



GOVERNMENT OF WESTERN AUSTRALIA

MINISTER FOR **E**NERGY; **S**CIENCE AND **I**NNOVATION

Our Ref: **M005193**

Ms Kathleen Dermody
Secretary
Senate Foreign Affairs, Defence and Trade References Committee
Suite S1.57
Parliament House
CANBERRA ACT 2600

Dear Ms Dermody

SCOPE AND OPPORTUNITIES FOR NAVAL SHIPBUILDING IN AUSTRALIA

Thank you for your letter of 10 November 2005 inviting the Western Australian Government to lodge a submission in regard to the inquiry by the Senate Foreign Affairs, Defence and Trade References Committee into the scope and opportunities for naval shipbuilding in Australia.

On behalf of the Western Australian Government I am pleased to respond with the attached submission which provides a Western Australian Government perspective of shipbuilding in Australia, encompassing both commercial and naval shipbuilding and of the Australian naval shipbuilding cycle.

The Western Australian Government believes that local construction of three air warfare destroyers and of two amphibious support ships is an opportunity to establish a competitive and sustainable Australian naval shipbuilding *capability*. But the Commonwealth must resist calls by vested interests to persist with doomed efforts to maintain an Australian naval shipbuilding *industry* as such.

Australia's best chance of retaining a viable naval shipbuilding *capability* is to embed it in a wider industry matrix that is underpinned by mainstream economic activity, not just sustained by defence expenditure on naval ships:

- The mainstream economic activity must be exposed to international economic competition so that it demands, and gets, world class performance from the industry matrix supporting it;
- That industry matrix would require commercial organisations, skills and infrastructure compatible with those used in naval shipbuilding;
- The industry matrix must be able to host naval shipbuilding prime contractors as design authority for the ships they build, as experts in managing complex supply chains and as repositories of the knowledge gained in construction and required for in service support;

- The industry would need to be able to move resources into and out of naval shipbuilding activity in response to the ebb and flow of construction activity while prime contractors and key sub-contractors retain the core knowledge required to support the preparedness of the fleet-in-being and required to expand for future construction or repair.

The Western Australian Government view is that a viable strategy for capturing the benefits of local construction of the three air warfare destroyers and the two amphibious support ships must be market-based. Governments must resist the temptation to intervene with administratively directed solutions. Governments need to concentrate on the critical tasks of defining and articulating objectives, clarifying the policy framework and attending to any obvious market failures.

A market-based strategy would involve vigorous competition for the business within a carefully defined and clearly articulated policy framework. Such a strategy is best for attracting and selecting those prime contractors and sub-contractors able to transit the current naval shipbuilding industry into a sustainable naval shipbuilding capability that is embedded into a **compatible industry matrix** and underpinned by mainstream economic activity.

The Western Australian Government's belief is that a market-based strategy is best suited to exploiting a flexible industry's capacity to adapt to Navy requirements. As the migration of industry to Western Australia in support of ships home-ported there shows, industry adapts readily to clearly-signalled policy requirement. A market-based strategy would not prejudice Navy preparedness so that industry can maximise returns on its initial investments by forcing Navy to support its ships in the yards that built them. Any forcing of Navy to support the build yards will be to the long term detriment of Navy preparedness and operational capability. Such a strategy will ultimately become unsustainable.

An administratively directed strategy would assign the work to a pre-ordained company or joint venture derived from the existing naval shipbuilding industry. Such an approach was floated in the 2002 Naval Shipbuilding and Repair Sector Strategic Plan but discarded by the Commonwealth Government two years later. An administratively directed strategy for establishing a viable naval shipbuilding capability is no more viable in 2006 than it was in 2004.

Some of the key elements of a market-based strategy for transiting away from an unsustainable naval shipbuilding *industry* to a viable naval shipbuilding *capability* are already in place in Western Australia. These elements include:

- Western Australia's world-class heavy engineering sector that services Australia's internationally competitive offshore oil and gas industry and is clustered together south of Fremantle along the coast of Cockburn Sound shares many of the skillsets required to construct naval vessels;
- Western Australia's Australian Marine Complex (AMC) Common User Facility, which obviates the need for heavy engineering companies and shipbuilders to provide dedicated naval shipbuilding facilities, thereby dramatically lowering the barriers they encounter in entering into, and exiting from, naval construction business;

- Western Australia's internationally competitive marine industry precinct which sustains maritime specialists ranging from manufacturers of high precision propellers and valves to software houses dedicated to computer-aided design of ships;
- Western Australia's educational and training infrastructure which upgrades the skills of the workforce involved in heavy engineering and maritime construction, primarily through courses delivered by Challenger TAFE located in the heart of the marine industry precinct; and
- Naval shipbuilding prime contractors, including Tenix and ASC, which have set up in Western Australia's marine industry precinct to provide responsive support of, respectively, the ANZAC ships and Collins Class submarines home-ported at HMAS STIRLING.

The heavy engineering/marine industry cluster located on Cockburn Sound south of Fremantle, and adjacent to Fleet Base West, at the AMC is unique in Australia as a matrix for a sustainable naval shipbuilding capability. To improve this matrix the Western Australian Government is investing a further \$81.1 million worth of additional marine infrastructure at the AMC, including a floating dock to launch and dock large ships and a rail transfer system to allow construction and repair under cover within the Common User Facility.

The Western Australian Government is prepared to build the second half of the floating dock should the AMC be selected as the site for integration and consolidation of the amphibious support ships.

Provided we as a nation are clear about our objectives and build on past experience, we can use local construction of the air warfare destroyers and the amphibious support ships to reconfigure naval shipbuilding on a sustainable and competitive basis, enhance Navy preparedness and improve our ability to manage strategic uncertainty.

I look forward to addressing the Senate Committee on the content of this Submission while it is in Perth.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Francis Logan', with a stylized flourish at the end.

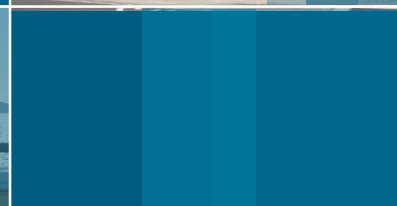
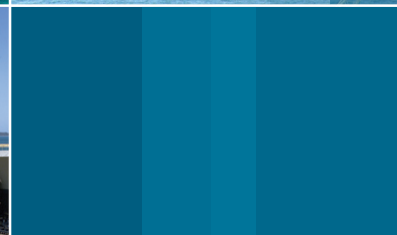
FRANCIS LOGAN MLA
MINISTER FOR SCIENCE AND INNOVATION

Att.



Western Australia

The logical choice



Department of
Industry and Resources



Submission by the Hon. F M Logan MLA Minister for Science and Innovation

on behalf of the State Government of Western Australia

to the inquiry by the Senate Foreign Affairs,
Defence and Trade References Committee
into the scope and opportunities for naval shipbuilding In Australia

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Executive summary

National security is a pre-requisite for prosperity. A credible maritime strategy is a key element of Australia's defence and, in turn, makes a fundamental contribution to Australia's security. An adequately equipped and structured Australian Navy maintained at appropriate levels of preparedness is fundamental to the credibility of Australia's maritime strategy.

Navy preparedness and, by extension, the credibility of Australia's maritime strategy depends increasingly on local industry support. 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.

Over the last two decades local construction of, for example, ANZAC frigates, Collins Class submarines, mine-hunters and the rebuild of other navy ships has sustained a viable naval shipbuilding industry in Australia. That naval shipbuilding industry is now restructuring for support of the ships and submarines it built. This entails a smaller scale of business, often relocated far from the original construction sites in Newcastle, Melbourne and Adelaide.

Over the next decade defence is scheduled to procure five large surface combatants and sundry other smaller ships. This modest build program will not sustain a conventional *naval shipbuilding industry* comparable in nature and scale to Australia's current industry.

Properly managed however, this five-ship program provides an opportunity to embed a viable *naval shipbuilding capability* in a broader, compatible industry structure underpinned by a much larger component of the national economy than defence spending on naval ships. Conversely, a decision to proceed with local construction of the three air warfare destroyers at ASC Pty Ltd and to build the amphibious support ships offshore will most likely see the industry collapse to a monopoly based on ASC and ship-specific repair and maintenance capacity, clustered around Fleet Base East and Fleet Base West.

For an Australian naval shipbuilding capability to remain viable when embedded in a broader industry base, that base must have compatible management structures, skills and infrastructure sustained by non-defence business. Subject to some important provisos, Western Australia's agglomeration of resource-based heavy engineering companies located south of Fremantle close to HMAS STIRLING would provide an appropriate matrix within which to embed a capability for building steel ships for the Australian Navy. At the same time, the aluminium shipbuilding industry located in the same area and focussed on Austal Ships provides a similar matrix hosting a capability for building aluminium ships for the Australian Navy - should the United States Navy's experiments with aluminium trimarans for littoral combat bear fruit and if the Australian Navy follows suite.

Taking advantage of the amphibious support ship project to embed a naval steel shipbuilding capability in Western Australia's resource-based heavy engineering sector would result in two complementary naval shipbuilding nodes. One node would be located in Cockburn Sound and would focus on integration and consolidation of the amphibious support ships and on in-service

support of the ANZAC frigates and Collins Class submarines home ported close. This would complement the ASC-based capability that has grown up in South Australia round the Collins Class construction program and that will be adapted for the air warfare destroyer program. Achieving this outcome however, will require co-ordinated action by governments (both Commonwealth and State), companies (both prime contractors and sub-contractors) and the workforce (in terms of training and mobility).

At the Commonwealth level, realising the above outcome will require, firstly, a commitment to build the amphibious support ships in Australia as an investment in future support, not only of those ships but of navy steel ships generally. Secondly it will require the Commonwealth to reinvigorate the Australian Industry Involvement (AII) program and to take advantage of developments in defence governance structures and processes to link AII in the supply and support of Australian Navy ships to Australian Navy performance targets specified in annual defence budgets. Thirdly, it will require the Commonwealth to require the overseas ship designers to release sufficient intellectual property to enable local prime contractors to assume design authority for the ships they build.

At the state level embedding a naval shipbuilding capability in Western Australia's resource-based heavy engineering sector will require the Western Australian Government to rectify actual and potential market failures. To this end, the Western Australian Government is investing in flexible infrastructure and in education and training. The Australian Marine Complex (AMC) and the associated common user facility, together with Challenger TAFE, have been the main focus of such investments by the State Government to rectify such failures. It also requires the South Australian and the Western Australian Governments to co-ordinate their respective investments in infrastructure and training. The Memorandum of Understanding (MOU) between the two governments (concluded in 2004) provides a framework for such co-operation.

At the company level, realising the above outcome will require prime contractors who are not only able to assume design authority for the air warfare destroyers and amphibious support ships but also able to ensure those designs are consistent with modular construction pioneered in Australia under the ANZAC ship program. The history of the ANZAC ships and the Collins Class submarines also suggests that a key role for the prime contractor is husbanding the knowledge gained in the construction program for in-service support. A related role for the prime contractor is to assemble a supply chain, able to build ships on time and to cost and conditioned to provide post-construction, in-service support cost effectively. Embedding a naval shipbuilding capability in Western Australia's heavy engineering sector will enable prime contractors to perform these roles but reduce their exposure to a potentially destructive cycle of naval shipbuilding "boom and bust".

Fluctuations in naval shipbuilding and ship repair business are inevitable, particularly in a five-ship cycle. Therefore, at the company level, a viable supply chain requires companies to be willing to compete for participation in the construction phase and have the ability to diversify into other business that enables them to sustain their construction-based capability until it is required to support those ships in-service.

Underpinning all this is the workforce, comprising not only tradespeople but also managers and professionals. Embedding a naval shipbuilding capability into a wider heavy engineering structure will require a workforce able and willing to take advantage of the opportunity to

enhance their skills by participating in the naval construction program and to apply the crucial tacit knowledge gained in that program to in-service support of the ships they built.

Retaining a viable naval shipbuilding capability by embedding it in a wider, compatible industry structure will require a combination of like-minded companies, flexible infrastructure and an adaptable, mobile workforce. The heavy engineering/marine industry cluster located adjacent to Cockburn Sound, south of Fremantle, is unique in Australia in providing this environment close to a major home port for the navy. Integration and consolidation in Western Australia of modules for the amphibious support ships built there and elsewhere would take advantage of this unique environment and foster sustainable industry support for navy preparedness by embedding a naval shipbuilding and ship repair capability in a wider heavy engineering/marine industry matrix.

The Western Australian Government is investing a further \$81.1 million worth of additional marine infrastructure at the AMC, including:

- A floating dock to launch and dock large ships and a rail transfer system to allow construction and repair within the Common User Facility's (CUF) undercover facilities.
- An extension and upgrade of the existing wharves to accommodate all types of naval and commercial vessels.
- The installation of marine services such as power, seawater fire main, wharf communications and sewerage off-take.

The Western Australian Government is also prepared to build the second half of the floating dock should the AMC be selected as the site for integration and consolidation of the amphibious ships. The current and future capabilities of the Western Australian ship building and repair industry also has potential applications to support the United States Navy (USN) and US Military Sealift Command (MSC) vessels operating in the Indian Ocean Rim.

Recommendations

The inquiry by the Senate Foreign Affairs Defence and Trade References Committee is a particularly timely opportunity for the Western Australian Government to present this proposal to a wider audience. To this end, the State Government has made a series of recommendations to the Senate Committee. These recommendations are summarised below.

The Western Australian Government **recommends** that, in the course of investigating the rationale for building naval ships in Australia, the Senate Committee bear in mind that distortions of the naval shipbuilding market resulting from government interventions, particularly since the end of the Cold War, greatly complicate any attempt to estimate such premiums and make robust international comparisons of the costs of naval shipbuilding in different countries notoriously difficult. Against this background, the Western Australian Government further **recommends** that the Senate Committee:

- Investigate the merits of benchmarking the productivity of the Australian naval shipbuilding industry against comparable industries overseas,

- Go beyond investigating the merit of benchmarking just the yards directly involved in final assembly and include in its inquiry the merit of benchmarking the productivity of the supply chain that supports those yards and that will provide subsequent in-service support; and
- Investigate how the Defence Department tendering process can be managed so as to reveal the full value to Australian Navy preparedness of local construction and not merely compare the direct costs of local and overseas builds.

The Western Australian Government **recommends** that, in enquiring into the sustainability of naval shipbuilding in Australia, the Senate Committee:

- Enquire into the terms and conditions under which related intellectual property is released to Australian industry;
- Enquire into the provisions for AII in the air warfare destroyer and amphibious support ship projects. Of particular importance is the nature of AII provisions in the tender documentation and the number and skills of the Defence Materiel Organisation (DMO) project staff available to evaluate them; and
- Enquire how the Defence Department and its supplier would establish the local supply chain required to underpin the future preparedness of the amphibious support ships if they are built offshore.

Within this overall policy framework, the Western Australian Government further **recommends** that the Senate Committee enquire into the efficiency and effectiveness of actions to ensure an adequate supply of appropriately skilled labour by:

- Candidate builders of the amphibious support ships in Australia,
- Defence as the customer exposed to increased cost schedule and technical risk in the amphibious support ship project resulting from inadequate attention to the supply side of the labour market,
- State governments competing to host the local construction of the amphibious support ships; and
- The Department of Education, Science and Training and other non-defence Commonwealth agencies responsible for national level programs to improve the supply of skilled labour.

The Western Australian Government **recommends** that, in investigating the sustainability of Australian naval shipbuilding, the Senate Committee bear in mind:

- The flexibility and scale of the Western Australian marine and fabrication industry infrastructure,
- The contribution of that infrastructure to the preparedness of naval ships home ported in Fleet Base West,
- The importance of supportive policies and enabling investments by government at both State and Commonwealth levels in establishing and maintaining that infrastructure,
- The preparedness of the Western Australian Government to build the second stage of the floating dock if the AMC is selected as the integration and consolidation site; and
- The strategic capability and benefit such a floating dock would provide the nation within the Indian Ocean Rim area of operation.

The Western Australian Government has **recommended** that, in investigating what action Australian stakeholders should take to capture the benefits of local construction of the air warfare destroyers and amphibious support ships, the Senate Committee enquire into:

- Implications for Australian industry of that industry being designated design authority for locally built air warfare destroyers and amphibious support ships,
- The implications of local design authority for any trade off between additional acquisition cost and the value of enhanced preparedness through more comprehensive local support,
- The scope for taking advantage of certain developments in defence governance in order to reinvigorate the AII program by linking it to defence performance as outlined in the Commonwealth Financial Management Improvement Plan and specified in the annual Defence Budget; and
- The merit of embedding a naval shipbuilding capability in a geographic concentration of compatible workforce, companies and infrastructure.

The Western Australian Government also **recommends** that, within the above broad policy framework for capturing the benefits of local construction, the Senate Committee further investigate:

- The construction methodology envisaged by each team for the air warfare destroyers and the amphibious support ships respectively, the extent to which the amphibious support ships as presently designed lend themselves to modular construction and the extent of geographic dispersal of module construction envisaged by ASC Pty Ltd for the air warfare destroyers and by the competing teams short listed for the amphibious support ships; and
- The consequences for the nature and scale of indigenous competition for future naval business if the Commonwealth decides to build the amphibious support ships overseas.

Conclusion

The Western Australian Government supports the construction of the amphibious support ships in Australia with the integration and consolidation of the ships undertaken at the AMC, Henderson, Western Australia.

Attached for the information of the Committee is a DVD and PowerPoint presentation that states the capability of the AMC and outlines why Western Australia is “The Logical Choice” for integration and consolidation of the amphibious support ships.

1 Introduction

On 10 November 2005 the Senate asked the Senate Foreign Affairs Defence and Trade References Committee to inquire into, and report on, the future of naval shipbuilding in Australia with particular reference to:

- The capacity of the Australian industrial base to construct large naval vessels over the long term and on a sustainable basis.
- The comparative economic productivity of the Australian shipbuilding industrial base and associated activity with other shipbuilding nations.
- The comparative economic costs of maintaining, repairing and refitting large naval vessels throughout their useful lives when constructed in Australia vice overseas.
- The broader economic development and associated benefits accrued from undertaking the construction of large naval vessels.

The Senate Committee subsequently wrote to the Premier of Western Australia on 10 November 2005 inviting the Western Australian Government to address these issues in a written submission to the Committee. In response, the Premier instructed the Minister for Energy; Science and Technology, through the Department of Industry and Resources (DoIR), to make this submission on his behalf.

1.1 A timely inquiry

From a Western Australian perspective, the Senate Committee's inquiry into the future of naval shipbuilding is particularly timely in light of the mixed signals about Australian naval shipbuilding policy in recent years. The winding down or completion of major construction projects like the ANZAC ships, Collins Class submarines and Mine Hunter Coastal ships and the hiatus in defence business pending release of the 2000 Defence White Paper precipitated a major debate among members of that industry and the Department of Defence about the industry's future. This debate culminated in the release by the Department of Defence of the Naval Shipbuilding and Ship Repair Sector Strategic Plan in 2002¹.

The 2002 plan proposed that, in response to the impending downturn in naval ship construction business, the industry should form a single entity with which Defence would partner for business. Instead, the Australian Government opted for a more conventional business model, based on open and effective competition and set the plan aside². From a Western Australian perspective however, many of the industry's underlying problems remain (although temporarily masked by the adjustment of the timing of their warfare destroyer and amphibious support ship programs).

The Senate Committee's inquiry is also timely in view of the important changes in the Australian economic environment that have occurred over the last five years and that are likely to affect

¹ Industry Division, Defence Materiel Organisation "Australian Naval Shipbuilding and Repair Sector Strategic Plan", Commonwealth of Australia, 2002.

² See joint media release 95/2004 by Senator the Hon Robert Hill and Senator the Hon Nick Minchin "Naval Shipbuilding: Moving Forward" Thursday, 27 May 2004.

Australian naval shipbuilding and ship repair. From a Western Australian Government perspective, the development of industries to support the resources sector of the economy and the national debate about the availability of sufficient skills to sustain Australia's economic growth are particularly significant in this context.

2 Background and approach

This section of the submission provides a Western Australian Government perspective of shipbuilding in Australia (encompassing both commercial and naval shipbuilding) and of the Australian naval shipbuilding cycle.

2.1 Shipbuilding in Australia: Western Australian aspects

Supply and support of naval ships dominates the Australian shipbuilding industry, with revenue from defence-related projects accounting for an estimated 65 per cent of industry revenue. Commercial shipbuilding (for example ferries and catamarans) accounts for an estimated 25 per cent of total industry revenue and commercial repair and maintenance accounts for a further 10 per cent³.

According to data published by the Australian Bureau of Statistics, Western Australia is the nation's largest shipbuilder: In 1999-2000, Western Australia accounted for 25 per cent of total employment in the shipbuilding industry (New South Wales was the second largest with 23 per cent, followed by Victoria with 22 per cent and South Australia with 11 per cent).

This generic shipbuilding capacity, combined with the home porting of the Collins Class submarines and about half of the ANZAC frigates at Fleet Base West on Cockburn Sound, has enabled the State to attract an increasing share of Australian naval shipbuilding business, including:

- A large and growing share of the \$3.5 billion worth of in service support of the Collins Class submarines to be undertaken by the ASC over the next 25 years.
- \$500 million worth of ANZAC frigate upgrades to be undertaken in Western Australia by the ANZAC Ship Alliance Group.
- An annual \$30 million worth of routine and ad hoc maintenance and support of the ANZAC ships undertaken by Tenix WA and SAAB Systems;
- \$350 million worth of Armidale Class patrol boats to be built in Western Australia by Austal Ships.
- \$60 million conversion of the Delos tanker undertaken by Tenix WA.

2.2 The Australian Naval Shipbuilding Cycle

In Australia, defence procurement of naval ships has driven Australian naval shipbuilding activity in cyclical peaks and troughs since at least the late 1950s. In assessing the sustainability of naval

³ IBIS World "Shipbuilding in Australia" C2821, Ibisworld Industry Report, October 2005, page 8

shipbuilding in Australia it is particularly important to understand the difference in nature and scale between the *previous* shipbuilding cycle and the *current* cycle.

The *previous* cycle began, arguably, some 20 years ago with the decision to award the following contracts to what were then new entrants to the Australian naval shipbuilding industry:

- In 1987, the \$5 billion (2005 prices) Collins Class submarine contract to the ASC, operating at a purpose built facility at Outer Harbour in South Australia.
- In 1989, the \$7 billion (2005 prices) ANZAC ship contract to what is now Tenix operating the newly privatised Williamstown Dockyard in Victoria.

The delivery of the last of ten ANZAC ships, HMAS Perth in June 2006 will mark the end of the previous naval shipbuilding cycle. The previous cycle was dominated by the ANZAC ship and Collins Class submarine projects. But the previous cycle was amplified by additional shipbuilding projects, including:

- The construction of oceanographic ships by North Queensland Engineers and Agents.
- The construction of six Mine Hunter Coastal vessels by ADI.
- The conversion of HMA ships Manoura and Kanimbla by Forgacs.
- The capability upgrade of Australia's guided missile frigates by ADI.

2.2.1 The current naval shipbuilding cycle (2004-2014)

The *current* cycle started, arguably, with the award of the contract for Armidale Class patrol boats to Austal Ships in 2004. The current cycle will be driven primarily by the construction of three air warfare destroyers (Project SEA 4000) and two amphibious support ships (Joint Project 2048). On present planning, the decline of the current cycle will begin with the delivery of the second amphibious support ship in 2013⁴.

In 2005 the Commonwealth Government exercised its stated preference for local construction of the air warfare destroyers and selected ASC as the preferred shipbuilder. In August 2005 the Commonwealth Government announced⁵ that Australian shipbuilders would be invited to tender for construction of either or both of the Spanish Navantia design at 27,000 tonnes or the French Amaris Mistral design at 22,000 tonnes. In making this announcement on behalf of the Government, the then Minister for Defence noted that "The Government's preference is to see the ships built in Australia, however Australian industry will need to demonstrate it can deliver the project at a competitive price."⁶

Local construction of the amphibious support ships is by no means certain. Assuming that the Commonwealth Government does in fact decide to build both air warfare destroyers and the amphibious support ships locally, the current cycle would still entail a lower level of expenditure compressed into a shorter time frame than the previous cycle. These characteristics pose special challenges for the sustainability of the industry. They also provide an opportunity to think

⁴ Department of Defence "Defence Capability Plan 2004-2014 (Public Version)" pp86-88

⁵ Minister for Defence media release 126/2005 "Government Approves First Stage of Amphib Ships Project" Thursday 11 August 2005.

⁶ Ibid

creatively about new ways to supply and support Australian Navy ships with regard to Australia's changing economic circumstances.

2.2.2 Naval shipbuilding and defence procurement reforms

It is probably inevitable that fresh thinking about how to supply and support Australian Navy ships in a sustainable way will be coloured by past controversies associated with procurement of, for example, the Collins Class submarines and the Seasprite helicopters for the ANZAC frigates. One constructive outcome of these controversies has been the Kinnaird reforms of the Defence procurement institutions and processes. On the other hand, a potentially adverse outcome of such controversies is that they could encourage Defence decision makers to focus on minimising narrow acquisition costs at the expense of a more balanced appreciation of:

- The value of local industry support to the preparedness of navy ships; and
- The importance to industry's downstream capacity to support navy ships in-service of industry involvement in a focussed and carefully managed way, upstream in the construction of those ships.

This submission provides a Western Australian Government perspective of the benefits to be gained by purposeful involvement of Australian industry in the construction of the air warfare destroyers and amphibious support ships in the current naval shipbuilding cycle.

2.3 The structure of the submission

This submission to the Committee is structured around the following themes. Firstly, the submission develops the case for co-ordinated action by Commonwealth, State and commercial interests to retain a capacity to build large naval ships in Australia generally and to have the integration and consolidation of the amphibious support ships undertaken at the AMC in Western Australia particularly, with regard to:

- The contribution to Australian defence self reliance of an appropriately conditioned and responsive commercial supply chain.
- The through-life costs involved in operating naval ships whether built here or abroad.
- The broader economic development and associated non-defence benefits accruing to Australia from the local construction of large naval ships.

Secondly, the submission analyses the sustainability of the naval ship building industry in Australia generally and in Western Australia particularly. A particular focus is developments in other industry sectors with comparable requirements for skilled people.

Thirdly, the submission suggests action required to capture the defence and wider non-defence benefits of local construction and support of naval ships on a sustainable basis, taking into account related developments in other industry sectors.

3 Why build naval ships in Australia?

The Commonwealth Government has a viable option for offshore construction of the amphibious support ships: Spain has just begun construction of the first of the Navantia ship

designs. France has completed construction of the Mistral design and the ship is undertaking its final test with the French Navy⁷. Leaving aside the option of constructing the ships in, for example, South Korea, Australia could easily take advantage of the learning accrued by Amaris and Navantia by having its amphibious support ships built in France or Spain respectively.

The case against local construction of these ships boils down to judgements that the cost, schedule and technical risks involved outweigh the benefits of local construction. This submission takes as given the number, size and capability of the amphibious support ships specified by the Commonwealth in the public version of the Defence Capability Plan 2004-14; it **does not** discuss whether or not Australia's interests would be better served by procuring a larger number of cheaper, faster amphibious support ships.

The remainder of this section explains why, from a Western Australian Government perspective, the two 25-27,000 tonne amphibious support ships should, like the air warfare destroyers, be built in Australia and integrated and consolidated at the AMC.

3.1 Navy preparedness

Western Australia has accumulated considerable experience in supporting the naval ships and submarines home-ported at Fleet Base West and elsewhere in the State. In light of this experience, the Western Australian Government is strongly of the view that indigenous construction of RAN vessels is a means to achieving the preparedness element of navy capability; it is not an end in itself. The key concept of *preparedness* is explained below.

Military capability is the power to achieve a desired operational effect in a nominated environment (land, sea or air) within a specified period and to sustain that effect for a designated period⁸. Military capability results from developing a force structure appropriately prepared for operations. *Preparedness* is a combination of *readiness* and *sustainability* where:

- Readiness is the ability of a military force to undertake specified operations within a designated time; and
- Sustainability is the ability of a military force to continue conducting operations for a specified period.

The Western Australian Government considers that 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.

⁷ Ibid

⁸ Adapted from the definition of capability in Department of Defence “*Defence Capability Development Manual*” Defence Publishing Service, Canberra 2005 page 2 para 1.4

For the purposes of this submission, the Western Australian Government distinguishes between the broad strategic aspects of navy preparedness and the specific targets for navy preparedness set by the Chief of the Defence Force to achieve Australian Government strategic and operational requirements.

3.1.1 Navy preparedness: strategic aspects

The Australian Navy, like the other services, has experienced long term and increasing difficulty in attracting and retaining the technical personnel required to retain in-house the capacity to provide the full range of in-service support it requires to meet its readiness targets. This competition for scarce skills is exacerbated by the increasing sophistication of the weapons, sensor and communication systems that determine the combat effectiveness of naval submarines and surface combatants. At the same time, initiatives like the Defence Commercial Support Program of the late 1980s and, more particularly, the Defence Reform Program of the late 1990s have encouraged the Australian Defence Force (including Navy) to concentrate scarce and expensive military personnel on combat and combat-related functions for which there is no commercial counterpart and to rely on the commercial sector for non-combat support.

In interpreting these trends it is important to remember that, before the previous naval shipbuilding cycle was initiated in the 1980s, navy's combatant fleet was predominantly imported. It included three guided missile destroyers and four guided missile frigates bought from and built in the United States. Two more US-designed guided missile frigates were built-to-print at Williamstown during that yard's transition from Australian Government ownership/navy management to private ownership and operation in the early 1980s.

The demographic, technological and resource trends described above forced the Australian Navy to scale back such in-house organisations as Naval Technical Services upon which it had previously relied for a measure of self reliance in supporting imported ships. Since then Navy has perforce relied increasingly on the naval shipbuilding and ship repair industry to meet its preparedness targets. We return to this issue below.

3.1.2 Navy preparedness: management aspects

During the 1990s the Commonwealth Government refocused its budgeting away from cash-based inputs to functionally oriented outcomes and outputs. All Commonwealth Government departments, including Defence, are involved in what is called the Financial Management Improvement Plan. Hence, in recent annual defence budgets, navy capability is designated Defence Outcome Two. Navy capability is sub-divided into eight capability outputs, of which - for example - the ANZAC ships home ported in Western Australia are part of Output 2.1 (Capability for Major Surface Combatant Operations) and the Collins Class submarines home ported in Western Australia constitute Output 2.4 (capability for submarine operations).

These budget reforms and Commonwealth Government efforts to hold defence managers increasingly accountable for defence performance have led to inclusion of increasingly specific navy preparedness targets in the annual defence budget. For example, the 2005-06 defence

budget stipulates a preparedness target for the six Collins Class submarines (defence capability output 2.4) of 1560 URD⁹.

The annual defence budget requires defence to identify any perceived risks to its achievement of specified performance targets. Accordingly, for example, the Defence Budget 2005-06 mentions logistic support as one of the key risks and limitations to achievement of Navy's Planned Performance in general and submarine performance in particular¹⁰. As already argued, the Australian naval shipbuilding and repair industry is overwhelmingly responsible for the logistic support of Australian Navy operations.

The requirement for defence to report *ex-post* in the Defence Annual Report on its achievement of these performance targets set *ex ante* in the annual defence budget enables Ministers and the Federal Parliament to gauge the performance of defence managers and, by extension, the performance of industries, including the naval shipbuilding and repair industry, upon which those managers depend.

From a Western Australian Government perspective, the next logical step is for defence to link these developments in the management of Navy preparedness to specific objectives for Australian industry involvement in the construction of Navy ships. This issue is revisited after the following discussion of Navy preparedness.

3.2 Industry support of navy preparedness

The Western Australian Government believes that efficient and effective industry support of Navy platforms and systems can help Australian Governments manage strategic uncertainty. In addressing the challenge of strategic uncertainty, the 2000 Defence White Paper stated that:

“Nothing can remove the element of the unexpected from our military affairs. Over the next decade we can be reasonably sure that government will consider using the ADF in circumstances that we have not envisaged. So our defence planning should not leave us with a set of capabilities that is too narrowly focused on specific scenarios. Our aim is to provide Australia with a set of capabilities that will be flexible enough to provide governments with a range of military options across a spectrum of credible situations....”¹¹

3.2.1 Managing strategic uncertainty and risk

The above discussion of uncertainty leads to the concept of risk. Risk is the exposure to the possibility of economic or financial loss or gain, physical damage, injury or delay as a consequence of pursuing a particular course of action. For the purposes of this submission the two key elements of the concept of risk are the *likelihood* of something happening and the *consequences* if it happens.

⁹ The Commonwealth of Australia, Defence Budget 2005-06, Australian Government Publishing Service, Canberra, 2005 pp 126-127.

¹⁰ Ibid, p 116.

¹¹ The Commonwealth of Australia “Defence 2000: Our Future Defence Force”, Australian Government Publishing Service, Canberra, 2000, para 6.33, page 54.

In principle, Australia can adopt a navy capability development model that relies on *off-shore* industry support for maintenance, repair, upgrade and adaptation of navy combatants. Such a model would expose Australia to the risk that such in-service support will not be forthcoming on a scale, of a nature and in a time frame best suited to Australian interests. This risk is particularly significant given the emphasis by successive Australian Governments on a fundamentally maritime strategy for the defence of Australia and of Australian interests.¹²

The Western Australian Government considers it entirely plausible 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.

The Western Australian Government believes that, subject to investment in the appropriate industry capacities, relying on *on-shore* industry for in-service support of Navy preparedness entails less risk that the naval component of Australia's military options will be constrained in the event of a challenge to national security. In this sense, local industry involvement in the construction of naval combatants constitutes an investment in local industry capacity to support those vessels in-service and, by extension, an investment in Navy preparedness.

Support by Australian industry is critical to the preparedness of, for example, the Collins Class submarines and the ANZAC frigates. The next section of this submission describes the nature and scale of this support in order to demonstrate the link between Australian industry involvement in construction of those platforms and Australian industry capacity to provide in-service support needed to meet:

- Contingent requirements inherent in Australia's uncertain strategic environment; and
- The preparedness targets specified in the annual Defence Budget.

3.2.2 Support for submarine preparedness

In December 2003 the ASC signed a 25 year \$3.5 billion contract for the through life support of the Collins Class. (Hypothetical alternatives to ASC included off-shore support by either Kockums in Sweden or General Dynamics in the US). ASC's capacity to support the Collins Class derives from its access to Kockums intellectual property about the design, from the detailed engineering knowledge about the platform and its systems accumulated by ASC in the course of constructing the submarines and from the tacit knowledge accumulated by the ASC workforce. In June 2004 ASC settled all disputes with Kockums, thereby securing perpetual access to Kockums' Collins Class intellectual property. In constructing the Collins Class ASC generated the engineering knowledge required to undertake full cycle dockings at Outer Harbour in South Australia and Intermediate Dockings at the AMC, Henderson, Western Australia, close to where the submarines are home-ported at HMAS STIRLING on Garden Island.

¹² See Defence 2000, page 65 paragraph 6.6.

ASC transferred to its operation in Western Australia the platform, system, maintenance and engineering skills and knowledge required for the conduct of maintenance and docking of the Collins Class submarines. The Western Australian operation will be the focal point of a multi-million dollar investment by ASC dedicated to in-service support of the Collins Class in the AMC Common User Facility (see below). ASC workers with the crucial skills and tacit knowledge of the Collins Class hull, machinery and systems have also migrated from South Australia to Western Australia, following the submarines they built – see Box 1.

Box 1 ASC Tiger Teams Support Collins Class Submarines

After building the Collins Class submarines in South Australia, ASC has formed tiger teams dedicated to the support of individual submarines at their home port in Western Australia and on deployment. These tiger teams are located in Western Australia close to their respective submarines. The teams are populated by ASC personnel who were previously involved in building and fitting out the Collins Class. The teams have also attracted ex-Navy submarine personnel with considerable on-board experience. ASC's tiger teams are thus the repository for the detailed knowledge critical to the preparedness of Australia's submarine force.

3.2.3 Support for surface combatant preparedness

Similarly, routine in-service support (including ad hoc repair) crucial to the readiness and sustainability of the ANZAC ships is provided through contracts between the Commonwealth and Tenix (for hulls, hull machinery and ship systems) and SAAB Systems (for combat systems and weapon systems). The contract for such routine support is managed by the ANZAC Ship System Project Office (SPO), out posted from the Defence Materiel Organisation (DMO). Contractor personnel are co-located with uniformed and Australian public service members of the SPO in an open plan office in Rockingham, Western Australia. These arrangements make for rapid response to and resolution of defects as well as facilitating the routine and ad hoc maintenance requirements and engineering support. Co-location has resulted in strong working relationships between contractors and the Commonwealth as well as reducing the administrative overheads associated with more formal contractor/client relationships (see box 2).

Box 2 An Integrated ANZAC Ship System Project Office (SPO)

Tenix routine support of the ANZACs in-service ranges from preparation of the work instructions to procurement of the necessary materials and provision of technical support staff to complete the work during ship dockings. It involves a spectrum of tasks ranging from routine replacement of superseded pumps through to replacement of entire Engine Control Modules and associated interfaces on an ad hoc basis.

The majority of contractor personnel responsible for in-service support in the ANZAC SPO are either ex-navy personnel or have extensive experience in building the ANZAC ships. Many of the ex-navy personnel have on-board ANZAC experience. This combination of detailed construction-based knowledge and operational experience helps contractor personnel identify and rectify faults accurately and rapidly while understanding ship operator priorities and risks.

The integrated ANZAC SPO does for the ANZACs what Navy used to do in-house for imported ships.

3.3 Western Australian industry support for Navy preparedness

In the 1970s Australia's increasing focus on defence self reliance and, within this framework, recognition of the vulnerabilities of Australia's northern approaches led successive Australian

Governments to move the centre of gravity of the Australian Defence Force progressively from the south and east of the Australian continent to the north and west. A key milestone in this process was the announcement in 1987 that the Commonwealth Government would move half the Australian naval fleet to HMAS STIRLING in Western Australia¹³

Global terrorism and the threat of weapons of mass destruction have since emerged as major security challenges. From a Western Australian Government perspective however, the geo-strategic logic that underpinned the Commonwealth Government's decision to increase navy preparedness for operations in Australia's northern approaches and in South East Asia by home-porting key units in HMAS STIRLING remains as relevant now as it was 20 years ago.

While the above relocation to HMAS STIRLING was a necessary condition for increased Navy preparedness, it was by no means sufficient. Equally important was development of the requisite infrastructure and, progressively, industry capacity to support the ships home-ported there. This entailed the migration to the home-port of industry capacity established during the build phase of naval ship procurements. Hence, for example, Tenix established a subsidiary in Western Australia and in conjunction with the Western Australian Government invested heavily in the specialised infrastructure (including a ship lift) in order to support the ANZAC frigates home ported there.

The establishment of the ANZAC Ship Alliance (see Box 3) located in Rockingham, close to the ANZAC ship operators and maintainers based at HMAS STIRLING, is a logical extension of the critical role played by industry in supporting Navy preparedness.¹⁴ The Alliance is co-located with the DMO's ANZAC Ship Systems Project Office (SPO) in Rockingham, Western Australia. It is close to the ANZAC ship support centre and training unit which were relocated from Williamstown, Victoria, where the ANZACs were built. The support centre provides the on-going training, systems integration and test required for ANZAC crew preparedness¹⁵.

Box 3 The ANZAC Ship Alliance

In July 2001 the Department of Defence, Tenix Defence Systems (responsible for platform in-service support) and SAAB Systems (responsible for Combat System in-service support) signed the ANZAC Ship Alliance to facilitate management of all future ANZAC Class capability change packages.

The ability of the ANZAC ship alliance to undertake such capability upgrades is a logical consequence of the Government policy of high levels of Australia-New Zealand content incorporated in the original project requirements. By achieving these local content goals, Tenix and its sub-contractors across the full supply chain secured the intellectual property required to support the ANZAC fleet on a cost effective basis. The ANZAC Ship Alliance is the means by which this investment in intellectual property is harvested to the benefit of Navy surface combatant preparedness.

¹³ The Department of Defence "*The Defence of Australia 1987*" Australian Government Publishing Service Canberra 1987 page 48 para 4.66.

¹⁴ see www.tenix.com./News accessed 10 February 2006

¹⁵ See media release of 22 January 2004 by Minister for Defence at www.defence.gov.au/minister/Hill, accessed 12 February 2006.

3.4 Local construction of the amphibious support ships

The current naval shipbuilding cycle will be driven primarily by construction of the three air-warfare destroyers and the two amphibious support ships. In 2005 the Commonwealth Government short-listed Navantia and Amaris as designers for the amphibious support ships and reaffirmed its preference for local construction of those ships subject to Australian shipbuilders offering a competitive price to do so. Tenix subsequently teamed with Navantia to build the Spanish design while ADI, partially owned by Thales, would build the French Amaris design.

At issue is the extent of any premium for local construction of the amphibious support ships, the extent to which the value to be gained from local construction outweighs any premium and how best to capture that value if the Commonwealth Government decides to build the ships locally.

As the above discussion of navy preparedness suggests, making an assessment of what, if any, premium is involved in local construction of the amphibious ships involves more than a simplistic comparison of costs. On the one hand, it entails imputing a value to the enhanced preparedness of Navy assets flowing from access to a tested, deeply knowledgeable local industry base. This value may swamp the extra cost involved in local construction.

On the other hand, assessing the premium for local construction entails gauging the extra cost, schedule or technical risk inherent in, for example, using an overseas design poorly adapted to Australia's circumstances, or an inadequately skilled workforce. Such risk will exacerbate any extra cost of local construction due to, for example, higher labour rates and must be identified and managed.

3.4.1 Estimating the premium for local construction of amphibious support ships?

The Western Australian Government is not party to the negotiations between Defence, the overseas designers of the amphibious support ships and their local partners. Hence it is not able to comment on the extent of any premium associated with local construction of the amphibious support ships. That said, *the Western Australian Government recommends that the Senate Committee bear in mind that distortions of the naval shipbuilding market resulting from government interventions, particularly since the end of the Cold War, greatly complicate any attempt to estimate such premiums and make robust international comparisons of the costs of naval shipbuilding in different countries notoriously difficult.* – see discussion of post Cold War trends in naval shipbuilding below.

Clearly, Australian Defence program managers required to allocate limited defence dollars among competing priorities will be tempted to take advantage of subsidised off-shore builds in order to minimise the acquisition cost of amphibious support ships. However, a comparison of prices tendered by the competing consortia for local and overseas builds of the amphibious support ships that ignored the value of local in-service support would be seriously misleading.

The Western Australian Government is therefore sceptical about the utility of crude cost comparisons in informing judgements about the balance of merit in building the amphibious support ships locally. But no responsible government could sensibly advocate local construction regardless of cost. Judgements about the merits of local versus overseas builds of these ships need to be informed by assessment of local industry's ability to capture the benefits of local construction in terms of naval preparedness.

As a first step to this end, *the West Australian Government recommends that the Senate Committee investigate the merits of benchmarking the productivity of the Australian naval shipbuilding industry against comparable industries overseas.*¹⁶ Assessing a yard's productivity involves estimating actual shipyard performance based on, for example, the number of shipyard employees, the number of employees engaged in shipbuilding, average number of hours worked per employee per year and estimates of annual shipyard output. Hence valid international comparisons of naval shipbuilding productivity would need to be based on surveys of specific yards rather than derived from aggregated national statistics. In order to gauge the merits of local production productivity needs to be analysed in terms of functional areas of shipbuilding practice. For example, First Marine International, an independent shipbuilding consultancy firm, analyses international best practice in the following functional categories:

- Steel work production
- Outfit manufacturing and storage
- Pre-erection activities
- Ship construction and outfitting
- Yard layout and environment
- Design, engineering and production engineering
- Organisation and operating systems

Secondly, this submission has emphasised the importance to Australian Navy preparedness of the supply chain fostered in the construction phase. Accordingly, *the Western Australian Government recommends that, in investigating the merit of benchmarking the productivity of the Australian shipbuilding industry, the Senate Committee go beyond just the yards directly involved in final assembly and include in its inquiry the merit of benchmarking the productivity of the supply chain that supports those yards and that will provide subsequent in-service support.*

Thirdly, the Western Australian Government is concerned that the processes by which defence seeks and then evaluates bids for the amphibious support ships will focus on the direct costs of local and overseas construction. *The Western Australian Government recommends that the Senate Committee investigate how the defence tendering process can be managed so as to reveal the full value to Navy preparedness of local construction, and not merely compare the direct costs of local and overseas builds.*

4 A sustainable Australian naval shipbuilding industry

As already indicated, the current naval shipbuilding cycle will be driven largely by the construction of five relatively large and complex naval surface ships – three air warfare destroyers built to naval construction standards and two amphibious support ships built to less demanding standards. In the Australian context, and leaving aside the non-cyclical flow of in-service support business required to sustain the fleet in being, the construction effort underpinning the current five ship cycle is much less than the construction effort inherent in delivery of 10 ANZAC

¹⁶ See, for example, report to the Under Secretary of Defense for Acquisition, Technology and Logistics- Industrial Policy by First Marine International “*Findings for the Global Shipbuilding Industrial Base Benchmarking Study*” Washington D.C. 2006.

frigates, six Collins Class submarines and six Minehunter Coastal vessels that dominated the previous cycle. Both the current and the previous cycles of Australian naval shipbuilding are in turn dwarfed by overseas naval shipbuilding programs.¹⁷ These programs include:

- The 57 Arleigh Burke Class guided missile destroyers being built in turns by Northrop Grumman's Ingalls shipyard and General Dynamic's Bath Iron Works for the US Navy.
- The 15-16 boats of the Japanese submarine fleet, each of which is kept in service for about 19 years, with the Mitsubishi and Kawasaki yards taking turns to replace them at the rate of one boat each year.
- The United Kingdom's 14 Type 22 frigates, of which the first four were sold to Brazil after some 16 years of service, the second six were largely decommissioned after 16 years in service and the balance, built mainly in the late 1980s/early 1990s, are still in service.
- The German submarine industry, now concentrated in the submarine division of Thyssen Krupp Marine Systems which, throughout the 1990s, built and delivered between one and two submarines per year (mainly for export).

While many overseas naval shipbuilding programs are much larger than those of Australia, they have encountered analogous problems of sustainability as a consequence of the end of the Cold War. By 2000, for example, the Royal Navy's fleet had shrunk to 60% of its size in 1970. This reduction in fleet size was reflected in a commensurate reduction in ship orders: In the 1970s, British shipbuilders delivered 4-7 naval ships per year but by the late 1990s such deliveries had fallen to 0-4 ships per year.¹⁸ The resulting pressures have led the UK Government to publish in 2005 a comprehensive strategy for retention of a viable maritime industrial base¹⁹.

Similarly, the US nuclear submarine industry delivered at least two and as many as five nuclear attack submarines each year during the 1980s. Deliveries stopped during the early 1990s and by the mid-1990s had resumed at the rate of about one per year. In December 1996 the two US nuclear submarine builders proposed, and the US Congress and US Administration subsequently accepted, that they build the Virginia Class nuclear attack submarines as a team rather than as competitors. This entailed each yard constructing about one half of each boat, specialising in building the same sections for each boat. The constructed sections from each yard are then barged to their counterpart, and the shipyard designated the 'delivery yard' for that boat completes the construction²⁰.

The above examples suggest that, while the Cold War ended well over a decade ago, overseas naval shipbuilders and their governments are continuing to experiment with different business models having regard to their respective national circumstances. In Australia, naval shipbuilding has not been affected by end of the Cold War. The Western Australian Government considers however, that the compressed timing and diminished scale of the current naval shipbuilding cycle precludes a business-as-usual approach if the nation is to manage the forthcoming air warfare

¹⁷ This material is based on country-specific data obtained from www.globalsecurity.org/military accessed February 2006.

¹⁸ M.V. Arena, h. Pung, C. Cook, J. Marquis, J. Riposo, and G. Lee "The United Kingdom's Naval Shipbuilding Industrial Base: The Next Fifteen Years", RAND, Santa Monica, 2005.

¹⁹ See Secretary of State for Defence "Defence Industrial Strategy: Defence White Paper" December 2005, pp68-77.

²⁰ <http://www.globalsecurity.org/military/systems/ships/ssn-774> accessed 7 January 2006.

destroyer and amphibious support ship programs so as to preserve local industry's capacity to support navy preparedness in an uncertain strategic environment.

The Western Australian Government's perspective of a sustainable naval shipbuilding and ship repair industry is explained in the next section of the submission.

4.1 Sustainable support for Australian Navy preparedness

The current Australian naval steel shipbuilding industry comprises three naval shipbuilding prime contractors specialising in steel ships (ADI, ASC and Tenix), each with facilities dedicated to naval shipbuilding and a workforce specialised in that activity. In addition, Austal has capitalised on its expertise in designing and building large, fast aluminium ferries and entered the naval shipbuilding industry through:

- Design and construction of the Armidale class patrol boats for the Australian Navy; and
- Teaming with General Dynamics for the US Navy's Littoral Combat Ship program.

The prime contractors for both steel ships and aluminium ships are supported by a supply chain of sub-contractors who move into and out of the industry or who move from one prime contractor to another in response to contract allocations. At the prime contractor level, the current naval steel shipbuilding industry structure is almost entirely a product of the previous naval shipbuilding cycle and of reforms of the associated Australian Defence business model.

Defence demand will similarly shape the nature and scale of any future aluminium shipbuilding for naval purposes. It is too soon to predict Australian Defence demand for large aluminium ships. Much will depend on the outcome of US Navy experiments in its Littoral Combat Ship program and US Marine Corps experiments with aluminium rapid transit ships.

From a Western Australian Government perspective, one key characteristic of the Australian naval shipbuilding industry has been its adaptability. This history, which has important implications for assessment of the future sustainability of the industry, is summarised below.

What is now Tenix, entered the industry at the beginning of the previous cycle by winning the ANZAC ship contract on the basis of a radical restructuring of what had previously been the Williamstown Naval Dockyard. ASC entered the industry by winning the contract to build (at a greenfield site in Outer Harbour, South Australia) replacements for the Oberon Class submarines. (The Oberon Class were imported from Britain but supported at Cockatoo Island Dockyard in Sydney). ADI, a product of the former government's decision to reform the government factories and dockyards, entered the naval ship building industry when it won the contract to build Minehunter Coastal ships at greenfield sites in the Hunter region of NSW. ADI's naval ship maintenance and repair activity is concentrated at Garden Island and Captain Cook Dock in Sydney.

This structure of three prime contractors underpinned by a flexible workforce and a dynamic sub-contractor base was relatively stable over the previous naval shipbuilding cycle. The structure was characterised by large investments in dedicated naval shipbuilding facilities which constituted significant barriers to entry and exit by prime contractors. The structure accommodated changes in workload by adjustment of workforce numbers and by the ebb and flow of the sub-contractor base.

Pressure for adjustment of the structure has increased as the construction phase of the previous cycle wound down, pending the onset of a new, smaller cycle. Pressure for adjustment has also been exacerbated by changing naval force dispositions (notably the shifting of half the fleet west as already described), evolving naval preparedness requirements and by new entrant Austal Ships.

Against this background, and from a Western Australian Government perspective, the key question is not the sustainability of the Australian naval shipbuilding and repair industry as such but rather the sustainability of indigenous support for Australian naval preparedness. In the Australian context, the sustainability of such support depends on:

- Access to platform and system specific intellectual property, particularly that IP captured in people's tacit knowledge.
- Maintenance of sufficient engineering knowledge of the characteristics and performance of naval platforms and systems so as to protect and enhance military advantage.
- Expertise in managing a responsive, well conditioned supply chain.
- The availability of a suitably skilled workforce.
- Access to appropriate infrastructure.

4.1.1 Sustaining Navy preparedness: intellectual property

ASC and Kockums have recently settled their dispute over Collins Class submarine intellectual property. This protracted dispute, which went to the heart of ASC's ability to provide in-service support of the Collins Class, demonstrates the overriding importance of attention by defence and its prime contractors to this issue in the pre-contract phase of the procurement process.

The air warfare destroyers and the amphibious support ships are all overseas designed. *The Western Australian Government recommends that, in investigating the sustainability of the Australian naval shipbuilding industry's capacity to support Navy preparedness in general, and the future preparedness of the air warfare destroyers and amphibious support ships in particular, the Senate Committee enquire into the terms and conditions under which related intellectual property is released to Australian industry.*

4.1.2 Sustaining Navy preparedness: engineering knowledge

The quality of engineering knowledge required to maintain the military competitiveness of naval platforms is demonstrated by such capability upgrade projects, for example:

- The ANZAC ship missile defence (SEA 1448 Phase 2b, worth an estimated \$75 million-\$100million); and
- The Collins Class Continuous Improvement Program (SEA 1439 Phase 5b, worth an estimated \$250 million-\$350 million) and the Collins Class sonar replacement (SEA 1439 Phase 6 worth \$350 million-\$450 million).

As these projects suggest, prior involvement in the construction and set to work of naval platforms and systems is the key to establishing the degree of engineering knowledge required to upgrade navy capabilities in Australia – see Box 4²¹.

²¹ See Department of Defence media release CPA 016/06 "Defence and CEA Sign Phased Array Radar Systems Contract" Tuesday 31 January 2006.

Box 4 Upgrading ANZAC ship anti ship missile defence

CEA Technologies is an Australian company based in Canberra. CEA has developed a scalable active phased array radar which automatically detects and tracks large numbers of high and low speed targets and an active phased array missile illuminator, which can also be tailored to individual customer requirements.

On 9 September 2005, the Government announced its intention to use CEA's phased array radar systems in upgrading the ANZAC ships' anti-ship missile defence so as to improve the ships' chances of survival in a multi-threat air attack. Tenix Defence and SAAB Systems, as members of the ANZAC Alliance, will collaborate with defence, the Defence Science and Technology Organisation and CEA Technologies in integrating CEA's design into the ANZAC ship hull and combat system. The ANZAC ship ASMD upgrade project will create an estimated 130 jobs during to acquisition and installation, with 25 jobs to support the capability through life and involve investment of about \$260 million in Australia.

The prime vehicle for securing the requisite engineering knowledge in the construction phase of navy projects is Australian Industry Involvement (AII). In 2003 The Australian National Audit Office (ANAO) criticised the AII program, noting that:

“In the absence of quantitative and/or qualitative performance measures for the AII program as a whole, it was not practicable for Defence to demonstrate whether, over the many years of its existence, the AII program has been making real progress, or is losing ground, in seeking to meet its objectives.”²²

Defence concurred with recommendations by the ANAO to remedy the deficiencies identified in the audit²³. *The Western Australian Government recommends that, in investigating the sustainability of the Australian naval shipbuilding industry's capacity to support the future preparedness of the air warfare destroyers and amphibious support ships, the Senate Committee enquire into the provisions for Australian Industry Involvement in these projects. Of particular importance is the nature of AII provisions in the tender documentation and the number and skills of the DMO project staff available to evaluate them.*

4.1.3 Sustaining Navy preparedness: supply chain expertise

The ANZAC ship program example demonstrates how, subject to appropriate targeting and close management, local industry involvement in the construction of the air warfare destroyers will help establish and condition the supply chain required to maintain an acceptable degree of preparedness once they enter service. In 1997 the Defence Department estimated that over 1300 Australian and New Zealand companies were involved in the supply chain for the ANZAC ships²⁴. Establishing and managing such a diverse and extensive supply chain is the responsibility of Tenix, the ANZAC ship prime contractor.

In order to meet its responsibilities as a prime contractor, Tenix worked closely with suppliers in order to upgrade their skills to defence standards – see Box 5.

²² Australian National Audit Office No 46 2002-03 “Australian Industry Involvement Program” Canberra, June 2003, page 14 para 17.

²³ Ibid, pp16-17.

²⁴ Department of Defence *HMAS ANZAC: Australia's Defence and Industry Partnership*, 1997 cited in Denise Ironfield “Impact of Major Defence Projects: A Case Study of the ANZAC Ship Project (Final Report)” Tasman Asia Pacific, February 2000, page vi.

Box 5 Industry participation in defence projects: Noske-Kaeser New Zealand Limited

The ANZAC ship contract required Tenix to work with overseas equipment manufacturers to achieve specified levels of Australian and New Zealand content.

Noske-Kaeser NZ is a subsidiary of Noske-Kaeser GmbH, Hamburg, and a member of Thyssen Krupp AG, one of Germany's largest companies. Noske-Kaeser established its NZ subsidiary to supply and support heating, ventilation and air conditioning (HVAC) and fire fighting systems and equipment for the ANZAC ships built by Tenix for the New Zealand and Australian navies. Noske-Kaeser NZ subsequently won contracts to supply HVAC equipment to, for example, the RAN's mine hunter coastal ships, the RAN's current amphibious support ships and the RNZN patrol vessels procured under Project Protector.

Noske-Kaeser NZ's expertise in supplying naval HVAC equipment enabled the company to diversify into supplying HVAC equipment for offshore oil and gas production facilities and railway rolling stock in New Zealand and Australia. Noske-Kaeser NZ is supplying HVAC and related equipment for the Perth Urban Rail Development and the Prospector-Avon rail link. It has established a facility in Perth to service the ANZAC ships and these trains.

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.

The incentives for prime contractors to involve local industry in the supply chain for navy ships depends importantly on the quantity and quality of AII prescribed by Defence in its requests for tender. The sustainability of the supply chain is greatly enhanced if the companies involved are not dependent on a single program – in this case ANZAC ships.

Western Australian companies have participated in the supply chains for, respectively the Collins Class submarines and ANZAC ships on this basis. By leveraging AII in navy projects and by competing in demanding overseas markets, Western Australian companies have been conditioned for participation in supply chains for the air warfare destroyers and amphibious support ships – see Box 6.

Box 6 Supply chains for Australian Navy ships and submarines

VEEM Engineering Group, based in Perth, Western Australia, began manufacturing propellers in 1956 for the leisure, high speed naval and work boat markets. From the supply of castings for the propellers for the ANZAC ship and Collins Class projects, it has developed its capacity to supply fully machined propellers and related components for the navy ship power trains. From this it has diversified into other high precision navy ship components, for example valves manufactured under license for the Collins Class submarines and propellers and stabilisers for the Armidale Class patrol boats built by Austal for the Australian Navy.

If the Commonwealth Government decides to build the amphibious support ships offshore, by contrast, the prime contractor involved would have greater difficulty, and less incentive, to establish a comparable Australian-based supply chain.

*The Western Australian Government **recommends** that the Senate Committee enquire how Defence and its supplier would establish the local supply chain required to underpin the future preparedness of the amphibious support ships if they are built offshore.*

4.1.4 Sustaining Navy preparedness: skills

Defence estimates that the Australian defence industry will require some 3000-5000 additional engineers, specialist technicians, key trades people and project managers to supply and support Australia's major defence platforms over the next decade. At the same time concerns have emerged at the national level about skills shortages caused by:

- A strong economy with low rates of unemployment.
- Growth of new industries with few ready-skilled tradespeople available.
- Relocation of new industries into different regions with a different skills base;
- Lack of interest in particular industries among potential job seekers.
- Location of industry, or project-based work, in rural or regional areas with a small skills base.
- Technology changes within an industry, especially production, resulting in new methods and therefore skill needs.
- Changes in underpinning skills needed to successfully undertake trade training²⁵.

For the purposes of this submission, the main issues are:

- The extent to which national skills shortages will affect the ability of Australian industry to deliver, on time and to cost, defence capital equipment projects.
- Whether or not the risks associated with a shortage of key skills in Australia are judged sufficient to warrant construction of the amphibious support ships overseas.

These issues are particularly important for Western Australia where, since 2002, skilled vacancies have remained well above the national average.²⁶ In the following paragraphs we address action taken by national, Defence and Western Australian stakeholders to address prospective skills shortages.

At the national level, the Commonwealth Government has initiated the National Skills Shortages Strategy, administered by the Department of Education, Science and Training. Key features of the National Skills Shortages Strategy include reinvigorating the vocational and technical education system at a cost of some \$130 million and encouraging greater participation in trades, with extra 31,000 places to be provided over the next four years through the New

²⁵ www.skillsinitiative.gov.au/skillsshortage.htm accessed 14 February 2006.

²⁶ Resources and Infrastructure Industry Skills Council Ltd "The RIISC Report: Western Australian Major Projects – Employment Demand and Predicted Skill Requirements 2005-2010" Western Australian Department of Education and Training, August 2005.

Apprenticeships Access Programme, pre-vocational training and school-based New Apprenticeships.²⁷

For its part, Defence has introduced the Skilling Australia's Defence Industry initiative.²⁸ Starting in 2005/06, the Commonwealth Government will invest up to 0.5% of the money spent on major defence capital equipment projects (equivalent to \$200 million over ten years) to help industry generate additional skilled positions, up-skill existing employees and improve the quality and quantity of skills training in defence industry. To this end, Defence has invited companies to submit proposals for defence-funded skills training which:

- Target growth in those professional and technical trades' categories where current and future shortages are identified.
- Attract new employees, both experienced and at entry level, into defence industries.
- Encourage skilled employees to remain in industry longer.
- Ensure access to the right training for both experienced and new employees.
- Address the short, medium and long term growth requirements of industry.
- Demonstrate the commitment of the company to increasing the workforce skills base.

The Western Australian Government has undertaken a range of initiatives to help address the States skills shortage, including:

- The creation of a New Defence Industry Skills Task Force which is examining the future expansion of the defence industry in Western Australia and identifying any associated training needs (see below).
- \$60 million annually for training programs in skill areas relevant to the resources/infrastructure development sector – creating approximately 30,000 training places.
- \$1.5 million over three years to establish a skilled migration unit to attract skilled migrants to Western Australia.
- \$1.5 million in Skilling WA grants to provide 1300 places in short training courses to up-skill metal tradespersons, electricians, and other key workers.
- The Fast Track Apprentice Program developed to reduce the impacts of cyclical skill shortages in the metals/engineering and electrical/instrumentation trades.
- The establishment of a new career development centre in Perth²⁹.

Within this framework, Challenger TAFE is Western Australia's leading provider of shipbuilding and vocational education and training (see Box 7). It operates 17 campuses and centres between Fremantle and Mandurah, where shipbuilding in Western Australia is concentrated. Challenger operates the WA Applied Engineering and Shipbuilding Training Centre, located in the Australian Marine Complex at Henderson. Challenger also provides state-of-the-art operator training of Collins Class submarine crews at the Submarine Training and Systems Centre at HMAS STIRLING.

²⁷ http://www.dest.gov.au/portfolio_departments/dest_information/publications_resource accessed 14 February 2006.

²⁸ <http://www.defence.gov.au/dmo/id/sadi/index.cfm> accessed 14 Feb 2006

²⁹ <http://www.mediastatements.wa.gov.au/media> accessed 15 February 2006

The Centre provides a one-stop-shop for all-round training of apprentices for both the defence and civilian shipbuilding industries, as well as a range of other industries within the resources sector, at both trade and para-professional levels. Training is to nationally accredited standards using Australian National Training Authority packages built up from core training units. The Centre's training is provided on a contestable basis under User Choice arrangements.

Box 7 Challenger TAFE (Western Australia)

Challenger TAFE established the WA Applied Engineering and Shipbuilding Training Centre over a decade ago when the marine industry cluster at the AMC at Henderson was at an early stage of its development. In growing with and adapting to the training needs of the Australian Marine Complex, the Centre has helped alleviate skills shortages that would otherwise have inhibited the growth of the WA marine industry.

One of the centre's main customers is Austal Ships which, in partnership with DMS, won the contract to build 14 Armidale Class patrol boats for navy. Full order books have left the company with no excess capacity and at the same time it competes strongly with the resources sector for skilled labour.

Challenger TAFE helped Austal meet its skill requirements by running fast-track courses to up-grade the skills of Austal's trade's assistants to train their replacements. This project was one of the first in Australia to be funded under the Defence Materiel Organisation's *Skilling Australia's Defence Industry* initiative.

These formal training measures relate to critically important trades. At least equally important in the management of naval shipbuilding and ship repair projects, however, are the professional and managerial skill categories. In these skill categories the tacit knowledge gained through on-the-job experience is, arguably, more important to the management of these projects than the formal qualifications individuals require to enter the career stream.

While the quantum of people with such professional and managerial experience is obviously important, so also is the mobility of qualified individuals. While individual circumstances and characteristics substantially affect individual mobility, the prevailing commercial environment is profoundly important. This environment can be strongly influenced by the nature of projects undertaken and how those projects are managed – see Box 8.

Box 8 Managerial Mobility in the Heavy Engineering Sector

United Group provides heavy engineering services including engineering design, procurement and project management, manufacturing, construction and long term maintenance support. United Group provides such services in support of not only companies in the oil and gas sector but also Navy operations at both Fleet Base West and Fleet Base East. By cross-training and careful recruitment United Group is able to assign a single, flexible workforce to tasks in either or both Navy preparedness and oil and gas operations.

Are these measures enough to avoid a skill squeeze?

This is particularly important in any assessment of the adequacy of these measures is the study commissioned by the DMO and Australia's four largest naval shipbuilders (ADI, ASC, Austal and Tenix) to assess skill-based risk associated with local construction of the amphibious support ships. The brief for the study noted that:

“The amphibious ship construction project will run from 2006 to 2013 and involve a shipbuilding outlay of about \$250 million a year. Additionally, another bigger project building air warfare destroyers (AWDs) for the Navy (in the \$500 million a year category for shipbuilding alone) will overlap with the amphibious

program, commencing in 2007 and going on until 2015-16 which will put constraints on the availability of certain skilled trades people in Australia and perhaps some materials. Other construction projects, Defence and otherwise, could be underway at the same time, which could make the situation worse.”³⁰

Modelling by ACIL Tasman, the consultants commissioned to undertake the study, suggested that the highest pressures on skills would occur over the period 2009-2013. The consultants suggested that if the main contracts for construction of the amphibious support ships were let in the period 2006-07. This should allow the companies involved to anticipate and recruit the necessary workforce through a combination of training and the migration of skilled people at both national and international levels³¹. ACIL Tasman concluded that the pools of relevant labour skills (mainly design engineers and other professionals, metal trades, electrical trades, electronics, systems, plumbers and painters) were large enough for local shipbuilders to engage the requisite people readily³².

Thiess’ experience in fabricating undersea components for the North West Shelf gas extraction projects tends to support the ACIL Tasman argument (see Box 9).

Box 9 WA Labour market flexibility

In August 2005 Thiess was awarded a contract by Woodside Petroleum to manufacture three 60 tonne skids for an offshore oil field. As these skids are for installation in 130 metres of water, the work involved assembling and welding to very high quality standards. Each weld had to be X-rayed, separately recordable, and structural welds were ultra-sonic tested.

To complete the task on time, Thiess recruited an additional 50 tradesmen, including 25 fully qualified welders as well as pipe fitters and boilermakers. They were recruited, fully trained and operational in about two weeks. The job was completed on time and on budget late January 2006 without any recorded safety problems.

While Thiess’ experience illustrates the flexibility of Western Australia’s labour market, care is obviously needed in extrapolating from this to assembling the workforce required to assemble the amphibious support ships (up to 1000 people).

The Western Australian Department of Education and Training was, like Defence, concerned that skill shortages could adversely affect projects. These concerns prompted it to commission the Western Australian Resources and Infrastructure Industry Skills Council (RIISC) to assess the employment demand and predicted skill requirements of major projects in Western Australia over the period 2005-2010. In estimating Western Australian demand for skills over this period, the RIISC focussed on those major projects either under construction or committed for construction. This conservative approach excluded a large number of speculative projects and, importantly for present purposes, construction of the amphibious support ships in Western Australia.

That said, the RIISC report tends to corroborate the above conclusions reached by ACIL Tasman. While stressing that Western Australia could not afford to reduce its efforts to ensure

³⁰ ACIL Tasman “Skill Shortages and the Amphibious ships project: An assessment of the prospects for a skill squeeze”, Canberra, April 2005, Appendix A, page A-1.

³¹ Ibid, page 65.

³² Ibid, page xiv.

the availability of sufficient numbers of appropriately skilled people to undertake projects under construction or committed for construction, the RIISC report noted that:

“Generally, major projects are not being significantly delayed or failing to go ahead as a result of an inability to source skilled labour. The sources of skilled labour have included:

- Smaller projects and on-going operations.
- Interstate migration, as the national economy “rebalances” and labour flows into Western Australia from the states with lower economic activity.
- Overseas migration.
- Substantial growth in the number of apprenticeships and traineeships offered in Western Australia (which increased by 18% and 23% respectively over the period 2002-2004).”³³

Looking ahead, the RIISC report concluded that the workforce needed to undertake major Western Australian projects under construction or committed for construction over the next decade would peak at between 5,000 and 8,000 in 2005 and decline to around half that peak by 2007.

The Western Australian Government is well aware that broad analyses along the lines of those by ACIL Tasman and the RIISC can mask commercially significant capacity constraints in the short to medium term at the level of the individual company (see Box 10³⁴).

Box 10 Labour shortages constrain Austal Ships capacity

According to Austal Chairman John Rothwell, capacity constraints left Austal little opportunity to take further orders over the next six to 12 months for short term delivery. Austal's Chief Operating Officer Steve Murdoch said that Austal planned to lift its apprentice numbers from the current level of around 160 to between 180 and 190 by early 2006, including mature age apprentices, to help boost Austal production capacity. Mr Murdoch said Austal had to compete in a world market place and could not match the money being offered for skilled workers on short-term expansion projects in WA's booming resources industry.

For present purposes, the key point is that while the Western Australian Government believes that individual workers and companies can - and do - respond to labour price and other signals indicating a labour shortage, the State would be ill-advised to leave the market entirely to its own devices. The Western Australian Government's response, outlined above, to early signals of a tightening labour market need to be seen in this context.

The Western Australian Government is confident that these initiatives, coupled with the timing of the amphibious support ship project relative to other developments in Western Australia and elsewhere, 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. To help ensure this is the case, however, the Western Australian Government's Defence Industry Skills Task Force is

³³ RIISC Report, op cit

³⁴ West Australian Newspaper of 2 December 2005.

to examine the future expansion of the defence industry in Western Australia and recommend the training strategies needed to service defence projects, particularly in the shipbuilding sector³⁵.

*The Western Australian Government **recommends** that the Senate Committee enquire into the efficiency and effectiveness of actions to ensure an adequate supply of appropriately skilled labour by:*

- *ADI and Tenix as candidate builders of the amphibious support ships in Australia.*
- *Defence as the customer exposed to increased cost schedule and technical risk in the amphibious support ship project resulting from inadequate attention to the supply side of the labour market.*
- *State governments competing to host the local construction of the amphibious support ships.*
- *The Department of Education, Science and Training and other non-defence Commonwealth agencies responsible for national level programs to improve the supply of skilled labour.*

4.1.5 Sustaining Navy preparedness: infrastructure

Infrastructure is a critical element of defence capability in general and of navy preparedness in particular. This section of the submission focuses on the marine fabrication-related infrastructure developing at the AMC in the vicinity of Fleet Base West and the role of that infrastructure in sustaining the preparedness of the Australian Navy fleet elements home-ported there. The section highlights the general importance of government enabling policies and programs in fostering such infrastructure. The section concludes by explaining how local integration and consolidation of the amphibious support ships could be managed so as to foster the infrastructure required for navy preparedness on a sustainable basis.

The Western Australian marine industry cluster at the Australian Marine Complex

Economists use the term ‘economies of agglomeration’ to describe the benefits that firms obtain when locating near each other. The notion of agglomeration is related to the idea of economies of scale and network effects. These effects mean that related firms cluster together in order to lower their costs of production and enlarge their markets. Fundamental to the network effects that encourage agglomeration is the transfer of information and knowledge.

According to Audretsch, information can be easily codified and has a singular meaning and interpretation (for example, engineering specifications). On the other hand, knowledge is difficult to codify and often embedded in people (for example, the knowledge required to manage a complex supply chain efficiently and effectively)³⁶.

Developments in information and communications technology now mean that the marginal costs of transmitting *information* across geographic space do not change with distance. By contrast, the marginal cost of transmitting *knowledge* rises with distance and has been much less affected by developments in information and communications technology. This is especially the case for tacit knowledge embedded in people. This helps explain the propensity for those industries in which tacit knowledge is important, for example marine engineering, to cluster together spatially.

³⁵ Joint media statement on 3 February 2006 by Alan Carpenter MLA and Ljiljana Ravlich MLC “New Defence Industry Skills Task Force announced” <http://www.mediastatements.wa.gov.au> accessed 17 Feb 2006.

³⁶ D.B Audretsch *Agglomeration and the location of innovative activity*, Oxford Review of Economic Policy, vol 14 No 2 pp 18-29

The need to minimise the cost of transmitting knowledge helps explain why:

- Engineering firms supporting resource projects have clustered in the AMC and Henderson region.
- The designers and builders of aluminium boats and ships have clustered there.
- The home-porting of naval vessels in Fleet Base West has spawned the development of navy-preparedness-related industries in close proximity to the ships they support.

The network effects also mean that enabling industries are attracted to the cluster in a virtuous circle (see Box 11). The virtuous circle underpinning industrial clusters needs to be taken into account in managing the construction of amphibious support ships so as to reinforce and expand the knowledge required to support them and other naval vessels in-service. This issue is revisited below.

Box 11 A marine industry cluster: Formation Design Systems

Formation Design Systems (FDS) specialises in software for computer aided design and construction of ships. From their base in Fremantle, Western Australia, they service a wide range of shipbuilding clients around the world. In recent years, the growth in naval shipbuilding in Australia has both supported, and been supported by, FDS technology.

Tenix has used FDS software to create full three dimensional computer model of ships built for the New Zealand Navy under Project Protector. This computer model is now being used by designers, shipbuilders, sub-contractors and the NZ Navy to improve project efficiency. Austal is using FDS software in designing a revolutionary high-speed trimaran for the US Navy's Littoral Combat Ship project.

The marine industry cluster is underpinned by other engineering companies whose capabilities have been developed in response to the requirements of the oil and gas and other resource and infrastructure development industries. These companies compete with overseas suppliers for this business.

In order to enhance their ability to compete for engineering work generated by Chevron's Gorgon Project, five of Western Australia's largest heavy engineering companies have formed a joint venture called Western Australian Major Projects (WAMP). The companies are the AUSCLAD Group of Companies, United Group, Steelplan, Fremantle Steel Fabrication and Park Engineers Pty Ltd. By enabling members to co-ordinate their resources, the joint venture aims to compete for work beyond the capacity of individual companies. Together they can provide turnkey and solutions from design to construct to assemble large structures. They have approximately 2,500 workers within the joint venture. The joint venture is open to further membership from companies with the required capability.

The commercial organisational structures (including project management capabilities), skills (including design, ability to fabricate complex structures to high quality and with precision, and knowledge of special materials) and facilities (including large covered work spaces, systems for lifting and transferring large heavy structures) required to support the resource sector have much in common with those required to build naval ships. The WAMP joint venture will compete for supply of modules for the air warfare destroyers and amphibious support ships drawing on the commercial structures, skills and facilities established for the demanding resources sector of the WA economy. All members of WAMP are in expansion mode and have the ability to draw on additional workers when and if required.

Western Australia's top fabrication workshops produce around 1,000 tonnes per week of fabricated structures plus approximately 400 tonnes per week of pipe spooling. This capability is more than what is required by the air warfare destroyer and amphibious support vessel projects.

Members of the WAMP will augment these existing resources by investing in additional advanced technology to meet the specific navy shipbuilding requirements. In order to be competitive, members of the joint venture will combine a highly skilled workforce with new technology and experienced management to achieve internationally competitive levels of productivity (see Box 12).

Box 12 Western Australia's internationally competitive engineering sector

Shell Todd Oil Services operate the Pohokura gas field in New Zealand. They sought international tenders for the design, construction and installation of a 400 tonne jacket measuring 56m by 16m by 16 m. for the Pohokura field.

The AUSCLAD Group of companies, which provide fabrication and heavy engineering services for the oil and gas industry from their facilities in Kwinana, Western Australia, won the \$10 million contract against stiff competition from Asian yards.

This is the first oil and gas assembly exported from Australia. It demonstrates that the Western Australian heavy engineers can build modules for navy air warfare destroyers and amphibious support ships at internationally competitive rates.

The marine engineering cluster also requires specialised facilities like fixed and floating docks, heavy lift and transfer systems and large volume covered facilities. 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 sufficient individual benefit to warrant making the investment by themselves.

The Australian Marine Complex Common User Facility

In response to this market failure, the Western Australian Government and the Commonwealth initially invested a total of \$180 million (\$100 million from the State Government and \$80 million from the Commonwealth) in the AMC Common User Facility (CUF).³⁷ This initial investment, which was completed in mid-2003, is owned by the State Government and operated by AMC Management (WA) Pty Ltd. It comprises:

- A protected deepwater harbour.
- A 15,000 tonne service and heavy lift wharf.
- A 3000 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.

³⁷ <http://www.mediastatements.wa.gov.au/media> "Major Boost for Western Australia's shipbuilding industry" 31 August 2005

- Offices, workshops and other amenities.

The business model underpinning the CUF is particularly significant for this submission. The Facility is not dedicated to one user or even one industry and it is expected to service the oil and gas, resources, marine and defence industries. It is sufficiently large to accommodate a number of different projects being undertaken concurrently. 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 period³⁸. This arrangement greatly reduces set up costs for the project and overheads for the company, thereby enhancing their ability to win such contracts (see Box 13).

Box 13 Australian Marine Complex Common User Facility

In order to fabricate the jacket (weighing 400 tonnes and measuring 56m by 16m by 16m) for the Pohokura gas field, the AUSCLAD Group of Companies hired the CUF's mobile fabrication hall. They then used the CUF transfer system, heavy lift facilities and wharfs to load the jacket on a barge for transport to New Zealand.

AUSCLAD will now use the CUF fabrication hall, lift and transfer systems and wharf for the fabrication, assembly, set-to-work and installation of a \$45million bio-diesel manufacturing facility, to be located at the Darwin Business Park in the Northern Territory.

This illustrates how the CUF would enable Western Australian companies to deliver navy ship modules to the ship assembly site on time, to cost and at the requisite standard of quality.

In December 2003, ASC was awarded the \$3.5 billion 25 year contract for repair and maintenance of the Collins Class submarines home-ported in Western Australia. This led ASC to consider establishing a dedicated Collins Class support facility in Western Australia. At the same time congestion and the need to improve security at HMAS STIRLING encouraged navy to consider relocating repair and maintenance activities to the AMC. In addition, Tenix Western Australia, won the \$60 million contract for conversion of the Delos oil tanker (to replace the navy's existing underway replenishment ship HMAS Westralia) and the ANZAC Alliance needed berthing in order to undertake \$500 million worth of ANZAC ship upgrades over 5 years.

Further investment in capability by the Western Australian Government

In response to these developments, the Western Australian Government decided to invest a further \$81.1 million worth of 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.
- The installation of marine services such as power, seawater fire main, wharf communications and sewerage off-take.

³⁸ See Australian Marine Complex operating principles at <http://www.landcorp.com.au/portal>.

In addition to these further investments in the CUF by the Western Australian Government, 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. In addition ASC intends to contribute a further \$5million in capital towards the common user transfer system connecting the floating dock to the ASC submarine support facility. Other long term stakeholders like the Australian Navy and the ANZAC Alliance will also make contributions to the operation and upgrade of the CUF commensurate with their respective usage of the facility.

The Common User Facility and the current naval shipbuilding cycle

The above floating dock is not large enough to accommodate amphibious support ships which, if the Government selects the Spanish Navantia design, would weigh some 27,000 tonne. The above CUF floating dock is being designed so that it can be extended to accommodate the amphibious support ships, if the Commonwealth chooses 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.

*The Western Australian Government **recommends** that, in assessing the sustainability of naval shipbuilding and repair in Australia, the Senate Committee bear in mind:*

- *The flexibility and scale of the Western Australian marine industry infrastructure particularly the capability of the AMC.*
- *The contribution of that infrastructure to the preparedness of naval ships home ported in Fleet Base West.*
- *The importance of supportive policies and enabling investments by government at both State and Commonwealth levels in establishing and maintaining that infrastructure.*
- *The preparedness of the Western Australian Government to build the second stage of the floating dock if the AMC is selected as the integration and consolidation site.*
- *The strategic capability and benefit such a floating dock would provide the nation within the Indian Ocean Rim area of operation.*

5 Capturing the benefits

In this submission the Western Australian Government has argued that, at the national level, the main benefit of local construction of large naval ships relates overwhelmingly to Navy preparedness. As the ANAO noted in its review of the AII program cited earlier, there is at present no methodology for linking AII in specific Navy projects to Navy preparedness in any rigorous, quantitative way. Hence this submission has analysed the national benefits of local construction of navy ships in qualitative terms.

The construction of navy ships generates substantial economic benefits at the regional level. As indicated earlier in this submission, the regional economic benefits of large naval construction projects are illustrated in the case studies of the Minehunter Coastal and ANZAC ship projects commissioned by the Defence Council of the Australian Industry Group and undertaken by Tasman Asia Pacific (later Tasman Economics) in 2000 and 2002 respectively.

Hence, Western Australia, like other states, competes vigorously to attract these projects. In Western Australia's case the benefits of the current naval shipbuilding cycle depend importantly on assumptions about, among other things, the share of the air warfare destroyer projects and amphibious support ships undertaken in Western Australia and about the multiplier effects of such work. Assuming about one third of the air warfare destroyers are constructed in Western Australia and that the amphibious support ships are integrated and consolidated there, the estimated annual economic benefits to the State from Western Australian industry involvement in supply and support of naval ships and submarines could be as high as \$450 million per annum and include:

- ANZAC ship refits \$20-\$30 million p.a. from 2005 to 2015;
- Delos tanker conversion \$60 million from 2005 to 2006;
- In-service support of Collins Class \$20million-\$140 million p.a. from 2007 to 2032;
- Amphibious support ships \$150 million p.a. from 2007-2015;
- Air warfare destroyers \$125 million p.a. from 2007 to 2015³⁹.

At issue are the measures required of government (Commonwealth and State) and commercial interests if they are to capture the above qualitative and quantitative benefits on a sustainable basis. From a Western Australian Government perspective, the starting point is recognition that construction of the three air warfare destroyers and two amphibious support ships that will drive the current naval shipbuilding cycle will not sustain a naval shipbuilding and ship repair industry as such. Properly managed, however, construction of these five ships can help sustain a viable naval shipbuilding and ship repair capability. Transition from the kind of naval shipbuilding and ship repair industry fostered by the previous naval shipbuilding cycle to the new, more flexible naval shipbuilding and repair capability consistent with the current cycle entails shifting to a new paradigm for the Australian naval shipbuilding industry.

5.1 A new paradigm for Australian naval shipbuilding and repair

The new paradigm hinges on the ability of the Australian Defence Organisation, the ship designers and their local partners to manage the air warfare destroyer and amphibious support ship projects so as to:

- Protect existing industry capabilities for in-service support of the Navy force-in-being.
- Establish the core intellectual property, infrastructure and tacit knowledge required for in-service support of the new assets.
- Manage the construction surge by creating a flexible workforce able to move between naval construction projects and those non-defence civil projects in the oil and gas and resources sector that require comparable skills.

This would involve a shift from preoccupation with a sustainable naval shipbuilding industry as such to fostering a heavy engineering industry and associated infrastructure able to swing resources from construction of large naval ships to fabrication of technologically comparable modules and assemblies for oil and gas and resources industries while retaining the core navy-

³⁹ Department of Industry and Resources estimates.

specific skills required for in-service support. In the next section of this submission the Western Australian Government outlines the more important actions required to realize this vision.

5.2 Realising the new paradigm

Moving from a policy focus on retention of the naval shipbuilding industry to a policy focus on creating a heavy engineering industry able to construct and support navy ships as needed while simultaneously attending to other national engineering tasks would require careful attention to:

- Intellectual property with particular reference to that required to assume design authority for Navy ships
- Linking the Australian Industry Involvement program, DMO obligations and navy performance requirements.
- Workforce mobility, company adaptability and infrastructure flexibility.
- The defence business model, with particular reference to competition.
- Commercial arrangements, with particular reference to modular construction.

These issues have all been addressed in general terms elsewhere in this submission. In this section of the submission, these issues are canvassed from the perspective of the new paradigm the State proposes and in terms of the air warfare destroyer and amphibious support ships.

5.2.1 Realising the new paradigm: Intellectual property aspects

The general importance to Navy preparedness of access by local industry to intellectual property was canvassed in Section 4.1.1 above. The air warfare destroyers and amphibious support ships are both overseas designed. If these ships are built here, the local prime contractor will have to purchase the intellectual property required for in-service support. At issue is how much control of intellectual property should be bought.

From a Western Australian Government perspective, the desirable outcome is sufficient control of intellectual property to enable local industry to undertake the kind of capability upgrades that have already characterised the ANZAC ship program and that are likely to characterise the Collins Class program. In principle, this is likely to mean access to sufficient intellectual property to assume design authority for the vessels concerned.

*The Western Australian Government **recommends** that the Senate Committee investigate the implications of Australian industry being design authority for locally built air warfare destroyers and amphibious support ships, with particular reference to any trade off between additional acquisition cost and the value of enhanced preparedness through more comprehensive local support.*

5.2.2 Realising the new paradigm: Linking Australian industry involvement to navy preparedness

The general importance of carefully targeted, contractually enforceable AII programs in determining the nature and scale of Australian industry's capacity to support locally built navy ships in service was explained in Sections 4.1.2 and 4.1.3 above. The Western Australian Government is concerned that insistence on high levels of local content in navy shipbuilding can

become an end in itself, rather than a means of fostering local industry's capacity to support the preparedness of Navy ships.

Realising the new paradigm for Australian naval shipbuilding envisaged by the Western Australian Government will entail stronger linkage between AII targets in defence tenders for the construction of Navy ships and performance targets set for the Australian Navy in the annual defence budgets.

The Western Australian Government sees scope for linking AII in navy shipbuilding projects to navy performance by taking advantage of the developments in defence governance. Over the last 15 years the governance of the Australian Defence Department has evolved steadily in response to Commonwealth Government requirements for better Defence organisational performance and greater accountability within the framework of the Commonwealth's Financial Management Improvement Plan. For present purposes, important aspects of Defence governance include:

- The wide ranging Kinnaird reforms to the defence procurement process.
- The clarification of what individual defence managers are accountable for, starting with the Ministerial Directive to the Secretary and the Chief of the Defence Force (CDF) rendering them explicitly accountable for specified results which are cascaded down defence organisational chains via performance charters between the Secretary, CDF, Defence Group Heads and Service Chiefs.
- Arrangements to improve defence organizational accountabilities include the use of intra-agency customer-supplier agreements like those between the DMO and the Services.

On 1 July 2005 the DMO became a prescribed agency. This is intended to foster improved DMO procurement and support practices through clearer alignment of the accountabilities, responsibilities and authority of the DMO and its Defence customers and by enabling the DMO to adjust financial and staffing resources to meet workload within the Commonwealth Government's regulatory framework⁴⁰. To this end, the DMO's Chief Executive will conclude:

- Materiel Acquisition Agreements with the Chief of the Capability Development Group to cover procurement of major capital equipment.
- Materiel Sustainment Agreements with the Service Chiefs, in their capacity as Capability Managers, to cover the sustainment of current capability (including repair and maintenance services).

At the other end of the spectrum of accountabilities, the DMO has continued to develop the company scorecard system under which the DMO records company performance in the supply and support of defence platforms and systems and takes that performance into account in the allocation of future defence business. The Western Australian Government considers that, in principle, these developments now permit construction of more explicit linkages between:

- AII in defence procurement.
- Company performance.
- DMO's performance obligations to its internal Australian Defence Force customers.
- The accountability of the Chief of Navy to the Chief of the Defence Force and, in turn to Government for Navy preparedness.

⁴⁰ Ibid, pp 259-262

*The Western Australian Government **recommends** that the Senate Committee enquire into the scope for taking advantage of certain developments in Defence governance in order to reinvigorate the AII program by linking it to Defence performance as outlined in the Commonwealth Financial Management Improvement Plan and specified in the annual Defence Budget.*

5.2.3 Realising the new paradigm: Clustering for workforce mobility, company adaptability and infrastructure flexibility

Sustaining a naval shipbuilding capability by consciously embedding it in a wider compatible heavy engineering structure will require careful attention to workforce training and mobility, company adaptability and infrastructure flexibility. These issues were canvassed in sections 4.4 and 4.5 above.

In December 2004 the Western Australian Government announced⁴¹ the WA Defence Shipbuilding Strategy aimed particularly at helping WA industry win the amphibious support ship contract. A significant element of that strategy was the conclusion of a Memorandum of Understanding with South Australia aimed at fostering a cooperative approach to the new work. In accordance with that MOU, Western Australia has actively supported South Australia in its successful campaign to secure the air warfare destroyer project for ASC and has concentrated its attention on the amphibious support ships.

In return the South Australian Government is supporting Western Australia's aspirations to consolidate the amphibious support ships at the AMC.

Underpinning the Western Australian strategy for integrating and consolidating the amphibious support ships at the AMC-CUF is the concentration - unique in Australia - of heavy engineering and marine industry expertise around this flexible infrastructure. This geographic concentration of labour, companies and infrastructure facilitates the exchange of knowledge and the movement of resources between compatible engineering activities. Subject to appropriate conditioning through participation in naval ship construction, the WA heavy engineering cluster, focused on the AMC, is uniquely placed to preserve a naval shipbuilding capability on a sustainable basis.

*The Western Australian Government **recommends** that the Senate Committee enquire into the merit of embedding a naval shipbuilding capability in a geographic concentration of compatible workforce, companies and infrastructure.*

5.2.4 Realising the new paradigm: Modular construction

With the ANZAC ship project Tenix pioneered the introduction of the modular construction techniques developed by MEKO in Germany. Tenix has also employed this approach in building ships for the Royal New Zealand Navy under Project Protector. Modules for Project Protector ships were built in Williamstown (Australia), Whangarei (New Zealand) and Merwede (Holland).

Tenix assembled the ANZACS from 12 major modules built at three sites including Newcastle and New Zealand and shipped to Williamstown, Victoria for final assembly and launch. These

⁴¹ See Media statement on 8 December 2004 by The Hon Clive Brown MLA and The Hon Geoff Gallop MLA "Premier Commits \$65 million to develop a world class defence shipbuilding hub" www.mediastatements.wa.gov.au accessed 14 Feb 2006.

modules, while large, are small enough to be worked on under cover, thereby minimising the effects of weather and allowing installation of equipment before the ends of the ship or its superstructure are fitted. Much of the ANZAC ships' equipment is containerised or palletised, enabling it to be installed in the modules as the latter reach the appropriate stage.

This containerisation principle allows for integration and testing of functional units before fitting to the ship. The resulting partially outfitted modules can easily be erected on the slipway. The level of outfitting at launch is higher than can be achieved using traditional shipbuilding methods.

Appropriate designs, extremely accurate construction by off-sight fabricators and rigorous quality assurance are critical to achieving the potential efficiencies of modular construction. Without these stringent standards, modules require expensive rework at the assembly site, in turn eroding the benefits of the process.

For present purposes, the key point of this modular construction approach is that it greatly facilitated achievement of high levels of Australian-New Zealand content that have characterised the ANZAC ship project. As already noted, these high levels of local content have translated into responsive, comprehensive indigenous support of ANZAC ship preparedness. Similarly, the dispersed fabrication allowed by modular construction enables the shipbuilder to reduce highly localised peaks and troughs in naval shipbuilding activity. This in turn helps foster sustainable industry capabilities.

*The Western Australian Government **recommends** that the Senate Committee enquire into:*

- *The construction methodology envisaged by each team for the air warfare destroyers and the amphibious support ships respectively.*
- *The extent to which the amphibious support ships as presently designed lend themselves to modular construction.*
- *The extent of geographic dispersal of module construction envisaged by ASC for the air warfare destroyers and by the competing teams short-listed for the amphibious support ships.*

5.2.5 Realising the new paradigm: The defence business model

Transition from the conventional naval shipbuilding paradigm to a new paradigm based on embedding a naval shipbuilding capability in a wider heavy engineering matrix would entail some significant adjustments by the commercial interests involved. The Western Australian Government considers that these adjustments would be best achieved by industry competing for amphibious support ship business (at both prime contract level and down the supply chain) within a clear defence policy framework and guided by AII objectives geared to specific preparedness outcomes.

The Western Australian Government therefore endorses the Commonwealth Government's encouragement of vigorous competition between overseas designers and local prime contractors for local construction of the amphibious support ships. Conversely, however, the Western Australian Government would be concerned that a decision to build the ships overseas would pre-empt any transition to a more viable naval shipbuilding paradigm along the lines proposed in this submission.

A decision to build the amphibious support ships overseas would very likely see the local industry collapse into a single monopolist naval shipbuilder centred on ASC (at least while it was engaged in the construction of the three air warfare destroyers) and two ship repair hubs centred on, respectively, Fleet Base East and Fleet Base West. In this scenario, potential new entrants from elsewhere in the heavy engineering sector would lack the conditioning obtained from participation in the amphibious support ship program and the main indigenous source of substantially reduced competitive tension would come from:

- In the longer term, navy interest in aluminium ships, perhaps modelled on the US Navy littoral combat ships if the Austal/General Dynamics candidate is successful.
- In the shorter term, the residual naval shipbuilding capability retained by local repair and upgrade of navy ships.

*The Western Australian Government **recommends** that the Senate Committee enquire into the consequences for the nature and scale of indigenous competition for future naval business if the Commonwealth decides to build the amphibious support ships overseas.*

6 Conclusion

In concluding this submission the Western Australian Government focuses on the specific issues identified in the Senate Committee's terms of reference.

6.1 The capacity of the Australian industrial base

The Western Australian Government considers that the current cycle of naval shipbuilding, driven by five large complex ships, is unlikely to be able to sustain an Australian naval shipbuilding industry comparable to that fostered by the previous cycle. Subject to appropriate involvement in construction of the five ships that will drive the current cycle, however, the Australian industrial base has ample capacity to construct large naval vessels over the long term and on a sustainable basis. Moreover, the marine industry cluster developing in the vicinity of Fleet Base West and focused on the AMC in Henderson is uniquely placed to foster an overall economic environment conducive to the mobility of resources and the flexibility of infrastructure required to construct large naval vessels over the long term and on a sustainable basis.

6.2 The productivity of the Australian shipbuilding industrial base

With the end of the Cold War, the UK and US Governments - like many other members of the Western strategic community - are managing the adaptation of their naval shipbuilding industries to much reduced demand and changing requirements that characterise the post Cold War environment. The Department of Defence and Australian naval shipbuilders would seem well advised to take advantage of experience gained by the UK and US Defence organisations in international benchmarking of the productivity individual yards. Such benchmarking would be a key input into any balanced assessment of the comparative economic productivity of the Australian naval shipbuilding industrial base.

While benchmarking the individual yards involved in any naval shipbuilding would be necessary, it is unlikely to be sufficient for Australian purposes. This is particularly the case if the focus of Australian policy moves away from sustainability of the naval shipbuilding industry as such in favour of embedding a naval shipbuilding capability in a broader marine engineering base. The Western Australian Government considers that it would be at least as important to benchmark the productivity of the supply chain underpinning the final assembly yard.

6.3 The cost of in-service support of naval ships built here and abroad

The Western Australian government is sceptical about the validity of comparing the cost of shipbuilding in Australia with the cost of shipbuilding in comparable countries overseas. Such comparisons are likely to understate the value to navy preparedness of a local industry conditioned for in-service support through involvement in construction of large navy ships. While Australia lacks a robust and generally recognised methodology for valuing such local support, the role of local industry in sustaining the preparedness of such key navy platforms as Collins Class submarines and ANZAC ships is a convincing demonstration of the value to be gained.

6.4 The broader economic benefits to be gained by local construction of naval ships

National security confers important economic benefits. The Western Australian Government endorses the focus on a credible maritime strategy for the defence of Australia and its interests as a key component of national security and, by extension, of national prosperity. A capable navy and the industry base that supports it are critical elements of a credible maritime strategy. At the national level, therefore, the economic benefits to be gained from local construction of navy ships need to be gauged in terms of the contribution such construction makes to the credibility of Australia's maritime strategy, not in terms of, for example, jobs and the exchange rate.

At the regional level, however, the economic benefits of naval ship construction can be substantial. The extent of such benefit depends substantially on prevailing economic circumstances.

If the regional economy is operating at full capacity, the introduction of naval shipbuilding can simply divert resources from other activity, making little – if any – contribution to aggregate welfare. Conversely, if naval shipbuilding is introduced into a dynamic adaptable regional economy with careful attention to intellectual property, company adaptability, workforce mobility and infrastructure flexibility, it can confer lasting economic benefits. The Western Australian Government is implementing its Defence Shipbuilding Strategy on this basis.

In conclusion, the Western Australian Government supports the construction of the amphibious support ships in Australia with the integration and consolidation of the ships undertaken at the AMC, Western Australia.