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REPORT

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Terms of Reference

The Senate Standing Committee on Foreign Affairs, Defence and Trade shall inquire into and report upon the scope and opportunity for naval shipbuilding in Australia and in particular:

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

Abstract

This submission demonstrates the benefits to the National Interest by retaining the capability to design, construct, maintain and support in service, indigenously designed and produced submarines. The submission argues Australia's unique strategic circumstances require a Maritime Strategy contingent upon the retention of an indigenous submarine construction industry. Further, this self reliance theme necessitates the retention of current shipbuilding skills as a basis for retaining the ability to design and construct future classes of submarines. An argument is also developed in the submission for the value added benefits of submarines designed and constructed in Australia to meet Australia's unique circumstances, highlighting the warfighting capability resident in submarines as essential for the maintenance of Australia's ongoing national security and thus in the national interest.

The timely acquisition of the next generation of submarines is critically dependent on sustaining a viable and cost competitive naval shipbuilding industry in Australia. Experience gained from the Collins Class submarine construction program (and the Anzac ship program) is used to demonstrate that the construction in Australia of large naval vessels would not only be viable and cost effective but also necessary to ensure ongoing development of the industry to respond to future submarine and other naval shipbuilding programs

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1. INTRODUCTION

1.1 THE TERMS OF REFERENCE

The Submarine Institute of Australia (the Institute) is conscious that the reference to 'large Naval vessels' in the Committee's terms of reference (TOR) may not be construed to include future submarine construction programs.

This paper demonstrates that it is necessary to include the benefits of Australia's submarine design, technology integration, construction and through life support capability's in the Committee's consideration of the scope and opportunity for naval shipbuilding in Australia.

1.2 CONSIDERATIONS

The critical interrelationships and interdependencies that exist between the maintenance of an ongoing viable naval shipbuilding industry and the strategic importance of sustaining Australia's submarine design, technology integration, construction and through life support capability are essential to any consideration of the future of Naval Shipbuilding in Australia.

This submission outlines the strategic importance of sustaining an effective submarine capability and argues that the timely acquisition of the next generation of submarines is critically dependent on sustaining a viable and cost competitive naval shipbuilding industry in Australia. Experience gained from the Collins Class submarine construction program (and the Anzac ship program) is used to demonstrate that the construction in Australia of large naval vessels would not only be viable and cost effective but also necessary to ensure ongoing development of the industry to respond to future submarine and other naval shipbuilding programs and to provide an effective battle damage and routine repair capability.

Finally, the Institute seeks to draw out some of the defence implications arising from consideration of this issue, particularly as they might apply to Australia's submarine capability in the future.

1.3 AUSTRALIA'S STRATEGIC CIRCUMSTANCES

Any consideration of the maintenance of Naval Shipbuilding must be set in the context of Australia's longer term strategic outlook. This submission does not develop these in detail and relies on the Defence White Paper,¹ Defence Updates in 2003 and 2005, supplemented by specific points where necessary. The points drawn out are generally confined to the issues affecting the requirement for a new class of submarine.

¹ Defence 2000: Our Future Defence Force

2. THE MARITIME STRATEGIC CONTEXT

2.1 THE 2005 DEFENCE UPDATE

The major review of Australia's National security released on 15 December, 2005 concludes in part that:

- "Continuing strategic complexity and uncertainty means that we need to build a balanced Defence Force that is versatile, robust, joint and integrated.
- Defence Industry is critical to meeting the ADF's needs and the Government is committed to policies that will build an internationally competitive industry to support, sustain and upgrade Defence assets."²

2.2 AUSTRALIA'S DEPENDENCE ON IMPORTED OIL

Australia's oil import dependence is rising from a low of 10% in 2000 to 60% in 2010.³ These imports are carried by sea.

Australia's maritime environment will become increasingly critical as a strategic and security issue, particularly in the context of energy and trade.

2.3 IMPACT OF AUSTRALIA'S GEOGRAPHY ON ITS STRATEGIC CIRCUMSTANCES

No country shares the characteristics of Australia's geographic and maritime circumstances. Whilst our relative isolation brings a number of strategic advantages, eg the long maritime approaches provide a barrier and the opportunity for early warning of an opponent's intention or approach; they are also a significant barrier to operate through. For the effective conduct of maritime operations Australia's maritime defence assets therefore require long range and endurance. Achieving these attributes frequently drives the design of these assets.

Australia's maritime security needs are unique, thereby demanding unique solutions.

² Australia's National Security – A Defence Update 2005, Australian Government Department of Defence, 15 December 2005.

³ Productivity Commission Inquiry into Energy Efficiency, Appendix 1, September 2005

2.4 CONTEMPORARY AND EMERGING CIRCUMSTANCES INFLUENCING MARITIME STRATEGY

As recognised in the Defence Update 2005 the strategic circumstances Australia faces in its area of national interest are undergoing rapid technology and capability change. To illustrate with two examples.

2.4.1 India

India operates the world's fifth largest navy⁴, whilst procurement delays and obsolescence are hindering India's self envisaged roles of sea control⁵ and denial,⁶ a number of programmes are underway to overcome this situation:

- India has a force of 15 submarines and is endeavouring to expand this to 24.
- The recent contract to acquire 6 modern Scorpene class, conventional submarines from France will achieve a substantial step toward this capability increase.
- A programme exists to construct an indigenously designed nuclear powered attack submarine; this has been supplemented by the recent lease of a modern Russian Akula class, nuclear powered attack submarine.⁷
- Debate continues on the need for a nuclear second strike capability, to be carried by nuclear propelled, nuclear armed ballistic missile submarines.

2.4.2 China

China has the largest submarine force in the Pacific. Although many of these units might be considered obsolete, active programmes are underway to acquire modern Russian designed conventional submarines and to develop a second generation of indigenous nuclear powered attack and nuclear powered and armed ballistic missile submarines. A recent publication by the US Congress Research Service cites reports that:

'China will have a net gain of 35 submarines over the next 15 years, with no production slow down in sight. It is reasonable to assume that at current production levels by 2020 the Chinese submarine fleet could boast nearly 50 modern attack boats.'⁸

⁴ Global Security Organisation, Indian Navy Development

⁵ Sea Control. "One has freedom of action to use an area of sea for one's own purposes, and deny its use to an opponent ... includes air space above the surface ... and the water volume and sea bed below." BR 1806 The Fundamentals of British Maritime Doctrine, 1995

⁶ Sea Denial. "The condition short of Sea Control that exists when an opponent is prevented from using an area of sea for his purposes" Ibid.

⁷ Russian online daily Kommersant, 9 February 2006

⁸ Congress Research Services Report For Congress – China Naval Modernization: Implications for US Navy Capabilities – Background and Issues For Congress, 18 November 2005.

2.5 GROWTH IN REGIONAL MARITIME CAPABILITIES

Many other navies in our region are introducing modern maritime surveillance systems backed by anti surface and anti submarine weapons systems

It will be a more demanding regime to operate in, with increased surveillance, anti surface warship and anti submarine capabilities deployed.

3. WHY DOES AUSTRALIA NEED A SUBMARINE CAPABILITY?

3.1 SUBMARINE CAPABILITIES

To appreciate the importance of the submarine force in Australia's defence capabilities it is necessary to summarise the capabilities submarines provide:

- A unique ability to operate in waters and under air space controlled by another, with a low probability of counter detection, or causing a diplomatic incident.
- A capability to operate throughout the Asia Pacific and Indian Ocean region, conducting surveillance and intelligence gathering where necessary.
- The deterrence implicit in the disproportionate amount of effort to counter and uncertainty that this can be assured – there is always an element of doubt as to their location and intentions.
- In periods of tension the submarine force is a significant deterrent against an aggressor intent on escalating a situation to conflict.
- In the event of conflict, a graduated response for Government arising from the capability to operate in an opponent's critical areas of interest, to observe and report back and when directed, conduct offensive operations.

3.2 OPTIONS FOR GOVERNMENT

In summary, submarines provide an excellent spectrum of options for Government ranging from land strike, maritime strike, anti submarine warfare, Special Forces insertion and extraction, covert intelligence collection to regional diplomacy.

3.3 SIA ACTIVITY

During the past two years, the Institute has conducted a number of conferences, colloquia and studies on the next generation submarine. The overall conclusion reached is that in view of the strategic discontinuities that will characterize the next few decades, the Institute believes it would be grossly irresponsible for any Australian Government to forego one of its most effective strategic assets – submarines.

3.4 SUBMARINE EFFECTIVENESS

For maximum effect Australia's submarines must be able to deploy throughout our region of interest, linger undetected in a patrol area and return, without being counter-detected. In Australia's case this typically entails long ocean transits, negotiating the Archipelago to our North before moving into a shallow, coastal operating area with extremely high shipping densities and growing anti submarine surveillance – all whilst remaining undetected. This combination of circumstances necessitates submarines with a long range, high transit speeds and excellent covert capability. Increasingly, this will require an air independent propulsion system able to sustain the submarine in the patrol area, freeing it from the need to expose masts to recharge batteries by snorkeling.

Having regard to Australia's strategic outlook and maritime environment, a sophisticated submarine capability will remain a core defence asset.

3.5 THE TIMESCALE FOR ACQUIRING THE FUTURE SUBMARINE CAPABILITY - IS IT A FACTOR IN THE CURRENT REVIEW OF NAVAL SHIPBUILDING?

The future submarine does not feature in the current Defence Capability Plan. The Institute understands that Defence currently envisages conceptual studies for the future submarine commencing in 2006 using Project Definition Funds, with a design contract awarded in 2015 leading to the commissioning of the first new generation submarine in 2026. This schedule is appropriate to avoid repeating some of the mistakes of the Collins acquisition.

- Although there are many lessons to be learned from the Collins acquisition, it is now clear that an outstanding defence capability was delivered, albeit in the face of many challenges.
- In hindsight, the planning cycle involving project development, design, construction and sea trials was too optimistic for a developmental program.

Preparation for the future submarine requirement now underway is critical to avoid repeating some of the difficulties encountered with the Collins

4. ACQUIRING THE CAPABILITY

4.1 OPTIONS

Two options exist for obtaining the capability:

- Can we buy it from overseas?
- The alternative – develop it within Australia?

4.2 OVERSEAS PROCUREMENT

The number of conventional submarine designers has shrunk significantly since the 1980s when 7 shipbuilders were approached to meet the Collins requirement. Today 2 remain active; a French and a German company - Spain is also building conventional submarines to a French design.

- None are designing or building a submarine for their parent navy or current customers able to meet Australia's demanding requirements.
- Whilst existing designs can be stretched to meet Australia's requirements this introduces additional risks - there are no 'off the shelf' solutions available.
- Both designers' facilities are too remote to provide a viable through life support capability. This underscores the need for self reliance in submarine through life support.

Achieving a 'two horse race' as required by the Kinnaird process will therefore require significant design development or acceptance of major capability shortfalls. There are a number of other drawbacks to following this process, for example:

- One off the shelf option might be a DCN Scorpene derivative (French, because Spain does not have sufficient submarine building expertise, and Germany is concentrating on shorter range submarines).
- It should be noted that proceeding with a French derivative would generate difficulties with the USN, with whom Australia has signed a Statement of Principles for sharing sensitive submarine information and technology.

The option to design and construct in Australia therefore becomes more compelling.

4.3 DESIGN AND CONSTRUCT IN AUSTRALIA

Collins was successfully constructed in Australia. Some of the pertinent lessons and outcomes from the Collins project are discussed in the following section of this submission. Given the difficulties of creating an off the shelf option and the eventual positive outcomes of the Collins project it would require an extraordinary lack of confidence

by the Government in Australia's shipbuilding industry for a one off, design and build project to meet Australia's future requirements to be given to an overseas shipbuilder. The following summarises issues for consideration in considering this matter:

- The quality of the Collins construction is recognised as world class, particularly when compared with US and UK submarines.
- A number of important design issues were identified, many from the Swedish designer's attempts to upscale from their experience of small, Baltic submarines designed for archipelagic, short duration use.
- Nevertheless, these have been overcome, mostly as a result of design work within ASC, as well as assistance from Electric Boat in the US.
- Further assistance came from the US Navy, cementing the existing ties and as a result of the Submarine Statement of Principles to work collaboratively together;
- This collaboration with the USN continues with current projects replacing the Collins combat system and with an advanced torpedo.
- Ties between ASC and Electric Boat are strong and have generated a parallel arrangement between ASC and another General Dynamics company, Bath Iron Works, to build the Air Warfare Destroyer.
- The updated Collins provides a useful design base from which to develop a new generation submarine.
- The design of a new class can be accomplished given adequate time to develop the design.
- The concept work and design exploration should begin early so that risk reduction trials of systems can be undertaken using Collins as a test bed.
- This work includes advancing Collins capability beyond just remedying the shortfalls highlighted by the McIntosh/Prescott Report.
- This also extends beyond hull and machinery, to the combat system which includes the "eyes and ears" that provide the necessary operational edge over adversaries.

Australia's requirements for the next generation of submarines will necessitate design development based on partnerships forged between Australian industry and overseas shipbuilders and combat system design houses.

4.4 AUSTRALIA'S NEED FOR A SUBMARINE DESIGN AND INTEGRATION AUTHORITY

The industry to do the work outlined above currently exists with ASC as the central core. To complete the work outlined above, industry needs to develop its people, exercise its skills, and invest in facilities. This can only be achieved with real and meaningful work. There is significant work to be done in preparation for a new generation submarine and extending beyond simply enhancing Collins. The effort toward a new class of submarine would involve Defence Science and Technology Organisation, Australian and overseas industry, given:

- The design and integration work would include Defence Science and Technology Organisation in two roles – to support technical studies and investigations and to
-

conduct technical risk assessments before project proposals are submitted to government.

- Industry has clearly demonstrated, through the Collins remediation, that it is capable of system design and modification.
- While there is a “degree of difficulty jump” to overall submarine design, this can be accomplished through the assistance of ASC’s submarine capability partner in the US, the Electric Boat Company, specialised submarine equipment suppliers and with the assistance of the US Navy.

4.5 THE CASE AGAINST PURCHASING THE CORE DESIGN FROM OVERSEAS

Should Australia fail to capitalise on its Collins design experience and seek to obtain the core design and integration work from overseas, there is the very real likelihood that a range of similar problems to Collins could occur. The need to interpret our unique requirements and either extrapolate or interpolate design details from an existing overseas design is an intense, iterative process which requires a good understanding of the operational requirement and extensive dialogue between the operators and the design house.

4.6 SUSTAINING SUBMARINE DESIGN EXPERTISE - THE UK EXPERIENCE

In a recent study into sustaining the UK’s nuclear submarine design capability the Rand Corporation estimated that a core design team of 200 was required.⁹ In the case of Australia, these numbers must be moderated by the reduced complexity and scale of a conventional submarine when compared with a nuclear powered vessel.

4.7 ASC SUBMARINE DESIGN CAPABILITY

Today ASC has a design force of 100 engineers and 170 technical and support personnel and estimates that it has approximately 75% of the skills necessary to initiate a submarine design project. The shortfall in numbers and expertise could be supplied in the first instance by their technology partner General Dynamics Electric Boat and niche designers of specialist components, eg submarine masts, periscopes. The major task for ASC is to integrate these contributions. The Institute contends that ASC provides a viable design base for developing Australia’s future submarine solution provided this acquisition strategy is accepted early and steps taken to sustain and develop the capability:

- It is therefore a critical requirement to build upon ASC as a submarine design and integration house, and to ensure that it gets real and meaningful submarine work.
- In addition, participating in the design, construction and through life support of major surface warships assists in developing and sustaining this design team.

⁹ The UK’s Nuclear Submarine Industrial Base, Vol 1 Sustaining Design and Production Resources, figure 2.5. Published 2005.

The resolution of the problems associated with Collins introduction into service and 'parent Navy' role for Collins through life support have established and will continue to sustain a core submarine design and integration capability.

4.8 SUSTAINING THE CAPABILITY – THE LINK TO MAJOR SURFACE SHIPBUILDING

The workforce within the shipbuilding and repair industry may exist in pockets, i.e. Sydney, Melbourne, Adelaide and Perth; however the pockets do not exist in isolation of each other:

- Some of the workforce tends to move with new challenges – this occurred with moving half of the Naval Fleet to WA, ANZAC Ships and with Collins, and is happening again with the Air Warfare Destroyer Project.

Sustainment activities for submarines and surface ships are similar, for example, in WA; Tenix conducts dockings for both surface ships and submarines, although for Collins, ASC supervises the work. The sustainment linkages can be summarised as follows:

- Some of the subcontractors are common to both the surface fleet and submarines; this can include sonars, communications and power equipment.
- There are activities that are carried out by companies on both submarines and surface ships, for example, Thales Underwater Systems provides sonars and accompanying maintenance to both the submarine and surface fleet; this synergy reduces costs to Defence.
- The skills from submarine construction and sustainment include safety programs, contract management, project management and quality assurance, aspects of which have been transferred to the surface fleet.
- A design and construction capability is a huge benefit when modifying ships and submarines and in carrying out unusual repairs, such as hull cracks (a particular issue with surface ships) and repairs to power generation equipment.
- Even more important is to have the industry continually engaged so that in the unfortunate but potential event of battle damage or accidental damage, major repairs can be conducted expeditiously within country; design experience is especially important in this case.
- The case stands for industry in respect of both submarines and the surface fleet.

A major surface shipbuilding project can assist in sustaining the submarine design and integration base.

The future submarine requirement should be a factor in any consideration of Australia's future Naval shipbuilding capability.

The decision taken as a result of this inquiry could directly impact on Australia's options for design and integration of the future submarine solution.

In support of these contentions this submission will now examine some of the pertinent lessons learnt from the Collins Project.

5. COLLINS CLASS SUBMARINE CAPABILITY

5.1 COLLINS INTRODUCTION

The Collins Class construction program involved a large investment in submarine capability for sound strategic reasons that continue to be relevant in Australia's current environment. It was a bold program that had its genesis in experience gained in RAN Oberon submarine operations. After a difficult introduction into service, the Collins is now performing well and regarded as an exceptional submarine

5.2 LONG TERM SUPPORT

The long-term support of the Collins Class is vital. Access to USN technology, interoperability, communications, future updates, intelligence and many other factors, including current and envisioned weapons, mandate a close and binding relationship with the USN. Current cooperation with Raytheon and the USN to further develop the combat system capability reflects this approach. It is recognised that no other country (including European shipbuilders and combat system suppliers) can provide such support in Australia's region of interest. It is also recognised that that security considerations arising from this approach may limit the options for ongoing Australian shipbuilding industry rationalisation including the future ownership of ASC. The USN is sensitive about compromising its submarine technology by inadvertent disclosure and limits its release to trusted and proven partners only.

5.3 BENEFITS OF COLLINS CLASS SUBMARINE CONSTRUCTION PROGRAM

The submarine construction program generated significant benefits. These included:

- Proven naval shipbuilding management capability.

- New industrial environment and progressive industrial relations practices.
- Contribution of indigenous R&D, design, production and trials capabilities.
- Extensive technology transfer across a broad spectrum of activities.
- Contribution of Australian expertise (combat systems, software, steel, welding, towed arrays, pumps and other products).
- Development of valuable new skills, manufacturing techniques and processes.
- Implementation of strict quality standards and requirements.
- Increased manufacturing productivity and enhanced Australian manufacturing competitiveness.
- Creation of capability to support vessels throughout their operational lives ('Whole of Life Management') at minimum cost and investment.
- Engendering a belief in Australia's own capabilities and confidence in its own ability to exploit opportunities.
- Creation of export opportunities.
- Extensive job creation.
- Establishment of new infrastructure including the construction facility in South Australia.
- Creation of new advanced financial management systems, contract administration systems and processes, management information systems and engineering and data management capabilities.
- Creation of new operational support facilities (eg, specialised ranges, training, logistic support and safety programs).
- Realisation of greater 'self reliance through industrial capability'.
- Successful implementation of the Australian Industry Involvement (AII) program that exceeded the contractual requirement (70% and 45% by value of the contract price for the platform and combat system elements).
- Australian industry as the principal beneficiary of more than \$3B was spent in Australia with over 100 Australian companies involved.
- Australian industry involvement included project management, submarine construction, manufacture and test of submarine systems, and development of test and support facilities.
- Some 80% of project funds directed to major Australian subcontractors and other suppliers (i.e., competitively bid at supplier level). Modular construction techniques ensured work was distributed around Australia.
- Exposure of gaps in technology capability, prompting development of Australian scientific and industry expertise to fill these needs, eg acoustic stealth technology.

5.4 SHIPBUILDING OUTCOMES FROM COLLINS

The Collins program (coupled with the Anzac ship program) generated a viable and efficient naval shipbuilding industry and significantly enhanced the capability and credibility of Australian defence industry in both the domestic and international market place. While the submarine project did encounter difficulties, such difficulties were not unexpected for a high risk program of this scale and complexity. Indeed, the ability to successfully address and resolve such difficulties is regarded as an important attribute for the industry.

5.5 OPERATIONAL OUTCOMES FROM COLLINS

Importantly the Collins Class construction program is increasingly perceived as delivering on its capability objectives and thereby revealing the significant achievements of Australian industry.

5.6 ECONOMIC BASIS FOR THE CONSTRUCTION OF COLLINS SUBMARINES IN AUSTRALIA

During the project development phase of the submarine program bids were sought from a number of overseas shipbuilders and combat system houses for the supply of six submarines. These bids included construction of all submarines overseas, construction of the first submarine overseas and the remaining five in Australia, and later (the Project Definition Phase) formal offers from two shipbuilders and two combat system houses for construction of all six submarines in Australia. Thus there was considerable cost data available to compare the cost of an overseas build program to an Australian construction program. The availability of this cost data coupled with the anticipated benefits of local construction led to the then Government's decision in May 1985 to construct all six submarines in Australia, and later to the decision in May 1987 to award the construction contract to the Australian Submarine Corporation (based on the Swedish Kockums platform design and Rockwell International combat system).

5.7 AUSTRALIAN INDUSTRY INVOLVEMENT

To assist the development of AII proposals, the PDS contracts provided for an AII Premium of up to 20% per item of work while items above this threshold had to be individually identified and justified. In the event final offers fell within Commonwealth ceiling price guidance and project cost estimates.

5.8 PRICE PREMIUM

Based on project cost estimates the overall premium for AII (based on 70% and 45% by value for the platform and combat system elements but excluding the cost of the construction facility of about \$150M) lay between zero and 4% of the total contract price. This estimate was derived from earlier comparable offers that included an option to construct all submarines overseas and also consideration of the factors that led to the ASC contract price (that was some 15% more than the earlier estimate for an overseas construction program). Factors that impacted on the final ASC contract price included:

- The requirement to establish management infrastructure in Australia.
 - The cost of the construction facility (some \$150M or 4% of contract price).
 - Commercial terms and conditions of the construction contract that related predominantly to risk, insurance, warranties and the integration of the platform and combat system designs and associated performance requirements.
 - Level of AII.
-

- Increased test and trials capability.
- Impact of the depreciation of the Australian dollar (some 5% of contract price)

5.9 ANZAC PROGRAM PRICE PREMIUM

Note that in the case of the Anzac ship program prices for overseas construction were not sought from potential shipbuilders. However, based on submarine cost data, it is estimated that the premium for construction of all Anzac ships in Australia was probably slightly less than for the submarines because of their lower complexity and lesser sensor/weapon fit.

5.10 FINAL IMPACT OF PREMIUMS

Having regard to the wider economic, strategic and other direct and indirect benefits of Australia construction, the premiums involved for local construction for both the submarine and Anzac ship programs were modest and clearly acceptable to Government.

Construction in Australia of naval vessels (including the Collins Class submarines) generated significant economic and other benefits including the prospect of ensuring adequate through life support of the vessels.

The Collins and ANZAC shipbuilding programmes demonstrated that Australian Industry is capable of mobilising and developing the skills to establish and sustain complex naval shipbuilding programmes.

The Collins and ANZAC programmes demonstrated that Australian Industry is competitive with international shipbuilders for cost and quality. Significant economic, strategic and a broad range of industry benefits were also obtained by constructing these vessels in Australia.

The Collins Class program demonstrated that the cost of Australian construction equated closely to the cost of overseas construction.

6. COMPETITIVENESS OF NAVAL SHIPBUILDING INDUSTRY

6.1 THE COLLINS EXAMPLE

The Collins Class submarine program demonstrated that the Australian naval shipbuilding industry competitiveness is on a par with overseas countries (eg, Europe and US). The submarine program also demonstrated that the key to controlling and minimising costs lay with use of advanced manufacturing techniques and processes (eg, modular construction), maximising competition throughout the materiel/equipment supply chain and an ongoing workload.

6.2 IMPACT OF THE LOSS OF SHIPBUILDING CAPABILITY IN AUSTRALIA

Loss of or a reduction in of naval shipbuilding industry capability in Australia would be a major setback in the confidence, capacity and competitiveness of manufacturing industry generally in Australia. It would send the wrong signal to an industry already in decline and struggling to compete with imports (particularly from China) and attendant loss of jobs to overseas.

It is important to note naval shipbuilding (including large, medium and small surface ships and submarines) is at the high value/high (smart) end of the technology spectrum and is regarded as a strategic asset important to Australian security and increased self-reliance.¹⁰

Naval shipbuilding involves literally hundreds of Australian companies in collaboration with numerous overseas companies with attendant benefits and spin-offs for all parties involved. As outlined these benefits include technology transfer, innovation, export opportunities, improved management practices and systems, etc.

Australian industry involvement extends beyond the initial development/construction phase into training, setting to work, sea trials and through life support including design and development support, in depth repair, modification and ship/equipment upgrades and modernization programs extending over the service lives of naval vessels of some twenty to thirty years.

¹⁰ Naval Shipbuilding and Repair Sector Strategic Plan – Aug 02, page xi.

6.3 IMPACT OF PARENT NAVY RESPONSIBILITIES

Commercial risk associated with overseas companies is particularly relevant to vessels where there is no overseas parent navy and for which the RAN is or becomes the only operator. For example, it is noteworthy that although Kockums no longer exists as a Swedish company to support the Collins Class submarines, ASC coupled with other Australian based companies were able to fill this void. Thus Australian construction significantly mitigates this type of commercial risk/outcome and also simplifies the security considerations associated with US sourced equipment and supplies.

Australian industry involvement extends beyond the initial development/construction phase into training, setting to work, sea trials and through life support including design and development support, in depth repair, modification and ship/equipment upgrades and modernization programs extending over some twenty to thirty years.

Australian industry is the major beneficiary of Australian naval ship construction programs.

7. RATIONALISATION OF AUSTRALIAN NAVAL SHIPBUILDING INDUSTRY

7.1 DEFENCE WHITE PAPER 2000

Consequent to the 2000 Defence White Paper, Defence argued the case for reducing current Australian naval shipbuilding capacity¹¹. At the same time Defence also proposed to undertake all future major naval shipbuilding in Australia. Defence argued that this approach, coupled with the introduction of a range of initiatives and business practices, would lead to Naval Shipbuilding and Repair industry rationalisation and efficiencies. Proposed initiatives included 'Future Demand Planning' (to avoid 'boom and bust' cycles), incentives, trust, risk sharing and mutual obligations. Importantly, Defence envisaged that this would lead to increased efficiencies, greater productivity and an industry that would be more internationally competitive.¹²

¹¹ Ibid, section 3.

¹² Minister of Defence, Senator Robert Hill, Media Release dated 29 Aug 02.

7.2 BENEFITS OF TEAMING BETWEEN OVERSEAS AND AUSTRALIAN SHIPBUILDERS

Defence has historically sourced equipment from both Europe and the US. Experience indicates that competitive teaming through commercial alliances between overseas shipbuilders/designers and major Naval Shipbuilding and Repair companies in Australia offers the best prospect of ensuring efficient Australian construction and industry involvement, timely delivery and performance and internationally competitive prices. Such a procurement strategy is well proven and exploits the full benefits of market forces. In particular, as shown by the Anzac ship, Collins Class submarine and Minehunter construction programs, competition is not constrained by existing facilities or current management entities. This approach is equally applicable to the construction in Australia of large naval vessels.

While some rationalisation of the Australian naval shipbuilding industry should be anticipated, the formula of Australian companies collaborating with overseas shipbuilders and combat system houses to construct naval vessels in Australia at internationally competitive prices is sound and proven.

Naval shipbuilding (including large, medium and small surface ships and submarines) is at the high value/high (smart) end of the technology spectrum and is regarded as a strategic asset, important to Australian security and increased self-reliance.

The construction of large naval vessels in Australia would enhance the efficiency, competitiveness and future viability of the naval shipbuilding industry in Australia.

8. ECONOMIC BASIS FOR LOCAL CONSTRUCTION OF LARGE NAVAL VESSELS

8.1 IMPACT OF COMPLEXITY ON CONSTRUCTION COSTS

There are often significant differences in the levels of complexity between the construction of large merchant vessels and large naval vessels albeit the design of both is increasingly based on commercial shipbuilding standards. However there are important and necessary differences that result in large naval vessels, such as the amphibious ships, being more complex in terms of some design specifications and standards, equipment fit (eg, Command Control Communications and Intelligence systems, ability to carry fuel and support aircraft, lifts, floodable dock, data links, early warning sensors, self defence weapons and control systems, damage control and survivability, automation, security requirements, replenishment at sea, etc), setting to work, trials and through life support.

In practice the construction of the hull (platform), propulsion system and other associated machinery is normally about 20% of the total cost of the construction

program. This work is the easy, low risk, high productivity part of construction that invariably utilises modular construction techniques (often at remote sites). Large naval ships can be assembled in the open (unlike submarines that require covered/enclosed construction halls/hangars).

While the value of purchased equipment and systems in submarine, frigate and destroyer construction programs is about 70% of vessel costs, for a modern large naval vessel (such as a LPH or equivalent large multi-purpose lift/support ships) this figure would reduce to about 40 - 50% of vessel costs. Engineering and other services make up the balance of costs.

It is contended large naval vessels utilise similar construction techniques and production processes as their smaller cousins – the only significant difference is large naval vessels are generally less complex than destroyers, frigates and submarines. For example, because of cost and other commercial benefits involved, modular construction techniques were employed for both the construction of the Collins Class submarines and Anzac Class ships. Modular construction includes installation of machinery and plant, assembly, fit out and test and trials of sections of the vessel before final assembly. Thus the construction in Australia of large naval vessels would exploit and serve to maintain the current naval shipbuilding industry capability with attendant long term benefits for through life support of all naval vessels as well as future naval construction programs.

It is also contended that there is no economic proposition that would suggest the cost of Australian construction for a large naval vessel would be more expensive than an overseas construction program. Exceptionally, if Australia could find a design that matched its requirements and was already under construction for another navy, then economies of scale might be achieved.

While some overseas labour costs are less than comparable labour costs in Australia, such savings only apply to a relatively small sector of construction/total program costs and must be weighed against other incurred or resultant costs (eg, total cost of ownership on a whole of life basis). It is worth noting that while large tankers and bulk carriers of proven design are usually built in countries like South Korea, the construction of large passenger cruise ships and other large and more sophisticated purpose built vessels is now largely dominated by European shipyards where labour costs are relatively high.

The Collins and ANZAC programmes demonstrated that Australian Industry is competitive with international shipbuilders for cost and quality. Significant economic, strategic and a broad range of industry benefits were also obtained by constructing these vessels in Australia.

9. SHIPBUILDING INDUSTRY OUTLOOK

9.1 AUSTRALIAN NAVAL SHIPBUILDING

The continuing competitiveness of Australian naval shipbuilding relies on maximising opportunities for local construction thereby smoothing as far as practicable the ‘peaks and troughs’ of supply and demand. The construction in Australia of large naval vessels is therefore critical to both maintaining an ongoing capability and further improving its efficiency and productivity. By this approach, the industry will realise its goals of continuing to be price competitive, technically innovative, consistent in quality, reliable in supply and profitable. It cannot exploit and develop intellectual property, new technology, new ideas and new methods of construction and support if it is not profitable.

9.2 OVERSEAS SHIPBUILDING

The economic debate on the strategic need, merit or otherwise of constructing naval vessels in Australia is not unique – the UK, The Netherlands, France, Germany and the US have at various times reviewed and debated the need and the economic rationale for indigenous naval construction programs. The outcome is invariably determined by the assessed strategic importance of nurturing and maintaining the naval shipbuilding industry. Based on Australia’s strategic outlook (as foreshadowed in current and past Defence White Papers), defence industry is an important element of our defence capability. Naval shipbuilding is the largest component of Australia’s defence industry.

9.3 THE ADF’S ROLE

The ADF is held in high regard by a large sector of the international defence community. This is important in the context of the Australian naval shipbuilding industry and the role of the ADF as an ‘informed customer’ – the adage ‘a first class customer demands a first class product’ applies. This was clearly reflected in the success of the Collins Class program noting that ‘build to print’ utilising an existing overseas design is seldom a viable option having regard to Australia’s strategic environment and unique operational requirements.

9.4 THE USA AND UK SUBMARINE CONSTRUCTION EXPERIENCE

It is noteworthy that the US and UK with mature defence industries have experienced major challenges and difficulties in the design, development, construction of naval vessels (eg, UK Astute and Upholder Class submarines, USN Seawolf Class submarines) with resultant major schedule delays and cost overruns. Their experience applies to both platform and combat system elements. For example, the

Astute nuclear powered attack submarine project was reported in October 2004 to be over 3 ½ years late and GBP 1 B over cost.¹³

9.5 INDUSTRY OUTCOMES FROM THE COLLINS PROJECT

While the Collins Class submarines experienced a schedule delay of two years due to the time taken to resolve relatively minor design and equipment difficulties, the cost impact directly attributable to the design deficiencies encountered during sea trials was relatively small (some \$400M at Jun 93 prices or about 6% of project cost at Jun 86 prices) and well within accepted overseas project contingency margins for an equivalent construction program (normally 20% of project cost). Relatively little of this was due to construction quality. The Collins Class program therefore compares more than favourably with contemporary projects in a variety of countries – an endeavour that all Australians should note with pride.

In terms of overseas construction costs and experience, the efficiency and competitiveness of the Australian naval shipbuilding industry is on a par with its peers in the UK and US albeit Australia clearly does not have the in depth design and development capabilities of those countries.

The formula of Australian industry collaborating with overseas shipbuilders and combat system houses to construct naval vessels in Australia at internationally competitive prices is sound and proven. The economic and other benefits of this approach have also been clearly demonstrated.

Loss of or a reduction in of naval shipbuilding industry capability in Australia would be a major setback in the confidence, capacity and competitiveness of manufacturing industry generally in Australia.

The ADF as an 'informed customer' has a significant role in maintaining an ongoing, viable and competitive defence industry capability.

10 CONCLUSIONS

The underlying conclusion is that implementation of Australia's maritime strategy requires an ongoing indigenous capability to design, construct and integrate weapon

¹³ UK Parliament Select Committee of Public Accounts 43rd Report, 21Oct04.

and combat systems into warships in general and submarines in particular. The other conclusions that follow from this submission are as follows:

- Australia's maritime environment will become increasingly critical as a strategic and security issue, particularly in the context of energy and trade.
- Australia's maritime security needs are unique, thereby demanding innovative solutions.
- It will be a more demanding regime to operate in, with increased surveillance, anti surface warship and anti submarine capabilities deployed.
- Having regard to Australia's strategic outlook and maritime environment, a sophisticated submarine capability will remain a core defence asset.
- Preparation for the future submarine requirement now underway is critical to avoid repeating some of the difficulties encountered with the Collins project.
- Australia's requirements for the next generation of submarines will necessitate design development based on partnerships forged between Australian industry and overseas shipbuilders and combat system design houses.
- The resolution of the problems associated with Collins introduction into service and 'parent Navy' role for Collins through life support have established and will continue to sustain a core submarine design and integration capability.
- The future submarine requirement should be a factor in any consideration of Australia's future Naval shipbuilding capability.
- A major surface shipbuilding project can assist in sustaining the submarine design and integration base.
- The decision taken as a result of this inquiry could directly impact on Australia's options for design and integration of the future submarine solution.
- Construction in Australia of naval vessels (including the Collins Class submarines) generated significant economic and social benefits by creating jobs of high intellectual content. Other benefits include the prospect of ensuring adequate through life support of the vessels.
- The Collins and ANZAC shipbuilding programmes demonstrated that Australian Industry is capable of mobilising and developing the skills to establish and sustain complex naval shipbuilding programmes.
- The Collins and ANZAC programmes demonstrated that Australian Industry is competitive with international shipbuilders for cost and quality. Significant economic, strategic and a broad range of industry benefits were also obtained by constructing these vessels in Australia.
- The Collins Class program demonstrated that the cost of Australian construction equated closely to the cost of overseas construction.
- Australian industry involvement extends beyond the initial development/construction phase into training, setting to work, sea trials and through life support including design and development support, in depth repair, modification and ship/equipment upgrades and modernization programs extending over some twenty to thirty years.
- Australian industry is the major beneficiary of Australian naval ship construction programs.
- While some rationalisation of the Australian naval shipbuilding industry should be anticipated, the formula of Australian companies collaborating with overseas

shipbuilders and combat system houses to construct naval vessels in Australia at internationally competitive prices is sound and proven.

- The construction of large naval vessels in Australia would enhance the efficiency, competitiveness and future viability of the naval shipbuilding industry in Australia.
- Naval shipbuilding (including large, medium and small surface ships and submarines) is at the high value/high (smart) end of the technology spectrum and is regarded as a strategic asset, important to Australian security and increased self-reliance.
- Loss of or a reduction in of naval shipbuilding industry capability in Australia would be a major setback in the confidence, capacity and competitiveness of manufacturing industry generally in Australia.
- The ADF as an 'informed customer' has a significant role in maintaining an ongoing, viable and competitive defence industry capability.

11 RECOMMENDATIONS

The Submarine Institute of Australia recommends that the Committee should:

- Note the requirement for a future submarine capability, the high probability that this must be designed and constructed in Australia and importance of the lead in work that is about to get underway for this project.
- Note that the construction of major surface warships in Australia can assist in sustaining the key design capability for the submarine programme.
- Note the economic, strategic and wider range of associated industry benefits of constructing naval vessels in Australia as demonstrated by the Collins Class submarines programme.
- Note that the Collins Class submarine (and ANZAC Class ship) programmes demonstrated the capacity of the Australian industrial base to construct large and complex Naval vessels over the long term and on a sustainable basis.
- Note that the Collins Class submarine (and ANZAC Class ship) program demonstrated that the economic and productivity competitiveness of the Australian naval shipbuilding industry vis a vis other shipbuilding nations.
- Note that the Collins Class submarine (and ANZAC Class ship) program demonstrated clear economic, social and strategic benefits associated with the maintenance, repair, refit and modernization of complex naval vessels on a 'whole of life' basis
- Recommend to the Government that any future large naval vessels should be built in Australia.

President
Submarine Institute of Australia