

**TOPIC: The future of Australian naval shipbuilding**

**Introductory paper**

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The 2009 Defence White Paper outlined a significant expansion of Australia's naval force. As well as doubling (at least) the size of the submarine fleet, the White Paper describes a future Royal Australian Navy (RAN) that will operate a larger number of larger vessels than is currently the case. Including the Air Warfare Destroyer (AWD) and Landing Helicopter Dock (LHD) programs already underway, the total tonnage to be delivered in the next twenty-five years is over 265,000 tonnes. The corresponding figure in the previous quarter century is less than 150,000 tonnes.

The detailed acquisition plan for this ambitious program is still under development. But governments of both stripes have shown a tendency to favour Australian shipyards when acquiring warships. So it is a fair bet that a significant fraction of the future tonnage will be built and supported here. And through-life support necessarily requires in-country capability.

To some extent, shipbuilding has been something of an outlier in Australian defence materiel acquisition. Major equipment for Army and Air Force is increasingly being sourced from overseas, consistent with the evolution of the national economy towards participation in a free global market. But external sourcing of warships continues to be by exception—such as the fabrication in Spain of the LHDs.

What the future holds for the Australian naval shipbuilding industry is not yet clear. There are various strategies that could be adopted to ensure that the industrial capability and capacity required to support the planned naval expansion is in place when required. Essentially the question boils down to the extent to which the government sees fit, or feels compelled, to intervene in the market. At one extreme everything could be open to global competition (including the location of the building phases of various projects)—essentially trusting the market to deliver the expertise and capacity we will need. At the other extreme, we could move to a single national naval shipbuilder, perhaps along the lines of the situation in the United Kingdom, which is consolidating the remaining shipbuilders into a single entity operating with a strategic agreement with the Ministry of Defence.

For this forum, we invited a selection of writers from the federal and state government sectors, industry and elsewhere to provide their thoughts:

- The Defence Materiel Organisation
- The Defence Industry Unit of the Victorian Government

- Defence SA Advisory Board
- BAE Systems Australia
- Austal Ltd
- Henry Ergas
- ASPI's own Mark Thomson.

There is a range of views on exhibit here, but some common themes emerge: the challenge of delivering the Defence White Paper's planned expansion of the naval fleet, the need to manage the workflow for industry to avoid a 'boom and bust' pattern, and the need for Australian industry to be competitive in a global marketplace.

ASPI thanks our contributors for their efforts. We are sure that there will be much more written about naval shipbuilding as the White Paper plans start to take shape, but this should provide a good base for further discussion.

## **The future of Australian naval shipbuilding—a DMO perspective**

### *Defence Materiel Organisation*

*(The DMO's mission is to acquire and sustain equipment for the Australian Defence Force. DMO is Australia's largest project management organisation.)*

The 2009 Defence White Paper includes in its strategic direction a significant enhancement of Australia's maritime capabilities. The number, and size, of vessels in the Royal Australian Navy (RAN) will increase over the next thirty years to provide a major contribution to delivering government's expectations of Defence. Two major programs are already well advanced to deliver the *Hobart* class Air Warfare Destroyers (AWD) and the *Canberra* class Landing Helicopter Dock (LHD) in the middle of the coming decade. These two programs demonstrate the extent to which the Australian shipbuilding landscape has changed over the past thirty years, and indicate the issues that must be addressed to ensure the upcoming programs are delivered cost effectively and efficiently.

In the early 1980s dockyards were government-owned and operated, primarily to repair and maintain foreign built naval vessels. The government then forecast two significant maritime programs in the *Collins* class submarines and the *Anzac* frigates. The government-owned dockyards were ill-equipped for these two major programs due to their management and cost structures built up through highly subsidised, guaranteed work.

So began a process by government of divesting itself of industrial infrastructure to the private sector so that the efficiencies and rationalisation necessary for long-term sustainable industry could be achieved. Concurrently, government made the strategic decisions that both the *Collins* class submarines and *Anzac* frigates would be built in Australia based on credible and substantial bids by the private sector. From these decisions, the Australian defence industry landscape as we know it today arose, with significant investment by US and European multi-nationals and the growth of Australian Small to Medium Enterprises (SMEs) in support. Australian industry also gained the confidence to bid for, and win, additional upgrade and construction programs through the 1990s and 2000s.

The first decade of the 21st century has seen the maturing of Australian defence industry with the confidence to undertake complex programs, but increasing difficulty in growing and retaining the skills base necessary to deliver these programs. Thus Australian defence industry was able to win the most complex surface ship program ever undertaken by Defence in the form of the AWD project, while at the same time government found it necessary to split the LHD program to construct the hulls offshore and integrate the capabilities on-shore. Programs have been initiated to develop the skills and numbers in Australian defence industry to undertake the major investment programs that flow from the 2009 Defence White Paper. Whether Australian industry will have the capacity to undertake all the programs forecast will be

tested through the tendering processes to be undertaken over the next decade.

In the meantime, government, through the DMO, has commenced a program of reform in the ship repair and maintenance stream designed to provide certainty and predictability of workload to industry and define the infrastructure needed for long-term sustainable capability in ship repair and maintenance. This groundbreaking activity can begin to set the scene for Australian industry's capacity to undertake the full range of naval ship repair, maintenance, upgrade and new capability build over the coming years. While no acquisition strategies have been decided for the Future Submarine program, the replacement of the *Anzac* frigates, the construction of the offshore combatant vessels, and the replacement of the fleet oiler, these programs, combined with the significant continuing workload sustaining the existing fleets, represent a level of challenge for the Australian naval ship industry that has not previously been contemplated.

Government remains committed to achieving the best value for money for the Australian taxpayer through competition whilst ensuring the warfighter receives the level of capability in the timeframe needed. Through Defence and DMO, government continues to implement programs designed to maximise the opportunities for Australian industry to compete, and to ensure the maintenance of the industrial capabilities that provide the Australian Defence Force with an essential strategic advantage.

## **The future of Australian naval shipbuilding—Victorian Government perspective**

*Defence Industry Unit, Department of Innovation, Industry and Regional Development, Victorian Government*

*(The Defence Industry Unit operates within and draws upon the resources of the Department of Innovation, Industry and Regional Development to provide dedicated support to the defence industry in Victoria and to foster greater industry and government collaboration.)*

The Victorian Government welcomes the opportunities provided by the 2009 Defence White Paper for the future of naval shipbuilding. Victoria has a proud and successful history in naval shipbuilding and a proven capacity in this sector of defence industry.

In looking at the future of naval shipbuilding in Australia there is a need to address three challenges including two that were first identified by ASPI in 2002.<sup>1</sup> These are:

- supporting an Australian naval shipbuilding industry that is internationally competitive
- ensuring the industry does not face a boom or bust cycle
- let commercial forces decide how many shipbuilders we can support in this country.

### **International competitiveness**

The purpose in acquiring defence equipment is not to help sustain local industry; it is to provide the best possible capability for the Australian Defence Force (ADF) within budget.

The Defence objective of ensuring self-reliance does not necessarily require industry to build platforms in Australia. The higher the price paid for domestic construction, the less will be the capability delivered to the ADF. Therefore, it is vital that Australian shipbuilders demonstrate that they can build warships and submarines at competitive prices. Otherwise, they risk seeing them built overseas.

One of the keys to being internationally competitive in naval shipbuilding is having the highly skilled people needed to undertake the systems design and integration and construction of naval vessels. A good example of this is the BAE Systems Australia facility in Williamstown which is constructing the LHDs and modules for the AWD program. BAE is able to quickly supplement its workforce, proven on the *Anzac* Frigate and Project Protector programs that were delivered to international benchmarks, by drawing on a large industrial workforce and by tapping a well-resourced and responsive skilling pipeline.

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<sup>1</sup> Mark Thomson, *Setting a Course for Australia's Naval Shipbuilding and Repair Industry*, ASPI, August 2002. Available at [http://www.aspi.org.au/publications/publication\\_details.aspx?ContentID=34&pubtype=1](http://www.aspi.org.au/publications/publication_details.aspx?ContentID=34&pubtype=1)

Notably, the *Anzac* frigates were built with greater than 70% local industry content and only a very modest (less than 5%) premium compared to importing the vessels.

### **Avoiding boom or bust**

The future force structure set out in the 2009 Defence White Paper calls for 48 vessels to be added to the RAN fleet in the next twenty years. It is likely that many of these platforms will be constructed in Australia. Some of the programs, particularly the Future Submarine project, will involve significant challenges for the industry.

While this program for the next two decades appears to be substantial, it will not provide a smooth workload. There is a significant gap between 2016 and 2020 when the workload will be relatively light. This will cause problems for skills retention on the production side. There is also lumpiness in design requirements, which will challenge industry's abilities to keep skilled design teams together.

There are a number of possible ways to address these problems. On the design side, there seems no reason why work could not begin on the Future Submarine and Future Frigate programs as design work on the *Hobart* class winds down. The possibility of cooperating with Navantia, which generally uses US weapons and systems in its warships, in designing the next generation anti-submarine frigate also seems to be worth exploring. More broadly, if it were feasible to adopt a Navantia design for the Future Frigate platform it would also generate some significant savings because of commonality with platform systems being incorporated in the *Canberra* class LHDs and the *Hobart* class AWDs. It would also mean that Australian requirements could be built into the design.

DMO has suggested there could be benefit in replacing platforms after about twenty years rather than undertake expensive and high risk mid-life upgrades. While this may be appropriate in some cases, it would need to be evaluated on a case by case basis. In terms of the workload gap after 2016, this approach appears unlikely to solve the problem. Undertaking a rolling-build program with a high degree of commonality between platforms should be considered.

### **Maintaining competition**

Moving to a monopoly supplier is unlikely to enhance the international competitiveness of the Australian naval shipbuilding industry. Although Britain has moved to a single supplier and the more state-controlled European economies have long followed the policy of nurturing 'national champions', this does not mean that Australia should follow suit. There is no immediate need to contemplate moving away from a competitive model in Australia. At present we have several companies operating in the industry with a

reasonable workload. The future structure of the naval shipbuilding industry should be left to the market to decide.

There seems no reason at this stage for the government to force a single supplier solution on the industry and it is not at all clear that such an outcome would be in the national interest.

## **Conclusion**

The Defence White Paper presents policymakers with the challenge of providing the best capability to the ADF and supporting an Australian naval shipbuilding industry that is internationally competitive. If we maintain our competitiveness, avoid boom and bust cycles and sustain competition in the sector, there is no reason to think Australia will not have a long-term future in naval shipbuilding.

## **Naval shipbuilding: Australia's \$250 billion nation building opportunity**

### *Defence SA Advisory Board*

*(The Defence SA Advisory Board, chaired by General Peter Cosgrove AC MC, is charged with providing high-level strategy and policy advice to the Government of South Australia to promote the growth of Defence and defence industries in SA.)*

Note: Late last year *DefenceSA* released a discussion paper on the future of naval shipbuilding in Australia. This article is excerpted from that report, which is available at [this link](#).

The White Paper fleet will require at least 48 new vessels—in addition to the amphibious ship and Air Warfare Destroyer projects. The potential cost including through-life support will likely total \$200–\$250 billion. Compare this quarter-trillion dollar infrastructure investment to the \$8 billion (in today's dollars) Snowy Mountains Scheme and the nation building potential inherent in this naval expansion is obvious.

One of the greatest challenges will be the Future Submarine project. That we are able to contemplate what is possibly Australia's most complex and sophisticated industrial project speaks volumes for the competency and capacity of Australian industry today.

The government's aim is to complete as much of this work as possible in Australia. We are well-placed to build on successful previous projects, but the sheer volume of future work means that we cannot rely on things 'being right on the night'. A rigorous examination of current structural issues and policy settings is required.

The massive scale of investment over the next thirty years creates the opportunity, indeed the need, to revolutionise the efficiency and cost-effectiveness of naval shipbuilding and through-life support. There is no question that developing, realising and sustaining the Navy of the future will be a major industrial challenge. If properly managed, with a coherent overarching view of the naval shipbuilding sector, the effort can be leveraged into a sustainable strategic national industrial and skills capability which will flow through to other 'high tech' industries and form the basis of an enduring capability for Australia.

Australia has a good success record in delivering major naval programs, but new projects have sometimes had to relearn hard-won lessons, and skilled workforces have had to find work elsewhere because of a 'stop-start' approach. We have been good at putting the right team in place to produce a quality outcome for specific projects, but less good at retaining them for the next one.

The quest for best practice necessarily involves an evolution of business models used for major naval shipbuilding projects. Improvements to current models might be implemented at two levels.



Firstly, the skills base required to build new ships strongly overlaps those required to support them through-life. It is highly desirable to manage work flows in order to retain essential workforce skills. Boom and bust models do not work well in a sector that requires high levels of individual and team-level expertise and experience.

Secondly, the effectiveness of the Australian market at the prime contractor level needs testing. The performance of Australian shipyards has sometimes been world class; at other times it has fallen short. But data is patchy and there is no consistent benchmarking. A study that provides a 'ground truth' on Australian performance against international standards could provide the base required for rational decision-making.

Noting the established trend towards rationalisation of the shipbuilding sector, it may no longer be in Australia's best interests to maintain several primary contractors. We could consider following the British Government's lead in opting for a single naval shipbuilding prime contractor—this potentially offers best value for Australia.

It would be necessary to ensure transparency and competitiveness. The apparent reduction in competition in a sole shipbuilder model could be more than offset by more innovative program and contract arrangements, with the requirement to competitively subcontract out the majority of the prime contract value (say ~80%) over the life of the contract, including ships' modules. Also, incentive and capability payments could be structured to promote world's best practice. One way would be to integrate into the single shipbuilder a Platform System Engineering Agent (PSEA) which would supply subcontractors with platform designs and manage configurations. It could also monitor subcontractor performance, using the best results of each to improve performance in others.

The single shipbuilder model is not the only possibility. An alternative is consolidation below the prime contractor level. A single national PSEA could work with a number of shipbuilders to supply platform designs and configuration management across the sector, allowing for further consolidation of systems throughout the fleet. The critical element is to achieve the right balance of industrial and commercial know-how with the needs of the government to deliver the required level of capability. This suggests that early decisions are needed on how this will be achieved.

As well as reform of the shipbuilding sector, the fleet composition will impact overall build program efficiency. Consideration should be given to procurement of fewer classes of warships with greater equipment commonality, built in greater numbers and preferably through rolling-build programs.

Building more units allows fixed costs to be amortised over a greater number of hulls. Also, production efficiency improves as the workforce gains experience with the design. This might mean for example that it would be advantageous to build more than three AWDs to provide at least some of the

hulls for the future surface combatants. Alternatively, the future surface combatants could be the start of a continuous build run.

Beyond acquisition, government's recent decision to move to long-term single performance based contracts for major fleet repair and maintenance activities is a key forward step. There are potentially greater savings to be achieved in the sustainment phase through greater commonality. Entire budgets for duplicated costs can be avoided in support activities such as training, land-based test systems, certification, configuration control and stores management if one class of warship can replace multiple classes. This would be the optimum scenario, but the same sort of savings would be accrued if common systems are used in visibly different types of warships and other naval vessels.

The government's proposed program of naval shipbuilding is of immense national importance—the \$250 billion public investment is unprecedented. Properly managed, the rewards could be far reaching. Not only could we build a strategic and enduring national naval shipbuilding capability, but also in the process boost the Australian economy and the national skills base, and promote local innovation.

This is an ambitious, but achievable program. What is needed now is the vision and policy direction to achieve a 'whole of nation' solution.

## **The future of Australian naval shipbuilding**

### *BAE Systems Australia*

*(BAE Systems Australia is Australia's largest defence company and is involved in providing capability solutions across the aerospace, land, maritime and joint domains.)*

The 2009 Defence White Paper outlines an ambitious program of growing and replacing Australia's naval fleet. Over the next twenty years, the Navy will introduce vessels into service at the greatest rate since the Second World War. This presents a unique opportunity for Defence and Industry to work together strategically to maximise the benefits to defence, industry, the economy and the community, whilst securing a sustainable future of a globally competitive national capability.

With three Air Warfare Destroyers and two Landing Helicopter Docks currently being constructed, the White Paper identifies a further 12 Future Submarines, 20 Offshore Combatant Vessels, 8 Future Frigates and a range of Amphibious Sustainment and Support vessels to be built before 2030. The acquisition cost of these vessels is conservatively estimated at \$60 billion, with a further \$200 billion in follow-on through-life support.

Shipbuilding is a capital and labour intensive industry that operates over a long cycle time. To obtain acceptable returns on the large capital investment costs for a modern shipyard with equipment capable of supporting world class productivity, long-term high volume throughput is required. The development of a highly skilled and productive labour force with practical hands-on experience occurs over many years. World class productivity levels are established over time through an embedded culture of continuous improvement that integrates engineering, the supply chain and production methods. This is underpinned by long-term research and development to mature and embed future technology.

Defence's historical approach to procurement assumes that they can procure naval capability when needed. This results in Navy's procurement program being either boom or bust for industry. In Australia, with a single customer and a relatively small industry base, the competitive tendering of a small number of very high value contracts results in a poorer outcome for all stakeholders. This high stakes environment produces winners and losers for companies and communities, and sub-optimal outcomes for Navy and government.

In this environment, industry will not risk long-term investment decisions until there is contractual certainty. Only after winning a contract will the successful company invest in facilities creation or upgrade programs that can be charged to that project. Workforces are mobilised and trained, and shipbuilding processes are created or, in some cases, dusted off and relearned. This reactive and short-term approach introduces complexity while the project proper is mobilising, setting the tone for the project and resulting in increased project risk, lower productivity levels and increased cost. At the end of the project, the workforce is downsized, the facilities underutilised and the productivity levels achieved over the project lost. Australia has seen this happen through the *Anzac Ship* and *Collins Submarine* programs.

The Naval shipbuilding program outlined by the government is a nation building opportunity with an average annual industry spend of over \$5 billion. This provides a clear choice—the government can either work with industry to develop a procurement program matched to the capacity of Australian industry and encourage the long-term investment necessary for shipbuilding, or put a large portion of the \$60 billion into overseas economies and shipyards that have the capacity and enjoy levels of productivity that make them more competitive.

By managing demand, sizing the shipbuilding industry accordingly, and working in partnership with industry to develop certainty, all parties can confidently make the long-term commitments to deliver each the optimal outcome. Each stakeholder will benefit as follows:

- Navy will be delivered more capability for their investment. Being developed in Australia, the capability will be easily tailored and more supportable through-life, conferring greater self-reliance.
- Defence Materiel Organisation will enjoy reduced program risk and improved schedule and cost performance. Value for money will be achieved through a partnering approach that benchmarks productivity and drives down cost of ownership.
- The community will receive an economic benefit of up to \$117 billion in national output and 613,000 jobs over twenty years<sup>2</sup> in the acquisition phase. Modern modular shipbuilding technology will allow this benefit to be distributed nationally, rather than confined to a single region.
- The government will achieve a significant balance of payments outcome, direct economic benefit, sustainment of regional communities, improved education, training, skills and reduced welfare expense. Export opportunities will improve with increased shipbuilding and adjacent industry competitiveness.
- Industry will be able to invest confidently, develop and guarantee their workforce, build strategic supply chains, improve productivity, and invest in research and development to deliver a sustainable and globally competitive capability with a fair shareholder return.
- Adjacent industries that supply commercial systems into naval shipbuilding will benefit from the increased volume, improving their productivity and competitiveness in adjacent markets.

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<sup>2</sup> Impact of Major Defence Projects: A Case Study of the *Anzac* Ship Project, Australian Industry Group, February 2000, p44 identifies that for each additional \$100 million spent in Australia by the government generates \$195 million in national output and 1022 jobs per annum.

The nation building opportunity that is afforded by the Defence White Paper can only be achieved through a partnering approach of each of the key stakeholders that balances the long-term nature of shipbuilding investment, the needs of Navy, and the benefits that can be delivered to Australia. Ultimately, by managing demand and providing long-term certainty to all stakeholders, in the framework of delivering clear strategic value for money for Australia, a sustainable and globally competitive shipbuilding industry can be developed. This will deliver more benefit at a lower cost to Navy, Defence, government, Australian communities and industry.

## **Can the Australian industrial base construct large naval vessels over the long term on a sustainable basis?**

### *Austal Ltd*

*(Austal Ltd is a designer and builder of aluminium commercial and defence vessels, with shipyards in Western Australia and the United States. Its current work includes the construction of Joint High Speed Vessels for the United States Navy.)*

The Defence Capability Plan released by the Australian Government in 2009 lays out an ambitious acquisition plan for the Royal Australian Navy (RAN) for the next twenty years. This includes 12 submarines, 3 Air Warfare Destroyers, 20 Multi-Role Vessels and 8 Future Frigates. The Australian naval shipbuilding industry does not presently have infrastructure and production personnel on the scale required to support economical construction of large naval vessels on a sustainable basis. If this capacity is developed, its long-term sustainability would, in the absence of significant ongoing Australian Government support, rely on the ability of the industry to secure contracts for other large commercial and naval vessels.

The Australian industry has proven itself to be highly competitive in the niche field of aluminium vessel design and construction, with Austal achieving significant naval vessel construction experience in support of both the RAN and the United States Navy (USN). However, Australian shipbuilding is not cost competitive for the construction of steel ships. This has been the case for some decades and resulted in the demise of the industry despite (then) substantial government support. Austal believes that the Australian shipbuilding industry could not successfully and sustainably compete in the future in either the commercial or naval markets for large steel ships for the following reasons:

The global *commercial* steel shipbuilding market:

- The technology associated with the great majority of large steel ships for commercial applications is relatively simple, mature and well understood, leading to contracts being awarded on the basis of price and delivery times. As a result, global shipbuilding has steadily migrated to countries with lower labour costs and mature manufacturing process control. Without the technology advantage that applies in the aluminium sector, the Australian industry would not be able to compete with the well-established, highly productive shipyards in other parts of the world.
- There is a limited market for steel ships that involve more sophisticated technology and specialist skills. The demand for these ships is not, however, expanding significantly whereas the capacity to produce them continues to grow. As international shipyards lose their cost competitiveness on simpler vessels they migrate into new markets. (The Australian aluminium shipbuilding industry itself faces emerging competition from

existing shipbuilders attempting to develop their aluminium capabilities.)

The global *naval* steel shipbuilding market:

- While the international naval sector requires sophisticated ships, the sophistication lies almost entirely in the design, installation and integration of the ship systems, not the design and construction of the ship's structure. This generally encourages nations, even those with limited shipbuilding capacity, to favour construction of the vessel in a domestic shipyard even though this may result in a more costly, lower quality, less timely solution. The justification for this is generally based on the notions of maximising local economic benefit, industry development and/or strategic importance. This approach has been illustrated most recently in India where their domestic naval shipbuilding capability has grown rapidly, but is unable to match the quality and schedule required by their Navy.
- In contrast, the ship systems are usually acquired from recognised weapons and sensor manufacturers with suitable systems. Contractors based in the United States, Europe or Russia supply and integrate these systems (using supervised local labour for the less complex tasks).
- Most nations with budgets sufficient to purchase and operate 'state of the art' naval platforms have shipyards with the capability to construct the ship's structure, and do so within a similar or better cost, quality and delivery performance than the Australian industry could reasonably be expected to offer.
- There are few nations that would consider the purchase of a naval platform from an offshore supplier without some significant domestic content. In many recent acquisitions the first of class vessel was constructed in whole or in part by the original manufacturer, with a significant technology transfer arrangement enabling the remaining vessels in the class to be substantially constructed domestically. Few nations consider purchasing large combatant vessels from overseas. So there exists a large number of potential builders—particularly for the ship's structure. Most of these builders would be able to produce the vessels at lower cost than Australian industry.

For the above reasons, Austal does not consider that Australian industry could realistically expect to secure export orders for locally-built large naval ships and, therefore, that such an industry would not be sustainable in the long term without some form of government support. (In the form of government-funded contracts not open to international competition and/or subsidies or other direct fiscal support measures.)

The lack of depth in the Australian defence sector is evidenced by the fact that the government has felt the need to identify Priority Industry Capabilities

which will require some level of government support to be developed or maintained in Australia.

There is, however, a vibrant international market for smaller naval platforms, such as patrol boats, which are not perceived as significant capital investments. Programs of this size would not typically necessitate significant domestic infrastructure investment by the government customer. Austal remains active in this market.

For the specialist area of aluminium vessels, Australian industry has proved competitive. The generally higher cost of producing the vessels in Australia is offset by the Australian industry's superior design technology<sup>3</sup>, construction quality and established reputation.

The Australian shipbuilding industry has been able to utilise previous research and development incentives to build a number of niche positions in the world aluminium shipbuilding markets, for example, the USN Littoral Combat Ship and Joint High Speed Vessel programs. This has created significant direct and indirect employment opportunities for Australians. The existence of world-competitive local manufacturers producing specialist products (including life rafts, seating, windows, interior panelling) for high speed aluminium vessels also assists the Australian industry's overall competitiveness.

The construction of large steel naval vessels may have negative effects on the existing Australian shipbuilding industry through the pressure such activities would have on the skilled workforce (both trades and professional) which has largely been responsible for the success of the existing industry. The labour resource is already under very significant pressure and with current predictions for a growing resources industry is likely to get worse. Additional pressure on wages and the loss of skilled workers may significantly erode the competitive advantage that Australia's aluminium shipbuilding industry currently possesses.

Austal believes that Australia should be cautious about investing in a naval shipbuilding sector that may not be economically sustainable in the longer term. Instead we should continue to focus on those aspects of shipbuilding where we have proven capability and an existing competitive advantage. Attempts to boost an uncompetitive sector are likely to deliver disappointing results.

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<sup>3</sup> Australian design technology has been exported for many years. For example, the vast majority of the United States fast ferry fleet is made up of Australian designs built at US shipyards.



## Building the fleet of the future

Henry Ergas

*(Henry Ergas is Senior Economic Adviser, Deloitte Australia. He was an economist at the OECD in Paris from 1978–1993, serving as Counsellor for Structural Policy in the Economics Department. Since then, he has acted as a consultant to a wide range of governments, regulators and corporations. He chaired the Intellectual Property and Competition Policy Review Committee for the Australian Government in 1999–2000, and was a member of the Prime Minister's Export Infrastructure Task Force in 2005 and of the Defence Industry Policy Review in 2006.)*

*The views expressed in this contribution are those of the author, and should not be imputed to Deloitte or any of its clients*

Decisions about where production of the future fleet is undertaken should be made on the basis of securing value for money, without giving any special preference to Australian industry, other than where that preference is a way of acquiring defence outputs that are valued in themselves. To the extent to which there are such outputs, they should be separately identified and costed, and should be taken into account only where securing them as part of the acquisition is the most efficient way of ensuring their supply. Rigorous implementation of this principle would likely lead to a substantial increase in the share of vessel construction and refurbishment work undertaken overseas, reducing the gap between naval and other military platforms in terms of their reliance on imports.

Before turning to a more detailed justification of this position, it is useful to start by noting that the cost of constructing military vessels has increased substantially in real terms over the years. A reasonable estimate of the real rate of increase in vessel prices for the US Navy is in the order of 7% a year; for Australia, the rate of increase is perhaps somewhat lower—in the order of 3 to 4%—though the estimate would be greater were the full cost of the *Collins* class submarine program taken into account. The main factor increasing production cost is rising vessel complexity, which involves not merely more sophisticated weapons and control systems, but also changes in vessel structure (such as complicated shapes and ever greater use of new materials) that are aimed at increasing survivability and reducing the vessel's signature.

One result of this trend is increasing divergence in construction and operation costs between military and commercial vessels, though that divergence is less marked for ancillary vessels (such as those used for coastal surveillance operations) than for combatants. In commercial vessels, the broad trend is to securing scale economies in design and construction while increasing capital efficiency by shortening production times; for military vessels, numbers produced are very small, design and production remain highly dependent on skilled labour, and production and testing times are long and becoming longer. As the rise in unit costs hits budgets that are more or less capped, volumes shrink, causing further increases in unit costs while reducing the number of military shipyards that can achieve any economies of scale.

Despite these worldwide trends, Australia has tended to rely on domestic sources for military shipbuilding, with relatively limited exceptions such as the hull for the LHD. This reliance on domestic sources has involved providing very high levels of protection to Australian naval shipbuilding. The best measure of the extent of that protection is the effective rate of assistance (ERA), which is a standard indicator of the effective subsidy to domestic value added. The Productivity Commission, which each year estimates ERAs for Australian industries in its *Trade and Industry Review*, explains that:

*'[ERAs] provide an indication of the extent to which assistance to an industry allows it to attract and hold economic resources. That is, where there is some competition between industries for resources, those industries with relatively high effective rates of assistance are more likely, as a result of their assistance, to be able to attract resources away from those with lower rates.'*

The ERA for Australian construction of the Air Warfare Destroyer is in the order of 30%; for the LHD, even taking account of overseas sourcing of the hull, it is closer to 50%. Since what matters with ERAs is the dispersion (i.e. the extent of the difference between the ERA for the activity at issue and that for other activities), it is useful to note that in 2007–08, the ERA for the next most highly protected industry—textiles, clothing and footwear—was in the order of 13%, while that for motor vehicles and parts was 12%. Assistance to these activities—which are usually regarded as highly protected compared to manufacturing as a whole (whose ERA is less than 5%)—was therefore far lower than that provided to naval shipbuilding.

It is against this backdrop of very high levels of assistance that future sourcing decisions need to be considered. Australia's primary interest is in ensuring the fleet has a sufficient number of vessels at a reasonable level of readiness to meet defence needs (including for uses such as disaster relief and peacekeeping). High unit costs of production and operation make that objective more difficult to achieve and are likely to force reductions in fleet capacity. A focus on value for money in acquiring the future fleet therefore protects the interests of taxpayers and the community, not only by preventing waste but also by making it more likely that the defence force will have access to the assets it requires. It follows that if vessel costs for given quality are minimised by sourcing production overseas, then overseas sourcing should be used.

Of course, there may be instances in which value for money is best secured by relying on domestic sources. This is likely to be true for ongoing maintenance and possibly for some refurbishment, though the inherent transportability of the platforms means the cost-effectiveness of domestic sources would need to be seriously tested (for example, by seeking bids for undertaking the work from foreign shipyards). To the extent to which local maintenance skills were required, it seems unlikely that securing them would necessitate local construction of the vessel itself. Put slightly differently, the economies of scope between construction, fit-out and maintenance are not substantial. This means that it could well be cost-effective to separate the location of initial construction from that of sustainment, as occurs for many other defence assets.

The argument conventionally put against carrying out construction overseas is that this would endanger critical defence industry capabilities. However, it is not clear what the capabilities that would be so endangered are. Even if there were such capabilities (which are more likely to be for equipment such as sonar than for the vessels), it is probably far more cost-effective to contract for them directly. Thus, if there is a requirement for spare capacity to be held or for skills to be retained in readiness, contracts for capacity or skills could be used to this end. More generally, the principle should be that where insurance in the form of guaranteed access to physical or human capital, or more broadly to technical capabilities, is required, the various options for obtaining that insurance should be market tested, and the most cost-effective option chosen. As well as allowing value for money to be obtained, this would have the virtue of greater transparency and accountability.

It is sometimes also claimed that there are 'spill-overs' to local construction, in the sense that undertaking production locally reduces costs (or increases quality) in other activities, without the activities that benefit making any explicit payment to government for this gain. (The spill-over is, in other words, an externality, i.e. a benefit given or cost imposed without a market transaction.) While this is not impossible, there is little evidence of such spill-overs (and even less that they are policy-relevant<sup>4</sup>), and account must also be taken of the possibility that serving military markets may inculcate a corporate culture and workforce attitudes poorly suited to competing in the commercial world—a negative spill-over. Additionally, even if there were positive, policy-relevant, spill-overs, the question would be whether they were most cost-effectively obtained through local production, as compared to (say) relying on targeted subsidies for skill development. Given the substantial cost penalties local production seems to involve, targeted subsidies, even if less effective, may be more efficient. Lastly, even if overseas sourcing were to lead to any positive spill-overs being entirely lost (rather than secured by other means), the gain to Australia from the resulting cost saving may still be far greater than the value of any forgone spill-over benefits.

Similarly, it is frequently claimed that local production is preferable to overseas sourcing because of the tax revenues local production generates. Perhaps a better form of this claim is to say that in comparing the cost of domestic and overseas sources, the cost comparison should be made netting off, from the cost of domestic supply, any taxes that would be paid. (So that if domestic shipbuilding cost \$500 million, of which \$50 million was accounted for by taxes, the cost for comparison purposes should be \$450 million.) However, this is only correct if the resources being used (say, the skilled labour) would otherwise be unemployed (thus generating no tax revenues), or employed in uses which generated lower tax revenues. This is highly unlikely. Rather, the more likely case is that the same tax revenue would be secured from alternative uses of the resources. In that event, any taxes paid in the domestic shipbuilding activity are part of the opportunity cost of that activity (in the sense that if domestic shipbuilding were not undertaken, the alternative use of those resources would pay the taxes). As a result, domestic shipbuilding should only be undertaken if it is capable of paying those taxes, from which it follows that the taxes should be included in the cost comparison.

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Spill-overs are only policy relevant when, in the absence of intervention, they would lead to too much or too little of an activity being undertaken. Demonstrating that a spill-over is policy relevant requires not merely showing that it exists, but that without corrective measures, too little or too much of the spill-over would be obtained.

Matters are somewhat more complicated for indirect taxes (such as duties on imported components). However, most of the materials used in naval shipbuilding are probably exempt from tariffs under the Tariff Concession System, either because they are not produced locally or because they are being imported under a government contract. As a result, there will, in the usual case, be no (or only minimal) tax revenue advantage from local production, and certainly not one sufficient to offset cost penalties of the magnitude set out above.

Conversely, and for the sake of completeness, it is worth noting that it is sometimes argued that using skilled labour in defence production will 'crowd out' more valuable uses of those resources, for instance in mining. This argument is incorrect, at least if the implication is that there is a cost to using those resources—in the form of contraction of other uses—*above and beyond* the amount paid for them. Rather, in a well-functioning labour market, the amount that must be paid to attract skilled labour will measure its cost, in terms of forgone output, in other activities. To that extent, any such 'crowding out' is already reflected in the input price. Indeed, it is for this reason that a domestic cost penalty (in the form of the 30% ERA) signals that the resources at issue are being withdrawn from more productive uses.

What is correct and important, however, is that defence procurement is tax funded. Simply put, each dollar spent on defence equipment is a dollar that must be raised in tax. Raising a dollar in tax transfers a dollar from the taxpayer to the government but also distorts the taxpayer's decisions, for instance by inducing a reduction in hours worked or in the incentives to save. That distortion imposes an economic cost (the so-called deadweight loss or excess burden of taxation), estimated at anywhere from 3 to 71 cents for an extra dollar of revenue, with the most widely accepted estimate being in the order of 30 cents. What this means is that when two dollars are spent producing in Australia defence equipment that could be purchased for a dollar overseas, the loss is not merely the waste of \$1 worth of resources (that could be put to some other use) but also of 30 cents of distortion created by raising that wasted dollar in tax. In other words, each \$1 of excess cost may cost \$1.30 in economic loss.

Given that the excess costs, calculated over the entirety of the future fleet program, are likely to amount to many billions of dollars, the resulting loss to Australian society from protecting domestic military shipbuilding could be extremely high. There is also the loss, more difficult to quantify but no less real, should the high cost of building ships in this country force us to under-dimension the fleet or in other ways miss out on platforms that most fully meet Australia's needs. Unless credible offsetting benefits can be identified, and they have not been identified to date, the case for continuing the current preference for domestic production must be very weak indeed.

## **A modest proposal: do our homework**

*Mark Thomson*

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A review of the Defence SA paper excerpted elsewhere in this forum: *Naval Shipbuilding: Australia's \$250 billion Nation Building Opportunity*, DefenseSA Advisory Board, 2009, 84 pages.

Late last year the South Australian Government's defence advisory board, DefenceSA, released a [discussion paper on the future of naval shipbuilding in Australia](#). And while the [executive summary](#) explicitly favours concentrating shipbuilding in South Australia, the report itself is somewhat less parochial. Indeed, the Paper is a thoughtful and well-researched effort which should be mandatory reading for anyone interested in naval shipbuilding policy.

The Paper examines alternative commercial and industrial arrangements for meeting the demand for vessels outlined in the 2009 Defence White Paper. Given its parentage, it's understandable that the Paper gives scant attention to buying vessels from overseas. This is a regrettable omission (as Henry Ergas' contribution to this forum makes clear). Aside from this, however, the Paper is balanced. Specific issues canvassed include the comparative efficiency of competitive versus regulated monopoly supply, and the merits of 'rolling-build' programs that would see the continuous production of vessels.

Despite the Paper's relative objectivity, it's clear that the authors are sympathetic to particular approaches. The proposal that has gained most attention is that to make the SA-based ASC the sole naval shipbuilder for the nation—not as a single vertically integrated monolith but as a prime contractor managing distributed subcontractors. Such a proposal is not outlandish. Other countries have already moved to consolidate their naval construction in a similar manner to generate economies of scale while retaining competition at the second tier.

The argument for this proposal is simple enough. There is insufficient demand to support effective competition for naval construction in Australia—not even a duopoly is practical—so we should move to a monopoly at least at the prime contractor level. The critical assumption is that the economies of scale and continuity of a single shipbuilder will outweigh the periodic benefits of competitive contracting.

Such a proposal deserves consideration, but the onus of proof must be on its proponents. Past experience with government-owned shipyards in Australia was disappointing to say the least. By the 1980s the government was ordering frigates from the United States rather than give work to its own yards. And recent troubles with submarine maintenance give little confidence that Defence can effectively regulate a long-term monopoly supplier.

If there is an argument for creating a monopoly, it is also finely dependent on the level of demand. Above some upper threshold, demand is sufficient to sustain

multiple suppliers. Below a lower threshold, demand is insufficient to justify a monopoly shipbuilder because gaps in production erase economies of scale, especially if successive programs are of disparate types. (Consider, for example, the extreme case of building a single ship every ten years.) Even with Australia's increased future naval demand, we arguably might still be below that lower threshold.

Perhaps this is why the Defence SA Paper also explores reducing the working life of vessels to allow rolling-build programs. This, we are told, would also avoid the need for risky mid-life upgrades and allow workforce skills to be retained. Well it might, but it is likely to come at a hefty price. While some countries have adopted this approach, it looks more like industrial paternalism than efficient procurement. The global trend for the past sixty years has been the opposite; as the unit cost of assets has grown, assets have been kept in service longer.

To some extent, the question of rolling-builds is hypothetical; even if future governments somehow find the money to build 12 submarines and 20 offshore vessels, they will not seriously consider a rolling-build until near the end of those programs. The question of surface combatants is more interesting. The Paper suggests that the current Air Warfare Destroyer (AWD) program could subsume the Future Frigate project. Although this would require fitting a different mission package (omitting the *Aegis* system and perhaps adding an additional hangar), the government would be ill-advised not to explore the proposal in detail.

Perhaps the strongest proposal in the Paper is also the most modest. Although it never says so explicitly, the report repeatedly extols the government to do its homework. Whether it's benchmarking the productivity of Australian shipyards or comparing the economic arguments for different industrial approaches, the report encourages the government to take an evidence/analysis based approach. On this point there can be no argument; there is too much at stake—financially and strategically—to simply take a punt on the way ahead.

The ball is now in the federal government's court. The South Australian Government has produced a paper to 'promote a broad, informed and analytical discussion about naval shipbuilding in Australia' and has done a good job of it. The federal government should now explain their thinking about naval shipbuilding so that stakeholders and taxpayers can see what they have in mind.