The Senate

Standing Committee on Foreign Affairs, Defence and Trade

Blue water ships: consolidating past achievements

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Table of contents

Acronyms and abbreviations

ADF	Australian Defence Force
ADI	Australian Defence Industries
AECA	Arms Export Control Act 1976
AFP	Australian Frigate Project
AIDN	Australian Industry and Defence Network Inc.
AII	Australian Industry Involvement
AiG	Australian Industry Group
AIMTEL Pty Ltd	Aerospace, Industrial and Marine Technology Pty Ltd
AMAS	Australian Minesweeping System
AMC	Australian Marine Complex
AMEC	Australian Marine Engineering Corporation
AMECON	Australian Marine Engineering Consolidated Limited
AMWU	Australian Manufacturing Workers Union
ANAO	Australian National Audit Office
AOR	Auxiliary Oiler Replenishment ship
ASC	ASC Pty Ltd, formerly Australian Submarine Corporation
ASMD	Anti-ship Missile Defence
ASPI	Australian Strategic Policy Institute
AWD	Air Warfare Destroyer
AWS	Australian Warships Systems Pty Ltd
BIW	Bath Iron Works
CAD	Computer Aided Design
CAM	Computer Aided Manufacture
CDS	Combat Data System
CEO	Chief Executive Officer
CEDA	Committee for Economic Development of Australia
CGT	Compensated Gross Tonnage
CIM	Computer Integrated Manufacturing
COTS	Commercial off the shelf
CUF	Common User Facility
DCP	Defence Capability Plan

DDL	Light Destroyer
DEWR	Department of Employment and Workplace Relations
DITR	Department of Industry, Tourism and Resources
DMO	Defence Materiel Organisation
DSME	Daewoo Shipping and Marine Engineering
DSTO	Defence Science and Technology Organisation
dwt	deadweight ton
EADS	European Aeronautic Defence and Space Company
ETM	Elaborately Transformed Manufactures
FFG	Guided Missile Frigate
FFGSPO	Fast Frigate Guided System Program Office
FMS	Foreign Military Sales
GCA	Gibbs and Cox Australia Pty Ltd
GDP	Gross Domestic Product
HHI	Hyundai Heavy Industries
HMAS	Her Majesty's Australian Ship
IP	Intellectual Property
ISO	Industrial Supplies Office
IT	Information Technology
ITAR	International Traffic in Arms Regulations
LCS	Littoral Combat Ship
LHD	Landing Helicopter Dock ship
LNG	Liquefied Natural Gas
LPG	Liquid Petroleum Gas
MOD	Ministry of Defence (UK)
MODL	Migration Occupations in Demand List
MOTS	Military off the shelf
MoU	Memorandum of Understanding
MSI	Mission Systems Integrator
PP	Production Package
R&D	Research and Development
RAN	Royal Australian Navy
R&M	Repair and Maintenance

RFT	Request for tender
RINA	Royal Institute of Naval Architects
RNZN	Royal New Zealand Navy
RSL	Returned and Services League of Australia
SADI	Skilling Australia's Defence Industry
SME	Small and medium sized enterprises
TLS	Through-life support
TMN	Tasmanian Maritime Network
UK	United Kingdom
URD	Unit Ready Days
U.S.A.	United States of America
USN	United States Navy
2D/3D	Two dimensional / three dimensional

Main finding

1. The committee has taken a measured and balanced approach to presenting and analysing the evidence. The lack of data in particular caused the committee to be cautious in reaching its main finding. The evidence, however, was clear cut—Australia's naval shipbuilding base is well-established, and in recent years has become more efficient, motivated and highly skilled. It has produced a number of outstanding world-class vessels that showcase the capability of Australia's naval industrial base. In assessing the four major components of Australia's naval industrial base, the committee found:

- Australian primes have an improved track record;
- SMEs and international subsidiaries form a vibrant, innovative and competitive network of suppliers;
- past and current investment in heavy engineering infrastructure outside the traditional ship building yards places the industry on a sound but flexible footing to meet future demand; and
- initiatives by both the public and private sector are tackling the problem of skills shortages to ensure that Australia has the knowledge and skills to support the industry.

2. The committee believes that this capability, built up over recent decades, is an asset to the nation which should be encouraged and supported by government, but with stronger emphasis on competitive productivity gains over the long term.

3. Not only does this industrial base have the capacity and potential to contribute to the maintenance of a self sufficient and self reliant naval shipbuilding industry, it also contributes in many other ways to Australia's industrial manufacturing base, the broader economy and Australia's national defence interest. The range of benefits include, but are not limited to:

- strategic self reliance for the repair and maintenance of the navy fleet and commercial shipping;
- greater self reliance and independence for national strategic defence capability;
- improved assurance of dependability and flexibility flowing from domestic capacity for ship modification or customisation for Australian conditions, and the development of innovative solutions for any of the Navy's unique requirements which might be considered appropriate and practical;
- increased gross domestic product from capital investment;
- reduced pressure on the balance of payments;
- enhancement of the labour market;
- expanded indigenous research and development (R&D), design, production and management capabilities;

- the acquisition and development of valuable new skills, manufacturing techniques and processes;
- extensive technology transfer across a broad spectrum of activities;
- a strengthening belief in Australia's own capabilities and confidence in its own ability to exploit opportunities;
- enhanced potential for exporting;
- the maintenance of capability to support vessels throughout their operational lives, shorter turn around for repairs with in-service support; and
- greater foreign investment.

4. The committee emphasises the need to retain a viable shipbuilding and repair industry to ensure that the Navy has the ability to respond quickly to urgent operational requirements. A reliance on off-shore industry to maintain, repair, upgrade or modify navy vessels would put Australia's defence interests at risk.

5. Further, the committee accepts that domestic naval construction provides greater assurance for ongoing effective technical support, maintenance, refurbishment and emergency repairs—as opposed to post construction technology transfer from overseas providers. There is a direct and strong connection between a ship's build and acquiring the knowledge, skills, experience and resources needed to support the ship especially when a rapid response is required.

6. When taking account of all the factors that are to be considered when acquiring a naval vessel, the committee believes that it is in Australia's national interest to maintain a viable naval shipbuilding and repair industry.

7. This requires a commitment by the government to have Australia's naval vessels constructed in Australia and for the government and Defence to adopt measures that would ensure the industry remains efficient, innovative and competitive.

8. Government should not allow itself to be captured by overly dependent and uncompetitive suppliers. The trade off between the benefits of self reliance and self sufficiency must be carefully measured against the best possible international benchmarks so as to avoid debilitating subsidisation of inefficient practices, but at the same time promoting improved productivity.

9. While the committee supports in country builds for naval vessels, the committee notes that for virtual commercial ships where there is no strong strategic defence interest, such as the *Delos* acquisition, offshore purchase may be appropriate.

10. The Committee believes that to assist the shipbuilding and repair industry improve its productivity, it is imperative that government develop longer term naval defence strategies from which can be derived economies of scale and continuity of demand, without which industry will continue to suffer.

Recommendation 1

11. The committee recommends that the government make a public commitment to maintain Australia's naval shipbuilding and repair industry. This commitment to be supported by improved long-term planning of naval shipping needs in order to maximise economies of scale and provide continuity for the broad but specialised design and construction skills required for a healthy industry over the long term.

Executive summary

International naval shipbuilding industry

1. Over recent decades, the global naval shipbuilding industry has faced major challenges with dwindling demand for ships but increased pressure for more highly sophisticated and expensive systems and weaponry. Advances in technology are continually expanding the capability edge which countries seek for their defence. To accommodate these shifts, the naval shipbuilding industry worldwide has undergone a period of transition marked by consolidation with fewer major producers. Furthermore, these remaining producers are increasingly looking to form alliances or cooperative arrangements to meet the demands of constructing a modern warship.

2. Broader heavy engineering capacity has also developed based on modular cad/cam design and manufacturing techniques which have rendered more traditional ship yard facilities obsolete and inefficient.

3. Maritime countries across the globe face a common difficulty in finding the most cost-effective way to maintain an up-to-date naval shipbuilding capability. They must address issues created by the falling demand for ships, the escalating costs of construction and of keeping pace with advances in technology, as well as the need to develop and retain skilled workers in buoyant economies. In light of these challenges, the governments of countries keen to maintain their naval shipbuilding capability are under pressure to review their approach to the industry. Recent studies conducted into the U.S. and the UK naval shipbuilding industries highlighted the important role that governments have in assisting the industry to adjust and succeed.

The Australian naval shipbuilding industry

4. As a nation with an established but diverse naval shipbuilding industry, Australia confronts similar challenges as overseas countries in sustaining the industry albeit more serious due to more limited demand, lower economies of scale, and poor continuity for investment purposes.

5. The report considered in detail the four main components of Australia's naval shipbuilding industry.

Australian Primes

6. Australia has prime contractors that are capable and willing to invest in complex build and repair projects. This capability has been developed through their involvement in key RAN projects over the past 20 years. With few exceptions, the primes have shown their ability to undertake technologically and managerially complex projects. They have done so through investing in contract and project management skills, modernising construction and assembly processes and connecting with suppliers up and down the supply chain.

7. Australia's major naval shipbuilders face the challenges of their counterparts worldwide. Project management skills are crucial to ensure that schedules are maintained, costs and risks controlled, resources are readily available, subcontractors are well-managed and the key overseas technologies are introduced and applied. Shipbuilding is no longer a discrete industry. It is part of an increasingly sophisticated and flexible heavy engineering industry, though still dependent on highly specialised design skills which are difficult to establish and retain in periods of low and unpredictable demand. More likely than not shipbuilding now entails modular design and construction within a contestable fabrication market, but centrally assembled.

8. Australia's prime contractors have demonstrated these abilities. The committee believes that Government has a key role in harnessing the experience and ability of the primes through support for local construction of major acquisitions.

SMEs

9. Australia has an extensive and widespread chain of suppliers who have supported, and are looking forward to continuing their involvement in, Australia's shipbuilding industry. They not only deliver a particular good or service but add value to the shipbuilding industry. The industrial base in Tasmania, for example, although small and remote from the major shipbuilding centres, demonstrates the scope and extent of the nation's capability, notwithstanding the small ship market it supplies. The committee has no doubt that SMEs in Australia have the skills, knowledge, experience and drive to provide a solid base upon which to build Australia's naval shipbuilding program. Some are at the cutting edge of world class developments and are contributing to innovation and driving advances in technology. In some cases, a Defence contract was the catalyst that set the company on its successful trajectory.

10. It is important that the wealth of local talent residing in Australia is properly harnessed and nurtured. The committee believes that Defence has a key role in developing this network and that considerations such as how best to nurture local SMEs should be part of Defence's overall strategic planning.

11. Overseas companies fill capability gaps left by Australian companies. Without doubt the Australian subsidiaries of large overseas companies are working side by side with local firms to provide the shipbuilding industry with an extensive, reliable and capable network of enterprises supporting the construction of naval ships.

12. The committee believes that it is important for government to ensure that the Australian industry is able to take full advantage of the presence of these companies in the country. They must be part of the growth and development of Australia's industrial base.

Infrastructure

13. Although a small industry by global standards, Australia has important shipbuilding infrastructure as a result of investment over many years. Two major naval acquisition projects, the Air Warfare Destroyer (AWD) and amphibious Landing Helicopter Dock (LHD), are currently underway in Australia and formed the

context for much of the evidence to the inquiry. Although most witnesses agreed that Australia does have, or could develop if required, the infrastructure needed to undertake the construction of large naval vessels, the project to build LHDs would require additional infrastructure. Estimates differed, however, on the amount of infrastructure investment needed to accommodate the LHDs. A study commissioned by the Defence Materiel Organisation (DMO) suggested that the cost estimates for improvements to satisfy an LHD build range from $100 million to $300 million.

14. It should be noted that any initial investment in infrastructure becomes a permanent asset and builds on the considerable infrastructure already existing in Australian shipyards. Some of this could become superseded and redundant.

15. Australia's naval shipbuilding and repair industry dates back to the mid-nineteenth century. Since then it has evolved and, in many ways, is a product of its history. Some submitters, led by the state governments of Western Australia, South Australia and Victoria, suggested that the present state of the industry reflects a legacy of an ad hoc approach to investment over many years. The lack of strategic coherence to the pattern of infrastructure development in Australian shipyards has created inefficiencies. They agreed with the view that a national strategic plan could result in a better and more efficient use of resources.[1]

16. The role of governments in planning for, and investing in, the industry is particularly important to ensure that future developments complement existing facilities and are compatible with a long term strategic plan. Certainty regarding government support for local construction is important to facilitate state and industry investment in infrastructure.

Workforce and skills

17. Australia has a quality skilled labour base, with skills required for naval shipbuilding distributed throughout various sectors of the economy. It is clear that there are skilled labour shortages in a number of occupations required for naval shipbuilding. The committee received different views as to whether labour shortages are so significant as to adversely affect the successful delivery of upcoming build programs. Many witnesses were confident that the workforce could be expanded, through training, movement between sectors and immigration, to meet the challenges associated with both the AWD and LHD builds. Other submitters, including Defence, were more circumspect.

18. The committee recognises the cautious approach by some submitters towards meeting the increased labour demands. For example, they are concerned that mobilising labour for naval shipbuilding could sacrifice the capacity for repair, maintenance and upgrade of the current fleet, or adversely impact on other profitable industry sectors.

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1 See chapter 6, paragraphs 6.64–6.73.

19. However, the committee also recognises the opportunities a naval shipbuilding industry provides as a catalyst for skills development and workforce growth. Forecast labour shortages are an incentive for innovation and industry investment in training and skills development. Government investment in naval shipbuilding programs in the past has strongly contributed to the workforce capacity that exists today. This resource, particularly highly specialised skill sets, will atrophy without further on-shore construction projects.

20. The committee considers that current skills shortages provide a significant but not insurmountable challenge for local construction of both the AWD and LHD platforms. The committee sees critical roles for industry, Defence and government in addressing the challenge. If Australian industry is to benefit from substantial federal funding, in the form of local construction of naval acquisitions, industry must show that is has innovative responses and solutions to skills challenges. The committee is encouraged by Australian and state government and industry investment in relevant training and skilling initiatives.

21. In the current era of advanced technology shipbuilding, access to and control over intellectual property (IP) is an important element of a nation's shipbuilding and repair capacity. This is an area where Australia's capacity is vulnerable. Australia largely sources ship designs from overseas and, except in niche areas, is reliant on overseas designed weapons and other systems. In selected areas Australia's research and development has produced cutting edge technology and generated important indigenous IP. However, as a relatively small market Australia will inevitably need to continue to access the technological advances made in the larger defence markets of Europe and the U.S.

22. The ability to negotiate and manage contracts guaranteeing access to IP is therefore vital to Australia's capacity for naval shipbuilding and repair. Without control over IP, Australia is unable to maintain operational sovereignty. Where IP is secured, there is potential for growth, development and export. Australia's capacity in this area is therefore largely reliant on the ability of DMO to negotiate contract outcomes effectively. The committee therefore notes the importance of DMO having the necessary skills and abilities to provide this important outcome.

Summary

23. The committee has highlighted how the main components of Australia's naval shipbuilding industry are making significant contributions to the industry's viability. The evidence was clear cut—Australia's naval shipbuilding base is well-established, and in recent years has become more efficient, motivated and highly skilled. It has produced a number of outstanding world-class vessels that showcase the capability of Australia's naval industrial base. In assessing the four major components of Australia's naval industrial base, the committee found:

- Australian primes have an improved track record;
- SMEs and international subsidiaries form a vibrant, innovative and competitive network of suppliers;

- past and current investment in heavy engineering infrastructure outside the traditional ship building yards places the industry on a sound but flexible footing to meet future demand; and
- Australia has an impressive skills base and initiatives by both the public and private sector are tackling the problem of skills shortages to ensure that Australia has the knowledge and skills to support the industry.

24. Despite the healthy state of the industry, a number of participants to this inquiry were of the view that greater efficiencies were to be achieved through a more coherent, strategic approach to planning. The committee agrees with their view and recommends that the government and Defence take note of the call for a more strategic approach by the Commonwealth to planning.

Comparative analysis

25. The lack of suitable data prevented any sensible or accurate comparative analysis of the productivity of Australian shipyards against overseas yards. Despite repeated requests for quantitative data or analysis from Defence on the price premium attributed to local construction, no such information was provided. The committee was therefore unable to determine the relative cost advantages or disadvantages of local construction.

26. Given that overseas countries are unlikely to remove the various forms of assistance and protection given to their local naval shipbuilding industry, Australia's builders of large naval ships must compete on an 'unlevel playing field' to some extent. The committee however, believes that whenever non commercial considerations are made, such as the need to be self reliant in defence support industries, where there are direct or hidden subsidies, or where broader economic benefits not considered in commercial cost benefit analysis are included, there will be added costs which need to be quantified. Such costs must be known for otherwise there will never be a true measure of actual competitive design and construction costs, nor of those costs properly attributed to non economic or political motives. The committee believes that if this work has not already been done it must be done as a priority for all future projects. If it has been done, but not provided to the committee, it should continue to be as part of a whole of project costing through life for future benchmarking purposes.

27. Therefore, given the absence of any credible quantitative data to the contrary, the committee would like to believe that a revitalised Australian ship building industry may well hold its own when compared with overseas naval shipbuilders, particularly if the value of ships' through-life support, is considered. No categorical assertion however, could be made on the basis of current evidence available.

28. Many submitters produced strong and credible arguments that savings accrue to the repair and maintenance costs if the ship is constructed in-country. They include savings generated by the substantial reductions in repair turnaround times and the more efficient through-life support that results from familiarity and experience with the ships and its systems.

29. The committee looked beyond the narrow costs of building and repairing a large naval ship in Australia compared with overseas. It noted a range of considerations that underscore the advantages of building naval vessels in Australia including the broader economic gains that benefit the Australian economy and the security reasons for building in Australia. For example, when weighing up the advantages of building naval vessels in Australia, the substantial risks associated with an overseas build should also be considered.

30. Naval shipbuilding is not exclusively an economic activity—it is a Defence activity with national security its foremost concern. Without exception, all witnesses agreed that national security concerns are central to any consideration about whether Australia should have a naval shipbuilding industry. The committee is of the view that to protect the nation's security interests, Australia must have the capability to maintain, repair and upgrade its naval vessels. While always present, this requirement becomes urgent and critical when the country's security is under threat. Furthermore, the committee is persuaded by the evidence that there is a strong connection between Australian involvement in the construction of a naval vessel and the acquisition of the knowledge, skills, experience and resources necessary to support effectively that vessel throughout its life.

31. The significant benefits that accrue from the construction of naval vessels in Australia are many and impressive. The range of benefits include, but are not limited to:

- strategic self reliance for the repair and maintenance of the navy fleet and commercial shipping;
- greater self reliance and independence for national strategic defence capability;
- improved assurance of dependability and flexibility flowing from domestic capacity for ship modification or customisation for Australian conditions, and the development of innovative solutions for any of the Navy's unique requirements which might be considered appropriate and practical;
- increased gross domestic product from capital investment;
- reduced pressure on the balance of payments;
- enhancement of the labour market;
- expanded indigenous research and development (R&D), design, production and management capabilities;
- the acquisition and development of valuable new skills, manufacturing techniques and processes;
- extensive technology transfer across a broad spectrum of activities;
- a strengthening belief in Australia's own capabilities and confidence in its own ability to exploit opportunities;
- enhanced potential for exporting;

- the maintenance of capability to support vessels throughout their operational lives, shorter turn around for repairs with in-service support; and
- greater foreign investment.

Summary

32. When taking account of the broad range of factors that are to be considered when acquiring a naval vessel, the committee believes that it is in Australia's national interest to maintain a viable naval shipbuilding and repair industry in Australia.

33. This requires a commitment by the government to have Australia's naval vessels constructed in Australia and for the government and Defence to adopt measures that would ensure the industry remans efficient, innovative and competitive. This however, must be measurable and transparent, based on detailed analysis on the best benchmarks available.

34. This means that government should not allow itself to be captured by overly dependent and uncompetitive suppliers. The trade off between the benefits of self reliance and self sufficiency must be carefully measured against the best possible international benchmarks so as to avoid debilitating subsidisation of inefficient practices, but at the same time promoting improved productivity.

35. In some cases, an Australian build premium may be involved. Such assistance to the local industry would be consistent with overseas practices. The committee has noted on a number of occasions the range of direct and indirect subsidies given by overseas governments to support their domestic shipbuilding industry. Furthermore, a premium should be viewed as an investment that will pay dividends not only to Australia's shipbuilding industry but the economy as a whole as well as safeguarding Australia's national security. The committee believes that the capability in Australia's shipbuilding industry, built up over many years, should not be eroded.

36. Even so, as noted earlier, the committee believes that the costs must be quantified in order to provide a true measure of actual competitive design and construction costs as well as the costs properly attributed to non-economic or political motives.

37. While the committee supports in country builds for its naval vessels, it does not necessarily believe that premiums should be paid for commercial-type ships such as the oiler *Delos*, the replacement ship for HMAS *Westralia. Delos* is a tanker specially equipped and rigged for replenishing other ships at sea. The committee does endorse, however, the decision to have the modifications done in Australia to convert the ship to its military role as an auxiliary oiler.

38. The committee believes that it is imperative that government develop longer term naval defence strategies from which economies of scale and continuity of demand can be derived, without which industry will continue to suffer.

Recommendation 1

39. The committee recommends that the government make a public commitment to maintain Australia's naval shipbuilding and repair industry. This commitment to be supported by improved long-term planning of naval shipping needs in order to maximise economies of scale and provide continuity for the broad but specialised design and construction skills required for a healthy industry over the long term.

40. Having come to this conclusion, the committee considered the scope and opportunities for Australia's shipbuilding and repair industry.

Scope and opportunities

41. As the sole purchaser of naval vessels in Australia, the Australian government exerts considerable influence on the performance and viability of the domestic naval shipbuilding industry. Indeed, the committee has noted more than once that Defence cannot be a disinterested bystander of the national shipbuilding and repair industries and should have 'a strong and enduring interest in the industry's success'.[2]

42. The committee notes the absence of meaningful data that would help to inform industry about the factors that shape or influence major acquisition decisions. The most notable areas where little information was available included analysis on the performance of past projects, especially where there have been scheduling or budget problems, assessments at important milestones as a project moves through its various stages, the policies underpinning local industry involvement including the application of those policies and on government subsidies for local builds. Such information would generate debate and promote critical analysis by those interested in the industry. They would gain a better appreciation of the factors that shape or influence major acquisition decisions. It would also assist the industry better appreciate how the industry is performing and enhance the accountability and transparency of naval acquisitions.

43. The committee sees a need for Defence to make information available that would enable the analysis of major projects and to release the results of their own studies on the performance of projects. In particular, the committee identified a need for continuous monitoring that would increase transparency and improve accountability of how a project is being managed. Clearly, Defence must develop and adhere to high standards of probity and accountability in its procurement practices. The committee accepts that commercial-in-confidence requirements would prevent the disclosure of some information but this should not be used as an excuse for withholding data that could be placed on the public record.

2 Notion taken from comments made in ASC, *Submission 17*, p. 10.

Recommendation 2

44. The Committee recommends that the government establish a thorough detailed model, subject to audit by a body such as the ANAO, for the establishment of through life design, construction and maintenance costs of each naval ship building project in the future by class and by individual ship. The model would contain sufficient detail to enable benchmarking to be done on an international basis, providing total budget accountability, assessment of domestic industry competitiveness, including all administrative overheads, with industry compliance to be mandated in all contracts.

45. The committee recommends further that Defence commission an independent assessment of the progress of major projects against the model as it attains set milestones providing explanations for any departures from the costings and other projections contained in the model. The reports to be provided to the Minister for Defence to be tabled within 3 months of being submitted to the Minister.

46. The committee noted the valuable contribution that domestic companies make to Australia's naval shipbuilding and repair industries. Local industry needs certainty to have the confidence to continue to invest and participate in the industry. The committee was not satisfied that Defence offers that certainty or guidance. From the quality of evidence provided by Defence to the committee, which was inconsistent and poorly articulated to say the least, the committee sees a definite need for Defence to articulate far more clearly its policy on involving Australian industry in its major projects and how this policy sits within the broader government policy on Australian involvement.

Recommendation 3

47. The committee recommends that Defence clearly articulate its policy on Australian industry involvement in naval shipbuilding and repair.

Recommendation 4

48. The committee recommends that Defence at the earliest phase of a major naval acquisition issue a statement on the measures it intends to take to maximise Australian industry involvement in that project and how they fit within Defence's broader acquisition program and the whole of government approach to support local industry.

Recommendation 5

49. The committee recommends that in tender documentation, Defence provide detailed information on the value placed on, and the weight given to, Australian industry involvement.

Recommendation 6

50. The committee recommends that as a benchmarking exercise, Defence on completion of a project, report on the measures it had undertaken to involve Australian industry in the project and the results of those measures. The report is to be provided to the Minister for Defence for tabling in the parliament.

51. The committee suggests that because of Defence's dominance in the market place, it should recognise and use its influence to assist industry gain greater efficiencies and to perform better. Strategic planning is central to Defence achieving this objective.

52. The committee has not received sufficient evidence to recommend in detail the specific nature of a strategic plan. It has received strong evidence, however, that there is a need for Defence to take a more coherent and strategic approach to planning. Furthermore that such planning should take account of how better:

- to encourage and use Australian SMEs and overseas subsidiaries;
- to build on existing infrastructure and guide future investment to ensure the Australian shipyards are used to their capacity; and
- moderate fluctuations in demand.

The plan should be developed within the context of Australia's broad national security strategy.

53. Demand flow was a particular concern. The committee accepts that the naval shipbuilding industry is subject to cyclical flows in demand that to a degree characterise that industry. However, it considers that as naval shipbuilding is a monopsony market, the circumstances of industry players are substantially different to many other cyclical industry sectors. It is concerned that if Australian companies cannot survive and grow through peak and trough demand cycles, the capacity to meet defence's capability needs into the future will be reduced.

54. The committee rejects the notion that measures cannot be taken to moderate demand peaks and troughs more effectively without adversely affecting Defence capability. Clearly, long-term strategic planning is required to address this problem.

55. Strategic planning relies not only on a thorough knowledge of the industry but on an understanding of how it fits into the broader industrial landscape. The committee has noted the merging of technologies and the opportunities for the industry to gain greater efficiencies. In Western Australia for example, the naval shipbuilding industry and the oil and gas sector are taking advantage of the growing similarities in their requirements. The Common User Facility at Henderson is expected to service the oil and gas, resources, marine and defence industries. Transferability of skills between sectors is also considered important for addressing labour demands. Similar opportunities may well exist for the naval shipbuilding and the commercial shipbuilding industries.

Recommendation 7

56. The committee recommends that Defence conduct a full analysis of, and identify, how the naval shipbuilding industry and the commercial shipbuilding industry and heavy engineering activities can better integrate to produce increased efficiencies and productivity gains for these sectors.

57. The committee supports the call for a strategic plan and considers that it should address the factors listed above including Australia's broad national security strategy. The committee further considers that the Defence Capability Plan can be improved as a document to reflect Defence's more strategic approach.

58. The committee assessed the value of Defence's Capability Plan as an informative and instructive means of keeping industry abreast of current and future developments in the industry. It found the need for Defence to improve its Defence Capability Plan so that industry has clearer guidance on Defence's long-term objectives for Australia's shipbuilding and repair industry and the intentions underpinning its acquisition program. In brief, the committee believes that the DCP is inadequate as a means of informing the industry, parliament and the public about Defence's future plans and intentions regarding its acquisition program.

Recommendation 8

59. The committee recommends that Defence make their DCP a document that provides industry with a much clearer sense of Defence's future plans and intentions. In particular, it recommends that the DCP provide:

- **a statement on the way the DCP accords with Australia's broad national security strategy including the nation's strategic priorities;**
- **a discussion about the nation's future strategic capability requirements that identifies the industrial capabilities deemed to be strategically important;**
- **an assessment of the nation's existing shipbuilding and repair facilities and future investment needs;**
- **a comprehensive statement providing accurate and reliable information on Defence's future plans for its naval acquisition program that goes beyond ten year projections;**
- **a clear indication of the government's policy on Australian industry involvement in government projects and how Defence would apply this policy to its acquisition program; and**
- **a detailed explanation on the acquisition schedule indicating the reasoning behind it and how Defence has taken into account demand flows.**

60. While the committee is asking Defence to provide more detail in their DCP and include information that provides a much clearer indication of Defence's future acquisition program, it accepts that the document can only be as good as the quality of the strategic planning it represents.

Defence as an informed buyer

61. The complexity of building warships in the current advanced technology, global industry increases the demands on Defence to function as an informed buyer. Some submitters questioned whether Defence has the appropriate level of experience and technical expertise to carry out its naval ship acquisition program effectively. Defence and DMO are aware of the need to have qualified personnel in–house and are taking steps to recruit such staff and to train existing employees. Industry's response appears to be positive. A number of submitters commented on the improvements coming from the Kinnaird reforms and DMO's new professional approach. Industry players especially welcomed earlier engagement with DMO.

62. In light of the absence of meaningful data and information, as noted earlier, especially on the successes and failures of past projects, the committee considers it imperative that such information is systematically gathered and assessed as Defence progresses through coming major acquisitions. Such information is important for assessing how the Kinnaird process is operating in practice, and whether DMO's investments in staff development and innovative contracting arrangements are yielding results.

63. Throughout the committee's inquiry Defence gave repeated assurances that it has the capacity to act as an informed buyer, that it is able to conduct rigorous tender assessment and manage complex contracts. The recommendations contained in this report provide the basis for objective evidence, enabling these assurances to be tested, successes flagged and weaknesses documented for assessment and improvement.

Chapter 1

Introduction and conduct of the inquiry

Referral of the inquiry

1.1 On 10 November 2005, the Senate referred the matter of Australia's naval shipbuilding and repair industry to the Senate Foreign Affairs, Defence and Trade References Committee for inquiry and report by the last sitting day of 2006. On 11 September 2006, the Senate committee system was restructured and the newly constituted Senate Standing Committee on Foreign Affairs, Defence and Trade assumed responsibility for the inquiry with the same terms of reference and tabling date.[1]

Terms of reference

1.2 The terms of reference focus on the future of Australia's naval shipbuilding and repair industry, its capacity, its economic viability, and the broader economic implications stemming from the construction of large naval vessels in Australia. The terms of reference required the committee to inquire into and report upon the scope and opportunity for naval shipbuilding in Australia and in particular:

(a) the capacity of the Australian industrial base to construct large Naval vessels over the long term and on a sustainable basis;

(b) the comparative economic productivity of the Australian shipbuilding industrial base and associated activity with other shipbuilding nations;

(c) the comparative economic costs of maintaining, repairing and refitting large naval vessels throughout their useful lives when constructed in Australia vice overseas;

(d) the broader economic development and associated benefits accrued from undertaking the construction of large naval vessels.

1.3 The committee's terms of reference focus on 'large naval vessels'. Although witnesses gave varying definitions of a large vessel, for the purposes of this inquiry, the committee was guided by Defence's classification:

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1 Under Standing Order 25(4) the committee shall inquire into and report upon matters referred to its predecessor committees and not disposed of by those committees, and in considering those matters may consider the evidence and records of those committees relating to those matters.

> …a 'large naval vessel' is something above a patrol boat and hydrographic ship size and includes frigates, destroyers, tankers, afloat support ships and amphibious ships.[2]

1.4 In addressing the terms of reference, the committee also took account of the growing sophistication and complexity of modern warships and included minesweepers and submarines in its consideration.

Conduct of the inquiry

1.5 The committee sought views from a range of people interested in the future of Australia's naval shipbuilding and repair industry. In particular, it wrote to, and invited, submissions from shipbuilders, suppliers, unions, professional associations and individuals engaged in the shipbuilding industry such as engineers and architects as well as academics including economists. It also sought contributions from state governments and relevant Commonwealth government departments.

1.6 The committee advertised the terms of reference and called for submissions in *The Australian* on numerous occasions leading up to the close of submissions in mid-February 2006.

1.7 Two-thirds of the way through the inquiry, the committee published a discussion paper, which identified the main themes emerging from the evidence. It released this paper to stimulate debate in areas where evidence before the committee was sketchy or contradictory or where it needed clarification in order to formulate recommendations. The committee invited submitters and witnesses to respond to the issues raised. A summary of this paper, together with the main discussion points, is at Appendix 6.

Submissions

1.8 The committee received and published 41 submissions which are listed at Appendix 1. The Department of Defence lodged its submission on 24 March 2006 just days before it was to give evidence before the committee on 28 March. The committee voiced its disappointment with the Department for what it deemed to be an inadequate coverage of the terms of reference.

1.9 This dissatisfaction was compounded when only one departmental officer appeared at the public hearing to represent Defence. The committee was expecting to hear from a team of senior experts drawn from Defence and DMO officers who had detailed and specific knowledge of particular naval acquisition programs and recent

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2 Department of Defence, answers to questions on notice, 28 March 2006 (received 9 May 2006), p. 15. Rear Admiral (Ret'd) W.R. Rourke, suggested that the term large naval vessels might reasonably include vessels of some 1200 tons and more, and could extend to vessels of some 25000 tons or more. *Submission 1*, p. 3. See also, Aerospace, Industrial and Marine Technology Pty Ltd, *Submission 15*, p. 1.

hands-on experience with various key projects. It was also seeking evidence from experienced officers who had a thorough understanding of industry's capability across all aspects of naval shipbuilding, specialists in relevant economic analysis and modelling, and high-ranking personnel with the knowledge to speak authoritatively on broader issues. These issues included Defence's strategic priorities, its procurement policies and practices and other matters far too numerous to mention here. Clearly no one person could have met these requirements.

1.10 To obtain information from Defence, the committee, on the following day, forwarded to the Department a list of 62 written questions on notice. It should be noted that Defence's response was comprehensive and greatly assisted the committee in conducting its inquiry. Furthermore, at its second appearance before the committee, a team of defence specialists led by Dr Stephen Gumley, Chief Executive Officer, Defence Materiel Organisation, and Lieutenant General David Hurley, Chief, Capability Development Group, Department of Defence, represented Defence.

1.11 The committee had to expend much time and effort in extracting information from Defence. Even then, it suspects that studies and analysis conducted by, or for, Defence, that may have been central to its inquiry, were not made available to it. The committee is particularly concerned about the lack of information on the comparative costs and productivity of major naval acquisitions. This matter is discussed in chapters 9 and 10.

Public hearings and site inspections

1.12 The committee held ten public hearings in Canberra, Perth, Adelaide, Melbourne, Hobart and Sydney. A list of the committee’s public hearings, together with the names of witnesses who appeared, is at Appendix 3.

1.13 As part of the inquiry process, committee members inspected a number of Australian shipbuilding sites including Henderson in Western Australia, Osborne in South Australia, Williamstown in Victoria, the Incat yard in Tasmania and the Australian Defence Industries (ADI) facility at Garden Island in Sydney. Committee members found these visits invaluable in gaining an insight into the industry, how it operates, the challenges it faces and some of the solutions that industry is putting forward to improve efficiency and competitiveness. The program for these visits is at Appendix 4.

Overseas delegation

1.14 The committee was particularly interested in the rapid advances in technology and the shipbuilding industry's response to these changes. It was very much aware of the influences that global trends and international business alliances were having on Australian industry. To gain a better understanding of the industry, the Prime Minister gave his approval for the committee to go on an extra parliamentary delegation to inspect overseas shipyards.

1.15 In the second half of September 2006, the delegation visited South Korea and the United States to inspect shipyards and associated sites and to talk to a range of people involved in the shipbuilding and repair industry. This visit provided the committee with the opportunity to study first hand the developments taking place in South Korea and the U.S. It equipped committee members with a greater appreciation of global developments and trends and helped them enormously in assessing the evidence before the inquiry and in formulating recommendations. Indeed, the visit was an integral part of the inquiry process.

1.16 The committee acknowledges the assistance of the Prime Minister and the Minister for Defence in allowing the committee to undertake the overseas visit. Committee members appreciated this support.

1.17 The delegation report was tabled in the Senate on 29 November 2006. The program for the delegation visits is at Appendix 5.

Visit to South Korea

The delegation visited DSME's shipbuilding site at Okpo Bay, Geoje Island on the southeastern tip of the Korean Peninsula. Transport to the site was provided in DSME's helicopter, affording a good view of Okpo bay and the scale of DSME's shipping operation.

The delegation visited Hyundai Heavy Industries' shipyard at Ulsan and inspected HHI's engine manufacturing plant. An engine block hangs from the hall roof behind the delegation.

Visit to the United States of America

The delegation with representatives of Lockheed Martin.

The delegation viewed a combat system demonstration at Raytheon.

Site visit in Australia

The committee visited Tenix's Module Hall at Williamstown on 27 April 2006. Senator George Campbell (far left), Senator Russell Trood (centre) and Senator Concetta Fierravanti-Wells (right).

Structure of the report

1.18 The report is divided into four broad parts:

Part I—Background to naval shipbuilding—provides context for the assessment of Australian industry by looking at trends in naval shipbuilding both overseas and in Australia.

Part II—Australia's capacity to produce large naval vessels—considers the four main elements of Australia's naval shipbuilding industry in the context of their capability to build large naval vessels—the prime shipbuilders, the network of suppliers that make up the broader industrial base of the naval shipbuilding sector, infrastructure and workforce.

Part III—Productivity of the Australian naval shipbuilding and repair industry—examines the comparative economic productivity of the Australian shipbuilding industrial base including the comparative economic costs of maintaining, repairing and refitting large naval vessels throughout their useful lives when constructed in Australia vice overseas. It also takes account of the broader economic benefits that accrue from building ships in Australia as well as the role of Australia's national security in influencing procurement decisions. Having examined Australia's capacity to produce large naval vessels and the productivity of Australia's naval shipbuilding and repair industry, the committee concludes Part III with its main finding on the industry in Australia.

Part IV—The role of governments—draws together and discusses the major themes that emerged in the body of the report, with the focus on how governments generally, and Defence more specifically, can assist the industry become more efficient and productive.

Acknowledgments

1.19 The committee thanks all those who contributed to the inquiry by making submissions, providing additional information, hosting site visits or appearing before it to give evidence.

Part I

Background—developments in the shipbuilding and repair industry overseas and in Australia

Part I of the report provides the necessary context for understanding developments in the shipbuilding industry in Australia and the likely challenges ahead for the industry. Firstly, it looks at overseas trends and in particular focuses on the shipbuilding industry in the United States and Europe particularly the United Kingdom. It is concerned with the demand for naval vessels, advances in technology, changes to the way ships are built, the skills needed in the construction of a modern naval ship, and the international market for such ships.

Secondly, it provides an overview of the shipbuilding and repair industry in Australia, tracing the emergence of the major shipbuilders in order to explain the current structure of the industry.

Chapter 2

Current trends in naval shipbuilding

2.1 Australia's naval shipbuilding sector is influenced by worldwide developments and cannot be examined in isolation. Since the end of the Cold War, the global shipbuilding industry has undergone significant transformation. This chapter considers the broader context of the industry as a background for the committee's consideration of developments in Australia. It examines the factors shaping worldwide trends in naval shipbuilding and looks specifically at the experiences of major naval shipbuilding countries. In particular, the committee looks at demand and supply patterns, the effects of changing technology, and the dynamics of the international market.

2.2 A delegation of committee members who visited South Korea and the United States (U.S.) witnessed first hand some of the developments taking place overseas in the naval shipbuilding and repair industries.

The experience overseas

2.3 Today's modern military forces rely on new and advanced technology to build greater defence capability—they want qualitative efficiency based on advanced technology rather than quantitative force based on manpower.[1] This desire for technological superiority is manifest in the increasing demand for more complex naval vessels with better, smarter technology. Most notably, the weapons, sensor and communication systems in modern warships are becoming more sophisticated. For example, Raytheon Australia surmised that because of 'increasing combat effectiveness and the need to constrain crew sizes future naval vessels are likely to be increasingly complex with greater use of automation and systems'.[2] Making a similar observation, the United Kingdom's Ministry of Defence (MOD) noted that:

> A manpower-intensive platform-heavy and predictable doctrine has been replaced by the requirement for sophisticated, rapid and precise military solutions.[3]

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1 China as an emerging global power provides a good example of this trend in military modernisation. See Senate Foreign Affairs, Defence and Trade References Committee, *China's emergence: implications for Australia,* March 2006, pp. 81–86.

2 *Submission 35*, p. 8.

3 Ministry of Defence, Policy Paper, Paper no. 5, *Defence Industrial Policy*, October 2002, p. 7.

Falling demand, increased capability

2.4 This quest for improved capability through developments in technology is expensive and creates tension between the desire for cutting edge technology and the ability to pay for it. Vice Admiral Paul E. Sullivan, U.S. Commander of the Naval Sea Systems Command, noted that the cost of warships has continued to increase. Furthermore, he informed the House Armed Services Committee on Shipbuilding that the costs relating to combat and weapons systems are the 'single largest driver in shipbuilding, even if costs of the weapons themselves are excluded'.[4]

2.5 Dr Donald Winter, U.S. Secretary of Navy, highlighted the challenges created by the cost and affordability factors determining a country's shipbuilding program. He identified how these two inter-related forces—the rising costs associated with advances in technology and a decline in the overall demand for naval vessels—are influencing defence policy:

> The nexus between technology and resources is the driving factor behind the dramatic changes in our plans for new ships…We are being pulled in two opposite directions.
>
> On the one hand, the Navy exerts constant pressure on itself and on industry to increase the capabilities of our platforms through the application of advanced technology. This costs money. At the same time, the Navy is under pressure to control costs. The greater capabilities, generally, the higher the costs—which means that the Navy can afford to buy fewer platforms. But that too drives up the cost per ship. Both factors—greater capability and lower numbers of ships—are pushing the cost of shipbuilding to prohibitive levels.[5]

2.6 He concluded:

> The upshot is clear: technology has provided us with extraordinary capable ships but we cannot afford to buy as many of them as we would like.[6]

2.7 He then spelt out the predicament facing maritime countries seeking to maintain their naval capability:

> We need a new shipbuilding model that can cost-effectively provide significant increases in capability at low rates of production.[7]

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4 Vice Admiral Paul E. Sullivan, Ms Allison Stiller, Rear Admiral Charles Hamilton, II, statement before the Subcommittee on Projection Forces of the House Armed Services Committee on Shipbuilding, 5 April 2006, p. 6.

5 Dr Donald C. Winter, Secretary of Navy, 'Sea Air Space Exposition', Marriott Wardman Park Hotel, Washington, D.C., 4 April 2006, p. 3.

6 Dr Donald C. Winter, Secretary of Navy, 'Sea Air Space Exposition', Marriott Wardman Park Hotel, Washington, D.C., 4 April 2006, p. 4.

2.8 Indeed, the increasing demands for improved capability at an affordable cost have produced dramatic shifts in the industry. Businesses have adopted new practices and entered into a range of different arrangements.[8]

New shipbuilding model

2.9 The South Australian government noted how the challenge for military shipbuilders to manage the increasing cost of ship design, development and construction in a fiscally constrained environment is leading to significant structural changes.[9]

> Faced with tight defence budgets and with little prospect of amortising military ship building costs through increased export or commercial activity, Governments have led the rationalisation process to ensure capability is maintained.[10]

2.10 This trend toward consolidation from a larger industrial base with shipbuilders amalgamating to a few in number is occurring in many maritime nations.[11] In 2002, the UK MOD noted that this re-structuring was also evident among the major sub contractors:

> Consolidation and globalisation at the level of prime integrators, as well as of sub-primes or specialist high level sub-systems suppliers, look set to continue if defence companies are to remain profitable and retain the capability to undertake large defence projects. Cost and capability pressures on national governments will not diminish, and even the US may struggle to retain a wholly independent national capability in all areas of defence. The process of consolidation has not concluded, and companies, responding

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7 Dr Donald C. Winter, Secretary of Navy, 'Sea Air Space Exposition', Marriott Wardman Park Hotel, Washington, D.C., 4 April 2006, p. 4.

8 The UK Ministry of Defence explained that in the 1990s new market conditions emerged, brought about by constrained budgets, increasingly technologically advanced solutions and the drive for greater efficiency, which forced 'radical restructuring within and across national borders'. Ministry of Defence Policy Paper No. 5, *Defence Industrial Policy*, October 2002, pp. 8–9.

9 *Submission 9*, p. 17.

10 *Submission 9*, p. 18.

11 See for example, John Sprat, 'Naval shipbuilding—last chance', *Asia-Pacific Defence Reporter, June 2004*, p. 19. See also comments by Dr Paul Richard Brabin-Smith, 'Priorities for Defence innovation in Australia, *The Business of Defence: Sustaining Capability*, CEDA, August 2006, p. 31 and Mark Thomson, 'Competition in Australian Defence procurement', *The Business of Defence: Sustaining Capability*, CEDA, August 2006, p. 73.

> to the need to position themselves in a changing market, will continue to seek restructuring opportunities. [12]

2.11 The same cost pressures have encouraged an increasing mutual interdependence among prime companies and also among major sub-prime contractors. This interdependence looks likely to continue.[13] For instance in the United Kingdom, BAE Systems and VT Shipbuilding have entered a cooperative arrangement for the Type 45 destroyers. This approach has 'allowed both parties to plan and invest for the longer term, train new workers and deliver benefits through economies of scale, with each facility gearing up to produce deliverables across the entire class'.[14] According to the Managing Director of BAE Systems Naval Ships:

> This longer term, co-operative approach to Type 45 has enabled both businesses to develop their warship building capabilities for the future at the same time providing value for money.[15]

2.12 This trend toward business consolidations, partnerships and alliances cuts across industries and national borders as countries are finding that, especially with highly complex systems, they cannot be self-sufficient in all aspects of a ship's design and construction.

Globally integrated production systems

2.13 Changing technology and the increasing costs associated with the design and development of state-of-the-art communication and combat systems in particular has meant that few countries or companies in their own right can produce such sophisticated and expensive systems. There is a trend toward what the department of Industry, Tourism and Resources termed 'globally integrated production systems'.[16] For example, Professor Peter Dombrowski noted that the U.S. Navy has taken steps to explore promising technologies developed elsewhere in the world. He used the HMS *Triton* as a model for the future which involves collaborative development between the United States and Great Britain. He explained:

> Such collaborative development offers the possibility of sharing R&D costs and combining technical capabilities to produce a more innovative product than might have been otherwise possible. In addition, if ultimately

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12 Ministry of Defence Policy Paper No. 5, *Defence Industrial Policy,* October 2002, pp. 8–9.

13 Ministry of Defence Policy Paper No. 5, *Defence Industrial Policy,* October 2002, pp. 8–9.

14 Vic Emery, Managing Director, BAE Systems Naval Ships, 'An Industry Perspective on UK Naval Construction', *Naval Construction in the 21st Century' conference*, Newcastle, UK, 12 and 13 October 2004.

15 Vic Emery, Managing Director, BAE Systems Naval Ships, 'An Industry Perspective on UK Naval Construction', *Naval Construction in the 21st Century' conference*, Newcastle, UK, 12 and 13 October 2004.

16 *Committee Hansard*, 3 July 2006, p. 70.

> satisfactory to both parties, it could provide for a larger production run since, presumably, both partners will have a stake in procuring offspring of the developmental model.[17]

2.14 He maintained that joint ventures, teaming and licensing arrangements that would allow the U.S. government and American shipbuilders to develop cooperative relationships with foreign companies were feasible. He suggested that cooperation between U.S. and overseas shipyards would be as likely to involve yards such as Bender and Bollinger as the big six, thereby potentially broadening the shipbuilding landscape.[18]

A new 'heavy industry' sector

2.15 A growing synergy in technologies is also occurring which is influencing the approach to the construction of naval ships. One of the major benefits flowing from the new construction methods is that it allows other industries to use the same facilities. Although naval shipbuilding is a highly specialised industry, there are strong parallels with the infrastructure needs of the oil and gas sector and the resources sector more generally.

2.16 This complementarity in technologies is evident in Australia. The Western Australia Chamber of Commerce and Industry observed that the risk profile for an oil and gas platform or an LPG plant is similar to the defence industry which encourages the technologies used in these sectors to blend.[19] It saw a unique opportunity for both industries to take advantage of the growing similarity between the two sectors:

> These industries are merging and their technologies are merging right across the world, and it is about who is the centre of technical excellence.[20]

2.17 The Western Australia Chamber of Commerce and Industry observed the extent of this blending and integration of technologies:

> It is like telecommunications: a merging of technologies is occurring in engineering. There are three things happening. Centres of technical

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17 Peter Dombrowski, 'The Globalization of the Defense Sector? Naval Industrial Cases and Issues', *Globalization and Maritime Power*, ed. Sam J. Tangredi, Washington, D.C., National Defense University Press, 2002, p. 9 of 16. http:www.ndu.edu/inss/books/books_2002/Globalization_and_Maritime_Power_Dec_02/12_ch11.htm (accessed 4 September 2006).

18 Peter Dombrowski, 'The Globalization of the Defense Sector? Naval Industrial Cases and Issues', *Globalization and Maritime Power*, ed. Sam J. Tangredi, Washington, D.C., National Defense University Press, 2002, p. 11 of 16. http:www.ndu.edu/inss/books/books_2002/Globalization_and_Maritime_Power_Dec_02/12_ch11.htm (accessed 4 September 2006).

19 *Committee Hansard*, 3 April 2006, p. 27.

20 *Committee Hansard*, 3 April 2006, p. 22.

> excellence in engineering are being established around the world, and engineering companies from around the world are coming together in one spot. If I am an expert in defence, I am basically trying to win defence contracts out of a place in the United States and I am engineering worldwide. If I am an expert in oil and gas, I am setting up in Houston, Yokohama and Perth and engineering oil and gas projects, and I have all my engineers doing that in one spot. There is a merging of engineering across the planet into bigger and bigger engineering centres.[21]
>
> We are also starting to see integration. Communications, especially broadband, have allowed people to move information 24 hours a day. Right at the moment, our engineers in Perth would be using companies to do drafting in India—and they will be working. Then they will move to San Diego and all around the planet to get their engineering and drafting done.[22]

2.18 In effect, naval shipbuilding can no longer be viewed as a discrete industry sector with capacity and productivity assessed on the basis of individual shipyards. Shipbuilding in the new technology era is part of the emerging heavy engineering sector. It is a process of collaboration and integration spanning the cutting edge of the electronics and IT industries. This partnership between companies and across sectors is also happening in the context of globalisation with alliances being formed between companies in different countries.

A protected industry

2.19 Even with a growing reliance on globally integrated production systems to supply and install high technology systems, many countries want to continue to build their own complex naval vessels. As much as possible they want to retain sovereignty over their own defence capabilities.[23] Thus, naval shipbuilding countries throughout the world seek to maintain a degree of control over their domestic industry by providing some form of direct or indirect assistance to their naval shipbuilding industry.[24] Vice Admiral Paul E. Sullivan told a subcommittee of the U.S. House Armed Services Committee on Shipbuilding that protection through direct or indirect subsidies can take different forms in the naval shipbuilding industry. He cited monetary grants given by a government to lower the price faced by producers (or

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21 *Committee Hansard*, 3 April 2006, p. 20.

22 *Committee Hansard*, 3 April 2006, p. 20.

23 *Committee Hansard*, 3 July 2006, p. 87.

24 See for example, Vice Admiral Paul E. Sullivan, Ms Allison Stiller, Rear Admiral Charles Hamilton, II, statement before the Subcommittee on Projection Forces of the House Armed Services Committee on Shipbuilding, 5 April 2006, p. 10.

consumers) of a good, or mechanisms such as soft loans, debt guarantees, tax shelters, provision of equity capital and other types of assistance.[25]

2.20 A number of witnesses also remarked on the various incentives offered by governments to their naval shipbuilders in order to sustain a domestic shipbuilding capability (see also paragraphs 9.9–9.14). The Australian Shipbuilders Association asserted that some countries maintain industry protection in the form of 'hidden tariffs and subsidies that provide a false perspective on their efficiency'.[26] Rear Admiral Doolan (retired), National Defence Committee, Returned and Services League of Australia, contended that:

> Nations design and build and market warships to other nations for explainable reasons. They gain economically, industrially, scientifically and strategically. In sum, they sell warships to other countries because it is in their national interests to do so. Variations to industrial relations regimes, taxation laws, shipbuilding subsidies and a host of other like mechanisms are available to vendor governments marketing warships to other countries at a cost that is less than that for which the vessels can be produced in the buyer state. More to the point, most if not all of these mechanisms can be kept from public scrutiny under one guise or another.[27]

2.21 Tenix also drew attention to the range of government benefits in the form of subsidies and protective legislation that are used to shield the local industry from overseas competition.[28] The U.S. Jones Act is often cited as a form of protection.

Major shipbuilding economies

2.22 To examine more closely changes underway in the naval shipbuilding industry, the committee considers developments in two major military shipbuilding economies—the U.S. and Europe with a special emphasis on the UK. It also briefly discusses developments in the major shipbuilding countries in Asia.

The United States

2.23 The U.S. provides an example of a country where the demand for naval shipbuilding and repair has been falling for some time resulting in a significant decline in the production of warships. Orders for U.S. warships declined 60 percent during the decade following the end of the Cold War. The total number of warships in

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25 Vice Admiral Paul E. Sullivan, Ms Allison Stiller, Rear Admiral Charles Hamilton, II, statement before the Subcommittee on Projection Forces of the House Armed Services Committee on Shipbuilding, 5 April 2006, p. 10.

26 *Submission 36*, p. 7.

27 *Committee Hansard*, 3 July 2006, p. 61. See also statement by Mr Kim Gillis, *Committee Hansard*, 18 August 2006, p. 39.

28 *Submission 26*, p. 3.

the U.S. Navy reached a peak at the end of the financial year 1987 then began to decline. In 2002, the number of ships in the U.S. fleet was just over half the number of the 1980s that comprised almost 600 ships at its peak.[29] The number of battle force ships in the Navy fell below 300 in August 2003 and by March 2005 had fallen to 288.[30] In March 2006, the U.S. Navy had 281 ships.[31] Recently, before the U.S. Armed Services Committee, Admiral Mike Mullen expressed concerns that the current rate of shipbuilding did not provide the stability America 'must possess to preserve its vital industrial base'.[32]

2.24 This steady drop in demand precipitated significant consolidation in the industry with shipyards closing or merging. In 1990, there were 14 U.S. yards capable of constructing large commercial ships and sophisticated warships and cutters. According to Dr Scott Truver, National Security Programs, Anteon Corporation, 'since then mergers, acquisitions, and closings have consolidated the nation's new construction capabilities for highly complex, large warships to just six private yards, owned by two corporations'—General Dynamics and Northrop Grumman.[33] Following the same pattern, the U.S. Navy's shipyards have consolidated and realigned facilities, falling from eight yards in 1990 to four in 2004.[34] For example, to reduce overheads and sustain engineering excellence, the Navy merged two West Coast facilities in 2003, Puget Sound Naval Shipyard and the Bangor-based Navy Intermediate Maintenance Facility.[35]

2.25 In pursuit of greater efficiencies, the U.S. Navy has developed a new model for its ship maintenance and repair operations. The objective 'is to take the four public

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29 Curt Weldon, Hearings on National Defense Authorization Act for Fiscal year 2003–H.R. 4546, House of Representatives, Committee on Armed Services, Military Procurement Subcommittee meeting jointly with Military Research and Development Subcommittee, 20 March 2002, p. 8.

30 Ronald O'Rourke, CRS Report for Congress, *Potential Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, updated 25 May 2005, p. CRS–68. He noted that 'the total number of battle force ships in the Navy reached a late Cold War peak of 568 at the end of FY 1987'.

31 Admiral Mike Mullen, Opening Statement before the Senate Armed Services Committee, 9 March 2006.

32 Admiral Mike Mullen, Opening Statement before the Senate Armed Services Committee, 9 March 2006.

33 Scott C. Truver, 'U.S. Shipyards Navigate between a Rock and a Hard Place', U.S. Naval Institute, *Proceedings*, March 2004 and also Vice Admiral Paul E. Sullivan, Ms Allison Stiller, Rear Admiral Charles Hamilton, II, statement before the Subcommittee on Projection Forces of the House Armed Services Committee on Shipbuilding, 5 April 2006, p. 9.

34 Scott C. Truver, 'U.S. Shipyards Navigate between a Rock and a Hard Place', U.S. Naval Institute, *Proceedings*, March 2004.

35 Scott C. Truver, 'U.S. Shipyards Navigate between a Rock and a Hard Place', U.S. Naval Institute, *Proceedings*, March 2004.

repair yards and operate them as a single enterprise: common business practices, common procedures to flow the work force among the yards to accommodate surges of work and try to create efficiencies'.[36]

2.26 The 1990s also witnessed the creation of joint ventures between foreign and U.S. shipyards, 'primarily motivated by the desire to construct certain ship types within the United States and to compete in the U.S. market'.[37]

The U.S.—the Arms Export Control Act and the International Traffic in Arms Regulations (ITAR)

2.27 The U.S. has a clearly stated and well-established protectionist policy for their shipping industry. *The Merchant Marine Act, 1920* stipulates that no merchandise shall be transported by water between points in the United States either directly or via a foreign port in any other vessel than a vessel built in and documented under the laws of the United States and owned by persons who are citizens of the United States.

2.28 The U.S. believes that such measures are necessary to ensure that the country has a merchant marine of 'the best equipped and most suitable types of vessels sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency'.

2.29 This statutory requirement that all U.S. flag ships be built in the U.S. means that the U.S. shipbuilding industry is effectively shielded from genuine competition from overseas. The substantial volume of shipbuilding created by this legislation assists productivity in the U.S. On the other hand, other countries are effectively closed out of the U.S. shipbuilding market. The Australian Manufacturing Workers Union highlighted the closed nature of the industry:

> …the recent US free trade agreement failed to get access to the US shipbuilding industry, symptomatic that the US government, for all of its rhetoric about free trade, sees shipbuilding as a key strategic industry and is not prepared to sell it out for supposed gains in a free trade agreement with Australia.[38]

2.30 The U.S. also has stringent policies that control the sale of defence articles and defence services. The policy, reflected in the *Arms Export Control Act 1976* (AECA), rests on the premise that all such sales must be consistent with the foreign

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36 Vice Admiral Phillip Balisle, Naval Sea Systems Command, 'Building more efficient support for Navy's ships, 28 March 2005, excerpts from interview reproduced *Federal Times.com.* See also Scott C. Truver, 'U.S. Shipyards Navigate between a Rock and a Hard Place', U.S. Naval Institute, *Proceedings*, March 2004.

37 National Security Assessment of the U.S. Shipbuilding and Repair Industry, May 2001, Executive Summary. See also paragraphs 2.11–2.12.

38 *Committee Hansard*, 28 June 2006, p. 42.

policy interests of the United States. The following strict conditions apply to the sale or lease of defence articles and services—the sale or lease would strengthen the security of the United States and promote world peace; the recipient agrees not to transfer title to, or possession of, the article or service without prior approval; the recipient has the capability and intent to maintain and protect the security of the article or service and is eligible to purchase or lease the article or service.[39] The International Traffic in Arms Regulations (ITAR), which provides for the promulgation of implementing regulations, executes the AECA statutory authority to control the export and import of defence articles and services.[40]

Europe

2.31 The shipbuilding industry in Europe has also experienced consolidation over the past decades with job losses and yard closures. According to a recent UK Ministry of Defence White Paper, Europe has twelve military shipbuilding companies with most in the UK, France, Germany, Spain, Italy and the Netherlands.[41] The industry in Europe, however, has taken a different course from that taken in the U.S.

2.32 The UK Ministry of Defence noted that in the United States, changing market conditions prompted the consolidation of the industry into a handful of 'super' prime contractors. With regard to Europe, however, it found that:

> …although major companies such as BAE Systems and European Aeronautic Defence and Space Company (EADS) have emerged, the general pattern of industrial restructuring so far has been to create joint ventures—MBDA, Agusta-Westland—rather than consolidation on the US model. This reflects Europe's history of collaborative programmes, and allows a degree of national control to be retained. The disadvantage is that it is more difficult to create synergies and strong managerial structures. Some European companies have also widened their markets by investing into the industries of other countries, presenting themselves as multinational companies with more than one national identity: notably BAE Systems, Rolls-Royce and Thales, but with smaller companies also having significant interests abroad.[42]

2.33 Mr Günter Verheugen, Vice-President of the European Commission responsible for Enterprise and Industry, commented more directly on the influence

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39 Section e, *The Arms Export Control Act.* See also Peter F. Verga, Deputy Under Secretary of Defense, 2000, www.dami.army.pentagon.mil/pub/dami-fd/10.31.200.1300.ppt (accessed 20 September 2006).

40 U.S. State Department, http:www.pmdtc.org/itar_index.htm (accessed 29 September 2006).

41 Ministry of Defence, *Defence Industrial Strategy: Defence White Paper,* presented to Parliament by the Secretary of State for Defence by Command of Her Majesty, December 2005, p. 73.

42 Ministry of Defence Policy Paper No. 5, *Defence Industrial Policy*, October 2002, pp. 8–9.

that national interest has on the rationalisation process in European shipbuilding industry. He stated that:

> The Commission is neither driving nor holding back the emerging trend of consolidation of naval shipbuilding yards. But whilst national consolidation has already begun in some countries, further cooperation between yards is hampered by diverging operational requirements of national navies and the absence of a truly common market for defence equipment.[43]

2.34 A recent report endorsed by the Interparliamentary European Security and Defence Assembly noted that the process of consolidation 'had turned out to be far more difficult than in the United States'. It also observed that European companies and governments are yet to adopt a common and cooperative approach to naval shipbuilding with countries focusing on their own particular concerns.

> The European naval defence industry today has to contend with the existence alongside one another of companies of different nationality, subject to different rules and with ties in certain cases to different governments. Market pressure alone is not enough to bring European companies closer together: to make large-scale reorganisation happen, government intervention is necessary.[44]

2.35 Indeed, Professor Keith Hartley, Centre for Defence Economics, University of York, observed that there had been relatively few 'giant' mergers of the type that characterised the U.S. and European aerospace industries. He explained:

> Typically, the European warship industry is structured around a national leader which forms a domestic monopoly. These include BAE Systems in the UK; DCN (state-owned) in France, Fincantierei (state owned) in Italy; Izar in Spain (state owned, comprising a merger of the Bazan yard and the private civilian yard, Astilleros Espanoles); HDW and Thyssen in Germany; and Kockums in Sweden.[45]

2.36 He maintained that European maritime nations place a high value on retaining an independent industrial capability in warships and support their warship building

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43 Günter Verheugen, Vice-President of the European Commission responsible for Enterprise and Industry, European Maritime Policies and Perspectives, Maritime Industries Forum, Bremen, 25 January 2005.

44 Assembly of WEU, the Interparliamentary European Security and Defence Assembly, *The Future of the European Naval defence industry*, 6 December 2005, p. 3 of 19. A Communication from the Commission to the Council, The European Parliament, The Economic and Social Committee and the Committee of the Regions stated bluntly that 'Wide-ranging co-operation between yards is still hampered by diverging operational requirements from national navies.' Commission of the European Communities, 2003, p. 13.

45 Keith Hartley, Director, Centre for Defence Economics, University of York, *Naval Shipbuilding in the UK and Europe: A Case for Industrial Consolidation?*, n.d., p. 2.

through preferential purchasing; ie a buy British or buy French policy.[46] This means that despite the pressure to consolidate, the shipbuilding industry in Europe is characterised by duplication with 'many countries and yards involved in the design and build of destroyers and frigates (9 countries), small warships (6 countries) and conventional submarines (5 countries)'.[47]

A protected industry

2.37 As noted above, European maritime nations support their warship construction through preferential purchasing policies which favour the home industry.[48] Indeed, naval shipyards in a number of member states of the European Union are state-owned or state-controlled.[49] The European Union recognises that Defence industries are of a strategic nature and therefore have a special relationship with the state:

> As sole clients, states determine demand for products on the basis of military needs linked to their strategic objectives and thus define the size of the market. They participate, to varying degrees depending on the country, in the financing of R&D, thus influencing the technological know-how and long-term competitiveness of industry…State control also extends to industrial restructuring, although to a more limited degree, and even to the level of shareholding…
>
> States may…see fit to set up special supply guarantees. The maintenance of a purely national industrial capacity for defence may seem a reliable way of being able to respond to strategic interests and emergency situations (military operations).[50]

2.38 It accepted that state support is required because production volumes are limited and the risk of commercial failure high.

2.39 On this matter of protection, Tenix noted in its submission that the European Economic Union has implemented measures to prevent subsidies for commercial

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46 Keith Hartley, Director, Centre for Defence Economics, University of York, *Naval Shipbuilding in the UK and Europe: A Case for Industrial Consolidation?*, n.d., p. 2.

47 Keith Hartley, Director, Centre for Defence Economics, University of York, *Naval Shipbuilding in the UK and Europe: A Case for Industrial Consolidation?*, n.d, p. 2.

48 See paragraphs 2.31–36 and chapter 9—Productivity paras 9–14.

49 Commission of the European Communities, Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions, 'LeaderSHIP 2015: Defining the Future of the European Shipbuilding and Repair Industry—Competitiveness through Excellence', 2003, p. 14.

50 Commission of the European Communities, *Green Paper: Defence procurement*, 23 September 2004, pp. 4–5.

vessels, but that no similar prohibition exists for naval shipbuilding projects.[51] Its concern, however, was with the benefits that accrue to European shipbuilders:

> Many shipbuilders in Europe who specialise in large naval vessels are Government-owned and derive considerable financial advantage from that ownership.[52]

2.40 Despite the costs involved, the European naval shipbuilding nations continue to strive for national independence in warship construction. Their governments, as major buyers, or in some cases the only buyers of warships, use their purchasing and political power to protect their domestic shipbuilding industry.

Ship repair

2.41 With regard to ship repair, the UK Ministry of Defence noticed the move toward rationalisation in the industry and a similar pattern of influence exerted by the respective nations:

> Similarly, there are extensive military ship repair facilities throughout Europe and within the US, many still controlled by national governments; consolidation and rationalisation is also evident in this area. To date, rationalisation has not extended across borders, although some cooperative programmes have been pursued by European governments. Retaining national military support facilities is widely seen as an essential requirement for mounting and supporting operations of a first class Navy.[53]

2.42 The committee now turns to look in more detail at developments in the naval shipbuilding industry in the UK.

The United Kingdom

2.43 The United Kingdom is an example of a member of the European Union that has witnessed a decrease in ship orders resulting in a series of closures and consolidations of naval shipbuilders.[54]

2.44 In 2005, the RAND Corporation produced a report, commissioned by the UK's Ministry of Defence, that examined the domestic capacity for naval ship construction (The UK's naval shipbuilding 2005 report). It noted that the end of the Cold War brought about a profound reduction in naval shipbuilding for the UK as

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51 *Submission 26,* p. 3.

52 *Submission 26,* p. 3.

53 Ministry of Defence, *Defence Industrial Strategy: Defence White Paper,* presented to Parliament by the Secretary of State for Defence by Command of Her Majesty, December 2005, p. 73.

54 The UK's Naval Shipbuilding 2005 Report, p. 12.

requirements lessened and the country sought to capitalise on the 'peace dividend'. After 1970, the Royal Navy combatant fleet experienced a marked and steady decline in its size. In 2000, it had shrunk to about 60 per cent of its 1970 size.[55]

2.45 The resultant fall in ship orders caused a series of closures and consolidations of naval shipbuilders.[56] According to the UK's naval shipbuilding report, the industry in the UK also underwent a period of de-nationalisation in the late 1980s:[57]

> From 1985 to 1990, designated shipyards were sold off. Coincidently, this period also corresponded to the time when naval ship orders began to decline. At the start of privatisation, the naval shipbuilders were, for the most part, profitable. Soon after privatisation finished, the bottom fell out of the market and these shipyards struggled to survive. There were too many shipyards chasing too few programmes. The intense competition that ensued during this period—driven by the MOD policy to compete work—led to very low bids from firms that were simply looking to fill their yards with work…although this situation may have led to better prices for the MOD, it left the shipyards in a vulnerable state. Certainly, there was little investment, modernisation, or upgrades in the shipyards during this period.[58]

2.46 This situation resulted in a number of shipyards going into receivership while others re-structured under single ownership.[59] The Ministry of Defence reported that ownership of UK warship yards has consolidated to the extent that by 2005 only two main companies existed with the skills necessary to design, manufacture and integrate complex warships.[60]

2.47 Similar to other European nations, the UK places a priority on retaining its industrial capability in warships. Professor Keith Hartley noted in particular that the British government is the only buyer of nuclear-powered submarines for its navy, and is 'willing to pay the price of creating and retaining' its national submarine industrial base.[61]

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55 The UK's Naval Shipbuilding 2005 Report, p. 12.

56 The UK's Naval Shipbuilding 2005 Report, p. 14.

57 See for example, Professor Martin Edmonds, Director, Centre for Defence and International Security Studies, 'UK shipbuilding: a new Direction?', 2001.

58 The UK's Naval Shipbuilding 2005 Report, p. 15.

59 The UK's Naval Shipbuilding 2005 Report, pp. 15–16.

60 Ministry of Defence, *Defence Industrial Strategy: Defence White Paper*, presented to Parliament by the Secretary of State for Defence by Command of Her Majesty, December 2005, p. 73.

61 Keith Hartley, *Naval Shipbuilding in the UK and Europe: A Case for Industrial Consolidation*, n.d., p. 5. He made the same observation about the French government.

South Korea, Japan and China

2.48 There is little information available about the military shipbuilding industry in Asia. It is without doubt, however, that countries such as South Korea, Japan and China now dominate the construction of commercial vessels. According to the 2004 global order book position, South Korea secured 37.6 per cent of the outstanding orders; Japan had a 28 per cent share while China accounted for 14.2 per cent of the orders.[62]

2.49 The South Korean shipyards are renowned for their efficiency in producing commercial tankers. Their business model is based on high-rate production and they have forward orders running for many years.[63] Dr Stephen Gumley, DMO, told the committee that Defence had purchased the *Delos*, a 37 000-tonne vessel, from a South Korean shipyard for $A50 million.[64] He maintained that the production capacity of these shipyards was 'just phenomenal'.[65] Indeed, Lieutenant General David Hurley recalled a tour of those yards:

> …we…asked the Koreans if they would be interested in building a 20,000-tonne LHD, they looked down their noses because they 'don't build tugs'. It was just a size they do not consider…[66]

2.50 According to a 2003 report by First Marine International Limited, South Korean shipyards took over 50 per cent of the container ship market in 2002, over 40 per cent of the oil tanker market and significant shares of the gas and chemical tanker markets. South Korean shipbuilders are endeavouring to pursue the higher value sectors to maximise profits, in particular the LNG carriers. They are yet to make their mark to any significant degree on the passenger ship sector, which is also a high value added sector.[67]

2.51 The committee's delegation to South Korea obtained some insights into naval shipbuilding in that country. The Republic of Korea's naval shipbuilding industry is structured around three major primes. Daewoo Shipping and Marine Engineering (DSME) and Hyundai Heavy Industries (HHI) are the principal suppliers of frigates and destroyers, while Samsung Heavy Industries also supplies landing craft. DSME's majority shareholder is the Republic of Korea Government, while Hyundai is completely privately owned.

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62 ACIL Tasman, *Naval shipbuilding in Australia: A background briefing*, 9 February 2006, p. 10.

63 See statement by Mr Kim Gillis, *Committee Hansard*, 18 August 2006, p. 46.

64 *Committee Hansard*, 18 August 2006, p. 44.

65 *Committee Hansard*, 18 August 2006, p. 45.

66 *Committee Hansard*, 18 August 2006, p. 46.

67 The European Community, *Overview of the international commercial shipbuilding industry*, Background Report, First Marine International Limited, May 2003, p. 18.

2.52 Members of the delegation were interested to observe that, due to the scale of their production and diversified commercial product base, both DSME and HHI are each able, in effect, to operate Common User Facilities within one company. The efficiencies derived from economies of scale, automation and modular construction were clear.

2.53 While naval construction comprises a small proportion of DSME's production, representatives commented that the technology gain and prestige associated with naval construction are key drivers for DSME's naval building program. Representatives noted that it is the profit from commercial building which makes naval shipbuilding viable, although the Republic of Korea government does make down payments for naval acquisitions. Naval shipbuilding also forms a small component of HHI's construction work and representatives confirmed a preference for commercial work. The naval vessels produced by HHI include submarines, destroyers, frigates, corvettes, patrol vessels, fast attack craft and logistic support vessels. HHI is developing a 10 000 tonne Aegis destroyer (HDD-10000) and a 16 000 tonne Landing Platform Dock.

2.54 Japan produces mainly bulk carriers for the home market, oil and chemical tankers and gas carriers. The Japanese shipbuilding industry has lost a considerable share of the container ship market to Korea.[68] Chinese builders concentrate on tankers and bulk carriers and hope to achieve the capability to build LNG carriers.[69] The Government of South Australia submitted that China will emerge in the next decade as a serious low cost competitor as it expands its shipbuilding infrastructure and starts to build more complex ships.[70]

Segmentation in the shipbuilding industry

2.55 A 2006 study by ACIL Tasman surmised that this growing segmentation of the shipbuilding industry is 'an indication of the continuing cost competitiveness of Korea and China in the tanker and bulk carrier end of the construction market and the growing specialisation of industrialised countries in the high-end shipbuilding'.[71]

2.56 The Australian shipbuilder Austal agreed with the view that the move in the production of the larger and less complex steel ships from Europe to Japan, South Korea and China was due mainly to cost efficiencies, particularly the labour component associated with the construction of large steel commercial vessels:

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68 The European Community, *Overview of the international commercial shipbuilding industry*, Background Report, First Marine International Limited, May 2003, p. 18.

69 The European Community, *Overview of the international commercial shipbuilding industry*, Background Report, First Marine International Limited, May 2003, p. 17.

70 *Submission 9*, p. 17.

71 ACIL Tasman, *Naval shipbuilding in Australia: A background briefing*, 9 February 2006, p. 12.

> The technology associated with the majority of very large steel ships for commercial applications is relatively simple, mature and well understood, and contracts are generally awarded on the basis of price and delivery times. As a result, global construction of very large steel ships has steadily migrated to lower cost countries—principally from Western Europe to Asia (South Korea, Japan and increasingly China) and to some extent Eastern Europe.[72]

2.57 Thiess Pty Ltd also drew the committee's attention to the shift of major shipbuilding activity away from developed countries to countries with cheaper labour. It explained:

> Korea and China, but particularly Eastern European countries such as Poland and Romania, have benefited from that evolution. However, it is interesting to note that ships with high value adding are still constructed in first world regions such as Western Europe. Large complex passenger vessels are all being built in countries like Norway or France. Only lower value cargo ships with low levels of technology are being constructed in less developed countries.
>
> This indicates that cost of labour is only a small parameter in the overall cost of a complex vessel such as a naval ship. Capacity to program manage huge projects, expertise in a large number of disparate disciplines and capacity to integrate and resolve problems across a wide variety of technologies are not typically second or third world competencies.[73]

2.58 Clearly, the shipbuilding industry divides into sectors according to the degree of complexity involved in the construction of the ship. At the moment, countries such as Japan, South Korea and China have captured the global market for large steel hulled ships associated with relatively simple and well established technology, mainly tankers and bulk carriers. While fiercely competitive in this sector, they are not major competitors in the naval shipbuilding sector where even countries with a long tradition and recognised capability struggle to keep pace with advances in technology.

2.59 The committee now turns to international developments in the methods of producing a naval ship.

Current trend—growing complexity in the construction of naval vessels

The fall in demand for naval vessels coupled with the ever increasing advances in technology, such as the use of 2D/3D computer aided design and modularisation are revolutionising the way ships are built. The concept of shipbuilding has shifted away from the traditional method where ships were constructed on a slipway and built up as

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72 *Submission 7*, p. 5.

73 *Submission 22*, p. 12. See also evidence from Rear Admiral Rourke, (retired), *Committee Hansard*, 3 July 2006, p. 105.

they went forward. Although modular construction has been used in Australia for many decades, this method of construction has become increasingly complex as the modules themselves increase in size and sophistication. Ships are now designed to be built in large modules that can be near complete before final consolidation. The Chamber of Commerce and Industry of Western Australia noted:

> Most ships used to be stick built. All the people would turn up on site and start by levelling the ground. They would then put a stick—a piece of steel—in the ground and bolt it down. It would be like a meccano set. They would build it that way. That is the way people traditionally built worldwide—stick build. Engineering has changed. Our ability to integrate has allowed us to move away from the stick build concept. We can build a 3,000, 4,000 or 5,000 tonne module somewhere, roll it up and plonk it down. So now we have modularisation—integration.[74]

Building in modules

2.60 The trend toward building a ship using modules has dramatically changed the dynamics of shipbuilding and according to the Government of South Australia has 'proved to be the most cost effective way to deliver modern warships'.[75] Some commentators refer to this change as a 'paradigm shift' in the construction of modern ships which allows more flexibility and reduces cost and risk.[76] The use of modular assembly is now common practice:

> The world has changed. It is all about integration—being able to bring big bits together into a central point and those bits come from all around the world.[77]

2.61 Modular ship production starts with hundreds of smaller subassemblies such as piping sections, ventilation ducting, other shipboard hardware and major machinery items being joined together. These sections are then assembled with other shipboard sensors and weapons to form ship modules.[78] The Government of South Australia described the final assembly of modules into the finished product:

> Modules, often weighting hundreds of tons, and between 60% to 90% complete, are then moved to the final consolidation site where they are aligned and then welded together on land to form the completed ship hull.[79]

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74 *Committee Hansard*, 3 April 2006, pp. 20–21.

75 *Submission 9*, p. 14.

76 The Hon. Francis Logan and Mr John O'Hare, Government of Western Australia, *Committee Hansard*, 3 April 2006, p. 93; ADI, *Committee Hansard*, 28 June 2006, p. 3.

77 *Committee Hansard*, 3 April 2006, p. 19.

78 *Submission 9*, p. 14.

79 *Submission 9*, p. 14.

> A floating dock, slipway or shiplift is used to launch the completed hull… Following launch, final ship outfitting is completed at the wharf, systems are set to work, and pre-delivery certification and onboard crew training finalised.[80]

2.62 The integration of modules means that only one major site is needed to assemble the various parts of the ship that have been constructed elsewhere. Thus, a wide network of sites for construction of ship modules is now involved which, according to the Australian Industry and Defence Network Inc. (AIDN), accounts for 60 to 80 per cent of fit outs. Mr David Miller, Executive General Manager of Tenix, stated that 'it is simply the way we do business'.[81] He explained the advantages of this method of construction:

> The primary driver is simply that it allows you to distribute work across a large area. It lets you, as a shipbuilder, concentrate on the high-end value of the problem, which is bringing various building blocks together so that you can take the module work itself and subcontract either to other shipyards or to steel fabricators who are not necessarily shipyards. [82]

2.63 Many other witnesses also highlighted the benefits that derive from this new approach particularly the potential to lower construction costs significantly and to better plan and implement the various phases of a project:

> Imagine a module with seven different fabrication yards all building at the same time. You can crunch your schedules together, because they are all building a different bit and they are using their own skill sets. So you can crunch project times together and you can have the same amount of control, because it is all computerised. It is basically crunching it together and it is reducing costs—and that is what is driving the engineering world right at the moment.[83]

2.64 According to a recent study of major shipyards, the U.S. is yet to embrace fully this modern state-of-the-art shipbuilding technology. It found that, with a few exceptions, the extent of module construction in U.S. yards was 'disappointingly low'. It concluded:

> This is often the result of building legacy designs where vessel design did not incorporate outfit modules. Although most yards now accept the benefits of outfit module building, they, and in some cases the Navy, appear to be reluctant to spend man-hours re-designing legacy vessels and few are familiar with the spatial design techniques that make module building

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80 *Submission 9*, p. 14.

81 *Committee Hansard*, 20 April 2006, p. 3.

82 *Committee Hansard*, 27 April 2006, p. 3. See also ADI, *Committee Hansard*, 28 June 2006, p. 3.

83 *Committee Hansard*, 3 April 2006, p. 21.

> highly efficient and effective. In addition, most yards lack dedicated module assembly facilities and, even in those yards that are active in module building, the work is often carried out in dispersed areas within different buildings or even in the open.[84]

2.65 During the delegation's visit to the U.S.A., members witnessed the technological advances being made in naval shipbuilding and the move toward modular construction. Modularisation techniques now apply both in platform construction and systems design. In relation to platforms, larger modules are being produced allowing more fit-out and testing to occur on land earlier in the build process. The delegation noted that international benchmarking studies have assisted U.S. shipbuilders to improve their efficiency and production processes. In relation to systems, open architecture is enabling system components to be packaged and configured to specific requirements and combined with commercial off the shelf products.

2.66 For example, the delegation noted Bath Iron Works' (BIW) enhanced use of modular technology and the major efficiency gains achieved through this technology. The advent of mega units (larger modules, weighing up to 1400 tons) has enabled BIW to build ships in 21 separate units. Previously 25 units, each weighing up to 480 tons, were required. A key advantage of the larger mega units is that a greater proportion of ship fit-out can be undertaken prior to the ship's final assembly.

2.67 BIW participated in the U.S. Department of Defence's International Benchmarking study and has been able to use the experience to improve its efficiencies. In 2000, BIW rated below both the average US shipyards and international yards on a range of productivity criteria. By 2005, it was well above U.S. averages and slightly above international averages.

2.68 It should be noted that, according to Mr Miller, Executive General Manager, Tenix, Australia is one of the countries leading the world with developments in modular construction.[85] Modularisation in Australia will be discussed in chapter 6.

Modern construction and the challenges for the prime contractor

2.69 The continuing advances in technology present a particular challenge for naval shipbuilders who need high order technological as well as managerial skills. The success of any project depends on the expertise that shipbuilders bring to the integration of the various modules. As noted by the Western Australia Chamber of Commerce and Industries, the emphasis is on the future and the ability to integrate:

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84 First Marine International, *First Marine International findings for the global shipbuilding industrial base benchmarking study, Part 1: Major shipyards,* August 2005, p. 24.

85 *Committee Hansard*, 27 April 2006, p. 3.

> It is no longer about your ability to fabricate. Fabrication is a separate skill— and half a ship could come in or half a plant could come in.[86]

2.70 The growing requirement for highly complex systems in modern warships makes these systems and their integration a central concern to today's shipbuilders. ADI explained:

> …the role of traditional shipbuilding has changed away from a focus on platform—in other words, hull—construction to combat communications and command and control systems, as the demands of modern naval capability have become more sophisticated.[87]

2.71 The Collins class submarine built in Australia illustrates some of the complexities faced by a modern naval shipbuilder:

> Aboard the Collins, we have 108 systems integrated into a pressure hull, one of which we are required to safety certify. It is a safety-critical piece of equipment. That alone makes it an engineering and technical challenge. The shipbuilder, or the submarine builder, in that case, is responsible for integrating those systems into the vessel. The combat system constitutes a system and there are the communications system and other systems. Even by the time we are done with everything that can be construed as a related part of the combat and C3I system, we still have 100 systems that are integrated which work to keep the platform in motion, keep the crew safe at deep-dive depth and a lot of other things.[88]

2.72 The challenge for modern naval shipbuilders is to manage these extremely complex projects and the relationships between subcontractors. The critical role of bringing together increasingly sophisticated systems as a functioning whole means that the role of designing and integrating them is a highly difficult and very expensive undertaking. Companies, such as Raytheon as a Mission System Integrator (MSI), assume a prominent role in the construction of a modern naval vessel. Mr Ron Fisher, Managing Director, Raytheon Australia, explained:

> …in the US model for the DDG1000, Raytheon is the MSI and it has Northrop Grumman and Bath Iron Works, along with Lockheed Martin, as part of the subcontract. As the mission systems integrator, it is responsible for putting it together. In that sense, that is the new model going forward, rather than the traditional primes.[89]

2.73 Indeed, officials from Lockheed Martin told the committee's delegation visiting the U.S. that with Australia's Air Warfare Destroyers (AWDs), the anti-air

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86 *Committee Hansard*, 3 April 2006, p. 21.

87 *Committee Hansard*, 28 June 2006, p. 3.

88 *Committee Hansard*, 4 September 2006, p. 12.

89 *Committee Hansard*, 3 July 2006, p. 22.

warfare system, the combat system and the ship need to be built as a single entity with the integrated Aegis system providing the basis for the ship design. They noted that Australia is 'buying an Aegis ship, not buying a ship and putting Aegis on it'.

2.74 Further underlining this point, Lockheed Martin representatives explained to the committee's visiting delegation that systems integration is the major area of risk for naval shipbuilding programs. They stressed that while advanced technology exists and its performance is proven, the business models underpinning projects can be the most difficult factor to manage. To illustrate the skills needed to manage partnerships effectively, especially those responsible for major systems, they cited a recent major multi-national integration project—the F310 Frigate for the Norwegian Navy. The vessel included weapons and systems built in Italy, France, Norway and Germany and the ship was built in Spain.

2.75 According to ADI, shipbuilders must ensure that all components of the project—design, platform construction and the installation and integration of platform, combat and command support systems and the test and evaluation regime—produce an end product that is 'safe for our sailors and fit for purpose'.[90] ADI explained that to deliver the 'fully integrated package of capabilities, the core competencies of a successful prime tenderer must now be prime contracting, project leadership and project management'. It noted:

> Project management delivers the ability to ensure that schedules are developed and managed, costs are controlled, risks are identified and mitigated, resources are available when and as required, subcontractors are managed, overseas technologies are introduced and management tools are current and are applied. Modern shipbuilding also demands comprehensive systems design and development and the ability to manage the software development to schedule cost and performance—a critical success factor for modern projects. Finally, it demands systems integration and testing that demonstrates to government that the product, as specified, meets its requirements.[91]

2.76 Mr Ron Fisher, Raytheon, also underlined the crucial role of the modern shipbuilder as project manager. He noted that the shipbuilder fails if the shipyard, the fabricators and the module builders are not aligned.[92] ASC explained the skills needed for success:

> An efficient shipbuilder must be able to employ creatively advanced technology and associated systems to design processes for constructing parts of a ship in a logical sequence, to manage the complexity of bringing the thousands of sub-systems together in a workable and harmonious

90 *Committee Hansard*, 28 June 2006, p. 4.

91 *Committee Hansard*, 28 June 2006, p. 3.

92 *Committee Hansard*, 3 July 2006, p. 14.

> manner, and to test and set-to-work subsystems and then the entire ship system. Indeed, the fewer the number of complex ships to be built, the more importance is placed upon the ability to effectively design all aspects of the vessel and then employ advanced techniques to model, plan and schedule production/construction so that mistakes can be avoided and opportunities for improvements can be incorporated before any steel is cut.[93]

2.77 Clearly, shipbuilding is not primarily about metal shaping or fabrication. It is a highly complex undertaking that requires specialist skills to integrate modules in the final assembly of a naval vessel in order to satisfy all conditions of the contract. Shipbuilders throughout the world face this challenge but ultimately it is the responsibility of governments, as the sole buyers of naval vessels, to ensure that their shipbuilding projects are managed properly and effectively. Australian shipbuilders are no exception, they require highly developed skills to manage the complex task of ship construction. Defence similarly needs to be able to oversee and effectively manage a major naval acquisition project from inception to final product. These matters are taken up in part IV of the report.

Developing and retaining a skilled workforce

2.78 A number of studies have shown that the dramatic changes taking place in the shipbuilding industry place increased demands on the workforce, particularly given the rapid rate in the development of technology. Highly skilled people are needed to design, build and integrate the modules that comprise a large weapons platform. The 2005 UK's shipbuilding report noted:

> The design of modern naval ships is now done using sophisticated three-dimensional computer-assisted design (CAD) tools. Thus, the design workforce must be highly skilled and educated. Production also requires many proficient skills or trades, such as electricians, welders, and painters. Testing these complex systems also requires commissioning and test specialists to verify functionality. For certain skills, it might take years to become proficient (e.g., nuclear-qualified welders and commissioning engineers). The workforce for the production trades might peak in the thousands for a typical naval vessel. [94]

2.79 Even in some areas of steel fabrication, military standards are higher, for example in welding and surface flatness.[95]

2.80 It should be noted that the skills critical to the shipbuilding industry take time 'to build and effort to sustain'.[96] Specifically, the 2005 Rand Report on the UK's naval

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93 *Submission 17*, p. 9.

94 The UK's Naval Shipbuilding 2005 Report, p. 3.

95 See Defence Industrial Strategy, Defence White Paper, presented to Parliament by the Secretary of State for Defence by Command of Her Majesty, December 2005, p. 74.

shipbuilding industrial base mentioned workers who have an intimate knowledge of naval shipbuilding rules and standards that are crucial to a company's naval success.[97] It stated:

> …it can take test and commissioning engineers 10 to 20 years working in the industry to become fully proficient. Furthermore, these engineers cannot be easily replaced in the short term by technical experts from other industries or even other shipbuilding fields (eg. submarines or naval surface ships).[98]

2.81 The RAND Corporation warned about the potential loss of expertise should these people leave the industry:

> Once made redundant, they [UK shipyards] believe, many of these highly skilled persons will not return to the shipbuilding profession.[99]

2.82 Most countries face difficulties in building-up and maintaining a highly skilled workforce to support their naval shipbuilding industry.[100] In the UK, 'design engineers are in short supply; and the intellectual support of underpinning science and technology is also fragile in some areas'.[101]

2.83 The U.S. also has concerns about retaining a skilled workforce especially where gaps in production mean that highly qualified and skilled workers leave the industry.[102] A consequence of the fall in demand for naval vessels in the U.S. has been

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96 Defence Industrial Strategy, Defence White Paper, presented to Parliament by the Secretary of State for Defence by Command of Her Majesty, December 2005, p. 73.

97 The RAND Corporation, *The United Kingdom's Naval Shipbuilding Industrial Base: The Next Fifteen Years*, prepared for the United Kingdom' Ministry of Defence, 2005, p. 69. Note also statements by the Royal Institution of Naval Architects, Australian Division, that it takes at least 15 years for an individual to be educated, trained and developed into a senior professional naval architect capable of providing suitable advice in relation to a naval shipbuilding project. It stressed that such expertise cannot be switched on and off on a project basis. *Submission 14*, p. [2].

98 The RAND Corporation, *The United Kingdom's Naval Shipbuilding Industrial Base: The Next Fifteen Years*, prepared for the United Kingdom' Ministry of Defence, 2005, p. 69.

99 The RAND Corporation, *The United Kingdom's Naval Shipbuilding Industrial Base: The Next Fifteen Years*, prepared for the United Kingdom' Ministry of Defence, 2005, p. 69.

100 See for example, *Submission 17*, p. 9.

101 Defence Industrial Strategy, Defence White Paper, presented to Parliament by the Secretary of State for Defence by Command of Her Majesty, December 2005, p. 74.

102 Statement of Cynthia Brown, President, American Shipbuilding Association, before the Committee on Armed Services, House of Representatives, 30 March 2004.

the erosion of the skill base in the shipbuilding industry.[103] Indeed, the ability to develop and maintain the expertise and higher order capabilities to sustain an in-country shipbuilding industry depends significantly on movements in demand. The situation in Australia regarding the availability of a skilled workforce is discussed in full in chapter 7 and further in chapter 15.

Peaks and troughs in demand for naval vessels

2.84 A number of commentators have remarked on the important role that governments have in assisting their domestic industry better manage the work flow. They point to the dominant position of governments in determining demands on the naval shipbuilding sector.[104] John F. Schank from the RAND Corporation, observed that the Ministry of Defence in the UK and the Department of Defense in the U.S. essentially set demand conditions—'they decide the nature of the programs in terms of their number and size; the nature of the market, that is, whether it's run by competition or allocation; and, at least indirectly, the number of firms that will survive'.[105] The following section briefly discusses the difficulties caused by uneven demand flows.

The United States

2.85 The U.S. faces workforce problems created by fluctuations in demand, with the boom and bust cycle in the technical areas of shipbuilding a particular concern.[106]

2.86 The recent U.S. study into major shipyards suggested that the government and Navy could assist shipbuilders by working with industry to smooth demand in order to provide more stable employment. Both the shipbuilding industry and government were concerned about the fluctuations in the shipbuilding workload and realised the need for a stable shipbuilding program to ensure 'minimum sustaining employment levels and retention of critical skills'.[107] The recently announced Chief of Naval

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103 Keith Hartley, Director, Centre for Defence Economics, University of York, *Naval Shipbuilding in the UK and Europe: A Case for Industrial Consolidation?*, n.d.

104 Richard E Self, President, Advanced Technology Institute and Executive Director, National Shipbuilding Research Program, before the House Armed Services Committee, Projection Forces Subcommittee, 4 April 2006; Roscoe Bartlett, Projection Forces Subcommittee, House Armed Services Committee, 5 April 2006.

105 John F. Schank, The RAND Corporation, 'Trends in the United Kingdom's Naval Shipbuilding Industrial Base. Lessons for the United States', Testimony presented before the Senate Armed Services Committee, Subcommittee on Seapower, 6 April 2006, p. 7.

106 First Marine International, *First Marine International findings for the global shipbuilding industrial base benchmarking study, Part 1: Major shipyards*, August 2005, p. 27.

107 Vice Admiral Paul E. Sullivan, U.S. Navy Commander, Naval Sea Systems Command, et al, before the Subcommittee on Projection Forces of the House Armed Services Committee on Shipbuilding, 5 April 2006.

Operations' 313 ship fleet of the future was intended to address these concerns.[108] This plan, designed to produce a more stable and predictable funding environment, would provide industry with a definitive direction to develop strategic long-range plans.[109]

2.87 It should be noted, however, that industry recognised that it also had a role in adjusting to the movements in workload. The President of Northrop Grumman, Mr Philip Teel, considered that managing movements in demand was nothing exceptional and should be considered part of the job of running a naval shipbuilding program. He told the committee's visiting delegation that managing workforce volatility remained an issue regardless of the shipbuilding schedule, as the build process for each ship itself has workload peaks and troughs.

The United Kingdom

2.88 Having experienced a downturn in demand, rationalisation and erosion of capability in the shipbuilding industry, the UK has embarked on its largest naval shipbuilding program in many years. This development has created problems for the UK government.[110] The ambitious proposal to expand the UK's naval capability will test the existing shipbuilding industrial base. The RAND report recorded that shipyard sources in the UK had expressed concern about the workload gap between 2003 and 2006 when it was anticipated that shipyard owners could lay off workers they may need in the future. It noted that the shipyards are worried that unless the Ministry of Defence starts other programmes earlier than planned, shortages of certain kinds of highly skilled workers, such as design engineers, might occur.

2.89 Mr John F Schank noted that one of the most significant findings coming out of their research was the 'importance of a comprehensive, long-term MOD

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108 Chairman Roscoe Bartlett, Opening Statement, Hearing on the Evolving Missions of the U.S. Navy and the Role of Surface and Subsurface Combatants, 15 March 2006, House Armed Services Committee.

109 Vice Admiral Paul E. Sullivan, U.S. Navy Commander, Naval Sea Systems Command, et al, before the Subcommittee on Projection Forces of the House Armed Services Committee on Shipbuilding, 5 April 2006.

110 John F. Schank, The RAND Corporation, 'Trends in the United Kingdom's Naval Shipbuilding Industrial Base. Lessons for the United States', Testimony presented before the Senate Armed Services Committee, Subcommittee on Seapower, 6 April 2006, p. 1. He told a U.S. Senate committee that 'This effort will be challenging, because it follows a period of reduced warship demand that has led to consolidation and reduction in the capacity of the UK shipbuilding industrial base and in the oversight resources available to the MOD'. See also Lord Drayson, uncorrected transcript of oral evidence, House of Commons, Minutes of Evidence taken before Defence Committee, 'Future Carrier and Joint Combat Aircraft Programmes', 25 October 2005.

shipbuilding strategy or plan.[111] He suggested that a strategic plan would help eliminate the 'boom and bust' cycle that characterises ship production and design in the UK:

> It would allow the MOD to make more efficient use of shipyard facilities and workforce skills and exploit the government's 'smart buyer' expertise. It would help the MOD better understand the financial implications of its acquisition strategy and anticipate problems by allowing it to independently assess shipyard demand. It should also lead to reduced cost and schedule risk through greater program certainty.[112]

2.90 Professor Martin Edmonds also referred to what he believed was the absence of an overall government industrial strategy towards the UK naval shipbuilding sector.[113] Indeed, the UK's Defence White Paper stated:

> We have been working to smooth out the long term cyclical demand for naval warships and provide a more predictable future for ourselves, and industry. But this more stable future can only be achieved if the design, manufacturing, support and integration capacity within the industry is matched to that pattern of demand.[114]

2.91 Clearly, developing and sustaining the high level of skilled workers needed to sustain a modern shipbuilding industry is a major challenge for the industry worldwide.

Conclusion

2.92 Over recent decades, the global naval shipbuilding industry has faced major challenges with dwindling demand for ships but increased pressure for more highly sophisticated and expensive systems and weaponry. Advances in technology are accelerating the changes. To accommodate these shifts, the naval shipbuilding

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111 John F. Schank, The RAND Corporation, 'Trends in the United Kingdom's Naval Shipbuilding Industrial Base: Lessons for the United States', Testimony presented before the Senate Armed Services Committee, Subcommittee on Seapower, 6 April 2006. He explained further: 'By a strategic plan, we mean one that would require that the MOD define its shipbuilding goals and future courses of action for the next several decades, establish a schedule or roadmap to achieve its plan, and identify future investments that would be needed, for example in facilities or workforce skills', p. 2.

112 John F. Schank, 'Trends in the United Kingdom's Naval Shipbuilding Industrial Base. Lessons for the United States', Testimony presented before the Senate Armed Services Committee, Subcommittee on Seapower, 6 April 2006, p. 2.

113 Professor Martin Edmonds, Director, Centre for Defence and International Security Studies, Lancaster University, 'UK Shipbuilding: a new direction', 2001, http://www.global-defence.com/2001/SeaSpart3.html (accessed 10 November 2005).

114 Defence Industrial Strategy, Defence White Paper, presented to Parliament by the Secretary of State for Defence by Command of Her Majesty, December 2005, p. 77.

industry has undergone a period of transition marked by consolidation with fewer major producers. Furthermore, these remaining producers are increasingly looking to form alliances or cooperative arrangements to meet the demands of constructing a modern warship.

2.93 Broader heavy engineering capacity has also developed based on modular cad/cam design and manufacturing techniques which have rendered more traditional ship yard facilities obsolete and inefficient.

2.94 Without doubt, the advances in production technology will continue and the countries that keep pace with such developments will improve their international competitiveness. High order computing skills, the use of automation and robotics and the capability to integrate highly complex operating systems using a modular approach will be paramount to a modern cost-effective shipbuilding industry. As noted earlier, the costs of achieving such a high level of capability are great.

2.95 Even with a growing reliance on a globally integrated production system to supply and install high technology systems, many countries place a priority on building their own complex naval vessels—as much as possible they want to retain their own capabilities.[115] Advances in technology and the change to modular construction have also created considerable demand for a highly skilled and stable workforce. Naval shipbuilding nations face the difficult task not only of developing but retaining skilled workers especially with the boom and bust nature of the industry.

2.96 The many demands on the shipbuilding industry mean that maritime countries across the globe face a common difficulty in finding the most cost-effective way to maintain an up-to-date naval shipbuilding capability. They must address issues created by the falling demand for ships, the escalating costs of construction and of keeping pace with advances in technology, as well as the need to develop and retain skilled workers. In light of these challenges, the governments of countries keen to maintain their naval shipbuilding capability are under pressure to review their approach to the industry. Recent studies conducted into the U.S. and the UK naval shipbuilding industries highlighted the important role that governments have in assisting the industry to adjust and succeed.

2.97 As a nation with an established naval shipbuilding industry, Australia confronts similar challenges as overseas countries in sustaining the industry. Having discussed the international context, the committee, in the following two chapters, looks at the effect that past and current naval shipbuilding projects have had on Australia's capability.

115 *Committee Hansard*, 3 July 2006, p. 87.

Chapter 3

A brief history of Australia's naval shipbuilding industry

3.1 This chapter gives a brief history of naval shipbuilding for the Royal Australian Navy (RAN). It provides a summary of RAN builds and naval shipbuilding and repair facilities in Australia prior to World War 2. The chapter then looks at the vessels built for the RAN during the 1960s, 1970s and early 1980s and notes the difficulties experienced with both in-country and offshore builds.

The early years of naval vessel construction and repair in Australia

3.2 The docking and repair of naval vessels at Australian dockyards pre-dates federation. In the 1850s, the Williamstown dockyard on the southern shore of Port Phillip Bay was established as a base for the Victorian Navy—the first navy established on the Australian continent.[1] Australia's first dry dock was opened in 1855 at Mort's Dock in Balmain. In 1856, the New South Wales government reserved Garden Island in Sydney Harbour as a base for the Royal Navy and a ship repair site.[2] In 1857, Fitzroy Dock was constructed at Cockatoo Island at Potts Point to service visiting vessels of the Royal Navy.[3]

3.3 The Cockatoo Island dockyard assembled the first Australian-built warship for the RAN—HMAS *Warrego*—in June 1912, a year after the official establishment of the RAN.[4] The same year, the Commonwealth government purchased the dockyard from the New South Wales government. It remained in Commonwealth ownership until 1933, when it was leased to the Cockatoo Docks and Engineering Co. Pty Ltd. Appendix 7 shows that the Commonwealth had an active record of naval vessel construction at Cockatoo Island between 1912 and 1933, highlighted by the commissioning of three *River* class torpedo boat destroyers in 1916. After 1933, the Cockatoo Docks and Engineering Company maintained a high rate of naval vessel construction with the building of two *Sloop* vessels (frigates) in the mid-1930s and

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1 Charles Murton, 'Historic Williamstown', *Williamstown Historical Society Museum*, http://www.labyrinth.net.au/~crmurton/historicwtown.html (accessed 19 May 2006).

2 *History of Garden Island*, see http://www.gardenisland.info/1-02-000.html (accessed 11 May 2006).

3 R. G. Parker, *Cockatoo Island: A History*, Thomas Nelson (Australia), Melbourne, 1977, p. 10. National Archives of Australia, *The History of Cockatoo Island dockyard*, http://www.naa.gov.au/Publications/research_guides/guides/dockyard/chapter01.htm (accessed 11 May 2006).

4 National Archives of Australia, *The History of Cockatoo Island Dockyard*, http://www.naa.gov.au/Publications/Research_Guides/guides/dockyard/pages/chapter01.htm (accessed 5 May 2006). HMAS *Warrego* had been built in Scotland and dismantled for reassembly at Cockatoo Island.

several *Bathurst* class minesweepers, *Tribal* class destroyers and *River* class frigates during the war years (see Appendix 7).

3.4 Since 1857, Garden Island has been the base of the Royal Navy's Australia Station and by the turn of the 20th century was well-established as a naval dockyard. In 1912, the Garden Island dockyard was transferred to the control of the Commonwealth Naval Board and the following year, the Admiralty handed over the island's buildings to the Commonwealth government.[5] The dockyard was used extensively during World War 1 for the repair of naval vessels and during the early 1920s for the refit of the British-built 'J class' submarine. In the 1940s, a naval graving dock was built on the island to enable fast refit and repair of naval vessels in Australia. Previously, many vessels needed to travel to Singapore for repair. With the fall of Singapore in 1942 and ongoing construction work at Cockatoo Island, a dry dock at Garden Island became a strategic imperative.[6] When the Captain Cook Graving Dock opened in 1945, at a cost higher than the outlay on the Sydney Harbour Bridge, Garden Island was established as the most important ship repair facility in Australia.

3.5 At Williamstown, work began on a state shipyard in 1865 and a dry dock was completed in 1873.[7] The shipbuilding dockyard was officially opened in April 1913 following the construction of two building berths. In 1918, the Commonwealth purchased the dockyard from the Victorian government and subsequently announced a six ship construction program at Williamstown.[8] Thereafter, the Williamstown dockyard averaged 'a vessel per year in addition to a large programme of refitting'.[9] From 1913 to 1945, however, Williamstown was only active in constructing naval vessels during World War 2, when it built eight *Bathurst* class minesweepers and the survey vessel *Warreen*. In 1940–41, two building slips were completed and in 1942, the Navy took over the dockyard from the Melbourne Harbour Trust.[10]

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5 *History of Garden Island*, http://www.gardenisland.info/1-02-000.html (accessed 11 May 2006).

6 *Captain Cook Graving Dock*, http://www.gardenisland.info/1-02-010.html (accessed 11 May 2006).

7 Parliamentary Standing Committee on Public Works, *Construction of Facilities for the Australian frigate project, Williamstown dockyard, Melbourne—Phase B*, Parliamentary Paper No. 189/1985, 1985, p. 3. The dock was called the Alfred Graving Dock.

8 *Historic Williamstown*, http://www.labyrinth.net.au/~crmurton/historicwtown.html (accessed 11 May 2006). See A. Bunnett, G. Halliburton and P. Webb, 'The Southern base of the RAN: A short history of HMA Naval Dockyard, Williamstown', *Naval Historical Review*, http://www.navyhistory.org.au/review/71-1.pdf (accessed 11 May 2006).

9 A. Bunnett, G. Halliburton and P. Webb, 'The Southern base of the RAN: A short history of HMA Naval Dockyard, Williamstown', *Naval Historical Review*, http://www.navyhistory.org.au/review/71-1.pdf (accessed 11 May 2006).

10 Parliamentary Standing Committee on Public Works, *Construction of Facilities for the Australian frigate project, Williamstown dockyard, Melbourne—Phase B*, Parliamentary Paper No. 189/1985, 1985, p. 3.

3.6 In the inter-war years, Australia's naval shipbuilding companies were not large enough to compete with the yards in Glasgow and Belfast and relied on substantive foreign orders. The 1930s were particularly lean for the Williamstown dockyard, which produced only three vessels.[11] Even in the 1920s, however, when the RAN ordered production of 22 steel ships from Australian shipbuilding companies, 'most had to close, or confine themselves to repairs'.[12]

3.7 Unsurprisingly, the RAN's demands during World War II were a fillip for Australia's naval shipbuilding and repair industry. The majority of naval vessels built at the Cockatoo Island and Williamstown dockyards were completed during the early to mid-1940s. In total, 113 RAN naval vessels were built at ten Australian dockyards during the Second World War, in addition to the repair of over 4000 RAN ships, over 500 United States Navy ships and 391 Royal Navy Ships.[13]

Shipbuilding challenges—the experience of the 1960s, 1970s & early 1980s

3.8 The repair of naval vessels at Australian dockyards continued in the immediate post-war years, albeit at a lesser rate. The RAN continued to purchase naval vessels from the UK and by 1964 had ordered the three Perth-class guided missile destroyers from the U.S. Dr Paul Earnshaw has noted that 'from about 1960…Australia had become a more discriminating customer, obtaining its naval requirements from the most appropriate source'.[14]

3.9 However, Australia's increasing resort over the 1960s and 1970s to purchasing foreign naval vessels for the RAN reflected the poor performance of domestic naval shipbuilding projects. The construction of the *Daring* and *River* class destroyers at the government-owned Williamstown and Cockatoo dockyards in the 1950s and 1960s ran well over cost and schedule.[15]

3.10 The difficulties plaguing local construction and the preference for foreign acquisition continued in the 1970s, leaving Australian dockyards to focus primarily on repair work. Apart from the two oceanographic vessels, HMAS *Cook* (1973) and HMAS *Flinders* (1981), the Williamstown dockyard did not commission a naval

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11 'History of hard work and strife', *Herald Sun*, 15 June 2006, p. 66.

12 Australian Heritage Commission, *Linking a nation*, 2003, http://www.ahc.gov.au/publications/national-stories/transport/chapter2.html (accessed 11 May 2006).

13 J. H. Straczek, Sea Power Centre Australia, *General RAN history, RAN in the Second World War*, http://www.navy.gov.au/spc/history/general/ww2.html (accessed 20 May 2006).

14 Dr Paul Earnshaw, 'Australian Naval Shipbuilding—1960s to the present', *Journal of the Australian Naval Institute*, January–March 1998, p. 22.

15 Dr Mark Thomson, *Setting a course for Australia's naval shipbuilding and repair industry*, Australian Strategic Policy Institute, Policy Report, August 2002, p. 16. He wrote that: 'the Daring class ships were delivered years late, and cost twice as much as the same class of ships built in Britain. The River Class suffered three-fold cost escalation during the project.

vessel between 1971 and 1991. After the commissioning of HMAS *Torrens* in 1971, the Cockatoo Island dockyard did not commission another vessel until the underway replenishment ship HMAS *Success* in 1986.

3.11 The Department of Defence experienced problems with both local construction and foreign acquisition projects. The following section identifies problems associated with the three major warship decisions of the 1970s—the locally designed DDL (light) destroyers; the acquisition of four frigates from the U.S. Navy (USN); and the foreign design and local construction of HMAS *Success*.

Problems with Defence specifications—the DDL destroyer project

3.12 In August 1972, the approved build of three DDL destroyers 'promised a significant level of work for the Australian industry…that would enhance and sustain project and construction skills over time'.[16] The estimated project cost was $355 million in 1972 prices, with construction on the lead ship planned to commence in 1975 and the others at two year intervals thereafter.[17] In 1973, the Williamstown dockyard began a program of extensive modernisation to prepare for the build.[18] The DDL Project Director, Commodore G. Willis, explained:

> In the interest of providing a stable workload, and thus retraining the skills and techniques required with a build of this size it is desirable to confine DDL construction to one yard which can be kept fully employed. This has the added advantage that an improvement in productivity can be expected as the yard learns from its experience and thus reduces costs...Although local building costs are higher than those overseas…local construction…minimises future logistic support problems…simplifies management of the project…increases our technical knowledge…[and] provides the skills and facilities we should need in any case for the repair of battle damage in an emergency.[19]

3.13 However, the Department of Defence faced rising cost estimates for the vessel and was unable to settle on its specifications.[20] The Navy reviewed the DDL project

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16 Dr Paul Earnshaw, 'Australian Naval Shipbuilding—1960s to the present', *Journal of the Australian Naval Institute*, January–March 1998, p. 23.

17 Commodore G. J. Willis, *Royal Australian Navy: A survey of future needs*, Parliamentary Paper No. 138/1972, Commonwealth Government Printing Office, Canberra, August 1972, pp. 25–26.

18 Parliamentary Standing Committee on Public Works, *Construction of Facilities for the Australian frigate project, Williamstown dockyard, Melbourne—Phase B*, Parliamentary Paper No. 189/1985, 1985, p. 3.

19 Commodore G. J. Willis, Parliamentary Paper No. 138/1972, *Royal Australian Navy: A survey of future needs*, Commonwealth Government Printing Office, Canberra, August 1972, p. 26.

20 Stanley S. Schaetzel, *Local development of defence hardware in Australia*, Working Paper No. 100, The Strategic and Defence Studies Centre, Australian National University, June 1986.

and found that it would prove unduly expensive.[21] A Joint Parliamentary committee also found that there was technical risk from an Australian design.[22] In August 1973, the government cancelled the DDL project and instead initiated the foreign order of Guided Missile Frigates. Mr John C. Jeremy, a council member of the Royal Institution of Naval Architects, told the committee that the cancellation of the DDL project:

> …tended to swing the pendulum towards accepting existing designs with a minimum of technical risk. That tends to mean that, within your organisations in-country, you lose the ability to start with a blank sheet of paper. You are taking something from someone else and modifying it. In my personal opinion, during the 1970s we lost a lot of the [design] capability that we had built up in the decades after World War II.[23]

3.14 One of the lessons drawn from the DDL project was the need for tighter controls on Navy's design requirements. Part of the problem was that those involved with the specifications for the project were without responsibility for cost and schedule. Mr Stanley S. Schaetzel has argued in reference to the DDL project that specifications should have been established between industry and the Defence Science and Technology Organisation (DSTO) according to mutually agreed broad requirements, with close consultation between the prime contractor and Defence on issues of cost and performance.[24]

Problems with foreign acquisition—the FFG 01–04 project

3.15 Based on the recommendation of a navy review, the Labor government approved an offshore build for the two FFGs in April 1974. The builder, Todd Pacific Shipyards Corporation in Seattle, was to supply the frigates under Foreign Military Sales (FMS) arrangements managed by the U.S. Navy.[25] The decision to build offshore reflected the government's concerns about local shipyards' low productivity and high level of industrial disputation. The Coalition government approved the purchase of a third FFG from the Seattle yard in 1977, and a fourth in 1980. The ships were delivered between November 1980 and July 1984, 'broadly within the required timeframe'.[26]

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21 Mr Bill Rourke RADM (Ret'd), 'The Australian Frigate Project', Letters to the Editor, *Australian Defence Journal*, no. 128, January–February 1998, p. 3 http://www.defence.gov.au/publications/dfj/adfj128.pdf (accessed 23 May 2006).

22 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 15.

23 Mr John C. Jeremy, *Committee Hansard*, Sydney, 28 June 2006, p. 62.

24 Stanley S. Schaetzel, *Local development of defence hardware in Australia*, Working Paper No. 100, The Strategic and Defence Studies Centre, Australian National University, June 1986.

25 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 15.

26 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 13.

3.16 As with the RAN's in-country builds, however, the offshore build of the four FFGs also met cost and capability hurdles. The projected project cost for the first two vessels—with helicopters—was $187 million in March 1974 prices.[27] However, the FFG 01-04 project ran well over cost with the four vessels (excluding helicopters) costing over A$1 billion in December 1982 prices. Defence attributed nearly half this cost (A$497 million) to inflation and exchange rate variations.[28] The other significant cause was the retrofit of the first three frigates to incorporate emerging technologies, notably a long range sonar system (TACTACS) and more capable helicopters (LAMPS III). The fourth FFG, HMAS *Darwin*, was built with several RAN requested modifications. It cost $256 million, nearly $100 million more than the FFG-03. It has been claimed that the retrofits may have been avoided had the RAN seized opportunities to incorporate modifications during the construction phase.[29]

3.17 The other problematic aspect of the FFG 01-04 project was the Australian government's use of a Foreign Military Sales contract.[30] A 1974 Memorandum of Agreement with the U.S. contained a clause enabling Australia to withdraw from the project if the ships failed to meet RAN requirements or proved 'unacceptably costly'. However, the USN appeared to resist any substantial alterations and at one point, the U.S. Department of Defence instructed the USN to cease providing financial data to Australia.[31]

3.18 The FMS contract also limited opportunities for Australian industry participation in the manufacture and supply of components for RAN and USN frigates. This was despite the 1974 Memorandum encouraging the U.S. government to limit the value of orders placed with U.S. firms so as to maximise opportunities for Australian industry participation.[32] The Department of Defence admitted that in future, it was necessary to sign deeds of agreement with the prime contractors before negotiating a Letter of Offer and Acceptance with the U.S. government. It suggested

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27 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 15.

28 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 17.

29 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, pp 27 and 29.

30 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 13. The 1986 JCPA report concluded that the FMS contract 'did not adequately protect Australia's interest especially in negotiations between the US navy and the shipbuilder'.

31 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, pp 31 and 33. On another occasion, the RAN inquired why it was not consulted when Ballistic Laminate was fitted to FFG 01-02 ships. There were also a number of examples of poor workmanship by Todd Pacific Shipyards on the hull of FFG-02.

32 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 35.

that earlier involvement of local suppliers and a more competitive local industry would enhance Australian industry participation in foreign projects.[33]

Problems with foreign design and Australian construction—HMAS Success

3.19 The 1976 Defence White Paper identified the need to develop Australia's self-reliance through investing in key industrial capacities. The local construction of the Fleet Underway Replenishment Ship HMAS *Success* reflected this policy.

3.20 HMAS *Success* was to be the largest ship built in Australia for the RAN. In 1977, the Government of France was awarded the design contract for $2.7 million based on the DTCN-PR Durance Class Ship. In October 1979, Vickers Cockatoo Dockyard Pty Ltd was awarded the construction contract for $68.4 million (in November 1978 prices) with ship delivery by 31 July 1983.[34] In June 1983, however, the contract was renegotiated, extending the acceptance date by three years and increasing the project cost to $187.3 million (in January 1983 prices).[35] When the vessel was finally commissioned in 1986, the total project cost was estimated at $197.41 million.[36]

3.21 The main reason for the cost and time overrun on HMAS *Success* was a protracted dispute between the Commonwealth and the Vickers Cockatoo Dockyard Pty Ltd over the drawings and specifications contained in the 'Production Package' (PP) from the French company, *Directions Techniques Des Constructions Naval*.[37] There is evidence that the Department of Defence significantly underestimated the extent of the differences between the original building specifications and the French PP.[38] A 1983 Auditor-General's report criticised the department for failing to ensure that the French company had the PP needed for an Australian build.[39]

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33 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 36.

34 K. F. Brigden, Report of the Auditor-General, Parliamentary Paper No. 234/1983, p. 15.

35 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 75.

36 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 69.

37 The French agency from which the Commonwealth purchased the Production Package was the *Direction Techniques des Constructions Navales*.

38 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 73.

39 K. F. Brigden, Report of the Auditor-General, Parliamentary Paper No. 234/1983, 6 September 1983, p. 16. Derek Woolner, *Procuring change: How Kockums was selected for the Collins class submarine*, Research Paper No. 4, 2001–02, Parliamentary Library, p. 11. It was suggested that the problem may have been as fundamental as translation difficulties.

3.22 On the other hand, Defence argued that the builder had deliberately underestimated the value of its original contract price in order to recover the costs from a significantly more expensive design package.[40]

3.23 The construction of HMAS *Success* also suffered from industrial relations disputes and skills shortages. In October 1982, Senator the Hon. Anthony Messner noted:

> …the problems which have occurred at the builder's yard…relate to the attracting and retaining of suitable skilled workers after a long gap in shipbuilding at that dockyard. Also, one very significant contribution to the delay has been industrial disputation because that builder has been a target for the unions' shorter working hours campaign.[41]

3.24 The 1986 Joint Committee of Public Accounts report noted that 171 days had been lost through industrial disputation.[42] It also identified insufficient staff resources to handle the design modifications, poor onsite representation leading to confusing quality assurance arrangements and an inadequate project management structure and resources.[43] These failings led Defence and the naval shipbuilding sector to prioritise project management and human resources in future naval shipbuilding projects.

Developing a modern, efficient naval shipbuilding industry

The Australian Frigate Project

3.25 The Australian Frigate Project (AFP) was initiated in May 1978 with the establishment of the Defence Naval Destroyer Group. Based on the Group's report, the FFG-7 Class Frigate was selected for local construction given it served 'the strategic need to regain shipbuilding skills' and offered a flexible design to maximise local technological input.[44] In 1980, the Coalition government made a commitment to build two FFG-7 frigates at Williamstown, conditional on the dockyard demonstrating its

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40 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 73.

41 Senator the Hon. Anthony Messner, Minister for Veterans' Affairs, *Senate Hansard*, 21 October 1982, p. 1697. The Minister's response also contained an answer to the issue of the international competitiveness of an Australian build: 'As to whether the French and/or South Koreans could build a ship in less time than it will take to build HMAS Success, it has to be acknowledged that Australia's policy in relation to this kind of development is for work to be undertaken in Australia. Consequently, the question of vessels being built in other countries does not arise'.

42 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 75.

43 K. F. Brigden, Report of the Auditor-General, Parliamentary Paper No. 234/1983, 6 September 1983, p. 25.

44 Paul Earnshaw, 'The Australian Frigate Project', *Australian Defence Force Journal*, No. 126, September–October 1997, p. 9.

capacity to build the ships to the RAN's requirements. In 1981, the government selected HMAS *Darwin* (FFG 04) as the baseline for the build.

3.26 A new Labor government came to office in March 1983 arguing that Australia should have the capacity to build warships in-country. Its commitment to self-reliance furthered the Coalition government's approach, and was significant given the previous Labor government's cancellation of the DDL project in favour of an offshore build.[45]

3.27 However, the government was also committed to fiscal restraint in the defence portfolio and recognised the need to reform highly inefficient, government-owned shipyards. Mr Derek Woolner, a Visiting Fellow at the Strategic and Defence Studies Centre, has noted that the government:

> showed that defence construction projects would no longer be used for job creation when it resisted union demands to build a second tanker at Cockatoo Island, ultimately condemning the yard to extinction.[46]

3.28 These decisions were integral to the government's broader program of micro-economic reform.[47] The challenge was to build a competitive domestic defence industry through rationalising defence factories and dockyards, while offering the private sector opportunities for long-term investment. The government maintained that through better management, a significant program of defence procurement could take place without continuous real growth in defence appropriations.[48]

3.29 The Labor government's strategy was to use the Williamstown dockyard to demonstrate its commitment to commercialising defence shipbuilding projects.[49] The selection of Williamstown for the FFG build was conditional on the resolution of productivity issues at the dockyard.[50] The Defence Minister, the Hon. Gordon Scholes, described the FFG 05–06 project as 'a chance for the dockyard to prove that

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45 The committee heard from Mr John O'Callaghan, head of the Australian Industry Group Defence Council, of the important commitment made from 'people like Sir James Killen' (Minister for Defence 1975–1982) to building major naval surface ships and submarines in-country. *Committee Hansard*, 28 June 2006, p. 41.

46 Derek Woolner, *Procuring change: How Kockums was selected for the Collins class submarine*, Research Paper No. 4, 2001–02, Parliamentary Library, p. 10.

47 Paul Earnshaw, 'The Australian Frigate Project', *Australian Defence Force Journal*, No. 126, September–October 1997, p. 10.

48 See The Hon. Kim Beazley, Minister for Defence, *House of Representatives Hansard*, 14 October 1986, p. 1928.

49 Paul Earnshaw, 'Australian Naval Shipbuilding—1960s to the present', *Journal of the Australian Naval Institute*, January–March 1998, p. 26.

50 Parliamentary Standing Committee on Public Works, *Construction of Facilities for the Australian frigate project, Williamstown dockyard, Melbourne—Phase A*, Parliamentary Paper No. 98/1984, 1984, p. 8.

it can…maintain price and production schedules', and emphasised the importance of prerequisite agreements on work practice issues and construction specifications.[51]

3.30 The government announced on 12 October 1983 that the project would cost an estimated A$830 million (in December 1982 prices). The size of the local cost premium paid for the build is unclear. However, a review of the project by the Joint Committee of Public Accounts in February 1986 estimated the 'cost premium of local production to be in the order of 30 per cent'.[52]

3.31 The contract for the build was signed in November 1983 between the Department of Defence and the Department of Defence Support. The first frigate (FFG 05) was to be delivered between the middle of 1990 and 1992 and the second (FFG 06) between the middle of 1992 and 1994. The project contract was designed specifically to maximise Australian industry involvement in the areas of expertise and capability that would increase Australia's self reliance and military preparedness. Materials sourced from the U.S. were supplied only if they could be delivered within project design and schedule and allowing for the Australian cost premium.[53]

3.32 The defining moment of the frigate project came on 1 April 1987 when the Defence Minister, the Hon. Kim Beazley, announced the government's decision to sell the Williamstown Naval Dockyard. In December 1987, the dockyard was sold to the Australian Marine Engineering Corporation (AMEC) for $100 million and a contract was signed with the company extending the delivery date for the FFG 05 by three months. In the event, an increased rate of work at the dockyard led to the launch of HMAS *Melbourne* (FFG 05) ahead of schedule on 5 May 1989. Although AMEC's efforts to launch the FFG 05 put the FFG 06 behind schedule, the second ship was delivered in October 1993, a month ahead of the original 1983 contract date.

3.33 The frigate project succeeded in its prime objective of re-establishing a major warship capability in Australia: 90 per cent of AMEC's costs and 75 per cent of the overall project costs were sourced locally.[54] The final project cost in real terms was similar to the 1983 contract schedule, with the only period of real cost increase associated with the privatisation process.[55]

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51 The Hon. Gordon Scholes, 'Construction of two FFG–7 frigates at Williamstown Naval Dockyard: Ministerial Statement', Minister for Defence, *House of Representatives Hansard*, 12 October 1983, p. 1659.

52 Joint Committee of Public Accounts, *Review of Defence Project Management*, Parliamentary Paper No. 19/1986, Report 243, Vol. 2, Canberra, 1986, p. 57; Paul Earnshaw, 'The Australian Frigate Project', *Australian Defence Force Journal*, No. 126, September–October 1997, p. 10.

53 A premium is essentially a subsidy paid by government to secure a local build. The question of premiums will be discussed in detail in chapter 14.

54 Paul Earnshaw, 'The Australian Frigate Project', *Australian Defence Force Journal*, No. 126, September–October 1997, p. 10.

55 Paul Earnshaw, 'The Australian Frigate Project', *Australian Defence Force Journal*, No. 126, September–October 1997, p. 18.

Naval shipbuilding as a platform for a competitive local defence industry

3.34 Moreover, the AFP established the Labor government's commitment to self-reliance and a competitive defence industry. In March 1987, the government released a Defence White Paper which emphasised the need to develop Australia's indigenous defence industry capability and improve its competitiveness. Upon presenting the White Paper to parliament, the Defence Minister the Hon. Kim Beazley warned that in the event of an attack on Australia:

> [m]ajor maritime forces would…be needed, involving large numbers of high capability ships and aircraft. These forces do not now exist in this region and could not be rapidly or secretly developed.[56]

3.35 In this context of the need for self-reliance, the Minister's commitment to the development of Australia's defence industry was twofold. The first was to create a 'more efficient defence', ensuring that government-owned defence factories and dockyards 'perform to the standards of competitive private industry'.[57] The Williamstown decision was integral to this direction, and others would soon follow. Mr Beazley's second commitment was to invest significantly in a competitive local industry.[58]

Conclusion

3.36 This chapter highlighted some of the problems with Australian naval shipbuilding projects in the three decades until the mid-1980s. The failure of the DDL destroyer project and the shortcomings of the FFG 01–04 and HMAS *Success* projects can be attributed to contractual disputes between Defence, shipbuilders, foreign designers, suppliers and workforces. Defence lacked contractual rigour in its specifications while shipbuilding companies suffered from poor handling of their inventories and their labour. It was in this context that the Australian Frigate Project

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56 The Hon. Kim Beazley, Minister for Defence, *House of Representatives Hansard*, 19 March 1987, p. 1091.

57 The Hon. Kim Beazley, Minister for Defence, *House of Representatives Hansard*, 19 March 1987, p. 1091.

58 The Hon. Kim Beazley, Minister for Defence, *House of Representatives Hansard*, 19 March 1987, p. 1091.

targeted—and succeeded in developing—the capability and competitiveness of the Australian naval shipbuilding sector.

3.37 The following chapter looks at the renaissance of Australian naval shipbuilding in the context of the projects to build the Collins class submarines, the ANZAC frigates and the Huon class Minehunters. They were highly significant projects, establishing the current prime contractors—ASC, Tenix and Thales Australia (ADI)—and the underpinning skills and capacity within Australian shipyards.[59]

59 See The Allen Consulting Group Pty Ltd, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, p. 24.

Part II

Australia's capacity to produce large naval vessels

Part I provided an overview of developments in the shipbuilding industry worldwide and identified the major challenges facing the builders of modern warships. It then focused on the evolution of Australia's shipbuilding industry up to the completion of the Australian Frigate Project.

Part II is primarily concerned with the capacity of the Australian industrial base to construct large naval vessels over the long term and on a sustainable basis. It examines in detail the four major elements upon which Australia's capacity relies—the country's prime shipbuilders; the wider shipbuilding industrial base made of a network of suppliers located in Australia, the infrastructure that supports the industry and the available skills base and workforce.

Chapter 4

Australian naval shipbuilders

4.1 The previous chapter traced the development of Australia's naval shipbuilding industry to the mid-1980s. This chapter concentrates on how Australia's prime contractors have developed their capacity over the past 20 years. It looks closely at the build of six Collins class submarines by the Australian Submarine Corporation (ASC) at Osborne, ten ANZAC frigates by Tenix at Williamstown and six Huon class minehunters by ADI at Newcastle. It notes the niche naval markets of two highly successful commercial aluminium shipbuilders in Austal and Incat. Finally, the chapter looks at the air warfare destroyer (AWD) and amphibious ship (LHD) projects, which are now in their early stages.

4.2 These past and current projects were referred to by a majority of witnesses to explain Australia's current capacity to construct large naval vessels. The projects will be mentioned throughout this report, particularly in connection with the role of small and medium sized enterprises (chapter 5), the pattern of infrastructure development (chapter 6), the productivity of the Australian naval shipbuilding industry (chapter 9) and the wider economic benefits from naval shipbuilding in Australia (chapter 11).

The prime contractors

4.3 Australia's major naval shipbuilders face the challenges of their counterparts worldwide. Their survival depends on finding the most cost-effective way to produce modern warships with highly sophisticated and expensive systems. They must keep pace with the rapid advances in technology in the face of falling demand for ships, escalating costs associated with the increasing pressure for improved capability and the need to develop and retain highly skilled workers. As noted in Chapter 2, shipbuilding is no longer about metal shaping or fabrication: shipbuilders need specialist skills to integrate modules in the final assembly. Australian naval shipbuilders have the added problem of servicing a relatively small market. The following section looks at the recent performance of Australia's three major primes—ASC, Tenix and Thales (ADI).

ASC and the Collins-class submarines: high achievement and high risk

4.4 The Australian Submarine Corporation (later ASC) was established in 1985 and chosen in 1987 as the prime contractor for the design, manufacture, upgrade and delivery of the Collins class submarines.[1] The Collins class project was the most

1 ASC, *Annual Report 2005*, p. 2.

ambitious and highest profile naval shipbuilding project in Australia in the past two decades.[2] It was ultimately a success on four key counts.

4.5 First, the May 1987 decision to award the $A5 billion Collins class contract to ASC established a highly capable prime contractor. The decision reflected Navy's view that considerable benefits would accrue from having one organisation build and maintain the vessels.[3] An Australian build with close access to the building yard promised reduced operating and maintenance costs and increased length of service between refits.[4] In addition, it was argued that building the vessels in-country would economise on the high initial capital outlay on the integrated logistics support needed to bring the submarines into military service.[5] ASC delivered on these benefits.

4.6 As a result of the Collins class project, ASC was the likely choice for the 25 year, A$5 billion contract for the through-life support of the submarines, announced in 2003.[6] There had been some concern prior to the completion of construction on the submarines that Australia would lose the skills and design capabilities that had merited the decision to build in-country. Writing in 1998, for example, Dr Paul Earnshaw commented:

> If a further two submarines are not acquired and there are no follow on submarine projects, the design development capabilities established are likely to diminish over time…Consequently, if Australia wishes to design and build the next generation of submarines in about 20 to 30 years time, we will likely again need to import key skills and capabilities, probably pay a substantial premium, and experience a significant learning curve that will

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2 The original proposal was for ten vessels. By May 1999, this number was reduced to six. Mr Derek Woolner, *Getting in early: Lessons of the Collins Submarine Program for Improved Oversight of Defence Procurement*, Research Paper No. 3, 2001–02, Parliamentary Library, p. 12.

3 Mr Derek Woolner, *Getting in early: Lessons of the Collins Submarine Program for Improved Oversight of Defence Procurement*, Research Paper No. 3, 2001–02, Parliamentary Library, p. 5. Patrick Walters, 'The Cutting Edge: The Collins experience', *Strategic Insights*, Australian Strategic Policy Institute, February 2006, p. 4.

4 Mr Derek Woolner, *Procuring change: How Kockums was selected for the Collins class submarine*, Research Paper No. 4, 2001–02, Parliamentary Library, p. 3.

5 Mr Derek Woolner, *Procuring change: How Kockums was selected for the Collins class submarine*, Research Paper No. 4, 2001–02, Parliamentary Library, p. 3.

6 ASC, *Submission 17*, p. 1. Upon announcing the through-life support contract, the Defence Minister, the Hon. Robert Hill, and the Minister for Finance and Public Administration, the Hon. Nick Minchin, explained that 'ASC will integrate capability enhancements, such as a new combat system and a heavyweight torpedo, to ensure that the technical capabilities of the submarines are maintained'. The Hon. Robert Hill, Minister for Defence, and the Hon. Nick Minchin, Minister for Finance and Public Administration, 'Submarine refit contract signed today', *Media Release*, 8 December 2003.

> ultimately pose a high level of risk in terms of capability performance, project schedule and project cost.[7]

4.7 Despite earlier well-publicised problems, ASC's ultimate success in completing the six vessels and securing the through-life support contract means that these concerns were successfully resolved. The company's expertise in the construction and repair of the Collins class submarines means it is well-placed to develop the next generation of submarines. As the Executive Director of the Australia Defence Association, Mr Neil James, told the committee:

> If the next generation of Australian submarines are not to be nuclear powered then it is highly likely they will have to be built in Australia because there will be no-one else to build them. Therefore the capacity of ASC to continue to build submarines is in a different setting to the capacity of the rest of the industry to build surface ships…[8]

4.8 Furthermore, in 2004 ASC secured access to the intellectual property rights for the submarines, ending a series of long-running legal disputes with the Collins class designer Kockums.[9] Although Kockums still owns the intellectual property (IP), ASC has full access to it. As Chapter 8 discusses, this access is crucial to ASC's long-term viability as a constructor and repairer of the RAN's submarines.

4.9 A second gauge of the Collins class project's success is that it proved and improved the capacity and productivity of the Australian industrial base to build complex warships to a high quality, from scratch.

- All six vessels, with the exception of the bow of the lead boat, were constructed in Australia to a high standard of workmanship. In terms of poor construction work, the main fault was with welding done in Sweden on the bow of the first ship.[10]
- The Collins class project achieved 73.5 per cent Australian industry content for the new platforms, exceeding the government's minimum target of 70 per

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7 Dr Paul Earnshaw, 'Australian Naval Shipbuilding—1960s to the present', *Journal of the Australian Naval Institute*, January–March 1998, p. 41.

8 Mr Neil James, *Committee Hansard*, 3 July 2006, p. 44.

9 The Australian Submarine Corporation (later ASC) was formed in August 1985 through a joint venture between Kockums, the Australian Industry Development Corporation, Wormalds International and Chicago Bridge and Australia Iron. Kockums was a 49 per cent shareholder of ASC when ASC was selected as the prime contractor for the submarines in May 1987.

10 Mr Patrick Walters, 'The Cutting Edge: The Collins experience', *Strategic Insights*, Australian Strategic Policy Institute, February 2006, p. 6.

cent.[11] In so doing, the project promoted the establishment and development of many second and third tier Australian companies. As ASC's Managing Director Mr Greg Tunny told the committee: 'I think there are something like two-and-a-half thousand significant suppliers on the Collins and over 1000 substantial suppliers'.[12]

- The Collins class project greatly enhanced the skill base of the naval construction and design industry. Institutions such as the defence science facility and the local TAFE at Port Adelaide were important in the training process.[13] The project has provided the design and engineering skills that will assist in ASC's development of the three air warfare destroyers and will be crucial should Australia commit to a new generation of submarines.
- The project indicated that ASC was more productive than its overseas counterparts. It produced one submarine per year, a faster rate of vessel construction than in Dutch and British yards.[14]

4.10 A third measure of the success of the Collins class project was its final product—a technologically and strategically important asset. The June 1999 report by Mr Malcolm McIntosh and Mr John Prescott on the problems with the Collins project acknowledged that the submarines 'constitute, on the one hand, probably Australia's most important strategic asset for the decades starting 2000, and on the other, Australia's most ambitious and technically advanced defence project ever'.[15]

4.11 ASC, in cooperation with the Defence Science and Technology Organisation (DSTO), developed submarine technology that in some cases led that of the U.S. and British navies.[16] Most notably, DSTO developed sound-absorbing anechoic tiles

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11 Mr Patrick Walters, 'The Cutting Edge: The Collins experience', *Strategic Insights*, Australian Strategic Policy Institute, February 2006, p. 5. Derek Woolner noted that the project was 'revolutionary in that it required those companies bidding for the RFT [Request For Tender] to provide detailed information on their plans to involve Australian industry'. Mr Derek Woolner, *Procuring change: How Kockums was selected for the Collins class submarine*, Research Paper No. 4, 2001–02, Parliamentary Library, p. 11.

12 Mr Greg Tunny, *Committee Hansard*, 19 April 2006, p. 13. Patrick Walters has noted that ASC managed 1600 individual contractors, of which nearly 80 per cent were Australian. 'The Cutting Edge: The Collins experience', *Strategic Insights*, February 2006, p. 5.

13 Mr John O'Callaghan, *Committee Hansard*, 28 June 2006, p. 21.

14 Mr Derek Woolner, *Getting in early: Lessons of the Collins Submarine Program for Improved Oversight of Defence Procurement*, Research Paper No. 3, 2001–02, Parliamentary Library, p. 14.

15 *Report to the Minister for Defence on the Collins class submarine and related matters*, June 1999, p. 5 www.minister.defence.gov.au/1999/collins.html (accessed 20 June 2006).

16 Mr Derek Woolner, *Getting in early: Lessons of the Collins Submarine Program for Improved Oversight of Defence Procurement*, Research Paper No. 3, 2001–02, Parliamentary Library, p. 13.

which exceeded the performance of those used by the northern hemisphere navies.[17] Moreover, the Collins class vessels are now acclaimed as world class. Mr John O'Callaghan, Head of the Australian Industry Group Defence Council, told the committee:

> …you would only have to ask the current commander-in-chief of the Pacific fleet and a number of his predecessors what they think about the Collins class submarine and there would be the unanimous view coming out of Pearl Harbor that it is the best conventional submarine in the world.[18]

4.12 In similar vein, Professor Gregory Copley, Director of Future Directions International, wrote in his submission to this inquiry:

> Despite the media's desire to repeatedly transform developmental challenges into "problems", and repeat them, *ad nauseum*, as clichés, the *Collins*-class built by ASC has proven to be almost unparalleled in terms of its silence of operation...[and] repeatedly proven its capability to defeat even US anti-submarine warfare sensors in rigorous fleet exercises.[19]

4.13 A fourth—albeit indirect—measure of the Collins project's ultimate success is that its well-publicised difficulties led to important changes in Defence's procurement procedures.[20] The creation of the Defence Materiel Organisation (DMO) in 2001 was partly a response to the project's poor management. As the McIntosh–Prescott report had recommended, the new procurement agency prioritised the recruitment of experienced professionals and provided the basis for the vetting process established in the Kinnaird reforms. These issues will be discussed in detail in Chapter 16. The difficulties with the Collins class build are discussed below.

Contractual problems

4.14 The Collins class project demonstrated the capacity of the Australian industrial base to construct complex naval vessels, but exposed serious flaws in Defence's procurement processes. The contract was framed:

- to fix the project’s technical specifications;
- to fix the project's cost; and
- within an inflexible procurement strategy.

In combination, these conditions significantly increased the project's risk and cost.

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17 Mr Derek Woolner, *Getting in early: Lessons of the Collins Submarine Program for Improved Oversight of Defence Procurement*, Research Paper No. 3, 2001–02, Parliamentary Library, p. 15.

18 Mr John O'Callaghan, *Committee Hansard*, 28 June 2006, p. 18.

19 Mr Gregory R. Copley, Future Directions International, *Submission 28*, pp. 8–9.

20 Mr Patrick Walters, 'The Cutting Edge: The Collins experience', *Strategic Insights*, Australian Strategic Policy Institute, February 2006, pp. 2 and 9.

4.15 The project's key technical specification was for a world-class combat data system (CDS). An early decision was made to prioritise a CDS independently of the vessels' design, 'rather than the traditional procedure of selecting from contending boat designs with whatever system was fitted as standard'.[21] Navy rejected a commercial off-the-shelf (COTS) design for the CDS and insisted on its multi-source specification. The CDS was to have a series of smaller computers, instead of a large mainframe computer, which would enable several (rather than one) crew stations to acquire and process data.[22]

4.16 This choice—to develop a unique product to match the RAN's ideal specifications rather than acquiring a proven overseas design—has been described as 'the most important single decision of the program'.[23] The McIntosh–Prescott report noted: 'by including the combat system with the platform in the single prime contract, with a unique military specification, Defence left itself wide open to…technological problems'.[24] The authors argued that the main problem with the development of all combat systems is the rapid rate of technological change, giving rise to new technologies during the course of the contract.[25]

4.17 The Collins class project had the added difficulty of working within a 'fixed cost' contract. The fixed cost of $3.9 billion (in June 1986 prices) was the Labor government's response to the cost over-runs on past defence procurement projects.[26] It aimed to prevent suppliers from receiving compensation for changes in the cost of inputs and specifications as they had done under 'cost-plus' contracts.[27] However, as the difficulties with the CDS became apparent, project costs inevitably inflated. In 2001 prices, the project's cost as at December 1999 was $5.1 billion.[28] The McIntosh–

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21 Mr Derek Woolner, 'The air-warfare destroyer: Managing defence procurement', *The business of defence: Sustaining capability*, CEDA Growth No. 57, August 2006, p. 72.

22 Mr Derek Woolner, *Getting in early: Lessons of the Collins Submarine Program for Improved Oversight of Defence Procurement*, Research Paper No. 3, 2001–02, Parliamentary Library, p. 9.

23 Mr Derek Woolner, *Getting in early: Lessons of the Collins Submarine Program for Improved Oversight of Defence Procurement*, Research Paper No. 3, 2001–02, Parliamentary Library, p. iv.

24 *Report to the Minister for Defence on the Collins class submarine and related matters*, June 1999, www.minister.defence.gov.au/1999/collins.html (accessed 20 June 2006).

25 *Report to the Minister for Defence on the Collins class submarine and related matters*, June 1999, www.minister.defence.gov.au/1999/collins.html (accessed 20 June 2006).

26 The fixed price figure comes from Dr Paul Earnshaw, 'Australian Naval Shipbuilding—1960s to the present', *Journal of the Australian Naval Institute*, January–March 1998, p. 40.

27 Mr Derek Woolner, 'The air–warfare destroyer: Managing defence procurement', *The business of defence: Sustaining capability*, CEDA Growth No. 57, August 2006, p. 72.

28 Mr Derek Woolner, 'Getting in early: Lessons of the Collins Submarine Program for Improved Oversight of Defence Procurement', *Research Paper No. 3, 2001–02*, Parliamentary Library, p. 12.

Prescott report identified the 'fixed cost' contract as a major shortcoming of the Collins class project:

> For a large, complex and new project, for which a design does not exist in detail, and for which generous up-front payments are made, its effect can be deleterious. Particularly in the later stages, it can encourage the supplier to contest the specifications…to avoid responsibility. Conversely, it can encourage the buyer to incorporate everything possible into the contract…Difficulties in these areas epitomise the submarine project…[29]

4.18 The problems arising from the project's fixed specifications and fixed costs were compounded by an inflexible procurement strategy. By 1993, it had become clear that Rockwell, the combat system designer, was unable to comply with Navy's specifications for the CDS. In keeping with the terms of the contract, however, Defence did not allow a replacement COTS technology and ASC effectively lost control of the Rockwell sub-contract.[30] In 1996, when first ship HMAS *Collins* was provisionally accepted into service, the CDS remained uncompleted. In 1998, these difficulties forced the last of the Oberon class submarine to be held over past its original commissioning date. Writing in September 2001, Mr Derek Woolner, a Visiting Fellow at the Strategic and Defence Studies Centre, concluded:

> The most compelling lesson that can be learnt from the Collins submarine program is the importance of selecting the procurement strategy to suit the nature of the project. In hindsight, at the point where it was decided to develop a unique design for the new submarines, was the time to change the procurement strategy.[31]

4.19 The McIntosh–Prescott report concluded that the CDS should be replaced, preferably with a COTS option.[32] Although a COTS-based combat system was (again) rejected, the Coalition government did pursue the report's recommendation for a new CDS contractor through open competition. However, in July 2001, the government scrapped the tender process and awarded the contract for the tactical command and control system to Raytheon. In September 2001, the RAN and U.S. Navy signed an agreement maximising submarine interoperability, equipment production and logistic

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29 *Report to the Minister for Defence on the Collins class submarine and related matters*, June 1999, p. 17, www.minister.defence.gov.au/1999/collins.html (accessed 20 June 2006).

30 *Report to the Minister for Defence on the Collins class submarine and related matters*, June 1999, www.minister.defence.gov.au/1999/collins.html (accessed 20 June 2006).

31 Mr Derek Woolner, *Getting in early: Lessons of the Collins Submarine Program for Improved Oversight of Defence Procurement*, Research Paper No. 3, 2001–02, Parliamentary Library, p. 47. Mr Woolner also noted that building a prototype is 'what Navy now recognises should have been done'. Rear Admiral William Rourke (retired) put the same argument to the committee: 'there is a need to have an increased gap between the lead ship of a class and its successor. The lead ship needs to be evaluated and given the all clear before the successor is completed'. *Committee Hansard*, 3 July 2006, p. 101.

32 *Report to the Minister for Defence on the Collins class submarine and related matters*, June 1999, www.minister.defence.gov.au/1999/collins.html (accessed 20 June 2006).

support. STN Atlas was later awarded the contract for sonar and navigation equipment.

4.20 Ironically, according to Mr Patrick Walters, the delays and difficulties experienced with the CDS over the past decade 'will now result in an even more advanced system being progressively fitted into the Collins Class boats by 2010'.[33] Navy is currently replacing the system at a cost of A$500 million.[34] The Managing Director of ASC Pty Ltd, Mr Greg Tunny, told the committee that:

> …Defence itself has essentially primed that [the combat data system replacement] program…finding the information from overseas, taking delivery of the FMS provided software and working with ASC, Raytheon, Atlas Electronics and Thales Underwater Systems to bring it all together. They have not had all the answers from day one but they have been very diligent in seeking them out and pulling it together. I think that is a demonstration of Defence being able to not only work very closely with industry but take the lead on a program which had a lot of difficulties and a lot of challenges.[35]

4.21 Indeed, in terms of contract management, both Defence and ASC have learnt valuable lessons from the Collins class experience. This is evident from the alliance contract model for the AWDs and the staggered selection of key contractors (discussed later in this chapter).

Tenix and the ANZAC class frigates: on time and on budget

4.22 The ANZAC Frigate Project established Tenix as a leading Australian prime contractor. The project was developed in the mid-1980s to replace the RAN's River class frigates (see Appendix 7). As with the Collins class project, an early decision was made to build the ships in-country. The original objective was to build twelve ships; eight for the RAN and four for the Royal New Zealand Navy (RNZN). The final contract was for ten ships, with only two for the RNZN. At a total cost of $7 billion, it remains the largest single defence contract awarded in Australia.[36]

4.23 The ANZAC project was based on a design and a construction contract, with two companies competing for each tender. In December 1987, the Australian and New Zealand defence ministers announced that Australian Warships Systems Pty Ltd (AWS) and Australian Marine Engineering Corporation (AMEC) would compete for the construction contract.

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33 Mr Patrick Walters, 'The Cutting Edge: The Collins experience', *Strategic Insights*, Australian Strategic Policy Institute, February 2006, p. 7.

34 See Commander Rob Elliot, 'Replacement Combat system for the Collins class soon to be operational!', *Navy Engineering Bulletin*, March 2006, http://www.navy.gov.au/publications/engineering/march2006/replacementcombat.html

35 Mr Greg Tunny, *Committee Hansard*, 4 September 2006, p. 5.

36 The Hon. Dr Brendan Nelson, 'Pride in the ANZAC spirit', *Herald Sun*, 15 June 2006, p. 62.

4.24 In 1989, the Australian government announced that the AMEC–Blohm+Voss teaming had been successful. The frigates were to be built to the Bholm+Voss MEKO 200 design at AMEC's newly acquired yard at Williamstown. The government supported Navy's confidence in the MEKO 200 design and the capability of the frigates.[37] The sale of the Williamstown dockyard and AMEC's early launch of Australia's first naval ship in more than 20 years indicated that the company was capable of delivering the ANZACs. Still, there has been some indication that the German designer had early concerns about AMEC's lack of construction experience.[38] Even the prime's founder and Chairman, Mr Carlo Salteri, acknowledged: 'we had never even built a rowing boat, let alone ten super sophisticated modern naval frigates'.[39]

4.25 AMEC's ownership of the Williamstown dockyard came through a series of takeovers associated with the ANZAC frigate tender and enabled by the dockyard's privatisation. In 1989, AMEC changed to Australian Marine Engineering Consolidated Limited (AMECON) and, in 1993, to Transfield Shipbuilding Ltd. In 1997, following a reorganisation of the Transfield Group, the ownership of the dockyard and the frigate project was in the name of Tenix Defence Marine Division.[40]

The key features of Tenix's role in the ANZAC build

4.26 The ANZAC Ship Project was a 15-year contract to design, construct, test and trial ten vessels.[41] All ten ships were delivered on time and on budget, with some of the frigates delivered ahead of schedule.[42] The ships were commissioned between March 1996 and June 2006 (see Appendix 7). Mr Salteri reflected on the success of the project in the following terms:

> We had faith in ourselves, and in the faith that some people—especially people in the Government and the Navy—had in our Company. We won their trust and support by running the Project so that it met international best practice in terms of quality, price and adherence to schedule.[43]

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37 The Hon. Kim Beazley, Minister for Defence, *House of Representatives Hansard*, 15 August 1989, p. 5.

38 The Allen Consulting Group Pty Ltd, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, pp. 25–26.

39 Tenix Defence Pty Ltd, *Submission 26*, p. 1.

40 Tenix Marine Division is one of four divisions within Tenix Defence, which is a branch of the Tenix Group. See http://www.tenix.com/Main.asp?ID=27 (accessed 10 September 2006).

41 Ms Denise Ironfield, *Impact of major defence projects: A case study of the ANZAC Ship Project*, Tasman Asia Pacific, February 2000, p. 6.

42 The Allen Consulting Group Pty Ltd, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, p. 23.

43 Tenix Defence Pty Ltd, *Submission 26*, p. 2.

4.27 In constructing the ships to this schedule, Tenix's main challenge was to develop and integrate the sensor, weapons and communications systems.[44] The key to overcoming this challenge was the technique of constructing modules in different locations before final assembly (see Chapter 2). The modules for the ANZACs were fabricated by Transfield at Newcastle and by Tenix at Williamstown and at Whangarei in New Zealand.

4.28 Several sources corroborate the importance of Tenix's construction techniques to the ANZAC project. Notably, a 2005 Allen Consulting Group report to the Victorian government stated:

> One issue where Tenix took the lead was in making substantial advances in the modular build concept in what was the first surface combatant to be constructed in this way in Australia. Not only were modules for the ships' hulls and superstructure built in other parts of Australia, but some were also constructed in New Zealand by Tenix. This sharing of the work allowed ten ships to be delivered in a much shorter period of time than otherwise would have been the case; at one stage of the project ships were being completed almost every year.[45]

44 Ms Denise Ironfield, *Impact of major defence projects: A case study of the ANZAC Ship Project*, Tasman Asia Pacific, February 2000, p. 7.

45 The Allen Consulting Group Pty Ltd, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, p. 24.

The committee inspected the ANZAC frigate HMAS *Perth* at Tenix's premises at Williamstown on 27 April 2006. Commissioned in June 2006, HMAS *Perth* was Tenix's tenth and final ANZAC ship.

4.29 Another crucial factor in the success of the ANZAC project was the decision to test the combat system prior to installation. The Allen Consulting report and a 2000 Tasman Asia Pacific report by Ms Denise Ironfield both highlighted this decision. The Tasman Asia Pacific report noted that the construction of a combat support centre to refine and test the combat system prior to its installation 'played an important role in the delivery of the first ANZAC frigate on time with a fully functional combat system'.[46] The Allen Consulting report noted that 'the cooperation between Tenix and SAAB in designing and installing the combat system has been one of the keys to success in this project'.[47]

4.30 Tenix's success in delivering the frigates to schedule must also be attributed to the availability and expertise of Australian subcontracting companies. Chapter 5 elaborates on the role of small and medium sized enterprises (SME's) in the project. Their involvement was aided by an effective Australian Industry Involvement (AII) program. The program was a key element in the ANZAC contract and part of the

46 Ms Denise Ironfield, *Impact of major defence projects: A case study of the ANZAC Ship Project*, Tasman Asia Pacific, February 2000, p. 9.

47 The Allen Consulting Group Pty Ltd, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, p. 24.

government's broader objective 'to foster Australian prime contractors able to achieve high levels of local content without subsidies'.[48]

Senator David Johnston aboard HMAS *Perth* at Williamstown, 27 April 2006

4.31 In 1989, Tenix (then AMEC) established an Industry Development Unit which assigned companies a clearly defined role. Tenix was also assisted to subcontract and maximise local industry content through the role of the Industrial Supplies Office (ISO). Tenix has noted that the ISO's role in identifying Australian subcontractors enabled the prime to secure local content at a lower cost and over a shorter timeframe than would otherwise have been the case.[49] At the same time,

48 The Hon. Kim Beazley, Minister for Defence, *House of Representatives Hansard*, 10 May 1989, p. 2343.

49 Ms Denise Ironfield, *Impact of major defence projects: A case study of the ANZAC Ship Project*, Tasman Asia Pacific, February 2000, p. 11.

Tenix's ability to meet Defence's high quality standards influenced subcontractors down the supply chain to implement best practice programs.[50]

4.32 Tenix and SAAB are responsible for the in-service support of the ANZACs. In July 2001 Defence signed a long-term alliance agreement with both companies covering the development of all future capability change packages for the ANZAC class.[51] This was the first time that Defence had pursued an alliance arrangement for a through-life support contract.[52] The alliance underlines the benefits that local construction offers for through life support for Defence, the prime and its sub-contractors.

Tenix and HMAS Sirius

4.33 Tenix's credentials as a successful prime contractor have also been evident in the A$60 million project to convert the commercial auxiliary oil tanker *Delos* into an underway-refuelling ship. Tenix performed all the conversion work at the Australian Marine Complex's Common User Facility in Henderson, south of Perth. It was awarded the contract in February 2005. The ship was commissioned on 16 September 2006, nearly three years ahead of schedule and on budget.[53]

4.34 Lieutenant General David Hurley described the project to the committee as 'one of [Defence's] most successful shipbuilding projects in 50 years'.[54] Mr Kim Gillis, the DMO's project manager for HMAS *Sirius*, partly attributed this success to the contractual incentives that DMO offered. He told the committee:

> We proposed a scheme that would indicate that if Tenix delivered four weeks ahead of schedule they would receive $1 million and if they delivered three weeks ahead of schedule the bonus was $750,000. So it was $250,000 a week.
>
> One of the reasons why we went through this task is that traditionally naval vessels, especially first of class, do have considerable blow-outs in time and there is a propensity to make lots of changes. With a time constraint, it meant that Tenix had no incentive to make changes to the vessel.[55]

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50 Ms Denise Ironfield, *Impact of major defence projects: A case study of the ANZAC Ship Project*, Tasman Asia Pacific, February 2000, p. 19.

51 Defence Materiel Organisation, 'Projects', http://www.defence.gov.au/dmo/msd/sea1348/sea1348p2.cfm (accessed 8 November 2006).

52 Mr Bob Wylie, 'Supplying and supporting Australia's military capability', *The Business of Defence: Sustaining Capability*, CEDA Growth No. 57, August 2006, p. 58.

53 See Department of Defence, 'HMAS Westralia passes the weight to Nuship Sirius', *Media Release*, 16 September 2006, http://www.defence.gov.au/media/DepartmentalTpl.cfm?CurrentId=6010 (accessed 2 November 2006).

54 Lieutenant General David Hurley, *Committee Hansard*, 18 August 2006, p. 1.

55 Mr Kim Gillis, *Committee Hansard*, 18 August 2006, p. 43.

4.35 Defence places importance on companies being able to meet its deadlines. In the case of Tenix and HMAS *Sirius*, the bonus scheme reflected the imperative of delivering on schedule. Apart from a decision to de-gas the vessel, Defence did not waiver from its original requirements.[56] Mr Robert Salteri, CEO of Tenix Defence, noted:

> The program has again demonstrated Tenix Defence's capability to successfully modify an existing ship design to meet Navy's needs within tight schedule and budget constraints. The successful completion of this complex project is a tribute to our outstanding workforce, and a positive and effective working relationship with our Customer, as well as a clear demonstration of what can be achieved with the facilities at Henderson.[57]

Thales Australia (ADI)

4.36 In October 2006, the French military company Thales increased its 50 per cent share in Australian Defence Industries (ADI) to full ownership.[58] This acquisition is discussed shortly. As a prime contractor in the Australian naval shipbuilding market, ADI's main projects were the build of six minehunter vessels and the ongoing upgrade of the FFG-7 Adelaide class frigates.

ADI and the Huon class minehunters

4.37 In May 1989, Australian Defence Industries (ADI) was created as a government-owned corporation to take over the major defence industry facilities still in government ownership.[59] Its four operating divisions were naval engineering at the Garden Island dockyard, ammunition and missiles, weapons and engineering and military clothing. The Defence Minister explained that the launching of ADI was part of broader process to 'step away from the bureaucracy and politics' and make government factories and dockyards 'an integral part of Australian industry'.[60] The Minister went on to detail the government's approach of managed competition in the naval shipbuilding sector:

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56 Kim Gillis explained to the committee that the decision to take the fuel out was to make it safe for welding, 'which meant that we only did that infrequently—once every four or five years'. *Committee Hansard*, 18 August 2006, p. 44.

57 Tenix, 'DELOS delivered early', 21 August 2006, http://www.tenix.com/News2.asp?ID=192 (accessed 2 November 2006).

58 References to ADI throughout this report reflect the company name at the time the evidence was taken.

59 ADI superseded the Office of Defence Production which had been established within the Department of Defence to improve the competitiveness of government owned dockyards and defence establishments. Graeme Cheeseman, *The Search for Self-Reliance, Australia's Defence since Vietnam*, 1993, p. 42.

60 The Hon. Kim Beazley, Minister for Defence, *House of Representatives Hansard*, 10 May 1989, p. 2345.

> Defence, like the economy at large, is best served by an industry structure that can hold its own in the world market…We have not abandoned the idea of nurturing particular capabilities in special circumstances, but government support of that kind is no longer an easy way out for firms unable to compete in the commercial area…Our objective is to foster Australian prime contractors able to achieve high levels of local content without subsidies. The ship building, ship repair and engineering industries exemplify this approach.[61]

4.38 ADI's key project was as the prime contractor for the Huon class Minehunter contract. Defence awarded the $917 million project to ADI in 1994 to build six Minehunter coastal vessels. ADI built the vessels at the greenfield site of Carrington in Newcastle, employing 'a completely new greenfield workforce for the…project'.[62] It delivered all six ships on schedule.

A model of the Huon class Minehunter, ADI Headquarters, Garden Island

4.39 ADI's achievement in keeping to schedule was all the more impressive given it had design authority and pursued a concurrent design and build program. It was the first Australian-sourced naval defence project in which the prime contractor was given design authority. A January 2002 report by Tasman Economics noted that ADI had estimated that 80 per cent of the design work had been undertaken in Australia. ADI and its subcontractors modified the Italian design to include an upgrade to the sonar, a new combat system, an upgraded air conditioning system, improved accommodation

61 The Hon. Kim Beazley, Minister for Defence, *House of Representatives Hansard*, 10 May 1989, p. 2345.

62 Lieutenant General David Hurley, *Committee Hansard*, 18 August 2006, p. 26.

and an extension of the upper deck. The first composite hull was manufactured in Italy; all subsequent hulls were completed at the new Carrington facility.[63]

4.40 A key to ADI's success in the project was its investment in an onshore integration facility to integrate the combat system. This facility was able to simulate the CDS technology in the environment that the ships would encounter. The 2002 Tasman Economics report noted that this approach 'minimised the risk associated with this complex task and enabled the conduct of the first-of-class trials to be undertaken within a tight contract schedule'.[64]

4.41 ADI also relied on a strong skills base, drawn from various subcontractors and small and medium sized enterprises. The Tasman Economics report noted that nearly 85 per cent of businesses supplying the Minehunter project were located in New South Wales.[65] The project also exceeded the specified 68.4 per cent of the contract value required as local content.[66] As with Tenix's build of the ANZAC frigates, a key factor in the high level of AII was the role of the Industrial Supplies Office. The Tasman Economics report noted that ADI worked closely with an ISO consultant for five years. As a result of this interaction, 'at least $55 million of the initially proposed imports were replaced with products manufactured by local industry'.[67]

4.42 The Minehunter project is the most significant example to date of ADI's ability to manage large naval shipbuilding projects. Apart from its local skill base and infrastructure, the company's capability was enhanced through its joint ownership by the French Group Thales. Mr Geoff Smith, ADI's former Director of Naval Sales and Marketing, told the committee:

> Our group is a highly experienced naval systems developer, integrator, designer and prime contractor, as evidenced by our successful delivery of the $1 billion minehunter project and our activity as the nation’s leading naval repair, maintenance and upgrade contractor. Our prime contracting creditability is further significantly enhanced by our reach-back capability to our part owner, Thales, which has prime contracting experience in complex projects throughout the world, including the UK aircraft carrier project.[68]

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63 Tasman Economics, *Impact of major defence projects: A case study of the minehunter coastal project*, Final report, January 2002, p. 9.

64 Tasman Economics, *Impact of major defence projects: A case study of the minehunter coastal project*, Final report, January 2002, p. 9.

65 Tasman Economics, *Impact of major defence projects: A case study of the minehunter coastal project*, Final report, January 2002, p. 13.

66 Tasman Economics, *Impact of major defence projects: A case study of the minehunter coastal project*, Final report, January 2002, p. 10.

67 ADI quoted in Tasman Economics, *Impact of major defence projects: A case study of the minehunter coastal project*, Final report, January 2002, p. 11.

68 Mr Geoff Smith, *Committee Hansard*, 28 June 2006, p. 2.

4.43 However, the Department of Defence noted that while ADI is viable in the ship repair and upgrade activity, it is having problems in meeting schedule and performance specifications.[69] These difficulties have been most apparent in ADI's project to upgrade the Adelaide class frigates.

The FFG Upgrade

4.44 The FFG Upgrade project is a A$1 billion contract for the upgrade of four frigates' combat systems. The first ship, HMAS *Sydney*, was returned to the Navy on 28 April 2006; HMAS *Melbourne* completed the docking phase in August 2006. The committee inspected progress on the upgrade of HMAS *Melbourne* during its visit to Garden Island in June 2006. It is expected that sea trials and the formal hand back to the Navy would take place in early 2007.[70]

4.45 ADI describes the FFG Upgrade project as 'the most sophisticated naval systems integration task ever undertaken by an Australian company…'[71] Mr Smith told the committee that ADI was the only company in Australia to have performed the complex design and engineering required to replace operating systems through the FFG's hull.[72] In terms of the technology required to perform the upgrade, the key is the ADI-designed and developed Australian Distributed Architecture Combat System. In terms of project management, the DMO's deputy CEO, Mr Kim Gillis, recently noted that 'with the cooperative working relationship now existing between DMO and ADI, I am confident of our ability to successfully deliver the FFG Upgrade Project'.[73]

4.46 However, the early stages of the FFG upgrade program were significantly delayed at considerable expense to the taxpayer. The upgrade of HMAS *Sydney* was originally scheduled for delivery in August 2003. However, work on the vessel at Garden Island only commenced in September 2003 before it was eventually delivered to the RAN in April 2006. The upgrade contract has been significantly redrawn, reducing the number of ships from six to four and extending the delivery schedule. A June 2005 Australian National Audit Office report noted that by August 2002, DMO had had to revise ADI's contract schedule on six separate occasions. The report also noted:

> A high level of audit assurance is not able to be provided on the FFG Upgrade Project given deficiencies in the FFGSPO information management systems and deficiencies in the level of design and

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69 Department of Defence, *answer to question on notice*, 28 March 2006 (received 29 May 2006), p. 28.

70 'Big achievements in FFG Upgrade project', *Pursuit 68*, August 2006, p. 5, http://www.adi-limited.com/default.asp?page=228

71 'HMAS Melbourne upgrade progress', *Login to ADI–Thales Australia*, May 2006, p. 7.

72 Mr Geoff Smith, *Committee Hansard*, 28 June 2006, p. 10.

73 'Big achievements in FFG Upgrade project', *Pursuit 68*, August 2006, p. 5, http://www.adi-limited.com/default.asp?page=228

development disclosure provided to SPO personnel by the FFG Upgrade Prime Contractor.[74]

The committee visited the Captain Cook Dry Graving Dock at Garden Island on 28 June 2006 where it viewed progress on the upgrade of HMAS *Melbourne*.

4.47 The committee understands that ADI has overcome most of its project management difficulties. Defence told the committee that 'the experience and expertise gained by the Prime Contractor during the first FFG platform upgrade has provided a higher degree of confidence in their ability to complete the upgrade'.[75] The *Navy* magazine commented in January 2006 that 'thanks to a reshaped project organisation, new management team and sharper project management focus, the FFG Project upgrade has turned the corner'.[76] ADI anticipates that subsequent upgrades of the FFGs are likely to run to, or ahead of, schedule. Defence is currently renegotiating

74 Australian National Audit Office, *Management of Selected Defence System Program Offices*, Audit Report No. 45, 2004–05, p. 20. FFGSPO: Fast Frigate Guided System Program Office.

75 Department of Defence, *answer to question on notice*, 28 March 2006 (received 29 May 2006), p. 28.

76 'SEA1390—The FFG Upgrade Programme', *The Navy*, Vol. 68, No. 1, January–March 2006, p. 4.

the contract to base payment on achievement of capability milestones rather than earned value.[77]

The issue of foreign ownership

4.48 In 1999, the French company Thales and Transfield bought ADI from the federal government for $360 million in a 50–50 joint venture. In October 2006, the Treasurer, the Hon. Peter Costello, cleared the proposed acquisition by Thales Australia Holdings Pty Ltd from Transfield Holdings Pty Ltd of the remaining 50 per cent of the shares it does not own in ADI Limited.[78] ADI has now joined other fully owned Thales subsidiaries—Thales Underwater Systems, Air Traffic Management, Training and Simulation—under the single organisation of Thales Australia.[79]

Summary

4.49 At a cost per vessel of US$500 million, US$375 million and US$122 million respectively, the Collins, ANZAC and Minehunter projects were the most expensive vessels built in Australia over the past decade.[80] They were important acquisitions for Australia's self-reliance, and central to the government's aim of increasing the private sector's share of defence outlays and the local defence industry's capacity and international competitiveness.[81] They have shaped the capability and viability of Australia's three main prime contractors. As Lieutenant General David Hurley told the committee: 'despite claims that ongoing work is required to ensure a competitive and skilled industry base, none of the major companies have workforces or shipbuilding projects that pre-date the mid 1980s'.[82]

The aluminium shipbuilders—Austal and Incat

4.50 Australia's naval shipbuilding sector also has two innovative and successful commercial shipbuilders in Austal and Incat. Given their specialisation in lightweight,

77 Department of Defence, *answer to question on notice*, 28 March 2006 (received 29 May 2006), p. 28.

78 The Hon. Peter Costello, 'Foreign Investment Proposal: Thales Australia Holdings Pty Ltd—Acquisition of remaining 50 per cent interest in ADI Limited', *Media Release*, 12 October 2006.

79 Thales Australia, 'Treasurer gives the go ahead to Thales Australia', *News Release*, 13 October 2006, p. 1.

80 Australian Shipbuilders Association Ltd., *Submission 36*, Annex B.

81 See the Hon. Kim Beazley, Minister for Defence, *House of Representatives Hansard*, 10 May 1989, p. 2345; The Hon. Kim Beazley, Minister for Defence, *House of Representatives Hansard*, 22 March 1988, p. 1110.

82 Lieutenant General David Hurley, *Opening Statement*, Public Hearing, 18 August 2006.

multi-hull aluminium vessels, Austal and Incat should be differentiated from builders of steel warships.[83]

Austal

4.51 Austal is the largest commercial shipbuilder in Australia. The company established operations at Henderson in Western Australia in 1998 and at Mobile in Alabama in 2001. In Western Australia, the company employs 1 100 staff at three sites, while it intends to grow its U.S. workforce to over 1 000 staff by December 2006.[84] Despite its recent growth, Austal is relatively small compared to the other primes. Its turnover is $65 million compared to ASC ($229 million), ADI Limited ($656 million) and Tenix Defence ($650 million).[85]

4.52 In 2003, Austal won the $553 million contract to supply the RAN with 12 Armidale class patrol boats.[86] Mr Bob Wylie, a Visiting Fellow at the Australian Defence Force Academy, has noted that Defence's contract for the Armidale class helped Austal enter the Australian defence market. Instead of insisting on mandatory specifications for the vessels, Defence framed the tender in terms of the operational performance that it wanted.[87] Austal met these performance requirements and has already delivered five vessels to the RAN.[88]

4.53 Austal's key U.S. naval contract is as the designer and builder of the Littoral Combat Ship (LCS) platform. It supplies the LCS as a trimaran solution for the U.S. Navy. Austal's LCS ship has a scheduled production timeframe of two years, compared with around four years for a regular combat ship. As the designer and builder of the vessels, Austal is able to tailor construction for its shipyard's build processes, and thereby minimise modifications. If the LCS program proceeds as planned the US Navy may require up to 60 vessels with an estimated project value of US$15 billion.

4.54 Austal's submission to this inquiry stated that the largest potential for growth in its shipbuilding business is in the patrol/defence sector.[89] It emphasised that

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83 This is not to say that Austal and Incat are unable to compete with builders of large steel warships in terms of certain Defence capability requirements.

84 *Submission 7*, p. 1.

85 Mr Bob Wylie, 'Supplying and supporting Australia's military capability', *The Business of Defence: Sustaining Capability*, CEDA Growth No. 57, August 2006, p. 58.

86 Defence has since ordered two further patrol boats from Austal. This was approved in the 2005 federal budget.

87 Mr Bob Wylie, 'Supplying and supporting Australia's military capability', *The Business of Defence: Sustaining Capability*, CEDA Growth No. 57, August 2006, p. 58.

88 Austal, 'Enhanced protection for Australian waters', *Media Release*, 5 May 2004, http://www.austal.com/index.cfm?objectid=44AB08E1-A0CC-3C8C-D9C40983CCA33C24 (accessed 2 October 2004).

89 Austal, *Submission 7*, p. 1.

Australia is world competitive in the construction of high speed aluminium vessels. However, the submission noted that most foreign builders of very large steel naval vessels 'would be able to produce the vessels within a similar or better cost and time delivery envelope than Australian industry could reasonably be expected to offer'.[90] This issue is discussed later in the report. It should be noted that although Austal specialises in lightweight, fast speed aluminium vessels, it would compete for resources and skills should Australia opt to build very large steel naval ships in-country.

Incat Australia

4.55 Incat is a Tasmanian-based company specialising in high speed aluminium vessels for commercial applications. As with Austal, Incat has captured a niche in the overseas market for fast ferries and other lightweight commercial vessels. For more than 20 years, Incat has developed the design of Wave Piercing Catarmarans. In 1990, it pioneered large high-speed craft with a 74 metre fast ferry. These vessels have increased in length to 112 metres today.[91]

4.56 Incat has successfully sold the high-speed transport application of these commercial Catarmarans to military buyers. It has leased three water jet propelled vessels to the U.S. Army.

- In 2001, Incat formed a strategic alliance with Bollinger Shipyard Inc. of Louisiana and in partnership, won a U.S. military contract for a high speed craft. The Bollinger–Incat USA alliance leased a 96 metre Catamaran, HSV-X1 Joint Venture, which participated in operations in the Persian Gulf.
- In 2002, Bollinger and Incat leased a 98 metre Theatre Support Vessel—TSV-1X Spearhead—to the U.S. Army. The Army has used the vessel to assist with rapid pre-positioning of supplies and troops.
- In 2003, Bollinger and Incat delivered a HSV 2 Swift (Incat Hull 061) to the U.S. Navy. The HSV 2 Swift—also a 98 metre vessel—will conduct a series of demonstrations that will develop interoperability potential of high speed vessels with amphibious ships.[92]

4.57 Incat Australia's Managing Director, Mr Craig Clifford, told the committee that the 'fact we have had vessels available to lease to military programs in the past has been more good fortune than management'. He noted that the vessels are large assets for the company and need to be in constant use. In the longer term, Mr Clifford agreed that commercial operators seconding vessels to a military operation 'would

90 Austal, *Submission 7*, p. 5.

91 Australian Shipbuilders Association, *Submission 36*. See also Mr Craig Clifford, *Committee Hansard*, 28 April 2006, p. 14.

92 Incat Australia, 'Defence Menu', http://www.incat.com.au/defence_fs.html (accessed 2 November 2006).

make some sense'.[93] However, it is unlikely that Incat will join Austal as a commercial shipbuilder involved in warship construction. As defence told the committee:

> …there is scope for commercial shipbuilders to undertake hull and ship modules construction work subject to their industrial capability…But they are less likely to play a major role in the design, production and support of the weapon, combat and specialised communication system requirements which make up the primary systems in Naval ships.[94]

4.58 Mr Clifford told the committee that the aluminium design of the vessels does not limit future development. Indeed, Incat has drawings for a 150 metre catamaran. Mr Clifford explained that Incat's focus remains on producing large aluminium high-speed catamarans, rather than aluminium patrol boats. He noted the company had had discussions with the UK Ministry of Defence, several European navies and 'North American interests as well'. Unlike Austal, however, Mr Clifford did not foresee opportunities to build offshore:

> We are not in a position, from a manpower point of view or a financial point of view, to set up shop with a large commercial facility in America at this point in time. We see that as distracting us from our core business, which is shipbuilding in Australia…We do not foresee a stage where the American shipbuilding lobby will readily allow Australian built ships to be sold into America.[95]

93 Mr Craig Clifford, *Committee Hansard*, 28 April 2006, p. 13.

94 Department of Defence, *answer to question on notice*, 28 March 2006 (received 29 May 2006), p. 32.

95 Mr Craig Clifford, *Committee Hansard*, 28 April 2006, p. 12.

The committee visited Incat's premises at Derwent Park, north of Hobart. The photo is of Hull 062, The Milenium Tres, now owned and operated by Acciona Trasmediterranea, Spain.

Summary

4.59 Austal and Incat have both had success in recent years adapting their commercial designs for military use. Unlike the three main primes, these companies specialise in fast, lightweight aluminium vessels designed for versatility and manoeuvrability in a military support role. Both companies have been assisted by partnerships with U.S. companies. In terms of business strategy, however, the companies are quite different. Incat adapts its commercial vessels for lease to the U.S. Army as a way to keep its ships in use. It has no plans to establish a foreign shipyard. Austal has operated a U.S. shipyard for the past five years and anticipates most business growth in its defence/patrol sales.

The Air Warfare Destroyer (AWD) and Amphibious Ship (LHD) projects

4.60 Before concluding the committee's consideration of Australia's major naval shipbuilders, this section outlines the primes' involvement in DMO's two major upcoming naval shipbuilding projects. These are the construction of three air warfare destroyers (AWDs) and two amphibious ships or Landing Helicopter Docks (LHDs). The 2006 Defence Capability Plan lists the estimated expenditure band for these two

projects at $4.5–$6 billion and $1.5–$2 billion respectively.[96] The AWDs will be built principally by ASC; tenders for the LHDs contract closed on 27 September 2006 and will be awarded in mid-2007.

ASC and the AWD project

4.61 The AWD shipbuilding contract was contested between two Australian primes; ASC and Tenix. Both companies lodged very competitive tenders with strong backing from their respective state governments. On 31 May 2005, the Minister for Defence, Senator the Hon. Robert Hill, announced that ASC was the government's preferred shipbuilder for the project 'on the basis that ASC Shipbuilders offered a superior bid in terms of value for money'.[97] The Minister also noted the government's allocation of $455 million until mid-2007 to fund further design work, workforce skilling, initial infrastructure investment and facilities construction.[98] Defence has told the committee that the South Australian government is providing $115 million in funding for a common user facility at Osborne while ASC will contribute $69 million.[99] The picture in Chapter 6 provides an impression of the completed Osborne site.

4.62 Following ASC's selection, the Commonwealth chose Raytheon Australia as the combat system systems engineer for the AWD project. It is Raytheon's responsibility to integrate the selected Lockheed Martin Aegis combat system, which the Commonwealth purchased from the U.S. Navy for A$1 billion.[100] Learning from the Collins class experience, the Commonwealth's purchase of the Aegis system is intended to 'minimise the risk of any delay in the 2013 delivery for the first Air Warfare Destroyer'.[101]

4.63 Following a further competitive tender process, in August 2005, the government announced that U.S. firm Gibbs & Cox had been selected as the preferred designer for the AWD hull.[102] Gibbs & Cox have opted to evolve a design based on the U.S. Arleigh Burke destroyer. Again, the government identified the Gibbs & Cox

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96 Department of Defence, *2006 Defence Capability Plan, 2006–2016*, p. 141.

97 Senator the Hon. Robert Hill, ASC chosen to build Air Warfare destroyers, *Media Release*, 31 May 2005.

98 Senator the Hon. Robert Hill, 'Purchase of Aegis combat system for destroyers', *Media Release*, 9 December 2005.

99 Department of Defence, *answer to question on notice*, 28 March 2006 (received 29 May 2006), p. 29.

100 Senator the Hon. Robert Hill, 'Purchase of Aegis combat system for destroyers', *Media Release*, 9 December 2005. Lockheed Martin is the supplier of the Aegis system to the U.S. Navy.

101 Senator the Hon. Robert Hill, 'Purchase of Aegis combat system for destroyers', *Media Release*, 9 December 2005.

102 Senator the Hon. Robert Hill, 'Preferred designer chosen for AWD contract', *Media Release*, 16 August 2005. The competing firms were Blohm+Voss and the Spanish firm Navantia.

tender as 'a superior bid in terms of value for money'.[103] However, the government has retained the right to choose a cheaper 'military off-the-shelf' design option developed by the Spanish firm Navantia based on the Spanish F100 destroyer.[104]

4.64 ASC, Raytheon Australia, and the Commonwealth government form the AWD Alliance. The Alliance is part of the government's collaborative strategy, designed to reduce project risk, meet contract schedules and deliver a high level of capability.[105] The practical expression of the Alliance is the AWD System Centre in Adelaide. Opened in August 2006, the centre will accommodate staff from ASC, Gibbs & Cox, Raytheon, Navantia, Lockheed Martin, the Commonwealth government and the U.S. Navy. Over the coming months, the two designers will collaborate with ASC and Raytheon to assess the compatibility and cost-effectiveness of their options. The Systems Centre will employ 200 people to develop lifetime support for the AWDs. A particular challenge will be to update continually the AWDs' software to ensure compatibility with U.S. Navy Aegis vessels.[106]

4.65 As the prime contractor for the AWDs, ASC is faced with particular challenges. Chapter 7 discusses the crucial issue of attracting sufficient skilled labour into large-scale naval shipbuilding projects at a time when the resources sector is booming and unemployment is low. The committee heard from Managing Director, Mr Greg Tunny, that the company has had no trouble to date in meeting its staffing requirements for both the AWD and Collins class refit projects. Mr Tunny stated:

> ASC has met its recruitment targets for AWD to date and is fulfilling its objectives on that program. Perhaps it is of even more interest that, during the last several months, we have actually recruited more than twice as many people onto submarines…We have recruited about 150 people in the last three and a bit or four months. There has been no trouble. We have got them all and we are keeping those programs to schedule and we are delivering what we need to on AWD.[107]

4.66 Another upcoming issue for ASC will be the transition to private ownership. It has been a long-standing policy of the Coalition Government to privatise the company.[108] Shortly after full Commonwealth control commenced in 2000, ASC

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103 Senator the Hon. Robert Hill, 'Preferred designer chosen for AWD contract', *Media Release*, 16 August 2005.

104 This decision will take place at 'Second Pass' stage in mid-2007. The classification of the Navantia design as 'military off-the-shelf' is made by the Department of Defence, *answer to question on notice*, 28 March 2006 (received 29 May 2006), p. 17.

105 Air-warfare destroyer alliance, 'Industry and Defence—working together to deliver a formidable air warfare capability to the Navy', http://www.ausawd.com/ (accessed 7 November 2006).

106 See Derek Woolner, 'The Air-warfare destroyer project', *The Business of Defence: Sustaining Capability*, CEDA Growth No. 57, August 2006, p. 74.

107 Mr Greg Tunny, *Committee Hansard*, 4 September 2006, p. 8.

108 The Hon. Nick Minchin, 'ASC sale', *Media Release*, 16 August 2006.

began a reform process to facilitate eventual privatisation.[109] In May 2006, however, a Carnegie Wylie report commissioned by the federal government recommended delaying the sale of the company until after the contracts for building the destroyers had been completed. Other reports raised concerns that the contract alliance had not properly bedded down.[110] In August 2006, the federal government announced that the competitive tender sale process for the sale of ASC would be delayed until after the 2007 federal election. The government has also flagged foreign ownership limits on the company, including a requirement that a majority of its directors must be Australian citizens.[111]

The LHD project: Tenix and Thales

4.67 As mentioned earlier, tenders for the LHD project closed in September 2006. The shipbuilding contest is between Tenix and Thales Australia. The primes have both teamed with a design company—Tenix with Navantia and Thales (then ADI) with Amaris. The Navantia (27 000 tonnes) and Amaris (22 000 tonnes) designs both class as 'very large' naval vessels. The LHDs are intended to replace HMAS *Manoora* and *Kanimbla* and the Heavy Landing Ship HMAS *Tobruk* (see Appendix 7). They will be by far the biggest ships in the Australian fleet.[112]

4.68 Defence has explained to the committee that 'proposals on what proportion [of the LHDs] to build in Australia as opposed to overseas will be one for the tenderers'.[113] In other words, either or both tenderers may incorporate some option to build part or all of the vessels overseas. The rationale would be that the foreign component could be built more cheaply abroad than in Australia given many foreign yards' economies of scale. The government has declared its preference for the LHDs to be built in Australia but has emphasised that 'Australian industry will need to demonstrate that it can deliver the project at a competitive price'.[114]

4.69 Most of the evidence the committee has received supports Australian primes' capacity to build the LHDs in-country.[115] An in-country build would require involvement from several Australian yards to construct the estimated 120 modules for

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109 ASC, *2005 Annual Report*, p. 2.

110 Australian Strategic Policy Institute, *Cost of Defence: ASPI Defence Budget Brief 2006–07* http://www.aspi.org.au/events/recentEventDetail.aspx?eid=26 (accessed 6 November 2006).

111 The Hon. Nick Minchin, 'ASC sale', *Media Release*, 16 August 2006.

112 Mr Geoffrey Barker, 'The politics of defence acquisition', *The business of Defence: Sustaining capability*, CEDA Growth No. 57, August 2006, p. 82.

113 Department of Defence, *answer to question on notice*, 28 March 2006 (received 29 May 2006), p. 17.

114 The Hon. Robert Hill, *Media Release*, 15 August 2005, http://www.defence.gov.au/minister/Hilltpl.cfm?CurrentId=5039 (accessed 8 November 2006).

115 See Australian Manufacturing Workers' Union, *Submission 21*, pp. 5–6; Returned and Services League of Australia (RSL), *Submission 6*.

each vessel.[116] The competing primes are themselves confident that the ships can be built in Australia. Mr David Miller, Executive General Manager of Tenix Defence Pty Ltd, told the committee:

> …one of the great advantages that we have in Australia is the availability now of these common user facilities. We do not have first-hand experience in South Australia but, certainly, our Tenix site is immediately adjacent to the common user facility in Henderson…The availability of that infrastructure allows us to take on major projects without the barrier to entry that we might otherwise experience if we had to go out and capitalise all of that ourselves.[117]

4.70 Mr Geoff Smith, ADI's former Director of Naval Sales and Marketing, told the committee that ADI supports an in-country build of the amphibious ships.[118] He was confident that ADI can garner the capacity to build the ships in-country:

> We have partners in the bid, one of whom is an engineering company based in Newcastle called Forgacs. They have facilities in Newcastle; they also have facilities in Brisbane. Between our partners, ourselves, Forgacs, our French designer-shipbuilder partner and other strategic subcontractors that we have already identified we do not see ourselves in anyway constrained in that particular [the LHD] program.[119]

The future of the primes

4.71 In their evidence to the committee, both ADI and Tenix commented on the effect that the AWD and LHD contracts may have on the future industry structure. Mr Smith told the committee that high end warship construction and future submarine construction is 'now inevitably focused in South Australia'. He added: 'we are exploring every opportunity that we can to be part of the AWD program'. Furthermore, Mr Smith explained that:

> …we believe that there is an opportunity and a need…to have a second company there [in South Australia] able to do repair and maintenance and, in particular, upgrade capabilities of existing fleet units…Our position is that we need to be there to repair, maintain and look after things that exist, but we also need to be able to use that very capability…to ramp up and to do less complex shipbuilding programs.[120]

4.72 Mr Miller from Tenix told the committee:

> Currently Australia is certainly on a path to get down to two strong shipbuilders, because whoever comes out of the LHD program would then

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116 The estimate comes from Mr David Miller, *Committee Hansard*, 27 April 2005, p. 5.

117 Mr David Miller, *Committee Hansard*, 27 April 2005, p. 5.

118 Mr Geoff Smith, *Committee Hansard*, 28 June 2006, p. 6.

119 Mr Geoff Smith, *Committee Hansard*, 28 June 2006, pp. 9–10.

120 Mr Geoff Smith, *Committee Hansard*, 28 June 2006, p. 7.

> obviously have a very large base of work and an infrastructure to go along with that for quite some time as long as those ships are constructed in Australia. If the result of LHD is that the ships are merely constructed overseas and brought here for some amount of final fit-out then that alters the landscape considerably.[121]

4.73 Mr Miller's comments indicate that the unsuccessful tenderer for the LHD bid will struggle for market position and that even the successful tenderer may lose some capacity if Defence opts for an offshore build. The committee is aware of arguments that future industry rationalisation may be needed.[122] It is important to note here, however, that various supply-side factors will also influence the future industry structure: which company will win the LHD tender; what proportion of this contract will go offshore; how will Thales' acquisition of ADI affect the market; and who will acquire ASC?

Conclusion

4.74 This chapter focused on the development of Australia's prime naval shipbuilding contractors over the past twenty years. It has highlighted the importance of key projects in establishing the viability, the capacity and the reputation of the prime contractors. The primes have shown their ability to undertake technologically and managerially complex projects. They have done so through investing in contract and project management skills, modernising construction and assembly processes and connecting with suppliers up and down the supply chain.

4.75 This experience has also underscored governments' important role in investing in the primes and improving Defence's own contract management practices. Governments have sustained domestic capacity by awarding through-life support contracts to ASC for the Collins class and to Tenix for the ANZACs. Defence's innovative contracts have introduced a new prime to the market (Austal) and achieved outstanding results from existing primes (Tenix and HMAS *Sirius*). It has also sought to minimise contractual risk for complex projects (FFG Upgrade and the AWDs).

4.76 The chapter concluded with a comment on Australia's current capacity to build and repair large naval vessels in the context of the demanding AWD and LHD builds. The committee received considerable evidence that the Australian primes have the capacity to build the LHDs in-country. They are improving their performance and capability and are willing to invest in Defence's demanding future workload. Their main challenge is to build more complex ships with highly sophisticated and expensive systems and rising costs associated with improved capability.

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121 Mr David Miller, *Committee Hansard*, 27 April 2005, p. 19.

122 See South Australian government, *Submission 9*.

Chapter 5

SME suppliers

5.1 Modern naval ships are complex systems that rely on a range of sub contractors specialising in particular aspects of naval shipbuilding to deliver the required capability on time and on budget. Thus, during a major naval shipbuilding project a significant part of the work is undertaken by a network of second and third level suppliers and subcontractors. As chapter 4 noted, the existence of an efficient and effective supply chain is critical to the naval shipbuilding and repair sector. An important consideration in determining the capability of Australia to build naval ships is the role of the many smaller companies that support the industry. These small to medium size enterprises (SMEs) provide specialist services and bring significant technology, innovation and skills to the maritime industry, particularly during upgrades and through-life support programs'.[1] This chapter looks at the capability and reliability of the supplier base in Australia. It seeks to identify the strengths and weaknesses in the network of SMEs servicing the industry.

Supply network in Australia

5.2 While shipyards are the high profile hubs of shipbuilding activity, they are supported by a substantial industrial base spread throughout the country. Particularly with modular construction, firms located at a distance from the shipyard are able to participate in a ship build providing a range of materials, equipment, and ships' parts and components. One SME told the committee that the country's shipbuilding capability is only:

> …possible by leveraging the capabilities of shipbuilding primes that will have overall platform build, enhancement and support responsibilities with the range of skills provided by established local enterprises that will provide the more detailed systems support and linkages to overseas equipment suppliers.[2]

5.3 Indeed, the supply chain is estimated to provide between 60 and 70 per cent of the net value of any new ship, naval or merchant.[3] Mr Michael Gallagher, Nautonix, stated that this figure of 70 per cent by value of a project that is expected to be outsourced by the prime can 'invariably be higher'. He stated:

> In fact, if I recollect correctly, the submarine program achieved 77 or 78 per cent. I would like to think as we go through the Air Warfare Destroyer

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1 *Submission* 20, p. 1.

2 *Committee Hansard*, 20 April 2006, p. 20.

3 See for example, Professor Martin Edmonds, Director, Centre for Defence and International Security Studies, 'UK Shipbuilding: a new direction?', Lancaster University, 2001; Nautronix, *Committee Hansard*, 3 April 2006, p. 36; and Senator the Hon. Robert Hill, Minister for Defence, Keynote Address, Defence & Industry Conference, Canberra, 21 June 2005.

> Program, given the way they have approached that task and encouraged Australian industry to get on board early, that potentially we will see a much higher percentage of Australian industry participation and involvement, as we have done with our electronic charting systems.[4]

5.4 The Government of Victoria also highlighted the extent to which a shipbuilder relies on a wide and diverse network of local suppliers to construct a naval vessel:

> Modern shipbuilding now rarely involves construction at a single site; rather, it involves a wide network of sites for construction of ship modules, which can include up to 80 per cent of fit-outs and then assembly of modules at a launch site. Consideration of a sustainable industry must therefore take into account a viable industry in the enabling sector, which includes the construction of components, fit-out components and manufacture of inputs. A successful industry in this regard requires a strong and diverse industry base which spans more than just defence manufacturing and access to a deep skills market. It is important to note that none of these activities need necessarily be located near to the final assembly of ships.[5]

5.5 In Australia, suppliers tend to have niche capabilities and their contribution ranges from 'quite small nuts and bolts to systems and electronics'.[6] There are well over 1000 small-to-medium domestic enterprises and a number of sophisticated systems houses that support Australia's naval shipbuilding projects. Some are subsidiaries of international companies. Indeed, the Australian Industry Group Defence Council spoke in glowing terms about the depth of Australia's shipbuilding supply chain especially since the Collins class submarine. Mr John O'Callaghan, Australian Industry Group Defence Council, said:

> …we now have a huge reservoir of small to medium sized enterprises in this country at the forefront of activity that are not only capable of being involved in ship construction activity but also have the wit to be involved in other things related to it. There are certain systems that are involved in ship construction which are very similar to aircraft activity. Various SMEs move between the two from time to time. In the main that is not the case, but we now have a reservoir of thousands of SMEs in this country which we never had before, capable of doing all that advanced integration systems activity which the JSFs and warfare destroyers of the world put before us.[7]

5.6 The Chamber of Commerce and Industry was in no doubt that Australian companies are 'more than capable' of building naval vessels. Observing that Australia could build on existing capability gained from projects such as the ANZAC and minehunters, Gibbs & Cox Australia Pty Ltd maintained that:

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4 *Committee Hansard*, 3 April 2006, p. 40.

5 *Committee Hansard*, 18 August 2006, p. 17.

6 *Committee Hansard*, 27 April 2006, pp. 36 and 37.

7 *Committee Hansard*, 28 June 2006, p. 29.

> …now is the right environment to grow capability in Australia and focus on the positive side of it.[8]

5.7 Suppliers also assume a key part in supporting the vessel through its life. The Government of Western Australia noted that:

> In supporting the ANZAC ships home ported in Western Australia, Tenix Western Australia is able to tap into a comprehensive supply chain in Australia and New Zealand that was already conditioned by extensive involvement in the construction of the ANZAC ships. The availability of a tested supply chain greatly reduced the cost, schedule and technical risk inherent in local support of the ANZAC ships. Specifically, under the ANZAC Ship build contract, Tenix contracted directly with original equipment manufacturers (OEM) for provision of such major items as, for example, propulsion engines. This enabled Tenix to extend these relationships in the provision of in-service support of the ANZACS, either directly by the OEM or by establishing dedicated local agents for the support of specific items.[9]

5.8 The 2000 Tasman Asia Pacific report on the ANZAC ship project estimated that the project called on the resources of over 1300 companies in Australia and New Zealand which accounted for over 60 per cent of the subcontractor companies.[10] More recently, Mr Miller advised the committee that:

> The current contract value of our largest program, the Anzac ship project, is about $A7.2 billion. Of that amount, over 80 per cent was subcontracted to about 3,000 suppliers in Australia and New Zealand. Stated differently, almost $5.6 billion flowed into small to medium enterprises in Australia and New Zealand as a result of the government's decision to construct those ships in Williamstown. It should further be noted that many of those businesses are now exporters themselves.[11]

5.9 Although the supplier base may extend across the country, industries tend to congregate in the vicinity of the lead shipyard. For example, the 2005 Allen Consulting Group study noted that a substantial chain of supplier companies was established in Victoria during the ANZAC project. The Victorian government recorded that there were about 600 firms in Victoria as part of 1300 that were part of the supply chain assisting the Anzac frigate project.[12] It noted that of the 416 suppliers on its register (February 2005), 383 were based in Greater Melbourne, many in proximity to Williamstown, with 10 located in South Australia. It stated:

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8 *Committee Hansard*, 19 April 2006, p. 42.

9 *Submission 23*, p. 17.

10 Tasman Asia Pacific, *Impact of Major Defence Projects: a Case Study of the ANZAC Ship Project*, Final Report by Denise Ironfield, prepared for the Australian Industry Group Defence Council, February 2000, p. vi. See also *Submission 23*, p. 16.

11 Mr David Miller, *Committee Hansard*, 27 April 2006, p. 1.

12 *Committee Hansard*, 18 August 2006, p. 23.

> While it is difficult to quantify, Tenix at Williamstown also derives some benefit from the existence of a broader cluster of companies with related skills in the Williamstown/Port Melbourne/Fishermans Bend area relating to the automotive, aerospace and defence research areas. Tenix is able to draw on this common infrastructure and skill base. The presence at Fishermans Bend of the DSTO's naval platforms researchers also is of considerable benefit for Tenix at Williamstown.[13]

5.10 Similarly, the Garden Island shipyard enjoys support from a whole range of SMEs spread through Western Sydney, Newcastle and some in the Illawarra that feed into and subcontract into projects undertaken by ADI.[14] The network is well established. The 2002 Tasman Economics report noted that nearly 85 per cent of businesses supplying the Minehunter project were located in New South Wales.[15] Former Director of Naval Sales and Marketing, Mr Geoff Smith, told the committee that, for the Minehunter project, ADI brought together a skilled workforce of some 600 ADI people with more than 2500 subcontractors and SME suppliers in the Newcastle area.[16]

5.11 Indeed, the Hunter Economic Development Corporation drew attention to Newcastle which it argued 'has a strong heritage and demonstrated capability for the shipbuilding and repair sector with over 300 vessels built and with many hundreds more vessels repaired and maintained in the region. It concluded:

> The region has credentials in managing defence projects, and undertaking technically challenging projects on time and to budget.[17]

5.12 Chapter 2 noted the growth in centres of excellence. Both the South Australian and Western Australian governments are actively encouraging the growth of an industrial complex adjacent to their state's key shipbuilding facilities. They are investing in developing centres of excellence, which include large technology parks, designed around a common user facility. These are intended to attract a range of smaller companies to the site in order to create a high technology precinct. For example, Mr Michael Deeks, Nautronix Ltd, explained:

> …the West Australian government is trying to support local industry to win a significant portion of the air warfare destroyer modules. Rough figures: I think there is going to be something like 28 modules per ship for the air warfare destroyers of which about seven or eight, I think, are going to be constructed in South Australia. We are expecting and hoping that local

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13 The Allen Consulting Group, *Building the Air Warfare Destroyers: How does Williamstown rate?,* February 2005, p. 24.

14 *Committee Hansard*, 28 June 2006, p. 68.

15 Tasman Economics, *Impact of major defence projects: A case study of the minehunter coastal projec*t, Final report, January 2002, p. 13.

16 Mr Geoff Smith, *Committee Hansard*, 28 June 2006, p. 2.

17 *Submission 39*, p. [4].

> industry will win up to half of the remaining modules or more, perhaps, to be constructed locally. We are trying to set up infrastructure to allow them to do that. We wish to see the amphibious ships consolidated and assembled here in Western Australia. We expect that some of the modules will be constructed…We have done quite a significant amount of economic modelling to support the case to government to spend the money they are spending on the current infrastructure at around $80-odd million. That stands on its own two feet regardless of whether we win the amphibious ships or not because the state is looking for economic development, employment, growth et cetera and also as an offset to other industry sectors such as the mining and offshore oil and gas sector.[18]

5.13 It should be noted that these industrial estates are not intended solely for shipbuilding related activities. A more detailed description of these centres of excellence is given in chapter 6.

5.14 It is beyond the scope of this inquiry to examine the potential of Australian suppliers to meet all of the many and various needs of a naval shipbuilder. A number of witnesses, however, used steel fabrication to demonstrate the capability of Australia's supply chain and its capacity to meet Navy's demands.

Steel fabrication—an example of Australia's capability

5.15 The Navy's shipbuilding program will be a significant test for Australia's steel fabrication and shipbuilding capability. The Queensland government believed that Australian suppliers could meet that challenge. It stated:

> Queensland's module fabrication capabilities are considered highly competitive for the current naval shipbuilding program. The State's heavy industry has the capacity and track record to cope with an increased share of the steel fabrication activity. The continued developments targeting the common user infrastructure, engineering capabilities and skilled trades will further strengthen the case for retaining this work within Australia.[19]

5.16 To support the contention that Australia has the capability to satisfy the demands created by defence's capability plan, the Western Australian minister, the Hon. Francis Logan, cited the potential residing in his state. He noted the massive support facilities that currently exist for all the other sectors of the economy that work with very complex areas including nickel-processing facilities in the goldfields, gold-processing facilities and LNG-processing facilities. He told the committee:

> The types of steelwork in these facilities, from exotic steels through to normal, mild steels, are second to none in the world. When specialist welding is required for any of these facilities, whether it is here in Australia or around the world, they come to WA to get the welders because they are the ones who can weld titanium and who can weld the various exotic metals

18 *Committee Hansard*, 3 April 2006, pp. 43–44.

19 *Submission 29,* p. 10.

> that are required. The ships of the future will include those types of materials.[20]

5.17 The Australian Association for Maritime Affairs Incorporated noted that Australian steel makers have no match in the world as demonstrated in the Navy's submarine project. It stated:

> The steels used in these vessels were required to have unique qualities and proved to be better than anything then available in the world. Warships built in Australia must be fabricated from the best steel and fortunately Australian steels have been shown to be equal if not better than steels manufactured overseas. This is more than a question of economics: it is an important factor in relation to 'shelf life' of Australian warships which can be as long as 40 years.[21]

5.18 Steel making provides one example of the potential that exists in Australia's supply chain to support a domestic naval shipbuilding industry.

Tasmania and its supply chain

5.19 As noted earlier, an established chain of local firms cluster around the shipyards at Williamstown, Victoria and Garden Island, New South Wales. They have a proven record of meeting the needs of the industry. The main Western Australian and South Australian shipyards also have local supplier networks and with government assistance are developing high technology centres of excellence to attract local business to their locality.

5.20 The construction of ships using modules means that increasingly firms located at a distance from the shipyard can contribute to a shipbuilding project. To explore further the potential and capacity of Australia's supply chain, the committee considers the sometimes forgotten and probably underrated Tasmanian companies. Unlike the larger states, Tasmania does not have the advantage of a prime naval shipbuilder operating in the state.

5.21 Tasmanian industries acknowledged that their state was not in the same league as Victoria and New South Wales with their established shipyards and Western Australia and South Australia who can boast of their impressive manufacturing and engineering precincts which surround a state-of-the-art common user facility. Nonetheless, they argued that local Tasmanian firms have enormous scope to support the larger shipyards.

5.22 The Tasmanian government was confident that Australian industry has both the capacity and capability to build the AWD and LHD in Australia to the desired schedule. It also acknowledged that the two programs would stretch Australia's resources but was of the view that the success of the projects would depend on

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20 *Committee Hansard*, 3 April 2006, p. 85.

21 *Submission 13,* p. 4.

drawing on Australian industry capability from all over the country and additional capability from non-traditional ship fabricators. With regard to Tasmania, the government submitted that it together with Tasmanian industry believed that the State has the capability to produce modules for both projects and is ready to participate. It informed the committee that Tasmania has about 1800 skilled personnel likely to be available to manufacture component parts for the AWDs and LHDs:

> This skilled workforce is stable and focussed; residing in Tasmania's regional centres and with a proven track record of meeting industry schedules during heavy industrial shutdowns; meeting shipbuilding delivery deadlines and providing programmed maintenance to large mineral and food processors. Utilisation of this type of capability throughout regional Australia would ease pressure on prime contractors to deliver on these key defence projects.[22]

5.23 Mr Rhys Edwards, Deputy Secretary of the Industry Development Division in the Tasmanian Department of Economic Development, told the committee that Tasmania is not seeking to become 'a centre for naval construction'. It approached Australia's naval shipbuilding industry from a different perspective:

> I think the Tasmanian government has not been, and probably is unlikely to be, in a position to invest tens of millions of dollars in common-user heavy infrastructure such as you have seen in some of the other states. Indeed, as I mentioned, our ambition does not lie in being a centre for naval construction in that way, in being the shipyard where it all gets put together. But I think the modularised methodology of modern shipbuilding means we are ideally placed, with some of our firms, to be providing substantial components. We do have…a big heavy engineering sector. I think the future lies in developing those firms to be able to be part of that. That is about getting to the level where they are comfortable as the tier 2 and tier 3 contractors in a relationship with a prime contractor and are seen as being able to provide quality work on time, at a good price—all the things that come out of the requirements of Defence and other customers. [23]

5.24 Mr Christopher Edwards, Chairman of the Tasmanian Marine Network, gave an impressive account of the achievements of companies in Tasmania that are in some cases leading the world in innovation.[24] He stated that:

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22 *Submission 30,* p. 1.

23 *Committee Hansard*, 28 April 2006, p. 54.

24 *Committee Hansard*, 28 April 2006, p. 20. He said, 'Tasmania's marine engineering workshops provide an impressive array of quality goods. Innovation and skill are qualities in which we have a high investment. Custom design casting and machining services in both ferrous and nonferrous metals by APCO result in high-quality products as diverse as hydraulic cylinders, water jets, deck hatches, bulkhead seals and piping system fittings, cast in aluminium and stainless steel. APCO hydraulic cylinders are in use in many countries, including Europe and the UK, interceptor kits, motion control hydraulic cylinders and two-square metre T-foil sets are supplied to the USA military'.

> …Tasmania's leading edge marine industry makes a considerable and growing contribution to the Tasmanian economy…Tasmania's marine industry relies on quality and technological innovation, and this is becoming more and more important as the years go by. If Tasmania is small in size, we in the marine industry are not slow to take up new challenges. What is more, we are more than ready to use our combined strengths to the advantage of all, as is evidenced by the success of the Tasmanian maritime network—taking the world by sea.[25]

5.25 A number of companies have formed the Tasmania Maritime Network (TMN) made up of approximately 15 highly skilled exporters and manufacturing companies with expertise in marine manufacture and fit out, such as Incat Australia Pty Ltd. Described as 'a mutual beneficial society', they have banded together to help promote Tasmania's maritime industry. In total, it has a turnover of about $250 million to $300 million a year.[26] Noting that shipbuilding is a cyclic industry, Mr Edwards stated that employee wise at the moment the TMN 'would be around 1,200 to 1,500, depending on what ship builds are going on'.[27]

5.26 The network is looking to provide completed module sections which provide the steel fabrication as well as the fit-out of mechanical, electrical and other componentry. The network would be able 'to provide not only the fabrication skills but also many other trades and get as much work into that as we possibly can'.[28] Mr Edwards explained:

> …we are all fairly high technology oriented in what we do, even from our ship provedoring to, in our case, antenna manufacturing. We tend to all be at the leading edge. Unfortunately, in Australia, we do not use any of that leading-edge stuff very much. We tend to buy overseas. That is a real shame, I think, but that is the way of things. We often find with our antennas that we will be selling them to the Malaysians or the US before Australia even looks at them. It is not always the case, but it often is the case.[29]

5.27 The TMN also forms part of a larger strategic working group of Tasmanian organisations endeavouring to maximise their potential to capture a share of work generated by the naval shipbuilding industry. The organisations are particularly keen to contribute to the LHD project.[30] According to the Government of Tasmania:

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25 *Committee Hansard*, 28 April 2006, pp. 21–22.

26 *Committee Hansard*, 28 April 2006, p. 24.

27 *Committee Hansard*, 28 April 2006, p. 24.

28 *Committee Hansard*, 28 April 2006, p. 27.

29 *Committee Hansard*, 28 April 2006, p. 25.

30 The organisations include: Tasmanian Manufacturing Industry Council; Tasmania Maritime Network; Department of Economic Development; Australian Industry Defence Network (Tasmania) and Industry Capability Network Tasmania

> Tasmania has an active AIDN (Australian Industry Defence Network) membership. The membership includes the majority of companies from the TMN and other leading companies with defence industry capability as well as the Australian Maritime College. In addition to these capabilities a number of niche manufacturers are able to provide products/services directly to prime contractors or tiered suppliers.[31]

5.28 The Tasmanian government has offered to provide logistical support to this consortium. Haywards Group and North West Bay ships Pty Ltd are the lead contractors.[32] In addition, a number of specialist and related Tasmanian companies have indicated their support for the project. These include all significant Tasmanian heavy steel fabrication companies, duplex stainless foundries, CNC machine shops and toolmakers and members of the Tasmania Maritime Network (TMN) as well as precision engineering specialists, technical engineering service providers, composite manufacturers, electrical and air conditioning installation experts.[33]

5.29 A working party for this group has investigated and identified suitable sites for final fabrication and shipping from Tasmania. The Tasmanian government stated that the 'newly formed Tasmanian Ports Corporation, arising from the recent amalgamation of the three major ports, will be closely associated with any Tasmanian bid'.[34]

5.30 In summary, Mr Christopher Edwards believed that Tasmania has the skills and capacity to fabricate for AWDs and LHDs concurrently.[35] He stated:

> …we have a very long tradition of shipbuilding in the state, and that is retained here. One of our big advantages in Tasmania has always been that we have a very stable workforce. If there is a bit of a downturn, for instance, in the shipbuilding industry, they are quite happy to move to the building industry, and then come back again.[36]

5.31 The Tasmanian government explained that there is significant interest in this project and reiterated that Tasmanian industry clearly has the capability to produce a number of modules for the project.[37]

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31 *Submission 30,* p. 2.

32 *Submission* p. 2. Haywards Group has agreed in principle to become the lead contractor working to a prime contractor. This company is Tasmania's leading heavy steel fabricator with expertise in large scale projects and has a skilled workforce of over 140 personnel and substantial workshops, design office and corrosion management facilities. North West Bay ships Pty Ltd is to support the Haywards Group with the 'necessary specialist maritime project management and additional marine manufacturing support'.

33 *Submission 30,* p. 3.

34 *Submission 30,* p. 3.

35 *Committee Hansard*, 28 April 2006, p. 29.

36 *Committee Hansard*, 28 April 2006, p. 29.

37 *Committee Hansard*, 28 April 2006, p. 61.

Committee view

5.32 Australia has an extensive and widespread chain of suppliers who have supported, and are looking forward to continuing their involvement in Australia's shipbuilding industry. The industrial base in Tasmania, although small and remote from the major shipbuilding centres, is an example of the scope and extent of the nation's capability, notwithstanding the small ship market it supplies. The modular construction of ships means that increasingly more firms or clusters of companies in regional areas or in states removed from the assembly site can participate in the shipbuilding projects.

5.33 There is no doubting the enthusiasm of the states and their local industries to participate in the AWD and LHD projects and their conviction that Australia has the capability to meet the demands created by the projects. Before further considering whether Australia's supply network has the capacity to satisfy the requirements of Navy's shipbuilding program, the committee examines in greater detail the capability of locally based companies and the contribution they make to the shipbuilding industry in Australia.

SMEs and their contribution to the industry

5.34 The role of SMEs in the local supply chain is integral to the construction of a ship and ranges across all aspects of a ship's build. They are in a unique position to add considerable value to the goods and services they provide to the naval shipbuilding industry. Nautronix told the committee that to get the systems set up when and where the shipbuilder wants them, Australia needs a raft of companies and organisations to form the 'backbone of that capability—the nuts and bolts suppliers through to…the acoustic suppliers—the whole nine yards'.[38]

Value adding

5.35 The contribution of SMEs, however, does not stop with the delivery of goods or services to a particular project. Defence through the prime shipbuilder is looking for the capability to meet its requirements including quality as well as quantity, the long-term reliability of the supplier, the cost effectiveness of supplying the product and the degree of dependence on any one major supplier.

5.36 Some of these 2nd and 3rd tier companies are able to provide services involving complex naval systems. Gibbs & Cox submitted that:

> Currently there exists an established industrial base in Australia experienced in the detail design and construction of surface combatants. Much of this base resides within the Australian shipbuilders, small, medium and large independent design firms, and Commonwealth design and research authorities. This base has recent experience in the design of the

38 *Committee Hansard*, 3 April 2006, p. 39.

> Collins Class submarines, the ANZAC Class frigates and the modernization of the Adelaide Class frigates.[39]

5.37 Mr Derek Woolner, who is researching the Collins class submarine project, cited the world class innovative work of some companies that were involved in the submarine project. For example, he informed the committee that:

> The anechoic tiles for the submarine were made by a company in Mordialloc that was close to the Maribyrnong materials research laboratory that did the research work. They got contracts to provide rubber components that we use to isolate the decks within the modules of the submarine. Not only did they do that but, once they got going, they redesigned those components and made them more effective. A similar thing happened with the building of the hull modules that were done around the country—some in Newcastle and some elsewhere.[40]

5.38 CEA Technologies is a major Australian company of 220 employees that specialises in the design, development and manufacture of radar and communications systems. Its success also demonstrates the ability of Australian companies to develop expertise in a specialised field and to be highly competitive on the global stage in a niche area. The growth of the company also highlights the role that Defence contracts can have in assisting fledgling enterprises in Australia and the importance for such firms to form strategic alliances with overseas companies.

5.39 An initial contract of about three months with Defence and worth approximately $60 000 gave CEA Technologies the necessary foothold to build a thriving business with export potential. Mr David Gaul, President, CEA Technologies, explained the company's incremental increases that were based on a continuous stream of Defence contracts:

> It is just a step up each time—bigger, more difficult, a more stretching project— and as long as we deliver, we get the next one. You keep moving up the chain, as it were, to where we are now with the AUSPAR development, which is a high-powered active phased array missile system that both the Australian and US governments are funding. [41]

5.40 The company took the opportunities offered by Defence and built on them gaining global recognition on the way. Its first export, which was an antenna developed for the Collins submarine, was arranged through Argo Systems in the U.S. to a couple of customers. CEA Technologies have formed a partnership with Saab to take the system for the ANZAC frigate ASMD upgrade to sell to European navies. Northrop Grumman has also become a minority shareholder and is going to open up the U.S. markets for the same product. The company has ambitions to expand into the Canadian and UK markets. Mr Gaul believed that these relationships are critical to

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39 *Submission 10,* p. 3.

40 *Committee Hansard*, 4 September 2006, p. 28.

41 *Committee Hansard*, 3 July 2006, p. 28.

enable the company to move forward. He was confident that other areas of Australian industries could emulate their example:

> To have a global reach, you must have global partners, because we do not have a global company in Australia, apart from BHP. Getting the right partners becomes an essential element. It was a very deliberate process that we went through to get Northrop Grumman on board. We first of all got two big brothers—the US government and the Australian government—and we got IP agreements. So they were standing next to us. Then we went out and selected our gorilla, basically, and we went through a very vigorous process to do so. Saab was also considered as part of that process, but obviously the American market is much more in our foci than is the European market. You can understand why. Saab are very comfortable with the outcome of where we are at now, and so we have two partners moving forward.[42]

5.41 Mr Gaul stressed the point, however, that an SME must be in a position to attract the interests of larger internal companies and that CEA Technologies could not have done so without the 'involvement of the U.S. and Australian governments in IP agreements and things like that'.[43]

5.42 Natronix Ltd, a large SME, provides another example of an Australian company making a valuable contribution to Australia's shipbuilding industry. It has grown significantly from its origins in Fremantle in the mid-1980s to a publicly listed Australian company with 'a strong global capability in key acoustic technologies'. It was acquired by a leading Oil and Gas company in 2002 and its headquarters transferred to Aberdeen, Scotland. The company continues to operate from four strategic centres in Australia, the UK and U.S. The largest of the four Nautronix companies is located in Australia which remains 'the central focus for the conduct of research and development as well as Defence related systems and solutions'.[44]

5.43 In Australia, Nautronix currently employs over 85 people with key specialisations centred on software and systems engineering with a primary interest in acoustic technologies. Increasingly it is moving towards military systems integration. It explained:

> From various external assessments, the Company has been identified as a large SME being ranked in the top 5 Australian SME for the last 2 years. Nautronix is often recognised for 'fighting above its weight' a fact that is evidenced by the investment of over $A20 million in Research & Development over the last 10 years with the majority of those funds being spent in Australia.[45]

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42 *Committee Hansard*, 3 July 2006, p. 30.

43 *Committee Hansard*, 3 July 2006, p. 32.

44 *Submission 27*, p. 3.

45 *Submission 27*, pp. 3–4.

5.44 Another important consideration is the ready availability of local SMEs to provide a product or service in Australia. The Western Australian government linked navy preparedness and by extension the credibility of Australia's maritime strategy to a dependency on local industry support.[46] It used the Anzac ship program to demonstrate how local industry involvement in the construction of the AWDs 'will help establish and condition the supply chain required to maintain an acceptable degree of preparedness once they enter service'.[47]

5.45 The potential that resides in Australian SMEs not only to deliver a particular good or service but to add value to the shipbuilding industry is beyond dispute. Even so, a shipbuilder requires the skills, knowledge, experience and capabilities covering every facet of a ship build. As noted in chapter 2, even the U.S. is not totally self-sufficient in the construction of its warships and must look to overseas sources to supply certain goods or services.[48] The following section examines how Australia's shipbuilding industry goes about acquiring all it needs for the successful construction of a modern naval ship.

Gaps in capability

5.46 A number of submitters referred to Australia having niche capabilities in shipbuilding but not a capability that encompasses all aspects of ship design and construction.[49] The Tasmanian government said:

> In some of the more complex systems engineering, software systems and communications and things, we just do not have those types of companies here, by and large. Indeed, when you look at the amount of off-the-shelf systems that are purchased overseas and then integrated in a vessel, you will see that there is quite a high proportion of that as well. So the Australian capability is not necessarily there either. [50]

5.47 Mr Michael Gallagher, CEO, Nautronix, was of the view that there are certain areas where Australia 'does not have the expertise to bring capabilities to the table'. He cited large turbine type engines.[51] Along similar lines, Saab Systems Pty Ltd also noted that there would be times when the services of foreign systems developers were

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46 *Submission 23*, p. iv.

47 *Submission 23*, p. 16.

48 See quote by the UK Ministry of Defence in chapter 2, paragraph 2.10.

49 Mr Peter Croser, *Committee Hansard*, 19 April 2006, p. 43.

50 *Committee Hansard*, 28 April 2006, p. 61.

51 *Committee Hansard*, 3 April 2006, p. 33. See also Mr Bonner, Weir Strachan and Henshaw, *Committee Hansard*, 20 April 2006, p. 24. Mr Bonner told the committee that it is inevitable that the platforms going to be built in Australia will have overseas equipment. He stressed the importance of establishing relationships with overseas equipment suppliers in the early design and procurement period. Indeed, Weir Strachan and Henshaw identified a range of equipments that were not being supported well in Australia and moved to fill that void. In some cases, however, it talked to 'people overseas and formed licences and have contracts'.

required to meet the level of capability sought or the specific technologies needed. It cited the combat system in the AWDs.[52]

5.48 ThyssenKrupp Marine Systems, a wholly owned subsidiary of Blohm+Voss, also recognised the limitations of Australia's shipbuilding industry. It questioned the capability of Australian firms 'to perform the full spectrum of design work involved in the development of large, complex warships and submarines without the direct support of well-established and experienced overseas designers'.[53] For example Mr Peter Hatcher, CEO ThyssenKrupp Marine Systems Australia Pty Ltd, noted that 'there is no way in the foreseeable future that I can see Australia ever becoming a developer for air-independent propulsion systems…that sort of technology is always going to need to be brought in'.[54]

5.49 Raytheon Australia, cited the development and production of highly complex systems such as a combat management system as an activity where Australia lacked capability:

> Due to the size and nature of the Australian defence market the majority of these systems will come from overseas. Although there are some sensors and control systems developed and made in Australia it is most unlikely that a world class naval combat management system would be developed here in the future. There is simply not the expertise within the local defence industry to produce a system that could equal those produced in the United States or Europe. [55]

5.50 In such cases, Australian shipbuilders have no option but to look to outside sources to fill the void left vacant by Australian companies.

International companies filling a void

5.51 Large projects undertaken in Australia have the potential to attract international companies to Australian shores. By locating in Australia they may fill a capability gap and indeed from an initial commitment go on to develop an indigenous skill and knowledge base in this capability and to establish an Australian business. Raytheon Australia noted that:

> Systems engineering and systems integration are areas where local subsidiaries of large international companies make a substantial contribution to raising the level of knowledge and improving the techniques, processes and tools utilised through the transfer of best practice from their parent companies.[56]

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52 *Submission 25,* p. 7.

53 *Submission 34,* p. 2.

54 *Committee Hansard*, 18 August 2006, p. 8.

55 *Submission 35,* p. 8.

56 *Submission 35,* p. 9.

5.52 A 2005 report by the Allen Consulting Group identified a number of overseas companies with major systems capability that have a presence in Australia including BAE systems Australia, Honeywell, Lockheed Martin, Raytheon Australia and Saab systems.[57] It stated that:

> The ability of these firms to build and maintain effective company networks and attract skilled personnel will be a factor in the success of the forward program of naval procurement.[58]

5.53 The committee took evidence from a number of Australian based companies whose origins or parent company is overseas. They have demonstrated their belief in the viability of an Australian naval shipbuilding industry and a commitment to employ and train Australians. For example, Gibbs & Cox indicated its confidence in Australia's future naval shipbuilding by recently establishing a wholly owned subsidiary, Gibbs & Cox Australia Pty Ltd (GCA) in Adelaide. It saw scope for further development of the Australian Ship Design and Build sector in meeting the demands of Defence's future naval acquisition program. It stated:

> We have supported various Commonwealth surface combatant shipbuilding and modernization programs for over 30 years. Our response to the Committee's inquiry reflects our expertise, our experience in Australia and, in particular, our plans for supporting the AWD Project and future shipbuild and modification programs.[59]

5.54 Raytheon Australia, however, pointed to the importance of ensuring that overseas companies contribute to the development of Australia's industrial base. It noted:

> …simply contracting the work to an overseas company, or hiring overseas workers without ensuring the transfer of knowledge to local people, results in little or no increase in Australian industrial capability.[60]

5.55 Without doubt the Australian subsidiaries of large overseas companies are working side by side with local firms to provide the shipbuilding industry with an extensive, reliable and capable network of enterprises supporting the construction of naval ships. As noted by Raytheon Australia, their role should extend beyond providing goods or services to participating actively in the growth and development of the industrial base.

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57 The Allen Consulting Group, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, pp. 37–39.

58 The Allen Consulting Group, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, p. 39.

59 *Submission 10,* p. 1.

60 *Submission 35,* pp. 9–10.

Overseas companies—fostering local industry

5.56 It should be noted that overseas companies operating in Australia also rely on the local supply chain to compensate for shortfalls in their own capability. They actively search for, identify and engage SMEs that have the capability they want. Raytheon advised the committee that it has about 30 SMEs, all Australian companies, working for it in the capability area.[61]

5.57 Mr David Bonner, Weir Strachan and Henshaw Australia, informed the committee that the company, established in Australia in 1988, initially seconded staff from Bristol to start the office but 'by a constant process of recruitment and business growth in Australia the business is now operated by an experienced local work force'.[62]

5.58 The Anzac ship project gave the Saab company in Australia the foundation on which it has broadened its activities throughout defence, leading to $1.1 billion of business. The company employs 300 staff involved in successful operations in the domestic and export sphere.[63] It sees itself as one of the fledgling companies that was given a kick start by local construction. Now in its 16th year of operation and employing a large workforce, it believes that it is making a significant contribution to the Australian economy.[64]

5.59 Raytheon, the fourth largest defence company in the United States, is another overseas company employing significant numbers of Australians in the shipbuilding industry. It has had a presence in Australia since the mid-1950s and has been a major supplier of weapons, sensors, command, control and communications systems to the ADF.[65] As a result of the government's Defence and Industry Strategic Policy Statement, Raytheon Company decided in 1998 to invest further in Australia and establish a local capability. Since then, Raytheon Australia, a wholly owned subsidiary of Raytheon Company, has grown to a workforce of over 1100, with operations in all mainland States and Territories. It had an annual turnover for indigenous business (not including product sales from the U.S.) of $390 million in 2005.[66] The company's core business in Australia is Mission Systems Integration, which it is in the process of expanding into Mission Support.[67]

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61 *Committee Hansard*, 3 July 2006, p. 24.

62 Committee Hansard, 20 April 2006, p. 20.

63 *Submission 25*, p. 4.

64 *Submission 25*, p. 7.

65 *Submission 35*, p. 2.

66 *Submission 35*, p. 2.

67 *Submission 35*, p. 2. Raytheon are involved in a number of major programs in which they are responsible for systems integration, including:

- Air Warfare Destroyers (AWDs);

Overseas companies—technology transfer and indigenous innovation

5.60 Companies such as Weir Strachan and Henshaw, Saab systems Pty Ltd, Gibbs & Cox Australia and Raytheon Australia not only create employment opportunities in Australia but have helped raise the level of capability of Australian employees, encouraged technology transfer and attracted further investment in technology development. These companies, according to Saab 'go on to sustain the technology providing a world class service and Australian oriented support for Australian military forces and spin-offs over civil and dual use technologies'.[68] They also broaden the industrial base and in so doing enrich the industry.[69]

5.61 The ability of these companies to reach back and tap resources from the parent company adds to the capability of those employed in Australia and assists in the transfer of technology.[70] Saab Systems Pty Ltd noted that 'Many successful companies have continued to work in Australia providing an ongoing conduit for global technology into Australia and giving Australians the experience that hones world-class skills. In many cases the companies are stand alone enterprises'.[71] As explained by Weir Strachan and Henshaw:

> We are an autonomous company, and part of our strategy is to become more autonomous. Because of that we are expanding our engineering activities here. We are building new facilities and moving to larger facilities. In that respect we are autonomous, but we do rely on our company in the UK to provide us, when necessary, with support. As they are an international defence business, they supply us with a lot of solutions. Quite often they are required to develop solutions on submarine systems by the MoD. They pay for all the development and are able to offer a proven solution here in Australia. The relationship we have is that they are still our technical counsel. In our transition to our own design authority status here, we have a couple of years to go along that road, so we rely on them for that

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- replacement combat system on the Collins Class submarines;
- simulators for the upgraded F/A-18 Hornets;
- electronic warfare training aircraft operated out of HMAS Albatross in Nowra;
- electronic warfare emulator pod, which is to be fitted to the BAE Hawk aircraft;
- in service support for the Royal Australian Navy (RAN) Submarine Group at HMAS Stirling; as well as technical support for the joint facility at Pine Gap and the Tidbinbilla Deep Space Communications Complex outside Canberra; and
- a geospatial imagery business.

68 *Submission 35*, p. 5.

69 Michael Gallagher, Nautonix, *Committee Hansard*, 3 April 2006, p. 40.

70 See for example David Bonner, *Committee Hansard*, 20 April 2006, p. 19.

71 *Submission 25*, p. 7.

> technical counsel and technical oversight and also design data for systems they operate worldwide.[72]

5.62 The benefits of this transfer of technology and close exchange of information are substantial. Again, Weir Strachan and Henshaw demonstrated the advantages to this collaborative approach:

> One of the things we are looking at is reciprocal working. Because we operate in two different time zones, it is actually quite useful at times to have them work on project problems which crop up in the afternoon, and sometimes we can have an answer in the morning and vice versa. We in Australia are not yet at the stage to be able to offer a lot of technical assistance to the Spanish submarine project. However, part of our development is that an exchange process has been set up where we are going to have engineers from Australia work in the UK, and possibly in Spain, and engineers from the UK working in Australia.[73]

5.63 According to Raytheon, its success and growth in Australia has been the ability and willingness of its parent company to strengthen the capability of its local subsidiary by transferring technology, knowledge, skills, and processes.[74]

> *Reach Back* has strengthened the knowledge and skill base of the Raytheon workforce in Australia and effectively extended the capability available to the Australian defence customer to that of Raytheon Company overall.[75]
>
> It also works in reverse with the parent company benefiting from advances made in Australia. For example, Raytheon Australia is now the company's centre of expertise for integrating combat systems into conventional submarines and has developed an innovative way of interfacing United States-designed combat systems to existing sensors in conventional submarines.[76]

5.64 Raytheon has expertise in the area of combat systems and stated that it was working with DSTO and others, such as the University of Melbourne, who have expertise in that area. Dr Terrence Stevenson, Chief Technology Officer for Raytheon Australia, added 'so there are areas…where we can add our expertise—and, if we are good at a particular area, we can enhance that system'.[77]

5.65 Mr Gallagher, Nautronix, explained how the work of his company in electronic charting systems has enriched Australia's industrial base:

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72 *Committee Hansard*, 20 April 2006, p. 25.

73 *Committee Hansard*, 20 April 2006, p. 26.

74 *Submission 35*, p. 2.

75 *Submission 35*, p. 3.

76 *Submission 35*, p. 3.

77 *Committee Hansard*, 3 July 2006, p. 14.

> We have brought that knowledge and technology to Australia. It becomes more than just a representative role; it becomes part of that Australian industry base. As I go down the track and achieve accreditation by the IMO as a certified place of production for these systems, I am no longer just a representative. We now have a workforce that is building, supporting and upgrading that capability in Australia with a significantly reduced reliance on the overseas supplier.[78]

5.66 The gaps may not only occur in technology but in special skills required. In this regard, companies are able to second or recruit specialists from their overseas company.[79]

Committee view

5.67 Clearly, in some specialised areas involving complex systems, Australia may have to seek overseas assistance to augment identified deficiencies. In many of these cases, overseas companies have established subsidiaries in Australia that have gone on to become valuable participants in the country's shipbuilding industry. Without doubt, many are contributing to a vibrant and innovative naval shipbuilding industry offering employment opportunities and driving advances in science and technology. The committee underlines the need for the government to ensure that Australia takes full advantage of their presence in Australia, especially in the area of technology transfer.

5.68 For highly complex systems or specialised services, Australia may have to turn to overseas based companies.

Overseas companies meeting special requirements

5.69 Australian companies do not stand alone or unassisted in determining and achieving the capability needed to satisfy Navy's demands. ASC told the committee that in preparing for the AWD contract, it accepted that it was not the world's best builder of air warfare destroyers so it approached Bath Iron Works which was deemed by ASC to be the best. Mr Tunny explained:

> We commissioned Bath Iron Works to do a study on us, to tell us in as unflattering detail as they desired, how imperfect we were and what they believed we needed to do to rectify that circumstance. So we got that report. We took on board all of their observations and recommendations. We would put in place either actions or planned actions. In the thousands of pages in which we responded to the government, the DMO and its expansive evaluation team which drew on shipbuilding consultants from around the world, we convinced them that we had put in place the ability to deliver the air warfare destroyers.[80]

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78 *Committee Hansard*, 3 April 2006, p. 40.

79 See for example, David Bonner, *Committee Hansard*, 20 April 2006, p. 26.

80 *Committee Hansard*, 19 April 2006, p. 16.

5.70 The purchase of Aegis as the core combat system for the AWDs is another example of Defence having to rely on the expertise and experience of an overseas company to provide a capability that Australian companies could not.[81] Lockheed Martin will supply the system and services to the U.S. Navy for transfer to Australia. According to Defence, Aegis has been proven in service with the U.S. Navy across a range of operations and has been regularly upgraded and improved to meet the changing requirements of naval operations. It explained:

> The AWDs will be fitted with the latest open architecture version of AEGIS which will provide the RAN with the opportunity to upgrade the system over coming decades and benefit from the fact that there will be around 100 AEGIS equipped warships operating globally by the time the AWDs enter service.[82]

5.71 The purchase of Aegis and its critical role into the future as the core combat system for the AWDs underscores how important it is for Defence to maintain and effectively manage a sound and mutually beneficial business and professional relationship with Lockheed Martin, and Raytheon Australia, the combat systems integrator. The difficulties for Defence and the Australian government in ensuring that such alliances run smoothly and that Australia's interests are fully protected is considered in Part IV of the report.

5.72 Australia is not alone in its reliance on overseas companies to assist in certain aspects of a ship's construction. As noted in chapter 2, even the U.S. 'may struggle to retain a wholly independent national capability in all areas of defence'.[83]

Conclusion

5.73 Clearly the success of a naval shipbuilding and repair programme relies heavily on the existence of an extensive chain of reliable, efficient and skilled subcontractors. The committee has no doubt that SMEs in Australia have the skills, knowledge, experience and drive to provide a solid base upon which to build

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81 According to Lockheed Martin, their Aegis Weapon System 'is the world's premier naval defense system and the sea-based element of the United States' Ballistic Missile Defense System. It is 'a radar and missile system seamlessly integrated with its own command and control system, capable of simultaneous operation defending against advanced air, surface and subsurface threats.' The system capabilities are on 67 U.S. Navy cruisers and destroyers on station around the world with plans underway to install the system on an additional 22 U.S. Navy destroyers. It is 'the primary naval weapon system for Japan, it is part of two European ship construction programs—the Spanish F-100 and the Norwegian New Frigate—and the Republic of Korea recently selected Aegis for its newest class of destroyers, http://www.lockheedmartin.com/wms/findPage.do?dsp=fec&ci=11357&rsbci-13000&, accessed 29 November 2006.

82 Department of Defence, answer to question on notice, 18 August 2006 (received 30 October 2006), p. [19].

83 Chapter 2, paragraph 2.10, contained in quote Ministry of Defence Policy Paper No. 5, *Defence Industrial Policy*, October 2002, pp. 8–9.

Australia's naval shipbuilding program. Some are at the cutting edge of world class developments and are contributing to innovation and driving advances in technology. In some cases, a Defence contract was the catalyst that set the company on its successful trajectory.

5.74 It is important that the wealth of local talent residing in Australia is properly harnessed and nurtured. The committee believes that Defence has a key role in developing this network and that considerations such as how best to nurture local SMEs should be part of Defence's overall strategic planning.

5.75 The committee is aware, however, that Australian companies cannot provide all the goods and services necessary for the construction of a naval ship and rely on overseas countries to fill the gaps. Many overseas companies have established subsidiaries to make up for the deficiencies in Australia's industrial base. Although initially reliant on their parent company, some have grown and developed a degree of autonomy to the point where in particular areas of specialisation they outshine their parent. Over time they have built up a local workforce meeting the special needs of Australian shipbuilders.

5.76 Furthermore, the committee notes the potential and actual contribution that Australian subsidiaries of international companies make to innovation and improved technology.

5.77 The committee believes that it is important for government to ensure that the Australian industry is able to take full advantage of the presence of these companies in the country. They must be part of the growth and development of Australia's industrial base. Also, Australia's reliance on overseas companies for a particular product or service raises a number of matters touching on Australia's national security interests and the desire for self-sufficiency in its defence capability. Chapter 12 of this report explores these matters.

5.78 While the committee believes that Australia's network of suppliers, including the subsidiaries of international companies, is capable of supporting the country's major shipbuilders, it is aware of the challenge posed by the AWD and LHD projects. They will test the capacity of local companies to deliver. The following section examines the infrastructure requirements of the shipbuilding industry.

Chapter 6

Infrastructure

6.1 The shipbuilding industry is capital intensive requiring substantial equipment and installations that are expensive to build and maintain. A shipyard itself is a major industrial facility that occupies large tracts of land with access to water.[1] Docks, slipways, piers, cranes, large covered workshops as well as supporting administrative buildings and amenities are needed. The age, condition and suitability of its facilities clearly influence a shipyard's capacity to build modern naval vessels.

6.2 As noted in the previous chapter, much of ship building activity takes place in sites scattered around the country. Activities, such as steel fabrication, may also be capital intensive and require substantial infrastructure. This chapter evaluates the infrastructure in Australian shipyards and associated sites to determine its capability to sustain a viable naval shipbuilding industry and its capacity to meet the likely demands of Australia's navy.

6.3 There are a number of phases in shipbuilding—design, production, outfitting, testing, commissioning and trials.[2] The UK's naval shipbuilding report spelt out the facilities required in the construction of warships which it asserted, 'cannot be developed or expanded without significant resources, planning effort, and a long lead time'.[3] It divided ship construction into three main phases together with the main facilities required in each phase.[4]

Pre-Final Assembly		
• Shops • Cranes		
	Final Assembly	
	• Dry docks • Floating docks • Slipways • Land-level areas • Ship assembly	
		Afloat Outfitting
		• Piers • Quays • Locks • Any location specified as such

1 See for example, The RAND Corporation, *The United Kingdom's Naval Shipbuilding Industrial Base: The Next Fifteen Years*, prepared for the United Kingdom' Ministry of Defence, 2005 (The UK's Naval Shipbuilding 2005 Report), p. 3.

2 See The UK's Naval Shipbuilding 2005 Report, p. 90.

3 The UK's Naval Shipbuilding 2005 Report, p. 3.

4 The UK's Naval Shipbuilding 2005 Report, p. 90.

6.4 There is some overlap in the use of different facilities throughout each phase. For example, the cranes, shops or fabrication facilities associated with the final assembly are used throughout the other phases.

Investment in infrastructure

6.5 Modern facilities are a precondition for success in naval shipbuilding.[5] The recent First Marine International study of major shipyards graded shipyards according to their level of technology. It identified five categories of shipyards ranging from the most basic to the highest state-of-the-art shipbuilding technology.[6]

6.6 Modularisation fits into the highest levels of technology as determined by the First Marine International study. Some shipyards in Australia have actively embraced this technology. Indeed, a number of witnesses believed that Australia has gained a comparative advantage from modularisation and assembly in Australia.[7]

6.7 Keeping infrastructure up-to-date with the latest advances in shipbuilding is costly. ASC noted that it and other Australian shipbuilders have invested heavily in new up-to-date facilities to satisfy the requirements of success. These include 'undercover construction and land level transfer to allow highly efficient outfitting on the hard stand' and access to key warship intellectual property.[8]

6.8 The Government of Western Australia recognised, however, the difficulties companies have in investing in major capital works:

> Provision of these facilities involves high fixed costs which can only be recouped over the long term and which even the largest companies have difficulty absorbing. This constitutes a form of market failure in which investments that would enhance aggregate state and national welfare are not forthcoming because individual firms selling into specific markets (like resources projects or repair/maintenance of naval ships) cannot obtain

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5 *Submission 17*, pp. 14–15.

6 For example Level 4 refers to shipyards that have continued to advance their technology during the 1980s and 1990s. Generally a single dock, with good environmental protection, short cycle times, high productivity, extensive early outfitting and integration of steel and outfit; together with fully developed CAD/CAM and operating systems. Level 4 is better than industry averages but not up to leading standards.

Level 5 represents state-of-the-art shipbuilding technology. It is developed from level 4 by means of automation and robotics in areas where they can be used effectively, and by integration of the operating systems, for example, by the effective use of CAD/CAM/CIM. There would be a modular production philosophy in design and production. The level is also characterized by efficient, computer-aided material control and by fully effective quality assurance. In summary, state-of-the-art use of technology and industry-leading business processes, facilities, systems, management and workforce.

7 See for example, Chamber of Commerce and Industry, Western Australia, *Committee Hansard*, 3 April 2006, p. 30.

8 *Submission 17*, pp. 14–15.

> sufficient individual benefit to warrant making the investment by themselves.[9]

6.9 The South Australian government also noted that a major challenge for the industry concerns investment in sustainable, modern, competitive infrastructure.[10]

6.10 Over and above the investment by Australian shipbuilders in their own infrastructure, governments have played a significant role in developing necessary facilities to support large construction projects. Thiess Pty Ltd remarked on the recent practice involving state investment in infrastructure which is then rented to the shipyards 'at prices which could vary depending on the willingness of the respective government to help the industry set up in their State'. It elaborated on the advantages that accrue to industry from this type of assistance:

> The main attraction is that they are leased for the duration of the project and therefore do not need to be fully amortized on the project. Because they remain the property of the State, if they are sufficiently generic, they can be reused by other industries such as the resource industry.[11]

6.11 A notable development based on this model of state involvement is the construction of a Common User Facility (CUF) to attract shipbuilding and other manufacturing industries. It is a new concept embraced by sectors of the Australian shipbuilding industry and supported by a number of state governments.

6.12 The CUF is designed to form part of a broader industrial complex. Its use is not limited to shipbuilding. A number of witnesses underlined the advantages of having a CUF which can be used by different companies from a number of industries, particularly the resources sector. The Australian Shipbuilders Association Ltd noted:

> Broadly, State Governments provide a site with state of the art infrastructure; wharfage and ship lift capacity on a lease basis. The availability of such infrastructure allows shipbuilders/repairers to undertake major projects without the barrier to entry of capital infrastructure costs, which might otherwise be incurred. The site can be leased for the duration of the project, reducing cost. A CUF can and is also used by other industries, in particular the resource industry.[12]

6.13 Mr David Miller, Tenix, regarded the availability of the CUF as one of the great advantages that shipbuilders have in Australia.[13] He stated:

> We do not have first-hand experience in South Australia but, certainly, our Tenix site is immediately adjacent to the common user facility in

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9 *Submission 23*, p. 25.

10 *Submission 9*, p. 35.

11 *Submission 22*, p. 11.

12 *Submission 36*, p. [3]. See also comments by Thiess, *Submission 22*, p. 11.

13 *Committee Hansard*, 27 April 2006, p. 5.

> Henderson. Over the past year we have undertaken a number of naval repairs on Anzac frigates using that facility. We are currently converting the civilian oil tanker *Delos* into an underway replenishment ship for the Australian Navy. It is soon to be the HMAS *Sirius*. The availability of that infrastructure allows us to take on major projects without the barrier to entry that we might otherwise experience if we had to go out and capitalise all of that ourselves.[14]

6.14 There are three CUFs in place or planned in Australia: WA, SA and Queensland. The Australian Shipbuilders Association Ltd stated that they are on a scale 'suitable for the fabrication and fit-out of large ship-section modules'.[15] They are designed to accommodate not only the major shipbuilders in Australia but also regional engineering and fabrication firms with their own labour and resources.[16] It suggested that this wider accessibility 'significantly augments Australia's overall "shipbuilding" capability through access to an extensive, much broader and geographically spread pool of resources with relevant skills'.[17]

Overview of shipyards in Australia

6.15 There are numerous naval shipyards located around the Australian coastline. Some, such as Henderson in Western Australia, are green field sites that have attracted significant investment. Others, however, are well established with a long tradition of naval shipbuilding (see paragraphs 3.2–3.7).

6.16 In 2002, after examining the physical infrastructure of Australian shipyards, the Naval Shipbuilding and Repair Sector Strategic Plan concluded that:

> It is important to note that no Australian shipbuilding facility can currently accommodate the consolidation/final assembly of Navy's major surface ships planned under SEA4000, JP2048/2027 and SEA1654. This assumes the following physical characteristics of these major ships:
>
> - a future Air Warfare Destroyer (AWD) will probably be in the order of 6,000-9,000 tonnes displacement and a length of 130m to 150m; and
> - future Amphibious and Afloat Support ships that will be somewhat larger and considerably wider than the AWD and also of considerably greater laden tonnage.[18]

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14 *Committee Hansard*, 27 April 2006, p. 5.

15 *Submission 36*, p. [7].

16 *Submission 36*, p. [7].

17 *Submission 36*, p. [7].

18 Defence Materiel Organisation, *The Australian Naval shipbuilding and repair sector strategic plan*, August 2002, p. 14. SEA 4000 is the AWD Project, JP2048 is the Amphibious Watercraft replacement, Amphibious Ships, Strategic Lift Ship Capability and Sea 1654 includes the replacement for the *Success*.

6.17 It suggested the following two alternatives if vessels were to be constructed in-country:

- varying degrees of infrastructure investment in an existing facility; or
- the development of a new green-field site.[19]

6.18 Significant developments have taken place since the publication of the strategic plan in 2002 including additional investment in infrastructure at a number of shipyards. It should be noted that the plan was not adopted by the government. Also, in May 2005, the government selected ASC as the preferred tenderer for the AWD project.

6.19 Before continuing a general appraisal of the current and future infrastructure requirements to meet Navy's future acquisition program, the committee considers the infrastructure at Australia's major shipyards.

Infrastructure and the lead naval shipyards in Australia

6.20 There are eight shipbuilding sites of particular relevance to the committee—Henderson in Western Australia, Osborne in South Australia; Williamstown in Victoria; Newcastle (ADI), Newcastle (Forgacs) and Garden Island in New South Wales; and Cairncross and Cairns in Queensland.[20] Some of these shipyards date back to the 19th century; others, however, have developed or are developing to accommodate the newest developments in technology particularly the construction of larger and more sophisticated modules. The following section looks at recent developments in these shipyards and the level of government support for infrastructure development.

The Australian Marine Complex at Henderson in Western Australia

6.21 The Australian Marine Complex (AMC) is at Cockburn Sound, south of Perth. It is situated next to a 'massive technology park', including an industrial estate, where companies can position themselves next to the AMC. The complex is divided into four specialist precincts and takes advantage of the advances in technology and the benefits that derive from catering for diversification in products and markets. It recognises the cost savings to be gained from integrating Australia's naval shipbuilding and ship repair capacity into a broader marine complex that also provides for the needs of the oil and gas sector. According to the Hon. Mr Francis Logan, Minister for Science and Innovation in the Western Australia government, this heavy engineering/marine industry cluster is 'unique in Australia as a matrix for a sustainable

19 Defence Materiel Organisation, *The Australian Naval shipbuilding and repair sector strategic plan*, August 2002, p. 14.

20 The Allen Consulting Group, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, p. 31.

naval shipbuilding capability'.[21] The AMC is not intended for shipbuilding alone but is a facility that can provide for the needs of a wide range of companies and industries.[22]

6.22 The Western Australian government has demonstrated its preparedness to invest in important infrastructure to support industry including naval shipbuilding. It informed the committee that it and the Commonwealth government initially invested a total of $180 million ($100 million from the State government and $80 million from the Commonwealth) in the Australian Marine Complex Common User Facility (CUF). This initial investment, which was completed in mid-2003, is owned by the State government and operated by AMC Management (WA) Pty Ltd.

Common User Facility (CUF)

6.23 The CUF is a state-of-the-art commercial heavy engineering facility located in the AMC. The facility is substantial and sufficiently large to accommodate a number of projects being carried out concurrently. It is not dedicated to one user or even one industry and will have applications other than for naval shipbuilding.[23] In particular, it is expected to service the oil and gas, resources, marine and defence industries.[24] The CUF comprises:

- a protected deepwater harbour—10 metres water depth;
- a 15,000 tonne service and heavy lift wharf;
- a 3,000 tonne load out wharf;
- a 4,800 square metre mobile assembly hall with a 200 tonne mobile portal crane;
- 39 hectares of paved laydown area; and
- offices, workshops and other amenities.[25]

6.24 It is leased out by the government on the basis of whoever wishes to use it under the following arrangements:

> Parties using the facility provide their own management and workforce and accept normal project accountabilities. They use only the facilities as and when their projects so require: for example, a company may require the use of the mobile assembly hall and a project office for some months and then use the load out wharf for two weeks. The CUF only charges the company for its use of those specific facilities for that particular period. This

21 *Submission 23*, covering letter from the Minister for Science and Innovation, The Hon. Mr Francis Logan MLA.

22 *Committee Hansard*, 3 April 2006, p. 82. See also p. 91.

23 *Submission 23*, p. 26.

24 *Submission 23*, p. 26.

25 *Submission 23*, pp. 25–26.

> arrangement greatly reduces set up costs for the project and overheads for the company, thereby enhancing their ability to win such contracts.[26]

6.25 The Hon. Mr Francis Logan also referred to the incentive that this large modern facility offers to Australian industry:

> Not one of those companies could afford that type of facility themselves… and they would not want to hold onto it because of the ongoing costs of running those types of facilities. But they can get access to it at any point in time, and that is the paradigm shift—and it is in keeping with the way in which the rest of the corporate world is going.[27]

6.26 Mr Michael Deeks, Chairman, Nautronix Ltd, envisaged that companies like Austal and Tenix would use the floating dock for other commercial ship construction work. He also expected other, non-naval businesses, such as heavy fabrication, to use it and noted that 'One company in particular wants to use the floating dock basically for testing purposes—to submerse fixtures that go on seabeds for the oil and gas industry'.[28] Clearly, the infrastructure will be used for purposes other than just naval ship construction.

The committee visited the Common User Facility (CUF) at Henderson south of Perth.

26 *Submission 23*, p. 26 and *Committee Hansard*, 3 April 2006, p. 93.

27 *Committee Hansard*, 3 April 2006, p. 93.

28 *Committee Hansard*, 3 April 2006, p. 44.

Recent developments at the AMC

6.27 Over the last three years, the AMC has attracted greater business. In December 2003, ASC was awarded the $3.5 billion 25 year contract for the repair and maintenance of the Collins class submarines. The Federal government and State government, in conjunction with the West Australian marine industry have established the home port of the submarines in Western Australia.[29] Other developments have encouraged further investment. These include Tenix Western Australia securing a $60 million contract to convert the Korean oil tanker *Delos* as a replacement for HMAS *Westralia* and the ANZAC Alliance needing berthing in order to undertake ship upgrades worth $500 million.

6.28 The Western Australian government responded to this growing demand by committing a further $81.1 million toward additional infrastructure at the CUF including:

- a floating dock to launch and dock large ships and a rail transfer system to allow construction and repair within the CUF's undercover facilities;
- an extension and upgrade of the existing wharves to accommodate all types of naval and commercial vessels; and
- the installation of marine services such as power, seawater fire main, wharf communications and sewerage off-take.[30]

6.29 According to the Western Australian Chamber of Commerce, the current upgrade means that the CUF:

> …could have five ships tied up at dock at the same time and they could have two platforms being built, two amphibious ships and a submarine being refitted—and this is just in the common-use facility. At the same time, you have not even called on Austal's or Tenix's premises. This is a very significant development that has occurred down there and you could have a lot of work in there. At the moment, there is a little bit of work in there compared to how much work you could put in there.[31]

6.30 The Australian Manufacturing Workers' Union (Western Australia Branch) singled out this massive and expanding manufacturing precinct at Henderson to demonstrate the extent of government commitment to developing infrastructure and the benefits flowing from it:

> The AMC accounts for approximately 55% of national shipbuilding production, and has produced vessels in excess of $2 billion dollars in the last decade. 25% of the world's demand for high-speed ferries is met by

29 *Submission 16*, pp. 1–2.

30 *Submission 23*, p. 26.

31 *Committee Hansard*, 3 April 2006, p. 26.

> businesses at the AMC. The AMC is an internationally competitive manufacturing precinct with a proven record of large-project shipbuilding.[32]

6.31 The Government of Western Australia expected that other long term stakeholders such as the Australian Navy and the ANZAC Alliance would also make contributions to the operation and upgrade of the CUF commensurate with their respective usage of the facility.[33] Indeed, ASC intends to:

- build its own new purpose built submarine support facilities (worth an estimated $20 million) in the Australian Marine Complex, adjacent to the CUF; and
- contribute a further $5 million in capital towards the common user transfer system connecting the floating dock to the ASC submarine support facility.[34]

6.32 To April 2006, the CUF had achieved a million man-hours and $100 million worth of work.[35] The Western Australian government believes that the success of the CUF to date demonstrates its existing capability to undertake naval maintenance work and establishes its claim for consideration for future naval shipbuilding.[36]

Additional investment

6.33 The Australian Manufacturing Workers' Union (Western Australia Branch) noted the planned upgrade of AMC including the floating dock and rail transfer system and was of the view that:

> Unlike other Australian locations, the AMC would not need significant additional infrastructure to cope with a major RAN shipbuilding contract. Such a project would, for the most part, merely require an expansion of current capacity rather than the construction of new facilities. [37]

6.34 Even so, the Government of Western Australia is considering further developments, over and above the current commitment.[38] It has stated that it would invest further should the site be included in the construction of the LHDs. According to the Hon. Mr Francis Logan, his government is 'prepared to build the second half of

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32 *Submission 16,* p. 1.

33 *Submission 23,* p. 27.

34 *Submission 23,* p. 27.

35 The Hon Francis Logan, Minister for Energy, Science and Innovation, Government of Western Australia, *Committee Hansard*, 3 April 2006, p. 82.

36 The Hon Francis Logan, Minister for Energy, Science and Innovation, Government of Western Australia, *Committee Hansard*, 3 April 2006, p. 82.

37 *Submission 16,* p. 2.

38 *Submission* 23, p. 27.

the floating dock should the AMC be selected as the site for integration and consolidation of the amphibious support ships'.[39]

6.35 Although naval shipbuilding is a highly specialised industry there are strong parallels with the infrastructure needs of the oil and gas sector and more generally the resources sector. The developments taking place in Western Australia demonstrate the growing synergy in technologies that is occurring and allowing other industries to use the same facilities. The Western Australia Chamber of Commerce and Industry observed that the risk profile for an oil and gas platform or an LPG plant is similar to the defence industry which encourages the technologies used in these sectors to merge.[40] It saw a unique opportunity for both industries to take advantage of the growing complementarity between the two sectors.[41]

Osborne in South Australia

6.36 In 2002, the Australian Naval Shipbuilding and Repair Sector Strategic Plan reported on the infrastructure at Osborne in South Australia. It recorded that the 20 acre site had a shiplift (5048 dwt capacity, 80m x 20m), side transfer rails, manufacturing halls, adjacent hull and outfitting workshops, various workshops and alongside berthing of 160 metres. The strategic plan found that the site had the capacity to be developed to cater for a considerably greater level of demand, including consolidation and upgrade of vessels proposed under SEA 4000, JP2048/JP2027 and SEA 1654.[42]

6.37 At the same time, a report from the Australian Strategic Policy Institute (ASPI) noted that significant facility development was required at the site for participation in major surface ship module construction or ship assembly.[43]

6.38 Since 2002, the South Australian government has actively promoted the naval shipbuilding industry in that state by committing to develop further the site at Osborne. It has developed a plan that builds on the presence of ASC at Port Adelaide to 'provide the critical mass of naval shipbuilding infrastructure and a skilled work force that can deliver the next generation'. It informed the committee that planning is well advanced to 'transform industrial land at Port Adelaide into a modern

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39 *Submission 23,* covering letter from the Minister for Science and Innovation, Mr Francis Logan MLA.

40 *Committee Hansard*, 3 April 2006, p. 27.

41 *Committee Hansard*, 3 April 2006, p. 22.

42 *The Australian Naval Shipbuilding and Repair Sector Strategic Plan,* August 2002, p. C–3.

SEA 4000 is the AWD Project, JP2048 is the Amphibious Watercraft replacement and Sea 1654 includes the replacement for the *Success*.

43 Australian Strategic Policy Institute, *Setting a Course for Australia's Naval Shipbuilding and Repair Industry,* An ASPI Policy Report, August 2002, p. 15.

internationally competitive shipbuilding site that can become the future hub of naval warship construction in Australia'.[44] The Allen Consulting Group noted that:

> …the ASC at Osborne has a capability in conventional submarine construction and support that is probably unrivalled outside Europe.[45]

6.39 The facility at Osborne has been designed around common user facilities to enable any shipbuilder to come onto the site to use the infrastructure.[46] The centrepiece of the infrastructure aspect of the plan comprises a 10 000 ton ship lift, wharf and transfer system representing a current budget of approximately $130 million.[47]

6.40 The configuration of the complex enables a builder from the back block, where the infrastructure will be developed, to gain access to the water through the ship lift.[48] Thirty hectares of land has been set aside where the government hopes to see a 'fully integrated submarine and shipbuilding supplier and subcontractor precinct'.[49] Adjacent to the shipbuilding infrastructure, the government intends to make available more than 100 hectares at Port Adelaide as a 'high technology defence industrial hub'.[50]

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44 *Committee Hansard*, 19 April 2006, p. 22.

45 The Allen Consulting Group, Future of Naval Shipbuilding in Australia: Choices and Strategies, May 2005, p. v.

46 Rear Admiral (retired) Scarce, *Committee Hansard*, 19 April 2006, p. 34.

47 *Submission 9*, p. 32 and Admiral (retired) Scarce, *Committee Hansard*, 19 April 2006, p. 34. According to Thiess 'SA is tendering to build a CUF to be used by ASC for the AWD project. $120m will be spent on a new ship lift and transfer system as well as in dredging and new wharves'. *Submission 22*, p. 11

48 Rear Admiral (retired) Scarce, *Committee Hansard*, 19 April 2006, p. 34.

49 Rear Admiral (retired) Scarce, *Committee Hansard*, 19 April 2006, p. 30.

50 *Submission 9*, p. 32.

This is an impression of ASC's site at Osborne when current developments are completed. The Collins-class submarines were constructed at the facility to the centre-right of picture, while some of the AWD modules will be constructed in the new facilities to the left of picture. The committee thanks ASC for their permission to reproduce this picture.

6.41 Mr Andrew Fletcher, CEO, Port Adelaide Maritime Corporation, noted progress in achieving the state government's objective to develop a long-term sustainable defence base at Osborne:

> There are the common user facilities…There is the suppliers precinct at the rear. That was initially 30 hectares; we now control 500 hectares of land on the peninsula and in the adjacent area for future development. There is also the development of the air warfare destroyer system centre and the skills centre in a hub that we are building.[51]

6.42 The base itself is in the heart of South Australia's busiest international port. It is 18 kilometres from the central business district and 16 kilometres from the international airport. According to Mr Fletcher:

> …on completion of the road and rail bridges across the Port River, which are anticipated by the end of next year, it will be connected directly by rail and road to the rest of Australia. So it is a unique piece of real estate that is attractive not just to the defence industry and the SMEs supporting the defence industry but to industry as a whole in South Australia…[52]

6.43 While the AWDs are to be assembled at Osbourne, 70 per cent of the module construction is expected to be outsourced. It should be noted that Defence informed the committee that the Commonwealth is not funding the development of any infrastructure for this project. It stated that the government of South Australia is funding the development of a Common User Facility (approximately $115 million) while ASC is funding about $69 million of infrastructure development. Defence

51 *Committee Hansard*, 19 April 2006, p. 30.

52 *Committee Hansard*, 19 April 2006, p. 31.

informed the committee that the Commonwealth is to reimburse ASC 'for the depreciation costs of the new infrastructure, which was taken into consideration in the comparative and value for money evaluation of ASC's offer against other tenders'.[53]

Older shipyards

6.44 Up to this stage, the committee has focused on the newer shipyards. Australia also has shipyards that have a long history of shipbuilding. Williamstown, Garden Island and Cockatoo Island were designed in the 1880s to look after old seafarers. According to Mr Peter Croser, Gibbs & Cox Australia Pty Ltd, the cost of changing their infrastructure would be reflected in the cost of the program. He does not argue that such sites do not have the capability but that it depends on where they are in their infrastructure development. He stated:

> What I would say is that once the infrastructure on a greenfield site is in place it obviously will be to a higher standard and more tailored to currently and to the future than the existing ones, and therefore will be a standout in that regard. But, with investment, you can improve old infrastructure to meet demand.[54]

6.45 Even so, he queried whether the older sites have sufficient space.[55]

Williamstown in Victoria

6.46 The Victorian government noted that its state holds most of the residual value of the considerable investment made in naval shipbuilding in Australia over recent decades. It made the point that Williamstown has benefited from over 100 years of public investment in its infrastructure.[56] Indeed, the Allen Consulting Group noted:

> Tenix's shipyard at Williamstown has a record in significant surface warship construction that would be envied by many competitors around the world.[57]

6.47 Williamstown is situated on the western shore of Port Phillip Bay and dates back to 1865. Tenix owns the site, which they bought in 1987 from the Commonwealth 'as a going concern to build ships'.[58] It has 2 x 6000dwt building berths (150m length x 36.5m total width), travelling cranes: 3 x 59t, 3 x 10t, graving

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53 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), pp. 29–30.

54 *Committee Hansard*, 19 April 2006, p. 43.

55 *Committee Hansard*, 19 April 2006, p. 43.

56 *Committee Hansard*, 18 August 2006, p. 20.

57 The Allen Consulting Group, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, p. v.

58 The Allen Consulting Group, *Building the Air Warfare Destroyers: How does Williamstown rate?*, report to the Government of Victoria, February 2005, p. 28.

dock (limited to 145m x 29.6m; gate 23.3m), cranage of 250t capacity, transporters with capacity 400t, halls for module construction, assembly, blast and paint and outfit, and wharfage in excess of 600m with 300m fully serviced.[59] Mr David Miller, Executive General Manager, Tenix Defence Pty Ltd, believed that, despite its age, Williamstown is a very modern, very clean and very advanced shipyard. He explained that, in the mid-1990s, the shipyard had four and five ships under consolidation simultaneously. He noted further that 'in terms of modularity and how it fits into our infrastructure, modularity allows us, more than anything, to simply…spread the work around so that we can have the higher, more complex, work of the system and physical integration of the ship ongoing'.[60]

Investment in infrastructure

6.48 The 2002 strategic plan noted that the infrastructure at Williamstown had been developed to enable consolidation of the ANZAC frigates. It observed that some aspects of the infrastructure could be modified 'relatively easily', whereas others would require 'considerable investment or are effectively permanent'.[61] The plan reflected advice it had received that 'for future construction of large major surface combatants such as proposed under SEA 4000, the site would need significant redevelopment'. It stated further 'Considerable investment, possibly including a floating dock to supplement land docking, might also be necessary should concurrent build and/or upgrade activities be planned'.[62] At this time, ASPI concurred that the site could be used to construct large ship modules but that major infrastructure changes would be necessary for the consolidation of large ships.[63] A study, conducted by the Allen Consulting Group in 2005, before the AWD project was awarded to ASC, found:

> While much of the existing shipyard would not require refurbishing in order to accommodate the AWDs, some facilities would need to be upgraded or replaced. For example, the present slipways and docks are too small, and in any case there is now a view that slipway launches are undesirable for substantial vessels because of the strain they supposedly exert on the hull. [64]

59 *Naval Shipbuilding and Repair Sector Plan,* August 2002, p. C–1.

60 *Committee Hansard,* 27 April 2006, p. 4.

61 *Naval Shipbuilding and Repair Sector Plan,* August 2002, p. C–1.

62 Defence Materiel Organisation, *Australian Naval Shipbuilding and Repair Sector Strategic Plan,* August 2002, p. C–1.

63 ASPI, *Setting a course for Australia's Naval Shipbuilding and Repair Industry,* An ASPI Report, August 2002, p. 15.

64 The Allen Consulting Group, *Building the Air Warfare Destroyers: How does Williamstown rate?,* report to the Government of Victoria, February 2005, p. 29.

The Tenix Williamstown 64 tonne slipway crane

6.49 The report indicated that the capital cost of the work would be approximately $80 million and would include: a floating dock for launch; cranes, including a heavy lift mobile crane; a construction hall; a steel fabrication shop; panel manufacturing facilities, including a robot cutting machine; pier demolition; and dredging.[65] The

65 The Allen Consulting Group, *Building the Air Warfare Destroyers: How does Williamstown rate?*, report to the Government of Victoria, February 2005, p. 29.

report noted that the Victorian government had offered a support package for the AWD project that would have provided 'funding for a share of this upgrade cost'.[66]

6.50 According to Mr Miller, Tenix commissioned a benchmarking study of its performance as a shipbuilder against companies through Asia, Europe and the U.S. According to Tenix, the study indicated that Tenix is 'above the midpoint of where many of the best yards in the worlds are in'. Although the study showed the company's strength in planning systems and organising work, it had specific suggestions to improve its modular assembly. Mr Miller stated:

> An area where it was suggested we should go back and begin to put in plans for improvement was the layout of our yard. So we would look at ways to have a better flow of material coming through in the way that modules are constructed, so that we do more work in the module phase before we begin the large assembly of a hull. A lot of that just gets into time use management to ensure that you get as much into that module as you can and that you get it as densely packed as you can before you begin moving that on and assembling it as part of the hull. Simply, it takes more labour once you get it as part of the hull—then the workers have to begin crawling down into more confined spaces and so forth.[67]

Investment for the construction of very large ships

6.51 Looking to the immediate future, the committee asked whether additional significant investment would be required in Williamstown to make those yards competitive for the modular assembly of both the AWDs and the LHDs. Mr Miller informed the committee that a substantial upgrade would be needed if Tenix were to take on the construction of a very large vessel such as an LHD at Williamstown. The company, however, has other options that would accommodate such a project, such as using its Western Australian site which is immediately adjacent to the common user facility in Henderson. According to Mr Miller, the common user facility in Western Australia is now part of Tenix's business plan: that when bidding for major jobs it tends to do so through the CUF.[68] He noted:

> Over the past year we have undertaken a number of naval repairs on Anzac frigates using that facility. We are currently converting the civilian oil tanker *Delos* into an underway replenishment ship for the Australian Navy. It is soon to be the HMAS *Sirius*. The availability of that infrastructure allows us to take on major projects without the barrier to entry that we might otherwise experience if we had to go out and capitalise all of that ourselves.[69]

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66 The Allen Consulting Group, *Building the Air Warfare Destroyers: How does Williamstown rate?*, report to the Government of Victoria, February 2005, p. 29.

67 *Committee Hansard*, 27 April 2006, p. 7.

68 *Committee Hansard*, 27 April 2006, p. 5.

69 *Committee Hansard*, 27 April 2006, p. 5.

6.52 It should be noted, however, that Mr Miller did not want to imply that because Tenix consolidates in one place, work cannot be done in other areas such as Williamstown.[70]

Garden Island in New South Wales

6.53 The New South Wales government noted that there are two existing facilities with the capacity 'to host work on large naval vessels'—Captain Cook Dry Dock in Garden Island and the Cairncross shipyard in Brisbane.[71] Mr Warwick Glenn, New South Wales Department of State and Regional Development, told the committee that the Captain Cook Dry Dock is 'ideally positioned at the fleet base—near naval personnel, accessible to Canberra and close to Defence ICT systems hub of North Ryde, which offers support for electronics components of modern ships'.[72]

6.54 Although in Commonwealth hands, the Garden Island Dockyard in Sydney is operated under lease by ADI Ltd (now Thales, see paragraph 4.48).[73] The yard is used mainly for repair and maintenance of major surface ships and upgrade of the FFGs.[74] The site has a dry dock 100 000 dwt capacity, 345 metre x 41.6 metre and a floating dock 800 dwt capacity, 63 metre x 12.9 metre. According to the 2002 Australian naval shipbuilding strategic plan, the dry dock is the largest in the Southern Hemisphere and capable of servicing very large ships of foreign navies. It was of the view that the site 'as a whole would require significant investment to convert to consolidation of vessels planned under SEA4000, JP2048/2027 or SEA1654'.[75]

6.55 The 2002 ASPI report was of the view that, although its key capabilities relate to the repair sector, it could be used for the construction of large ship modules. It noted, however, that while the Captain Cook Dry Dock could be used to assemble modules, this activity would disrupt its repair and maintenance dockings.[76]

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70 *Committee Hansard*, 27 April 2006, p. 5.

71 *Committee Hansard*, 28 June 2006, p. 66.

72 *Committee Hansard*, 28 June 2006, p. 66.

73 *The Australian Naval Shipbuilding Repair Sector Strategic Plan*, August 2002, p. 13.

74 *The Australian Naval Shipbuilding Repair Sector Strategic Plan*, August 2002, p. 13.

75 *The Australian Naval Shipbuilding and Repair Sector Strategic Plan*, August 2002, p. C–4.

76 ASPI, *Setting a course for Australia's Naval Shipbuilding and Repair Industry*, An ASPI Report, August 2002, p. 15.

The Captain Cook Dry Dock at Garden Island

Investment for the construction of large naval vessels

6.56 Mr Smith, ADI, advised the committee about the existing facilities on the eastern sea board which have been in place for many years. In his view they are 'fully capable right now of commencing this LHD program with only very small infrastructure investment—and I mean really small'.[77] He explained:

> The history of Garden Island as a facility before ADI was a privatised company is that it was a heavy engineering facility where anything was possible. You could do any work there. That has changed for obvious reasons. There are environmental pressures on the site. Having said that, however, what we can do are essentially…major cutting, major refabrication within the ship, putting in new capabilities and so forth. As I said before, if there is some aspect of that work that is noisier, dirtier or whatever than what is possible under our licence regime then we get that done somewhere else and bring the finished product into the facility where we then install it in the ship.[78]

77 *Committee Hansard*, 28 June 2006, pp. 13 and 14.

78 *Committee Hansard*, 28 June 2006, p. 10.

6.57 He noted that ADI have partners in the bid for the LHDs including Forgacs, an engineering company based in Newcastle that has facilities in Newcastle and Brisbane.[79] He indicated that between ADI; Forgacs; the French designer-shipbuilder partner, Amaris; and other strategic subcontractors, ADI does not envisage any constraints in undertaking the LHD program.[80]

The Cairncross Dry Dock in Queensland

6.58 The Queensland government also believed that Australia has the existing infrastructure needed to sustain a viable naval shipbuilding industry. It identified two sites in Queensland that could provide the necessary infrastructure for the proposed LHDs.

6.59 The Cairncross Dry-dock Facility is situated in a mixed industrial-residential area on the Brisbane River and has access to the local workforce, existing steel fabrication sites and transportation nodes. In 2002, the Naval Shipbuilding and Repair Sector Strategic Plan noted that the site covered 16 hectares and had a graving dock (85 000 dwt capacity, 263 metre x 33.5 metre), a fitting out wharf of 307 metre and travelling cranes: 4 x 5 tonnes, 1 x 50 tonnes, 1 x 30 tonnes. The 2002 Strategic Plan commented on the capacity for infrastructure expansion on this 'relatively spacious' site. It was of the view that 'some investment would be needed to adapt it to module fabrication, but full vessel assembly was not considered 'practical'.[81]

Investment for the construction of large naval vessels

6.60 According to the Government of Queensland, the site is amongst the largest in the Southern Hemisphere and could facilitate the assembly of either of the LHD designs. It is considering developing a CUF, particularly in support of building modules to be consolidated in the Cairncross Dock in Brisbane and is working on the plan for the development of a common user facility with leaseholder Viking Industries.[82] The development would provide the necessary facilities for the complete assembly of large ship modules up to 500 tonnes which could then be transported six kilometres to the Cairncross Dry Dock or another shipyard in Australia.

6.61 Cairncross is highly suited to the assembly of super-blocks, such as the forward or aft section of a large vessel and the site requires minimal upgrade to support the project 'given the symbiotic relationship between the dry dock and the fabrication facility (Common User Facility) immediately down river'. The Queensland government noted that the site would be suitable for the fabrication of modules for the

79 *Committee Hansard*, 28 June 2006, pp. 9–10.

80 *Committee Hansard*, 28 June 2006, p. 10.

81 *Australian Naval Shipbuilding and Repair Sector Strategic Plan*, August 2002, p. C–8.

82 *Submission 22*, p. 11

AWD that would then be transported to South Australia.[83] Additional requirements, however, would be needed to cater fully for the consolidation of the LHDs at this site.

6.62 Brisbane Slipways wrote to the committee drawing attention to its facilities and suitability to be part of the naval shipbuilding projects. It noted that it is a 2500 tonne repair facility based in Brisbane on over 30 000 square metres. It listed its existing infrastructure and concluded:

> Brisbane Slipways has existing physical and staff infrastructure to make a serious contribution to Australia's shipbuilding capabilities. We are enthusiastic about the future and look forward to working with Government and other industry players to develop our joint capabilities.[84]

6.63 Having looked at individual shipyards, the committee now considers the state of Australia's shipbuilding infrastructure as a whole. It looks at the efficiencies or inefficiencies created by the pattern of investment in Australian shipyards.

Overall infrastructure development in Australia

6.64 Australian shipyards are not without problems. Rear Admiral (retired) Kevin Scarce from the Port Adelaide Maritime Authority and the South Australian government informed the committee that their analysis of data revealed 'a fragmented industry characterised by an oversupply of dated, uneconomic and competitive infrastructure…'[85] The South Australian government stated that Australian shipbuilding infrastructure has 'evolved on a project-by-project basis rather than in response to a national plan'. It maintained that 'the myriads of facilities that are left are old, underutilised and not cost competitive'. In its view, further infrastructure investment beyond that already planned, can 'only add to the underutilisation of costly assets'.[86] Thiess also gave its assessment of the current state of infrastructure in Australia. It found:

> In past naval shipbuilding programs, most infrastructures were built as part of the project. For instance, ASC built up the site in Osborne, SA from a green field. ADI did the same in Newcastle for the Mine Hunter. In most cases, the investment represented around 3% of the total value of the project. The ultimate use of the site after the end of the program was never fully optimized. The Newcastle site was returned to the landlord who is leasing it to a super yacht builder from New Zealand. The site in Williamstown used to build the ANZAC ships is probably underutilised at the present time.[87]

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83 *Submission 29,* pp. 4, 8.

84 *Submission 41*, pp. 1–4.

85 *Committee Hansard*, 19 April 2006, p. 21.

86 *Submission 9,* p. 35.

87 *Submission 22,* p. 11.

6.65 An Allen Consulting Group study, commissioned by Tenix, published before the successful tender for the AWD project was announced touched on the development of new sites while, it noted, the older sites offered a viable option. It stated:

> On the basis of the criterion of minimising capital expenditure on set-up costs, Tenix at Williamstown is a clear winner. If the AWD project went to Osborne (under the auspices of either Tenix or ASC), the investment required would be at least twice that needed at Williamstown, which is a working naval shipyard successfully building major surface combatants. Other things being equal, since the two sites would be equally capable, this does not stand up as an investment, irrespective of whether or not the South Australian government would fund it. It seems unlikely that a private investor such as Holden, for example, would scrap a successful existing facility when it introduced its next model and build a new plant 800km away at double the cost.[88]

6.66 Mr David Miller, Tenix Defence Pty Ltd, drew attention to the legacy of this practice of building up infrastructure to meet the needs of a specific project resulting in the underutilisation of sites. He told the committee:

> My comment would be that there may be value in having more focus on industry policy so that we do not end up with the situation…of having various sites all around the nation that have been developed to a certain level and then left for the grass to grow over. Our site in Williamstown is operating well below capacity, and I suspect that that is the situation at many sites around Australia right now.[89]

6.67 Defence also noted the influence that specific projects have had on the pattern of infrastructure development in Australia:

> ASC was created to meet the needs of the Collins project. Tenix grew from the Anzac ship project, which used Williamstown facilities previously owned by government, and they created a whole new workforce to undertake the build program. ADI created a completely new greenfield workforce for the MHC project.[90]

6.68 Mr Kim Gillis, DMO, noted further that the Osborne facility in South Australia is designed around the AWD program. Mr Warren King, DMO, reinforced the view that the Osborne site is being purposely designed and built to accommodate the AWDs.[91]

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88 The Allen Consulting Group, *Building the Air Warfare Destroyers: How does Williamstown rate*?, Report to the Government of Victoria, February 2005, p. 30.

89 *Committee Hansard*, 27 April 2006, p. 18.

90 *Committee Hansard*, 18 August 2006, p. 29.

91 *Committee Hansard*, 18 August 2006, p. 35.

6.69 Mr Andrew Fletcher, CEO of the Port Adelaide Maritime Corporation, wanted to make clear that the fundamental premise behind South Australia investing in a Common User Facility at Osborne was 'to provide internationally competitive and flexible infrastructure for users'. The additional investment in the CUF is 'to ensure the development of world-class infrastructure that can support multiple users (beyond that required to service the AWD program)'.[92]

6.70 The Government of Victoria surmised that fragmented single project based decisions had given rise to a situation where there was an oversupply in the naval shipbuilding and repair sector at the same time that Australian industry does not have the capability to undertake the AWD and LHD projects concurrently.[93] It observed:

> It is interesting to note that, over the last 20 years, each new major shipbuilding contract awarded by Defence has involved building up new capability at a different shipyard.[94]

6.71 The New South Wales government also referred to what it believed could be a better use of established facilities rather than putting in place a new facility:

> Use of existing facilities rather than the building of new infrastructure for individual projects is clearly a better use of resources for the taxpayer. Creating new infrastructure is likely to result in a national overcapacity and risk the viability of both existing and new dockyards. Equally, purchasing the amphibious ships from overseas creates risk to the survival of infrastructure for Australia's future needs by reducing the critical mass of work available in Australia. An overseas purchase also relocates to other nations rather than captures for Australia positive impacts such as technology and skills enhancement.[95]

6.72 To a degree, major engineering centres such as the AMC, which are intended to service more than one industry, are looking to address the problem of underutilisation. They are designed to make more and effective use of major infrastructure. Difficulties arise however, if the demands of the respective sectors run out of kilter and the demand for the facilities peak simultaneously, placing heavy demands on the facilities, which may drive prices up.[96]

6.73 Clearly, while individual shipyards and state governments develop their infrastructure to cater for a specific project, there is the potential for inefficiencies and underutilisation of infrastructure. The Commonwealth government, as the major buyer of naval ships in Australia and the custodian of taxpayer money, together with state governments have an important role in ensuring that the pattern of infrastructure

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92 Andrew Fletcher to Senator Steve Hutchins, 1 September 2006.

93 *Committee Hansard*, 18 August 2006, p. 16.

94 *Committee Hansard*, 18 August 2006, p. 16.

95 *Committee Hansard*, 28 June 2006, p. 66.

96 Mr Gregory Tunny, CEO, ASC Pty Ltd, *Committee Hansard*, 19 April 2006, p. 9.

development benefits the industry as a whole and not just particular sites. This is especially important considering the two major naval ship projects that are underway. The role of the Australian government in planning and shaping Australia's shipbuilding is discussed in Part IV.

Infrastructure needs for the AWDs and LHDs

6.74 Each of the shipyards discussed in this chapter would require further investment in infrastructure if it were to meet the requirements for the construction of the AWDs and LHDs. The state governments, ASC, ADI and Tenix were confident that their particular shipyard, with some infrastructure development or use of additional sites, could accommodate the build of large naval vessels such as the LHD. Their public optimism is understandable. The amount of investment needed to bring Australian shipyards up to standard, however, is unclear and their capacity to meet the demand created by an LHD build is uncertain. For example, in assessing the overall capability for Australian industry to meet Defence's demands with regard to the AWD program, the Allen Consulting Group suggested in 2005 that:

> No existing shipyard would be able to accommodate their [AWDs] construction without modification. Of the three competing tenders, only Tenix at Williamstown offers an existing shipyard that, with a significant outlay but one that is relatively modest in terms of the overall value of the contract, would be capable of accommodating the AWD project.[97]

6.75 On the other hand, Mr Warren King, Program Manager, AWD, said with regard to the AWD project:

> For the air warfare destroyer, both sites that came under serious consideration—that is, Tenix at Williamstown and the Osborne site—required very similar levels of investment in facilities to make them AWD ready, which is probably not understood by all. There was no facility that was ready and waiting to be used and then was not used. Of course, if there were such a place, that might have made that particular proposal more attractive. The fact is that both sites needed an investment, and it was not an entirely dissimilar level of investment—and in both cases, of course, it was the state governments which made the investment behind the companies. So I do not think we actually had a site that was AWD ready and we ignored it. That was not the case.[98]

In summary, he advised the committee:

> My team's bottom line was that they found significant capability around Australia to do the AWD modules in a variety of formats—not just in the shipbuilding industry, interestingly enough.[99]

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97 The Allen Consulting Group, *Building the Air Warfare Destroyers: How does Williamstown rate?*, Report to the Government of Victoria, February 2005, p. 27.

98 *Committee Hansard*, 18 August 2006, p. 37.

99 *Committee Hansard*, 18 August 2006, p. 49.

6.76 He noted, however, that their underpinning concern at the moment was 'capacity'.[100] The committee asked Defence to explain the distinction between industry 'capability' and 'capacity'. Defence uses capability to refer to industry's 'shipbuilding related skills and the necessary infrastructure to construct the AWD modules'. On the other hand, Defence understood 'capacity' to mean 'the measure of the available labour to carry out the work'.[101] It explained further:

> At a number of locations Australian industry has the experience and facilities required to build AWD modules (capability). The capacity of Australian industry to build the AWD modules depends upon the availability of skilled people during the desired build period.[102]
>
> Along with meeting the demands of broader Australian industry, the potential impact of building LHD's concurrently with AWDs will need to be evaluated.[103]

6.77 Chapter 7 examines workforce issues in terms of Australia's capacity to meet the demand for the construction of large naval vessels in Australia. The following section looks in greater detail at the capability of Australian shipyards to construct the LHD given that the AWDs are to be built in Australia.

Capacity to meet the challenges of an AWD and LHD program

6.78 Although most witnesses agreed that Australia does have, or could develop if required, the infrastructure needed to undertake the construction of large naval vessels, the project to build LHDs would require additional infrastructure. Estimates differed, however, on the amount of infrastructure investment needed to accommodate the LHDs. Thiess concluded:

> In addition to existing facilities in existing yards and at fabrication shops across Australia, it is now clear that very limited further investment will be necessary to build the new AWD and Amphibious ships (LHD). That should improve the competitiveness of the build by the 3% or 4% that previously was invested in infrastructure during earlier programs and that is not necessary for foreign yards if the ships are built overseas.[104]

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100 *Committee Hansard*, 18 August 2006, p. 49.

101 Department of Defence, answer to question on notice, 18 August 2006 (received 30 October 2006), p. [10].

102 Department of Defence, answer to question on notice, 18 August 2006 (received 30 October 2006), p. [10].

103 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), p. [10]. Defence noted that being mindful of competing Australian projects that also require substantial metal fabrication labour, the AWD Program, in conjunction with industry partners ASC and Raytheon, is currently undertaking a series of industry engagements to better understand Australian industry's capacity and commitment to undertake the task of building the AWD modules. Initial indications appear positive, but will need to be confirmed in due course.

104 *Submission 22*, p. 11.

6.79 Aerospace, Industrial and Marine Technology (AIMTEL) Pty Ltd had some reservations about the capacity of Australian shipyards to build the LHDs. It was of the view that Australia has limited capacity to construct ships in excess of 100 metres from existing facilities.[105] It stated:

> Australian industry is substantially behind the leading 'Large' shipbuilding yards in Japan and Korea which benefit from massive investment in automated process for construction of 'large' steel ships. However, Australia still leads the productivity race in respect of Aluminium construction.[106]

6.80 Even so, it concluded that large ships could reasonably be constructed from improved facilities at Brisbane, Sydney, Melbourne, Adelaide or Perth/Fremantle.[107]

6.81 Austal, however, was certain that Australia does not have the infrastructure and production personnel on a scale that would enable the construction of very large naval (or commercial) steel vessels, which are greater than 10 000 tonnes. It noted that traditional steel shipyards have a lot of automated equipment—'a lot of large panel lines; equipment is welded, coated and so forth'. It stated that 'Were this capacity to be developed for a specific naval program then its long-term sustainability would, in the absence of significant ongoing Australian government support, rely on the ability of industry to secure additional contracts for very large, steel vessels'.[108] Mr Rothwell, Executive Chairman, Austal, had no doubt that large ships could be built in Australia but added:

> I have often said that, if you need a hole in the ground, you can use a pick and shovel or you can use an excavator—and I do not think we have an excavator, if I can use that as an analogy, in Australia; it is not here. Moving on from that, it could be set up in Australia, but the question is: would that be sustainable or, at least, would there be a workload for it?[109]

6.82 It should be noted that the Western Australian and South Australian governments have clearly indicated their preparedness to invest in the lead shipyards in their respective states as a positive indication of their confidence in their industrial infrastructure to meet the demands of building a large naval vessel. The Western Australian government concedes that the investment to date, including the new floating dock, is not large enough to accommodate amphibious support ships which could weigh some 27 000 tonnes. As noted earlier, it has put on the public record its plan to provide the needed infrastructure should it be required. It stated:

> The…CUF floating dock is being designed so that it can be extended to accommodate the amphibious support ships, if the Commonwealth chooses

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105 *Submission 15*, p. 1.

106 *Submission 15*, p. 1.

107 *Submission 15*, p. 1.

108 *Submission 7*, p. 3.

109 *Committee Hansard*, 3 April 2006, p. 65.

> to build the amphibious support ships in Australia and if the shipbuilder selected for the job chooses to build or assemble them at the CUF. The estimated cost of any such extension of the CUF floating dock is $50 million, equivalent to about 2.5 per cent of the estimated cost of constructing the two amphibious support ships.[110]

It has made clear, however, that if the amphibious ships do not come to Western Australia, the government would not invest in this second stage.[111]

6.83 Mr Kim Gillis, Deputy CEO of the DMO, referred to the plans for further investment in Western Australia. He noted a recent study undertaken by Appledore that assessed all the independent and individual sites in the country and their ability to build the LHDs and any upgrades or specifics.[112] It noted the Western Australian government's two-stage plan to upgrade its facilities at the AMC and the intention in the second stage to investment in a second phase lift so that an LHD could be lifted out of the water.[113]

6.84 With regard to the other major sites, Mr Gillis told the committee that:

> The Osborne facility in South Australia, from what I have seen of the plans, is designed very much around the air warfare destroyer program; it does not have the facility to lift an LHD. The original plans were that, before ASC withdrew from the LHD program, they could have expanded into that facility but, at this stage, the plans indicate that they cannot lift an LHD. The Williamstown facility does not have the facilities to lift an LHD out of the water. Garden Island in Sydney and Cairncross in Brisbane have the facilities to dock a vessel of that size.[114]

6.85 According to Mr Gillis, the Appledore report looked not only at those particular facilities but also a whole range of other areas, including blast, the capacity to move large modules and infrastructure issues.[115]

6.86 In response to a direct question about whether suitable and capable infrastructure and plant existed in Australia to accommodate the AWD and LHD projects, Mr Gillis said with regard to the LHD:

> The limiting factors are not necessarily the lifting facilities; a whole range of other infrastructure issues are affecting the ability of any company to build in Australia. The amount of steel that we would need to process would require significant investment in infrastructure in respect of blasting, painting and the ability to move these large modules. Yes, there is a lot of

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110 *Submission 23*, p. 27.

111 *Committee Hansard*, 3 April 2006, p. 84.

112 *Committee Hansard*, 18 August 2006, p. 35.

113 *Committee Hansard*, 18 August 2006, p. 35.

114 *Committee Hansard*, 18 August 2006, p. 35.

115 *Committee Hansard*, 18 August 2006, p. 35.

> work. We have had estimates from all four original tenderers in the risk reduction and design study phase, which was a funded study that DMO undertook with Austal, ASC, Tenix and ADI. The outcome of that was that a significant investment was required in-country. The dollar figures varied from somewhere between $100 million to $300 million worth of investment just in infrastructure in-country to build the LHDs in-country.[116]

6.87 He indicated that the tenderers have been negotiating with state governments about state government investment.[117]

6.88 There can be no doubt that if the LHDs are to be built in Australia, infrastructure development would have to take place to supplement existing facilities which could amount to between $100 and $300 million.

Through-life costs

6.89 The investment in infrastructure, however, does have long-term benefits for the costs in maintaining and upgrading the vessels. Many noted that by constructing vessels in Australia the economic costs of maintaining, repairing and refitting large naval vessels throughout their useful lives is reduced.[118] The savings generated by having the infrastructure available for the maintenance of the Navy's fleet is a major consideration.

Infrastructure outside the shipyard

6.90 It is clear that the importance of adequate infrastructure extends beyond the shipyard. The shift in production to modularisation creates demands for improved infrastructure not only in the shipyards but, as noted above, in areas such as steel fabrication. Modern ship construction also requires the effective and efficient transportation of large modules from their place of production to the assembly site.

6.91 The following section looks at the need for improved methods of transporting large modules from their place of construction to the assembly site.

High wide load corridors

6.92 Modular construction techniques allow the bulk of steelwork fabrication and equipment installation to be performed in controlled workshop environments, in a number of locations simultaneously. This modular approach to shipbuilding significantly shortens project schedules and reduces manpower requirements. The use of modular techniques, however, also leads to an increasing need for high wide loads up to and exceeding 200 tonnes in weight to be transported from place of production

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116 *Committee Hansard*, 18 August 2006, p. 36.

117 *Committee Hansard*, 18 August 2006, p. 36.

118 See for example, AMWU *Submission 21,* p. 3.

to final assembly.[119] Thus the move to larger modular construction creates new infrastructure demands such as improved transport routes. Although it does not necessarily matter where the modules are built they need to be moved to the lead shipyard. The Chamber of Commerce and Industry, Western Australia, noted that the metropolitan areas are growing throughout Australia but 'without thought to our ability to move huge loads as we have moved to integration across the world'.[120]

6.93 While confident that the industrial capacity exists in Australia, Tenix saw an urgent requirement for the Federal government and State governments 'to seek out and implement innovative means for transporting large steel modules'.[121] It cited the example of modules fabricated in Brisbane, Newcastle or Melbourne for the AWD or LHD programs which may need to be transported efficiently and economically to Osborne or Henderson for final consolidation. Referring to the difficulty transporting modules by truck or train to the one location for consolidation, Mr Miller of Tenix, suggested that consideration be given to heavy sealift.[122]

6.94 Noting that the growing trend toward modularisation in the shipbuilding industry created specific infrastructure needs, the Chamber of Commerce and Industry of Western Australia stated that:

> …principal workshops in the Kwinana and the Kewdale-Welshpool industrial areas were previously hamstrung from bidding for many large contracts because the road network out of those areas contained power line and road furniture obstructions preventing the outward movement of high and wide loads.[123]

6.95 It cited the construction of very high wide load corridors in Western Australia to accommodate the new trend toward large engineering centres.[124] This development of high wide corridors has enabled the modules to be transported to the site for assembly. Mr Alan Windram, AGC Industries Pty Ltd, told the committee that with the high wide load corridor, his company can move an 11 metre by 11 metre module of probably 200 tonnes through the arteries of Western Australia.[125]

6.96 As noted earlier, the initial outlay in building the necessary infrastructure for constructing a vessel will then be available for the vessel's through-life support. Investment in infrastructure will also benefit the larger economy, especially

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119 *Submission 11*, p. 1.

120 *Committee Hansard*, 3 April 2006, p. 19.

121 *Submission 26*, p. 7.

122 *Committee Hansard*, 27 April 2006, p. 21.

123 *Submission 11*, p. 1.

124 *Committee Hansard*, 3 April 2006, p. 21.

125 *Committee Hansard*, 3 April 2006, p. 75.

improvements in facilities such as the common user facility, which is designed with other users in mind, and the nation's transportation network.

6.97 ASC submitted that national governments are not disinterested bystanders of national shipbuilding and repair industries, that they should have 'a strong and enduring interest in the industry's success'.[126] This chapter has identified a number of problems in the industry such as the underutilisation of facilities that could be addressed by better planning.

Committee view

6.98 Over many years governments and private enterprise have invested in infrastructure for the naval shipbuilding industry. The governments of New South Wales, Victoria, South Australia, Queensland and Western Australia together with ASC, ADI and Tenix were confident that Australian shipyards, with some infrastructure development could accommodate the build of large vessels such as the LHD. Recent studies acknowledge that infrastructure improvements are needed to supplement existing facilities and that undoubtedly some investment would be required. A study commissioned by DMO suggested that the cost estimates for improvements to satisfy an LHD build range from $100 million to $300 million.

6.99 Some lead yards are looking to their respective state government to help fund infrastructure improvements. For example, Western Australia has committed to further investment in its CUF should Henderson be selected as the assembly site for the LHDs. As noted in this chapter, the government would charge for the use of such facilities which would be reflected in the overall cost of building the ships in Australia. The committee has no doubt that should the decision be taken to build the LHDs in Australia, there is the commitment by state governments and the major primes to ensure that the infrastructure needed to support the project would be available.

6.100 This chapter picked up on a number of themes emerging from previous chapters. One of the main themes is the important role that Defence, as the sole purchaser of navy vessels, has on shaping the industry. The committee is concerned about how Defence encourages or fosters local business and the influence it exerts on the extent and nature of investment in large infrastructure. The role of governments in planning for, and investing in, the industry is particularly significant in light of the observations about the fragmented state of the industry where specific projects have dictated the infrastructure requirements for that site. Part IV of the report considers these issues in greater depth.

6.101 Although Australia may possess the infrastructure or the potential to develop the necessary facilities to support the Navy's shipbuilding program, this capability

126 *Submission 17*, p. 10.

alone does not mean that Australia has the wherewithal to meet the challenge created by the AWD and LHD projects. A highly skilled workforce is essential to sustain the industry. The following chapter considers the skill base in Australia.

Chapter 7

Workforce and skills

Introduction

7.1 Construction and through-life support for naval vessels in today's advanced technology era requires skilled labour in a range of specialised fields as well as traditional trades. These include design, platform engineering and systems engineering, integrated logistic support, hull and mechanical construction and module fabrication and project management.[1] Workforce availability and sustainability is fundamental to Australia's capacity to build and support naval ships.

7.2 This chapter looks at workforce and skills issues for the naval shipbuilding sector. The chapter discusses skilled labour shortages and the level of employment demand generated by future naval shipbuilding projects. The issues of competition for skilled labour within heavy industry, skills transfer and workforce mobility are reviewed. The chapter then looks at capacity issues relating to particular skill sets—the trades and the high end design, systems integration and project management skills. The chapter assesses the AWD and LHD programs as a case in point with regard to workforce capacity. Finally, the chapter overviews government and industry initiatives to address skilled labour shortages.

Skilled labour shortages

7.3 National skilled labour shortages and the potential impact of such shortages on future labour force supply and productivity have been increasingly recognised in recent years. In 2003, the Senate Employment, Workplace Relations and Education References Committee conducted an inquiry into current and future skills needs. The committee found:

> The overarching message during the inquiry was the need to recognise that Australia is facing a major skills formation challenge, both in the immediate future and accelerating over the next two decades, due to the combined effect of a shrinking cohort of young workforce entrants, a depleted stock of skills in some key industries and occupations and the accelerating need for new skills, flowing from technological and business process change.[2]

7.4 The Department of Employment and Workplace Relations (DEWR) has responsibility for monitoring skills demand in Australia. DEWR defines skill shortages as follows:

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1 Department of Defence, *Submission 20*, p. 14.

2 Senate Employment, Workplace Relations and Education References Committee, *Bridging the skills divide*, November 2003, pp. 3–4.

> Skill shortages exist when employers are unable to fill or have considerable difficulty in filling vacancies for an occupation, or specialised skill needs within that occupation, at current levels of remuneration and conditions of employment, and reasonably accessible location.3

7.5 DEWR has identified that all states are currently experiencing skills shortages in a number of trade occupations relevant to naval shipbuilding, including metal machinists, sheet metal workers and electricians.[4] In addition, there are state-wide shortages in all but one or two states in several other relevant engineering and electrical trades, including metal fitters, metal fabricators and welders.[5]

7.6 Skills shortages in the engineering sector have been apparent for some time. In 2001 the Engineering Working Group of the National Industry Skills Initiative reported that:

> High levels of shortage were identified across the three engineering streams of mechanical, fabrication and electronic. Shortages are particularly severe at the higher trade levels of electronic engineering, and welding skills, tool making, and in computer aided design and machining, and in the use of computer numerically controlled processes.[6]

7.7 Factors thought to influence engineering skills shortages included the:

- cyclical patterns of the main employing industries, such as manufacturing, construction and transport sectors;
- pace of technological change, rendering some skills obsolete and making others critical;
- changes in the sources of skilled labour, with privatisation of public utilities reducing the traditional training ground and supply of skilled engineering labour;
- high labour mobility, which can make it difficult for smaller firms and trade exposed sectors to compete with the financial rewards offered by larger firms. High labour mobility can also be a disincentive for firms to invest in long-term training; and

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3 DEWR, *Skills in Demand Lists State and Territories—2006,* p. 39.

4 DEWR, *Skills in Demand Lists State and Territories—2006,* p. 39. www.workplace.gov.au/NR/rdonlyres/BF83E4CC-1E8F-4630-95C7D9F3A6108A9A/0/SkillsinDemandMarch2006.pdf, (accessed 19 May 2006).

5 DEWR, *Skills in Demand Lists State and Territories—2006,* www.workplace.gov.au/NR/rdonlyres/BF83E4CC-1E8F-4630-95C7D9F3A6108A9A/0/SkillsinDemandMarch2006.pdf, (accessed 19 May 2006).

6 National Industry Skills Initiative, Engineering Working Group, 2001, *Engineering Skills Shortages,* p. 4.

- the ageing workforce, resulting from a decline in the number of young people entering the engineering trades.[7]

7.8 Skills shortages are already affecting defence industry. A defence industry survey undertaken in 2003 found that 40 per cent of businesses had been significantly constrained by a shortage of senior managers, 58 per cent by a shortage of professional staff, 48 per cent by a shortage of associate professionals and 67 per cent by a shortage of tradespeople.[8]

7.9 While the above survey indicated the extent of skills shortages experienced by defence industry generally, it is difficult to gain a clear assessment of the extent of direct skills shortages in naval shipbuilding. The committee is cognisant that in a competitive tender environment, companies would be reticent to disclose publicly any concerns about their ability to attract and retain labour.

7.10 Austal, which operates in a niche market and not in competition with the major steel builders, did comment directly on the effect of skilled labour shortages. Mr John Rothwell, Austal Ships' Executive Chairman, advised that the shortage of skilled labour is the company's biggest challenge. Despite committed endeavours, such as training programs, profit sharing and other employee satisfaction programs, attrition remains a factor, with a staff turn over rate of around 30 per cent.[9] Mr Rothwell commented that the company would currently prefer to have 'an extra couple of hundred people' and that its ability to take on new projects is restricted by workforce availability.[10] Without a significant increase in the availability of skilled labour, Austal considered that pressure on wages and continued loss of skilled labour may jeopardise Australia's competitive advantage in aluminium shipbuilding.[11]

Naval shipbuilding—workforce demand

7.11 Defence has estimated the size of the expected workforce demand resulting from its planned naval acquisition program. Figure 1 presents Defence's estimates of the total workforce needed to support naval ship construction, upgrade and in-service support for the period 2005 to 2025, if all upcoming projects were managed in country.[12] There is a sharp rise from 2008 to 2012, reflecting the additional workforce needed for the AWD and Amphibious (LHD) and Afloat Support projects. According to Defence's estimates, this increase in demand would require the naval shipbuilding

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7 National Industry Skills Initiative, Engineering Working Group, 2001, *Engineering Skills Shortages*, pp. 11–13.

8 ACIL Tasman, November 2004, *A Profile of the Australian Defence Industry*, p. 18.

9 *Committee Hansard*, 3 April 2006, pp. 63–65.

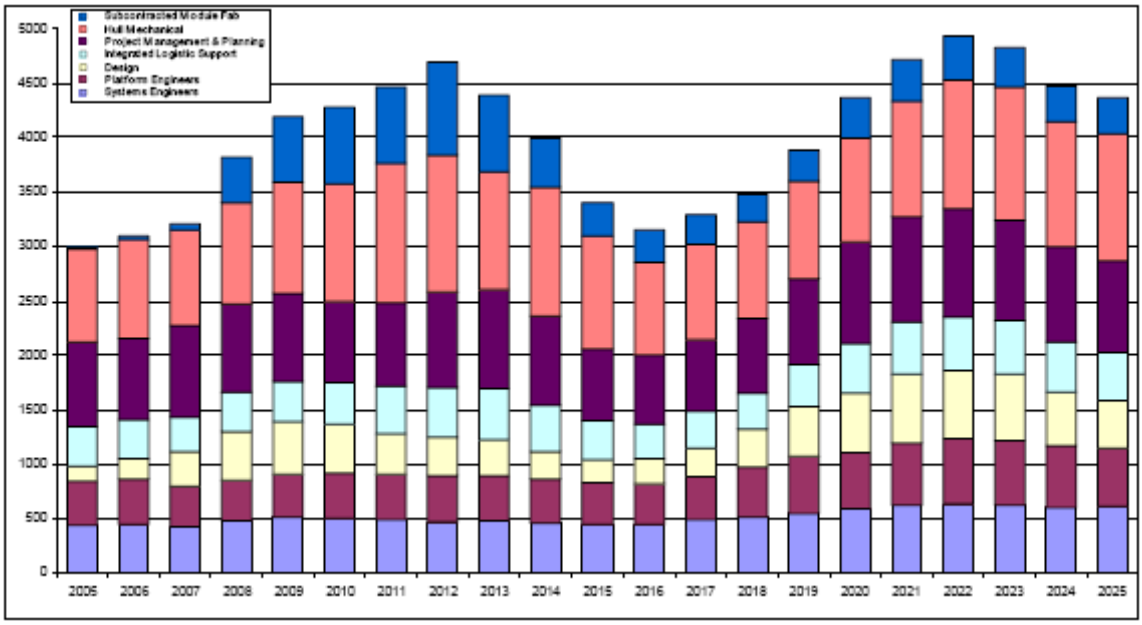
10 *Committee Hansard*, 3 April 2006, p. 65; Austal Ships, *Submission 7*, p. 9.

11 Austal, *Submission 7*, p. 9

12 Department of Defence, *Submission 20A*, p. 6.

workforce to expand from around 3000 people in 2005 to a peak of 4700 in 2012, around a 57 per cent increase.[13]

7.12 Following a marked trough in demand around 2013 to 2016, a second rise is projected for 2017 to 2022. While the current Defence Capability Plan extends only to 2016, Defence anticipates that it will require a replacement Frigate and Submarine program from about 2018 onwards and has included these programs in the workforce estimates.[14]



Estimated total workforce requirements, by skill sets.[15]

7.13 The coming demand for workers in the naval shipbuilding industry varies across different skill sets. Defence estimates that the majority of the workforce increase will be required in hull and mechanical construction and module fabrication, with demand increasing from around 900 workers in 2005 to around 2100 in 2011.[16] Demand for designers is also projected to be significant, increasing from a relatively small base of around 140 in 2005 to 490 in 2009.[17]

7.14 The predicted peaks and troughs in demand for naval shipbuilding workers in the coming decades principally reflect peaks and troughs in major construction and upgrade work. The requirement for construction and upgrade workers is estimated to double over the five years from 2008 to 2012, with commencement of construction of

13 Department of Defence, *Submission 20A*, pp. 6–7.

14 Department of Defence, *Submission 20A*, p. 1.

15 Department of Defence, *Submission 20A*, p. 6.

16 Department of Defence, *Submission 20A*, pp. 6–10.

17 Department of Defence, *Submission 20A*, p. 8.

the AWDs and LHDs.[18] The workforce required to provide in-service support to the RAN's fleet is projected to remain relatively stable over time, at around 1700 to 2000 workers.[19] In-service support for the submarines accounts for around two-thirds of this workforce.

Sustainment workforce

7.15 Defence emphasised throughout the inquiry that, from its perspective, the primary reason for an Australian naval shipbuilding industry is to ensure that there is a sufficient indigenous capability to support the fleet through life. To this end, Defence estimated the workforce needed to meet its 'sustainment requirements'. That is, the workforce required to 'maintain, upgrade and modify the Naval Fleet to the required operational capability levels'. Defence explained that the sustainment requirement includes 'all of the in-service support workforce plus a proportion of the construction workforce that will need to be retained and used to support the new ships once they enter service and to address attrition within the in-service support workforce'.[20]

7.16 Sustainment requirements vary across skill sets:

> …only a proportion of the naval construction workforce needs to transition into the in-service support workforce to meet operational requirements. The proportion of skills to be transitioned depends on the nature of the skills. System Engineering…and Platform Engineering…represent specialist, high-end skill categories that are fundamental to retaining the operational capability of the naval fleet. As such, Defence would seek to retain a higher proportion of these skills. Design,…Integrated Logistic Support…and Project Management/Planning,…whilst important skills, are not required for sustainment purposes at the same proportions as the high-end specialist skills. Hull and Mechanical Construction…and Subcontracted Module Fabrication Skills, whilst critical for construction, are not required at high-levels for in-service support and capability sustainment.[21]

7.17 Overall, Defence estimated that it needs only around two-thirds of the total projected workforce to meet its ongoing sustainment needs. Therefore, without further indigenous construction projects, Defence sustainment work is unlikely to generate sufficient work for an expanded naval shipbuilding workforce. This analysis is informative regarding Defence's aggregate, ongoing workforce requirements and helps ensure that debate about workforce capacity is not focussed only on the construction phase of major projects. However, sustainment of the RAN's overall fleet capability will inevitably involve replacement programs into the future. If any or all such construction work is to be conducted in Australia, then the 'sustainment' level workforce will need to be expanded again in time.

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18 Department of Defence, *Submission 20A*, p. 3.

19 Department of Defence, *Submission 20A*, p. 5.

20 Department of Defence, *Submission 20A*, p. 7.

21 Department of Defence, *Submission 20A*, p. 10.

Other industry sectors—competition or support?

7.18 A range of skills used in the naval shipbuilding sector is also relevant to other industry sectors. Therefore, the capacity of Australia's workforce for naval shipbuilding cannot be viewed in isolation from other sectors. The committee received different views about competition for skilled labour and transferability of skills across sectors. Some witnesses suggested that competition for labour resources might reduce Australia's capacity for naval shipbuilding, while other witnesses considered that there was potential to draw labour from other sectors of the economy to address peak periods of shipbuilding demand.

7.19 Given identified skills shortages and the demand for skilled labour in other industries such as mining, natural resources and construction, Defence commented that there is a risk that industries within Australia will end up competing for the limited skill sets available.[22] Such competition may make it difficult to secure necessary labour and may drive up wage rates, increasing the cost of construction projects. Defence also indicated that the effect of a sustainable naval shipbuilding industry on other sectors of the economy should be considered, particularly as the mining and construction industries are 'currently managing projects that are key to the wealth generation for Australia'.[23]

7.20 The Department of Industry, Tourism and Resources (DITR) analysed the workforce requirements of offshore petroleum developments currently committed or likely to proceed. DITR noted that the estimates were based on 'very approximate data' and provided 'rough order of magnitude calculations'. The results showed that the employment demand generated by offshore petroleum and LNG projects is likely to peak slightly ahead of peak naval shipbuilding demand. However, the employment demand created in the offshore resource sector was estimated to be far greater than the demand generated by naval shipbuilding projects. Upcoming shipbuilding projects were estimated to generate employment demand in the order of several thousand workers overall. In contrast, DITR estimated that the possible employment demand created by offshore resource projects may peak at around ten thousand workers.[24]

7.21 Mr Ken Pettifer, Head of Manufacturing, Engineering and Construction Division, DITR commented that:

> Availability of skills is an issue that will have to be managed, and there may be risks to the naval shipbuilding projects if all the possible resource projects go ahead.[25]

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22 Answers to questions on notice, Attachment A, p. 1.

23 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), p. 41.

24 DITR, *Submission 38*, p. 4.

25 *Committee Hansard*, 3 July 2006, p. 71.

7.22 Some sources suggested that naval shipbuilding construction, with peak demands around 2009 to 2013, may coincide with a downturn in construction activity in the resources sector. Mr Terence Booth of Challenger TAFE in Western Australia and Mr Jamie Mackaway of the Western Australian Department of Education and Training, advised the committee that demand for construction workers within the resources sector had already reached a peak level.[26] Mr Booth commented that many apprentices trained for the resources industry may become available to the shipbuilding industry in the future.[27]

7.23 Tenix also said that the pressure of skills shortages was likely to lessen:

> One commonly held view is that the current shortage is largely attributable to activities in the resource sector, especially in the construction of new mines and so forth. Over the next five years or so much of that activity will complete, and although there may still be a shortage of workers in Western Australia, the magnitude of the shortage may shrink considerably.[28]

7.24 However, Mr John Rothwell, Executive Director of Austal, had a different view:

> Whilst the demand for resources continues to be what it is at the moment—and it is difficult to see that slowing down although no-one can really tell—it is almost certain that mining companies will find reasons to develop mining sites and offshore gas facilities and of course oil will continue to happen…[29]

7.25 A 2004 ACIL Tasman assessment of labour availability found that among key occupations such as structural steel and welding trades, metal fitters and machinists, electricians and engineering professionals, the workers in naval shipbuilding form a small proportion of all workers in those occupations.[30] Therefore there may be potential to draw labour resources from other sectors of the economy into naval shipbuilding if required.

7.26 A later, 2006, ACIL Tasman report tempered these findings:

> This is not to suggest that the impact of the proposed naval shipbuilding program would not place a constraint on the supply of appropriate skills. There will be geographic issues and naval specific training requirements that may constrain supply in critical periods.

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26 *Committee Hansard*, 3 April 2006, pp. 54, 60–61.

27 *Committee Hansard*, 3 April 2006, p. 50.

28 Tenix, *Submission 26*, p. 6.

29 Mr John Rothwell, Executive Chairman Austal Ships, *Committee Hansard*, 3 April 2006, p. 66.

30 ACIL Tasman 2004, *Skill shortages and the amphibious ships project, Report prepared for the Australian Shipbuilding Advisory Group,* in ACIL Tasman, February 2006, Naval Shipbuilding in Australia, A background briefing, Attachment to South Australian government, Submission 9, p. 34.

> However the table suggests that, on the face of it, there is a base resource of skills in the Australian workforce on which support for the naval shipbuilding program could be drawn. The critical issues are whether the available skills match the needs of naval shipbuilding, how those skills will be mobilised, the nature of additional training that may be required and the competing demand for those skills from other sectors of the economy. The last issue will have implications for their cost.[31]

7.27 This report also stated:

> While previous analysis indicates that the level of demand that the naval shipbuilding program will generate for each relevant skill set is small compared to total number of skills available, the strength and quality of the available skills will continue to be an issue for policy makers and industry.[32]

7.28 Several submitters argued that the naval shipbuilding industry was well placed to secure labour resources, even in a competitive environment, with attributes such as job security not always found in other sectors. Tenix stated:

> …many skilled workers—particularly older members of the trades, who have family responsibilities—are often more inclined to seek out jobs that offer permanence, stability and balanced quality of life rather than simply following the highest wage. Long duration projects such as construction of major naval vessels are ideally suited for those workers.[33]

7.29 Similarly, Thiess commented on the benefits provided by naval shipbuilding employment:

> Naval programs have lead times of at least 18 months to recruit, train and grow a particular skill that can be used for several years on the same program. That provides a stability of jobs unknown in the commercial world. In addition, most jobs in the naval domain are to be provided in large cities rather than in remote sites where most resource projects tend to be constructed. A naval program therefore would be quite attractive to a work force and their families who otherwise may be living/working in remote locations.[34]

7.30 The AMWU also commented on the attraction of stable employment, noting that 'obtaining employment in a place like Williamstown and staying there for

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31 ACIL Tasman, February 2006, Naval Shipbuilding in Australia, A background briefing, Attachment to South Australian Government, *Submission 9*, p. 33.

32 ACIL Tasman, February 2006, Naval Shipbuilding in Australia, A background briefing, Attachment to South Australian Government, *Submission 9*, pp. 35–36.

33 Tenix, *Submission 26*, p. 6.

34 Thiess, *Submission 22*, p. 10.

10 years with good earnings, continuity and job security is what young people are looking for'.[35]

7.31 In terms of future labour supply, Defence acknowledged that there is some cross over to naval shipbuilding from trade workers in other sectors, but commented on the difficulty of modelling cross industry impacts. Rear Admiral Trevor Ruting told the committee:

> What we predominantly rely on…is the industry, in their tender responses, doing that detailed skills analysis and identifying what they believe is the availability of skills particular to that geographic area and their capability to deliver.[36]

7.32 It is therefore important for DMO to have the skills and industry knowledge to realistically assess tenders, both in the context of labour supply for specific projects and the wider labour demands occurring in the broader heavy industry sector.

Transferability of skills

7.33 In the context of competition for skilled labour resources, transferability of skills between heavy engineering sectors is an important consideration. Many witnesses were confident that naval shipbuilding workers could transition to other sectors in periods of low demand. Challenger TAFE representatives commented that the apprentices and trainees being trained for the naval shipbuilding sector in Western Australia, would be equally employable in commercial shipbuilding and other heavy construction.[37] Thiess stated:

> …the 2 naval programs represent only a small fraction of the trades people required. Therefore, at the end of the programs, they can be employed in the mineral resource sector or other industries, keeping the skills fully utilised until the next shipbuilding program or until another peak linked to a major refit is reached.[38]

7.34 There was more debate regarding the ease of transition into naval shipbuilding from other industry sectors. The committee heard that the skill requirements for naval shipbuilding are not always directly transferable from other industries. Complex defence industry construction may require further upskilling through external courses and practical on the job training. As discussed in chapter 2, in many areas military standards are higher than for commercial production and it can take many years to develop a detailed knowledge of naval shipbuilding rules and standards.

7.35 A Defence Industry Survey in 2003 found that among companies doing business for Defence, defence-specific knowledge and skills were important,

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35 Mr Pat Johnston, National Organiser, AMWU, *Committee Hansard*, 28 June 2006, p. 52.

36 Rear Admiral Trevor Ruting, *Committee Hansard*, 28 March 2006, p. 24.

37 Mr Terence Booth, Challenger TAFE, *Committee Hansard*, 3 April 2006, p. 55.

38 Thiess, *Submission 22*, p. 10.

particularly for professional staff. Respondents estimated that, on average, eleven months were needed to train senior managers in required defence-specific skills, eight months were needed to train professionals and five months for associate professionals and tradespeople.[39]

7.36 Mr Booth, of Challenger TAFE, considered that while there was much similarity in the skills required across industries, some of the higher end specialisations within the defence industry (such as weapons systems) were relatively unique. Challenger TAFE representatives considered that industry partnerships are critical to ensuring transferability of skills. This might involve industry personnel coming into the training system to provide training and also lecturers going out into the industry. Austal Ships and Woodside were given as examples where industry personnel are active in providing training.[40]

Workforce mobility—geographic issues

7.37 While many witnesses were of the view that the shortage of skilled labour for upcoming naval ship programs is manageable and relatively small on a national basis, some expressed reservations about the ability of the industry to secure labour in the required locations. For example, Mr Geoff Smith, Director at ADI commented:

> Analysis shows that the added demand on the skilled workforce for both AWD and LHD projects is one per cent of the available skilled workforce in critical trades. Therefore, perhaps the issue is more to do with transportability. Many skilled workers with established homes and families seem disinclined to relocate across the nation, despite high wages for what may be a spike in infrastructure construction work.[41]

7.38 Defence commented that the national assessment of labour shortages was somewhat outdated:

> …when we had a look at the skills issues 18 months to two years ago, there was an expectation that you would have the capacity, for example, in Western Australia to move people from the east coast to the west. The recent data I have is that that is significantly harder now as a result of some of the housing prices—the increases that have occurred recently in Western Australia. Tenix was expecting to be able to move people from its Williamstown operation across to its Western Australian operation, but people are less willing to do that and, if they are, they have to do it at a significant premium. These things are very fluid, and it depends on individuals and their personal financial circumstances.[42]

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39 ACIL Tasman, November 2004, *A Profile of the Australian Defence Industry*, p. 93.

40 Mr Robert Player, *Committee Hansard*, 3 April 2006, p. 53.

41 *Committee Hansard*, 28 June 2006, p. 3.

42 Mr Kim Gillis, *Committee Hansard*, 18 August 2006, p. 49.

7.39 The Hon Andre Haermeyer, Victorian Minister for Manufacturing and Export, Minister for Financial Services and Minister for Small Business, commented on the costs of mobilising labour:

> Sometimes the workforce is extremely reluctant to move and sometimes they will not move, so there is a cost associated with building up the skills that are required. And there is a cost associated with the alternative of attracting the workforce to a different location.[43]

7.40 Major General Haddad, Strategic Adviser, Victorian Department of Industry and Regional Development, considered that workers will not necessarily move to work on naval shipbuilding projects, if their skills can be used locally in other sectors.

> …the workforce is very mobile here in Melbourne and Victoria because of the choices available to it. So my judgement would be that it is most unlikely that those workers would go to South Australia from Victoria to do work because they will find other opportunities here because of existing shortfalls.[44]

7.41 The AMWU noted that industry has never had trouble attracting people to shipbuilding because of the job security provided by the length of the projects. Mr Pat Johnston, National Organiser, considered that the majority of the workforce would move from the east coast to South Australia if offered good earnings and stable employment. However, industry should not rely on moving an established workforce:

> I think the attractiveness of these projects will be there for employees and skilled employees. But those people who are domiciled already in Williamstown I do not think would go to Western Australia for a shipbuilding project. Some would—maybe the younger and the more mobile—but certainly for people who are entrenched in their own area I believe it is just too big an ask.[45]

7.42 Overall, the Victorian Government considered that labour shortages for naval shipbuilding could be met with proper planning as to where the work occurs.[46] While a large core of skilled workers is inevitably required at prime shipbuilding sites, modern shipbuilding techniques such as modular construction (discussed in chapters 2 and 6) enable work to be geographically distributed and to some extent mitigate the need for mass labour mobility.

7.43 Defence cautioned against assuming that construction work can be distributed to a large number of regions. Mr Warren King, DMO's Air Warfare Destroyer Project

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43 *Committee Hansard*, 18 August 2006, p. 23.

44 *Committee Hansard*, 18 August 2006, p. 24.

45 Mr Pat Johnston, National Organiser, AMWU, *Committee Hansard*, 28 June 2006, p. 52.

46 The Hon Andre Haermeyer, Victorian Minister for Manufacturing and Export, Minister for Financial Services and Minister for Small Business, *Committee Hansard*, 18 August 2006, p. 16.

Manager, commented that while distributing module fabrication work has economic benefits and can help maintain the skill base across the nation, using too many sites can erode the economic gains because there is 'just too much management and too much distribution'. Research conducted in the UK indicated that economically, around three sites was the optimal number for module fabrication work.[47]

7.44 The South Australian government proposed that centralising naval shipbuilding around a hub in South Australia would enable the development and short-term expansion of the industry base, without the challenges of regional distribution:

> If there was felt to be a need to maintain two shipbuilders, this could be achieved at a single site where maximum use could be made of common infrastructure and skills base.[48]

7.45 Geography and labour mobility issues were also raised in relation to repair and maintenance work. Both Tenix and the Victorian government commented on Defence's policy of repairing and maintaining naval ships near the home port, at Fleet Base East in New South Wales or Fleet Base West in Western Australia. The Victorian government considered that this policy will effectively exclude Victorian based yards from repair and maintenance contracts.[49] Tenix stated:

> Our experience is that it is difficult to manage workforce issues in this very important part of our business [repair and maintenance] because of the geographic sequence in which Defence awards R&M [repair and maintenance] contracts. For most of the last year, our facility in Henderson operated at a high tempo of activity due to the large volume of R&M contracts awarded for ships home-ported at Fleet Base West. As a consequence, we were able to recruit and retain a highly skilled workforce in Henderson to perform naval repairs. However, for the next twelve months, nearly all R&M contracts planned by Defence will be for ships home-ported at Fleet Base East. This means we will have skilled R&M workers in Western Australia next year but little or no work for them; and concurrently we will have to scramble to assemble an R&M workforce for the Sydney region.[50]

7.46 Defence on the other hand commented on the geographic flexibility of the repair and maintenance sector, with some items of equipment being able to be removed for repair at various locations and in other cases the labour force being mobile. Defence acknowledged that continuity of work was a relevant factor:

> Items that are repaired in the ship are done at each of those east and west coast locations and the skill base either moves to those particular locations

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47 *Committee Hansard*, 18 August 2006, p. 49.

48 Government of South Australia, *Submission* 9, p. 36.

49 *Submission 31*, p. 25.

50 *Submission 26*, p. 6.

> because that is where the work is, or is able to be recruited from the local industry base. Because we have now built up a fair degree of continuity of work in our east and west coast repair and maintenance industries, they are able to cope with the workloads in those two geographic locations and are able to maintain our ships appropriately there.[51]

7.47 Even so, the comments of Tenix indicate that sensible planning can assist industry to better manage work plans.

Skill sets

7.48 As noted above, naval shipbuilding requires skills across a wide range of areas and the predicted demand for workers varies across different skill sets. The following sections review some of the workforce and skills issues raised in relation to particular skill sets.

Trade skills sets

7.49 According to Defence, the majority of the increased workforce that would be required to deliver its naval shipbuilding program within Australia is in hull and mechanical construction and module fabrication.[52] These fields are reliant on skilled tradespeople and, as noted previously, there are currently national skills shortages in a number of trade occupations.

7.50 Apprenticeships and traineeships are an important source of skilled trade labour and several witnesses expressed confidence in the ability of the training sector to provide sufficient skilled workers to meet the peak demands of the naval shipbuilding program.[53] Challenger TAFE representatives described recent growth in apprenticeships and traineeships in Western Australia. Significantly, a state government target of 30 000 apprentices and trainees in training by 2009 had been met four years ahead of schedule. Much of this growth had been in areas critical to the shipbuilding industry, including trades such as metal fabrication, fitting and turning and welding.[54]

7.51 The committee was advised that the overall drop out rate for trade apprentices is around 30 per cent.[55] Representatives of Challenger TAFE in Western Australia described some of the strategies they are employing to reduce attrition, including a support network of field officers to work with apprentices and employers. The committee heard that the highest apprenticeship drop out rates occur in the first few

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51 Rear Admiral Trevor Ruting, *Committee Hansard*, 28 March 2006, p. 12.

52 Department of Defence, *Submission 20*, p. 16.

53 See Challenger TAFE, Western Australia Department of Education and Training, *Committee Hansard*, 3 April 2006.

54 Mr Robert Player, Challenger TAFE, *Committee Hansard*, 3 April 2006, p. 51.

55 Mr Robert Player, Challenger TAFE, *Committee Hansard*, 3 April 2006, p. 51.

months of an apprenticeship.[56] Solutions therefore need to look at career information and decision making for those entering apprenticeships, not only supporting people once they are undertaking a trade qualification.

7.52 Other witnesses discussed the need for not only increased numbers of workers qualified in relevant trades, but also the need for specific skills relevant to the industry. Mr John Rothwell, Executive Chairman of Austal Ships, commented that 'people need the practical, hands-on experience within the industry in addition to what they learn at TAFE'.[57] Mr Rothwell also commented that there are limits to the number of apprentices a company can take on, given the need to have tradesmen to supervise apprentices.

7.53 The distinction between aggregate numbers of trade workers and the availability of specific skills was also canvassed under the government's National Skills Initiative by the Engineering Working Group. The group found that among engineering firms experiencing skills shortages, nearly two-thirds reported a general lack of people with the requisite trade qualifications. However, some 40 per cent reported that 'the shortage was more related to an inability to find people with specific skills required by the enterprise within the occupational area'.[58]

7.54 While much evidence to the inquiry focussed on potential labour shortages, naval shipbuilding can also provide a catalyst for skills development. The AMWU argued:

> A sustainable naval shipbuilding industry with regular contracts will be part of the solution to the skills shortages. If it is decided to purchase vessels offshore, not only will we lose the skills to provide through life support to the vessels, we will lose a valuable skills base for the wider economy.[59]

7.55 The AMWU was of the view that employers have been remiss in providing training and apprenticeships over the last 15 years, and that current demand is generating change.[60] Mr Pat Johnston, National Organiser, commented:

> In relation to the skills issue, I do not think anybody should get spooked about a shortage of skills. Skill shortages have always been cyclical. We are seeing a boom in the mining industry and a demand for a lot of skills. The skills needed previously—say, in the last five years—are now coming on stream and they are in high demand. All the manufacturing and heavy engineering companies are now starting to take on apprentices. They

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56 Mr Robert Player, Challenger TAFE, *Committee Hansard*, 3 April 2006, p. 51.

57 Mr John Rothwell, Executive Chairman, Austal Ships, *Committee Hansard*, 3 April 2006, p. 64.

58 National Industry Skills Initiative, Engineering Working Group, 2001, *Engineering Skills Shortages*, Appendix 1, p. iv.

59 *Submission 21*, p. 12.

60 Mr Pat Johnston, *Committee Hansard*, 28 June 2006, p. 48.

> recognise that in the future they are going to need higher skills, so there is a very distinct movement towards retraining.[61]

7.56 Evidence from ADI supported the assertion that apprenticeship training has gathered greater focus in recent years:

> At Garden Island we have apprenticeship programs, which we recommenced about four years ago. When ADI was a corporatised activity, it tended not to focus so much on those for a number of years. However, certainly now, as a privatised ADI, we see investment in our people as being fundamental to our success. We are attempting to grow our own, so to speak, and are investing a significant amount of our budget into doing that. We are not sitting back waiting to be spoon-fed qualified people; we are trying to grow our own, nurture our own and improve our own.[62]

7.57 Mr Martin Edwards, General Manager ASC Shipbuilding, described the training ASC is planning for the AWD project:

> There will certainly be a large focus on apprentices. The TAFE system will be used for the base training of apprentices. The maritime skills centre will be used for a lot of upskilling and very specialised ship training associated with the project.[63]

7.58 The committee welcomes initiatives from the private sector to recruit and train apprentices. Skills development should be one of the broader outcomes generated by the significant government investment made in naval acquisitions. Again, this is an area where public-private partnering would be beneficial.

High-end skill sets

7.59 The committee was informed that the complexity and sophistication of naval shipbuilding is predominantly related to design, installation and integration of ships' systems, rather than construction of the hull and structure.[64] In particular, the increasing use of modular technology requires high order integration engineering skills.[65] In Defence's view, these skills are the most critical to develop and retain in order to ensure ongoing support and self-sustainability of the fleet:

> The more important capabilities that are required to flow on from construction into support are associated with the ability to adapt the design and integrate new systems and the ability to support complex unique

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61 *Committee Hansard*, 28 June 2006, p. 43.

62 Mr Geoff Smith, ADI, *Committee Hansard*, 28 June 2006, p. 9.

63 *Committee Hansard*, 19 April 2006, p. 12.

64 See for example Austal, *Submission 7*, [pp] 5–6; Submarine Institute of Australia Inc, *Submission 3*, pp. 16–17; ASC Pty Ltd, *Submission 17*, p. 9; Department of Defence, *Submission 20*, p. 3. See also Chapter 2.

65 Mr David Kobelke, Director, Industry Capability Network, Chamber of Commerce and Industry, Western Australia, *Committee Hansard*, 3 April 2006, pp. 21 and 27.

> systems. The competencies of fabrication and fitout associated with shipbuilding are less critical.[66]

7.60 ASC Pty Ltd commented that high order engineering skills are particularly critical in the complex start-up design to production phase, which occurs only once per ship class program. This phase is significant to the overall cost effectiveness of the program, as it sets the foundations for later build, system integration, test and evaluation phases.[67] Without consistent demand, these skill sets can be lost:

> A key characteristic of cost-effective and successful shipbuilding programs is that there is ongoing scope to exercise and mature these critical high-end engineering skills so that they are available to be applied to the next shipbuilding program.[68]

7.61 The committee heard that retention of workers with these high-end technical skills is as much about the nature of the work, as remuneration and other benefits. Representatives of Nautronix Ltd, an SME involved in the defence and offshore oil and gas industries, commented that having a strong research and development component and plenty of stimulating work was essential for attracting and retaining skilled staff.[69] Mr Michael Gallagher, Nautronix CEO, cautioned 'Be in no doubt: engineers love interesting work and they are going to go where that interesting work is'.[70] ASC commented that even within a relatively large shipbuilding program, 'these skills can atrophy if not further exercised'.[71]

7.62 As such, development work and not only maintenance and support work may be required to retain these skill sets in Australia. The South Australian government commented:

> …there is no doubt that challenging technical work, well beyond just routine maintenance, is required to retain a technically competent, motivated and productive workforce.[72]

7.63 This view was also evident during committee members' visit to the U.S. Mr Mark Russell, head of Engineering at Raytheon Integrated Defence Systems, commented that challenging, interesting work is the key to retention. He noted that for engineers, enjoying the work that they do and working in a good team was often more of an incentive than monetary considerations. Mr Russell commented that a culture of

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66 Department of Defence, *Submission 20*, p. 25.

67 ASC Pty Ltd, *Submission 17*, p. 6.

68 ASC Pty Ltd, *Submission 17*, p. 6.

69 Mr Michael Gallagher, CEO, Nautronix Ltd, *Committee Hansard*, 3 April 2006, pp. 34 and 37.

70 Mr Michael Gallagher, CEO, Nautronix Ltd, *Committee Hansard*, 3 April 2006, p. 35.

71 ASC Pty Ltd, *Submission 17*, p. 6.

72 South Australian Government, *Submission 9*, p. 15.

interesting, challenging work in a stimulating team environment would need to be cultivated for Australia's AWD project in order to retain skilled staff.

7.64 Defence acknowledged that existing labour capacity was a result of skills developed through past build projects. Mr Warren King notably remarked:

> …we would not embark on the AWD program as a nation today if it had not been for all the skill sets that have been built up and which are broadly retained in the industry base as a result of Collins, Anzacs and minehunters.[73]

7.65 The committee emphasises that today's naval shipbuilding workforce capacity in Australia reflects the significant government investment made in past build programs. In turn, local construction of currently planned projects is an investment in the skills resources needed for the future.

Design skills

7.66 While Australia largely sources its ship designs from overseas,[74] there was general agreement that it is important for Australia to retain an element of design capability. These skills enable designs to be tailored to Defence specific requirements, facilitate modifications during the building of the ship and are integral to ongoing support, maintenance and upgrade work.[75] Design skills are also critical for economic productivity:

> …strong design engineering capabilities permit the shipbuilder to plan with far greater efficiency and production/construction arrangements, materials selection, workforce skills requirements and matters that bear on the through-life support of the vessels. Possessing these high-end design engineering skills is essential for a shipbuilder to optimise production efficiencies.[76]

7.67 The Submarine Institute of Australia commented on the importance of nurturing design skills for ongoing maintenance and repair:

> A design and construction capability is a huge benefit when modifying ships and submarines and in carrying out unusual repairs, such as hull cracks…and repairs to power generation equipment.

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73 *Committee Hansard*, 18 August 2006, p. 34.

74 For example: the intellectual property rights for the Collins class submarines rest with the Swedish firm Kockums, which was acquired by Howaldtswerke–Deutche Werft in 2002; the ANZAC frigates were designed by the German firm Blohm+Voss GmbH, a division of ThyssenKrupp Marine Systems; the contract for the AWD design will be contested between Spanish firm Navantia and the American firm Gibbs & Cox; and the contract for the LHD design will be contested between Navantia and the French firms Armaris and DCN.

75 ASC Pty Ltd, *Submission 17*, p. 6.

76 ASC Pty Ltd, *Submission 17*, p. 6.

> Even more important is to have the industry continually engaged so that in the unfortunate but potential event of battle damage or accidental damage, major repairs can be conducted expeditiously within country; design experience is especially important in this case.[77]

7.68 Recognising the challenges associated with sustaining an indigenous design capacity in Australia, ThyssenKrupp Marine Systems Australia advocated a single Naval Design Bureau for all aspects of naval design work in Australia. ThyssenKrupp emphasised the importance of planning, consistent workload and nurturing the capabilities developed through previous ship builds.[78] Mr Peter Hatcher, CEO, commented that a competitive approach was not appropriate for design work:

> Design is all about knowledge. It relies entirely on putting together a significant team of very experienced or experienced design engineers working within an organisation, with a disciplined process and with access to the right sort of information on standards and materials. Such systems are very difficult to build and maintain and they are very susceptible to eroding their capability very quickly. As I said before, without a guaranteed workload or an assured workload, the capability rapidly disappears. In principle, I suppose there is no difference between design and production, because we could say the same things about production, but in my experience it is easier to put together a production capability. It is easier to move individual people from one production facility to another, to establish, if you like, greenfield sites for production. It is very hard, I believe, to do that for design.[79]

7.69 Engineers Australia commented that, while cost effective, buying overseas designs reduces the learning opportunities for Australian engineers, technicians and research staff:

> … the more the Australian Department of Defence buys ship designs and weapon systems from overseas, the less self-reliant we become as a nation in terms of technical capability.[80]

7.70 Australia needs high-end design capacity not only for self reliance, but to be able to interact effectively and knowledgably in the global market. The Royal Institute of Naval Architects noted that, given the highly specialised nature of naval ship design, many projects around the world are internationally collaborative. Australian shipbuilding projects enable Australian designers to both contribute to, and learn from, such collaboration:

> Australia has considerable opportunity to make a contribution to that process by bringing what are considerable talents in this country to that process. By being involved in a project like the air warfare destroyer—and

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77 The Submarine Institute of Australia, *Submission 3*, p. 9.

78 *Committee Hansard*, 18 August 2006, p. 5 and *Submission 34*, pp. 2–5.

79 *Committee Hansard*, 18 August 2006, p. 6.

80 Engineers Australia, *Submission 24*, p. 12.

> indeed the Collins class submarine—we develop our own skills in specialised areas which we can then contribute to others and, by the same token, sustain the skills that we need in-country.[81]

7.71 Gibbs & Cox Australia explained that it was able to take advantage of design skills in both Australia and the U.S.:

> We are currently employing Australians who have specialist skills and who are riding off those skills of previous programs. Many of our new employees coming from Australia have a long heritage of involvement in Anzac programs, minehunter programs and even US programs…So there is talent here in Australia that should be corralled and used to the benefit of Australia, the government and then possibly export ability. In addition, we are supplementing those staff with US citizens who are then transferring to Gibbs and Cox Australia, and they will act as mentors, teaching the new employees the design techniques that we employ within the US company to meet the US Navy's need. That means we are growing a capability not in isolation from but in parallel with the growth of capability in the USN.[82]

7.72 The committee heard from the Australian Maritime College that Australia's capacity for innovation in the high-end skills areas such as design is dependent on research and development. Developing these skills is important not only for project delivery, but for initial planning. Dr Brandner, a Research Leader at the College said:

> …research needs to be done well ahead of the development of the platform; it should not be after a contract has been left, it should be much earlier. They are strategic studies, concept studies, where decisions should be made well ahead of the final bid. Then we are more informed as a buyer, because there is more debate and more discussion before the design is approaching the tender stage, and we are better able to deal with overseas allies, if you like, or collaborators such as the US if we have more of a knowledge base. So it is about investment in the future, I would argue. If the platform is being built, it is too late.[83]

7.73 Defence concurred that there can be a stronger tie between design and system knowledge when a ship is built in Australia. However, Defence did not see Australian builds as essential for ensuring ongoing vessel support.[84] Defence considered that the necessary design skills could be developed and retained in Australia as part of the acquisition process, without original ship design occurring here:

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81 Mr John Jeremy, Member of Council, Australian Division, Royal Institute of Naval Architects, *Committee Hansard*, 28 June 2006, p. 55.

82 Mr Peter Croser, Managing Director, Gibbs & Cox Australia Pty Ltd, *Committee Hansard*, 19 April 2006, p. 40.

83 *Committee Hansard*, 28 April 2006, p. 36.

84 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), pp. 3 and 10.

> Approximately 2% of the acquisition cost relates to Australian industry engagement in design activities. This percentage allows for sufficient transfer of design skills to ensure that Australia retains the skills to meet follow-on through life support requirements provided that such access and involvement in the detailed or production design is provided to Australians.[85]

7.74 Even with sufficient design skills transfer, an important criterion for efficient through-life support when vessels and systems are not designed in Australia is that adequate access is obtained to relevant intellectual property and design rights. This issue is discussed in the next chapter of the report.

Systems integration

7.75 As discussed in chapter 2, the quest for naval capability advancement means that naval vessels have increasingly sophisticated weapons, sensor and communication systems. Systems integration skills, which ensure that all components of the systems work together and work with the ship platform, are therefore essential to a modern naval shipbuilding capacity.

7.76 Raytheon Australia commented on the difficulty of generating such systems integration capacity, emphasising the importance of knowledge transfer:

> Systems integration is complex, there are not books on the subject and the capability is acquired through experience and working with those who have acquired the capability through experience.[86]

7.77 In Raytheon Australia's view, systems integration is an area where local subsidiaries of international companies can make a substantial knowledge and skills contribution:

> We are proud of the fact that the company is staffed entirely by Australians, over three quarters of whom are engineers and technicians. However, a key to Raytheon's success and growth in Australia has been the ability and willingness of our parent company to strengthen the capability of its local subsidiary by transferring technology, knowledge, skills and processes.[87]

7.78 A review of the defence industry by ACIL Tasman in 2004 also concluded that systems integration capacity should be viewed in an international context:

> ….innovation in military systems integration depends much more on how effectively specific institutions—be they government laboratories,

85 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), p. 6.

86 Raytheon Australia, *Submission 35*, p. 3.

87 Raytheon Australia, *Submission 35*, pp. 2–3.

> companies or universities—interact in a collective system of knowledge creation and use that has both domestic and overseas dimensions.[88]

7.79 The review pointed to the need to balance both international input and local capacity:

> For the foreseeable future, Australian-based subsidiaries of US firms will remain key means by which Australia obtains US technology of critical strategic and commercial importance. Australian access to this technology is highly conditional, however…Hence such access as we have does not obviate the need to maintain a local capacity to integrate systems—both locally developed and imported—in configurations suited to Australian requirements.[89]

7.80 The importance and scarcity of high quality systems integration skills highlights that Australia's skills capacity cannot be assessed in isolation. Networks and business relationships which facilitate knowledge and skills transfer from international leaders are also important. The committee considers it important that such networks are used effectively, not only as a source of services and information, but to contribute to Australia's knowledge and skills base.

Project management skills

7.81 As discussed in chapters 3 and 4, Australia's naval shipbuilding history has seen the delivery of large, complex and technically difficult projects to varying degrees of success. Project management has always been key to successful and efficient naval shipbuilding and with the advent of modular build processes, evolving advanced open architecture systems and increased reliance on global alliances, project management skills have become only more critical.

7.82 ThyssenKrupp Marine Systems Australia considered that the 'greatest risk to complex warship construction lies in inadequate management systems and inexperienced engineering management'.[90] ADI commented that to deliver a 'fully integrated package of capabilities, the core competencies of a successful prime tenderer must now be prime contracting, project leadership and project management'.[91] Mr Smith, Director, Naval Sales and Marketing, explained:

> Project management delivers the ability to ensure that schedules are developed and managed, costs are controlled, risks are identified and mitigated, resources are available when and as required, subcontractors are

88 ACIL Tasman, November 2004, *A Profile of the Australian Defence Industry*, p. 97.

89 ACIL Tasman, November 2004, *A Profile of the Australian Defence Industry*, p. 98.

90 *Submission 34*, p. 2.

91 *Committee Hansard*, 28 June 2006, p. 3.

> managed, overseas technologies are introduced and management tools are current and are applied.[92]

7.83 In Defence's view, the availability of high-end management skills is currently a 'major weakness' in the shipbuilding industry, with management teams 'relatively thinly resourced to take on the major projects foreshadowed by Government'.[93] Defence observed that in the past there has been a high level of transition of management teams between construction projects that would not be possible in future years given the schedule of parallel and overlapping projects.[94]

7.84 The committee notes this concern and accepts that high-level, experienced project management is critical for the successful delivery of complex naval ship projects.

The AWD and LHD builds

7.85 Issues relating to the Australian workforce's capacity for naval shipbuilding coalesced in debates about the industry's capacity to deliver both the AWD and LHD projects. Defence questioned, from a workforce perspective, whether it was feasible or necessary to construct both the AWDs and the Amphibious ships in Australia. Others were confident that the industry could meet the skills challenges associated with both builds.[95]

7.86 In a *Profile of the Australian Defence Industry* produced in 2004, ACIL Tasman commented on the possible implications of the dual build program. Noting the skills shortages already experienced by Defence industry businesses, ACIL Tasman reported:

> Continuation of this shortage during concurrent construction of the AWD and amphibious support ships and on-going support of the fleet could entail significant cost and schedule risks for the above construction program.[96]

7.87 According to Defence, the peak demand period resulting from these projects (2008 to 2012) would require a doubling of the construction workforce. Defence emphasised that such expansion should not reduce the labour resources available to provide ongoing in-service support to the existing fleet. That is, new workers would need to be brought into the sector. Defence questioned whether there are sufficient sources of new skilled labour to meet the construction peak generated by the AWDs

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92 *Committee Hansard*, 28 June 2006, p. 3.

93 Department of Defence, *Submission 20*, p. 25.

94 Department of Defence, *Submission 20*, p. 25.

95 See for example Australian Industry Group, *Submission 8*, [p.] 4; Mr Jamie Mackaway, Director, Industry and Community Planning, Department of Education and Training Western Australia, *Committee Hansard*, 3 April 2006, p. 58.

96 ACIL Tasman, November 2004, *A Profile of the Australian Defence Industry*, p. 35.

and LHDs, commenting that 'This is a significant workforce 'peak' that will be hard to meet'.[97]

7.88 While Defence considered that the workforce peak would be hard to meet, it also acknowledged that it did not yet have industry data to support this assumption:

> Industry companies will submit their proposals for how they will grow their staff to build up to the required numbers. Until we have those submissions from industry we cannot predict whether they actually have all of the staff required and whether they will be able to obtain them in a time frame that is commensurate with the schedules for build.[98]

7.89 Defence also indicated that an expanded workforce would be hard to sustain, as the ongoing workforce needed for repair, maintenance and upgrade of the fleet would be substantially smaller.[99] Defence was of the view that Australian construction of the AWDs alone would expand the workforce sufficiently to meet the ongoing service needs of its fleet:

> With the onshore build of AWDs and the long-term maintenance programs for Collins and Anzac, there will be sufficient skills—notably, design, platform and system engineers—to meet that requirement and to act as a base for any future development programs. An LHD onshore build would only add large modules of construction skills to the skill base developed by the AWD program and the long-term maintenance contracts.[100]

7.90 Defence emphasised that the case for a domestic build was not as strong for the LHDs as for the AWDs, commenting that a local build was likely to produce relatively few savings for through-life support.[101] In particular, Defence argued that the LHD platform would not require the highend skills that are critical for the industry to retain:

> For a low to moderate technology basic platform like the Amphibious-LHD (as differentiated from a high technology AWD/Aegis or a Collins submarine) there is only a low correlation between Build capability and Sustain/Upgrade capability…The key skills to nurture for the long-term in this technology area are in systems integration and upgrade. In this sense, the skills used during platform construction are…less important in the through life support phase of ships.[102]

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97 Department of Defence, *Submission 20A*, p. 12.

98 Rear Admiral Ruting, *Committee Hansard*, 28 March 2006, p. 6.

99 Department of Defence, *Submission 20A*, p. 13.

100 Lt Gen. Hurley, *Committee Hansard*, 18 August 2006, p. 29.

101 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), p. 2.

102 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), p. 1.

7.91 A report by ACIL Tasman also commented on the different skill sets needed for the two projects. While the Air Warfare Destroyers would require more specialised fabrication skills, ACIL Tasman considered that construction of the Amphibious Ships could 'draw more readily on the skills available in the general engineering base'.[103]

7.92 Engineers Australia noted that the workforce requirements for the AWDs and remaining capacity, or lack of, to deliver the Amphibious Ships has not yet been quantified.[104] However Engineers Australia considered that much of the nation's engineering capacity would be taken up with the AWD project.[105]

7.93 While Engineers Australia would welcome an expansion of the engineering workforce to meet the demand of the Amphibious Ships build, there would need to be commitment to ongoing work to sustain the workforce.[106] Engineers Australia observed:

> Whilst Engineers Australia supports the Government's strong preference for future naval ships to be built in Australia, the argument to build the Amphibious Ships in Australia, is not as clear cut as it is for the Air Warfare Destroyers. With little future demand currently programmed by Defence for large steel ships to be built in Australia, the establishment costs for new infrastructure and training must be amortised over the two ship LHD program.[107]

7.94 Numerous submitters referred to a study by ACIL Tasman which suggested that the skills pressures generated by both the LHD and AWD programs would not be significant given the size of the relevant labour pools.[108] However, other submitters noted that regional effects were important. For example, DITR commented:

> At the aggregate level it will be marginal in terms of the national economy. The shipbuilders group had a large study done…and at an aggregate level it is certainly marginal. The question will be whether there are specific effects in specific locations. You have had advice from a couple of the aluminium shipbuilders anxious about the supply of labour. If these things are managed with appropriate resources being put into training then that will reduce the extent of those problems.[109]

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103 ACIL Tasman, November 2004, *A Profile of the Australian Defence Industry*, p. 34.

104 Engineers Australia, *Submission 24*, pp. 1 and 26.

105 Engineers Australia, *Submission 24*, p. 1.

106 Engineers Australia, *Submission 24*, p. 1.

107 Engineers Australia, *Submission 24*, p. 26.

108 See for example, Government of Western Australia, *Submission 23*, p. 21.

109 Mr Mike Lawson, General Manager, Aerospace Defence and Australian Industry Participation Branch, DITR, *Committee Hansard*, 3 July 2006, p. 80.

7.95 ThyssenKrupp Marine considered that expanding the skilled workforce base to undertake construction of the AWDs and LHDs was possible and appropriate, but that other projects may need to go offshore:

> …construction of the AWDs and LHDs in Australia will impact on the other major acquisitions: the AOR [Auxiliary Oiler Replenishment ship] and strategic lift ship. The AWDs and LHDs will be the largest and most complex warships ever built in Australia. Problems, whose resolution will require experienced, skilled engineering management, will inevitably occur. Stretching the capacity of Australian industry to also build the AOR and strategic lift ships in Australia would introduce a very significant risk that the AWD and LHD projects would be left without sufficient resources to overcome these problems. The end result would be a significant increase in the risk of failure of the AWD and LHD projects.[110]

7.96 The Government of Western Australia reported the findings of a study into the employment demand and predicted skill requirements of major projects in WA over the period 2005 to 2010. The study found that while Western Australia could not afford to reduce its efforts to ensure the availability of skilled workers, generally major projects were not being significantly delayed or failing to go ahead as a result of an inability to source skilled labour. The Western Australian government considered that while 'the State would be ill-advised to leave the market entirely to its own devices', government and industry skills initiatives combined with the timing of the amphibious ships build should be 'sufficient to obviate the need for adjusting the demand side of the labour market by, for example, building the amphibious support ships offshore'.[111]

7.97 The Queensland government indicated that the AWD and LHD build programs should provide a catalyst for industry investment in workforce training:

> It is estimated that around 3,000 to 5,000 additional engineers, specialist technicians, key trades people and project managers will be required by defence industry over the next decade to provide the skills necessary to build and maintain Australia's major defence platforms. Defence and defence industry alike have an interest in, and responsibility for, developing these skills. The funding available for the program will not meet the full requirement for growth and industry will need to make an additional investment to grow the industry skill base to the required level.[112]

7.98 Submitters to the inquiry drew different conclusions about the implications of workforce availability for the AWD and LHD builds. Defence considered that

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110 ThyssenKrupp Marine Systems Australia Pty Ltd, *Submission 34*, p. 2. The Strategic Lift Ship Capability is currently planned for delivery in 2016–2018 and the Auxiliary Oiler Replenishment ship (HMAS *Success* replacement) is planned for delivery in 2015–2017. See *Defence Capability Plan 2006–2016*, pp. 67–69 and p. 134.

111 Government of Western Australia, *Submission 23*, pp. 21–22.

112 Queensland Government, *Submission 29*, p. 12.

building only the AWDs or Amphibious Ships in country would have a positive impact on program costs. Specifically:

> Defence would not be required to bear the significant Non-Recurring Expenditure (NRE) costs associated with the ramping up and ramping down of workforce requirements. The steeper the ramp-up /ramp-down the higher the NRE costs borne by Defence.[113]

7.99 Other witnesses considered that workforce and skill supply issues made a strong case for longer-term, more even defence demand. For example, the RSL considered that long-term employment benefits could be assured through a policy of Australian construction of all Australian warships and an ongoing ship replacement program as vessels reach the end of their service life.[114] Future Directions International Pty Ltd commented that 'Consistency of order books is the essential means of maintaining a skills set'.[115] The Government of South Australia commented that, from a workforce perspective, simultaneous construction programs are not ideal and that demand needs to be smoothed over the longer term.[116] South Australia called for a national skilling and shipbuilding infrastructure plan in the context of a rationalisation of the industry.[117] The issue of demand planning is covered further in chapter 15.

Workforce and skills initiatives

7.100 Numerous submitters expressed confidence in the ability of the industry to meet future naval construction demand. The committee heard about a number of initiatives being implemented by governments and industry to increase the supply of skilled labour to the naval shipbuilding industry. Several of these initiatives are canvassed below.

Federal government—skilling Australia's defence industry

7.101 The Skilling Australia's Defence Industry (SADI) Program is a federal government policy initiative aimed at addressing the shortfall in the quantity and quality of skills available to defence industry. In 2004 the federal government committed up to 0.5 per cent of the money spent on major defence capital equipment projects and maintenance to SADI, equating to around $215 million over ten years.[118]

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113 Department of Defence, *Submission 20A*, p. 13.

114 Returned and Services League of Australia Ltd (RSL), *Submission 6*, p. 3 and p. 5.

115 Mr Gregory Copley, Director and Acting Chief Executive, Future Directions International Pty Ltd, *Committee Hansard*, 3 April 2006, p. 16.

116 Government of South Australia, *Submission 9*, p. 26.

117 Government of South Australia, *Submission 9*, pp. 5, 26.

118 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), p. 42.

7.102 Defence has entered into SADI agreements with five companies, with two more imminent. A further two proposals are under review and Defence anticipates proposals from a further 15 companies in coming months.[119] The initial focus of SADI is on entering into agreements with larger companies who hold major contracts with Defence. Agreements are not generally established directly with SMEs. Rather, larger companies are encouraged to provide places for their subcontractors in the programs for which they receive SADI funds.[120] The South Australian government commented on the need to make SADI more appealing to small to medium enterprises.[121]

7.103 Proposals for SADI funding must meet a range of criteria, including addressing short, medium and long term growth requirements, attracting experienced and entry level employees and retaining skilled employees in the industry for longer. SADI proposals must target professional and technical trades where current and future shortages are identified.[122]

7.104 SADI funding is specifically aimed at expanding, not maintaining, the skilled workforce:

> Consideration will be given only to those proposals that demonstrably increase the numbers of skilled employees over and above the projected growth that could be reasonably expected within the constraints of a company's normal commercial considerations or any mandatory contractual conditions within an extant contract between Defence and the company. Funding will not be made available to proposals that maintain the status quo.[123]

7.105 Given that SADI is a relatively new program, as yet there is little evidence to assess its effectiveness. Defence explained that companies receiving SADI funds are required to report progress against agreed targets twice a year. The one company that has so far been required to report has achieved all its targets.[124]

State government initiatives

7.106 State governments, in conjunction with industry, have implemented a range of training and skilling initiatives to improve labour supply. The South Australian,

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119 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), p. 42.

120 *Skilling Australia's Defence Industry*, www.defence.gov.au/dmo/id/sadi/index.cfm, (accessed 8 May 2006).

121 South Australian Government, *Submission 9*, p. 16.

122 *Skilling Australia's Defence Industry*, www.defence.gov.au/dmo/id/sadi/SOR.cfm, (accessed 8 May 2006).

123 *Skilling Australia's Defence Industry*, www.defence.gov.au/dmo/id/sadi/SOR.cfm, (accessed 8 May 2006).

124 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), pp. 42–43.

Western Australian and Queensland governments provided particular detail of initiatives undertaken and these are outlined below.

South Australia

7.107 The South Australian government described the investments it is making to meet the trade and high technology skills needs of its naval shipbuilding industry. These investments included:

- $20 million for a Maritime Skills Centre at Port Adelaide to deliver trade and technical training to ASC and other users. The committee heard that the welding classes delivered at Port Adelaide are world's best practice, due to the exceptionally high standard of welding required for submarine production and maintenance.[125]
- $8 million with DSTO and the University of South Australia for the Centre of Excellence in Defence Industry Systems Capability, to enhance Australian industry capability in software engineering, systems engineering, systems integration and systems maturity.[126]

Western Australia

7.108 The committee received evidence about a number of initiatives in Western Australia relevant to naval shipbuilding workforce supply. These included:

- the Skills Formation Taskforce—led by industry, the taskforce has a major role in reforming the apprenticeship and traineeship systems in WA. Outcomes have included reducing the duration of building and construction industry apprenticeships to two and three years, with similar reductions planned for the metals and automotive industries;[127]
- the fast track apprentice program—which gives mature age and semi-skilled workers an 'express route' through the traineeship and apprenticeship system;[128]
- a school apprenticeship link program—which targets the transition from school to apprenticeships;[129]
- Challenger TAFE—which provides training to the RAN and other regional maritime forces and has developed relationships with key naval shipbuilding enterprises;[130]

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125 See for example Mr John O'Callaghan, Australian Industry Group Defence Council, *Committee Hansard,* 28 June 2006, p. 21.

126 South Australian Government, *Submission 9*, pp. 32–33.

127 Mr Robert Player, Challenger TAFE, *Committee Hansard*, 3 April 2006, p. 46.

128 Mr Robert Player, Challenger TAFE, *Committee Hansard*, 3 April 2006, p. 46.

129 Mr Robert Player, Challenger TAFE, *Committee Hansard*, 3 April 2006, p. 46.

- the Western Australian Applied Engineering and Shipbuilding Training Centre, run by Challenger TAFE—which is the main shipbuilding vocational training provider in WA, located within the Australian Maritime Complex;[131] and
- the Western Australian Skills Advisory Board—which is working to encourage permanent skilled migration to Western Australia.[132]

7.109 A joint ministerial taskforce 'Skilling WA's Defence Industry Task Force' has been established to look closely at Western Australia's defence industry needs and inform, among other things, the establishment of a defence industry training centre and the courses that the centre will provide. The taskforce follows a state commissioned consultancy that investigated the training strategies Western Australia should adopt to meet defence industry workforce requirements. Recommendations of that consultancy included:

- establishing a defence industry centre of specialisation in Western Australia to act as a training provider, developer and broker;
- conducting a comprehensive audit of skill requirements;
- customising and badging education and training programs to meet industry needs and provide definite pathways into the industry;
- promoting defence industry careers to senior secondary school students;
- exploring a 'defence industry group training scheme' to assist smaller employers to take on apprentices and trainees; and
- evaluating strategies to increase uptake of engineering courses.[133]

Queensland

7.110 The Queensland government outlined a number of initiatives which, although not targeted specifically at the naval shipbuilding industry, address the trade workforce base relevant to the industry. Some of these initiatives included:

- the Queensland Skills Plan—aimed at modernising the vocational and education training systems, including improving delivery of TAFE training and fostering partnerships with training providers, industry, communities and unions;
- development of a Trade and Technician Skills Institute and expansion of the number of trade and training places;

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130 Mr Robert Player, Challenger TAFE, *Committee Hansard*, 3 April 2006, p. 46.

131 Mr Robert Player, Challenger TAFE, *Committee Hansard*, 3 April 2006, p. 46.

132 Mr Gary Collins, Executive Director, Client Services, Chamber of Commerce and Industry Western Australia, *Committee Hansard*, 3 April 2006, p. 23.

133 Mr Robert Player, Challenger TAFE, *Committee Hansard*, 3 April 2006, p. 47.

- the SmartVET strategy—encouraging accelerated skill development and supporting workers to upgrade their skills. Some of the initiatives involved include developing skills formation strategies, recognition of prior learning, industry training partnerships and accelerated apprenticeships; and
- an integrated Manufacturing Careers Initiative—to promote manufacturing careers and pathways and address negative perception about working in the manufacturing industry.[134]

Overseas migration

7.111 Mr Gary Collins, of the Western Australian Chamber of Commerce and Industry, commented that training local people is an inadequate solution to Western Australia's shortage of skilled tradespeople. Skilled migration is also required to provide an adequate labour pool for the naval shipbuilding sector.[135] Tenix presented a similar view:

> Existing Government policy provides for skilled immigration in certain circumstances. It is worthwhile considering the need for higher priority to candidates with proven skills applicable to industries such as oil drilling, mining, shipbuilding and steel fabrication. In most cases, the basic skills are similar and transferable between these adjacent industries. The potential immigrants are available now; and if allowed to immigrate under controlled conditions they could easily offset the shortage needed for the AWD and LHD programs.[136]

7.112 The AMWU agreed that migrant labour may be required as an interim measure to enhance Australia's naval shipbuilding capacity:

> We are satisfied that, with the retraining programs that are in place and the supply of supplementary labour when required as an interim measure—migrant labour sourced by reputable companies that are not ripping off these migrant workers—we can deliver all the skills required for these major projects either now or in the future. If there is a short-term skill shortage, that can be filled with supplementary labour through reputable companies. So we do not think the skill shortage is a real factor that should be considered when we are talking about whether or not we build these vessels overseas.[137]

7.113 The potential for skilled migration programs to meet specialist labour shortages in Australia depends in part on the availability of skilled labour overseas. Other countries, for example in Southern Europe, are also experiencing skills

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134 *Submission 29*, pp 13–19.

135 Mr Gary Collins, Executive Director Client Services, Chamber of Commerce and Industry, Western Australia, *Committee Hansard*, 3 April 2006, p. 23.

136 *Submission 26*, p. 7.

137 Mr Pat Johnston, National Organiser, AMWU, *Committee Hansard*, 28 June 2006, p. 43.

shortages.[138] Mr Pat Johnston of the AMWU emphasised the importance of appropriately managed migration programs in this context:

> Australia is not the only country with a shortage of skills. There is a skills shortage all around the world. That is why it is important when people are sourcing labour from overseas to make sure that they have the right providers—those who have the expertise to supply the labour.[139]

7.114 Skilled migration has had an increased focus in Australia's overall migration program in recent decades. A record 97 500 places were allocated for skilled migrants in 2005–06.[140] As explained below, the skilled migration program targets particular areas of skills shortage.

Permanent migration—Migration Occupations in Demand List

7.115 In addition to age, English language and other generic requirements, migrants under the General Skilled Migration program are generally required to be qualified in an occupation listed on Australia's Skilled Occupation List.[141] This list includes a wide range of occupations in the categories of managers and administrators, professionals, associate professionals and tradespeople and related workers. In addition, the Migration Occupations in Demand List (MODL) lists occupations and specialisations which have an identified and ongoing national labour shortage. Migration applicants are awarded additional points if their nominated occupation is on the MODL and further points if they have a job offer from a suitable Australian employer. Migration applications from people whose nominated occupation is on the MODL are also given priority processing.[142]

7.116 As at March 2006 several occupations relevant to naval shipbuilding were listed on the MODL, including metal trades such as metal fabricators, machinists, sheetmetal workers and welders. Electrical trades listed included general and specialist electricians and electronic instrument tradespersons. The MODL is reviewed twice a year to take into consideration any existing and emerging skills shortages.[143] Therefore, there is some scope for the existing permanent skilled migration program to respond to labour shortages related to naval shipbuilding.

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138 Mr David Kobelke, Director, Industry Capability Network, Chamber of Commerce and Industry Western Australia, *Committee Hansard*, 3 April 2006, p. 29.

139 *Committee Hansard*, 28 June 2006, p. 48.

140 Parliamentary Library, 2006, *Skilled migration to Australia*, http://www.aph.gov.au/Library/intguide/SP/Skilled_migration.htm, (accessed 15 June 2006).

141 Department of Immigration and Multicultural Affairs, *General Skilled Migration*, http://www.immi.gov.au/migration/skilled/index.htm, (accessed 15 June 2006).

142 Department of Immigration and Multicultural Affairs, *Do you have an occupation in demand?* www.immi.gov.au/migration/skilled/advice_doc/gn_modl.htm, (accessed 19 May 2006).

143 Department of Immigration and Multicultural Affairs, *Do you have an occupation in demand?* www.immi.gov.au/migration/skilled/advice_doc/gn_modl.htm, (accessed 19 May 2006).

Temporary migration—457 visas

7.117 In addition to increases in permanent skilled migration, there has been an increased focus on temporary migration in recent years. The Temporary Business (Subclass 457) visa, introduced in 1996 and expanded in 2002, allows skilled personnel to come to Australia to work for an approved employer for up to four years. Minimum skill and salary levels apply to positions filled through the 457 visa program, although certified regional employers have been able to seek exemptions from these requirements.[144] In 2004–05, some 26 280 class 457 visas were granted.[145]

Conclusion

7.118 Availability of skilled labour is a critical determinant of the Australian industry's capacity for naval shipbuilding. It is clear that Australia has a quality skilled labour base, with skills relevant to naval shipbuilding distributed across different sectors of the economy. Defence, however, is correct to draw a distinction between a capable workforce and one that has the capacity to meet an increase in demand.

7.119 It is clear that there are skilled labour shortages in a number of occupations required for naval shipbuilding. The committee received different views as to whether labour shortages are so significant as to affect adversely the successful delivery of upcoming build programs. Many witnesses were confident that the workforce could be expanded, through training, movement between sectors and immigration, to meet the challenges associated with both the AWD and LHD builds. Other submitters, including Defence, were more circumspect. The committee is cognisant that in a competitive tender environment, such as the current naval shipbuilding environment, companies would tend to be publicly optimistic about their ability to attract and retain labour.

7.120 The committee recognises the cautious approach by some submitters towards meeting the increased labour demands. For example, they are concerned that mobilising labour for naval shipbuilding could sacrifice the capacity for repair, maintenance and upgrade of the current fleet, or adversely impact on other profitable industry sectors.

7.121 However, the committee also recognises the opportunities a naval shipbuilding industry provides as a catalyst for skills development and workforce growth. Forecast labour shortages are an incentive for innovation and industry investment in training and skills development. Government investment in naval shipbuilding programs in the past has strongly contributed to the workforce capacity

144 Department of Immigration and Multicultural Affairs, *Sponsoring a temporary overseas employee to Australia*, http://www.immi.gov.au/allforms/booklets/1154.pdf (accessed 15 June 2006).

145 Senator Vanstone, Answer to Question No 1669, *Senate Hansard*, 14 June 2006, p. 102. Data refer to primary onshore visa grants.

that exists today. This resource, particularly highly specialised skill sets, will atrophy without further on-shore construction projects.

7.122 The committee considers that current skills shortages provide a significant but not insurmountable challenge for local construction of both the AWD and LHD platforms. The committee sees critical roles for industry, Defence and government in addressing the challenge. If Australian industry is to benefit from substantial federal funding, in the form of local construction of naval acquisitions, industry must show that is has innovative responses and solutions to skills challenges. The committee is encouraged by Australian and state government and industry investment in relevant training and skilling initiatives. The committee also notes that appropriate enterprise bargaining arrangements, which foster innovation and encourage workforce productivity, are important to address labour and skills issues and increase industry efficiency.

Chapter 8

Intellectual property

8.1 In a global industry such as naval shipbuilding, capacity cannot be considered on a country by country basis alone. Australia must access the knowledge and technology of world leaders in order to keep pace with technological developments and support its fleet. In this context, this chapter discusses Australia's capacity and requirements in the area of intellectual property (IP).

8.2 As noted elsewhere, Australia largely sources ship designs from overseas and, except in niche areas, is reliant on overseas designed weapons and other systems. With limited indigenous IP, the ability to negotiate and manage contracts guaranteeing access to IP is essential for efficient and sustainable naval shipbuilding.

Negotiating in a global market

8.3 Defence stated that it deals with intellectual property rights in a 'unique way':

> Instead of seeking particular categories of intellectual property, Defence contracts for broad groupings of rights often designated as foreground, background and third party intellectual property. It does this because it is often difficult to determine what intellectual property exists or will exist, and the nature of that intellectual property.[1]

8.4 Defence explained that the task of 'intellectual property needs identification' is undertaken in conjunction with other planning activities for each acquisition. The needs identification phase forms the basis of Defence's approach to negotiating intellectual property rights. Among other things, the phase gives guidance as to which rights should be owned by Defence and which rights licensed to Defence. Defence explained:

> Whilst ownership of intellectual property will give Defence the greatest flexibility, Defence may pay a high premium to own the intellectual property. It may be more cost-effective to negotiate a broad licence over the necessary intellectual property, if this will allow Defence to achieve its operational or business goals. In some scenarios ownership of intellectual property may be required, despite the added expense, for strategic or national security reasons.[2]

8.5 The ability of Australian companies to gain access to necessary intellectual property depends in part on inter-government relations. As ASC mentioned in its submission:

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1 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), Question W5.

2 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), Question W7.

> In order to build sophisticated warships, a builder must secure commercial and security rated access to a wide range of warship design, technology, hardware and software systems. Some of this is available through the negotiation of commercial partnerships and supply contracts but some can only be acquired by having appropriate national security clearances and government-to-government 'fathering' agreements, for example the United States/Australian agreement for the AEGIS air warfare destroyer weapons system. Securing and maintaining such access requires the successful negotiation of appropriate agreements and the implementation and maintenance of many commercial and security systems and practices.
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> Failure to achieve appropriate security clearances and agreements with governments and other high technology systems providers, and failure to build confidence that information acquired will be protected, leads to denial of critical technologies and systems.[3]

8.6 In an assessment of defence industry generally, Professor Paul Dibb touched on the complexities involved in securing such agreements:

> This [increasing dependence on access to US technologies] will require that we negotiate firmly with the US over its non-disclosure policies and get access to the source codes that will enable us to modify or alter the performance characteristics of US platforms, missiles and sensors. These are highly sensitive issues, even for such a close ally of the US as Australia.[4]

8.7 Defence was generally satisfied with Australia's bargaining position, noting that 'the degree of leverage Australia possesses in intellectual property negotiations depends largely on the nature and value of the procurement'.[5] Defence observed that the Defence Materiel Organisation's (DMO) 2006–07 budget of $8.7 billion equates to around 0.8 per cent of Australia's GDP, giving DMO some leverage in negotiating contract terms with Australian companies. Further, Defence noted that 'as the market amongst advanced industrialised countries for defence industry is relatively small, Australia retains a reasonable degree of leverage with international companies'.[6] Of course, this assessment is based on DMO's entire budget, not naval shipbuilding specific acquisitions and technologies.

8.8 In relation to U.S. technology, Defence acknowledged:

> Some difficulties have arisen with US companies because of restrictions on exporting US information, including associated intellectual property, under

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3 ASC Pty Ltd, *Submission 17*, p. 9.

4 Professor Paul Dibb, 'A Defence industry development strategy', *The business of defence: sustaining capability*, CEDA Growth No. 57, August 2006, p. 18.

5 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), question W9.

6 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), question W9.

> the International Traffic in Arms Regulations. These difficulties apply to all countries dealing with the US, not only Australia.[7]

8.9 Defence explained some of the mitigation strategies DMO uses to deal with difficulties that arise with negotiating intellectual property rights. These include buying commercial-off-the-shelf (COTS) and military-off-the-shelf (MOTS) capabilities which generally have appropriate intellectual property right attached to them.[8] However, a key consideration for Defence's naval acquisition decisions is the need for capabilities that meet Australia's specific operational requirements. COTS and MOTS options are not always able to meet these requirements.

8.10 Another strategy used by DMO, where it has been unable to obtain intellectual property or technical data from an equipment manufacturer, is to use 'agreements with other countries to enable a transfer of the intellectual property or technical data needed to meet a capability requirement'.[9]

Benefits of IP access

8.11 Contractual arrangements guaranteeing access to IP and design rights are critical both to construction and to cost-effective through-life support. Without ownership or access to IP, Australia is left dependent on system providers' specifications, developments and upgrades. This limits Australia's capacity to independently integrate, repair and upgrade systems and tailor them to specific strategic requirements.

8.12 ASC Managing Director Mr Greg Tunny told the committee that access to IP is important for efficient production:

> What is most important is the access to the intellectual property. If I have full and free access then I do not so much mind who owns it. But if the ownership brings access restrictions then I may mind. Those access restrictions, for example, may be my disclosure of that intellectual property to the subcontractor of my choice. That may cause me to have to choose another subcontractor or to do it myself when I would have preferred to give it to a subcontractor or other issues like that.[10]

8.13 Defence reiterated throughout the inquiry that its focus for Australian industry was ensuring that the sector has sufficient capacity to sustain, maintain and upgrade

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7 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), question W9. See also chapter 2, paragraphs 2.27–2.30.

8 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), question W9.

9 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), question W9.

10 *Committee Hansard*, 4 September 2006, p. 6.

the fleet.[11] As such, Defence's discussion of IP focused on development and sustainment of defence capability:

> Defence must ensure that it owns or licenses rights to all intellectual property that it requires to develop and sustain Defence capability. Defence must ensure that it has access to all appropriate technical data to enable it to exercise its intellectual property rights. As a minimum, Defence must secure sufficient control of intellectual property to allow for the use and support of the relevant Defence capability.[12]

8.14 Other submitters commented not only on Defence's operational needs, but also the wider benefits of owning intellectual property, for example developing and exploiting export opportunities. ASC stated:

> Possessing…high-end design engineering skills provides scope for owning a vessel's functional and structural design intellectual property. This major advantage provides the shipbuilder with the freedom to export any vessels and designs without confronting crippling licence fees and other constraints from foreign design owners. Export opportunities, in turn, have the potential to generate further economies of scale.[13]

8.15 Mr Gaul, President of CEA Technologies, noted the importance of both international partners and IP agreements in developing export activity:

> I think those relationships [with larger overseas corporations] are critical going forward. I really do believe it is something that can be emulated in other strategic areas of Australian industry. To have a global reach, you must have global partners, because we do not have a global company in Australia, apart from BHP. Getting the right partners becomes an essential element. It was a very deliberate process that we went through to get Northrop Grumman on board. We first of all got two big brothers—the US government and the Australian government—and we got IP agreements. So they were standing next to us.[14]

8.16 Defence noted that it does facilitate access by Australian industry to Defence intellectual property and assists industry to benefit from that access 'as appropriate'. Defence also 'facilitates Australian industry access to third party intellectual property, with the goal of developing a national defence capability, where this is consistent with ownership and licensing rights'.[15]

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11 See for example Lt Gen. Hurley, *Committee Hansard*, 18 August 2006, p. 29.

12 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), question W7.

13 *Submission 17*, p. 6.

14 *Committee Hansard*, 3 July 2006, p. 30.

15 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), question W7.

Australian IP development

8.17 As discussed in Chapter 2, advances in technology and increasing costs mean that few countries can produce sophisticated naval combat, sensor and communication systems in their own right. A review of Defence industry by ACIL Tasman commented on the need to strike a balance between access to overseas technologies and investment in indigenous innovation:

> Excessive reliance on overseas intellectual property and innovation will lead to the 'dumbing down' of Australia's capability…thereby reducing Australia's strategic and commercial options.[16]

8.18 Dr Richard Brabin-Smith considered that there are four broad criteria for assessing whether to develop indigenous research and development. These criteria are:

- where Australia has critical needs that are so different from those of other nations that their products do not come sufficiently close to what we require;
- where there are sensitive and compelling national security considerations;
- where not even our closest allies are prepared to share sensitive information or materiel with us; and
- where a new idea has emerged with potential benefits so compelling that it would be folly not to take it further.[17]

8.19 In addition to the technology and design developed by Australian prime companies and SMEs, the Defence Science and Technology Organisation (DSTO) contributes to Australia's capacity for indigenous IP and innovation in support of Australia's strategic defence requirements. DSTO has broad based industry relationships and described its goals for industry interaction as:

> (i) enhancing industry capability to support Defence, and (ii) national wealth creation, whilst royalty income may be a by-product for DSTO.[18]

8.20 DSTO noted that although its primary focus is on developing Defence capability, subsequent commercialisation has potential applications for both defence and civilian operators. DSTO works with industry in a range of ways, including:

- industry alliances—focusing on areas of mutual interest, innovation and developing pathways to commercialisation;
- the Capability and Technology Demonstrator Program—enabling Australian industry to exhibit new technologies to Defence and explain potential Defence applications;

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16 ACIL Tasman, November 2004, *A Profile of the Australian Defence Industry*, p. 98.

17 Dr Richard Brabin-Smith AO, 'Defence Innovation in Australia', *The Business of Defence Sustaining Capability*, CEDA Growth No 57, August 2006, p. 27.

18 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), p. 1.

- centre of expertise with universities—which provide a platform for contract research in specific areas and enable universities to leverage additional funding;
- collaborative relationships—enabling DSTO to broaden the knowledge base on which it conducts its research; and
- assisting commercialisation—for example growing Australian Defence industry through technology transfer and knowledge exchange with DSTO IP.[19]

8.21 Cutting edge naval technology has been developed in Australia with the assistance of the DSTO. As noted in Chapters 4 and 5, the anechoic, low-observable tiles developed for the Collins class submarines are recognised as world class technology. Other examples include the Australian Minesweeping System (AMAS), developed under a licence agreement by DSTO and ADI, and carbon-fibre patching for ships' decks, developed by DSTO and transferred under license to ADI.

8.22 As at July 2006, DSTO was managing 80 licenses. DSTO commented that:

> Although only a small number of these 80 licenses provide any significant royalty returns, substantial export revenues have been generated through just 2 DSTO-based technologies (AMAS, and Advanced Sonar Systems). This highlights DSTO's philosophy of providing its intellectual property to industry in order to enhance defence capability and national wealth creation, rather than create revenue.[20]

8.23 The above examples demonstrate that while key components of Australia's naval ships are sourced from overseas, the indigenous capacity for technology development should not be overlooked.

Conclusion

8.24 Access to and control over IP is an element of naval shipbuilding where Australia's capacity is vulnerable. As noted previously, Australia largely sources ship designs from overseas and, except in niche areas, is reliant on overseas designed weapons and other systems. In selected areas Australia's research and development has produced cutting edge technology and generated important indigenous IP. However, as a relatively small market Australia will inevitably need to continue to access the technological advances made in the larger defence markets of Europe and the U.S.

8.25 The ability to negotiate and manage contracts guaranteeing access to IP is therefore vital to Australia's capacity for naval shipbuilding and repair. Without

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19 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), pp. [2–6].

20 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), pp. [7–8].

control over IP, Australia is unable to maintain operational sovereignty. Where IP is secured, there is potential for growth, development and export. Australia's capacity in this area is therefore largely reliant on the ability of DMO to negotiate contract outcomes effectively.

Part III

Productivity of the Australian shipbuilding and repair industry

Part II considered the capability of Australian primes to meet Navy's future shipbuilding and repair demands, the adequacy of the network of suppliers required to service the industry, the infrastructure needed to support a naval shipbuilding industry in Australia and the available skill base and workforce to sustain the industry. It found that in all four areas, Australia has the capability or the potential to achieve that capability. Whether Australian companies are internationally competitive in the construction and through-life support of naval vessels is another matter.

Part III examines the comparative economic productivity of the Australian shipbuilding industrial base and associated activity with other shipbuilding nations. It then looks at the comparative economic costs of maintaining, repairing and refitting large naval vessels throughout their useful lives when constructed in Australia vice overseas. Finally, it considers the broader economic development and associated benefits that accrue from building, maintaining and upgrading naval ships in Australia including the strategic arguments for, and advantages in, having a viable naval shipbuilding and repair sector in Australia.

Chapter 9

The comparative economic productivity of the Australian shipbuilding industrial base and associated activity with other shipbuilding nations

9.1 While Australia may have the shipbuilders, the supply chain, the infrastructure and the skills base capable of sustaining a naval shipbuilding industry, it is quite another matter whether this industry can match or better the productivity of overseas competitors. This chapter considers the data available that would enable a comparative analysis of Australian shipbuilders and their overseas counterparts. It then endeavours to compare the economic productivity of the Australian shipbuilding industrial base and associated activity with other shipbuilding nations.

Difficulties in comparing the productivity of shipyards in Australia and overseas

9.2 The difficulty in undertaking a comparative analysis of the productivity of shipyards is underscored by the findings of a recent work, *First Marine International findings for the global shipbuilding industrial base benchmarking study, Part 1: Major shipyards.* The study was to provide a direct international comparison and a comparison of the performance of U.S. naval and commercial builders. It compared the practices and technology employed in six major U.S. shipyards with those of seven selected leading international commercial and naval shipbuilders in Europe and Asia.

9.3 A key component of the study was to establish the productivity of U.S. shipbuilders in order to make comparisons with the international yards and to determine how effectively the U.S. yards use the technology applied.[1] The analysis was hampered, however, by a lack of information. The study acknowledged this weakness:

> As the majority of the U.S. shipyards benchmarked were unable to supply the information required to calculate shipyard performance, productivity has been estimated from information available in the public domain…the resulting estimates are considered to be indicative only and would need to be validated by calculations supported by the shipyards before any robust conclusions could be drawn. Even so, the estimate of overall industry productivity is in-line with the expectations resulting from the technology survey carried out in the shipyards.[2]

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1 First Marine International, *Findings for the Global Shipbuilding Industrial Base Benchmarking Study, Part 1: Major shipyards,* August 2005, p. 3.

2 First Marine International, *Findings for the Global Shipbuilding Industrial Base Benchmarking Study, Part 1: Major shipyards,* August 2005, p. 14.

9.4 In order to provide a direct international comparison, the study used man-hours per Compensated Gross Tonnage (CGT)[3] and $US per CGT as overall measures for productivity and cost performance respectively.[4] Again the study warned:

> This method has produced very rough estimates, based on very limited information, and extreme caution is advised regarding its use. Shipyard cooperation is required to produce a more definitive estimate.[5]

9.5 The study produced very helpful advice to the U.S. shipyards on how they could raise their productivity. This advice also has direct application to all shipbuilders including those in Australia. It provides a best practice guide for governments who are major purchasers of naval vessels on how to manage better their practices in order to assist their shipyards become more efficient and cost effective. The study, however, did not help the committee in its task of comparing economic productivity. It should be noted that Defence considered the study to be 'the only public comparator of productivity factors across US/Europe/Australia'.[6]

Quality of available data

9.6 According to witnesses and the committee's research, there is a lack of clear and solid comparative economic and productivity data on the naval shipbuilding industry.[7] Engineers Australia believed that the type of detailed benchmarking and analysis required to compare Australian shipyards with shipyards overseas has never been done. Certain that no results have been published, it concluded:

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3 Compensated Gross Tonnage is the measure of work content that forms the basis of the productivity estimate. It is the international gross tonnage (a measure of internal volume) of the vessel multiplied by a compensation coefficient which represents the complexity of the vessel design. It allows the productivity of different shipyards to be compared even though they may be …the man-hours required by a particular shipyard to execute the work content are determined by multiplying the CGT for the vessel by the productivity of the yard in terms of man-hours per CGT. First Marine International, *Findings for the Global Shipbuilding Industrial Base Benchmarking Study, Part 1: Major shipyards,* August 2005, p. 13

4 First Marine International, *Findings for the Global Shipbuilding Industrial Base Benchmarking Study, Part 1: Major shipyards,* August 2005, p. 33.

5 First Marine International, *Findings for the Global Shipbuilding Industrial Base Benchmarking Study, Part 1: Major shipyards,* August 2005, p. 33.

6 Question 1, answer to question on notice, 18 August 2006 (received 31 October 2006).

7 See for example, Rear Admiral Kevin Scarce, Port Adelaide Maritime Corporation, *Committee Hansard,* 19 April 2006, p. 21; ASC Pty Ltd, *Submission 17,* p. 14. ASC's submission stated: 'it is very difficult to make direct comparisons between the cost efficiency of Australia's naval shipbuilding industry and those in foreign countries. in nearly every case Australia has built significantly different ships to those built elsewhere and, coupled with the fact that comparative pricing data rarely exists, assumptions about life-cycle costing and the relative costs of through-life support differ'.

> In the absence of such analytical data, any assessment of comparative economic productivity of the Australian shipbuilding industrial base and associated activity with other shipbuilding nations is subjective in nature.[8]

9.7 The South Australian government also found that there was 'little definitive information available to assess the economic productivity of constructing naval vessels in Australia compared with overseas'.[9] The Department of Industry, Tourism and Resources (DITR) agreed with the view. It said:

> The sort of information that is available can be the market outcomes of who is actually producing these things which have been sold in world markets. That tends not to apply to naval shipbuilding, so you cannot find analysis from market outcomes. In terms of industry level statistics, we provided some statistics for various countries on the relative productivity of Australia versus other countries. We also point out the difficulty as to those numbers. They are imperfect numbers in various ways. The output measures are problematic and the input measures are problematic.
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> In terms of specific firm or company level data, we have not been able to find publicly available data that enables us to compare Australia with other countries. People have made reference to the First Marine International study which was done for the US Department of Defense, and I understand they visited some of the Australian companies. But that material on Australian companies has not yet been published.
>
> It is really the nature of the beast of government procurement, defence procurement and commercial in confidence that that sort of data at a company level is not going to be available.[10]

9.8 Aside from this lack of data, the degree of regulation and government control or intervention in the naval shipbuilding industry is another factor when considering the productivity of shipyards.

A protected industry and distorted data

9.9 A number of submitters cited the protected nature of the naval shipbuilding industry as a major complication when comparing productivity between different countries.[11] Indeed, as noted in chapter 2, a number of shipyards are government owned or controlled enterprises. Furthermore, the range of direct or indirect

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8 *Submission 24*, p. 22.

9 *Submission 9*, p. 5.

10 *Committee Hansard*, 3 July 2006, p. 80–81.

11 For example, the Western Australian government, the AMWU and Tenix refer to distortions in the naval shipbuilding market created by government interventions which make robust international comparisons of the costs of naval shipbuilding in different countries difficult. They believed that it was unsafe to make direct comparisons between the costs of building in Australia with overseas countries who receive government benefits in the form of subsidies and protective legislation to support/protect the local industry.

government assistance given by overseas governments to their local shipbuilders takes on many and various forms—money grants, soft loans, debt guarantees, tax shelters, tariffs and provision of equity capital (see also paragraphs 2.15–2.18).

9.10 The Government of Western Australia was one of many participants in the inquiry who urged the committee to bear in mind the distortions in the naval shipbuilding market that stem from government interventions, particularly since the end of the Cold War. In its view, this interference makes 'any attempt to estimate such premiums and make robust international comparisons of the costs of naval shipbuilding in different countries notoriously difficult'.[12]

9.11 The Australian Manufacturing Workers Union (AMWU) also argued that the differing levels of protection by other shipbuilding nations creates difficulties in comparing productivity.[13] Tenix voiced its concerns about making direct comparisons between the costs of building in Australia and some overseas countries who receive government benefits in the form of subsidies and protective legislation to support the local industry.[14] To the same effect, the Australian Shipbuilders Association noted that 'Some countries still maintain industry protection in the form of hidden tariffs and subsidies that provide a false perspective on their efficiency'. [15]

9.12 Rear Admiral Doolan and the RSL similarly spoke of the difficulties in establishing the cost effectiveness of overseas naval shipbuilders because of government assistance to that sector which provides 'a false perspective on their efficiency'.[16] The RSL argued that 'With so many variables and questionable data it would be imprudent to make any firm judgment about this issue'.[17]

9.13 The committee sought advice from Defence about the difficulties conducting comparative analysis on the productivity and cost effectiveness of Australian shipyards against overseas yards. Defence's assessment confirmed the view that there are significant difficulties in comparing this type of economic performance. It also cited the use of subsidies by previous and current governments in Australia and overseas which hampers the production of 'meaningful comparative data'. It explained further that the difficulty is exacerbated by the range of national funding arrangements for military ships in areas covering:

- design development and R&D costs of ships and equipment relevant to a particular acquisition;

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12 *Submission 23,* p. vi.

13 *Submission 21,* p. 7.

14 *Submission 26,* p. 3.

15 *Submission 36,* p. 7.

16 *Committee Hansard*, 3 July 2006, pp. 67–68.

17 *Submission 6,* p. 4.

- other cost attributions (or cost recovery) available from other related defence programs (eg staff allocations/skilling, etc); and
- broader infrastructure investment and other operating costs that may be hidden or charged differently to a specific ship program to suit commercial interests.[18]

9.14 The lack of reliable data coupled with the difficulties in ascertaining the extent to which the shipbuilding industry benefits from direct and indirect government assistance prevents the committee from making any definitive finding about productivity in Australian or overseas shipyards. There is evidence, however, that provides some indication of the economic productivity of the Australian industrial base.

Data on Australian productivity

Australian shipyards, the construction of commercial steel ships and niche capabilities

9.15 Despite the lack of sound data, most studies and commentators generally accept that countries such as South Korea, China and Japan dominate, and are highly competitive in, the construction of commercial ships, notably large tankers and carriers. Chapter 2 provided detail on the shipbuilding industry in these countries (see paragraphs 2.48–2.54). Australia is simply not in their league. Indeed, DITR informed the committee that, 'In large commercial steel ships the evidence is equally clear that Australia is not as productive as other countries. We have not produced large commercial steel ships for around thirty years'.[19] Austal asserted that:

> Australian industry is not able to compete with the well-established, highly productive steel shipyards in Asia whose main threat comes from the rapidly expanding Chinese industry which has access to a large, low cost workforce and inexpensive land for the development of the necessary infrastructure.[20]

9.16 On performance, however, some Australian companies, notably Austal and Incat, have clearly demonstrated that they have a competitive edge in niche markets of the commercial and naval shipbuilding industry.[21] The Australian Shipbuilders Association also referred to the demonstrated world class competitiveness of Australian shipbuilders as the leading manufacturer and exporter of large fast ferries

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18 Question 1, answer to question on notice, 18 August 2006 (received 31 October 2006).

19 Mr Lawson, DITR, *Committee Hansard*, 3 July 2006, p. 71.

20 *Submission 7*, p. [4].

21 DITR noted that Austal and Incat 'have designed and exported naval ships based on indigenous commercial designs. They have been able to capture economies of scale based on having unique capabilities and intellectual property in the aluminium fast ferry businesses, which they have been able to carry over into naval vessels'. DITR, *Submission 38*, p. 2.

as an indicator of the potential in Australia. It suggested that 'export success by the sector generally would re-enforce the comparative economic productivity of the Australian shipbuilding industry'.[22]

9.17 The committee's delegation witnessed the success of Austal's overseas enterprise when it visited the company's facility in Alabama which was opened in 2001. Since then Austal USA has built and delivered eight ships in the yard, including a 192 foot high-speed vehicle-passenger ferry, two 150 foot fast crew/supply monohulls, an 86 foot high-speed passenger catamaran, a 111 foot dinner cruise catamaran, a 135 foot dinner cruise monohull, a 143 foot high-speed passenger/excursion catamaran and a 102 foot surface-effect ship. Austal is currently constructing the largest aluminium catamaran in the U.S., a 107 metre high-speed cargo/passenger ferry for Hawaii Superferry. In terms of naval vessels, as the designer and builder of the Littoral Combat Ship (LCS) platform, Austal is part of the General Dynamics team offering a unique trimaran solution for the US Navy.

9.18 Delegation members discussed with Austal representatives the Littoral Combat Ship (LCS) program. The LCS is intended to operate in coastal areas globally, be highly manoeuvrable and configurable to support mine-warfare, anti-submarine and surface ship warfare. Austal's LCS is based on its trimaran underwater hull design, which offers superior seakeeping and speed, along with the capacity to configure a range of weapons packages. It is a 127 metre long craft, with maximum hull draft of 4.5 metres and speed over 40 knots. The mission bay comprises 1000 m^3 and the ship has aviation capacity for one H-53 or two H-60 helicopters. Mission specific system modules, such as submarine seeking or minehunting modules, can be added to the generic vessel (the 'sea frame') to tailor the ship's specific capabilities. Open architecture systems are therefore critical.

9.19 The LCS is being built using the principle of 'cost as an independent variable'. Austal offers capability options within its capped price of $220 million. Where further specification changes are required the resulting cost and capability outcomes are assessed.

9.20 The committee also visited the Incat shipyard in Hobart where it inspected one of the high-speed craft on lease to the U.S. Army (see chapter 4). In April 2006, Mr Craig Clifford, Managing Director of Incat Australia, informed the committee that currently the company had leased three vessels to the U.S. military—*Joint Venture*, a 96-metre vessel charted on a long term basis (nearly 5-years), *Spearhead* and *Swift* both 98-metre catamarans. He explained the nature of the company's relationship with the U.S. military which has been developing since 2000 'when HMAS *Jervis Bay* in the north of Australia opened the eyes of the military world as to what an aluminium, catamaran, high-speed craft could achieve'. He stated:

> A dialogue was opened up with various arms of US military which led to the charter of our hull No. 50, which up until that point in time had been in

22 *Submission 36,* p. 7.

> a commercial operation between the North and South Island of New Zealand. A combination of Navy, Army and other arms within US military chartered the vessel. It was appropriately called Joint Venture because it was a joint venture between a numbers of arms. They have chartered that vessel on what has turned out to be a long-term basis to operate in various field sectors that they are interested in.[23]

9.21 Mr Clifford noted the political obstacles in the U.S. that prevent the U.S. purchasers from buying a foreign asset of the size and cost of the types of vessels on lease to the U.S. Defence. He maintained that the leasing arrangement was operating successfully and that the company had explored the option of building vessels in America. Looking to the future, he advised the committee that the company's next stage is a 112 metre vessel made entirely of aluminium:

> Today we are building 98-metre vessels for the commercial market and 112-metre vessels for the commercial market and are pursuing additional military opportunities as they present themselves.[24]

He suggested that the vessels are popular with the commercial world because of their speed, their carrying capacity and their competitive costs.[25]

Australia's record in the construction of naval ships

9.22 Returning to steel-hulled naval vessels, however, the absence of reliable data on these ships makes any assessment of Australia's competitiveness in naval ship construction difficult. To gain some appreciation of the productivity of Australian shipbuilders, many witnesses, as a starting point, drew on the industry's proven capability over recent decades to construct modern naval vessels on a sustainable basis.[26] For example, the RSL noted the way in which the naval shipbuilding sector has adapted to changing circumstances with teaming arrangements and by other collaborative means to meet varying government needs. It stated:

> With this track record there is no reason to believe it cannot continue to adapt. Given the high probability of the ongoing need to continue to replace all major Australian warships over the next half century, there is a clear opportunity to continue to grow a national industrial capacity to meet the need. A consistent government policy of building all Australian warships in Australian shipyards would strengthen the industrial basis of the industry and give it the best chance of evolving efficiently and effectively.[27]

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23 *Committee Hansard*, 28 April 2006, p. 3.

24 *Committee Hansard*, 28 April 2006, p. 2.

25 *Committee Hansard*, 28 April 2006, p. 2.

26 *Submission 9*, p. 26. See also Australian Academy of Technological Sciences and Engineering, which stated it belief that a viable naval shipbuilding industry is possible in Australia based on past performance and potential future Defence demand. *Submission 18,* p. 1. See also *Committee Hansard*, 19 April 2006, p. 21.

27 *Submission* 6, p. 3.

9.23 Taking the same approach, Rear Admiral (Ret'd) W. J. Rourke submitted that the productivity of local shipbuilders is practicable and appropriate. He argued that local construction can usually compete well with U.S. construction costs and those of Europe.[28] Thiess provided an example of where it believes Australian shipbuilders are competitive:

> If we compare raw productivity figures in terms of welding for offshore purposes, Australia competes very successfully against US standards achieved on the Gulf of Mexico coast, where most of the efficiency standards in that industry are set.
>
> Therefore in global terms, the Australian shipbuilding industry is capable of competing successfully against world standards.[29]

9.24 Tenix commissioned a benchmarking study of its performance as a shipbuilder against companies through Asia, Europe and the U.S. According to Tenix, the study indicated that Tenix is 'above the midpoint of where many of the best yards in the worlds are in'. Although the study showed the company's strength in planning systems and organising work, it had specific suggestions to improve its modular assembly.[30]

9.25 Raytheon Australia noted that it had conducted a benchmarking test against its parent company in the U.S. The study showed that Raytheon Australia 'could conduct many of the functions associated with systems engineering and systems integration at less than two-thirds of the cost of doing them in the U.S.'[31]

9.26 Many submitters cited the construction of the ANZAC frigates and the Minesweepers as evidence of Australia's capability to build naval vessels on time and on budget and with economic benefits to the nation (see chapter 4).[32] The AMWU observed that:

> The ANZAC frigate project, based at Williamstown, Victoria, was extremely efficient. The project for 10 frigates, costing $5.6 billion (in 1999 dollars) over 10 years, was, until the new Air Warfare Destroyer project, the largest single defence contract ever entered into by Defence. All of the frigates have been delivered on time and on budget.
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> In 1994, Defence awarded ADI Limited a contract to build 6 Italian-designed minehunter vessels at a contract value of $917 million. ADI delivered the first minehunter, HMAS Huon, on time and on budget in March 1999.[33]

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28 *Submission 1*, p. 4.

29 *Submission 22,* p. 12.

30 *Committee Hansard*, 27 April 2006, p. 7.

31 *Committee Hansard*, 3 July 2006, p. 3.

32 AMWU, *Submission 21,* p. 3.

33 *Submission 21,* p. 3.

9.27 Two significant studies inform most commentary on the productivity of Australia's naval shipbuilding industry—*A case study of the ANZAC Ship Project*, and *Impact of Major Defence Projects: A case study of the Minehunter coastal project.*[34] Although they were not comparative studies, they did demonstrate clear savings.

9.28 The Australian Industry Group (AiG) represented the views of many witnesses in submitting that Australia's naval construction industry has proven its capacity to deliver major defence capabilities within the time schedule and budget. It also cited ADI and Tenix's involvement in the recent 'highly successful' naval construction projects—the Minehunters and ANZAC frigates.[35] It stated:

> The ANZAC frigate project, based at Williamstown, Victoria, provides a first-class template of success. The project for 10 frigates, costing $5.6 billion (in 1999 dollars) over 10 years, was, until the new Air Warfare Destroyer project, the largest single defence contract ever entered into by Defence. All of the frigates have been delivered on time and on budget.[36]

9.29 The Australian Shipbuilders Association contended that the costs of building most categories of naval vessel in Australia can be comparable with, if not better than, those achieved in foreign countries. It also cited data gathered from the ANZAC and Minehunter studies to strengthen its argument, asserting the 'after the initial learning curve, production in each program was efficient and globally competitive'. [37]

9.30 The Submarine Institute of Australia Inc was of the view that 'The Collins Class submarine program demonstrated that the Australian naval shipbuilding industry competitiveness is on a par with overseas countries (for example, Europe and the U.S.). According to the Institute the submarine program demonstrated that the key to controlling and minimising costs is the use of advanced manufacturing techniques and processes (such as modular construction), maximising competition throughout the materiel/equipment supply chain and an ongoing workload.[38] Overall it argued that:

> The Collins and ANZAC programmes demonstrated that Australian Industry is competitive with international shipbuilders for cost and quality…The Collins Class program demonstrated that the cost of Australian construction equated closely to the cost of overseas construction.[39]

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34 Denise Ironfield, Tasman Asia Pacific, Impact of Major Defence Projects: A case study of the ANZAC Ship Project, Final Report, Prepared for Australian Industry Group Defence Council, February 2000 and Tasman Economics, Impact of Major Defence Projects: A case study of the Minehunter coastal project, Final Report, January 2002.

35 *Submission 8*, p. [2].

36 *Submission 8*, p. [2].

37 *Submission 36*, p. 7.

38 *Submission 3*, p. 14.

39 *Submission 3*, p. 13.

9.31 Defence, however, was reserved in its assessment of the productivity of Australia's shipbuilding industry. It observed that apart from Tenix's obtaining orders for small and or less complex warships and Austal's success with the Littoral Combat Ships for the USN, Australian industry has been unable to secure orders for major warships construction from overseas. It added:

> Industry might be best placed to comment on why they have not been able to secure orders but Defence would observe that the market is very competitive and the Australian industry is unlikely to have a cost advantage in steel monohull ships or product advantage such as a unique design except in the high speed multi-hull sector.[40]

Factors influencing productivity in Australia's shipbuilding and repair industry

9.32 Defence's assessment points to a significant hurdle for Australian shipbuilders in endeavouring to be internationally competitive; namely, economies of scale.

Costs and economies of scale

9.33 Some submitters drew attention to the diminishing costs associated with the number of vessels built.[41] According to Defence, when shipbuilders build the first of class, they 'always find that it is a significantly more expensive vessel than the second, third and fourth'. Mr Gregory Copley of Future Directions International Pty Ltd, advised the committee that economies of scale in terms of the shipbuilding process for warships are achieved after the second vessel—three or more vessels onwards.[42]

9.34 Supporting this view, ASC stated that one of the most serious problems preventing Australian shipbuilders from meeting high building efficiency on a routine basis are those relating to the management of vessel demand. It cited in particular 'the small scale of the demand for particular classes of ship, and hence production is frequently confined to the steep end of the learning curve'.[43] It found:

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40 Department of Defence, answer to question on notice, 28 March 2006 (received 19 May 2006), p. 34.

41 See for example, David John Truelove, *Submission 12*, p. [5]; ASC Pty Ltd, *Submission 17*, p. 15.

42 *Committee Hansard*, 3 April 2006, p. 5. Professor Keith Hartley maintained that 'small-scale production means a sacrifice of learning economies. A labour learning curve shows how the man hours to build each ship decrease as more ships of that type are built. For a group of 25 UK and US naval ships programmes, the average learning curve was 87%. This suggests that if an output of a class is increased from 6 to 12 ships, man hours per ship will fall by some 13%'. Keith Hartley, 'Naval Shipbuilding in the UK and Europe: A Case for Industrial Consolidation'. See also John Craggs, Damien Bloor et al, *Naval CGT coefficients and shipyard learning*, Ministry of Defence (UK), 2003.

43 *Submission 17*, p. 15.

> Plotting, in a general conceptual sense, the learning curves of the Australian destroyer/frigate, submarine, minehunter, and other naval ship programs of recent decades, highlights the fact that Australian shipbuilding programs have rarely been of a size to permit the full benefits of economies of scale to be reaped…it was only in the case of the ANZAC frigates and, to a lesser extent, the Collins Class submarines and the Huon minehunters, that production was of a sufficient scale to permit the flatter parts of the learning curve to be reached. Even when relatively high efficiencies were achieved, this was generally from ship 4 or 5 onwards and so the real cost per vessel across the entire program was still relatively high.[44]

9.35 The Victorian government agreed with the general principle of economies of scale and learning curve. It noted that while not always the case, construction of major vessels in Australia is:

> …generally more expensive than construction overseas, because international shipyards benefit from greater economies of scale in activity as well as productivity improvements generated by experiential learning on larger production runs of a particular ship type.[45]

9.36 DITR argued that 'a driving factor determining whether Australia can produce on a long term and sustainable basis is whether Australia can achieve the required economies of scale to be competitive'.[46] Indeed, Defence attributed the success of the ANZAC, in some measure, to the relatively large number of ships (10) that 'generated substantial learning/improvement'.[47]

> The data from Anzac…is that when the tenderer put in their submission on Anzac, their statement was that they would be equivalent to any foreign or European builder. What happened was that it took until the sixth vessel for the Australian industry to be equivalent to the Europeans, and with vessels seven, eight, nine and 10 we actually bettered the Europeans in some of our productivity factors. What it really came down to is that it took a learning curve to get there.[48]

9.37 Defence informed the committee, however, that:

> With a small Navy it is unlikely Australia will have a need for a build of more than 2–4 ships in each class until the capability provided by the

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44 *Submission 17,* p. 15.

45 *Submission 31,* p. 5. The South Australian government contended that the available data suggests that Australian productivity would be on par with Europe and North America but would be unlikely to match the economy of scale that can be achieved by Japan, Korea or China. It argued that Australia would need to consolidate shipbuilding skills and infrastructure if it were to derive economy of scale of benefits. *Submission 9*, p. 5.

46 DITR, *Submission 38*, p. 1.

47 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), question no. 20.

48 *Committee Hansard*, 18 August 2006, p. 39.

> submarines and ANZAC ships has to be replaced. The numbers and types of ships required for Navy will be decided by this capability analysis. Defence will take into account of the economies of scale benefits when modelling capability acquisition options.[49]

9.38 It should be noted that even with the ships constructed in Australia that benefited from a larger production run, such as the ANZACs, there was a local build premium.

9.39 A 2005 report by the Allen Consulting Group, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, pointed to the often cited cost premium of 3 to 3.5 percent for the ANZAC Project. It accepted that this was a relatively low cost but equates to over $200 million on a $7 billion acquisition.[50] It also referred to the cost premium for the Collins class but stated that it was impossible to estimate because of the uniqueness of the submarine. The report stressed, however, that:

> …the cost premium for each of these classes was low for particular reasons that may not apply to the acquisitions currently in the pipeline. This is because a significant number of both the Collins and Anzac classes were produced in Australia even by world standards.
>
> …
>
> In the case of the Collins and ANZAC classes, therefore, there was a beneficent coincidence of minimum local production costs, because of the availability of scale and learning economies, and maximum benefits in terms of self-reliance, because of the use of domestically engineered and integrated systems. The pay-off to Defence from the investment in local capability was almost certainly positive.[51]

9.40 The report noted that the AWDs and LHDs are to be built in production runs of three and two respectively and suggested the outlook for the future acquisitions was 'less rosy'. It suggested that the cost premium of a local build of the AWDs could be high because of the inability to benefit significantly from scale or experience economies.[52] The report was also of the view that the relative costs of local procurement for the two LHDs was likely to be higher because of the smaller number

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49 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), question on notice, p. 15.

50 The Allen Consulting Group, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, p. 45.

51 The Allen Consulting Group, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, p. 45. The Submarine Institute of Australia Inc stated that:' the case of the Anzac ship program prices for overseas construction were not sought from potential shipbuilders. However, based on submarine cost data, it is estimated that the premium for construction of all Anzac ships in Australia was probably slightly less than for the submarines because of their lower complexity and lesser sensor/weapon fit'. *Submission 3*, p. 13.

52 The Allen Consulting Group, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, p. 46.

of ships being purchased.[53] It noted that the scale and learning benefits may be 'commensurately reduced'.[54]

9.41 Defence concurred with this view on both the AWD and LHD projects. It observed that the limited build run on naval ships in Australia limited the scope for productivity gains and cited the LHDs. Mr Kim Gillis, Deputy CEO of the DMO advised that on a two-ship class it would be 'very hard for us to get to that learning curve where we can compete with a European builder who is building modules in a process, in a production line'.[55] In his opinion it would take four or five LHDs to reach the stage approaching the productivity of the Europeans.[56]

9.42 Without doubt, the lower demand for naval vessels in Australia and the concomitant smaller economies of scale limit opportunities for Australian naval shipbuilders to gain efficiencies in their production runs.

9.43 Mr Gillis also noted that the difference in productivity between Australian shipbuilders and their European counterparts is due not only to a combination of infrastructure and learning curve but also the association between designer and builder. He said that there is an advantage 'if you are the designer of a product and you are building your own design as distinct from being a designer who is handing it over to a different builder'. He noted:

> Whenever we took a design that was not worked on and developed in house, there was a significant loss in our productivity factors. The difference between being the designer and being the builder is significant.[57]

9.44 When purchasing vessels designed overseas, however, Defence must take account of the specific needs of its naval fleet. So, an important consideration in assessing productivity is the work and costs involved in customising a ship for Australian conditions. The following section considers Australia's unique operational requirements and the costs involved in customising a ship for Australian conditions. A closely related matter—Australia's national security interests—is discussed fully in chapter 12.

Costs in meeting Australia's unique requirements

9.45 Australia confronts a range of challenges protecting its shores and surrounding maritime approaches from external threats. The 2000 Defence White Paper stated:

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53 The Allen Consulting Group, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, pp. iii and 46.

54 The Allen Consulting Group, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, p. iii.

55 *Committee Hansard*, 18 August 2006, p. 40.

56 *Committee Hansard*, 18 August 2006, p. 40.

57 *Committee Hansard*, 18 August 2006, p. 40.

> The Government's primary goal for our maritime forces is to maintain an assured capability to detect and attack any major surface ships, and to impose substantial constraints on hostile submarine operations, in our extended maritime approaches. We also intend to maintain the ability to support Australian forces deployed offshore, to contribute to maritime security in our wider region, to protect Australian ports from sea mines, and to support civil law enforcement and coastal-surveillance operations.[58]

9.46 It stated further:

> Australia's forces for maritime operations give us the ability to deny an opponent the use of our maritime approaches, and allow us the freedom to operate at sea ourselves…Capable maritime forces also provide important options for contributing to regional coalitions in support of our wider strategic interests and objectives.[59]

9.47 Australia pursues these objectives in a unique environment that places particular demands on its naval ships. Mr Derek Woolner pointed out:

> Traditionally, the Europeans have designed equipment to look at something like a campaign from London to Moscow as being horrendously large. We have to contemplate distances greater than that in simply moving our equipment around in our areas of strategic interest and getting them to apply the various military capabilities in ways that suit the national interest. That for a start demands different sets of design parameters.
>
> It is a question not only of putting enough fuel in to get them there, but also of how you sustain the crew. You have to keep them efficient, keep them operating. You have to put them in an area with a big enough load of weapons and ordnance and so on to make them effective. You have to develop communication systems that enable you to transmit intelligence or whatever other information you are gathering back to headquarters, and enable you to operate them with allies that want to operate further afield than you would normally plan, with the same sort ability for your deployed units to operate under Australian command.[60]

9.48 The Navy has underlined the fact that not only are great distances involved in its line of duty but Australian naval ships are expected to endure extremes of climate from the calmer warm tropics to the icy conditions in the Southern Ocean:

> The area of direct interest to Australia's security encompasses a substantial percentage of the Earth's surface. Australia adjoins the Pacific Ocean in the east, the Indian Ocean in the west, the South East Asian archipelago in the north—and sometimes forgotten—the Southern Ocean. Our maritime jurisdictional areas alone comprise more than eight million square nautical miles (or almost 16 million square kilometres). Our security requirements

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58 Commonwealth of Australia, *Defence 2000—Our Future Defence Force*, pp. XIV and 88.

59 *Defence 2000—Our Future Defence Force*, p. 88.

60 *Committee Hansard*, 4 September 2006, p. 31.

> are such that maritime forces can find themselves rapidly moving from one extreme of climate and local sea environment to another within a few weeks, major units may transit from the tropical calm and heat of the dry season in the South East Asian archipelago to the huge seas and swells of the Southern Ocean.[61]

9.49 Naval vessels may also be called upon to participate in a range of non-combat operations such disaster relief. On such occasions they may be required to provide short term or long term assistance not only for coastal locations, but inland as well:

> While shipborne helicopters can be particularly useful and ships may act as logistic support bases, hospitals and command posts for long periods, the specialist skills available in ships also mean that their personnel can be invaluable sources of trained manpower for rehabilitation and repair work. Naval forces are self-supporting and do not create logistic burdens in situations where infrastructure has been destroyed or severely damaged.[62]

9.50 Participants in the inquiry readily recognised Australia's special operational requirements and the need to modify off-the-shelf purchases. Mr Ron Fisher, Managing Director of Raytheon Australia, asserted that 'no one off-the-shelf platform can address the unique strategic circumstances in Australia'.[63] Mr Peter Hatcher, Chief Executive Officer of ThyssenKrupp Marine Systems Australia Pty Ltd, cited in particular the need to take account of distance and endurance. He understood that Australia developed with Kockums its own design for the Collins-class submarine because the capability that was required was 'very much an Australian capability requirement'.[64] Mr Woolner supported this view:

> The Navy wanted to use those vessels in a particular way that exploited the ability of submarines to disrupt an opponent’s preparations for naval warfare by being able to attack them near their bases. Given Australia’s geographical position, and particularly the position of its naval ports, that meant a submarine with long range, high endurance and very great weapons carrying and systems capacity.[65]

9.51 In turning to the AWDs, he noted:

> It is seen as being able to operate in conjunction with US task force groups. With the Aegis system, the US navy insists that those operating with it have the system certified. That will mean that this particular ship will be more like an aircraft than a ship in terms of the way it is handled. Instead of going through major midlife refits that generate workload in a period of 10-

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61 Royal Australian Navy, *Australian Maritime Doctrine,* 2000, chapter 2.

62 RAN, *Australian Maritime Doctrine,* 2000, chapter 7.

63 *Committee Hansard*, 3 July 2006, p. 4. See also Mr Peter Hatcher, CEO ThyssenKrupp Marine Systems Australia Pty Ltd, *Committee Hansard*, 18 August 2006, p. 8.

64 *Committee Hansard*, 18 August 2006, p. 8.

65 *Committee Hansard*, 4 September 2006, p. 16.

> to-12-year cycles, the software for those vessels will have to be continually updated so that they remain in sync with US naval standards, so that those vessels can be certified by the US navy as capable of operating in what they call a 'network warfare mode'—without the Americans worrying about any technological data system glitches.
>
> At the same time, there is a component in the concept of operations that calls for those vessels to operate as what they call private ships. In other words, it accepts the fact that the Australian Navy, unlike the US navy, is not often going to operate in large task force groups and that we will be looking at those vessels to operate not always in US naval groups but independently for Australian national interests. That requires a somewhat more capable fit than those vessels and that there be a more thorough investigation of what they are under. That might cause conflicts between some of the equipment that is mounted on US vessels, which is supplied by some of the people who are currently major members in the alliance contract organisation, and choosing other equipment, some of which is made by local companies.[66]

9.52 Indeed, DITR noted that the FFG, ANZAC, Collins and prospectively, the AWDs and the LHDs, are 'typically modifications of overseas designs'.[67] The 2004 ACIL Tasman report on the Australian Defence Industry similarly noted that 'the surface combatants, submarines, mine warfare and oceanographic ships were all built to overseas designs but adapted in Australia to suit Australian circumstances'. It stressed that such modifications can 'entail substantial innovation'.[68]

The costs of customising a ship for Australian conditions

9.53 Defence acknowledged that modifying a standard military off-the-shelf design 'will always involve a cost increase, wherever construction occurs'.[69] Other witnesses were convinced that modifications to an off-the-shelf model should be conducted in Australia. Mr Tunny of ASC, explained that it is 'not nearly so easy' to modify a ship for particular needs at a distance. He suggested that such an undertaking was possible but questioned whether it would be efficient or cost effective. He explained:

> I think there is a close interaction between the customer iteratively defining its requirements and the alliance iteratively refining potential solutions. Attempts to do that sort of work at great distance lead to mistakes, misunderstanding and inefficiencies.[70]

9.54 Saab Systems Pty Ltd was of the view that:

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66 *Committee Hansard*, 4 September 2006, p. 17.

67 *Submission*, p. 2.

68 ACIL Tasman, *A Profile of the Australian Defence Industry, Helping align defence industry, defence industry policy, and defence strategic planning*, November 2004, p. 31.

69 Department of Defence, Answer to question on notice from 28 March 2006, Overview.

70 *Committee Hansard*, 4 September 2006, p. 12.

> The best outcome for the customer will be achieved when the systems selection, integration, test and delivery is performed by companies who are Australian based, understand the customer and the operational environment and who themselves have an ongoing stake in the outcome.[71]

9.55 Raytheon Australia noted further that even with a relatively less complex ship such as the LHD, the platforms may have to be modified to meet Defence's needs which 'are unique compared to the Spanish and French model'.

9.56 Ms Denise Ironfield, the author of the studies on the Minehunters and the ANZACs, noted that there are problems with international benchmarking of naval shipyards because governments choose to 'purpose-build their ships'. Put simply, 'we are not looking at like with like and that makes it very difficult'. The requirement to modify off-the-shelf vessels, which according to the evidence is best conducted in country, further highlights the difficulty in making comparisons between Australian built ships and those built overseas.

9.57 The flow of work, as distinct from the economies scale, also affect a shipyard's productivity. The government has set out a long-term acquisition and naval ship repair and upgrade program. The committee now considers the effect that the Navy's acquisition program has on industries efficiencies and hence its ability to minimise costs.

Fluctuations in work flow

9.58 The Australian Academy of Technological Sciences and Engineering argued that a viable industry requires a consistent long-term base workload. In its view, no industry can survive on a stop/start order book—that a viable industry is possible if steps are taken to manage a consistent flow of work to avoid costly stops and starts during which time skills and other capacity is lost'.[72] While it accepted that exports could fill in gaps, it noted 'a base load of reasonably predictable local demand can provide the platform on which a competitive export industry can be developed'.[73] The Academy submitted:

> Costs cannot be divorced from the demand question and a steady flow of orders to naval shipbuilding yards will spread the establishment overheads, avoid recurring design or manufacturing errors, provide greater negotiation leverage over suppliers, amortise the training costs and reduce labour mobility. It would be particularly helpful if ship-procurement programs could be adjusted to ensure the timing of the order for the first in any class of ships allowed a sufficient interval before the rest were required, to allow

71 *Submission 25*, p. 7.

72 *Submission 19*, p. 3.

73 *Submission 19*, p. 2.

> full validation of design, construction and operating features, so avoiding costly later modifications.[74]

9.59 Indeed, it suggested that should a steady stream of work be available the Academy has every reason to believe Australian costs and productivity would match the European, American and Japanese yards who would be the alternative suppliers.[75]

9.60 The Australian Industry Defence Network Inc pointed out that shipbuilding tends to be work of varying intensity with the associated costs of start up and wind down. It noted that the peaks and troughs can be moderated by the benefit of in-service support contracts but they do not alter 'the risk and cash relationships of the initial task themselves—nor do they absorb the full compliment of the initial workforce.[76] The Submarine Institute of Australia Inc also referred to the peaks and troughs in demand for naval vessels. It submitted:

> The continuing competitiveness of Australian naval shipbuilding relies on maximising opportunities for local construction thereby smoothing as far as practicable the 'peaks and troughs' of supply and demand. The construction in Australia of large naval vessels is therefore critical to both maintaining an ongoing capability and further improving its efficiency and productivity. By this approach, the industry will realise its goals of continuing to be price competitive, technically innovative, consistent in quality, reliable in supply and profitable. It cannot exploit and develop intellectual property, new technology, new ideas and new methods of construction and support if it is not profitable.[77]

9.61 Mr Geoff Evans OBE VRD also referred to this problem of fluctuations in demand. He stated 'Australia's main problem as a naval shipbuilder is, and always has been, lack of continuity in orders for ships, making it difficult if not impossible for shipbuilders to hold a highly trained workforce together.[78] The South Australian government noted that even with state and federal investment in the defence industry, 'when the bow wave of Air Warfare Destroyer (AWD) and Amphibious ship construction work is complete, remaining long-term demand will not be sufficient to support the existing ship builders'.[79]

9.62 The committee accepts that fluctuations in demand create difficulties for the shipbuilding industry which can affect their overall productivity. It should be noted that overseas countries face this same problem. To a degree, industry must accept and adjust to this problem. Defence, as the sole purchaser, also has a responsibility to

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74 *Submission 19,* pp. 2–3.

75 *Submission 19,* p. 2.

76 *Submission 2,* p. 2.

77 *Submission 3,* p. 18.

78 *Submission 4, The Navy*, vol. 67, no. 4, p. 18.

79 *Submission 9,* p. 8.

ensure that it plans naval acquisitions with a view to assisting industry manage the demand cycle. Indeed, as noted in chapter 2, recent overseas studies have pointed to the dominant position that governments have determining demands on the naval shipbuilding sector.[80] This matter of planning and scheduling is discussed in detail in Part IV.

9.63 Increasing demand through exports is one way of achieving efficiencies through economies of scale and by moderating fluctuating demands.

Impediments to export trade

9.64 The 2005 Allen Consulting report looked at the substantial barriers to trade in the international arena. It stated:

> Government purchasing policy and subsidies have distorted the global market for warships to an extremely high degree and no matter how internationally competitive a particular shipyard may be, the lack of anything resembling a level playing field means it is very difficult for it to succeed internationally.[81]

9.65 The Australian Manufacturing Workers' Union (AMWU) suggested that 'the need to pay royalties and to negotiate marketing rights erodes the international competitiveness of Australian builders'.[82] Chapter 2 described the obstacles to trade in naval ships including direct and indirect government subsidies and legislation designed to protect local producers (paragraphs 2.37–2.40). The range of measures used by governments to protect their domestic shipbuilding industries means that Australian producers looking to export their products are effectively locked out of these highly protected markets. Also, when it comes to selling to a country that is not a naval ship producer, Australian industry must compete against shipbuilders who enjoy some form of subsidisation.

9.66 In addition to a relatively small domestic market, limited export opportunities further impact on industry's ability to achieve economies of scale and resulting efficiencies. With the exception of niche markets, Australia is limited in its export of naval ships and equipment.

Comparative labour productivity

9.67 Comparison of the costs and efficiencies of Australia's naval shipbuilding labour base with overseas industries is also hampered by a lack of data. Both ACIL Tasman and DITR have used a measure of 'value-added per employee' to approximate

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80 Roscoe Bartlett, Projection Forces Subcommittee, House Armed Services Committee, 5 April 2006.

81 The Allen Consulting Group, *Future of Naval Shipbuilding in Australia: Choices and Strategies*, May 2005, p. i.

82 AMWU, *Submission 21*, p. 13.

labour productivity. The ACIL Tasman analysis suggested that 'Australia's labour productivity might be comparable to that of Western shipbuilders, but behind that of Asian shipbuilders, notably Japan'.[83] DITR's assessment suggested that Australia is comparable with Norway and Denmark, somewhat ahead of the UK, France and Spain and well behind Japan and to a lesser extent the USA. However, there are major shortcomings in the measure used. DITR noted that the measure is not adjusted for hours worked per employee and is biased upwards for countries that protect their shipbuilding industries. Importantly, the data are not specific to naval shipbuilding.[84] It is therefore difficult to make an informed assessment of the comparative productivity of the Australian shipbuilding workforce using quantitative measures.

9.68 Qualitative assessments were put forward by a number of submitters. Observations included that in the area of hull construction Australia needs to compete with the lower labour costs of countries such as South Korea and China. However, some submitters suggested that design and efficient work practices, including the use of automation, are the principal drivers of construction costs rather than wage rates. Several submitters observed that other high labour cost countries such as Sweden, Israel and Japan maintain viable naval shipbuilding industries.

9.69 A number of submitters acknowledged the world class skills of Australia's welders, engineers, technicians and systems integrators. Several companies submitted that Australian labour costs for higher end skill sets are comparable or less costly than in Northern Europe and the United States.

Summary

9.70 The lack of suitable data prevents any sensible or accurate comparative analysis of the productivity of Australian shipyards against overseas yards. The committee therefore finds difficulty in making a definite determination about the comparative economic productivity of the Australian shipbuilding industrial base with other shipbuilding nations. Evidence, however, suggesting that Australia may not be as productive as overseas producers included:

- Australia cannot compete with countries such as Japan, China and South Korea in the production of larger and less complex steel ships such as tankers and carriers;
- Australia is a relatively small market and the demand for naval vessels is not as large as for some overseas producers—Australia does not have the economies of scale enjoyed by some of its potential competitors;

83 ACIL Tasman, *Naval Shipbuilding in Australia, A background briefing*, February 2006, Attachment to South Australian government *Submission 9*, p. 47.

84 Output measures relate to commercial shipbuilding while input measures cover all shipbuilding. DITR, *Submission 38*, pp. 10–11.

- the assistance or protection given by the governments of shipbuilding countries to their domestic naval shipbuilding industry limits Australia's export opportunities; and
- even with larger production runs, some projects in Australia such as the ANZACs are believed to have attracted a local build premium.

9.71 Evidence suggesting that Australia may be as productive as overseas producers in constructing naval vessels include:

- the naval shipbuilding industry in overseas countries is subsidised or protected in someway by government; (removing or discounting such barriers may show that Australian producers can match the productivity of overseas producers);
- the success of Incat and Austal in producing very fast vessels;
- the bench-marking studies carried out for Tenix and Raytheon Australia;
- greater efficiencies when it comes to modifying or customising a ship in Australia for Australian conditions; and
- the acknowledged world class standing of Australian welders, engineers and technicians.

Conclusion

9.72 Given that overseas countries are unlikely to remove the various forms of assistance and protection given to their local naval shipbuilding industry, Australia's builders of large naval ships must compete on an 'unlevel playing field' to some extent. The committee however, believes that whenever non commercial considerations are made, such as the need to be self reliant in defence support industries, where there are direct or hidden subsidies, or where broader economic benefits not considered in commercial cost benefit analysis are included, there will be added costs which need to be quantified. Such costs must be known for otherwise there will never be a true measure of actual competitive design and construction costs, nor of those costs properly attributed to non economic or political motives. The committee believes that if this work has not already been done it must be done as a priority for all future projects. If it has been done, but not provided to the committee, it should continue to be as part of a whole of project costing through life for future benchmarking purposes.

9.73 Therefore, given the absence of any credible quantitative data to the contrary, the committee would like to believe that a revitalised Australian ship building industry may well hold its own when compared with overseas naval shipbuilders, particularly if the value of ships' through-life support, is considered. No categorical assertion however, could be made on the basis of current evidence available.

9.74 To this stage, the committee has not taken account of other important considerations including the through-life support of the ship nor the wider advantages

or benefits that accrue to the country when a major ship project is undertaken in Australia. These matters are taken up in the following chapters.

Chapter 10

The comparative economic costs of maintaining, repairing and refitting large naval vessels throughout their useful lives when constructed in Australia vice overseas

Background

10.1 When considering the costs of an acquisition, many witnesses emphasised the need to take account of the through-life expenses which are many times greater than the initial cost of acquisition. Most accepted that the rule of thumb applying to large constructions, including a typical warship, is 30 per cent in initial acquisition costs compared with 70 per cent through-life support (TLS) costs.[1] This chapter examines the comparative economic costs of maintaining, repairing and refitting large naval vessels throughout their working lives when constructed in Australia against an overseas build.

Through-life costs

10.2 The 2006 ACIL Tasman report noted that the Navy requires an in-country capability to undertake repair and maintenance. It noted further that this requirement is not only because of strategic and operational issues but also a result of personnel policies for crew leave and training.[2] It came to the conclusion:

> Because ship and submarine repair and maintenance must for the most part be performed in Australia and are constrained by home porting and capability sustainment in the repair and maintenance sector international comparisons would provide minimum insights into productivity in the Australian repair and maintenance context.[3]

10.3 Defence confirmed unequivocally that Navy requires major support for its warship to be conducted in or near the ship's home port.[4] It identified two important considerations that Navy requires:

- the advantages and reduced impact on ship's company of conducting ship support and crew rest and recreation in parallel; and

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1 See for example, Nautronix, *Committee Hansard*, 3 April 2006, p. 36; the Western Australian government, *Committee Hansard*, 3 April 2006, p. 85; Department of Defence, *Submission 20*, p. 28 (para 5.6) and Graham Harris, *Committee Hansard*, 27 April 2006, p. 24; Susan Smith, Executive Officer, Australian Industry and Defence Network Inc, *Committee Hansard*, 27 April 2006, p. 29; ADI, *Committee Hansard*, 28 June 2006, p. 7.

2 ACIL Tasman, *Naval shipbuilding in Australia: a background briefing*, 9 February 2006, p. 49.

3 ACIL Tasman, *Naval shipbuilding in Australia*: *A background briefing*, 9 February 2006, p. 49.

4 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), question 1.

- proximity to support infrastructure such as ammunitioning point, ranges and fleet assets, necessary to work up the crew and platform after maintenance.

10.4 It explained:

> Navy's requirement does not prevent maintenance being conducted at repair facilities that are not in the proximity of the ship's operational base. It is sometimes necessary to conduct maintenance at other locations. For example,
>
> — Collins class Full Cycle Docking maintenance is conducted at Osborne in South Australia as a consequence of a Federal Government decision to retain the relevant skills developed during the build program…;
>
> — because warships can be deployed anywhere in the world, Navy has successfully conducted major repair activates at many facilities remote from the ships' home port.[5]

10.5 Defence made clear that while it is not essential to have a repair facility close to a ship's home port it is 'desirable' to meet Navy's requirements'. Given that Defence requires its naval fleet to be repaired and maintained in Australia, the extent to which an in-country build influences these through-life costs is a significant consideration.

The lack of data

10.6 The lack of sufficient data prevented the committee from obtaining any sensible or reliable statistics on the comparative economic productivity of building a naval vessel in-country compared with overseas. The same difficulty confronts the committee in endeavouring to determine the comparative costs of TLS for large naval vessels when constructed in Australia vice overseas. As ASC's submission noted:

> In nearly every case Australia has built significantly different ships to those built elsewhere and coupled with the fact that comparative pricing data rarely exists, assumptions about life-cycle costing and the relative costs of through-life support differ.[6]

10.7 Despite this lack of data, many witnesses took the view that there was a strong connection between savings that could be made repairing and maintaining a ship in Australia if that ship were built in-country.

10.8 As noted in the previous chapter, the Allen Consulting Group report queried the cost savings that would accrue to the AWDs and the LHDs because of the small production run. It nevertheless accepted that if the ships were not built in Australia the capability to maintain and provide TLS may be compromised. The 2006 ACIL

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5 Department of Defence, question 1, answer to written question on notice following hearing on 28 March 2006.

6 ASC *Submission 17*, p. 14. See also Government of South Australia, *Submission 9*, paragraph 6.8.1, p. 27.

Tasman report suggested that linkages between shipbuilding and TLS can be very important to the productivity and cost of ship repair and maintenance.[7]

10.9 It cited findings from its 2002 study which showed that the in-service support benefits associated with the arrangements established for the Minehunters included:

- cost savings for Defence in money and resources for in-service support;
- shorter turn around times than out of country support, particularly in times of international crisis;
- increased effectiveness during operations with a 24 hour technical enquiry service;
- opportunities for value adding such as the multi-functional system team approach used by ADI and Thales Underwater Systems to support the Minehunter Coastal Vessels;
- development of related and supporting industries that create alliances between systems suppliers and contractors which improve local capability to deliver repair and maintenance services; and
- ability to provide more consistent employment for specialist skills in systems, systems integration and application.[8]

10.10 These findings are consistent with the general view of a number of submitters who suggested that savings are made on TLS if the ship is produced in-country. They highlighted the importance of taking account of the advantages gained for TLS by building in-country.[9]

10.11 Rear Admiral (Ret'd) W. J. Rourke argued that the costs of maintaining, repairing and refitting ships that have been constructed in Australia will be significantly less than the costs of maintaining ships constructed overseas.[10] Drawing on past performance, the Submarine Institute of Australia noted that construction in Australia of naval vessels (including the Collins class submarines) generated significant economic and other benefits including the prospect of ensuring adequate through-life support of the vessels.[11]

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7 ACIL Tasman, *Naval shipbuilding in Australia*: *A background briefing*, 9 February 2006, p. 50

8 ACIL Tasman, *Naval shipbuilding in Australia*: *A background briefing*, 9 February 2006, p. 51.

9 See for example, Graham Harris, *Committee Hansard*, 27 April 2006, p. 24; Susan Smith, Executive Officer, Australian Industry and Defence Network Inc, *Committee Hansard*, 27 April 2006, p. 29; ADI, *Committee Hansard*, 28 June 2006, p. 7; Australian Academy of Technological Sciences and Engineering (ATSE), *Submission 19*, p. 3; DISplay, *Submission* 40, pp. 4 and 5.

10 *Submission 1*, p. 5.

11 *Submission 3*, p. 13.

10.12 Saab Systems Pty Ltd also asserted that 'the long term economic outcome is that Australian based support for the life of a ship is much cheaper than foreign based support or introduction of a new development or support facility into Australia'.[12] Mr Mark Proctor, Business Development Manager, Saab Systems Pty Ltd, added:

> The greatest cost of a warship is the cost of support and upgrade provided during its working life. This is most economically provided from Australian based organisations whose origins need to be during the construction and initial delivery phase.[13]

10.13 ASC concurred with the view that generally it would cost more to maintain, repair and refit a foreign-built vessel than one produced domestically.[14] More specifically, Thiess Pty Ltd argued:

> Repairing ships built overseas can cost 2 to 3 times as much as maintaining in country. The offshore scenario does not provide repairs or parts at short notice and does not provide or retain the adequate expertise to diagnose problems in very complex ships. Repairs of battle damaged ships or major change of use of ships cannot be accommodated if industry is not building the ships in country.[15]

10.14 The Australian Industry Defence Network Inc submitted that the 'ability of Defence to rely on local sources for repairs, maintenance and spares will lead to substantial reductions in repair turnaround times…which will have an impact on the quality and overall costs of stock holdings'. It also stated that 'beyond repair and maintenance, involvement in the construction phase will position many Australian companies to play an active role in subsequent upgrades'.[16]

10.15 The Victorian government also pointed to the cost savings gained during the working life of a vessel if it is constructed in country. It argued that familiarity and experience with the warships results in more efficient through life support.[17] The Government of Western Australia agreed with this view. The Hon. Mr Francis Logan, the Western Australian Minister for Energy, Science and Innovation, explained:

> There is no doubt that the through-life costs will go up if the corporate memory, the knowledge, the skills and the intellectual property is not contained in the place where the ship will eventually undertake its service.[18]

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12 *Submission 25,* p. 7.

13 *Submission 25,* p. 7 and *Committee Hansard,* 20 April 2006, pp. 2–3.

14 *Submission 17,* p. 19.

15 *Submission 22,* p. 3.

16 *Submission 2,* pp. 2–3.

17 *Submission 31,* p. 5.

18 *Committee Hansard,* 3 April 2006, p. 85.

10.16 While many submitters maintained that the economic costs of maintaining, repairing and refitting large naval vessels throughout their useful lives is greatly lessened by constructing those vessels in Australia, they did not produce statistics to substantiate this assumption.

The ACIL Tasman estimate

10.17 In broad quantitative terms, the main guide for the committee on this issue is the modelling by ACIL Tasman. The February 2000 report, *A Case Study of the ANZAC Ship Project*, found that:

- local or overseas supply is determined on a case by case basis: items that are part of pools through which components are rotated may be most economic to acquire from overseas; items that are uniquely developed or depend on timeliness of supply are often sourced locally;
- the cost of repairs, maintenance and spares is cheaper if the original source of supply is local because of shorter repair turn around times for locally produced items. Shorter repair turn around times mean a lesser quantity and overall cost of spares that need to be held;[19] and
- the ANZACs' annual repair costs of $45 million could be higher by a factor of two if the original source of supply had been overseas. Assuming a long term bond rate of 7.12 per cent over a repair period of 25 years, the estimated repair cost saving is A$518 million.[20]

10.18 It should be noted that Ms Denise Ironfield, the author of the reports on the Minehunters and the ANZACs, informed the committee that despite her efforts to obtain information from Defence, she had no government data but was given 'very comprehensive information by Tenix and ADI', the respective primes.[21] She explained that she spoke to Defence:

> …I was trying to get some information from them on through-life support issues. Both reports were very interested in the through-life aspects of Australian industry involvement. However, in both instances it was extremely difficult to get very much information from the Department of Defence on the implications of the Australian build on through-life support.[22]

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19 Tasman Asia Pacific, February 2000, *Impact of Major Defence Projects: A case study of the ANZAC Ship Project*, pp. 38–39.

20 Tasman Asia Pacific, February 2000, *Impact of Major Defence Projects: A case study of the ANZAC Ship Project*, pp. 49–50. The figure is reached by deducting 7.12 per cent from the principal ($45 million in year one) for each of the 25 years.

21 *Committee Hansard*, 3 July 2006, p. 89.

22 *Committee Hansard*, 3 July 2006, p. 90.

The Department of Industry response

10.19 The Department of Industry, Tourism and Resources' (DITR) submission to this inquiry questioned some of the findings from the ANZAC study and made the following points regarding comparative costs of TLS:

- Domestic equipment can be installed in Australia for an overseas build. So, even with an overseas build, the costs and problems with maintaining overseas sourced equipment can be avoided.
- ACIL Tasman's repair savings figure of A$518 million for the ANZAC project must be discounted by the proportion of Australian produced equipment that would be sent overseas to support an offshore build of the same vessel or fitted when the ship arrives in Australia. If this proportion is half, then the repair cost saving from the in-country build is A$259 million (half of A$518 million).
- The ACIL Tasman long-term government bond rate of 7.12 per cent underestimates the risk—a 10 per cent rate is more appropriate which reduces the savings estimate to $408 million.
- Australian built ships will still depend on some overseas sourced equipment.
- Factors other than the source of initial construction supplies are significant in minimising repair costs. These include automated processes in the vessel design to reduce the whole of life crew costs and access to intellectual property (IP) for repair.
- Developing the in-country skills and knowledge for repair and maintenance does not depend on the location of the build—personnel can be posted offshore to participate in the build. However, 'there are greater benefits (and risks) from conducting an onshore build of complex vessels than simple vessels'.[23]

10.20 The committee accepts that some proportion of foreign-built RAN vessels will be sourced from Australian supplies and generic supplies that can be readily replaced in Australia. To this extent, it notes DITR's claim that ACIL Tasman's estimate is inflated. The committee also understands that Australian-built ships will look to overseas sources for some products or services. According to Defence, however, a local build is far more likely to have higher Australian industry content than a foreign-built vessel, and is therefore more likely to have original parts in stock for repair.[24] It was of the view that:

23 Department of Industry, Tourism and Resources, *Submission 38*, p. 15. See also ASC, *Submission 17*, p. 19.

24 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006) p. 9.

> …the economic costs of maintaining, repairing and refitting large naval vessels throughout their useful lives is greatly lessened by constructing those vessels in Australia.

10.21 Ms Ironfield, in response to a question about the criticism of using the government bond rate of 7.12 per cent, noted that this figure was equal to the long-term rate in December 1999. She noted, however, advice from Defence contained in the report that:

> …experience with other major defence projects constructed in Australia is that sourcing locally, rather than overseas, achieves substantial savings in repair turn around times and spare stock savings for a comparable operational availability. These savings can flow through to cost and productivity savings for Defence which in turn translates into improved welfare for the economy as a whole…[25]

10.22 She explained that given the ANZAC ships have a twenty-five to thirty year service life, savings of sourcing repairs and maintenance would be substantial. Furthermore, referring to the ACIL Tasman report, she told the committee:

> …assuming overseas sourcing doubled annual costs for repairs, and maintenance, and spare holdings for the ANZAC ships, the saving to the Australian economy…would be the one quoted—that is, the $515 million.[26]

10.23 In answer to a written question on notice from the committee, however, Defence stated that 'for a low to moderate technology basic platform like the Amphibious-LHD there is only a low correlation between build capability and sustain/upgrade capability'.[27] It considered that there could be relatively few savings in whole-of-life cost from choosing to build the LHDs locally. It expected that the greatest savings over the life of the ship would come from full access to and use of ship design and intellectual property across the entire capability. ASC also understood that while generally it would cost more to maintain, repair and upgrade a foreign-built vessel than one produced in-country, the savings would depend on circumstances of the specific case and in particular the complexity of the ship.[28]

Skills, knowledge and intellectual property

10.24 The availability of equipment is only part of the explanation for potential TLS cost savings from a local build. A broader reason is that an in-country build develops the skills and knowledge base needed for subsequent through life support.[29] ASC's submission stated that the challenges of repairing and maintaining a foreign-built

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25 *Committee Hansard*, 3 July 2006, p. 99.

26 *Committee Hansard*, 3 July 2006, p. 99.

27 Question 1, p. 3.

28 *Submission 17*, p. 19.

29 Australian Manufacturing Workers Union, *Submission 21*, p. 8.

vessel in-country depend on: the level of familiarity with key systems and original equipment manufacturers; access to the foreign shipbuilder and the ship's original drawings; and access to the parent navy's technical staff.[30] For example, it is more expensive to train labour to repair and upgrade a vessel that was built offshore than it is to employ the skills used in the construction phase for through-life support.

10.25 Several witnesses also argued that the greater the complexity of the warship, the greater the need to build in-country to develop the domain knowledge and skills for through-life support.[31] The committee notes that this is the rationale for Defence's support for building the complex AWDs in-country: it is much less enthusiastic to build the less complex LHDs in-country.

10.26 DITR, among others, suggested that these skills can be developed by posting local designers offshore during the construction phase. This arrangement would need to ensure that access is allowed to the offshore builder's resources.

10.27 An in-country build may not be without its own challenges for through-life support. Engineers Australia argued that there is often a challenge in sustaining in-country skills once the ship transitions from the construction phase into naval service.[32]

10.28 Contractual arrangements guaranteeing access to IP and design rights are important to cost-effective through-life support.[33] Gibbs & Cox Australia's submission noted that in-country design of warships will mean that the Commonwealth will have control over the amount of life cycle cost savings. Difficulties can arise with TLS costs when the IP is not Australian-owned. Most notably, ASC's resolution of a contractual issue with IP owner Kockums was crucial to enable it to secure the Collins class refit contract. As ASC's Managing Director Mr Greg Tunny told the committee, without the IP and the repair and refit contract 'ASC would not exist'.[34]

Conclusion

10.29 The previous chapter concluded that given that overseas countries are unlikely to remove the various forms of assistance and protection given to their local naval shipbuilding industry, Australia's builders of large naval ships must compete on an 'unlevel playing field' to some extent. Evidence suggests, however, that the

30 ASC, *Submission 17*, p. 19.

31 ASC, *Submission 17*, p. 19; DITR, *Submission 38*, p. 15; Engineers Australia, *Submission 24*, p. 23.

32 Engineers Australia, *Submission 24*, p. 24.

33 South Australian government, *Submission 9*, p. 21; Gibbs & Cox Australia, *Submission 10*, pp. 5–6.

34 Mr Greg Tunny, *Committee Hansard*, 19 April 2006, p. 9. The contract is worth $125 million annually for 25 years.

comparative costs of producing a ship in Australia would improve when the total amount of the acquisition, including the ship's through-life support, is considered.

10.30 Indeed, many submitters produced strong and credible arguments that savings accrue to the repair and maintenance costs if the ship is constructed in-country. They include savings generated by the substantial reductions in repair turnaround times and the more efficient through-life support that results from familiarity and experience with the warships.[35]

10.31 Intuitively, these assumptions appear logical and sensible. However, the lack of data on this issue makes any reliable or accurate assessment difficult. ACIL Tasman has produced some figures which provided the basis for discussion. But even in these cases, the author of the studies noted that little government data was made available.

10.32 ACIL Tasman estimated that annual TLS costs could be twice as high if foreign supplies had sourced the ANZAC Ship Project. This is due to shorter repair turn around times and lower stocks of spares from local sources of supply. However, DITR noted that local equipment can be used for an overseas build, thereby avoiding the higher costs associated with repairing overseas-built ships in Australia. It argued that the ACIL Tasman TLS estimate must be discounted by the proportion of equipment that could be sent overseas to support an offshore build of the same vessel.

10.33 The committee also accepts that through life support productivity savings from an in-country build derive in large measure from developing the skills and knowledge during the construction phase needed for this support. It notes that measures can be taken to compensate for the skills and knowledge deficiency should the ship be built overseas. For example, personnel can be posted offshore to participate in the build in order to develop the in-country skills and knowledge for repair and maintenance.[36]

10.34 Even so, the committee's evidence was unanimous in the view that building warships in-country would deliver greater TLS savings than an offshore build. Defence also agreed with this view but added the qualification that the savings from an in-country build depends on the complexity of the ship. It used the example of the less complex LHDs, stating 'there could be relatively few savings in whole-of-life cost from choosing to build locally'.[37]

10.35 To this stage, the committee has considered the costs of building and repairing a naval ship in Australia vice overseas within a narrow economic framework. The

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35 See for example, Australian Industry Defence Network Inc, *Submission 2*, p. 2.

36 See also ASC Pty Ltd, *Submission 17*, p. 19.

37 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), p. 2.

following chapter takes a broader approach and examines the wider benefits that accrue to building large naval ships in Australia.

Chapter 11

Economic benefits

11.1 The previous chapter found that there are cost savings to be gained in the through life support phase of a naval vessel if that vessel were built in Australia. This chapter looks beyond these narrow economic savings to consider possible broader economic benefits from constructing naval ships in Australia.

Broader benefits accruing from an in-country build

11.2 In its submission to this inquiry, the Victorian government stressed that 'the comparative costs of construction is only one factor, and perhaps not even a dominant factor, in making an appropriate decision on where to build Australia's new warships'.[1] It highlighted 'the contribution major defence projects make to critical mass for innovation and technology transfer, and the building of skills that translates to an improved productive capacity through the economy'.[2] Indeed, many submitters provided a long list of what they considered significant benefits that accrue from the construction of naval vessels in Australia. They included, but are not limited to:

- increased gross domestic product from capital investment;
- reduced pressure on the balance of payments;
- enhancement of the labour market;
- expanded indigenous research and development (R&D), design, production and management capabilities;
- the acquisition and development of valuable new skills, manufacturing techniques and processes;
- extensive technology transfer across a broad spectrum of activities;
- a strengthening belief in Australia's own capabilities and confidence in its own ability to exploit opportunities;
- enhanced potential for exporting;
- the maintenance of capability to support vessels throughout their operational lives, shorter turn around for repairs with in-service support; and
- greater foreign investment.

11.3 Attributing a value to these many benefits, however, is difficult and further complicates the task of comparing the costs of constructing a ship in-country with the costs of an overseas build. The following section considers the broader advantages

1 *Submission 31*, p. 5.

2 *Submission 31*, p. 6.

from an in-country build over and above the savings from through-life support. The strategic advantages of an in-country build are discussed in the following chapter.

Quantifiable evidence of wider economic benefits

11.4 The Tasmanian government's submission noted the ripple effect that flows through the economy from increased activity in the naval shipbuilding and repair industry. It cited research from Australian Economic Consultants Pty Ltd showing that:

> for every dollar spent on new or retained manufacturing business output, benefits flow not only from increases in manufacturing activity, but also from Australian industries that provide inputs into manufacturing activity and from industries meeting the consumption demands resulting from more jobs, wages and salaries.[3]

The Victorian government's submission similarly underlined the wider economic advantages gained from constructing naval ships in Australia. It stated:

> Compared to buying warships from overseas, in-country construction of major defence platforms generates additional activity throughout the local economy. Some of this additional economic activity is captured in standard economic models that are based on multiplier effects, as local expenditure is spread through the economy through wages and profits. Modelling of the ANZAC frigate program suggests that the $5.6 billion construction program generated between $3 billion and $7.5 billion in additional GDP.[4]

The Minehunter and ANZAC studies

11.5 Indeed, many witnesses referred to the studies of the ANZAC (Tasman Asia Pacific) and Minehunter (Tasman Economics) projects to demonstrate the broader economic benefits that can accrue from building naval vessels in-country.[5] The studies sought to quantify the flow of economic benefits from these projects to the wider economy. They indicated that substantial benefits extend to the broader economy from naval shipbuilding through linkages to other industries, increased employment and improved productivity.[6]

11.6 The extent of the economic benefits identified in these studies depended on the model used. For both projects, the Tasman Asia Pacific and Tasman Economics reports applied a general equilibrium analysis and an input-output multiplier analysis. The general equilibrium model takes into account constraints on the supply of labour,

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3 *Submission 30,* p. 3.

4 *Submission 31*, pp. 5–6.

5 Tasman Economics and Tasman Asia Pacific are the forerunners to ACIL Tasman.

6 Tasman Asia Pacific, February 2000, *Impact of Major Defence Projects: A case study of the ANZAC Ship Project*, pp. 43–49; Tasman Economics, January 2002, *Impact of Major Defence Projects: A case study of the Minehunter Coastal Project*, pp. 53–76.

capital and other inputs that will apply in an economy like Australia. On the other hand, the input-output multiplier analysis does not take account of an economy with no excess capacity or full employment.

11.7 Using the input-output multiplier analysis for the Minehunter project (valued at $1000 million in 2001 dollars over a period of nine years), Tasman Economics calculated that the project's economic benefits would:

- contribute up to $1665 million (2001 dollars) to national output;
- contribute up to $505 million (2001 dollars) to Australia's Gross Domestic Product; and
- generate (or sustain) up to 9250 full-time equivalent jobs) (Tasman Economics 2002).[7]

11.8 Using a general equilibrium analysis, Tasman Economics calculated that the project's economic benefits would:

- contribute up to $887 million to GDP;
- contribute up to $492 million to consumption; and
- generate or sustain an average of more than 1800 full-time equivalent jobs each year.[8]

11.9 Using the input-output multiplier analysis for the ANZAC project (valued at $5600 million in 1998–99 dollars over a period of approximately 15 years), Tasman Asia Pacific calculated that the project's economic benefits could have:

- generated up to $10 900 million in national output; and
- supported up to 57 000 full-time equivalent jobs.[9]

11.10 Using a general equilibrium analysis, Tasman Asia Pacific calculated that the project could:

- contribute at least $3000 million to GDP;
- contribute at least $2200 million to consumption; and
- generate around 7850 full-time equivalent jobs.[10]

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7 ACIL Tasman, *Naval shipbuilding in Australia: A background briefing*, 9 February 2006, p. 55.

8 Tasman Economics, January 2002, *Impact of Major Defence Projects: A case study of the Minehunter Coastal Project*, pp. vii and 75.

9 Tasman Asia Pacific, February 2000, *Impact of Major Defence Projects: A case study of the ANZAC Ship Project*, p. 44. The input-output multiplier analysis tends to overstate the flow-on effect of projects on the wider economy because it does not factor in the economic effects between industries and it cannot take into account of the impact of a change in demand when there is no excess capacity. In other words, the input-output multiplier analysis does not take into account the constraints that can apply in an economy.

11.11 The Minehunter and ANZAC projects' modelling concluded that for both projects the Australian economy would have been worse off if Defence had sourced the new capability requirements 'off the shelf' from an overseas supplier rather than building them in Australia. In the case of the ANZAC ships, this finding included the assumption that importing the frigates could have saved 3.5 per cent of the Australian contract price.[11]

11.12 One of the greatest benefits from an in-country build was the flow-on effect of new technologies and business practices from companies involved with the ANZAC and Minehunter projects. In its submission to this inquiry, the Australian Association for Maritime Affairs Incorporated stated:

> Although it [ANZAC study] was produced six years ago, the key findings of this study included an estimate that the national GDP would grow by around $3.0 billion annually, and that the project would generate around 7850 full-time jobs. Importantly the project was able to stimulate improvements across the board by the many companies involved, specifically in the fields of productivity, research and development, business practices, and export opportunities. In addition this project enabled an efficient and through life support capability to be built up in country: in balance of trade terms this project has been a significant achievement.[12]

11.13 A February 2006 ACIL Tasman study, *Naval shipbuilding in Australia: A background briefing*, reiterated the findings of the ANZAC and Minehunter studies. It stressed that through linkages to other industries, and the increased employment and economic activity associated with these linkages, Australia's naval shipbuilding industry makes a substantial indirect contribution to the economy.[13] Significantly, the study referred to input-output multipliers as 'a well-established analytical approach for assessing the extent of the direct and indirect linkages between an activity…and the rest of the economy'. It added:

> It should be borne in mind that the general equilibrium modelling in both instances did not consider the benefits to the Australian economy flowing from a combination of local construction and through-life support.[14]

However, as the following section notes, some witnesses have highlighted the limitations of the input-output multiplier analysis and modelling methods generally.

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10 Tasman Asia Pacific, February 2000, *Impact of Major Defence Projects: A case study of the ANZAC Ship Project*, p. iv.

11 Tasman Economics, January 2002, *Impact of Major Defence Projects: A case study of the Minehunter Coastal Project*, p. 75; Tasman Asia Pacific, February 2000, *Impact of Major Defence Projects: A case study of the ANZAC Ship Project*, p. 46.

12 *Submission 13*, pp. 1–2.

13 The study was commissioned by the South Australian government as background information for its submission to this inquiry.

14 ACIL Tasman, *Naval shipbuilding in Australia: A background briefing*, 9 February 2006, pp. 67–68.

Critiques of the ANZAC and Minehunter studies' modelling

11.14 While many submitters quoted the above studies as evidence of the broader economic benefits of naval shipbuilding, the Department of Industry, Tourism and Resources (DITR) and the Department of Defence recommended caution in interpreting analysis of multiplier effects. DITR noted that input-output multiplier models are based on an unrealistic model of the economy. Specifically, that 'in a relatively fully employed economy, with scarce skilled labour and price pressure on raw material, input-output multipliers do not provide credible results'.[15] With regard to general equilibrium analysis, DITR observed that the broader economic gains reported are a result of assumed increases in efficiency. Therefore, the reported economic benefits of the projects are realistic only in so far as the assumptions made about productivity gains are realistic.[16] DITR noted that a critique of the methods was not intended to suggest that no broader economic benefits accrue from naval shipbuilding. Rather, 'the size of any such benefits is a matter for judgement that will depend on the particular circumstances of the project, the involved firms and the broader economy'.[17]

11.15 Based on advice from the Treasury, Defence went further to state that much of the focus tends to be on the positive multipliers. It indicated that it is possible for second order effects to be negative; for example, 'where labour and capital are displaced from more productive to less productive sectors, lower national income can be expected to result'. Specifically:

> …where labour and capital are displaced from more productive to less productive sectors, lower national income can be expected to result. If there were skill shortages, then in the process of competing for skilled labour, nominal wages would be bid up as these resources were drawn away from other naval projects and/or the oil and gas sector. In these situations, economic activity is simply shifted rather than increased, and not necessarily shifted to its most productive use.[18]

Treasury also advised that where the need for skilled labour is satisfied by temporary migrants 'any multiplier or second tier order effects may be limited by the extent to which they seek to repatriate their wages to their home country'.[19]

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15 DITR, *Submission 38*, p. 17.

16 DITR noted that in the study of the ANZAC project, productivity gains reported in a survey of businesses involved with the project were unrealistic, so a more moderate assumed productivity growth figure of three per cent was used in the model. For the Minehunter study, the productivity growth figure used reflected business survey results, that is, 2.24 per cent improvement in 35 per cent of project sub contractors' 'non–Defence' work.

17 DITR, *Submission 38*, p. 19.

18 Treasury advice quoted by Defence, answers to question on notice, 28 March 2006 (received 29 May 2006), question 17, p. 44.

19 Treasury advice quoted by Defence, answers to question on notice, 28 March 2006 (received 29 May 2006) question 17, p. 44.

11.16 Defence's submission noted that:

> Constructing the ships identified in the DCP [Defence Capability Plan] in Australia has the potential to impact adversely on the overall wealth of the nation. Given the competition for scarce, skilled resources these may be better focused on non-Defence projects (such as export orientated investments) aimed at the long term good of the nation and wealth generation rather than being employed in new ship construction.[20]

11.17 Ms Denise Ironfield, author of the Minehunter and ANZAC reports, told the committee that while Treasury's advice was theoretically correct, Defence projects tend to be high-technology, high value added projects with a high return to GDP. As firms will move within and across industries to higher yield areas and labour resources will, where possible, move to higher reward work, it is therefore more likely that Defence projects would displace resources from less productive sectors, rather than more productive sectors.[21]

11.18 Defence noted that even calculating the direct economic benefits of naval ship construction is not straightforward. For ships constructed in Australia, the designs will normally be based on overseas designs and most equipment and systems will be sourced from overseas suppliers. Defence suggested that typically around 45 to 64 per cent of total expenditure for a warship project will be put towards work generated in Australia.[22]

Employment growth and broadening the industrial base

11.19 Submitters strongly supported investment in naval shipbuilding as a basis for employment growth, skills generation and higher economic growth.

- The Western Australian government referred to a 'wider heavy engineering matrix' which can and should contribute to naval shipbuilding projects 'while simultaneously attending to other national engineering tasks'. Its submission noted that if WA constructs 'about one-third' of the AWDs and integrates and consolidates the LHDs, the estimated annual economic benefits to the state from all naval shipbuilding and support projects 'could be as high as $450 million per annum'.[23]
- The Victorian government emphasised the additional economic benefits from naval shipbuilding that are not captured in ACIL Tasman's modelling. In particular, its submission cited the impetus that defence projects give to mass for innovation and technology transfer, skills development 'that translates to an improved productive capacity through the economy' and additional

20 *Submission 20*, p. 28.

21 *Committee Hansard*, 3 July 2006, pp. 92–94 and 97.

22 Department of Defence, *Submission 20*, p. 27.

23 *Submission 23*, pp. 28–29.

taxation revenue for the Commonwealth 'that would not occur if warships are purchased directly from overseas'.[24]

- Tenix referred in its submission to the 'ripple effect' that the naval shipbuilding industry provides to the resource sector, infrastructure projects and manufacturing 'by channelling significant investment into training and development of a long-term skilled workforce'.[25] Mr David Miller, Executive General Manager of Tenix Defence Pty Ltd, also emphasised the importance of sustaining existing industry capability in an economically significant national asset.[26]
- The RSL noted that significant employment benefits are to be gained in Australia by letting tenders to Australian shipbuilders to build Australian warships. It identified several industries that benefit from large naval shipbuilding projects including engine manufacturers, steel makers, transportation companies, weapons producers, electronic and electrical firms.[27]
- Mr Mark Proctor, Business Development Manager of Saab Systems Pty Ltd, told the committee that local construction projects are crucial for local SMEs to get 'the confidence and track record to be able to compete for international work'. He argued that local investment in large local defence programs provides a 'nation wide stimulus for training and development of an experienced workforce' in both defence and non-defence industries. This investment puts in place 'a sustained capability' which is an important asset when negotiating transfer of foreign owned intellectual property.[28]

Contributing to an innovative and productive industrial base

11.20 The February 2006 ACIL Tasman report revisited the findings from its ANZAC and Minehunter studies. It argued that naval shipbuilding can bring considerable indirect benefits such as technology transfer, the uptake of performance enhancing practices and higher productivity.[29]

11.21 According to more than 20 per cent of respondents to the survey of businesses participating in the ANZAC and Minehunter projects, their firms obtained a transfer of technology resulting from their involvement with the project. For the majority of these companies, the technology transfer benefited their business performance and

24 *Submission 31*, p. 6.

25 *Submission 26*, p. 7.

26 *Committee Hansard*, 27 April 2006, pp. 2 and 20.

27 *Submission 6*, p. 5.

28 *Committee Hansard*, 20 April 2006, p. 3.

29 ACIL Tasman, *Naval shipbuilding in Australia: A background briefing*, 9 February 2006, p. 60.

growth.[30] Among the surveyed businesses involved in the Minehunter project, around 25 per cent obtained a technology transfer, one-third improved their export prospects, and around 35 per cent increased their overall productivity.[31] In the ANZAC project, one-fifth of surveyed businesses obtained new technology and over 20 per cent improved their ability to export through involvement in the project.[32]

11.22 The RSL's submission argued that:

> Advances in technology continue to revolutionise the work place and in no arena is this more apparent than in the development of defence force platforms, weapons and sensors. These advances bring with them economic gains. Australian developments such as the Nulka System for ship protection from missiles along with technology transferred from allied countries assist in this process.[33]

11.23 Mr Gallagher told the committee:

> Take Nautronix, for example: I suspect that, had it not gone into the defence business and been part of that program—albeit in a very small way, in the latter stages—considering what is happening in the oil and gas sector today and our relative percentage splits, we might not have a Nautronix. I think that would apply to quite a number of other companies, given the number of organisations that were involved in many ways in that submarine build program and have gone on to be part of a future defence industry program—or it allowed them to upskill and be part of other industrial programs. Given that one cannot rely wholly and solely on defence programs, you look for synergies and other opportunities. I think a lot of companies will have benefited from having had that opportunity in that build program; therefore, the Australian industry base has also benefited as a result.[34]

11.24 Nautronix provided an example of the spur given to technological development and innovation from its participation in defence industry. In the early to mid-1990s, when the Collins class project was experiencing difficulties, it was realised that some of Nautronix's acoustic capability and product and solutions could be applied to Defence purposes. As part of the development activity associated with its work on the Collins class submarines, Nautronix invested in water communications. The company used technology which could 'transfer very accurate SMS type messages between shore and submarine and now from submarine to submarine to submarine to ship'. Mr Gallagher explained:

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30 ACIL Tasman, *Naval shipbuilding in Australia: A background briefing*, 9 February 2006, p. 61.

31 Tasman Economics, January 2002, *Impact of Major Defence Projects: A case study of the Minehunter Coastal Project*, p. vii.

32 Tasman Asia Pacific, February 2000, *Impact of Major Defence Projects: A case study of the ANZAC Ship Project*, pp. vii and x.

33 *Submission 6*, p. 5.

34 *Committee Hansard*, 3 April 2006, p. 42.

> The evolution of that, and through the acquisition of MariPro in the US from SAIC, got us into the fixed ranges business. Part of that technology transfer out of MariPro into Australia allowed us to extend our capability into the portable ranges business, which was also a spin-off from the oil and gas sector.
>
> …
>
> The evolution of these activities got us into underwater computing systems and we are currently under contract with the Navy for the provision of these hand-held diver systems that are a spin-off from the electronic charts. … Now, I do not suggest that Nautronix in the near or even medium term is going to be a military systems integrator of the significance of, say, a Raytheon or a Boeing et cetera, but it is having that capability that will allow us to strengthen the overall base in Australia and support those major companies or clients in getting the jobs done in a cost-effective and timely fashion.[35]

11.25 Nautronix explained further that:

> At the moment, on board the vessels themselves, we have the through water communications system or HAIL, the hydro acoustic information link. Around the USN, through MariPro we have the fixed ranges as part of that, but we have supplied our portable range technologies into the USN and they are currently operational in Hawaii and will be extended across the US operating straits.[36]

11.26 The economic benefits from an in-country build extend more broadly to improved commercial opportunities and productivity outcomes for local companies. The RSL's submission highlighted the comments of Mr Hector Donohue, General Manager, Strategic and Business Development at Tenix Defence Systems:

> Local construction of ships has facilitated the 'Australianisation' of vessels, such that much of the ship fitted plant and equipment is sourced in Australia and tailored to meet specific Australian standards. This results in equipment that is optimal for Australian conditions and requirements and equipment that can be supported locally. It is therefore capable of local evolution as technology advances, threats change and capabilities improve and mature. Australian naval shipbuilders have expertise in systems adaptation, design refinement and systems integration. Systems integration, in particular, has encouraged shipbuilders to enter into the strategically important areas of data management, signal processing, command, control and communications.[37]

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35 *Committee Hansard*, 3 April 2006, p. 38.

36 *Committee Hansard*, 3 April 2006, p. 38.

37 *Submission 6*, p. 6. Speech at the Australian National University titled 'Whole of Nation Concepts—Industry Perspectives' by Hector Donohue AM, General Manager, Strategic and Business Development, Tenix Defence Systems, October 2003.

11.27 The 2006 ACIL Tasman study highlighted a strong link between the implementation of 'best practice' programs, such as quality assurance, and improved productivity and business performance. It suggested that 'involvement with a Defence project had been a key factor in businesses' decision to introduce all or a number of the performance enhancing programs and practices'.[38] In the main, the benefits from participating in a shipbuilding project improve productivity. The survey findings from ACIL Tasman's ANZAC and Minehunter studies suggest that:

> …the identified productivity increase and other improvements in business performance were in large part driven by the businesses access to technology transfers and the performance enhancing programs and practices which were implemented in order to meet Defence's stringent quality requirements.[39]

11.28 The management and logistical aspects of building, operating, maintaining and repairing warships are a crucial part of their effectiveness. The use of world's best practice in these facets can deliver flow-on effects to the broader Australian economy, as well as maximising the cost effectiveness of the Australian fleet.

11.29 The promotion of best practice is often facilitated through the influence of large foreign multinationals in Australia. Mr Gallagher of Nautronix told the committee that past government investment in the naval shipbuilding sector had been successful in attracting high-profile multinationals to Australia.[40] Mr Mark Proctor of Saab Systems noted that the presence of world-class international companies with a base in Australia gives confidence to Australian companies to compete for international work. He also noted the importance of a strong indigenous electronics industry with which Australia can bargain with when negotiating transfer of foreign owned intellectual property into Australia.[41]

11.30 A number of submitters also referred to export opportunities created by defence programs. For example, Nautonix informed the committee that:

> It also allows us the opportunity to get through some of the international hurdles such as the Itar restrictions imposed by the US. We have had a number of successes in that space, particularly as one of the very first Australian companies to go through the foreign comparative test program and get our system on board US platforms.[42]

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38 ACIL Tasman, *Naval shipbuilding in Australia: A background briefing*, 9 February 2006, p. 62.

39 ACIL Tasman, *Naval shipbuilding in Australia: A background briefing*, 9 February 2006, p. 64.

40 *Committee Hansard*, 3 April 2006, p. 34.

41 *Committee Hansard*, 20 April 2006, p. 3.

42 *Committee Hansard*, 3 April 2006, p. 35.

Disadvantages of building overseas

11.31 The flipside of the economic benefits from in-country construction of naval vessels is the relative disadvantage associated with building the vessels offshore. ACIL Tasman concluded their recent study with the statement that:

> General equilibrium analysis undertaken as part of the two case studies considered the implications to the Australian economy had these made naval acquisition programs been sourced 'off the shelf' from overseas suppliers. In both instances it was found that the Australian economy would have been worse off had the foreign supply option been followed. In the case of the ANZAC ships modelling it was found that Australia would have been worse off even if the 'off the shelf' acquisition would have cost Defence 3.5 per cent less than the alternative locally sourced option.[43]

Commercial risks

11.32 Several submitters also highlighted drawbacks from offshore construction and reliance on offshore suppliers. For example, the Submarine Institute of Australia Inc. noted the higher commercial risk associated with offshore construction where there is no overseas parent navy and for which the RAN is the only operator.[44] It also urged that to avoid a repeat of the problems with the Collins class submarines, Australia must 'seek to obtain the core design and integration work from overseas'.[45] Weir Strachan and Henshaw told the committee of their first-hand experience in dealing with overseas supplying on the Collins class project:

> So we found that our dealings with them [the overseas suppliers] became more and more strained, and they were less and less interested in dealing with us. So, although probably in the first instance the companies were quite keen to supply equipment to the projects, once the acquisition was complete, and because often, as we discussed earlier, there were no requirements on them to support the equipment through life, the business model was not attractive for them. There just was not enough business in support for them to look after it. If they were pressed, they would look after the equipment, but it was actually at a price and a schedule that pleased them rather than our customers. That led us to take things into our own hands.[46]

11.33 The Fremantle-based SME, Nautronix Ltd, argued that Australian companies suffer from a 'tyranny of distance' in their interactions with overseas shipbuilders. Mr Mike Deekes, Chief Executive Officer of Nautronix, told the committee:

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43 ACIL Tasman, *Naval shipbuilding in Australia: A background briefing*, 9 February 2006, pp. 66–68.

44 *Submission 3*, p. 15.

45 *Submission 3*, p. 8.

46 *Committee Hansard*, 20 April 2006, pp. 26–27.

> If that industry goes offshore then it is going to be very difficult for SMEs particularly to compete in an international space and be part of what is effectively a foreign shipbuilding program without some absolute direction or requirement by, say, the government of the time. Shipbuilders will tend to want to, if they are to provide a cost-effective solution, fit those ships with the systems that are prevalent in their sister classes in their own countries.[47]

11.34 In blunt terms, Mr Deekes told the committee:

> You lose the flexibility and accessibility to being part of the program, and that would apply to a whole range of companies. Why would you buy nuts and bolts from some guy in Australia when it is obviously far cheaper to walk around the corner in the US or wherever the ships might be being built?[48]

Eroding the Australian industrial base

11.35 Another major disadvantage in purchasing naval vessels offshore is that it overlooks the investment needed to maintain in-country capability and infrastructure. An offshore build uses taxpayer money to support investment in offshore capabilities. It also allows the foreign yard to use the build of the Australian ship as a promotional tool for its prospective customers, an advantage not enjoyed by Australian industry.

11.36 The RSL noted that purchasing vessels from overseas reduces the capacity of the Australian industrial base.[49] It cited the case of HMAS *Westralia* which was purchased from Britain:

> When this vessel had to be deployed to the Persian Gulf during the 1991 Gulf War it could not meet the 'one stop shop' need of the warships it was supporting. This operational shortcoming has been perpetuated by the second stop-gap measure of acquiring the foreign built tanker Delos to replace HMAS Westralia. Even after conversion in an Australian shipyard it will not have the 'one stop shop' AOR capability when it enters service as HMAS Sirius. The support ship will be unable to replenish ammunition and will lack some of the other features normally built in to an AOR.[50]

11.37 Mr Peter Croser, Managing Director of Gibbs & Cox Australia Pty Ltd, highlighted the pitfalls of buying ships off-the-shelf from an overseas seller. He emphasised the importance of acquiring cutting-edge technology to suit Australia's unique strategic requirements:

> Because we then would be buying a ship that was from a few years before, and the capability requirement that the Australian Navy are asking for is

47 *Committee Hansard*, 3 April 2006, p. 39.

48 *Committee Hansard*, 3 April 2006, p. 41.

49 *Submission 6*, p. 3.

50 *Submission 6*, p. 3.

> from last year not 10 years ago. They want to be 10 years ahead of the game or else they are in the future going to be 10 years behind the game. Effectively, we are looking to meet a capability that the Australians need for their projected future, not USN's projected future. I think they are different.[51]

11.38 Mr Miller of Tenix emphasised the economic importance of continuing Australia's investment in warship construction. He told the committee that recent experience with Tenix and other Australian shipbuilders has showed that Australia can compete with yards in Europe, both in material costs and labour costs. Mr Miller emphasised that shipbuilding is of 'economic value to Australia' and contributes to the economic strength of the nation. He noted that Australia, as a country with an established shipbuilding industry, does not face the huge economic barriers to entry as would a company seeking to enter the aircraft manufacturing industry.[52]

The effect on Australia's trade deficit

11.39 Large one-off purchases of defence items substantially increases Australia's balance of payments deficit. The Australian Manufacturing Workers Union noted in its submission that over the past decade, the growth in imports of elaborately transformed manufactures (ETMs) has 'greatly exceeded' ETM export growth. It argued:

> The purchase of naval vessels overseas would increase our imports of ETMs by a massive margin. For example, if the Federal Government had decided to source the Air Warfare Destroyers completely from overseas that would have added approximately $6 billion to our ETM import figure, representing 4.4% of total ETM imports or increasing our trade deficit by 26.3%.[53]

11.40 On the other hand, local procurement of naval vessels not only avoids worsening the ETM trade deficit but can also provide a basis for exports of naval vessels. Not only does local construction reduce ETM imports; it often leads to more ETM exports. Mr Miller told the committee:

> It is a part of Australian industry that in our business alone we are fairly confident that we have contributed several billion dollars to the export and balance of payments situation here in Australia. I am certain that John Rothwell and the many other successful people in shipbuilding in Australia would be able to point to exactly that. We got into the industry and there are areas now where we certainly can compete. I do not think we are terribly disadvantaged simply by being in Australia.[54]

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51 *Committee Hansard*, 19 April 2006, p. 49.

52 *Committee Hansard*, 27 April 2006, p. 20.

53 *Submission 21*, pp. 13–14.

54 *Committee Hansard*, 27 April 2006, p. 20.

11.41 Australia is well-placed to continue capitalising on these past export successes. Against a backdrop of sustained economic prosperity and large budget surpluses, it is important that Australia invests in its indigenous naval shipbuilding industry.

Defence's assessment of these benefits

11.42 Defence agreed that all of the benefits put forward by witnesses can accrue to some extent from Australian naval shipbuilding. However, these broader benefits are not generally considered when assessing tenders. Defence explained:

> Some of the less tangible benefits, such as technology transfer and access to intellectual property, are achieved through the activities proposed for Australian industry and form part of the evaluation of these activities. Others, such as potential spin-offs to industry at large and wider benefits to the economy, such as increased employment, may be recognised but play little or no part in the numerical evaluation. Such benefits will be noted in advice to Government.[55]

11.43 Defence stated it is not their practice to base a source decision solely on cost. The primary consideration is 'value for money', which balances cost with acquisition capability.[56] These issues are discussed in more detail in chapter 15.

Conclusion

11.44 The committee notes several economic benefits from past investment in an indigenous naval shipbuilding industry. Both the ANZAC and Minehunter projects had clear spin offs for the companies involved and the wider Australian economy in terms of employment growth, higher GDP and consumption, technology transfer, export opportunities and the adoption of best practices. Disagreement over the accuracy of different economic models to measure these benefits is an argument about the size of the projects' economic benefits, not their existence.

11.45 The committee has received considerable qualitative evidence pointing to the importance of in-country investment in warship construction for job creation, technological innovation and higher productivity. There have been corresponding arguments that offshore construction not only fails to recognise these benefits, but also fails to capitalise on the sizeable investment already made in the naval shipbuilding sector. Moreover, failure to continue investing in an indigenous naval shipbuilding industry would threaten the livelihood of the existing industrial base, detract from the economy's overall value and compromise the effectiveness and timeliness of Australia's key strategic requirements.

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55 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006) question 52, p. 48.

56 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006) question 27, pp. 17–18.

Chapter 12

The strategic imperative

12.1 The last three chapters concentrated mainly on the costs and savings involved in building and maintaining a naval ship through its life in Australia compared with overseas. Naval shipbuilding, however, is not exclusively an economic activity—it is a Defence activity with national security its foremost concern.

12.2 This chapter focuses on the strategic needs of Australia and how they shape Australia's policy toward its indigenous shipbuilding industry. It looks at the uniqueness of Australia's security requirements especially those stemming from its geographical isolation and the environment in which Australian ships operate. Against this background, the chapter considers the importance attached to having an indigenous shipbuilding industry and a domestic capability to support Australia's naval ships through their working lives.

Defence capability and the national interest

12.3 Nations feel strongly about having control over the capability and technology necessary to have operational independence in areas vital to their country's defence. A country's desire to have an appropriate degree of self-sufficiency when it comes to protecting its borders, people and broader national interests shapes its defence procurement policy.

12.4 Australia is no exception. It has adopted a policy that gives great weight to local industry as an important element of its defence capability.[1] Defence advised the committee that its strategic aims for industry are centred on 'having a sustainable and competitive Australian defence industry base to support a technologically-advanced ADF'.[2]

12.5 The following section focuses on the naval component of Australia's defence capability. It considers Australia's unique security needs and how they interact with other considerations such as costs and affordability. The committee's principal concern is to determine the extent to which Australia should be self-reliant on the design, construction, maintenance, repair and upgrading of its naval fleet.

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1 Australian Government, Department of Defence, *Australia's National Security, A Defence Update 2005*, p. 19. The Government's Defence Update 2005, recognised that its defence capability is 'the most potent of the range of instruments Australia employs to promote and support its security interests'

2 Department of Defence, Overview, answer to question on notice, 28 March 2006 (received 29 May 2006) p. 1.

Australia's unique strategic requirements

12.6 Over recent decades substantial changes have taken place in the international security environment deriving mainly from globalisation, the activities of terrorist groups, rapid advances in technology and the growing worldwide demand for energy resources.[3] In considering its national security, Australia must take account not only of these worldwide trends but also its traditional security concerns that emanate from a region characterised by political, ethnic, cultural and religious diversity. There are latent and active tensions in the region that threaten to undermine the complex and changing web of relations.[4] As noted by the Department of Foreign Affairs and Trade 'the Asia-Pacific area is still home to eight of the world's ten largest armies and, after the Middle East, the world's three most volatile flashpoints—the Taiwan Straits, the Korean Peninsular and Kashmir'.[5] More immediately, pockets of political instability among some of Australia's closest neighbours, such as the Solomon Islands and East Timor, create significant security concerns.[6]

12.7 Many submitters suggested that the size and nature of the Australian continent calls for 'a military strategy fundamentally oriented to the maritime environment'.[7] They argued that as an island nation with vulnerable northern approaches, Australia should attach great importance both to its capability to defend its land mass and people and also to securing its maritime approaches.[8]

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3 See for example, Commonwealth of Australia, *Defence 2000: Our Future Defence Force*, pp. 15–26; Ministry of Defence, United Kingdom, *Defence Industrial Strategy: Defence White Paper*, presented to Parliament by the Secretary of State for Defence by Command of Her Majesty, December 2005, p. 15. See also Department of the Navy, *Australian Maritime Doctrine*, 2000, chapter 2.

4 See for example consideration of the region's security concerns in Senate Foreign Affairs, Defence and Trade References Committee, *China's emergence: implications for Australia, March 2006*, pp. 127–172, 194 and chapter 11. Although this report is focused on China, it provides an overview of security concerns in the East Asian region.

5 Commonwealth of Australia, *Advancing the National Interest*, Australia's Foreign and Trade Policy White Paper, 2003, p. ix.

6 See for example consideration of the region's security concerns in Senate Foreign Affairs, Defence and Trade References Committee, *China's emergence: implications for Australia, March 2006*, pp. 171–3, 177. Australian Government, Department of Defence, 'Operation Astue, 25 May 2006, http://www.defence.gov.au/opastute/default.htm (accessed 26 May 2006).

7 Government of South Australia, *Submission 9*, p. 10; Gregory Tunny, *Committee Hansard*, 19 April 2006, p. 18; Rear Admiral (Retired) Kevin Scarce, Port Adelaide Maritime Authority, *Committee Hansard*, 19 April 2006, p. 21; Government of Western Australia, *Submission 23*, pp. 9–10; Gregory R. Copley, Future Directions International, *Submission 28*, pp. 3–5.

8 Government of South Australia, *Submission 9*, p. 10; Gregory Tunny, *Committee Hansard*, 19 April 2006, p. 18; Rear Admiral (Retired) Kevin Scarce, Port Adelaide Maritime Authority, *Committee Hansard*, 19 April 2006, p. 21; Government of Western Australia, *Submission 23*, pp. 9–10; Gregory R. Copley, Future Directions International, *Submission 28*, pp. 3–5.

12.8 The South Australian and Western Australian governments were among the many submitters who underlined the importance of Australia having a maritime capability.[9] The South Australian government stated:

> The physical environment of Australia as an island nation dictates the criticality of having an independent and effective maritime capability to contribute to our national defence and security requirements into the foreseeable future. To deliver this maritime capability, shipbuilding, repair and maintenance must be recognized as a national strategic industry.[10]

12.9 Its submission suggested that 'any military threat to Australia would have to be made through or over our maritime approaches'. It observed that 'a key strategic priority for successive governments has been the capacity to deploy independent naval strength into the ocean and archipelago areas adjacent to the continent.[11] The state government also noted that deploying Australian forces would require 'heavy lift ships and their effective protection to traverse our nearby archipelagos and oceans to their area of operations'.[12]

12.10 The Australian Manufacturing Workers Union (AMWU) similarly contended that the defence of Australia depends on 'control of the long maritime approaches to the continent, or at the very least denial to a potential enemy control of these approaches'.[13] The Submarine Institute of Australia Inc and the Returned & Services League of Australia (RSL) also highlighted the uniqueness of Australia's maritime security needs, including the increasingly critical strategic issues in the context of energy and trade, which, they argued, demanded unique solutions.[14]

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9 See also Aerospace, Industrial and Marine Technology (AIMTEL) Pty Ltd, *Submission 15*, p. 2. AIMTEL recommended that Australia continue to procure Australian made ships for the benefit of its future skills base and that any economic matters be treated under the banner of training to maintain our independence. See also the Australian Association for Maritime Affairs Incorporated, *Submission 13*, p. 4.

10 *Submission 9*, pp. 4 and 11. The submission listed the factors that make giving an effective marine capability a priority: notably, one of the longest coastlines in the world, territorial seas and exclusive economic zone amounting to an area greater than the continent itself. See also Mr Gregory Copley, *Committee Hansard*, 3 April 2006, p. 2.

11 Government of South Australia, *Submission 9*, p. 10.

12 *Submission 9*, p. 10.

13 *Submission 21*, p. 2.

14 *Submission 3*, p. 2. The RSL noted important factors determining Australia's defence planning. They included:

- For the foreseeable future, the bulk of Australia's trade with other nations will continue to be almost exclusively sea borne thereby placing an increasing and ongoing obligation on the nation to play its part in keeping open the vital international sea lines of communication;
- The country should expect to be called upon by the United Nations to assist in military operations authorised by the UN Security Council in diverse parts of the world. Alliance partners may also seek Australian involvement in mounting security operations distant from the Australian continent;

12.11 The RSL's view of Australia's key maritime interests was that it:

> would be irresponsible of Australia not to provide itself with the wherewithal to maximise its maritime security advantages, including an ability to play its part in maintaining the security of sea-borne trade.

12.12 Of equal importance to the RSL was for Australia to remain capable of the sea-borne deployment of its armed forces and of protecting these forces en route to their destinations.[15] This need to maintain a naval capability is in the context of rapid changes in technology. As the RSL noted:

> All these considerations demonstrate the ongoing need for a state-of-the-art and broadly capable maritime combatant force capable of sustained operations throughout the sea-air gap surrounding the continent and of deploying to areas of conflict in other parts of the world. This will require Australia to acquire, maintain and operate modern surface combatants, submarines, amphibious and troop carrying warships, mine warfare and clearance diving forces, maritime air forces and maritime logistic support forces.[16]

12.13 The 2000 Defence White Paper also noted the growing sophistication of naval vessels and improved technology in the region. It cited in particular anti-ship missiles with longer range, better guidance and more capable systems which allow several missiles to be launched at a target simultaneously from different directions. It maintained that the number of types of platform that can launch these missiles has also increased to include not just ships, but submarines and several types of aircraft. It expects these trends to continue over the current decade. For example, it anticipates that the supersonic anti-ship missiles will enter service in several countries in the region within the next ten years and the capability to target ships at long range will improve.[17] Defence contended that:

> Over the coming decade it is likely that the capabilities of submarines being operated by regional navies will improve significantly, and a number of navies will acquire sub-marines for the first time. Anti-submarine warfare capabilities will also improve.[18]

12.14 The Victorian government similarly drew the committee's attention to the growing naval defence capability in the region. It stated:

- Nearer home, the security of the region requires that Australia remains capable of deploying significant forces in response to requests from regional governments or to assist in bolstering security in the vast area stretching from Papua New Guinea into the South Pacific. *Submission* 6, pp. 1–2 and also *Submission 3,* p. 20.

15 *Submission* 6, p. 2.

16 *Submission* 6, p. 2.

17 *Defence 2000—Our Future Defence Force,* p. 25.

18 *Defence 2000—Our Future Defence Force,* p. 25.

> A review of the acquisition policies and practices of the largest Asian-Pacific militaries reveals that buyers are seeking more sophisticated capabilities, particularly long-range precision strike, command and control and intelligence systems. …
>
> In particular, China, India, South Korea, Japan, Taiwan, Singapore and Thailand have launched ambitious naval acquisition programs intended to provide their respective militaries with greatly increased regional power projection capabilities. These efforts will dramatically increase the region's number of advanced diesel-electric submarines, aircraft carriers, amphibious assault ships and destroyers and frigates with long-range air and missile defence systems.[19]

12.15 Clearly, there are compelling reasons for Australia to have a navy capable not only of defending its shores but ensuring the safety of the surrounding seas. As a large island nation in a region where there is significant expansion of naval capability, the protection of Australia's security interests relies heavily on an effective and modern naval force. The general acceptance that Australia needs such a force opens up debate about the relationship between self-sufficiency and capability. The section below considers the importance of an indigenous shipbuilding industry to Australia's defence capability.

The relationship between defence capability and an indigenous naval shipbuilding industry

12.16 Defence's 2000 White Paper stated that with Australia's national defence expenditure accounting for only one per cent of world military expenditure it would be unrealistic to aspire to complete industrial self-sufficiency.[20] It noted:

> The Government will also seek to make greater use of off-the-shelf purchases, especially where the additional capability from Australian specific modifications does not justify the increased cost and risk. However, total reliance on off-the-shelf purchases is neither achievable nor desirable. It would risk our forces having inferior technology in key areas such as combat systems, and place the ADF at a serious disadvantage if local industry were unable to repair or modify critical equipment in wartime.[21]

12.17 The Defence 2000 White Paper and DMO's 2002 Strategic Plan noted that the policy of self-reliance had underpinned the Australian Government's preference for the local construction of major surface ships and submarines since the 1980s. It stated further:

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19 *Submission 31,* p. 44.

20 Department of Defence, *Defence 2000, Our Future Defence Force,* Commonwealth of Australia, 2000, p. 99.

21 Department of Defence, *Defence 2000, Our Future Defence Force,* Commonwealth of Australia, 2000, pp. 100–101.

> Our Future Defence Force reinforces the self-reliance policy of previous White Papers. It states that the ADF needs to be able to defend Australia without relying on the combat forces of other countries. To achieve this policy outcome, the Government's stated objective is to have a sustainable and competitive defence industry base, with efficient, innovative and durable industries, able to support a technologically advanced ADF.[22]

12.18 This policy stance, as noted in Defence's 2000 White Paper, allows for the purchase of overseas ships. The 2002 Strategic Plan also explained the limits on self-sufficiency:

> The concept of self-reliance does not imply complete self-sufficiency in the supply of goods and services. Self-sufficiency is neither affordable nor practicable due to factors such as Australia's remoteness, economies of scale, and the need to access global technologies and supply chains as required. In conjunction with developing local support capabilities, there must be the capacity to ensure that support can be drawn from overseas must be retained whenever necessary. Therefore, careful investment judgements are required in order to achieve an optimum combination of combat strength and supportability.[23]

12.19 In 2004, Senator the Hon. Robert Hill, Minister for Defence, restated the government's preference for self-sufficiency in its procurement policy but conceded there were practical constraints.[24] Even so, he stressed that Australia:

> must be able to support and maintain our equipment and the investment in Australia in systems integration, weapons integration, electronic warfare protection, new generation radar, advanced communications and other critical areas remain very important.[25]

12.20 The Allen Consulting Group maintained that there has never been the view that Australia should build all the missiles and military systems that it requires. It went on to state, however, that while these types of assets and other hardware can be stockpiled to meet defence needs in any emergency, 'in other areas there is a need for significant in-country industrial capacity to maintain defence assets in a state of operational readiness'.[26]

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22 *Submission 21,* p. 2. Defence Materiel Organisation, *Australian Naval Shipbuilding and Repair Sector,* Canberra, 2002, p. 43; Commonwealth of Australia, *Defence 2000: Our Future Defence Force,* p. xi.

23 *The Australian Naval Shipbuilding and Repair Sector Strategic Plan,* September 2002, p. 17.

24 Senator the Hon Robert Hill, Minister for Defence, Opening Address, Pacific 2004 International Maritime Exposition and Congress, Sydney Convention and Exhibition Centre, 3 February 2004.

25 Senator the Hon Robert Hill, Minister for Defence, Opening Address, Pacific 2004 International Maritime Exposition and Congress, Sydney Convention and Exhibition Centre, 3 February 2004.

26 The Allen Consulting Group, *Future of Naval Shipbuilding in Australia: Choices and Strategies,* May 2005, p. 19.

12.21 Chapter 2 discussed the difficulties facing maritime nations wishing to retain a degree of control over their domestic naval shipbuilding industry for national security reasons. Many countries provide direct and/or indirect subsidies to keep their industry viable but even then they do not have the wherewithal to retain absolute sovereignty over their naval capability. Indeed, the Allen Consulting Group noted that not even the U.S. can produce everything it needs purely from its own resources (see chapter 2).

12.22 The UK Ministry of Defence took the view that maintaining control of domestic defence capability, including the ability to respond to urgent operational requirements, 'does not necessarily mean "procurement independence" or total reliance on national supply of all elements'. It noted further that the degree of control will differ across technologies and projects:

> In many, even high priority areas, we can, and do, rely on overseas sources, and have made progress in recent years in developing increased assurances of security of supply, but there are critical areas where not maintaining assured access to onshore industrial capabilities would compromise this operational independence and hence our national security.[27]

12.23 Thus, Australia is not alone in endeavouring to reconcile the desire for self-sufficiency in naval defence capability as a national security priority with the practical limitations imposed by cost and technology. Indeed, the tension that exists between the desire to maintain self-sufficiency in naval shipbuilding for national security reasons and the practical considerations of affordability was pronounced in evidence before the committee.

12.24 A number of submitters were certain that an indigenous naval shipbuilding capability should be a critical component of Australia's defence capability. For example, when the committee asked witnesses why Australia could not simply purchase the ships it needs off-the-shelf from countries producing such vessels, the response drew heavily on the strategic argument that Australia needs to retain some degree of self-sufficiency so that it is not left vulnerable. Rear Admiral Kevin Scarce stated:

> I would say that with warships, whilst not as critical perhaps as with a submarine, it is just as vital for us in the longer term to understand what we are buying, to warrant the safety of the ship and to be able to amend it, to update it and to upgrade the systems. It is not about building steel, it is about managing the design and build program and ensuring the quality of what you produce to meet the end customer's requirement. I do not believe you can do that by just importing the ship. I do not think it is just the skills

27 Ministry of Defence, United Kingdom, *Defence Industrial Strategy: Defence White Paper,* presented to Parliament by the Secretary of State for Defence by Command of Her Majesty, December 2005, p. 15.

> transfer, and the Collins program shows us quite clearly what happens when you do not make provision for that knowledge transfer.[28]

12.25 The RSL cited the views of Major General Peter Abigail, who stated that there is a strategic imperative for Australia to have a naval shipbuilding industry.[29] The Submarine Institute of Australia Inc noted that 'naval shipbuilding (including large, medium and small surface ships and submarines) is at the high value/high (smart) end of the technology spectrum and is regarded as a strategic asset important to Australian security and increased self-reliance'.[30] Mr Michael Gallagher of Nautronix Ltd, argued that:

> The government's stated policy for strategic self-reliance will be potentially eroded if we start to move key activities such as shipbuilding offshore. We need that security. We need to have the flexibility. We need to be able to respond and react in good time to changing scenarios, particularly given our geographic disposition and the large maritime area that we are responsible for.[31]

12.26 In its submission, Defence noted and broadly agreed with the findings of the 2002 ASPI report that asserted 'There is in fact no strong strategic reason to build the Navy's warships here in Australia'.[32] The ASPI report argued that:

> Australia cannot and should not aim for self-sufficiency in supporting our naval capability. There is simply no way we could design, build, and equip our own ships without relying on imported systems and technology. The benefits of self-sufficiency would be low, and the costs very high. Strategically it would result in a major reduction in overall capability. So we will import all or most of the design work needed for our major warships, and all or most of the sophisticated weapons and systems that make up a large proportion of the value of our ships.[33]

12.27 Clearly it is beyond the means of any country to retain absolute control over all aspects of its defence capability. Delineating the point at which a country relinquishes its control over the design or construction of a major defence acquisition depends on the weight it gives to security, economic and other national interest considerations.

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28 *Committee Hansard*, 19 April 2006, p. 38.

29 *Submission 6*, p. 6.

30 *Submission 3*, p. 14.

31 *Committee Hansard*, 3 April 2006, p. 35.

32 *Submission 20*, paragraphs 1.6–1.7, p. 2. Australian Strategic Policy Institute, *Setting a Course for Australia's Naval Shipbuilding and Repair Industry*, An ASPI Policy Report prepared by Mark Thomson and Simon Harrington, August 2002, p. 11.

33 Australian Strategic Policy Institute, *Setting a Course for Australia's Naval Shipbuilding and Repair Industry*, An ASPI Policy Report prepared by Mark Thomson and Simon Harrington, August 2002, p. 10.

The relationship between defence capability and an indigenous naval ship maintenance and repair industry

12.28 Although Defence acknowledged that industrial capability had 'always been a critical partner for the Australian Navy, essential to the delivery and sustainment of warships throughout their life', it was prepared to accept that Australia did not need the capability to construct its naval vessels.[34] The strategic argument applying to the maintenance and repair of naval ships is different. Indeed, a number of key studies have underlined the importance of being able to repair, maintain and upgrade vessels in-country. Although the 2002 Strategic Plan did not suggest that a shipbuilding industry was essential it found that 'Without an effective long-term repair & maintenance regime the very function and purpose of the Navy are jeopardised'.[35]

12.29 It acknowledged up front the strategic importance of Australia's naval shipbuilding and repair sector. It stated forcefully that the repair and maintenance of naval vessels is vital to operational effectiveness of the fleet. The Strategic Plan adopted the tenet that 'the development and sustainment of NSR capabilities and skill-sets is critical to the long-term delivery and management of naval capability and to the viability of the sector'.[36]

12.30 It left no doubt that Australia's self-reliant defence could not be assured unless the capabilities exist in Australian industry to maintain, modify, upgrade and repair the nation's warships.[37] The plan spelt out the requirement for 'competent ship repairers supported by an experienced workforce able to repair and maintain equipment that spans a range of technologies from the early 1960s to today's leading edge'. In its view, they need to be able to respond promptly to pressing operational requirements and have the capability to meet the demands that arise during periods of increased operational commitments, including the urgent repair of unforseen work such as major battle damage.[38]

12.31 The ASPI report reinforced this view stating that the real strategic priority is to have the ability to repair and maintain our ships, including the ability to keep them in operation during conflict.[39] It highlighted the impracticality of not having this capability:

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34 *Submission 20*, paragraph 1.1, p. 1.

35 *The Australian Naval Shipbuilding and Repair Sector Strategic Plan*, September 2002, p. 12.

36 *The Australian Naval Shipbuilding and Repair Sector Strategic Plan*, September 2002, p. 7.

37 *The Australian Naval Shipbuilding and Repair Sector Strategic Plan*, September 2002, p. xi.

38 *The Australian Naval Shipbuilding and Repair Sector Strategic Plan*, September 2002, p. 12.

39 *Submission* 20, paragraphs 1.6 and 1.7, p. 2.

> The transit times to foreign maintenance locations would be prohibitive in peacetime and operationally compromising in wartime.[40]

12.32 The majority of evidence presented to the committee supported the view that Australia should have a naval shipbuilding and repair industry. Many participants in the inquiry, however, saw a direct and critical link between maintaining the country's defence capability and having an Australian naval shipbuilding and repair industry.[41] It should be noted that the 'modification and adaptation of a vessel through its service life to meet unanticipated capability requirements and changes in technology such as obsolescence' are included in activities associated with ship maintenance and repair.[42]

12.33 The South Australian government pointed out that all significant maritime nations maintain a core naval shipbuilding and repair capacity. This applies not only to the major maritime powers but also to medium-size countries, such as Sweden, the Netherlands, Spain, Italy and Canada and, in our region, South Korea, Singapore, Indonesia, Malaysia and New Zealand. It argued that Australia's 'great distances from major North American and European suppliers means that having an indigenous shipbuilding industry greatly enhances our defence self-reliance'.[43] It added:

> Maintaining an Australian shipbuilding and repair capability is a critical element in providing the government with options to deliver defence and foreign policy objectives in this uncertain strategic environment.[44]

12.34 Building on this line of argument, the Government of Western Australia was of the view that a reliance on off-shore industry to maintain, repair, upgrade or modify navy vessels puts Australia's defence interests at risk. It maintained that:

> …if a dispute occurred between Australia and a regional country, third country governments may be reluctant to permit their industries to support Australian naval combatants. It is equally plausible that overseas shipbuilders and repairs may accord the task of supporting Australian naval combatants involved in such a dispute lower priority than other business. The consequences for Australia of inadequate off-shore support could be serious: The ability of the Australian Defence Force to conduct naval operations on its terms could be seriously impeded and the Australian Government's ability to conclude hostilities in a way that protected and advanced Australia's interests could be substantially compromised.[45]

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40 Australian Strategic Policy Institute, *Setting a Course for Australia's Naval Shipbuilding and Repair Industry,* an ASPI Policy Report, Prepared by Mark Thomson and Simon Harrington, August 2002, p. 11.

41 See for example, Rear Admiral (Retired) Kevin Scarce, Port Adelaide Maritime Authority, *Committee Hansard*, 19 April 2006, p. 21; Gibbs & Cox Inc, *Submission 10*, p. 5; Engineers Australia, *Submission 24*, p. 23.

42 See DISplay Pty Ltd, *Submission 40,* p. 4.

43 *Submission 9*, p. 12.

44 *Submission 9*, p. 34.

45 *Submission 23,* p. 8.

12.35 With equal force, the Submarine Institute of Australia Inc underlined the importance of Australia having the industry 'continually engaged so that in the unfortunate but potential event of battle damage or accidental damage, major repairs can be conducted expeditiously within country; design experience is especially important in this case'.[46]

12.36 As noted above, Defence saw no strong strategic reason to build the Navy's warships in Australia. It did, however, place a high priority on self-sufficiency in the through-life support of its naval ships.[47] Indeed, two of its key stated strategic aims are clear about the importance of retaining control over the repair and maintenance of its naval vessels. Defence stated that its aims are:

- the ongoing sustainment of a vibrant, competitive, cost effective Australian maritime industrial capacity able to conduct repair and maintenance, upgrade and systems integration of Navy's surface ships and submarine force; and
- an industry disposition that can efficiently support the Navy fleet basing strategy.

12.37 It explained that the strategy would continue maintenance and home-porting of major surface ships on the East Coast in Sydney at Fleet Base East and the West Coast near Perth at Fleet Base West. With regard to the submarines, full cycle dockings are carried out in South Australia with the remainder of submarine maintenance activities carried out at Fleet Base West.[48]

12.38 On strategic grounds, the argument supporting the existence of a naval ship repair industry in Australia presented a stronger case than for having a naval shipbuilding industry. Even so, the relationship between the two sectors, particularly any interdependence between shipbuilding and ship repair, must also influence national security concerns and warrants the committee's consideration. The following section looks at nature of the relationship between the naval shipbuilding industry and the repair industry and whether it has implications for defence marine capability and national security.

Connection between shipbuilding and maintenance, repair and upgrades

12.39 As noted above, Defence's policy allows for ships to be purchased overseas. Defence has made clear, however, that 'the most important thing that the shipbuilding industry can add to the Defence of our country is the onshore capability for upgrade of the platforms and maintenance through-life…we need to develop enough skills in the country to maximise Australian content in the upgrade and maintenance cycles'.[49] DMO's 2002 Strategic Plan, which accepted that ships may be able to be built

46 *Submission 3*, p. 9,

47 *Submission 20*, paragraph 4.7, p. 25.

48 Department of Defence, *Submission 20*, p. 1.

49 *Committee Hansard*, 18 August 2006, p. 31.

overseas, also made clear that there was no practical alternative for conducting repair and maintenance of the Fleet in Australia.[50] The 2005 Allen Consulting Group study, however, drew a very firm connection between in-country build and the capability to maintain and repair the vessel. It concluded:

> …in undertaking local build of both the *Collins* and *ANZAC* classes Australia put itself in the position whereby it has significant parent navy responsibilities for both classes of ships and has achieved a high level of self-reliance in maintaining them.[51]

12.40 Many submitters made a similar connection between the acquisition of the skills necessary for the effective and efficient maintenance, repair and upgrade of a ship to an in-country build.[52] They believed that the two sectors were linked and could not, or should not, be separated. The Western Australian government tied navy preparedness—and by extension the credibility of Australia's maritime strategy—to a dependency on local industry support. This in turn rests on the construction of naval vessels in-country:

> …the case for construction of naval combatants in Australia rests primarily on the contribution that such activity makes to the preparedness of the naval units operating the vessels so constructed. Navy preparedness is based on the availability of vessels and their crew and is currently measured in Unit Ready Days (URD). The number of URD achieved by naval combatants depends fundamentally on the efficiency and effectiveness with which they are supported in-service. In-service support of naval combatants comprehends their routine maintenance, their repair should they sustain damage, their upgrade so as to remain competitive in military terms and their adaptation to meet the requirements of specific missions.[53]

12.41 The Western Australian government considered that:

> Australian industry involvement in the supply of naval ships is a means of conditioning our companies and workers for support of navy preparedness. Local construction of navy ships is therefore an investment in local industry capability for support of Australian Navy preparedness; it is not an end in itself.[54]

12.42 The Western Australian government cited the cases of the Collins class submarines and the ANZAC ships where Australians working on the construction of both vessels gained the platform, system and engineering knowledge and crucial skills

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50 *The Australian Naval Shipbuilding and Repair Sector Strategic Plan*, September 2002, p. xvi.

51 The Allen Consulting Group, *Future of Naval Shipbuilding in Australia: Choices and Strategie*s, May 2005, p. 45.

52 *The Australian Naval Shipbuilding and Repair Sector Strategic Plan*, September 2002, p. xvi; Display Pty Ltd, *Submission 40*, p. 10.

53 *Submission 23*, p. 5.

54 *Submission 23*, p. iv.

that would carry over to support the ships through their life. Arrangements are now in place dedicated to the in-service support of the Collins and ANZAC vessels that 'make for rapid response to and resolution of defects as well as facilitating the routine and ad hoc maintenance requirements and engineering support'.[55]

12.43 Taking the same approach, the AMWU stated that:

> Beyond the economic costs, it is vital to Australia's independence that we have an indigenous capacity to support, repair and upgrade our naval vessels. Local construction is inexorably linked to this. We must avoid repeating the situation we faced in 1982 when during the Falkland Islands conflict the Royal Navy froze export of all spare parts for the Oberon class submarines.[56]

12.44 The Submarine Institute of Australia Inc argued that it is important to have the industry 'continually engaged so that in the unfortunate but potential event of battle damage or accidental damage, major repairs can be conducted expeditiously within country; design experience is especially important in this case'.[57] Mr Greg Tunny, Managing Director and CEO of ASC Pty Ltd, told the committee:

> …at any one point in time over the life of a vessels we do not necessarily know that we can go back to where we got it from to get the latest and greatest upgrade enhancement that we need at an affordable price within an affordable time to meet an emergent contingency which may be coming on us very rapidly. If we have not built it, we do not necessarily have the capacity to do that in country.[58]

12.45 It should be noted that DITR informed the committee that part of the reason 'that more complex vessels are self-built rather than purchased is that building them is a way of developing the domain knowledge required to maintain and operate the vessel'.[59] Indeed, officers from DMO made a direct and strong connection between the construction of a ship and the development of a skills base needed for future ship builds and repairs. They saw local involvement in the construction of a ship as setting the necessary foundations on which to build future ships in Australia. Mr Warren King, Deputy CEO of DMO, told the committee:

> …we would not embark on the AWD program as a nation today if it had not been for all the skills sets that have been built up and which are broadly retained in the industry base as a result of Collins, Anzacs and minehunters.[60]

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55 *Submission 23*, p. 9.

56 *Submission 21*, p. 8.

57 *Submission 3*, p. 9.

58 *Committee Hansard*, 19 April 2006, p. 18.

59 *Submission 38*, p. 6.

60 *Committee Hansard*, 18 August 2006, p. 34.

Referring to when the AWD build is finished, DMO's Chief Executive Officer Dr Stephen Gumley added:

> But when we look at the size of the skill base, the many hundreds of engineers that ASC employed to build the AWD, those people, hopefully, will be ready for the next round, whenever that might be. It is the generic skill base that matters more than the specifics of any particular class or company.[61]

12.46 He further emphasised the critical link between skills needed to maintain and upgrade a vessel with a local build:

> In the shipping area, it really is the upgrade and maintain capability. To get that…we have been able to piggyback off the successful builds of Anzac and Collins. It is my hope that, with the successful build of AWD and whatever might happen with the LHD, we will have a base for the next phase, whatever that might be.[62]

12.47 When asked pointedly whether it was possible to sever the link between the construction of a naval vessel and its through-life support, Defence's response was qualified. It believed that the connection was not always strong. It told the committee that in many cases it was preferred to maintain the link by having ships constructed in-country. Even so, it stated that 'it is possible to meet the strategic imperative to maintain and modify Navy ships in Australia without building ships in Australia'. It found only a small linkage between the need to build ships in Australia and to maintain them when ships are relatively simple. It stated that 'As complexity grows, the link becomes stronger. Patrol boats and the refit of the oiler SIRIUS are at the simple end, while the frigates, submarines and AWD are at the other end'.[63]

12.48 Defence cited a number of projects involving the purchase of ships from overseas where repair and maintenance was successfully carried out in Australia. It made the following points:

> The first four FFGs were supported in Australia before the final two were constructed here; navy operates the two LPAs constructed in the US and the Fleet replenishment ships HMAS WESTRALIA constructed in the UK.
>
> Major warship repair and maintenance is conducted by members of the ship repair panel. Of the four members of this panel (Tenix, ADI, Forgacs and United-WA) three have not previously conducted major warship construction.
>
> Ship repair generates a significant demand for skills and knowledge regardless of the construction demand.

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61 *Committee Hansard*, 18 August 2006, p. 34.

62 *Committee Hansard*, 18 August 2006, p. 38.

63 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), p. 3.

12.49 It included the proposed LHD project in its consideration of the relationship between building and repairing a ship. Defence categorised the LHD as a low moderate technology basic platform where only a low correlation between build capability and the maintenance and upgrade capability exists. It concluded:

> The key skills to nurture for the long-term in this technology area are in systems integration and upgrade. In this sense, the skills used during platform construction are of less importance in the through life support phase of ships.[64]

Conclusion

12.50 Without exception, all witnesses accepted that national security concerns are central to any consideration about whether Australia should have a naval shipbuilding industry. The government, however, noted that practical and economic circumstances place limitations on the extent to which Australia can be self-sufficient in the construction of naval vessels. The argument for self-sufficiency in maintaining and repairing naval vessels, however, was stronger especially when it came to the ability to respond to urgent operational requirements. Defence stated unequivocally that for strategic reasons there is a high priority on being able to repair, maintain and upgrade vessels in Australia. It did not accept, however, the necessity to build a ship in-country in order to have the capability to support it through its service life. Some submitters argued otherwise. They saw a direct and strong connection between a ship's build and the knowledge and resources needed to support the ship especially when a rapid response is required.

12.51 The committee accepts that to protect the nation's security interests, Australia must have the capability to maintain, repair and upgrade its naval vessels. While always present, this requirement becomes urgent and critical when the country's security is under threat. Furthermore, the committee is persuaded by the evidence that there is a strong connection between Australian involvement in the construction of a naval vessel and the acquisition of the necessary knowledge, skills, experience and resources to support effectively that vessel throughout its life. As noted earlier, however, the committee accepts that Australia cannot be fully self-sufficient in the construction of its naval vessels.

12.52 The committee underlines the importance of recognising the contribution that the construction of naval vessels in-country makes to the capability to maintain, repair and upgrade them—a requirement central to the nation's security. Importantly, the committee believes that there are critical areas where reliance on overseas suppliers may compromise operational independence and ultimately Australia's national security. In such cases, security concerns must take precedence over economic costs.

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64 Department of Defence, answer to question notice, 28 March 2006 (received 29 May 2006), pp. 1 and 3.

12.53 This chapter and the previous one looked beyond the narrow costs of building and repairing a large naval ship in Australia compared to overseas. They noted a range of considerations that highlighted the advantages of building naval vessels in Australia including the broader economic gains that benefit the Australian economy and the security reasons for building in Australia. The following chapter summaries the committee's findings to this stage of the report.

Chapter 13

Overall assessment of Australia's shipbuilding and repair industry including committee's main finding

13.1 The committee has taken a measured and balanced approach to presenting and analysing the evidence. The lack of data in particular caused the committee to be cautious in reaching its main finding. The evidence, however, was clear cut—Australia's naval shipbuilding base is well-established, and in recent years has become more efficient, motivated and highly skilled. It has produced a number of outstanding world-class vessels that showcase the capability of Australia's naval industrial base. In assessing the four major components of Australia's naval industrial base, the committee found:

- Australian primes have an improved track record;
- SMEs and international subsidiaries form a vibrant, innovative and competitive network of suppliers;
- past and current investment in heavy engineering infrastructure outside the traditional ship building yards places the industry on a sound but flexible footing to meet future demand; and
- initiatives by both the public and private sector are tackling the problem of skills shortages to ensure that Australia has the knowledge and skills to support the industry.

13.2 The committee believes that this capability, built up over recent decades, is an asset to the nation which should be encouraged and supported by government, but with stronger emphasis on competitive productivity gains over the long term.

13.3 Not only does this industrial base have the capacity and potential to contribute to the maintenance of a self sufficient and self reliant naval shipbuilding industry, it also contributes in many other ways to Australia's industrial manufacturing base, the broader economy and Australia's national defence interest. The range of benefits include, but are not limited to:

- strategic self reliance for the repair and maintenance of the navy fleet and commercial shipping;
- greater self reliance and independence for national strategic defence capability;
- improved assurance of dependability and flexibility flowing from domestic capacity for ship modification or customisation for Australian conditions, and the development of innovative solutions for any of the Navy's unique requirements which might be considered appropriate and practical;
- increased gross domestic product from capital investment;
- reduced pressure on the balance of payments;

- enhancement of the labour market;
- expanded indigenous research and development (R&D), design, production and management capabilities;
- the acquisition and development of valuable new skills, manufacturing techniques and processes;
- extensive technology transfer across a broad spectrum of activities;
- a strengthening belief in Australia's own capabilities and confidence in its own ability to exploit opportunities;
- enhanced potential for exporting;
- the maintenance of capability to support vessels throughout their operational lives, shorter turn around for repairs with in-service support; and
- greater foreign investment.

13.4 The committee emphasises the need to retain a viable shipbuilding and repair industry to ensure that the Navy has the ability to respond quickly to urgent operational requirements. A reliance on off-shore industry to maintain, repair, upgrade or modify navy vessels would put Australia's defence interests at risk.

13.5 Further, the committee accepts that domestic naval construction provides greater assurance for ongoing effective technical support, maintenance, refurbishment and emergency repairs—as opposed to post construction technology transfer from overseas providers. There is a direct and strong connection between a ship's build and acquiring the knowledge, skills, experience and resources needed to support the ship especially when a rapid response is required.

13.6 When taking account of all the factors that are to be considered when acquiring a naval vessel, the committee believes that it is in Australia's national interest to maintain a viable naval shipbuilding and repair industry.

13.7 This requires a commitment by the government to have Australia's naval vessels constructed in Australia and for the government and Defence to adopt measures that would ensure the industry remains efficient, innovative and competitive.

13.8 Government should not allow itself to be captured by overly dependent and uncompetitive suppliers. The trade off between the benefits of self reliance and self sufficiency must be carefully measured against the best possible international benchmarks so as to avoid debilitating subsidisation of inefficient practices, but at the same time promoting improved productivity.

13.9 While the committee supports in country builds for naval vessels, the committee notes that for virtual commercial ships where there is no strong strategic defence interest, such as the *Delos* acquisition, offshore purchase may be appropriate.

13.10 The committee believes that to assist the shipbuilding and repair industry improve its productivity, it is imperative that government develop longer term naval

defence strategies from which economies of scale and continuity of demand can be derived, without which industry will continue to suffer.

Recommendation 1

13.11 The committee recommends that the government make a public commitment to maintain Australia's naval shipbuilding and repair industry. This commitment to be supported by improved long-term planning of naval shipping needs in order to maximise economies of scale and provide continuity for the broad but specialised design and construction skills required for a healthy industry over the long term.

Part IV

The role of governments

To this stage of the report, the committee has, as required by the terms of reference, inquired into the capacity of the Australian industrial base to construct large naval vessels; the economic productivity of the Australian shipbuilding industrial base compared with other shipbuilding nations; the economic costs of maintaining, repairing and refitting large naval vessels when constructed in Australia vice overseas; and the broader economic benefits that accrue from building large naval vessels.

Part IV draws together the main themes that have emerged in the previous 13 chapters to focus on the overarching broader term of reference—the scope and opportunity for naval shipbuilding in Australia. Its main concern is to determine measures that could assist the naval shipbuilding and repair industry improve its efficiency and overall performance.

Chapter 14

The role of Defence in Australia's naval shipbuilding and repair industry—informing industry

Background

14.1 Information is the lifeblood of any industry. One way of improving the efficiency and overall performance of an industry is to ensure that it has the necessary information to learn from previous experiences and to plan ahead. This chapter focuses on how well the Australian industry is informed about the performance of past projects, including local premiums, and about Defence's policy on Australian involvement in major projects. It also considers the value of the Defence Capability Plan as a means of keeping the industry informed about Defence's future plans and intentions regarding its acquisition program.

Australian industry—an informed provider

14.2 As noted in chapters 9 and 10, the committee was unable to obtain any meaningful data on the productivity of Australia's naval shipbuilding and repair industry. Furthermore, recent studies conducted on Australia's naval shipbuilding projects by ACIL Tasman, commissioned by the Australian Industry Group Defence Council with support from other organisations and the Department of Defence, had difficulty extracting information from the department.

14.3 In a general discussion about the availability of information on major naval products, Mr John O'Callaghan, Head of the Australian Industry Group Defence Council, told the committee that, for example, he had never seen any public analysis of the problems that occurred with the Collins class submarine. He said:

> I know for a fact that one of the great errors we made, and I was partly responsible for it, was that we paid too much upfront at the time we signed the contract. That meant that when we got downstream we did not have enough financial leverage on the contractors—because that was more than one—to force them to perform better. That was an important lesson. That is the sort of lesson I am talking about.[1]

14.4 Mr O'Callaghan acknowledged that problems are a natural part of project activity but 'it is how those problems are managed which is the key thing'. He thought that Defence needed to be 'a bit more mature about putting on the table' some of the lessons from experiences such as the problems with the modernisation of the FFGs and the Collins class submarine. In his view, such an approach may help industry avoid the sorts of problems that have arisen. He said that he had never seen any public analysis of these problems and called for a 'sensible debate' about failures:

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1 *Committee Hansard*, 28 June 2006, p. 31.

> …exposing some of these analyses so that industry can get the benefit of it, and the media, would avoid some of the tabloid sensationalism that we see from time to time.[2]

He added that one of the challenges for the DMO over the coming five years 'is to fess up when errors are made because we learn from the errors'.[3]

14.5 A number of commentators pointed to the problems that can result from the lack of information about Navy acquisitions including the speculation that can swirl about a project when information is vague or general.[4] Mr Derek Woolner noted:

> Had people understood that the Collins submarine project was a developmental project and that there had been a change from the earlier stated project objective, which was to buy a proven submarine in service or about to enter service with an overseas navy, there would have been a greater understanding of how the project would work out, perhaps some expectation that there would be problems that would need to be fixed and a clearer basis on which to draw the contract.[5]

14.6 The lack of data on the public record means that industry experts and companies involved in the industry cannot obtain a complete picture of how the industry operates. On the one hand, insufficient information stifles public debate and undermines accountability and on the other encourages speculation about projects. Such a situation is unhelpful for the industry and for Defence.

14.7 Commercial-in-confidence concerns may well prevent some information from being available. Even so, regular and frank analysis of the successes and failures of projects and the extent of assistance given to a project (local premium) could assist industry. This knowledge would help to keep industry better informed about the performance of particular projects and also make Defence more accountable for its decisions and the way it manages major projects. Indeed, as noted earlier, Mr John O'Callaghan, Head of the Australian Industry Group Defence Council, was of the

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2 *Committee Hansard*, 28 June 2006, p. 30.

3 *Committee Hansard*, 28 June 2006, p. 31.

4 See for example the discussion about the reported $6b final cost estimate for the AWDs. The committee notes that the 2006–2016 Defence Capability Plan stated that 'Estimated Phase Expenditure' for the AWDs (Project SEA4000) was between $4.5 billion and $6 billion. In evidence given to the committee, Mr Greg Tunny, Managing Director of ASC Pty Ltd, hesitated in confirming the $6 billion price tag for the AWD project. Defence acknowledged that the 2001–2002 estimated expenditure of $3500m to $4500m was updated in the 2004–2014 DCP to $4500m to $6000m. It explained that the revision in cost estimates 'allowed for the cost of additional capabilities, contingency and price movement'. It was also aware that some commentators were suggesting that the cost of the AWDs may be as high as $8 billion. It concluded that two design options were under consideration that would vary in capability, cost, schedule and risk. The final cost of the AWDs would be dependent upon these decisions. Questions 20, 21, 23, answers to written questions on notice from 18 October 2006.

5 *Committee Hansard*, 4 September 2006, p. 21.

view, that a more open approach may help industry avoid the sorts of problems that have arisen.

14.8 The committee sees a need for Defence to make available information that would enable the analysis of major projects and to release the results of their own studies on the performance of projects. In noting that the studies that have been undertaken on major naval acquisitions tend to be conducted at the end of the construction of the vessels, the committee suggests that data should be gathered and analysed as a project moves through its various construction stages. This continuous monitoring would increase transparency and improve accountability of how a project is being managed. Clearly, Defence, must develop and adhere to high standards of probity and accountability in its procurement practices. The committee accepts that commercial-in-confidence requirements will prevent the disclosure of some information but this should not be used as an excuse for withholding data that could be placed on the public record.

Recommendation 2

14.9 The Committee recommends that the government establish a thorough detailed model, subject to audit by a body such as the ANAO, for the establishment of through life design, construction and maintenance costs of each naval ship building project in the future by class and by individual ship. The model to contain sufficient detail to enable benchmarking to be done on an international basis, providing total budget accountability, assessment of domestic industry competitiveness, including all administrative overheads, with industry compliance to be mandated in all contracts.

14.10 The committee recommends further that Defence commission an independent assessment of the progress of major projects against the model as it attains set milestones providing explanations for any departures from the costings and other projections contained in the model. The reports to be provided to the Minister for Defence to be tabled within 3 months of being submitted to the Minister.

14.11 The committee now examines local build premiums as an indication of the information made available on naval acquisitions.

Premiums for local builds

14.12 As mentioned in chapters 3 and 4, Defence has awarded local industry a cost premium for past RAN warship projects. It is very difficult, however, to obtain reliable evidence on the premiums. Even for well-publicised projects such as the ANZAC Ship Project, the committee cannot confirm the veracity of the 3.5 per cent figure.

14.13 This confusion also surrounds the upcoming LHD bid. Mr O'Callaghan drew the committee's attention to an article in the *Australian Financial Review* on 29 July 2005 which stated estimates that an in-country build of the LHDs 'could be 30 per cent

higher than the cost of acquiring them overseas'. Mr O'Callaghan rejected this estimate stating:

> It is a number which to the best of my knowledge, no-one in Defence has ever exposed with any analysis. It is a number which has no bearing in terms of our own track record in the Australian defence naval construction industry in successfully building the number of platforms I mentioned previously.[6]

14.14 Again, the lack of clear statements by Defence has encouraged public speculation. Mr O'Callaghan stated that Australian industry has never had 'the benefit of the sort of modelling or analysis that is being done within Defence and which leads to that outrageous '30 per cent' statement being made…' He added 'It is bunkum, basically. I would love to see the analysis, so let us encourage them.'[7]

14.15 Engineers Australia suggested that Defence should provide clear guidance on the level of any premium attributable to construction in Australia, versus construction overseas, and particularly for the costs of any new infrastructure and training of personnel.[8]

14.16 It should be noted that, according to Defence, it 'does not directly apply a premium to undertake naval shipbuilding projects in Australia'.[9] It explained:

> In accordance with Commonwealth Procurement Guidelines, the source selection for the acquisition and sustainment of military platforms and systems is based on best value for money. The strategic value of generating and sustaining indigenous industry capabilities, as required in support of ADF operational capability and military self-reliance, is one of many factors taken into consideration in Defence's overall value-for-money considerations.[10]

14.17 The committee believes that this is another way of saying that some naval shipbuilding projects in Australia do attract a local build premium.

14.18 In its tender documents, Defence defines the indigenous industry capability outcomes it requires. It explained that:

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6 Mr John O'Callaghan, *Committee Hansard*, 28 June 2006, p. 19.

7 *Committee Hansard*, 28 June 2006, pp. 32–33.

8 Engineers Australia, *Submission 24*, p. 11.

9 Department of Defence, answer to question on notice, 18 August 2006, (received 29 October 2006), Question 3.

10 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), Question 3.

> The associated cost of developing program-specific indigenous industry capability is reflected in the overall value-for-money consideration of achieving program objectives. [11]

14.19 Defence was 'unaware of any naval shipbuilding decision in the past 20 years that was not based on value-for-money considerations'.[12] Whether the additional cost to construct a ship in Australia is termed an in-country build premium or value for money, there is no reliable information available on the extra costs involved in major naval ship construction undertaken in Australia. Defence informed the committee:

> Defence is unaware of any formal internal reviews to determine whether undertaking naval shipbuilding projects in Australia has returned value-for-money over time. The tender evaluation process and subsequent source selection decision for naval shipbuilding projects and naval sustainment contracts are based on value-for-money criteria, and this has partially obviated the need to undertake such reviews.[13]

14.20 At the moment, Defence's method for determining cost premiums or 'value for money' for local construction lacks transparency and has given rise to unhelpful speculation. This lack of transparency may have implications for industry which has no clear guidance on the policy and application of local build premiums and for Defence's accountability. This matter of local build premium is closely related to another area of vital importance to the industry—the policy governing Australian industry involvement in major naval acquisitions.

Industry involvement

14.21 Accurate, reliable and clear information on Defence's policy regarding local Australian involvement in its major acquisition projects is fundamental for those in the industry to plan and manage their business effectively.

14.22 According to the January 2001 Australian Industry Involvement (AII) Manual, indigenous industry capability is 'crucial' to meeting the ADF's capability requirements.[14] The Manual identifies the AII Program as 'the key tool for maximising

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11 Department of Defence, answer to question on notice, 18 August 2006, (received 31 October 2006), Question 3.

12 Department of Defence, answer to question on notice, 18 August 2006, (received 31 October 2006), Question 3.

13 Department of Defence, answer to question on notice, 18 August 2006, (received 31 October 2006), Question 4.

14 Department of Defence, Industry Operations Branch, Industry Division, *Australian Industry Involvement Manual*, p. 1–1. http://www.defence.gov.au/dmo/id/aii/manual_inclannexes_5Feb00_contactsremoved.pdf

the involvement of Australian industry development in Defence acquisition projects…where this is cost effective'.[15]

14.23 A June 2006 *Defence Industry Policy Review* Discussion Paper noted that the AII program is less transparent than what it once was. The Paper mentions that Defence's previous method of listing specified percentage targets for Australian industry content was ineffective in achieving particular industry capabilities. However, it added that specifying targets was transparent, 'and allowed industry to seek the most cost-effective solution to the requirement'.[16]

14.24 The committee was particularly interested to obtain an understanding of the policy on Australian involvement in major naval acquisitions.

14.25 In evidence to the committee, Defence made plain that the primary objective of its industry policy was to ensure that there is sufficient indigenous capability and capacity to support the operational capability of Australia's naval vessels, once acquired. It explained that it:

> uses its acquisition leverage to generate the required level of in-country skills, technologies and capabilities to meet this objective. The nature and level of skills, technologies and capabilities required for support is assessed on a project by project basis.[17]

14.26 Defence advised the committee that in some projects, industry issues may attract a higher priority in the overall process of tender evaluation.[18] It explained that local industry involvement in its projects is approached through a series of steps which involves Defence:

- identifying the industry capabilities it considers important for strategic, logistical and other reasons;
- specifying industry capability outcomes for new projects, i.e., the outcomes it wants in terms of support services, in the Request for Tender (RFT);[19] and
- assessing each bid and ranking potential suppliers in terms of the quality of their response to Australian industry and other tender requirements.

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15 Department of Defence, Industry Operations Branch, Industry Division, *Australian Industry Involvement Manual*, p. 2–1. http://www.defence.gov.au/dmo/id/aii/manual_inclannexes_5Feb00_contactsremoved.pdf

16 *Defence Industry Policy Review* Discussion Paper, June 2006, p. 17.

17 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), Question 15.

18 There is no uniform level of Australian industry involvement specified for each project. That is, fixed percentages specifying targeted values of Australian industry participation are no longer part of the tender process.

19 These industry capability outcomes may cover specific requirements, such as the ability to modify command and control system software, or they may be more general, such as the ability to undertake deeper maintenance of systems in Australia.

14.27 Having defined the level of in-country activity required to meet its strategic industrial capability needs and confident that demand is sufficient to sustain the required level of activity; Defence takes the approach that the remaining work should be subject to open competition on the global market.[20]

14.28 According to Defence, the principal criterion against which the proposals are evaluated is how well tenderers' Australian Industry Capability proposals meet the industry capability outcomes required for the project and specified in the RFT'.[21] It informed the committee that 'a bidder's failure to satisfy all of the Australian industry involvement outcomes set out in a RFT may disadvantage that bidder relative to its competitors and potentially disqualify the bidder from contention'.[22] Defence stated, however, that it 'retains the right to select a bidder whose approach may not satisfy all Australian industry involvement outcomes set out in the RFT if other aspects of its approach provide offsetting benefits.[23] Thus, while Australian industry involvement outcomes are considered important by Defence, there may be instances where a preferred bidder is selected without these being satisfied fully'.[24]

14.29 Defence also stated that proposals for local industry involvement are evaluated on the basis of value for money and tenderers are required to show how cost-effective involvement in the project by Australian industry has been maximised.[25] According to Defence, 'This does not always mean that goods and services sourced from local industry must be cheaper than those available from overseas. There may be instances where paying more for a local source of supply yields offsetting strategic or other benefits which mean that value for money has been achieved'. Defence explained:

> The percentage or dollar value of Australian content is but one factor. Direct benefits such as capabilities for support and savings resulting from shorter repair times are taken into consideration in evaluation against these criteria. Some of the less tangible benefits, such as technology transfer and

20 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), Question 16.

21 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), p. 48.

22 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), p. 7.

23 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), pp. 47–48.

24 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), p. 7.

25 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), pp. 47–48.

> access to intellectual property, are achieved through the activities proposed for Australian industry and form part of the evaluation of these activities.[26]

14.30 Engineers Australia called on the Australian government to:

> Clarify the strategic direction of the Australian naval shipbuilding and repair sector so as to determine the weighting that Australian industry development should have in the value for money calculation in the source selection of the Amphibious Ships' preferred tenderer and potential prime contractor.[27]

14.31 Having questioned Defence at length about how it goes about determining and informing industry about its requirements for Australian involvement in its acquisition projects, the committee still does not have a clear understanding of the department's policy on this issue and how it applies this policy. The matter becomes even more difficult to understand when taking account of the broader economic advantages that accrue to an in-country build.

14.32 The committee notes Defence's own statement that matters such as technology transfer and access to IP form part of the evaluation of tenders. Other benefits, however, 'such as potential spin-offs to industry at large and wider benefits to the economy, such as increased employment, may be recognised but play little or no part in the numerical evaluation. Such benefits will be noted in advice to Government'.

14.33 Given the difficulties estimating the value of broader economic benefits, the committee asked Defence how these wider benefits would be 'noted in advice to Government'. It explained:

> Knock-on effects such as industry skilling, regional development, engagement of local businesses, enhanced employment opportunities and a range of other factors will be noted in the business cases. Other Government departments and agencies such as the Department of Industry, Tourism and Resources, will be engaged by the AWD Program in assessing potential benefits.
>
> In respect of the LHD Program, the tender incorporates a strategy which seeks as far as practicable to maximise Australian content during the build phase, within budgetary guidance. The tender also stipulates Australian content requirements for through-life support and mandates certain Australian systems as costed options.
>
> However, tenderers will also be able to submit an additional proposal—'Tender-Initiated Options'—which will increase the contribution of Australian industry, but at increased cost which may exceed the guidance in the Defence Capability Plan. The Tender-Initiated Options proposals will need to demonstrate specifically that they offer value for money by

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26 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), pp. 47–48.

27 *Submission 24*, p. 2.

> showing the marginal benefit of the extra expenditure that will accrue to the Commonwealth and to Australian industry.
>
> Tender evaluation will also consider the projected benefit of effects on the wider economy. This element will be conducted by contracted, independent third-party experts. The analysis will examine the tenderer's economic benefit assessment including the validity of assumptions, their economic viability and the likely effects of the proposal on other major defence projects.[28]

14.34 This explanation demonstrates clearly, why industry may be confused about Defence's intentions and plans for the domestic industry, let alone its commitment, to involve Australian companies.

14.35 The committee now turns to address directly the lack of information on Defence's policy on Australian industry involvement in its major naval acquisitions and how it applies this policy.

14.36 As noted earlier, the construction of a modern naval vessel is a major and expensive undertaking with substantial follow-on effects that benefit the broader economy. From Defence's perspective, an off-the-shelf purchase from overseas may offer the capability it wants at an apparently lower cost. This situation may well create tension between the government's desire to foster local industry and Defence's approach based on a narrow definition of value for money which takes account only of Defence's capability requirements and not the economy as a whole.

14.37 Although Defence asserts that it does not consider naval procurement decisions in terms of broader economic considerations or market influence, the government cannot divorce itself from such considerations. It has a broader responsibility that encompasses the whole economy. It follows that Defence's acquisition decisions should be consistent with the government's policy on Australia's broader industrial base.

14.38 The confusion arising from Defence's response to the committee's questions on Australian involvement and Defence's procurement policy and practice may well be due to a disjunction between the broader political interest in fostering Australian industry and Defence's primary concern with capability and value for money. There is a clear need for Defence to clarify its position and to articulate its policy against the broader government policy regarding Australian involvement in government funded acquisitions.

14.39 The committee is aware that Defence is currently undertaking a review of its Defence industry policy. This will be discussed in the following chapter. Whatever the outcome of this review, the committee sees a definite need for Defence to articulate

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28 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), Question 12.

far more clearly its policy on involving Australian industry in its major projects and how this policy sits within the broader government policy on Australian involvement.

Recommendation 3

14.40 The committee recommends that Defence clearly articulate its policy on Australian industry involvement in naval shipbuilding and repair.

Recommendation 4

14.41 The committee recommends that Defence at the earliest phase of a major naval acquisition issue a statement on the measures it intends to take to maximise Australian industry involvement in that project and how they fit within Defence's broader acquisition program and the whole of government approach to support local industry.

Recommendation 5

14.42 The committee recommends that in tender documentation, Defence provide detailed information on the value placed on, and the weight given to, Australian industry involvement.

Recommendation 6

14.43 The committee recommends that as a benchmarking exercise, Defence on completion of a project, report on the measures it had undertaken to involve Australian industry in the project and the results of those measures. The report is to be provided to the minister for tabling in the parliament.

Conclusion

14.44 The committee notes the absence of meaningful data that would help to inform industry about the factors that shape or influence major acquisition decisions. The most notable areas where little information was available included analysis on the performance of past projects especially where there have been scheduling or budget problems, milestone assessments as a project moves through its various stages, the policies underpinning local industry involvement including the application of those policies and on government subsidies for a local build. Such information would generate debate and promote critical analysis by those interested in the industry. They would gain a better appreciation of the factors that shape or influence major acquisition decisions. It would also assist the industry better appreciate how the industry is performing and enhance the accountability and transparency of naval acquisitions. Indeed, the information made available on local build premiums exemplified the problems associated with the way in which the government and Defence convey information about the industry.

14.45 The following chapter examines one of the areas of concern to many of those who participated in the inquiry—the planning process for naval Defence's acquisition program.

Chapter 15

Strategic planning

15.1 As the sole purchaser of naval vessels in Australia, the Australian government exerts considerable influence on the performance and viability of the domestic naval shipbuilding industry. Noting that the defence department is a monopsonist, Mr Robert Wylie, a specialist in public policy analysis, was of the view that the defence industry in Australia is 'overwhelmingly a product of government decision'.[1] He explained:

> The classic argument then follows that what business it does and how it does that business has a direct and immediate effect on the nature and scale of the industry capabilities that we have in this country. Similarly, the choice between what Defence and the armed forces do in house and what they do in industry has a similar direct effect. The choice between what we import and what we decide to do ourselves, by whatever criteria, has far-reaching implications.[2]

15.2 Indeed, the committee has noted more than once that Defence cannot be a disinterested bystander of the national shipbuilding and repair industries and should have 'a strong and enduring interest in the industry's success'.[3]

15.3 In this context, this chapter has two parts. The first looks at key areas where the government and Defence may better assist Australian shipbuilders improve their productivity. It highlights the need for a coordinated approach between industry and state and federal governments to promote SMEs and invest strategically in infrastructure and skills. The second part deals with the need for Defence to moderate fluctuations in demand and formulate a strategic plan to clarify Defence's long-term objectives for the industry.

Assisting industry improve productivity

15.4 The following section considers some of the key aspects of the industry discussed in the body of the report where submitters considered that strategic planning would substantially improve industry efficiency. They include: the supply network, infrastructure and skills.

SMEs

15.5 The committee has noted the vital and valuable contribution that local companies are making to the naval shipbuilding industry. It found that Australian

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1 *Committee Hansard*, 4 September 2006, p. 23.

2 *Committee Hansard*, 4 September 2006, pp. 23–24.

3 Notion taken from comments made in ASC, *Submission 17*, p. 10.

SMEs not only deliver a particular good or service but add value to the shipbuilding industry.[4] Indeed, the committee used the network of shipbuilding and repair enterprises in Tasmania to demonstrate the depth of skills, knowledge and experience ready and willing to support the industry. It is important that the reservoir of local talent residing in Australia—and the Tasmanian example provides only a small sample of the potential—is properly harnessed and nurtured. The committee believes that Defence has a key role in developing this network and that considerations such as how best to nurture local SMEs should be part of Defence's overall strategic planning.

15.6 In some specialised areas involving complex systems, Australia benefits from overseas assistance that helps to fill capability gaps in the local industry. In many cases, overseas companies have established subsidiaries in Australia that have gone on to become valuable participants in the country's shipbuilding industry. They are working side by side with local firms to provide the shipbuilding industry with an extensive, reliable and capable network of enterprises supporting the construction of naval ships. Raytheon Australia, however, pointed to the importance of ensuring that overseas companies contribute to the development of Australia's industrial base. It noted:

> …simply contracting the work to an overseas company, or hiring overseas workers without ensuring the transfer of knowledge to local people, results in little or no increase in Australian industrial capability.[5]

15.7 Without doubt, many foreign companies are contributing to a vibrant and innovative naval shipbuilding industry offering employment opportunities and driving advances in science and technology. The committee underlines the need for the government to ensure that Australia takes full advantage of their presence in Australia, especially in the area of technology transfer.[6] This means that important considerations should also be given to matters such as IP. Such matters should be important considerations in any strategic plan.

Infrastructure

15.8 Australia's naval shipbuilding and repair industry dates back to the mid 19th century. Since then it has evolved and, in many ways, is a product of its history. Some submitters suggested that the present state of the industry reflects investment tailored for specific past projects resulting in a lack strategic coherence.

15.9 For example, the Government of South Australia stated that 'Australian shipbuilding infrastructure has evolved on a project-by-project basis rather than in response to a national plan'. It maintained that 'the myriads of facilities that are left are old, underutilised and not cost competitive'. In its view, further infrastructure

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4 See chapter 5.

5 Raytheon Australia, *Submission 35*, pp. 9–10.

6 See paragraphs 5.56–66.

investment beyond that already planned, can 'only add to the underutilisation of costly assets'.[7] The Government of Victoria surmised that fragmented single project based decisions had given rise to a situation where there was an oversupply in the naval shipbuilding and repair sector at the same time that Australian industry does not have the capability to undertake the AWD and LHD projects concurrently.[8] The New South Wales government also referred to what could be a better use of established facilities rather than putting in place a new facility.

15.10 In pointing to problems created by this rather ad hoc approach to investment planning, including underutilisation of existing facilities and unnecessary capital expenditure at others, the governments agreed with the view that a national strategic plan could result in a better and more efficient use of resources.[9] The South Australian government, for example, cited the lack of strategic direction at the national level for the industry as the most significant factor contributing to the problems. In its view, government has the task of providing strategic direction and that 'industry alone cannot set the ground rules for how it must operate'.[10] It was looking for a longer term strategic plan that 'leverages off investments already made'.

> From the perspective of a state that has committed more than $250m in investment in critical shipbuilding infrastructure and skills development, there is an urgent need for a more proactive dialogue between Defence and the industry to ensure these critical capabilities are maintained for the future.[11]

15.11 Recognising that a long-term Commonwealth shaped shipbuilding industry plan is essential, the Government of South Australia urged the Commonwealth, as the only customer in the naval building and repair industry, to set the parameters by which industry can succeed.

15.12 Rear Admiral (retired) Kevin Scarce also drew attention to what he perceived as a fragmented industry with outdated infrastructure, underinvestment in skills and a volatile demand in shipbuilding and repair that impeded the delivery of cost-effective products. He reinforced the view that one of the major factors underpinning this situation was the 'lack of a strategic industry direction at the national level'.[12]

Committee view

15.13 While individual shipyards and state governments develop their infrastructure to cater for a specific project, there is the potential for inefficiencies and

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7 Government of South Australia, *Submission 9*, p. 35.

8 *Committee Hansard*, 18 August 2006, p. 16.

9 See chapter 6.

10 *Submission 9*, p. 34.

11 *Submission 9A*, p. 1.

12 *Committee Hansard*, 19 April 2006, p. 22.

underutilisation of infrastructure across the industry. The Commonwealth government, as the major buyer of naval ships in Australia and the custodian of taxpayer money, together with state governments have an important role in ensuring that the pattern of infrastructure development benefits the industry as a whole and not just particular sites. This is especially important considering the two major naval ship projects that are underway.

Competition and collaboration

15.14 In any future planning, the Commonwealth government and Defence should be aware of how individual projects affect the pattern of infrastructure development across the industry as a whole. Their approach should ensure that existing infrastructure and the current developments taking place are complementary and do not lead to inefficiencies in the industry. Although the opportunity is there for the Commonwealth government to take a leadership role, State governments should also assume some responsibility for contributing to a strategic approach to infrastructure development.

15.15 Indeed, the governments of Western Australia and South Australia are taking the initiative. They have signed a Memorandum of Understanding (MoU) which according to the Government of Western Australia 'promotes a co-operative approach in vying for the new work [stemming from the AWD project] and maximises the chances of our two States competing successfully against the more populous and politically powerful eastern states'.[13] The Government of South Australia stated:

> In the absence of a national plan both Governments decided to work together to ensure that their shipbuilding and repair industries and infrastructure developed in complementary manner.

It suggested that 'this template has the potential for national application'.[14] However, as Major General Peter Haddad told the committee:

> It is not the state government that decides where the work gets done; it is the federal government that awards the contract and it is the commercial firm that then places whatever work needs to be placed. It may be that these sorts of agreements are a helpful thing, but I do not know whether they are a critical thing.[15]

15.16 The final decision on which prime wins a contract does indeed rest with the Commonwealth government. However, the State governments, both competitively and cooperatively, must actively seek to retain and attract prime contractors through investing in infrastructure. While encouraging competition, Defence should also ensure that such activity does not lead to waste or inefficiencies.

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13 Government of Western Australia, 'WA Defence shipbuilding strategy'.

14 *Submission 9A*, p. 2.

15 Major General Peter Haddad, *Committee Hansard*, 18 August 2006, p. 21.

Committee view

15.17 The committee believes that there is a need for sensible and efficient investment in major shipbuilding infrastructure, with State governments, the Commonwealth government and the private sector co-operating closely and taking into account the existing industry base. It supports the initiative taken by the South Australian and Western Australian governments in agreeing to a Memorandum of Understanding.

Skills

15.18 Australia has a quality skilled labour base, with skills relevant to naval shipbuilding distributed across various heavy engineering sectors. This base has been developed through government investment—both federal and state—in past naval shipbuilding programs. The committee has noted the challenges associated with skilled labour shortages, given the future shipbuilding schedule and the current high demand in the resources sector. Clearly, strategic planning is crucial to the management of labour resources. Another important factor is investment in and coordination of skills and training programs.

15.19 The Western Australian and South Australian governments have taken a strong lead in investing in and coordinating defence and naval shipbuilding skills programs. Both governments have recently announced major defence skills programs with a focus on strategic collaboration with key stakeholders.[16] At the national level, the Skilling Australia's Defence Industry (SADI) initiative is a step towards Defence working with industry to address skills issues. Skilled labour shortages provide an incentive for the private sector to be innovative in recruiting and training staff.

Committee view

15.20 The committee strongly supports collaborative, state based skills programs. It is important that these forums are used to connect the needs of industry, government and training institutes and focus on the state's training requirements for future naval shipbuilding projects. The common goal must be to develop programs that target both short and long-term skill requirements.

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16 In February 2006, the Western Australian government launched the Defence Industry Skills Taskforce (see paragraph 7.109). The Taskforce's membership includes representatives from the State Departments of Industry and Resources and Education and Training, Challenger TAFE, the defence industry and DMO. See the Hon. Alan Carpenter and the Hon. Ljiljanna Ravlich, 'New Defence Industry Skills Task Force announced', *Media Statement*, 3 February 2006. The Defence Skills Institute was recently established as a joint initiative of the South Australian government and the defence industry designed to help the state win more defence contracts. The Institute will work cooperatively with governments, industry and leading educational and training organisations to 'take a lead role in identifying and aggregating defence industry education requirements'. See Government of South Australia, 'Defence Skills Institute', http://www.defence-sa.com/pdfs/DSIbrochure.pdf (accessed 23 November 2006).

15.21 However, these programs will take industry only so far. It is crucial that there is also collaboration on skills issues between state governments, Defence and the Commonwealth. Western Australia's MoU with South Australia is an important example of a platform from which both states can implement their skills strategies for the upcoming AWD build. The Commonwealth should recognise opportunities for its defence skills programs—notably SADI—to complement and reinforce the states' initiatives.

Summary

15.22 The committee has highlighted how three of the main components of Australia's naval shipbuilding industry are making significant contributions to the industry's viability. SME's and international subsidiaries form a vibrant and innovative network of suppliers; past and current investment in infrastructure places the industry on a sound footing to meet future demand; and initiatives by both the public and private sector are tackling the problem of skills shortages to ensure that Australia has the knowledge and skills to support the industry.

15.23 Despite the healthy state of the industry, a number of participants to this inquiry were of the view that greater efficiencies were to be achieved through a more coherent, strategic approach to planning. The committee agrees with their view and recommends that the government and Defence take note of the call for a more strategic approach by the Commonwealth to planning.

15.24 One area that underlines the importance of having a strategic plan is the issue of demand flow.

Managing demand fluctuations

15.25 Recent overseas studies have highlighted the problems created by fluctuations in naval shipbuilding demand in both the U.S. and the UK.[17] With regard to Australia, Dr Mark Thomson of the Australian Strategic Policy Institute noted that the current schedule for ship construction is problematic:

> There are six year gaps between the first and second of class for both the Amphibious and Afloat Support programs which will prohibit a sequential build of each class and compromise the potential economies of scale. Also, the bunching of work early next decade will see the concurrent construction of three class of vessel. This will multiply the infrastructure and workforce requirements, and stretch Navy's ability to accomplish a timely acceptance and transition into naval service. In addition, there is no delay between the

17 See paragraphs 2.84–2.91.

> first and second AWD to allow lessons from the first-of-class trials of this very challenging project to be referred back into the remaining vessels.[18]

15.26 Indeed many commentators and witnesses pointed to the feast and famine nature of the naval shipbuilding industry and called on government to take measures to help smooth demand. They argued that volatility in demand for naval vessels creates significant costs for the industry and the taxpayer, including:

- 'ramp up' costs associated with attracting and training the required workforce following periods of low demand;
- the difficulty of retaining highly skilled, efficient teams and the tacit skills and knowledge gained during construction work; and
- costs of underutilised infrastructure.

15.27 Mr Geoff Evans of the Navy League of Australia, summarised:

> Australia's main problem as a naval shipbuilder is, and always has been, lack of continuity in orders for ships, making it difficult if not impossible to for shipbuilders to hold a highly trained workforce together.[19]

15.28 Mr Tunny, Managing Director of ASC Pty Ltd, expressed concern that demand peaks and troughs may reduce Australia's naval shipbuilding capacity in the longer term. He said:

> Feast and famine is an excellent Darwinian environment for the strong surviving, but it is an environment where a lot die as well. That is not always the best thing, because when a company goes under or scales back dramatically it is not always the case that the survivors pick up all of the key skills and experience that are let go by that company.[20]

15.29 The Australian Academy of Technological Sciences and Engineering reflected the views of many witnesses in arguing for 'a consistent long-term base workload':

> No industry can survive on a stop/start order book and while exports can fill in gaps, a base load of reasonably predictable local demand can provide the platform on which a competitive export industry can be developed.[21]

15.30 It submitted that:

> Costs cannot be divorced from the demand question and a steady flow of orders to naval shipbuilding yards will spread the establishment overheads,

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18 Mark Thomson, 'Setting a Course for Australia's Naval Shipbuilding and Repair Industry', a presentation to the Maritime Building, Repair and Maintenance Conference, 26–27 March 2003. Mr Thomson is the Program Director Budget and Management, Australian Strategic Policy Institute.

19 Mr Geoff Evans, OBE VRD, 'Shipbuilding a problem for Small Navies', *Submission 4*, p. 18.

20 *Committee Hansard*, 19 April 2006, p. 8.

21 *Submission 19*, p. 2.

> avoid recurring design or manufacturing errors, provide greater negotiation leverage over suppliers, amortise the training costs and reduce labour mobility. It would be particularly helpful if ship-procurement programs could be adjusted to ensure the timing of the order for the first in any class of ships allowed a sufficient interval before the rest were required, to allow full validation of design, construction and operating features, so avoiding costly later modifications.[22]

15.31 The Academy stated that it had every reason to believe that, should a steady stream of work be available, Australian costs and productivity would match the European, American and Japanese yards who would be the alternative suppliers.[23] Rear Admiral Doolan (retired) stated:

> …if we look out over 50 to 60 years and have a consistent pattern of building warships in Australia and fitting in…the various elements of them in a sensible replacement pattern rather than in an ad hoc knee-jerk reaction, that is the basis on which the naval shipbuilding and naval ship repair industry can plan into the future. We have no disagreement with that point and we support it.[24]

15.32 The South Australian government argued that 'over the long term demand must be smoothed, and shipbuilding infrastructure and skills development consolidated to ensure that the industry is sustainable and efficient. To achieve these challenging policy goals a national shipbuilding and repair plan is required'.[25] The AMWU supported this viewpoint. It was convinced that the Australian industrial base has the capacity to construct large naval vessels over the long term and on a sustainable basis but noted the problems created for the industry by the cyclical nature of demand.[26] The Australian Association for Maritime Affairs Incorporated joined the call for Defence to place a high priority on ensuring that the industry remains sustainable into the future:

> Long-term assured levels of government commitment over decades rather than over individual budget cycles are essential to achieve an effective growth and sustainment strategy. For a nation whose physical form, maritime responsibilities, history and trade dependence is deeply embedded in the security and integrity of its maritime boundaries and sea lines of communications, such a long-term investment is seen as paramount.[27]

15.33 Defence asserted that while smoothing demand for naval construction may appear relatively straightforward, naval acquisitions need to be considered in the

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22 *Submission 19,* pp. 2–3.

23 *Submission 19,* p. 3.

24 *Committee Hansard*, 3 July 2006, p. 63.

25 *Submission 9,* p. 26.

26 *Submission 21,* p. 2.

27 *Submission 13,* p. 3.

context of Defence-wide procurement. For example, scheduling of high cost projects such as the AWDs and LHDs is influenced by funding considerations and other major projects, such as the Joint Strike Fighter. Also, Defence maintained that the capabilities of some acquisitions are dependent on other acquisitions and so cannot be scheduled in isolation. For example, the full capability provided by the amphibious ships is interdependent with other projects such as the Main Battle Tank Replacement.[28] Defence argued:

> To reschedule one capability would have a complex effect on the overall Defence capability which could result in considerable capability wastage with assets unable to be used effectively while related capability is delayed.[29]

15.34 Defence acknowledged that it ultimately 'pays for successful companies to adjust to fluctuations in market demand each time a contract is signed'. Defence also pointed to the costs of alternative industry models:

> While releasing and then attracting resources can be expensive, the overall costs for Government are generally lower than if selected defence companies are paid to retain spare capability on an extended basis.[30]

15.35 Overall, Defence did not consider that the naval shipbuilding industry was in a unique position in dealing with demand peaks and troughs. Defence argued that it is industry's responsibility to manage cyclical demand:

> The cyclical demand of project work is a factor for all industry sectors not just shipbuilding.
>
> Shipbuilding is no more or less cyclic than oil/gas or mining or construction. Those industries have coping strategies to mitigate expected cycles, as must Defence industry.[31]

15.36 Defence was clear that it primarily considers naval procurement decisions on the basis of defence capability and the ongoing support needs of the fleet, not in terms of market influence, industry needs or broader economic outcomes.

15.37 It should be noted, however, that a 2004 study by ACIL Tasman on the Australian Defence Industry, stated bluntly that:

> Where Defence is the sole customer for an industry, it is the management of defence demand, rather than a free market, that will determine the health and capacity of that industry.[32]

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28 Department of Defence, answer to question on notice, 28 March 2006 (29 May 2006), question 31, p. 36.

29 Department of Defence, answer to question on notice, 28 March 2006 (29 May 2006), p. 36.

30 Department of Defence, answer to question on notice, 28 March 2006 (29 May 2006), p. 37.

31 Department of Defence, answer to question on notice, 28 March 2006 (29 May 2006), question 4, p. 31.

15.38 Similarly, while the recent First Marine International study found that 'the successful implementation of best practice requires the full cooperation of the workforce and the unions', it added:

> The government and Navy could assist by working in partnership with the industry to smooth demand in order to provide more stable employment.[33]

15.39 The committee accepts that the naval shipbuilding industry is subject to cyclical flows in demand that to a degree characterise that industry. However, it considers that as naval shipbuilding is a monopsony market, the circumstances of industry players are substantially different to many other cyclical industry sectors. It is concerned that if Australian companies cannot survive and grow through peak and trough demand cycles, the capacity to meet defence's capability needs into the future will be reduced.

15.40 The committee is concerned that Defence does not fully accept how powerfully its demand scheduling shapes Australia's naval shipbuilding capacity and efficiency. The committee rejects the notion that measures cannot be taken to moderate demand peaks and troughs more effectively without adversely affecting Defence capability. Clearly, long-term strategic planning is required to address this problem.

15.41 The committee noted in chapter 14, in relation to Australian industry involvement and Defence's procurement, a possible disjunction between the government's broader interest in fostering Australian industry and Defence's primary concern with capability and value for money. The committee observes this disjunction again here, with Defence viewing demand planning in terms of its capability requirements and not necessarily with a view to sustaining a viable and efficient industry into the future. The issue of demand planning underscores the need for a clearly articulated policy on Australian industry involvement and a clear indication of the weight given to supporting the local industry in procurement planning and decisions.

Demand flows for ship repair and maintenance

15.42 With regard to repair and refit for major ships, Defence acknowledged that it has had a 'short-term focus that is detrimental to developing and sustaining a viable industry support base and is inefficient in delivering effective support outcomes'.[34] Defence explained:

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32 ACIL Tasman, *A Profile of the Australian Defence Industry: Helping align defence industry, defence industry policy, and Defence strategic planning*, commissioned by The Australian Industry Group Defence Council, The Australian Industry Defence Network, the Department of Defence, et al., November 2004, p. xviii.

33 First Marine International, *Findings for the Global Shipbuilding Industrial Base Benchmarking Study*, Part 1: Major shipyards, August 2005, paragraph 4.10, p. 27.

34 Department of Defence, *Submission 20*, pp. 6–7 and paragraph 1.23.

> Currently, Defence contracts each major surface warship maintenance availability separately. About 20 availabilities are conducted each year. Each availability is unique and the work load can vary significantly between availabilities. The four members of the ship repair panel are therefore faced with the need to frequently prepare and submit tenders to achieve ship repair work. Both Defence and industry are therefore focused on the short term, undertaking the current work and preparing for the next maintenance tender.[35]

15.43 It identified specific shortcomings resulting from these arrangements:

- The short term focus does not allow sufficient time for industry (and Defence) to conduct adequate planning. Industry bids may therefore be based on inadequate planning and understanding of the outcomes Defence requires.
- Inadequate planning is a factor in the very high level of contract change proposals raised during ship repair availabilities to meet the outcomes of the availability.[36]

15.44 Defence explained that it is intending to improve this situation by batching a number of successive maintenance jobs into one contract. Successful contractors will then be engaged for a longer period (3–5 years) than for a single maintenance contract (typically 2–4 months).[37]

15.45 The committee notes and commends Defence's endeavours to schedule its naval vessel repair and maintenance program in order to achieve greater efficiencies.

A strategic plan

15.46 Without doubt many participants in this inquiry called for Defence to take a more strategic approach to planning its naval acquisitions program.[38] Some gave detail as to what they would like a strategic plan to do. Rear Admiral Scarce, proposed a strategy that would identify key capabilities and workloads to enable industry 'to consolidate and focus with government on platform and equipment affordability and productivity'.[39] He argued that the Commonwealth in implementing an industry policy needs to:

- determine what critical skills are necessary to sustain Australia's maritime capability;

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35 Department of Defence, answer to question on notice, 28 March 2006 (29 May 2006), question on notice no. 47.

36 Department of Defence, answer to question on notice, 28 March 2006 (29 May 2006), question on notice no. 48.

37 Department of Defence, answer to question on notice, 28 March 2006 (29 May 2006), pp. 8–9.

38 See also DISplay Pty Ltd, *Submission 40,* covering letter.

39 *Committee Hansard*, 19 April 2006, p. 22.

- formulate a ship demand plan which narrows the peaks and troughs over the longer term;
- introduce a comprehensive skills investment program for both primes and SMEs; and
- invest in modern, internationally competitive infrastructure that enables Australia to produce quality, cost-effective products.[40]

15.47 Engineers Australia noted that Defence's current approach to acquisition 'involves assessing the costs and benefits of Australian industry involvement in each program, and selecting the option that provides the best value for money in each case'. It expressed the view that, although this series of decisions provides valuable work to Australian companies and employees, it lacks strategic coherence. According to Engineers Australia, 'the work has little long-term value in developing new large scale industries or capabilities'.[41] It suggested that Australia:

> …could choose to develop a long term strategy for Australia's naval shipbuilding and repair sector, which would involve an evaluation of the costs and benefits of each project's option in terms of the national strategy.

15.48 In its view, the option that 'provides best value for money in terms of achieving the longer term strategy would be selected'.[42] Some witnesses wanted Defence, through strategic planning, to exert more direct control over the industry. For example, Mr David Miller, Executive General Manager of Tenix Defence Pty Ltd, suggested that there should be a more focused industry policy that addresses questions such as where is the right place to have common user facilities and what is the correct timing of work so that the shipbuilding and the resource sectors can coexist as 'happy neighbours in Western Australia'.[43] He argued that if the market is based 'only on competitive tenders, each project may be optimised but the longer-term interest of the nation is in some cases suboptimised'.[44] Along similar lines, other submitters also were asking for the strategic plan to address competition issues. The South Australian government advocated a rationalisation of the industry around a centralised hub.

15.49 Recently a number of leading experts on Defence industries called for an improved statement on strategic industry policy. Professor Paul Dibb of the Defence and Strategic Studies Centre at the Australian national University said:

> Australia needs a new Strategic Industry Policy Statement, which will focus on managing demand and competition, and state what industrial capabilities are of strategic importance and why. It would confirm that the government

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40 *Committee Hansard*, 19 April 2006, p. 23.

41 *Submission* 24, p. 1.

42 *Submission* 24, p. 1.

43 *Committee Hansard*, 27 April 2006, p. 14.

44 *Committee Hansard*, 27 April 2006, p. 14.

> continues to seek to maximise the economic benefits to Australia's economy, while retaining preference for the best value for money.[45]

Admiral Chris Barrie, a Visiting Fellow at the Australian National University, reinforced this view:

> We need a comprehensive statement of government policy that sets out the broad principles, establishes the decision-making framework, and brings to bear an active approach to solving this important set of problems in utilising all the skills and talents available in industry, government, the bureaucracy and in the armed forces.[46]

Committee view

15.50 The committee suggests that because of Defence's dominance in the market place, it should recognise and use its influence to assist industry gain greater efficiencies and to perform better. Strategic planning is central to Defence achieving this objective. The committee has not received sufficient evidence to recommend in detail the specific nature of a strategic plan. It has received strong evidence, however, that there is a need for Defence to take a more coherent and strategic approach to planning. Furthermore, this planning should take account of how better;

- to encourage and use Australian SMEs and overseas subsidiaries;
- to build on existing infrastructure and guide future investment to ensure that Australian shipyards are used to their capacity; and
- moderate fluctuations in demand.

15.51 In addition, the committee's evidence suggested that Defence could take a more active leadership role in ensuring that the contribution by the states and the private sector to sustaining and developing Australia's naval shipbuilding industry is complementary.

15.52 Strategic planning relies not only on a thorough knowledge of the industry but on an understanding of how it fits into the broader industrial landscape. The committee has noted the merging of technologies and the opportunities for the industry to gain greater efficiencies. In Western Australia for example, the naval shipbuilding industry and the oil and gas sector are taking advantage of the growing similarities in their requirements. The CUF at Henderson is expected to service the oil and gas, resources, marine and defence industries. Transferability of skills between sectors is also considered important for addressing labour demands. Similar opportunities may well exist for the naval shipbuilding and the commercial shipbuilding industries.

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45 Paul Dibb, 'A Defence Industry Development Strategy', *The Business of Defence: Sustaining Capability*, CEDA, August 2006, p. 19.

46 Chris Barrie, 'Defence Industry Policy', *The Business of Defence: Sustaining Capability*, CEDA, August 2006, p. 11.

Recommendation 7

15.53 The committee recommends that Defence conduct a full analysis of, and identify, how the naval shipbuilding industry and the commercial shipbuilding industry and heavy engineering activities can better integrate to produce increased efficiencies and productivity gains for these sectors.

15.54 The committee supports the call for a strategic plan and considers that it should address the factors listed above. The committee further considers that the Defence Capability Plan can be improved as a document to reflect a more strategic approach.

Strategic planning—Defence Capability Plan

15.55 Defence acknowledged that industry needs a predictable and sustainable basis on which to plan ahead.[47] It recognised the importance of keeping industry abreast of its future requirements so that industry would be able to align its planning and development to meet Defence's long-term needs. The committee has drawn attention to concerns about the lack of data available on past and current projects—costs, productivity, overall performance. It now proceeds to consider Defence's Capability Plan (DCP), the key document that informs industry about Defence's future acquisition program.

15.56 Those in the shipbuilding industry rely on astute forward planning to manage their business effectively. In many cases, the respective companies look to government to provide a blue print that would clearly indicate the intention behind, and the schedule for, future naval acquisitions. Such information would enable them to make informed business decisions based on sound intelligence.

15.57 For example, Mr Proctor, Saab Systems Pty Ltd, told the committee that 'lack of assurance is the biggest deterrent to a positive attitude'.[48] Similarly, Mr Geoffrey Barker, a journalist and long-standing commentator on Defence procurement, stated:

> If you are a defence business, you have to ask yourself: 'Will I make long-term capital investment in the hope that there will be Australian industry involvement in the project going this way?' You would have to say, on reading that, that you are not getting much assurance that your punt is going to pay off. There is that uncertainty. So there is that need for, I think, greater transparency to the extent that one can have it. It is very difficult, I acknowledge, to give businesspeople a greater sense of certainty about the plan. But we need to do more than just saying: 'Here's your plan, but it could all change—or a fair bit of it could change—and you'll carry the

47 Department of Defence, *Defence 2000: Our Future Defence Force*, Commonwealth of Australia, 2000, p. 98.

48 *Committee Hansard*, 20 April 2006, p. 11.

> investment risk if you buy in too early in the hope that you are going to be able to do this.'[49]

15.58 Currently, the public version of the Defence Capability Plan is the primary means by which Defence articulates future naval shipbuilding demand and likely acquisition schedules.[50] It provides a ten-year outline on Defence capability requirements. Defence's long term capability needs and objectives are also set out in the Defence Update and Defence Capability Strategy. In addition, Defence 'uses various industry councils to discuss on a regular basis long term capability development programmes that are outside the ten year DCP time frame'.[51]

15.59 Defence maintained that its capability plan 'provides some certainty to Australian Industry as a whole'.[52] While the DCP aims to 'provide industry with sufficient guidance to enable broad business planning', commentators and industry experts identified perceived shortcomings in the DCP for planning purposes.

15.60 As noted earlier a number of leading experts on Defence industries, including Professor Dibb and Admiral Barrie, called for an improved statement on strategic industry policy. They wanted such a statement to set out broad principles, establish the decision-making framework and include the identification of strategically important industrial capabilities. Dr Brabin-Smith also levelled criticism at the current Defence Capability Plan:

> Removal of ambiguities in the government's defence policies would help, as would the development and publication of a new Defence Capability Plan, consistent both with a coherent interpretation of the government's policies and with the levels of funding likely to be available.[53]

15.61 Participants in this inquiry also called for changes to the DCP. ADI underscored the need 'to create a single integrated plan that pulls together operational issues, resourcing and industry aspects of shipbuilding and whole-of-life repair and maintenance'.[54] Mr Mark Proctor of Saab Systems Pty Ltd acknowledged that Defence

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49 *Committee Hansard*, 4 September 2006, p. 22.

50 While the DCP aims to 'provide industry with sufficient guidance to enable broad business planning', submitters pointed to inadequacies in the DCP for planning purposes. For example, Engineers Australia considered that the Defence Capability Plan should attempt to look further ahead than a ten year period. See also Saab Systems Pty Ltd, *Committee Hansard*, 20 April 2006, p. 12. The committee also notes that DMO produced a naval shipbuilding and repair sector strategic plan in August 2002 but it was not adopted by government.

51 Department of Defence, answer to question on notice, 28 March 2006 (29 May 2006), question 37, p. 5.

52 Department of Defence, answer to question on notice, 28 March 2006 (29 May 2006) question on notice no. 37.

53 Richard Brabin-Smith, 'Defence innovation in Australia', *The Business of Defence: Sustaining Capability*, CEDA, August 2006, p. 31.

54 *Committee Hansard*, 28 June 2006, p. 2.

has produced a number of documents about its defence needs and strategic requirements. He gave the example, however, of the amphibious ships and the possibility of them being designed and built overseas which to his mind 'immediately puts people on the back of their heels to say: "That's a change of tune. That wasn't in the documents" '.[55]

15.62 Engineers Australia considered that the Defence Capability Plan should attempt to look further ahead than a ten-year period. It should be noted that while the current DCP extends only until 2016, naval shipbuilding workforce projections submitted to the inquiry by Defence extended to 2025, acknowledging an anticipated replacement frigate and submarine program beyond the DCP.

15.63 Defence acknowledged that some in the industry were calling for it to do more about informing industry 'of its future requirements…and a concept led and capability based approach to developing capability'.[56] In response to suggestions to extend the timeframe of the DCP, Defence stated that it was 'hard to see how a projection beyond the 10 to 20 years influenced by the DCP can be prudently extended'. It maintained that 'to do so would require a faith in the linearity of the development of technology and war fighting concepts that might, for example, be foolhardy'.[57]

Committee view

15.64 Both experts and commentators on Defence procurement as well as those active in the shipbuilding industry were critical of the information made available through the Defence Capability Plan. Witnesses wanted accurate and reliable information on Defence's forward procurement plans. Indeed, one of the strongest messages coming out of the inquiry was that Australian industry wants clearer guidance from government on its long-term plan and objectives for the industry. In particular they want a comprehensive statement providing accurate and reliable information on Defence's future plans for its naval acquisition program that go beyond ten year projections. They are looking for detailed information on the value placed on, and the weight given to, Australian industry involvement, the industrial capabilities identified as strategically important, and the levels of funding likely to be available.

15.65 The committee notes Defence's response to suggestions that the DCP should extend over a longer period. It is of the view, however, that there is scope for the plan to provide industry with a better appreciation of Defence's longer term requirements. The plan currently seems to bring industry into the discussion about capability development too late. It believes that the DCP should provide the opportunity for Australian industry, and indeed the wider community, to engage with Defence in the earlier stages of analysing and identifying Australia's strategic priorities and the

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55 *Committee Hansard*, 20 April 2006, p. 12.

56 *Committee Hansard*, 18 August 2006, p. 27.

57 *Committee Hansard*, 18 August 2006, p. 27.

capabilities needed to meet them. An analysis of Australia's strategic priorities in the DCP would facilitate discussion on capability development at a higher level before decisions and commitments are made about particular acquisitions. It would not only allow projections to be made about technology developments into the future but include industry in considerations about defence capability.

Summary

15.66 This chapter has highlighted the need for a more strategic and collaborative approach to using and investing in Australia's naval shipbuilding resources. It has reviewed calls for a strategic plan and assessed the value of Defence's Capability Plan as an informative and instructive means of keeping industry abreast of current and future developments in the industry. It found the need for Defence to improve its Defence Capability Plan so that industry has clearer guidance on Defence's long-term objectives for Australia's shipbuilding and repair industry and the intentions underpinning its acquisition program. In brief, the committee believes that the DCP is inadequate as a means of informing the industry, parliament and the public about Defence's future plans and intentions regarding its acquisition program.

Recommendation 8

15.67 The committee recommends that Defence make their DCP a document that provides industry with a much clearer sense of Defence's future plans and intentions. In particular, it recommends that the DCP provide:

- **a statement on the way the DCP accords with Australia's broad national security strategy including the nation's strategic priorities;**
- **a discussion about the nation's future strategic capability requirements that identifies the industrial capabilities deemed to be strategically important;**
- **an assessment of the nation's existing shipbuilding and repair facilities and future investment needs;**
- **a comprehensive statement providing accurate and reliable information on Defence's future plans for its naval acquisition program that goes beyond ten year projections;**
- **a clear indication of the government's policy on Australian industry involvement in government projects and how Defence would apply this policy to its acquisition program; and**
- **a detailed explanation on the acquisition schedule indicating the reasoning behind it and how Defence has taken into account demand flows.**

15.68 While the committee is asking Defence to provide more detail in their DCP and include information that provides a much clearer indication of Defence's future acquisition program, it accepts that the document can only be as good as the quality of the strategic planning it represents.

Chapter 16

Defence—an informed buyer

16.1 The report has demonstrated clearly that naval shipbuilding is an expensive and complex undertaking requiring costly infrastructure and a highly skilled workforce. It has also acknowledged the strategic importance of having a navy capable of defending the country and its people, its coastal waters and its transport and communication routes.

16.2 The changing nature of Australia's security concerns, together with the continuing advances in technology and substantial costs of acquisitions mean that Defence must be a savvy, competent and knowledgeable buyer. It needs strategic analysts with the skills and experience to identify the capability Australia needs to protect its interests, and the technical experts able to draw up and articulate specifications and assess the technology solutions that meet these requirements. Defence needs highly skilled project managers able to manage very complicated tender and contracting processes and oversee delivery of complex projects, often involving joint ventures, alliances or partnerships. It needs leaders with the vision to look beyond individual projects to Defence's long-term capability needs and the most efficient use of industry-wide resources.

16.3 This chapter looks at the requirement for Defence to have the highly skilled strategic analysts, technical specialists and competent and experienced project managers and leaders necessary to perform as an informed buyer.

Strategic analysts

16.4 Australia's broader strategic Defence environment was beyond the scope of this inquiry. The committee believes, however, that Defence procurement and Australian Industry Involvement policy must derive from Australia's strategic capability needs now and into the future. It considers, as stated in the previous chapters, that the DCP must provide a broad analysis of Australia's strategic requirements as the foundation for the capability plan. Defence needs trained analysts to undertake such strategic assessment and to articulate it through the DCP.

Technical specialists

16.5 Given its position as a monopsonist, Defence can assist industry efficiency by ensuring that it has the technical knowledge, thinking and skills to manage acquisitions effectively. Mr Peter Hatcher told the committee that 'it is difficult to have a good working relationship…if the customer is not knowledgeable: that is it much easier to work with a well-informed, intelligent customer'.[1]

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1 *Committee Hansard*, 18 August 2006, p. 10.

16.6 Defence outlined a number of initiatives that have been taken to enhance relevant staff skills and to improve the professional standing of DMO.[2] DMO has been actively recruiting experienced industry personnel to increase the skills available to conduct complex tasks such as assessing tenderers' ability to deliver on time, on budget and at the required performance levels. DMO has also been improving the technical skills and qualifications of existing staff. Defence informed the committee that:

> Increasing the number of chartered engineers and technical officers is one of the key priorities of the DMO's professionalisation agenda. Since initiating the professionalisation program in April 2004 the numbers of engineers and technical officers who have achieved chartered status has increased from 125 to 218. There are a further 398 enrolled and working towards their chartered status.[3]

16.7 In addition, DMO has access to significant numbers of scientists and engineers in DSTO to provide specialist technological advice.[4] Depending on the complexity of a project, Defence also engages specialist consulting companies to analyse information provided by tenderers and independently assess industrial capacity. The companies engaged include BMT, KBR and Appledore which are specialists in the areas of financial and commercial management, shipbuilding and facilities and cost modelling.[5]

16.8 Not all witnesses were convinced of Defence's ability to operate as an informed buyer. Several witnesses commented on the decrease in Defence's technical and engineering workforce. They expressed concerns about Defence's ability to clearly articulate requirements, ensure that proposed designs meet operational requirements and hold contractors accountable. In the opinion of Rear Admiral (ret'd) W.R. Rourke, the Navy needs to increase its capability with regard to 'technological and engineering development'. He suggested that Navy should give consideration to training officers who will be able to participate constructively in the Navy's technological future and who would 'be able to contribute to high quality technological management in the DMO'.[6] Rear Admiral Scarce stated:

> In my view, in the early 2000s we were lapsing to the stage where we were not intelligent customers about naval vessels. We did not have the skills because we were not involved in the design and detailed engineering work

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2 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), questions 58 and 59, pp. 25–27.

3 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), question on notice no. 60.

4 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), questions 40 and 60, pp. 25 and 27.

5 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006), question 8, p. 23.

6 *Submission 1*, pp. 7–8.

> of the Anzac class. We got to the stage where we did not understand enough about building ships, designing them and integrating the weapons systems, and we were coming close to the time where we could not warrant the safety of our own ships because we did not have the skills to do it. That was largely there at that particular time because we felt that it was something that industry could do and it could deliver those services for us.[7]

16.9 Mr Peter Hatcher, Thyssen Krupp Marine Systems Australia, presented a similar view. He commented on the shift over the last 15 years to outsourcing Defence engineering functions and surmised:

> I do not think there would be many people who would deny that Defence is in a fairly precarious position with regard to its ability to operate as an informed customer, from an engineering point of view. I would not say that that capability needs to reside within Defence, but that capability does need to reside within the country, be in an independent form and be accessible by Defence.[8]

16.10 On the other hand, the Submarine Institute of Australia was of the view that the ADF is held in high regard by a large sector of the international defence community and its high standards demand high-quality products. The Australian Industry Group Defence Council commented on the team that is being built up in DMO, stating that:

> …it has a pretty good balance of hard-headed specification type development and it has appropriate experience… It has probably the best legal council team that they have ever put together. They now have industry expertise working actively inside, which they have never had before. So I would give it a big tick at this time. But the verdict is out because, until such time as the air warfare destroyers come through successfully, we will not know how successful it has been—certainly, for the most complex project currently in line.[9]

16.11 The committee notes some witnesses' concerns that Defence lacks the necessary technical and engineering capacity internally to operate as an informed buyer. It is pragmatic for Defence to contract expert technical advice when this capacity is lacking. However, the committee emphasises that Defence and DMO remain accountable to government and the taxpayer for their advice on tender options and the ultimate delivery of acquisitions that meet specifications. This responsibility cannot be outsourced. The committee considers it appropriate that Defence, as part of its strategic planning, identify the skills and expertise it requires in-house to operate as an informed buyer.

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7 *Committee Hansard*, 19 April 2006, p. 37.

8 *Committee Hansard*, 18 August 2006, p. 10.

9 *Committee Hansard*, 28 June 2006, p. 27.

Project managers and leaders

16.12 In the main, a project is set on the path to success during its early stages. Much of the success of naval acquisition projects depends on the foresight, planning and skills employed by Defence and the DMO in the initial procurement stage. Defence was aware of this role:

> …before committing to an acquisition, Defence must independently assure that industry has the capacity to deliver on schedule and within budget the required capability.[10]

16.13 Defence informed the committee that it is responsible for the preparation of tender documentation, the evaluation of tenders and the subsequent provision of advice to government on preferred tenderers. Managing the tendering process efficiently can improve defence industry profitability, in turn producing better outcomes for Defence.[11]

16.14 Defence relies on 'the results of specific tenders to compare actual aggregate costs relevant at the time of acquisition against a specific requirement'. Such information is provided to Defence in a tender on a commercial-in-confidence basis.[12] According to Defence it uses

> …commercial tendering to allow comparison of total cost to owner against specific requirements in the economic environment prevailing at the time. This comparison will reflect many economic factors including yard productivity, scale of production, subsidies, other program funding and underlying economic drivers in pricing.[13]

16.15 While Defence relies on the information provided in tenders, it needs skilled analysts and project managers able to objectively assess this information. This is important to avoid what Mr Warren King termed 'the conspiracy of optimism'. He explained:

> It is not conspiratorial other than in the sense that everybody wants to do something. So you get the situation where the military clearly want a capability. They need a capability…industry then says—and rightly so; you can see their enthusiasm—'We would like to do these things in Australia,' and who in industry would not? So they say they can do it—let us say…for $2 billion. The government of the day would clearly like their defence force to have that capability, and they would like their industry to deliver it. Now you have the beginning of what I call 'the conspiracy of optimism'.

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10 Department of Defence, *Submission 20*, p. 4.

11 ACIL Tasman, *A profile of the Australian Defence Industry, Helping align defence industry, defence industry policy, and defence strategic planning,* November 2004, p. xxv.

12 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), question 2.

13 Department of Defence, answer to question on notice, 18 August 2006 (received 31 October 2006), question 1.

> Typically, in our industry experience, when you put bids together, you have to hit a middle ground: 'How much risk; how much opportunity; what's my price?'[14]

16.16 DMO considers that it assesses tenders against a wide range of criterion, including weighing up factors such as operational capability and maximising Australian industry involvement. DMO may also engage expert consultants to analyse tenders. Clearly, managing the process of formulating specifications and then testing tenders against these specifications, while objectively assessing many other factors and input from external analysts requires highly skilled project managers.

16.17 Defence also has responsibility for contracting the successful tender. As noted in chapter 2, the growing complexity in the construction of naval vessels, with their highly sophisticated and expensive systems, has influenced the business arrangements for major contracts. Different contracting arrangements and business models are used for different projects. Prime or major contractors may come together under a range of partnering or alliance arrangements that share project risks and project rewards.

16.18 There have been a number of significant changes to Defence tendering and contracting arrangements in recent years. One of the most significant reforms to Defence procurement has been the implementation of the Kinnaird recommendations. As a result of the Defence Procurement Review, a 'Two Pass Government Approval' system for Defence projects has been instituted to ensure that government is provided with the opportunity to make better informed decisions regarding the procurement of Defence systems. Defence also informed the committee that it has 'embarked on a program of continuous improvement to ensure that lessons learned and internal and external stakeholder feedback are considered in the development/review of procurement policy, practices and related tendering and contractual documentation'.[15] It outlined how, in recognition of the need to ensure that its standard contracting procedures and templates reflect commercial 'best practice', it commenced a 'Procurement Improvement Program' in July 2005. Defence maintained that this initiative will benefit both Industry and Defence. It would:

- reduce unnecessary processes and documentation;
- place Defence procurement and contracting on a commercial footing while remaining consistent with Government accountability frameworks; and
- provide increased attention to Defence and defence industry concerns to ensure a full understanding of Defence's capability requirements and full understanding of defence industry offers before entering into a contract.[16]

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14 *Committee Hansard*, 18 August 2006, pp. 50–51.

15 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006) question 9, p. 4.

16 Department of Defence, answer to question on notice, 28 March 2006 (received 29 May 2006) question 9, p. 4.

16.19 A number of submitters commended the progress made by DMO to improve its tendering and contracting process especially the earlier involvement of industry. In brief, ADI was of the view that there had been a 'demonstrable change and benefit with the establishment of DMO'.[17] The Australian Industry Group Defence Council praised the work being done by DMO.[18] As well as improving the professional standing of DMO and its endeavour to introduce world best practice in their tendering and contracting processes, DMO has also reviewed the effects on industry of their contracting practices. It has identified weaknesses and put in place remedies to rectify them.

16.20 Raytheon Australia was positive about the new approach. It commented that its role as a Mission System Integrator (MSI) fitted well with the Kinnaird process, as mission systems integration involves working with both the customer to specify capability requirements and with industry to deliver outcomes. Dr Stevenson said:

> I guess what we are finding is that by getting with the customer earlier and working with them we can help make sure that we have the right documents that specify the system in going forward…basically there is a lot more interaction between capability in DMO now than there was previously.[19]

16.21 Mr Gaul, President of CEA Technologies, commented that the Kinnaird process provides more rigour which is healthy. He stated further:

> It does cause delays, which cause us problems, but Defence is very flexible and able to overcome that with CCP activity and things like that in our case so that contracts can still march forward until everything lines up. As long as that flexibility is there, I think the system will continue to work.[20]

16.22 Mr Fisher, Raytheon Australia, commented on improvements in scrutinising in-contract performance. He stated:

> I would say that, under Dr Gumley, industry is more aware—if your schedule is 12 months, your schedule is 12 months. But the prior practice was that, if they brought it to nine months, they would win the job. Industry is being held more accountable for its overruns than previously. Before that, people used to do a CCP and just change it.[21]

Further:

> From a taxpayer perspective, the process they are running today is a good process. What it really is doing is sorting out people who used to hide

17 *Committee Hansard*, 28 June 2006, p. 16.

18 *Committee Hansard*, 28 June 2006, p. 27.

19 *Committee Hansard*, 3 July 2006, p. 8.

20 *Committee Hansard*, 3 July 2006, p. 34.

21 *Committee Hansard*, 3 July 2006, p. 9.

> behind work in the job after they won it. That is the business approach the DMO has now taken.[22]

16.23 Mr Peter Hatcher noted that Defence had taken measures toward developing 'more innovative contracting arrangements that break down the fixed price contractual barrier between the customer and the supplier, in part to overcome that lack of internal capability within Defence.' He commended this approach as a good way of doing business.[23]

16.24 The AWD project provides an example of a cooperative contracting approach that involves an alliance between ASC, Raytheon Australia, the DMO and the Defence Department's Capability Development Group. In 2005, Defence tendered for the ship build through three separate contracts: one to choose a shipbuilder; another to choose a combat system systems engineer; and a third to select a designer. The weapons system was purchased under a separate arrangement. The Commonwealth selected ASC as the preferred shipbuilder; Raytheon Australia won the contract for the combat systems engineer; while U.S. firm Gibbs and Cox and the Spanish company Navantia are competing for the design contract, to be announced in mid 2007.

16.25 The AWD Alliance approach reflects the complexity of the destroyer project and the need for partnerships that bring together all the necessary skills and expertise to meet the task of integrating high-technology weapons, sensor and communications systems. Defence's close involvement partly reflects its own need to keep up-to-date with this rapidly evolving capability, particularly Raytheon's integration of the Defence-mandated Aegis combat system. Defence also has a strong interest in developing key partnerships, both among the alliance partners and between these companies and potential equipment suppliers, for future warship projects.

16.26 The ability of Defence and DMO to access and draw together skills and expertise from across companies and countries is increasingly important. Defence and DMO require project leaders with the vision and ability to drive complex projects, to inspire productive relationships between companies who may operate as rivals in the commercial world and to take difficult decisions at the outset of a project. Of all the stakeholders in an alliance or partnership arrangement, it is Defence and DMO which require the broad vision to look for opportunities to maximise the government's investment in a specific project. For example, there may be opportunities to improve the efficiency of eventual through-life support or potential spin offs to other projects and capabilities. As discussed in chapter 15, efficient naval shipbuilding requires a collaborative approach which looks at the most efficient use of industry-wide resources. Defence and DMO need the leadership skills to drive this approach and foster the necessary partnerships.

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22 *Committee Hansard*, 3 July 2006, p. 10.

23 *Committee Hansard*, 18 August 2006, p. 10.

16.27 The committee is encouraged by the positive views expressed about DMO and the progress it is making in improving tendering and contract management processes. However, the committee considers that delivery of upcoming projects will provide a more definite measure of the success or otherwise of such initiatives. This underlines the importance of having in place a review process that can gather information and assess projects as they progress through the various phases from concept to completion.

Conclusion

16.28 The complexity of building warships in the current advanced technology, global industry increases the demands on Defence to function as an informed buyer. Some submitters questioned whether Defence has the appropriate level of experience and technical expertise to carry out its naval ship acquisition program effectively. Defence and DMO are aware of the need to have qualified personnel in–house and are taking steps to recruit such staff and to train existing employees. The committee considers it appropriate that Defence articulate through a revised DCP the skills and expertise that it requires and will maintain in-house in order to operate as an informed buyer.

16.29 DMO has undertaken steps to improve its tendering and contracting procedures and practices. Industry's response appears to be positive. A number of submitters commented on the improvements coming from the Kinnaird reforms and DMO's new professional approach. Industry players especially welcomed earlier engagement with DMO.

16.30 Even so, this report has highlighted the growing complexities in managing major naval acquisitions, especially given the complicated network of relationships and partnerships involved in modern naval construction projects. The committee considers that the current acquisition schedule will provide firm ground for assessing the progress made by DMO in improving defence procurement practices.

16.31 Chapter 14 commented on the absence of meaningful data and information, especially on the successes and failures of past projects. The committee considers it imperative that such information is systematically gathered and assessed as Defence progresses through coming major acquisitions. Such information is important for assessing how the Kinnaird process is operating in practice, and whether DMO's investments in staff development and innovative contracting arrangements are yielding results. Throughout the committee's inquiry Defence gave repeated assurances that it has the capacity to act as an informed buyer, that it is able to conduct

rigorous tender assessment and manage complex contracts. The recommendations contained in this report provide the basis for objective evidence, enabling these assurances to be tested, successes flagged and weaknesses documented for assessment and improvement.

SENATOR DAVID JOHNSTON
COMMITTEE CHAIR

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Additional comments – Senator Mark Bishop

Introduction

It is Labor's view there could be a viable naval ship building industry in Australia which is efficient and competitive. Australia has the skills, technology and the management prowess. That view is based on our history of ship building, the capacity of our heavy engineering sector, and the all-round capability of the workforce.

Small to medium ship building in Australia provides an excellent example of those elements working successfully in a competitive world market place. Labor is confident that given the same conditions, the heavy naval ship building industry could do the same.

It needs to be recognised, however, the nature of large ship building has changed dramatically in former traditional ship building countries. There, demand has fallen, due to the high degree of specialisation, larger economies of scale and lower cost structures, particularly in Korea, China and India.

This is especially the case for large commercial shipping, where there is a reluctance in Australia to subsidise construction where there are considered to be more important investment and spending priorities for taxpayer funds. Indeed, for larger commercial shipping, Australia has not been competitive in this market for decades.

Maintaining a competitive base

For Australia to become competitive, ship building must evolve into a model which is not competitive between large yards, but between heavy engineering fabrication plants. Central assembly must be in one location only. With respect to naval ship building, Australia may not be able to sustain more than one such large assembler, supplied by a more competitive market of fabricators.

Such rationalisation of the industry is already observable, through subtle policies clearly aimed to concentrate naval ship building in South Australia. If, however, that site is sold, that would create a mixed model, but one in which the monopsony cost risks of Defence procurement policy would be tempered by a competitive supply market more suited to modular fabrication and ship repair, other heavy engineering work, and the currently very successful smaller end of the ship building market.

This would include continuing heavy engineering manufacture for the offshore energy industry, successfully operating in Western Australia. If this is a de facto industry plan, then perhaps it ought to be explored and developed more overtly. Certainly it’s a more flexible model and one more capable of sustaining continuity of work.

Labor supports such an approach for that reason alone. More than any other industry, ship building has been allowed to wane in line with the vagaries of naval ship building

policy over the past 10 years. This attitude can only lead only to the atrophy of industry and the loss of valuable skills and investment in modern plant and capacity.

Regrettably, conditions needed for the existence of the small ship building industry do not exist for heavy naval ship building, though they could with good leadership and long-term focus by government, which is the only purchaser. While those conditions may have existed with respect to the ANZAC frigate project (and to some extent with the submarine project) that is no longer the case due to the lack of continuity in naval strategic planning and long-term policy.

The conclusion of those contracts and the long gap before the commencement of the next project means the potential to maintain and strengthen the industry has been lost. Establishing a new greenfield site is also far more expensive than an evolving policy of upgrading existing sites, made even more dubious when driven by designs of selfish political advantage.

The assertion that recent ship and submarine building programs have been internationally competitive regrettably has not been fully tested by the Committee. There is little evidence to guide us on the exact level of that competitiveness. Unlike commercial shipping, there are some shibboleths and assertions surrounding naval shipping, some of which are valid and others which are political by nature. This is an impossible context in which to make financially responsible decisions. Unfortunately it's this vacuum of data in which expectations of subsidy arise and are inevitably conceded.

That is the conundrum for so much of defence procurement, as openly acknowledged. It's obvious from some evidence to the Committee that the climate of industry cost plus dependency should continue for all the un-costed reasons of defence policy. This contrasts with the desire to maximise value for the taxpayers' dollar, and to achieve the productivity, which has been shown to be best achieved through healthy, measurable competition. The latter is the prevailing paradigm, but regrettably is difficult to accurately assess.

Protective policies

The claim that all countries engage in subsidised, secretive defence procurement policies and that Australia therefore should as well, is another protective assertion. This is supported by the other assertions that navy ships are different in design and so can only be built domestically due to familiarity and repair in times of emergency. This is barely plausible, particularly as the steel fabrication task is well established in Australia supported by a very skilled workforce. The telling statistic that only about 20 per cent of a ship by value is contained in the steel fabrication should encourage governments to take a broader view and take other parameters into account including the capacity of the industry in times of economic pressure, as well as the competitive state of international ship building.

There are two vital factors here. The first is the need to be flexible in an industry so capital intensive and where demand is erratic. The second is that government has a

vital role in defence strategic planning, especially for naval ship building, which by nature has been cyclical, and so capital intensive that only government can sustain it. The biggest single threat and opportunity to this industry is the competence of government decision-making; that is the nub of the current problem.

Self sufficiency

It's also argued that Australia must retain an element of defence manufacturing capacity, even though we are largely dependent on alliances and overseas suppliers for much of the technology in ship fit out, especially in weaponry. Self sufficiency in case of emergency is an undeniable ambition, though it’s doubtless becoming less attainable given the sophistication and security attached to that technology. It is true, however, that given the benefits of technology transfer, the ambition should be optimised by securing strong partnerships and alliances.

There is no sign internationally that the environment of political decision-making on naval ship building is any different to that in Australia. It has not been possible in the current procurement policy framework to identify any sustained attempt to distinguish rational economic approach to naval ship building based on adequate cost benchmarking, from one based on the uncosted values of traditional defence policy. That emphasises self sufficiency, with nationalistic overtones of the asserted broader economic benefits of such investment to industry and the economy.

It is this dilemma which confronted the Committee and which it has not been able to satisfactorily resolve. This is reflected in the evidence from Defence. In the context of current ship building plans, it began with the rational economic assertion that it preferred a market-based response to its ship building tenders, with the downside cost of erratic and unpredictable demand borne by the industry and taxpayer. This was later revised with a more thorough explanation of the dilemma faced by defence procurement policy in Australia, where the demand was from a monopsony, with a highly dependent industry, unable to achieve competitiveness.

Hence Labor's acceptance of evidence given to the Committee that the prospects of a viable naval ship building industry in Australia are dependent on the political, strategic defence decision-making process. As long as decisions to invest in new navy ships are limited to small production runs and for expensive and technically-sophisticated ships regardless of their strategic role as determined by government, the less likely the industry can be sustained without a significant financial impost which (to the Committee's knowledge) has not been calculated.

Unquantifiable costs

Government and taxpayers are held captive to uncertain and unknown costs. Until that research and analysis is undertaken, based on thorough benchmarking of costs, and better estimates of the other non-economic and political values such as that of self sufficiency in defence industry support, a more rational approach to industry development will not be found.

This Inquiry report must be qualified, and in the interests of formulating better policy responses, that is disappointing. It might be hoped the government has undertaken this analysis, in which case the full economic assessment of current ship building projects should be revealed.

Hence some frustration on Labor's part in not being able to get to the heart of the issue, which continues to be clouded by these traditional values. The Committee has been unable to get beyond those barriers of tradition, simply because the evidence has not been provided in sufficient detail – including by the Government and any of its economic agencies. Nor has the Committee been able to properly assess the overall economic benefits, noting current economic circumstances are such that large investments of this kind at this time may cause further pressure on an economy at full stretch. To that extent therefore, the intent of the Committee's terms of reference has not been satisfied.

The Committee's conclusions and recommendations must be qualified by the paucity of research and evidence available necessary for well considered and economically defensible outcomes. Labor supports the Committee's report, simply because in the current circumstances we have been unable to develop a viable alternative addressing the hard questions which flow from the heart of the terms of reference. That is a serious shortcoming which can only be remedied by more committed political leadership and commitment over decades, based on sound long-term strategic defence policies, rather than ad hoc decisions driven by short-term considerations motivated by domestic politics.

Conclusion

Labor is also conscious that responsibility for the development of the naval ship building industry in Australian rests exclusively with the Government. The single most important ingredient for a successful, long-term, viable naval ship building industry is continuity of demand. This can only flow from proper defence strategic planning based on practical considerations, including the needs of industry. It is unacceptable as Defence asserted in evidence, to rely on market forces with the costs of short-term ad hoc decision making to be borne by industry and the taxpayer. The critical issue for the industry, therefore, is government decision-making and that's where the buck should rest.

SENATOR MARK BISHOP

Appendix 1

Public submissions

P1	Rear Admiral (Ret'd) W R Rourke
P2	Australian Industry & Defence Network Inc.
P3	Submarine Institute of Australia
P4	Mr Geoffrey Evans
P5	Australian Marine Complex Management (WA) Pty Ltd
P6	The Returned and Services League of Australia Ltd
P7	Austal Ships Pty Ltd
P8	Australian Industry Group
P9	South Australian Government
P9A	South Australian Government
P10	Gibbs and Cox Inc.
P11	Chamber of Commerce and Industry of WA
P12	Mr David John Truelove
P13	The Australian Association for Maritime Affairs Incorporated
P14	Australian Division of the Royal Institute of Naval Architects (RINA)
P15	Aerospace, Industrial and Marine Technology (AIMTEL) Pty Ltd
P16	AMWU (WA Branch)
P17	ASC Pty Ltd
P18	The Navy League of Australia
P19	Australian Academy of Technological Sciences and Engineering
P20	Minister for Defence
P20A	Minister for Defence
P20B	Minister for Defence
P21	Australian Manufacturing Workers' Union
P22	Thiess Pty Ltd
P23	Western Australian Government
P24	Engineers Australia
P25	SAAB Systems Pty Ltd
P25A	SAAB Systems Pty Ltd
P26	Tenix Defence Pty Ltd
P27	Nautronix Ltd
P28	Future Directions International
P29	Queensland Government
P30	Tasmanian Government

P31 Victorian Government
P32 Australian Maritime College
P33 Weir, Strachan and Henshaw
P34 ThyssenKrupp Marine Systems Australia Pty Ltd
P35 Raytheon Australia
P36 Australian Shipbuilders Association
P37 Mr Robin Virant
P37A Mr Robin Virant
P38 Department of Industry, Tourism and Resources
P39 Hunter Economic Development Corporation
P40 DISplay Pty Ltd
P41 Brisbane Slipways (BSE Group)

Appendix 2

Additional information, tabled documents and answers to questions on notice

Additional information

- ASC Pty Ltd, newsletter, *In Depth*, 2006.
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Tabled documents

Hearing date	
3 July 2006	Raytheon Australia, *Opening statement by Ron Fisher, Managing Director.*
18 August 2006	Department of Defence, *Opening statement by Lieutenant General David John Hurley, Chief Capability Development Group.*

Answers to questions on notice

Hearing date

28 March 2006 Department of Defence—Answers to questions on notice relating to:

1. Defence Industry Capability Requirements
2. Cost/Capability Considerations
3. Defence Processes
4. Domestic Ship Building Industry
5. Strategic Industry Requirements
6. Broader Economics
7. Export Control
   - Attachment 1: Navy Major Approved Projects
   - Attachment 2: Navy Minor Approved Projects
   - Attachment 3: Maritime Systems Division Organisation Chart
   - Attachment 4: DMO Organisation Chart
   - Attachment 5: ANZAC Subcontracts Vendor List.

3 April 2006 Department of Industry and Resources—extract from *Economic Assessment Report on the Australian Marine Complex—Common User Facility Infrastructure Expansion using a General Equilibrium Approach*, 21 June 2005.

Challenger TAFE and Department of Education and Training—Answers to questions on notice relating to:

1. Defence Force submission
2. Department of Education and Training's understanding of the ship building industry of other countries

3. Statistics of apprentices in the shipbuilding industry.

27 April 2006 — Australian Industry and Defence Network Inc—Spreadsheet with details of the AIDN members who are involved in the Maritime industry, amount of exporting they undertake, number of employees and annual turnover.

28 June 2006 — ADI Limited—Answers to questions on notice relating to:

1. Major focus of investment in training
2. Apprentice training and numbers
3. Former DMO employees
4. ADI's relationship with DMO.

3 July 2006 — The Returned and Services League of Australia Limited—response to a question taken on notice in relation to long term naval shipbuilding plan.

Department of Industry, Tourism and Resources—list of members of the Marine Industry Action Agenda and their roles.

18 October 2006 — Department of Defence—answers to questions on notice relating to:

1. BHP Port Kembla
2. Comparative economic costs
3. Local building premium
4. Intellectual property
5. Capacity
6. Broader benefits
7. Policy on Australian industry involvement
8. Industry structure—Carnegie, Wylie & Co report
9. Acquisition processes

Appendix 3

Public hearings and witnesses

Tuesday, 28 March 2006—Canberra

RUTING, Rear Admiral Trevor, Head, Maritime Systems, Defence Materiel Organisation, Department of Defence

Monday, 3 April 2006—Perth

BOOTH, Mr Terence, Executive Officer, Skilling Western Australia's Defence Industry Taskforce, Challenger TAFE

COLLINS, Mr Gary, Executive Director, Client Services, Chamber of Commerce and Industry, Western Australia

COPLEY, Mr Gregory Rolph, Director and Acting Chief Executive, Future Directions International Pty Ltd

DEEKS, Mr Michael Edward, Chairman, Nautronix Ltd

GALLAGHER, Mr Michael Forbes, Chief Executive Officer, Nautronix Ltd

KOBELKE, Mr David Norton, Director, Industry Capability Network (WA), Chamber of Commerce and Industry, Western Australia

LOGAN, The Hon. Francis, Minister for Energy, Science and Innovation, Government of Western Australia

LOVELLE, Mr Trevor James, Principal Adviser, Industry Policy, Chamber of Commerce and Industry, Western Australia

LUPI, Mr Stephen John, Strategy and Business Development Manager, Austal Ships

MACKAWAY, Mr Jamie, Director, Industry and Community Planning, Department of Education and Training

O'HARE, Mr John, General Manager, Marine and Defence, Australian Marine Complex, Office of Science, Technology and Innovation, Department of Industry and Resources, Government of Western Australia

PLAYER, Mr Robert Michael, Acting Managing Director, Challenger TAFE

ROTHWELL, Mr John, Executive Chairman, Austal Ships

WINDRAM, Mr Alan David, Special Projects and Development, AGC Industries Pty Ltd

Wednesday, 19 April 2006—Adelaide

CROSER, Mr Peter Norman, Managing Director and Director, Gibbs and Cox Australia Pty Ltd and Gibbs and Cox Inc.

EDWARDS, Mr Martin Peter, General Manager, ASC Shipbuilding Pty Ltd

FLETCHER, Mr Andrew Vernon, CEO, Port Adelaide Maritime Corporation

GALLAGHER, Mr John Robert Ross, Chief Executive Officer, ASC Shipbuilding Pty Ltd

SCARCE, Rear Admiral Kevin John (Retired), Adviser, Port Adelaide Maritime Corporation

TUNNY, Mr Gregory Roy, Managing Director and Chief Executive Officer, ASC Pty Ltd

Thursday, 20 April 2006—Adelaide

BONNER, Mr David Harold, General Manager, Weir Strachan and Henshaw Australia

PROCTOR, Mr Mark Laurence, Business Development Manager, Saab Systems Pty Ltd

WEBB, Mr Peter, Manager, Surface Ships, Weir Strachan and Henshaw Australia

Thursday, 27 April 2006—Melbourne

BATHGATE, Mr Liam Donald, Manager, Public Affairs, Tenix Defence Pty Ltd

BLACK, Mr Peter Terence, General Manager, Operations, Tenix Defence Marine Division, Tenix Defence Pty Ltd

HARRIS, Mr Graham, President, Navy League of Australia

MILLER, Mr David, Executive General Manager, Tenix Defence Pty Ltd

SMITH, Mrs Susan Mary, Executive Officer, Australian Industry and Defence Network Inc

Friday, 28 April 2006—Hobart

BRANDNER, Dr Paul Anthony, Research Leader, Cavitation and Fluid Dynamics, Australian Maritime College

CLIFFORD, Mr Craig Robert, Managing Director, Incat Australia, Pty Ltd.

EDMUNDS, Mr Steven, Managing Director, Haywards Steel Fabrication and Construction

EDWARDS, Mr Christopher Wentworth, Managing Director, Moonraker Australia; Chairman, Tasmanian Maritime Network

EDWARDS, Mr Rhys David Michael, Deputy Secretary, Industry Development Division, Department of Economic Development, Tasmania

HILL, Ms Debra Louise, General Manager, Food, Manufacturing and ICT, Industry Development Division, Department of Economic Development, Tasmania

McSHANE, Professor Paul Edward, Vice President, International and Development, Australian Maritime College

Wednesday, 28 June 2006—Sydney

CONROY, Mr Pat, National Project Officer, Australian Manufacturing Workers Union

GEHLING, Mr Robin Charles, President, Australian Division, Royal Institution of Naval Architects

GLENN, Mr Warwick, Executive Director Investment, New South Wales Department of State and Regional Development

GLOVER, Ms Anne, Manager Investment, New South Wales Department of State and Regional Development

HERRING, Mr Andrew Dean, Manager, Naval Public Affairs and Communications, Australian Defence Industries Ltd

JEREMY, Mr John Christopher, Member of Council, Australian Division, Royal Institution of Naval Architects

JOHNSTON, Mr Pat, National Organiser, Australian Manufacturing Workers Union

O'CALLAGHAN, Mr John Jerome, Executive Officer, Australian Industry Group Defence Council

SMITH, Mr Geoff, Director, Naval Sales and Marketing, Australian Defence Industries Ltd

Monday, 3 July 2006—Canberra

ADAMS, Mr Harold John Parker, AM, Board Chairman, Australian Association for Maritime Affairs

DOOLAN, Rear Admiral Kenneth Allan (Retired), Member, National Defence Committee, Returned and Services League of Australia

FISHER, Mr Ron, Managing Director, Raytheon Australia

GAUL, Mr David John, President, CEA Technologies Pty Ltd

IRONFIELD, Ms Denise, Executive Director, ACIL Tasman Pty Ltd

JAMES, Mr Neil Frederick, Executive Director, Australia Defence Association

LAWSON, Mr Mike, General Manager, Aerospace Defence and Australian Industry Participation Branch, Manufacturing, Engineering and Construction Division, Department of Industry, Tourism and Resources

PETTIFER, Mr Ken, Head, Manufacturing, Engineering and Construction Division, Department of Industry, Tourism and Resources

ROACH, Commodore Terence A, Member, National Defence Committee, Returned and Services League of Australia

ROURKE, Rear Admiral William John (Retired), Private capacity

STEVENSON, Dr Terrence, Chief Technology Officer, Raytheon Australia

Friday, 18 August 2006—Canberra

ANDERSON, Dr Ken, Deputy Chief Defence Scientist (Policy), Defence Science and Technology Organisation, Department of Defence

BRUCE, Mr Lachlan Nicholas, Executive Director, Office of Business Innovation and Strategy, Department of Innovation, Industry and Regional Development, Victoria

CLARKE, Mr Kerry Francis, Head, Industry Division, Defence Materiel Organisation, Department of Defence

COCKING, Ms Janis Louise, Chief, Maritime Platforms Division, Defence Science and Technology Organisation, Department of Defence

GILLIS, Mr Kim Rogers, Deputy Chief Executive Officer, Defence Materiel Organisation, Department of Defence

GUMLEY, Dr Stephen John, Chief Executive Officer, Defence Materiel Organisation, Department of Defence

HADDAD, Major General Peter Francis, AO (Retired), Strategic Adviser, Defence Industries, Office of Business Innovation and Strategy, Department of Innovation, Industry and Regional Development, Victoria

HAERMEYER, The Hon. Andre, Minister for Manufacturing and Export, Minister for Financial Services, Minister for Small Business, Victorian Government

HATCHER, Mr Peter Broughton, Chief Executive Officer, ThyssenKrupp Marine Systems Australia Pty Ltd

HURLEY, Lieutenant General David John, Chief, Capability Development Group, Department of Defence

KING, Mr Warren Leslie, Program Manager, Air Warfare Destroyer, Defence Materiel Organisation, Department of Defence

RILEY, Dr John Leslie, Chief, Maritime Operations Division, Defence Science and Technology Organisation, Department of Defence

RUTING, Rear Admiral Trevor Barmby, Head, Maritime Systems, Defence Materiel Organisation, Department of Defence

Monday, 4 September 2006—Canberra

BARKER, Mr Geoffrey, Private capacity

EDWARDS, Mr Martin Peter, General Manager, ASC Shipbuilding, ASC Pty Ltd

GALLACHER, Mr John Robert Ross, Chief Executive Officer, ASC Shipbuilding, ASC Pty Ltd

TUNNY, Mr Gregory Roy, Managing Director and Chief Executive Officer, ASC Pty Ltd

WOOLNER, Mr Derek Noel, Private capacity

WYLIE, Mr Robert Charles, Private capacity

Appendix 4

Site visits in Australia

The committee visited the following sites as part of its program of public hearings:

3 April 2006

Australian Maritime Complex (AMC), 124 Quill Way, Henderson, Western Australia

Nautronix Ltd, 108 Marine Terrace, Fremantle, Western Australia

19 April 2006

ASC Pty Ltd, Mersey Road, Osborne, South Australia

20 April 2006

Saab Systems Pty Ltd, 21 Third Avenue, Technology Park, Mawson Lakes, South Australia

Defence Teaming Centre, First Avenue, Technology Park, Mawson Lakes, South Australia

Weir, Strachan and Henshaw Australia Pty Ltd, 10 Peekarra Street, Regency Park, Adelaide

27 April 2006

Tenix Defence Pty Ltd, Nelson Place, Williamstown, Melbourne

28 April 2006

Incat Pty Ltd, 18 Bender Drive, Derwent Park, Hobart

28 June 2006

ADI Ltd, Garden Island, Sydney

Appendix 5

Delegation program to the Republic of Korea and the United States of America

The committee visited the following organisations over the period 13-24 September 2006:

The Republic of Korea

Daewoo Shipping and Marine Engineering, Pusan

Hyundai Heavy Industries, Ulsan

Poongsan Munitions, Ulsan

The United States of America

Northrop Grumman Ship Systems Ingalls Operations, Pascagoula, Mississippi

Austal, Mobile, Alabama

Lockheed Martin, Moorestown, New Jersey

Raytheon Integrated Defense Systems, Tewksbury, Massachusetts

Bath Iron Works, Bath, Maine

Appendix 6

Extract containing a summary of main issues and points for discussion from a discussion paper published by the committee on 25 August 2006

Discussion paper

Work in progress

Australia's Naval shipbuilding and repair industry

Summaries and discussion points

Introduction

Summary

Today's modern military forces rely on new and high technology to build greater defence capability—they want qualitative efficiency based on advanced technology rather than quantitative force based on manpower.

The increasing pressure for more highly sophisticated and expensive systems, coupled with dwindling demand for ships has created major challenges for the naval shipbuilding industry worldwide. Advancing technology and the increasing costs associated with the design and development of state-of-the-art communication and combat systems in particular, has meant that few countries or companies on their own can produce such sophisticated systems. These challenges have also influenced the business approach. For example, the department of Industry, Tourism and Resources referred to the emergence of 'globally integrated production systems'.[1] Some witnesses spoke of the requirement for Australia to establish a 'consortium of shipbuilders and designers who can pool their capabilities and develop the interaction and specializations needed'.

A critical issue for Australia, which must rely on overseas companies for vital components of its naval ships, is ensuring that Defence has the necessary access to, and sovereignty over, intellectual property.

Advances in technology have influenced the way ships are constructed most notably with the trend toward building ships in modules. Integration of modules and systems has become a key element of shipbuilding. It means that only one major site is needed to assemble the various parts of the ship that have been constructed elsewhere. Thus, a wide network of sites for construction of ship modules, which according to AIDN accounts for 60 to 80 per cent of fit outs, is now involved.

A growing synergy in technologies is also occurring which is influencing the industrial base of naval shipbuilding. Although the industry is highly specialised, there are strong parallels with the infrastructure needs of the oil and gas sector and more generally the resources sector. A new approach to manage these synergies is required not only by the prime contractors but by governments who must have a wider appreciation of Australia's heavy engineering sectors.

The quest for advanced technology and need for integrated systems has also linked naval shipbuilding directly into the information technology market. In effect, naval shipbuilding can no longer be viewed as a discrete industry sector with capacity and

1 *Committee Hansard*, 3 July 2006, p. 70.

productivity assessed on the basis of individual shipyards. Shipbuilding in the new technology era is part of the emerging heavy engineering sector.

The changes occurring in the naval shipbuilding and repair industry as outlined above present a particular challenge for Australian naval shipbuilders who need high order technological as well as managerial skills and for Defence which requires the expertise to oversee all the complexities involved in a major acquisition. Defence faces a particular challenge in managing the reconfiguration of the business model which now involves a complex web of relationships between the prime contractor, which may be a consortium, and the many sub contractors, a number of which have key roles in the integration of complex systems and may themselves be joint ventures. To manage a project effectively and properly, Defence requires not only strong technological and managerial skills but an approach that ensures transparency and accountability.

It also requires Defence to consider demand flows and their implications for the Australian workforce. A number of the matters touched on in this introduction will be covered in the paper.

1. The capacity of the Australian industrial base to construct large naval vessels over the long term and on a sustainable basis

The capacity of Australia's industrial base to construct large naval vessels depends on the integration of four main elements: Australian shipbuilders willing and able to undertake major naval projects; the network of enterprises supporting the industry; the infrastructure necessary for modern naval shipbuilding; and the available skills base and workforce.

The Australian prime contractors

Summary

The four prime contractors in the Australian naval shipbuilding market are proven competitors and capable and willing to invest in Defence's demanding future workload. There are heavy demands placed on prime contractors, especially the increasing pressure for complex ships with highly sophisticated and expensive systems and the rising costs associated with the continuing search for improved capability. The committee is aware of mixed views about whether the Australian naval shipbuilding sector can support four primes and that some rationalisation of the industry may be required.

Discussion

The committee welcomes opinions on:

- how Australia's major shipbuilders, servicing a relatively small market, can keep pace with the rapid advances in technology and the increasing demand for improved capability (e.g. joint ventures);
- the benefits and risks of foreign ownership of prime contractors operating in Australia; and
- whether industry rationalisation is inevitable in Australia.

The supply chain

Summary

Overall, it would appear that Australia's network of suppliers together with the contribution of major overseas companies who have established a presence in Australia provide an adequate supply chain to sustain Australia's naval shipbuilding and repair industry.

Discussion

The committee is interested in views on the capability of Australian firms to support the shipbuilding industry in Australia, especially:

- whether their capabilities are being effectively tapped and developed and how actively Defence encourages them to engage in the Defence industry;
- measures that could be taken to increase the capability of Australian firms to support the naval shipbuilding industry and to extend the local supply network beyond that already servicing the industry; and
- the adequacy of incentives to entice Australian companies to conduct research and development in the naval defence industry.

The committee also invites comment on Australia's reliance on overseas subsidiaries to supply some of the high technology systems. In particular:

- although subsidiaries are located in Australia, whether their ties to an overseas parent company undermine or weaken the ability of Australia to sustain a modern and effective shipbuilding industry; and
- the steps needed to ensure that Australia has access to the necessary resources and expertise to support the vessels through life. For example, the Allen Consulting Group surmised that 'unless Australian industry has the capacity to repair AEGIS, the benefits of a local build of the AWDs in terms of providing the capacity to sustain self-reliance must be questioned'.[2]

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2 Allen Consulting Group, 'Future of Naval Shipbuilding in Australia', May 2005, p. 46.

Infrastructure

Summary

Overall, it would appear that Australia has the infrastructure necessary to sustain a naval shipbuilding industry but that further investment would be required to manage the proposed LHD project. This additional investment is required even though a number of witnesses suggested that some existing facilities are underutilised.

Discussion

The committee invites views on:

- the claims that facilities in Australian shipyards are underutilised, particularly in light of the proposed further investment in Western Australia and South Australia; and
- the wisdom of investing in infrastructure required to accommodate the LHDs, which according to some witnesses is a one in 40 year project.

Cooperation between the states in meeting infrastructure needs

Summary

The Western Australian and South Australian governments have entered into an MoU regarding the AWD and LHD tenders.

Discussion

The committee welcomes opinions on cooperation and competition between the states and how this may influence Australia's capability to sustain a naval shipbuilding and repair sector. It is particularly interested in the significance of the MoU between SA and WA.

Workforce and skills

Summary

It is generally recognised that Australia has a well skilled, productive labour base to draw on for naval shipbuilding but that skilled labour shortages represent a challenge for the industry. Views differ as to the extent of the challenge and whether skilled labour shortages present a risk to upcoming projects.

There was general agreement that it is important for Australia to retain an element of design capability to enable designs to be modified to Australia's specific requirements and for through life support, but views differ as how best to retain such capability.

Discussion

The committee invites view on whether:

- current government and industry skills initiatives are adequate to mitigate risks to upcoming naval construction project costs and schedules;
- a temporary skilled migration program is a satisfactory way to address shortfalls in the workforce;
- design and systems integration skills can be sufficiently fostered without indigenous design and construction, in order to maintain autonomy in ship maintenance, repair and upgrade; and
- strategies to retain required skill sets for through life support are sufficient. Is a more strategic, overarching approach required? Can critical skill sets be identified and policies developed and implemented to ensure these skills are retained in Australia?

Intellectual property

Summary

In the new era of shipbuilding, access and control over intellectual property is a key determinant of shipbuilding and repair capacity. Sovereignty over IP facilitates growth and access to export markets. Without ownership or access to IP, Australia is left dependent on system providers' developments and upgrades.

Control over IP is an element of shipbuilding where Australia's capacity is vulnerable. Australia is largely reliant on overseas ship designs and weapons systems. The ability to negotiate and manage contracts guaranteeing access to IP has therefore become a key criterion for successful naval shipbuilding.

Discussion

The committee is interested in views and experiences in the following areas:

- whether access to and control over IP is given sufficient focus in the negotiation of naval acquisition contracts;
- given that modern shipbuilding involves complex contractual arrangements between multiple parties, who carries responsibility for ensuring satisfactory IP outcomes;
- whether Australia, as a relatively small power, has sufficient leverage to negotiate the IP outcomes it requires for sovereignty over fleet maintenance and repair; and
- whether there is sufficient investment in research and development to facilitate the generation of Australian IP.

2. The comparative economic productivity of the Australian shipbuilding industrial base and associated activity with other shipbuilding nations

Summary

There is no available data that would allow a comparative analysis of the productivity of Australian shipyards against overseas yards. The committee therefore finds difficulty in making a definite determination about the comparative economic productivity of the Australian shipbuilding industrial base with other shipbuilding nations. Evidence, however, suggesting that Australia may not be as productive as overseas producers included:

- some projects in Australia such as the ANZACs are believed to have attracted a local build premium;
- Australia is a relatively small market and the demand for naval vessels is not as large as for some overseas producers—Australia does not have the economies of scale enjoyed by some of its potential competitors; and
- Australia cannot compete with countries such as Japan, China and South Korea in the production of larger and less complex steel ships such as tankers and carriers.

Evidence suggesting that Australia may be as productive as overseas producers in constructing naval vessels include:

- the naval shipbuilding industry in overseas countries is subsidised or protected in someway by government; (removing or discounting such barriers may show that Australian producers can match the productivity of overseas producers);
- the success of Incat and Austal in producing very fast vessels;
- the bench-marking studies carried out for Tenix and Raytheon Australia;
- greater efficiencies when it comes to modifying or customising a ship in Australia for Australian conditions; and
- the acknowledged world class standing of Australian welders, engineers and technicians.

This summary looked purely at the matter of the cost to the Australian Government of building a ship in Australia as against a ship purchased from overseas. To this stage, it has not considered the wider advantages or benefits that accrue to the country when a major ship project is undertaken in Australia.

Discussion

The committee invites comment on whether, without taking account of other considerations such as wider economic benefits and national security, it is safe to assume that:

- Australia does not have a significant competitive edge in the construction of major naval vessels, with economies of scale a major impediment; and
- the naval shipbuilding industry is highly protected in most naval shipbuilding countries which narrows the opportunities for a country such as Australia to compete internationally.

The committee would be interested to learn of any studies that would help it obtain a better understanding of the productivity of the Australian naval shipbuilding and repair sector compared to overseas producers.

The committee is also interested in views regarding the opportunities for increasing exports in the NSR sector.

3. The comparative economic costs of maintaining, repairing and refitting large naval vessels throughout their useful lives when constructed in Australia vice overseas

Summary

The committee underlines the following points on the issue of comparative economic costs of through life support (TLS).

- There is a lack of data which reflects the difficulty in making a direct comparison.
- ACIL Tasman has estimated that annual TLS costs could be twice as high if foreign supplies had sourced the ANZAC Ship Project. This is due to shorter repair turn around times and lower stocks of spares from local sources of supply. However, the Department of Industry, Tourism and Resources (DITR) has cautioned that local equipment can be used for an overseas build, thereby avoiding the higher costs associated with repairing overseas-built ships in-country. The department argued that the ACIL Tasman TLS estimate must be discounted by the proportion of equipment that could be sent overseas to support an offshore build of the same vessel.
- The committee's evidence is unanimous in the view that building warships in-country will deliver greater TLS savings than from an offshore build—Defence added the qualification that TLS savings from an in-country build depends on the complexity of the ship. It used the example of the less complex LHDs, stating 'there could be relatively few savings in whole-of-life cost from choosing to build locally'.[3]
- The TLS productivity saving from an in-country build derives mainly from developing the skills and knowledge during the construction phase needed for TLS.

3 Department of Defence, answers to questions on notice, p. 2.

- Personnel, however, can be posted offshore to participate in the build in order to develop the in-country skills and knowledge for repair and maintenance.[4]

Discussion

The committee invites discussion on the following issues:

- the findings of the ACIL Tasman study with regard to TLS and whether they can be usefully applied to current or future projects;
- Defence's statement that 'there could be relatively few savings in whole-of-life cost from choosing to build the LHD locally'. It expected that the greatest savings over the life of the ship will come from full access to and use of ship design and intellectual property across the entire capability.[5]
- the contention that posting personnel overseas during an offshore build is an effective way to develop the skills and knowledge required for TLS; and
- the contention that there is difficulty in sustaining in-country skills once the ship transitions from the construction phase into naval service.

4. The broader economic development and associated benefits accrued from undertaking the construction of large naval vessels

Summary

Numerous witnesses identified economic benefits that they consider accrue from naval shipbuilding. The committee's research identified two major studies, relating to the ANZAC and Minehunter projects, which sought to quantify the flow of economic benefits from the construction of naval vessels. The extent of the economic benefits identified in these studies depended on the model used. The more conservative figures, resulting from general equilibrium analysis, indicated a contribution to GDP of up to $887 million for the Minehunter and $3,000 million for the ANZAC project.

Defence and DITR recommended caution in interpreting the findings of the above studies. DITR noted that the results are specific to the projects assessed and the assumptions made about the productivity gains produced by those projects. Defence presented Treasury advice which stated that not only are multiplier effects difficult to quantify, but the effects can be negative if resources are displaced from more productive to less productive sectors of the economy.

It should be noted that Defence explained that technology transfer and access to IP form part of the evaluation process but that other benefits:

> such as potential spin-offs to industry at large and wider benefits to the economy, such as increased employment, may be recognised but play little

4 See also *ASC submission P17*, p. 19.

5 Department of Defence, answers to questions on notice, p. 2.

or no part in the numerical evaluation. Such benefits will be noted in advice to Government.[6]

Discussion

The committee invites comment on the following issues:

- whether any general conclusions can be safely drawn about the broader economic benefits of naval shipbuilding, given that the available quantitative analysis is confined to two specific projects;
- the likelihood that, in reality, negative multiplier effects would arise from a high technology industry such as naval shipbuilding; and
- whether and to what extent, wider economic benefits should be taken into account in naval shipbuilding acquisition decisions;
- who argues or should argue the case for the wider economic benefits that accrue to a local build in advice to government.

Strategic considerations

Summary

Without exception, all witnesses accepted that national security concerns are central to any consideration about whether Australia should have a naval shipbuilding industry. On strategic grounds, the argument for self-sufficiency in maintaining and repairing naval vessels was strong, especially when it came to the ability to respond to urgent operational requirements. Several witnesses went further suggesting that in order to have this capability it was important for the ships to be constructed in Australia.

The government, however, noted that practical and economic circumstances place limitations on the extent to which Australia can be self-sufficient in the construction of naval vessels. Even with the ship repair industry, the government argued that there could be exceptions.

It is beyond the means of any country to retain absolute control over all aspects of its defence capability. The argument for self-sufficiency in a particular capability turns largely on an interpretation of what constitutes a strategically important capability. According to DITR, based on import replacement policies, the objectives are being driven toward 'a new conception of operational sovereignty as the objective, with economic 'make or buy' decisions determining the cheapest way to achieve *operational sovereignty'*.[7]

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6 Department of Defence, answers to questions on notice, question 52, p. 48.

7 DITR, *Submission 38*, p. 1.

Discussion 1—definition of strategic capability

The committee is having difficulty using general concepts about self-sufficiency, core strategic capabilities, value for money and the need for in country construction to arrive at definite conclusions about the connection between national security, defence capability, the requirement for self-sufficiency and cost effectiveness. For example, it is unclear about DITR's statement that global economics is changing military self-reliance objectives and the concept of 'operational sovereignty'.

It invites comments on:

- whether DMO's definition of a strategically important industry capability is satisfactory or indeed relevant to today's debate about self-sufficiency;[8] and
- the significance, as mentioned by DITR, of the new concept of operational sovereignty as the objective, with economic 'make or buy' decisions determining the cheapest way to achieve operational sovereignty.

The committee would like some guidance or assistance in identifying the circumstances under which it is appropriate for Australia to relinquish its control over the design or construction of a major naval defence acquisition or component of an acquisition to an overseas supplier. For example, are there principles governing national security and the acquisition of a naval defence capability that should be strictly observed? If so, what are they and how should they be articulated to industry?

The committee understands that in some cases Australia simply cannot afford or attain the level of skill, knowledge or technological expertise in a particular critical defence capability. It is seeking advice on the steps that should be taken to ensure Australia maintains a level of capability that would not compromise national security.

Discussion 2—strategic capability and value for money

The committee would like to gain a better understanding of:

- the difficulties applying an acquisition policy that places a high priority on retaining self-sufficiency in identified core strategic capabilities, but at the same time emphasises value for money; and
- what the term 'value for money' means in the broader context of naval shipbuilding and national security'.

8 DMO's 2002 strategic plan defined a strategically important industry capability and/or skill-set as one, which, 'if not readily available, would inhibit the performance and execution of ADF capability and operations, and, if denied, may not be able to be obtained within the required operational time-frame'. This definition is given in the main text of this paper.

5. The role of Defence in Australia's naval shipbuilding and repair industry

Assisting industry improve productivity

Strategic planning and policy on Australian industry involvement

Summary

Defence's long term capability requirements and objectives are articulated through the Defence Update, the Defence Capability Strategy and the Defence Capability Plan (DCP). Some witnesses raised concerns about the adequacies of the current documentation that Defence makes available to industry on its future strategic plans and, indeed, on what appears to be weaknesses in the planning process.

The committee notes that the recent Defence Capability Plan identified on a project-by-project basis the areas of expertise that Australian industry could currently supply.

There appears to be a lack of certainty in how Defence applies its policy on local involvement in the naval shipbuilding industry. There is no uniform level of AII specified for each project. On the one hand, a 'bidder's failure to satisfy all of the Australian industry involvement outcomes may… potentially disqualify the bidder from contention'. At the same time, Defence 'retains the right to select a bidder whose approach may not satisfy all Australian industry involvement outcomes set out in the RFT if other aspects of its approach provide offsetting benefits'.[9]

Defence stated that proposals for local industry involvement are evaluated on the basis of value for money and tenderers are required to show how cost-effective involvement in the project by Australian industry has been maximised.[10] According to Defence, 'This does not always mean that goods and services sourced from local industry must be cheaper than those available from overseas. There may be instances where paying more for a local source of supply yields offsetting strategic or other benefits which mean that value for money has been achieved'.[11]

Some witnesses have suggested that the AII program lacks a clearly articulated strategic approach. In 2003 the ANAO found that:

- the lack of specific guidance as to what defence industry capabilities are required is a significant omission from Defence industry policy and makes it difficult to determine how well the strategic objectives of the Program are being met; and
- there was no evidence of a systematic endeavour to gain synergies by linking the AII plans of one capital equipment project with those of any other project.

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9 Department of Defence, answers to questions on notice, p. 7.

10 Department of Defence, answers to questions on notice, pp. 47–48.

11 Department of Defence, answers to questions on notice, p. 7.

The committee is aware that Defence is currently undertaking a review of Defence's procurement policy.

Discussion

The committee notes the call for Defence to develop a long term strategic plan for Australia's naval shipbuilding industry. It would like some guidance from industry on the key matters that it believes should be included in such planning and the preferred level of detail.

The committee also invites views on:

- how Defence can make its priorities clearer and provide a better understanding of its intentions when using vague terms such as 'value for money' and 'sustaining key strategic capabilities'; and
- the project-by-project approach and whether it hinders the development of a coherent and overarching policy designed to best use Australian industry to ensure that Australia sustains key strategic capabilities.

The committee welcomes comment on:

- the effectiveness of the AII Program in the NSR sector;
- the need for greater rigour in assessing the performance of the AII Program;
- whether a Strategic Plan for the NSR sector that identifies core in-country capabilities could give the AII Program more focus; and
- suggestions that Defence should develop key performance indicators for the AII program.

Smoothing demand

Summary

Australian demand for naval vessels has historically been uneven and significant peaks and troughs are projected for the coming build programs. Numerous submitters called for smoother Defence demand to help alleviate costs and secure the sustainability of the industry base in the longer term.

Defence considered that it is industry's responsibility to manage cyclical demand. It outlined that scheduling major acquisitions is complex, involving consideration of the budget implications of other major projects and the interdependence of some capabilities with others. Ultimately, the scheduling of naval construction work reflects Defence's capability needs not the perceived needs of the industry.

Discussion

As noted above, the committee notes the call for Defence to develop a long term strategic plan for Australia's naval shipbuilding industry and would like some guidance on what this plan should encompass.

The committee invites views on the difficulties cited by Defence in smoothing the demand flow.

Industry—informed provider

Reviews of past projects and premiums for local builds

Summary

The committee notes the absence of meaningful data that would help to inform industry about the factors that shape or influence major acquisition decisions, especially analysis of past projects and premiums offered to Australian companies.

Commercial-in-confidence concerns may well prevent some information from being available. Even so, regular and frank analysis of the successes and failures of projects and the extent of assistance given to a project (local premium) could assist industry. This knowledge would help keep industry better informed about the performance of particular projects and also make Defence more accountable for its decisions and the way in which it manages major projects. Indeed, Mr John O'Callaghan, Head of the Australian Industry Group Defence Council, thought that Defence needs to be 'a bit more mature about putting on the table' some of the lessons from experiences such as the problems with the modernisation of the FFGs and the Collins Class submarine. In his view, such an approach might help industry avoid the sort of problems that have arisen.

Discussion

The committee would welcome opinions on the suggestion that, in order to have a well-informed industry and an accountable buyer, Defence publicise information such as analysis of past projects or on the policies governing local premiums. It would be interested to learn of major impediments to implementing such a proposal.

The need for local premiums and preference for local involvement touches on matters such as the tension that exists between capability and affordability, previously raised in the discussion of strategic considerations.

Defence—an informed and skilled purchaser

Informed buyer

Summary

A few submitters questioned whether Defence has the appropriate level of experience and expertise to carry out effectively an acquisition program involving complex naval ships. Defence is aware of the need to have qualified personnel in-house and is taking steps to recruit such staff. It also has access to outside experts to assist it in its acquisition program and processes.

Tendering and contracting

Summary

DMO has undertaken steps to improve its tendering and contracting procedures and practices. Industry's response appears to be positive. Even so, this paper has highlighted the growing complexities in managing major naval acquisitions especially with the complicated network of relationships and partnerships involved in the project. The paper has also commented on the absence of meaningful data and information especially on the successes and failures of past projects. This is most notable in the discussion of local premiums. Clearly, Defence must develop and adhere to high standards on probity and accountability in its procurement practices.

Discussion

The committee would be interested to learn if there are, in industry's view, areas of weaknesses in DMO's NSR tendering and contracting procedures that could be strengthened.

The committee also invites comment on the probity and accountability aspects of Defences procurement practices and procedures.

Government's intervention in the market place

Competition

Summary

According to Defence, it wants 'a vibrant and competitive Australian maritime industrial capacity' that enables it 'to maintain or enhance the capability baselines of the Naval ships so that they are fully capable to meet the mission requirements in the context of the evolving threat environment and strategic requirements'.[12] It also wants value for money and looks to competition to stimulate managerial innovation, drive innovation and the development of new technologies and promote general cost consciousness among defence contractors. A competitive environment acts as a check on excessive monopoly pricing and helps to drive down cost premiums.[13]

The demand for naval ships in Australia, however, is relatively small and Defence is the only buyer. It faces the challenge of meeting its need to sustain key naval capabilities in country cost effectively but in a market with few suppliers. This raises questions about the extent to which government or Defence should intervene in the market place to create a competitive framework.

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12 Department of Defence, answers to questions on notice, pp. 21–22.

13 John O'Callaghan, Australian Industry Group Defence Council, *Committee Hansard*, 28 June 2006, p. 23.

Discussion

The committee invites comment on how Defence best manages a market with only one buyer and few suppliers. For example:

- the usefulness of contract management tools—fixed price contracts, alliance contracting, open book accounting, close monitoring of rates of return, greater use of benchmarking, stricter specification of AII;
- whether Defence should be directly intervening in the market (e.g. awarding particular projects to specific companies with a view to maintaining future competition);
- the extent of sole sourcing in naval shipbuilding contracts and the opportunities for Defence to introduce greater competition in these contracts; and
- the role of competitive teaming.

Appendix 7

Naval ships built at Cockatoo Island, Balmain and Williamstown dockyards; repair and upgrade activities at Garden Island (1912–1945)

Date	Cockatoo Docks & Eng., Cockatoo Island	Morts Dock & Eng. Co., Balmain, Sydney	Williamstown, Melbourne	Garden Island, Potts Point, Sydney
1912	HMAS *Warrego* (Torpedo boat destroyer)			
1916	HMAS *Brisbane* (Town light class cruiser) HMAS *Huon* HMAS *Swan* HMAS *Torrens* (River class torpedo boat destroyer)			Extensive refit and repair of Allied and Australian ships during World War 1
1920				Refit of British 'J class' submarines (J1–J5)
1922	HMAS *Adelaide* (Light Cruiser)			Refit of British 'J class' submarine (J7)
1929	HMAS *Albatross* (Seaplane Carrier)			
1936	HMAS *Yarra* (Sloop)			
1937	HMAS *Swan* (Sloop)			
1940	HMAS *Bathurst* (Minesweeper) HMAS *Parramatta* HMAS *Warrego* (II) (Sloop)			Work commenced on the Captain Cook Graving Dock
1941	HMAS *Bendigo* HMAS *Goulburn* HMAS *Wollongong* (Minesweeper)	HMAS *Burnie* HMAS *Deloraine* HMAS *Lismore* HMAS *Lithgow* HMAS *Mildura* HMAS *Warrnambool* (Minesweeper)	HMAS *Ballarat* (Minesweeper)	
1942	HMAS *Arunta* HMAS *Warramunga* (Tribal class destroyer) HMAS *Cessnock* HMAS *Glenelg* (Minesweeper)	HMAS *Armidale* HMAS *Colac* HMAS *Dubbo* HMAS *Inverell* HMAS *Latrobe* HMAS *Wagga* (Minesweeper)	HMAS *Castlemaine* HMAS *Echuca* HMAS *Geelong* HMAS *Horsham* (Minesweeper) HMAS *Warreen* (Survey vessel)	
1943		HMAS *Gascoyne* (River class frigate)	HMAS *Benalla* HMAS *Shepparton* HMAS *Stalwell* (Minesweeper)	

Date	Cockatoo Docks & Eng., Cockatoo Island	Morts Dock & Eng. Co., Balmain, Sydney	Williamstown, Melbourne	Garden Island, Potts Point, Sydney
1944	HMAS *Barcoo* (River class frigate)	HMAS *Hawkesbury* (River class frigate)		
1945	HMAS *Barwan* (River class frigate) HMAS *Bataan* (Tribal class destroyer)	HMAS *Lachlan* (River class frigate) HMAS *Macquarie* (River class frigate)		Captain Cook Graving Dock officially opened

Source: 'Former ships of the Royal Australian Navy', *Seapower Centre Australia*, http://www.navy.gov.au/spc/history/shiphistorymain.html (accessed 11 May 2006). The other 34 *Bathurst* class minesweepers were built by Poole and Steel (Sydney), Walkers Ltd., (Maryborough, Queensland), Evans Deakin and Co. Ltd. (Brisbane) and Broken Hill Pty. Ltd. (Whyalla).

*Naval vessels built in Australia for the RAN (1946–2006)**

Date (comm.)	Vessel	Class	Builder / dockyard
1946	HMAS *Condamine*	Bay class frigate	New South Wales State Dockyard, Newc.
1946	HMAS *Shoalhaven*	Bay class frigate	Walkers Limited at Maryborough, Qld
1947	HMAS *Culgoa*	Bay class frigate	Williamstown Naval Dockyard, Melb.
1950	HMAS *Tobruk*	Battle class destroyer	Cockatoo Docks & Engineering Co.
1951	HMAS *Anzac*	Battle class destroyer	Williamstown Naval Dockyard, Melb.
1958	HMAS *Vendetta*	Daring class destroyer	Williamstown Naval Dockyard, Melb.
1958	HMAS *Voyager*	Daring class destroyer	Cockatoo Docks & Engineering Co.
1959	HMAS *Vampire*	Daring class destroyer	Cockatoo Docks & Engineering Co.
1961	HMAS *Parramatta*	River destroyer, type 12	Cockatoo Docks & Engineering Co.
1961	HMAS *Yarra*	River destroyer, type 12	Williamston Naval Dockyard, Melb.
1963	HMAS *Stuart*	River destroyer, type 12	Cockatoo Docks & Engineering Co.
1964	HMAS *Derwent*	River destroyer, type 12	Williamstown Naval Dockyard, Melb.
1964	HMAS *Moresby*	Oceanographic ship	Williamstown Naval Dockyard, Melb.
1967	HMAS *Aitape*	Attack class patrol boat	Walkers Limited at Maryborough, Qld
1967	HMAS *Attack*	Attack class patrol boat	Evans Deakin and Company, Brisbane
1968	HMAS *Acute*	Attack class patrol boat	Evans Deakin and Company, Brisbane
1968	HMAS *Adroit*	Attack class patrol boat	Evans Deakin and Company, Brisbane
1968	HMAS *Advance*	Attack class patrol boat	Evans Deakin and Company, Brisbane
1968	HMAS *Archer*	Attack class patrol boat	Walkers Limited at Maryborough, Qld
1968	HMAS *Ardent*	Attack class patrol boat	Evans Deakin and Company, Brisbane
1968	HMAS *Arrow*	Attack class patrol boat	Walkers Limited at Maryborough, Qld
1968	HMAS *Assail*	Attack class patrol boat	Evans Deakin and Company, Brisbane
1968	HMAS *Aware*	Attack class patrol boat	Evans Deakin and Company, Brisbane
1968	HMAS *Bandolier*	Attack class patrol boat	Walkers Limited at Maryborough, Qld
1968	HMAS *Barbette*	Attack class patrol boat	Walkers Limited at Maryborough, Qld
1968	HMAS *Barricade*	Attack class patrol boat	Evans Deakin and Company, Brisbane
1968	HMAS *Bombard*	Attack class patrol boat	Walkers Limited at Maryborough, Qld
1968	HMAS *Buccaneer*	Attack class patrol boat	Evans Deakin and Company, Brisbane
1968	HMAS *Ladava*	Attack class patrol boat	Walkers Limited at Maryborough, Qld
1968	HMAS *Lae*	Attack class patrol boat	Evans Deakin and Company, Brisbane
1968	HMAS *Madang*	Attack class patrol boat	Evans Deakin and Company, Brisbane
1968	HMAS *Stalwart*	Escort maintenance	Cockatoo Docks & Engineering Co.
1969	HMAS *Bayonet*	Attack class patrol boat	Walkers Limited at Maryborough, Qld
1970	HMAS *Swan*	River destroyer, Leander	Williamstown Naval Dockyard, Melb.
1971	HMAS *Torrens*	River destroyer, Leander	Cockatoo Docks & Engineering Co.
1971	HMAS *Balikpapan*	Balikpapan landing craft	Walkers Limited at Maryborough, Qld
1973	HMAS *Samurai*	Attack class patrol boat	Evans Deakin and Company, Brisbane
1973	HMAS *Brunei*	Balikpapan landing craft	Walkers Limited at Maryborough, Qld
1973	HMAS *Labuan*	Balikpapan landing craft	Walkers Limited at Maryborough, Qld
1973	HMAS *Tarakan*	Balikpapan landing craft	Walkers Limited at Maryborough, Qld
1973	HMAS *Flinders*	Oceanographic vessel	Williamstown Naval Dockyard, Melb.
1974	HMAS *Wewak*	Balikpapan landing craft	Walkers Limited at Maryborough, Qld
1974	HMAS *Betano*	Balikpapan landing craft	Walkers Limited at Maryborough, Qld
1981	HMAS *Tobruk*	Heavy landing ship	Carrington Slipways Pty Ltd, Tomago
1981	HMAS *Cook*	Oceanographic vessel	Williamstown Naval Dockyard, Melb.
1981	HMAS *Townsville*	Fremantle class patrol boat	North Qld Engineers & Agents, Cairns
1982	HMAS *Launceston*	Fremantle class patrol boat	North Qld Engineers & Agents, Cairns
1982	HMAS *Ipswich*	Fremantle class patrol boat	North Qld Engineers & Agents, Cairns
1983	HMAS *Cessnock*	Fremantle class patrol boat	North Qld Engineers & Agents, Cairns
1983	HMAS *Gawler*	Fremantle class patrol boat	North Qld Engineers & Agents, Cairns
1983	HMAS *Geraldton*	Fremantle class patrol boat	North Qld Engineers & Agents, Cairns

Source: 'Former ships of the Royal Australian Navy', *Seapower Centre Australia:* http://www.navy.gov.au/spc/history/shiphistorymain.html: 'Australian military stubs', http://en.wikipedia.org

* Note: The list covers those vessels mentioned in paragraph 1.6. It is not intended as a complete list. The vessels built in Australia and sold abroad—eg: the *Pacific* patrol boats—are not included. Shaded items are those vessels still in commission as of December 2006.

Naval vessels built in Australia for the RAN, cont. (1946–2006)

Date (comm.)	Vessel	Class	Builder / dockyard
1984	HMAS *Dubbo*	Fremantle class patrol boat	North Qld Engineers & Agents, Cairns
1984	HMAS *Bendigo*	Fremantle class patrol boat	North Qld Engineers & Agents, Cairns
1984	HMAS *Geelong*	Fremantle class patrol boat	North Qld Engineers & Agents, Cairns
1984	HMAS *Gladstone*	Fremantle class patrol boat	North Qld Engineers & Agents, Cairns
1984	HMAS *Bunbury*	Fremantle class patrol boat	North Qld Engineers & Agents, Cairns
1986	HMAS *Success*	Durance oil replenisher	Cockatoo Island Dockyard
1989	HMAS *Mermaid*	Survey motor launches	Eglo Engineering, South Australia
1989	HMAS *Paluma*	Survey motor launches	Eglo Engineering, South Australia
1990	HMAS *Shepparton*	Survey motor launches	Eglo Engineering, South Australia
1990	HMAS *Benalla*	Survey motor launches	Eglo Engineering, South Australia
1992	HMAS *Melbourne*	Adelaide class FFG (05)	AMECON, Williamstown, Melb.[1]
1993	HMAS *Newcastle*	Adelaide class FFG (06)	AMECON, Williamstown, Melb.
1996	HMAS *Collins*	Collins submarine, SSG73	Australian Submarine Corporation, SA
1996	HMAS *Anzac*	Anzac frigate (FFH150)	Tenix, Williamstown, Melbourne
1998	HMAS *Arunta*	Anzac frigate (FFH151)	Tenix, Williamstown, Melbourne
1998	HMAS *Farncomb*	Collins submarine, SSG74	Australian Submarine Corporation, SA
1999	HMAS *Waller*	Collins submarine, SSG75	Australian Submarine Corporation, SA
1999	HMAS *Huon*	Huon minehunter M-82	Australian Defence Industries, Newcastle
2000	HMAS *Hawkesbury*	Huon minehunter M-83	Australian Defence Industries, Newcastle
2000	HMAS *Norman*	Huon minehunter M-84	Australian Defence Industries, Newcastle
2000	HMAS *Leewin*	Hydrographic survey ship	North Qld Engineers & Agents, Cairns
2000	HMAS *Melville*	Hydrographic survey ship	North Qld Engineers & Agents, Cairns
2001	HMAS *Gascoyne*	Huon minehunter M-85	Australian Defence Industries, Newcastle
2001	HMAS *Dechaineux*	Collins submarine, SSG76	Australian Submarine Corporation, SA
2001	HMAS *Sheean*	Collins submarine, SSG77	Australian Submarine Corporation, SA
2001	HMAS *Warramunga*	Anzac frigate (FFH152)	Tenix, Williamstown, Melbourne
2002	HMAS *Stuart*	Anzac frigate (FFH153)	Tenix, Williamstown, Melbourne
2002	HMAS *Diamantina*	Huon minehunter M-86	Australian Defence Industries, Newcastle
2003	HMAS *Yarra*	Huon minehunter M-87	Australian Defence Industries, Newcastle
2003	HMAS *Parramatta*	Anzac frigate (FFH154)	Tenix, Williamstown, Melbourne
2003	HMAS *Rankin*	Collins submarine SSG78	Australian Submarine Corporation, SA
2004	HMAS *Ballarat*	Anzac frigate (FFH155)	Tenix, Williamstown, Melbourne
2005	HMAS *Armidale*	Armidale class patrol boat	Austal, Western Australia
2005	HMAS *Toowoomba*	Anzac frigate (FFH156)	Tenix, Williamstown, Melbourne
2006	HMAS *Larrakia*	Armidale class patrol boat	Austal, Western Australia
2006	HMAS *Bathurst*	Armidale class patrol boat	Austal, Western Australia
2006	HMAS *Perth*	Anzac frigate (FFH157)	Tenix, Williamstown, Melbourne

Source: 'Former ships of the Royal Australian Navy', *Seapower Centre Australia:* http://www.navy.gov.au/spc/history/shiphistorymain.html: http://en.wikipedia.org

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1 Australian Marine Engineering Consolidated Limited.