end of the scale, where several of the Prime/Tier 1 contracts are significantly larger than the highest value in the ranges provided.

Predictably, the largest companies both in terms of employee headcount and annual turnover (defence only and total turnover) in Victoria are Tenix, It should be noted that these figures exclude estate management, R&D institutions and some segments of defence-enabled industry yet to be surveyed – (eg. Combat clothing, software houses, automotive, biotechnology related to CB protection etc.) as well as the companies who refused to participate in the survey.

As Victoria's GSP amounts to $222,000 million[1] the defence work generated in Victoria is 0.5%. Total business activity (defence and non-defence) across Australia for companies operating in Victoria last year was $4,640 million, and AADI estimates that the defence plus the non-defence work generated by these companies in Victoria to be

[1] ABS data - 2005

in excess of $2,000 million or approximately 1% of GSP. Nationwide, each employee of companies operating in Victoria turns over $193,000 for defence and non-defence activities.

Table 3.1: Turnover figures for defence companies operating in Victoria

	Prime/Tier 1	SME	Industry Total
Total Annual Turnover – defence & non-defence work in Australia	$2.94 B	$1.70 B	$4.64 B
Defence Activity Turnover in Victoria (2005/06)	$784 M	$275 M	$1.06 B
Defence Activity Turnover in Victoria (2004/05)	$627 M	$244 M	$871 M
Defence Activity Turnover in Victoria (2003/04)	$668 M	$228 M	$896 M
Turnover per employee (defence & non-defence products)	$171 k	$250 k	$193 k

3.2 The Function of the Defence Industry in Victoria

The defence industry in Victoria is represented by a broad and deep industry capability to serve most aspects of global defence industry requirements. The survey data indicates that the defence and defence-enabled industry in Victoria has strengths represented across a broad range of industry and capability categories, as summarised in Table 3.2.

Victoria has a vibrant concentration of defence and aerospace companies, including significant operational presence of all four defence primes in Australia and either headquarters or major operational presence of several more Tier 1 suppliers. The sector has particular strengths in:

- naval shipbuilding;
- aerospace design, electronics, manufacture, through life support & overhaul, and;
- weapons & ordnance,

In addition to these particular areas, sector capabilities are spread remarkably evenly across the spectrum of defence requirements.

The Victorian defence industry is also in a "hub and spoke" relationship with a network of mutually supporting innovative and technology-enabled industries including biotechnology and information & communications technology. This is in addition to the strategically important engineering industries of automotive and manufacturing, which in Victoria are undergoing a substantial and rapid transformation from the traditional production line focus to a new capability which now sees a significant global design

Table 3.2: Major sources of Defence industry activity in Victoria over the last three years by sector

Industry Segment	Estimated Annual Value	Projects in order of decreasing value L-R
Naval Shipbuilding & Repair	$400 million	ANZAC Frigates; Collins Submarine; Project Protector; FFG Upgrade; AWD
Aerospace - Structural Design & Manufacture	$240 million	Aircraft component manufacture; JSF Structural Design; Repair design for aging aircraft.
Weapons & Ordnance	$200 million	Ordnance and propellants; Nulka Decoy Missile; ESSM; JDAM
Aerospace - Electronics	$140 million	P3C Orion Avionics Upgrade; Seahawk Mid Life Upgrade; Project Wedgetail – AEW&C; Project Echidna – Electronic Self Protection
Land Equipment	$85 million	Bushmaster; M113 Overhaul & Upgrade; ASLAV Support
Non-Aerospace Electronics	$80 million	Jindalee Over the Horizon Radar; HF Modernisation; Air Defence Systems; NCW
Aerospace – Maintenance & Overhaul	$75 million	F/A-18; Hawk; F-111; Kiowa

Table 3.3: Overview of Victorian Defence industry capability by function

Category	No. of companies with capability			% of companies with capability		
	Total[2]	Prime/T1	SME	Total	Prime/T1	SME
Manufacturing	73	13	59	61.9 %	68.4 %	60.2 %
Design	40	11	28	33.9 %	57.9 %	28.6 %
Systems & software	67	12	54	56.8 %	63.2 %	55.1 %
Training & Simulation	21	6	14	17.8 %	31.6 %	14.3 %
Human Protection & Performance	11	2	8	9.3 %	10.5 %	8.2 %
Logistics & Support	53	11	41	44.9 %	57.9 %	41.8 %
Service Provider	18	5	13	15.3 %	26.3 %	13.3 %

[2] The figures for total number of companies in all the sectors except Service Provider include an additional company, attributed to a commercial research organisation that was interviewed.

capability for 3 of the world's top 4 automotive manufacturers located in Melbourne. Many of the skills in the automotive industry are fully transferable to the defence sector, particularly in the areas of management of large technically complex projects, advanced design and simulation.

Victoria has a strong value added skill base of engineers and project managers and this is reflected in these results. Overall, the companies that completed the survey employ 1,563 professional engineers and 475 project managers in Victoria.

The Victorian defence industry has a core of primes and Tier one suppliers the principal companies being Tenix, Thales/ADI, BAE Systems, Boeing/Hawker de Havilland, GKN Aerospace, L3 Communications and Sinclair Knight Metz.

3.3 The Location of the Victorian Defence Industry

Victoria's defence industry is distributed primarily throughout Melbourne's outer eastern and south eastern suburbs, with hubs of operation concentrated in Melbourne's north, west and central business district as illustrated in Figure 3.1. Only 10% of the entities interviewed had operations in regional Victoria; however these accounted for a much higher percent of sector output, with a number of organisations locating factories and production facilities in regional Victoria. The locations of Primes in Bendigo, Benalla and Wodonga, coupled with the consequent clustering of SMEs in these areas, further strengthens regional Victoria's role in the defence sector.

An examination of the four traditional defence sub-sectors (Aerospace, Marine, Land and Electronic Systems & Software) shows a diversity of capability throughout Melbourne and regional Victoria, which is graphically represented in Figure 3.2. Companies with capabilities in the aerospace sector are primarily located in the manufacturing-rich south eastern and northern suburbs, with engineering and design strengths are located in the aerospace precinct of Port Melbourne and South Melbourne. AADI is aware that regional data for aerospace capabilities would be boosted by a

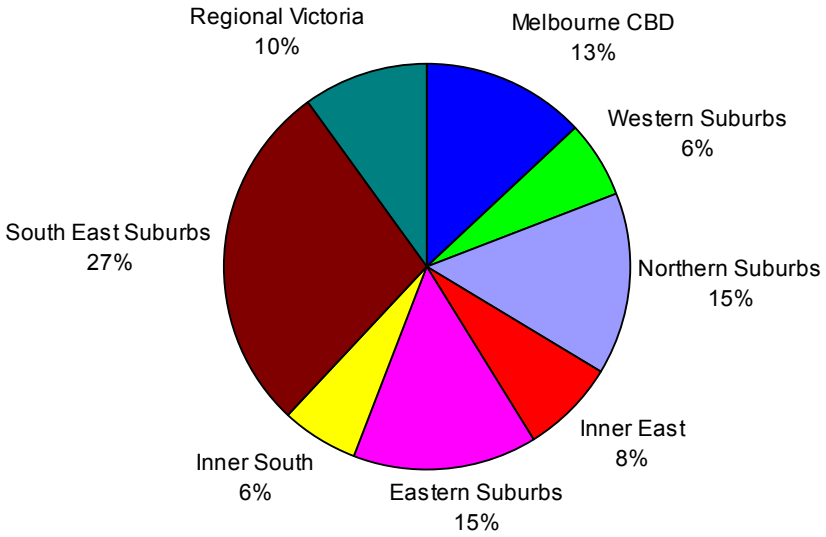

Figure 3.1: Geographical Distribution of Victoria's Defence Industry

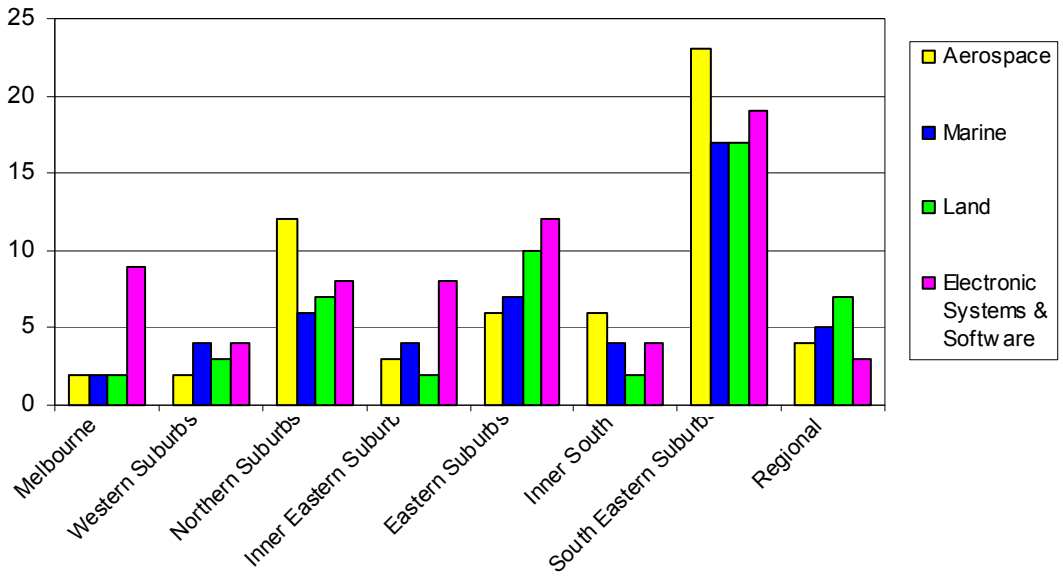

Figure 3.2: Company Distribution by Defence Sector of Operation

number of organisations in the East Gippsland/Sale area, who were unable to respond within the reporting period, but whose data will be included in the web-enabled database as soon as it becomes available.

Victoria's marine and land sector participants provide the bulk of regional Victoria's defence capability, while inner Melbourne's strengths are electronic systems and software companies and the headquarters and design and development divisions of other sector organisations.

3.4 The Victorian Defence Business Environment

The survey data indicates that Victorian defence industry has large representation by all the main players and is complemented by a large and diverse number of SMEs providing a range of critical strengths and capabilities to service major defence and aerospace industry projects. These strengths are integrated by the intersection of three economic attributes whose geographic combination is unique to Victoria within the Commonwealth of Australia and provide a significant relative advantage to the state. It is the intersection within the state of defence technical know-how, advanced manufacturing capability, broad technical skills and training and financial institutions that can't be matched by other states.

However, this combined strength needs more public expression and organisation to win large defence projects and attract overseas primes' investment into Victoria.

3.4.1 Defence Business Constraints

Survey participants were given the opportunity to provide comments to AADI, raise issues of concern and discuss constraints and barriers to their increased participation in the sector. AADI received a mixed reaction to this, with industry opinions ranging from positive, indicating strong support for the survey:

> *"… it is good to see AADI coming to visit us. It is a positive sign that the Victorian Government is taking action"*

and

> *"The Bracks Government was slow in the early days to appreciate the defence industry. It is good that they now do appreciate it and that they are doing something about it, especially from an SME point of view."*

to

> *"It feels like the Government have turned their back on the defence sector. This government is resting on their laurels."*

Overall, the ratio of negative comments to turnover was quite low – essentially, the most critical comments came from a small percentage of companies at the lower end of the turnover spectrum, although most companies voiced concerns with the operating environment for SMEs. The loss of a 'buy Australia' policy was regularly raised, as were payroll tax issues, labour competition with China and cost of capital investment, for example:

> *"In other countries, eg Israel, Ireland, Scotland etc, the governments have initiatives that really assist industry. For example, the government will build the building and won't charge the company tax or rent for 3 years. [We] have operations in China and the Chinese government are giving us the building for free for the first 3 years."*

Some interesting points were raised by companies with strategic perspectives on Victoria's defence industry. A key example is the following comment:

> *There would be a lot more aircraft work that could come into Australia if one of the governments would fix the processing area. We don't have any of the certifications or qualifications in processing here in Australia, so we have to send components overseas to get processed. [We] get as much processing done in Victoria/Australia as we can, but we have to send $3m worth of work overseas per year because it's not being done effectively here at world's best practice."*

Overall, the recurring theme was positive reaction to the survey itself, and a desire for the Victorian Government to continue supporting the Victorian defence industry by promoting local capabilities to Defence and attract large defence projects to the state.

3.4.2 Role of Government assistance programs

Several respondents made particular mention of the positive impact that Government export programs – both Victorian Government (export assistance through the Office of Manufacturing and similar) and Commonwealth Government (AusIndustry and AusTrade) had made on their business operations.

The role of Government R&D programs is discussed in Section 4.2.

Comment was consistently made about the aggressive nature of interstate governments, particularly Queensland and South Australia, in providing generous government inducements for companies to relocate or expand into those states. Larger companies tend to view the industry from a more holistic and strategic standpoint, and plan expansions and relocations accordingly (eg. One Prime commented that it would be far more productive from a national perspective for states to cooperate and develop mutually supporting core capabilities, rather than "poaching" each other's industry and duplicating capability).

4.0 Victorian Defence Industry Enablers

4.1 Exports by Defence-Related Industries

Victoria has a strong and vibrant concentration of both SME and Prime defence industry exporters that are drawing the international defence market into the State economy. Two thirds of the companies interviewed were exporting from Australia with a total value for defence and non defence goods and services of $1,040 million last year. This compares with the total exports from Victoria of $18,000 million last year. Major destinations for these exports were New Zealand, South East Asia, USA, Canada, Europe, China, and Taiwan. Majority of companies expressed a strong view that exports would play a key role in their future and almost all were able to discuss future export plans in some detail.

Note that the Primes were interviewed on a Victorian business unit basis, therefore export figures quoted represent to a very high degree of accuracy exports from Victoria alone. Only the export figures of two companies (3M and GD Systems) with a total of $15 million each may have exported a significant proportion of their totals from outside Victoria. However this would account for less than 3% of the total figure quoted.

4.2 Access to R&D, IP & Technology

The defence and defence-enabled industry in Victoria leads innovation through its focus on research, design and innovation. This can be seen from the technology spend indicator, as shown Table 4.3.

Expenditure on the acquisition of new technology measures total innovation expenditure as percentage of total turnover[3]. Several of the components of innovation expenditure, such as investment in equipment and machinery and the acquisition of patents and licenses, measure the diffusion of new production technology and ideas. Overall, the indicator measures total expenditures on many activities of relevance to innovation. The indicator partly overlaps with the indicator on business R&D expenditures (BERD).

Table 4.1: Victorian defence and defence-enabled industry acquisition of innovation and new technology.

Industry Segment	Proportion acquiring new technology	Acquisition cost for new technology	Tech spend - those acquiring technology (% of turnover)	Tech spend – entire sector (% of turnover)
Whole Industry	60%	$174 million	5.0%	3.8%
Primes/Tier 1s	74%	$105 million	4.3%	3.6%
SMEs	58%	$69 million	7.0%	4.0%

[3] European Commission trendchart 2005

The rate of expenditure in the defence sector in Victoria compares favourably to several equivalent European indicators[4]:

- Innovation expenditure for Victorian defence industry is 3.8%, against 1.8% for all EU industries;
- 58% of Victorian defence SMEs innovate, against 44% of SMEs across all EU industries;
- 56% of Victorian SMEs collaborate on innovation and new technologies against 12% of SMEs across all EU industries.

It is likely that the BERD component of Victorian defence industry innovation expenditure is comparatively low as only 28% of local companies had accessed R&D funding programs, and around a third of these (9%) nominated the R&D Tax Concession as their exclusive method of "government funded R&D". The proportion of companies accessing proactive R&D programs, such as R&D Start, CTD and ICIP either exclusively or in conjunction with the R&D tax concession was around 22%. Comparing this to the relatively high level of in-house innovation in the sector, the data indicate that more innovation and technology development expenditure is directed towards business-to-business collaboration, in-house technology development and purchasing innovation on a "COTS" basis.

4.3 Skills Development & Training

83% of the companies surveyed (95% of Primes/Tier 1 companies and 80% of SMEs), have staff training and upskilling programs of some description. Anecdotally however, a large proportion of the training and upskilling in the sector is performed as "in-house sales & product training" or similar. Furthermore, the data indicate that the sector-wide average spend on training was only 0.3% of turnover, or a total of $12 million for the entire sector.

[4] European Commission trendchart, 2005

5.0 Survey Constraints & Future Work

This survey was conducted over a short time frame with limited resources and although a large dataset has been gathered from the companies interviewed, the survey cannot therefore be described as comprehensive.

In particular, it is recommended that further work be conducted to firstly to complete the defence company register and secondly to capture data on companies that have capabilities that are contiguous to defence. Such companies would be expected to be drawn from sectors including biotechnology with relevance human protection & performance, homeland security etc., clothing, and gaming software, with strong overlaps into the simulation, NCW and human-machine interface areas.

Thirdly as this study has confirmed, the Victorian defence sector is strongly aligned with and dependent on the application of innovation and new technologies for its competitive advantage. As such, it will be important to survey R&D institutions in the state that are being or could be applied to defence projects, and to delve deeper into the extent, nature and specifics of the industry's utilisation of new technology.

6.0 Conclusions

Victoria has an extensive and large defence industry base that is growing, exporting, and crucially in the knowledge economy, working to a very high degree in the high-tech high value-added end of the market. The data support the conclusion that the Victorian defence and defence-enabled industry sector is strongly dependent on and aligned with technology and high value-added business practices.

The sector employs over 10,000 people in the State, with approximately 4,000 employed by SMEs and 6,000 employed by Primes & Tier 1 contractors.

The defence and defence-enabled sector has large establishments throughout the State, including significant facilities in regional Victoria which contribute a large amount to the State's defence sector output. The data supporting these propositions has been entered in a data base for future exploitation, however to be of continuing use it will have to be maintained and expanded.

There are key deficiencies in the sector in the amount of company turnover being invested in training and upskilling of employees, with only 0.3% being reinvested, or less than $1,200 per employee. The relative dearth of training activity represents a significant challenge to industry and Government to maintain Victoria's position at the cutting edge of the knowledge-intensive aspects of the sector.

Victoria has a distinct advantage in delivering defence projects in the intersection within the state of wide and deep defence technical know how, manufacturing capability, engineering skills and training, particularly project management skills, and financial institutions. No other Australian State enjoys the same intersection of defence capability, financial sector maturity and congruent non-defence industry capability and capacity. This advantage should be more vigorously exploited through public expression, organisation and promotion.

Appendix 1: Summary of Company Participation in the Survey

Companies/Divisions Interviewed

3M Australia	DVR Engineering Pty Ltd	Pennant Australasia Pty Ltd
94th Peso	Eaton Power Quality	Platypus Outdoors Group Pty Ltd
Adacel Technologies	EDAG Australia Pty Ltd	PPG Industries Australia Pty Ltd
ADI Ltd (Vic) Land - Vehicles & Engineering	Envision IT Pty Ltd	Printatech Systems Pty Ltd
ADI Munitions (Benalla)[5]	Flexible Drive Agencies Pty Ltd (Vic)	Production Parts
Advanced Power Machinery Pty Ltd	Fortburn Pty Ltd	Radio Frequency Systems Pty Ltd
Aerosonde	Frontline Australasia Pty Ltd	Redflex Communications Systems P/L
Aerostaff Australia	Future Fibre Technologies	Regina Glass Fibre Pty Ltd
AFC Group Pty Ltd	General Dynamics Land Systems International	Remote Vision Solutions Pty Ltd
Agent Orientated Software	GKN Engineering	RLM Systems
Alloy Computer Products (Aust) Pty Ltd	GPSat Systems Australia Pty Ltd	Rohde & Schwarz (Australia)
AMOG Consulting	Hardchrome Engineering Pty Ltd	Rosebank Engineering
Amphenol Australia Pty Ltd	Hawker de Havilland	Sinclair Knight Merz Pty Ltd (Vic)
Ansett Aviation Engineering Services	Honeywell	Skytech
Australian Aerospace Resources Pty Ltd	Hosico Engineering Pty Ltd	Smart Engineering And Logistic Solutions Pty Ltd
Australian Defence Apparel Pty Ltd	Inductoheat	SMS Management & Technology
Australian Marine Technologies Pty Ltd	Intercorp Pty Ltd	Special Operations Research & Development (SORD) Australia
Aviation Data Systems	Invenio Pty Ltd	SYPQ Systems Pty Ltd (Vic)
Aviation Turbine Overhaul	Jet Turbine Services	Tectonica Australia Pty Ltd

[5] The interview with Thales Land Ordnance Group (formally ADI) covered data from ADI Munitions, therefore the data from ADI Munitions has been amalgamated into Thales Land Ordnance Group to avoid duplication.

AW Bell Pty Ltd	KAZ Technology Services Pty Ltd	Tenix Defence: Aerospace Division (Vic)
BAE Systems Australia Ltd (Vic)	KESEM International	Tenix Defence: Land Division (Vic)
Bendtech Industries	Kidde Australia Pty Ltd	Tenix Defence: Marine Division (Vic)
Bertram Bullet Co Pty Ltd	L-3 Communications Australia Pty Ltd	THALES ATM Pty Ltd
BMT Defence Services (Australia) Pty Ltd	Learning Systems Analysis Pty Ltd	Thales Land Ordnance Group
Brenco Aerospace Pty Ltd	Lovitt Technologies Australia	The Aerostructures Group of Companies
Brooks-Koochew Pty Ltd	M&H Power systems	The Specialty Group
Bruel & Kjaer	Mack Valves Pty Ltd	Thyssenkrupp Marine Systems Australia
C GEAR Australia Pty Ltd	Mackay Consolidated Industries	Trimcast Pty Ltd
Cablex	Marand Precision Engineering	UES (Intl) Pty Ltd (Vic)
Ceramet Technologies Pty Ltd	MFB Products Pty Ltd	Unique Micro Design
Commodore Security and Intelligence Pty Ltd	Moog Australia Pty Ltd	United Surface Technologies Pty Ltd
Communications Design and Management Pty Ltd	MSC Software Australia Pty Ltd	VICOM Australia
CompAir (Australasia) Pty Ltd	MSX International	VoTech Systems Engineers & Developers Pty Ltd
CPE Systems Pty Ltd	MTM Celsiunator Pty Ltd	Victorian Partnership for Advanced Computing (VPAC)
Daronmont Technologies	NEC Business Solutions	Way Out Evacuation Systems Pty Ltd
Datanet Pty Ltd	Niksar Pty ltd	WinRadio Communications
DESA Australia Pty Ltd	Ocean Software	Wright Technology Corporation
Diamond Australia	Olin Australia Ltd - Winchester Australia	Wwite
Draeger Safety Pacific Pty Ltd	Pacific Composites	Zantech Consulting Pty Ltd
DVExperts International Pty Ltd	Pains Wessex Australia Pty Ltd	

Companies initially identified but not interviewed

Company	Reason not interviewed
Accenture Australia Ltd	Written survey not back in time
Aggreko Pty Ltd	Declined to be interviewed
Anritsu Pty Ltd	Not appropriate to be included in study
Association of Professional Engineers, Scientists & Managers, Australia	Declined to be interviewed
Ballistic and Mechanical Testing Pty Ltd	Unable to be contacted. May not exist anymore
BB Engineering Pty Ltd	Declined to be interviewed
Ceramic Fuel Cells Limited	Declined to be interviewed
Cisco Systems Australia Pty Ltd	Defence work not conducted in Victoria
Defence Communications Industry Pty Ltd	Declined to be interviewed
Dotmar Engineering Plastic Products Pty Ltd	Written survey not back in time
eB2Bcom Pty Ltd	Was unable to be interviewed within reporting period
Edge Aviation	Written survey not back in time
Epsilon Instrumentation Pty Ltd	Declined to be interviewed
Forgecast Australia Pty Ltd	Not appropriate to be included in study
Gippsland Aeronautics	Unable to coordinate interview – awaiting written survey response
KEL Aerospace	Not in existence anymore
Liquip International Pty Ltd	Not appropriate to be included in study
Macdonald Technologies International	Declined to be interviewed
Microsecure Corporation Pty Ltd	Declined to be interviewed
Network Connect Australia	Defence work not conducted in Victoria
Orica Limited	No longer operate in defence sector

Company	Reason not interviewed
Permian Pty Ltd	Was unable to be interviewed within reporting period
PLM Services Pty Ltd	Did not respond to questionnaire after requesting that it be sent
Project Performance (Australia) P/L	Declined to be interviewed
Recoilless Technologies International Corp Ltd	Declined to be interviewed
SDR Communication Technologies	Ruled insolvent in 2005
Simultech Australia Pty Ltd	Not appropriate to be included in study
Sun Microsystems Australia	Defence work not conducted in Victoria
Transfield Services	Not appropriate to be included in study

Appendix 2: Methodology for Gathering and Analysing Data

AADI recognised that many of the privately owned companies interviewed were disinclined to divulge sensitive financial information. To encourage interviewees to provide AADI with comprehensive data regarding commercial activities, AADI devised the questionnaire with financial questions structured in value ranges. In general, AADI found that companies were more willing to disclose financial information when selecting ranges, rather than giving precise figures.

The reporting function of AADI's database has been structured to read the midpoint value of the entered range. For example, when reporting company turnovers, a data set that has selected the $1-5 million turnover range would register that turnover as $3 million. The registered turnover is subsequently used to determine such factors as technology spend and export dollars.

The following presents a worked example:

	Entered Data	Midpoint/Reported Data
Turnover	$10-25 million	$17.5 million
Defence Work	$3-5 million	$4 million
Exports	15%	$2,625,000
Technology Spend	3%	$525,000